

Conference Proceedings

Transforming India 2030:

Strategies for Sustainable Development Goals

Editors : Jyoti Chandiramani • Ranjan Kumar Dash

This book is the proceedings of an International Conference, "Transforming India 2030: Strategies for Sustainable Development Goals", organised by the Faculty of Humanities and Social Sciences, Symbiosis International (Deemed University), Pune (India). The three-day conference attracted research papers contributed by faculty, students and practitioners - providing multiple and diverse perspectives to the various themes. The papers received critical comments from a very illustrious panel of experts.

The book is divided into five tracks, which formed the theme of the conference which are Poverty and Inequality, Education and Gender, Sustainable Cities, Jobs and Economic Growth and lastly, Partnership for the Goals. The multifaceted feature of the tracks and the respective goals allowed the contributors to purview papers on various attributes related to the goals.

The 26 papers included in the book will indeed acquaint the readers with the larger theme of the conference.


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Transforming India 2030:
Strategies for Sustainable Development Goals

International Conference

Transforming India 2030: Strategies for Sustainable Development Goals

Organised by
Faculty of Humanities and Social Sciences

Pune, India 15-17 February 2017

Conference Proceedings



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Capital Publishing Company

NEW DELHI

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Capital Publishing Company
7/28, Mahaveer Street, Ansari Road
Daryaganj, New Delhi 110 002

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Editors:

Prof. Jyoti Chandiramani
Director, Symbiosis School of Economics (SSE)
Dean, Faculty of Humanities and Social Sciences

Dr. Ranjan Kumar Dash
Assistant Professor, Symbiosis School of Economics (SSE)

Publication Team: Vaibhavi Pingale

ISBN: 978-93-81891-64-3

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Typeset by Innovative Processors, New Delhi
Printed in India.

Preface

The idea of gauging the economy's well-being, or the Gross Domestic Product (GDP) was put forth by Simon Kuznets back in 1934, in the aftermath of the Great Depression. Since then, GDP has become an iconic policy variable. However, the shallowness of this measure was understood better by Kuznets than any other. He acknowledges that "welfare of a nation can, therefore, scarcely be inferred from a measurement of national income."

It's been a long development journey since 1934, and many an economist, besides social scientists and statisticians world over have tried to come up with a measure of development that is reflective of more than merely the value of goods and services produced in the economy. The efforts over the decades concentrated on measurements of the well-being of people. The Human Development Index (HDI) of 1990s, sought to do just that, bringing the condition and state of human mankind to the centre-stage of policy discussions. The HDI included parameters such as life expectancy (health), education, and per capita income (standard of living) indicators, which are used to rank countries into four tiers of human development. In line with this world view, the turn of the 21st Century witnessed the Millennium Summit of the United Nations, culminating in the adoption of the Millennium Development Goals (MDGs) comprising eight international development goals pertaining to human development, environmental sustainability and development of the global partnership. They were instrumental in steering unprecedented efforts to meet the needs and challenges of the world's poorest and addressing the issues of poverty and inequality. However, the goals weren't free from criticisms. In particular, it was felt that the framing process did not see adequate involvement by developing countries, and the goals were not adapted for feasibility and did not pin responsibilities appropriately.

At the end of 2015, the MDGs have been replaced with an alternate framework for addressing the future development of humankind. The Sustainable Development Goals (SDGs) were agreed upon at the Rio +20 Summit (United Nations Conference on Sustainable Development) in 2012 and have been developed with a view to addressing the future of mankind. The SDGs are expected to adopt an approach that integrates the economic, social and environmental dimensions and concerns, which form the very core of sustainable development. They are composed of 17 goals and 169 targets, each intertwined with the other, thus recognizing the need to not compartmentalise development. The goals engage with poverty, hunger, health, education,

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jobs and economic growth, infrastructure, innovation, sustainable cities and communities, responsible consumption, clean water, energy, climate change, sustainability of oceans and terrestrial life forms, and peace and partnership for development cooperation.

In the words of UNDP Administrator Helen Clark, “This agreement marks an important milestone in putting our world on an inclusive and sustainable course. If we all work together, we have a chance of meeting citizens’ aspirations for peace, prosperity, and well-being, and to preserve our planet.”

The development strategies being adopted by India to commemorate the 75 years of independence – Amrut Mahotsv (2022) – and towards the commitment to realising the SDGs, will ensure that the onward journey will be decisive with a strong intent to ensure for its people a more liveable, secure and sustainable future.

Prof. Jyoti Chandiramani

Dean, Faculty of Humanities and Social Sciences
Symbiosis International University

Acknowledgements

“Transforming India 2030: Strategies for Sustainable Development Goals” is an outcome of our efforts to collaborate with Niti Aayog and the special efforts taken by Dr. P.K. Anand (Advisor) and his team. We also express our deepest gratitude to United Nations Information Centre for India and Bhutan (UNIC) and the support extended to us by Mr Rajiv Chandran. Research and Information Systems for Developing Countries (RIS) the leading think tank - Ministry of External Affairs under the dynamic leadership of Prof. Sachin Chaturvedi, has always recognised the importance of collaborating with academia and the need for capacity building for common research areas. Sustainable Development Goals is one such area where Symbiosis International University and RIS work together. The financial assistance received from Research and Development Fund of National Bank for Agriculture and Rural Development (NABARD) towards printing of proceedings of the conference is gratefully acknowledged.

We would like to acknowledge the Chairs and speakers across all tracks who individually and collectively were responsible to raise the level of the discussions and deliberations by providing valuable insights and rich contributions with regard to poverty, inequality, education, gender, jobs, growth, sustainable cities, partnerships – in short the select sustainable development goals and their challenges.

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Track 1: Poverty and Inequality

Households' Toilet Facility in Rural India: Socio-Spatial Analysis

Arjun Kumar

Impact and Policy Research Institute, Saket, New Delhi – 110007
arjunkumarresearch@gmail.com

Introduction

Recognizing that greater progress on sanitation is essential for fighting poverty, ensuring proper health to all and for achieving all the Millennium Development Goals (MDGs), the United Nations (UN) has renewed its commitment and determination on 'Target 7c' (which exhorted the nation states to commit to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation) to make a headway towards progress on the sanitation and water goals and end the practice of open defecation by 2025. The 2030 agenda on Sustainable Development Goals (SDGs) sets the Goal #6: 'Ensure availability and sustainable management of water and sanitation for all'.

The WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation in its 2015 report Progress on Sanitation and Drinking Water – 2015 Update and MDG Assessment estimated that 61 percent of the rural population in India practised open defecation, and assessed the country's performance as a whole as moderate progress during 1990 and 2015, with a decline in open defecation by around 30 per cent in rural areas during the same period (WHO/UNICEF JMP, 2015), see Figure 1. The report also placed India as one of the worst performers in the world, strikingly far behind many developing countries including its neighbours like Bangladesh, Nepal, Pakistan and Sri Lanka which were comparatively ahead than of India in meeting the sanitation targets. Earlier, the JMP in its 2014 report assessed the performance of India as—not on track, based on 2012 data (WHO/UNICEF JMP, 2014).

Over the last three decades, the Government of India (GoI) have launched a host of rural sanitation programmes and schemes to improve the pitiable situation, with special provisions for poor, excluded and marginalised groups—Central Rural Sanitation Programme (CRSP), 1986; Total Sanitation Campaign (TSC), 1999; Nirmal Gram Puraskar (NGP), 2003; Provision of Urban Amenities in Rural Areas (PURA), 2004; Nirmal Bharat Abhiyan

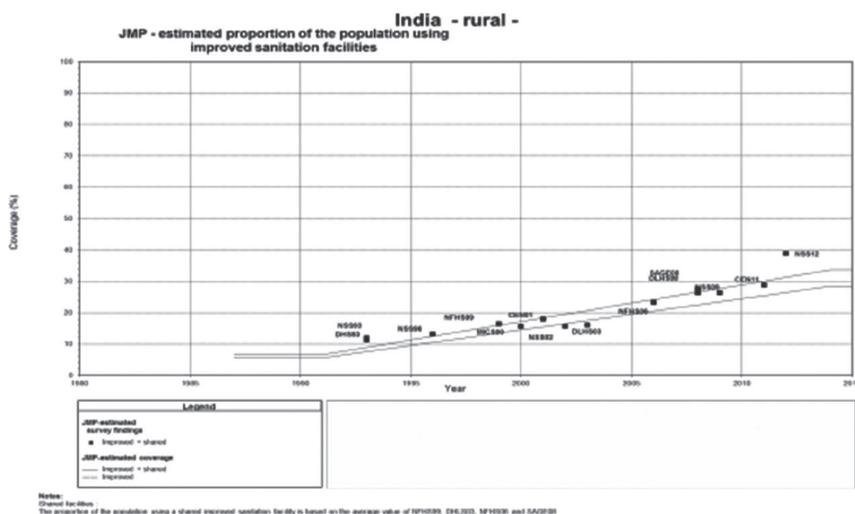


Figure 1: JMP estimated proportion of the population using improved sanitation facilities in rural India.

Source: WHO/UNICEF JMP (2015), India: Estimates on the Use of Water Sources and Sanitation Facilities (1980 - 2015), WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation, Updated June 2015 access at <http://www.wssinfo.org/>

(NBA), 2012; and the newly launched Swachh Bharat Mission (Gramin) (SBM(G)), 2nd October 2014 (Ministry of Drinking Water and Sanitation (MoDWS), 2011, 2014). These efforts have been supplemented with region-sensitive, state-level policies and schemes.

There has been an emphasis on the provision of Individual Household Latrine (IHHL) that comprises a cash incentive to households which itself constructs a Toilet unit in all these rural sanitation programmes. The improvements in access to toilet facilities in rural India in past few decades have been inadequate and it varies spatially and across socio-economic sections of the society leading to abysmal exclusions. The efforts by the rural sanitation programmes have however fallen short in achieving the desired results, and hence large-scale deprivations in access to toilets in rural India continue to loom large, with engraved disparities among regions and socio-economic groups (Planning Commission, 2013; Bhagat, 2013; Dreze and Sen, 2013; Bakshi et al., 2015; Kumar, 2014a, 2014b, 2015; Ali, 2015; Gatade, 2015).

The SBM(G) which replaced the NBA, aims to achieve Swachh Bharat by 2nd October 2019, as a tribute to the 150th Birth Anniversary of Mahatma Gandhi, which in rural areas shall mean improving the levels of cleanliness through Solid and Liquid Waste Management activities and making Gram Panchayats (GPs) Open Defecation Free (ODF), clean and sanitised. The mission aims to ensure that all rural families have access to toilets. The future

targets for IHHL under SBM(G) were fixed as per the baseline survey data of 2013. Under SBM(G), there has been improvement in the definition for IHHL which now includes the provisions of sanitary sub-structure, water storing facility and hand washing, along with rise in the incentive amount to Rs 12,000 for Below the Poverty Line (BPL) and identified Above the Poverty Line (APL)¹ households along with other improvements pertaining to the functioning of scheme (MoDWS, 2014).

Database and Methodology

This study is based on database on rural sanitation facilities in the Census of India (Data on Houses, Housing Amenities and Assets, House Listing and Housing Census Data, 2001 and 2011); National Sample Surveys (NSS) (Housing Conditions Rounds unit record data, 1993 and 2008/09, and 2012); and Base Line Survey Data 2012 as reported by the online Management Information System (MIS) based database at MoDWS (can be found at <http://tsc.gov.in/tsc/NBA/NBAHome.aspx>).

The indicator for households toilet facility used in the study for the analysis of level and changes over time is a deprivation measure which captures the unavailability of toilet facility in the house. The indicator used from Census of India is '*households not having latrine facility within the premise*' (this refers to the households with public and open latrine use, meaning no latrine facility within the premise). The indicator used from NSS is '*no latrine facility in the house*' (this refers to the public or community use of latrine facilities and non-availability of such a facility within the premise of the house). Other important qualitative facets of rural households' toilet facilities have been also analysed using the latest information from the above-mentioned datasources.

The Census data (2001 and 2011) have been used for the analysis of rural households' toilet facilities by aggregate, state wise and social groups (ST – Scheduled Tribe, SC – Scheduled Caste and Others). The Baseline Survey data 2012 MoDWS have been used to analyse the aggregate, state wise (including the functional status of the toilet) and BPL and APL households. The NSS data (1993 and 2008-09) have been used for the analysis by aggregate, state wise, poor–non-poor, household types/livelihood categories, social groups and religious groups.

For the analysis, proportions (in percentages) and absolute levels of deprivations in access to the toilet by households in rural India have been calculated, and also, the changes in the levels of deprivation have been measured using compounded annual growth rate.

To tackle the issue of sufficient sample sizes for the analysis from NSS, while making minute enquiries, sample sizes have been checked for every

¹ Restricted to SCs/STs, small and marginal farmers, landless labourers with homestead, physically handicapped and women headed households.

unit of analysis, and only the minute enquiries with sufficient and appropriate sample sizes have been reported in the study. To overcome the limitations of NSS, since it is based on sampling and not the whole universe, data from the Census for household information has also been referred to.

The disparities in deprivation of toilet facilities among various groups have been measured using Modified Sopher's Disparity Index (Modified Sopher's Disparity Index = $\text{Log}(X2/X1) + \text{Log}[(200-X1)/(200-X2)]$), where $X1$ and $X2$ are percentages values of the indicators (deprivation) for group 1 and 2 respectively; the ideal value for the Index for having no disparity is 0; a higher value of the Index shows that the extent of disparity is higher, and vice-versa; a positive value suggest that the situations are in favour of Group 1 (less deprived), and a negative value suggest that the situation is in favour of Group 2). The changes in the index values, over time, were also captured and analysed.

The determinants of households having access to toilet in the house have been estimated using Probit² model on households unit record data, NSS Housing Conditions round (using the sample (probability) weights), 2008-09, to identify the factors that affect the likelihood of households to have access to basic amenities in the house. The dependent variables in the model is *households having latrine facility in the house*, and the explanatory variable are *households' affiliation to MPCE quintile class categories, Household types (Livelihood Categories), Social groups, Religious groups and States* (with one subcategory of a variable referred to as the 'reference category' for that variable).

Methods and Database for Decomposition of Probabilities by Social Groups

The difference between the upper caste (Others) households (reference group) and households from group X (ST, SC or OBC), in their respective proportion (mean) in access rates to latrine facility in the house, was decomposed into an 'attributes contribution' and a 'coefficient contribution' using the method³ of extension of the Blinder-Oaxaca decomposition technique to Logit and Probit (discrete choice) models (Sinning et al., 2008; Fairlie, 2005; Fairlie, 2006; Borooah et al., 2014). The attributes contribution (explained differences) was computed by asking what the difference between Others households and households from group X, in their proportions accessing latrine facility in the house, would have been if the difference in attributes between them had been evaluated using a common coefficient vector. The coefficient

² Probit estimation using `dprobit` stata command; using `vce (robust)` command; using sample weight.

³ Decomposition using `Fairlie` stata command using probability (sample) weight, based on probit model. The explanatory variables in the probit model used were household's affiliation to MPCE quintiles, livelihood category, religion and states.

contribution (unexplained differences) was computed as a residual as the observed difference less the attributes contribution – this could be ascribed to the ‘structural advantage/disadvantage’ that households from one group enjoyed over those from group X.

Note that we do not, and cannot, say where the source of this structural advantage/disadvantages lies, as also pointed out by Borooah et al. (2014). This coefficient contribution is also signified as caste contribution after the decomposition of differences in probabilities between two groups. The dataset used here are from NSS housing condition round 2008-09 for rural India, and estimates are based upon the sample (probability) weights as provided by the NSS household level unit record data (8130 villages and 97,144 households⁴).

Summary of Findings

The access to latrine facility within the premise of the house in rural India has seen an improvement from the year 2001 to 2011 (Table 1), with the percentage of households not having latrine facility within the premise falling from 78.1% to 69.3% (improvement of 9 percentage points). It reveals that of the 30.7% of the households having latrine facility within the premise in 2011 (51.6 million out of total rural 167.8 million households), 19.4% have water closet (piped sewer system – 2.2%, septic tank – 14.7%, other systems – 2.5%) and 11.3% have pit (with slab/ventilated improved pit – 8.2%, without slab/open pit – 2.3%) and other latrine facility (night soil disposed into open drain – 0.2%, night soil removed by human – 0.3%, night soil serviced by animals – 0.2%). Of the 69.3% of the households not having latrine facility within the premise, 1.9% use public latrine and 67.3% defecate in the open.

The absolute number of households having latrine facility within the premise has risen by 21.2 million from 30.3 million in 2001 to 51.6 million in 2011 (decadal growth of 70.1%). However, the absolute number of households not having latrine facility within the premise has risen by 8.3 million from 108 million in 2001 to 116.3 million in 2011 (decadal growth of 7.7%). It indicates that the rate of decline of households not having latrine facility within the premise has clearly fallen short of the desired rate to contain the number of households not having latrine facility within the premise.

There has been an improvement in the access to latrine facility in the house by the households during 1993 and 2008-09 with acceleration during 2002 and 2008-09 as per the NSS data (Kumar, 2014a). The proportions of households having no latrine facility in the house were 87.3%, 78.3%, 66.4% and 59.4% during 1993, 2002, 2008-09 and 2012 respectively (Table 4, Kumar, 2014b, 2015, and Ministry of Statistics and Programme Implementation (MoSPI), 2013). The compounded annual rate of decline of the proportions of

⁴ The share of rural households among social groups in the sample were 16.6%, 21.8%, 38.1% and 23.5% for ST, SC, OBC and Others households respectively.

Table 1: Levels and changes in latrine facilities of the households during 2001 and 2011 in rural India

	2011		2001		2001-2011 (Changes)			
	Number (in million)	As proportion of total HHs (in %)	Number (in million)	As proportion of total HHs (in %)	Number (in million)	Decadal growth in %	Annual exponential in %	Compounded annual in %
Total Households	167.8		138.3		29.6	21.4	1.9	
Households not having latrine facility within the premise	116.3	69.3	108.0	78.1	8.3	7.7	0.7	-1.2
Households having latrine facilities within the premise	51.6	30.7	30.3	21.9	21.2	70.1	5.3	3.4

Note: Annual compounded growth rate is calculated based upon proportion of HHs in 2011 over proportion of HHs in 2001 of levels of deprivation/attainment.

Source: Author's Calculation using data from Census of India, 2001 and 2011.

households having no latrine facility in the house was found to be 1.1%, 2.6% and 3.0% between 1993-2002, 2002-2008-09 and 2008-09-2012 respectively. This suggests that there has been a significant acceleration in the rate of decline for households having no latrine facility in the house in recent periods.

The NSS data 2012 (MoSPI, 2013) reports the rural households' access to latrine to be 40.6% (exclusive use- 32%; common use in the premise – 7.1%; public/community latrine without payment – 0.7%; public/community latrine with payment – 0.1%; others – 0.8%) and 59.4% households with no latrine. Of the households which have access to latrine – 98.3% used and 1.7% did not use it. Those households which had access to latrine facility and were not using it reported the reasons for not using latrine as: no superstructure – 21%, not clean/insufficient water – 20%, malfunctioning of the latrine – 22%, personal preference – 23%, others – 14%. NSS also asked question to those households who had access to latrine, whether all household members (by categories) are using latrine, and reported that 93, 96, 94 and 98 per cent of the male of age below 15 years, male of age 15 years and above, female of age below 15 years, and female of age 15 years and above respectively were using the latrine and rest were not.

As per the Census 2011, households in the states of Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal were found to have high levels of deprivation of latrine facility within the premises (Figure 2 and Table 2). Spatial variations found can be also

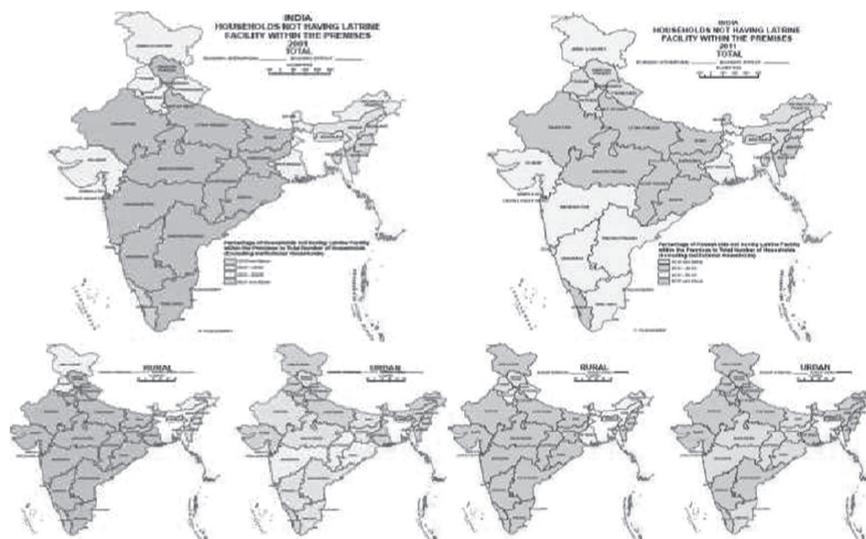


Figure 2: State-wise maps for HHs not having latrine facilities within premise, Census 2001 and 2011.

Source: Census of India (2014), Houses, Household Amenities and Assets Data 2001 - 2011 - Visualizing Through Maps, Office of the Registrar General & Census Commissioner, India.

Table 2: Households deprived of latrine facility within the premise across States & UTs between 2001 and 2011 in rural India

	2011		2001		2001 - 2011 (changes)			
	No. (million)	As proportion of total HHs (in %)	No. (million)	As proportion of total HHs (in %)	No. (million)	Decadal growth in %	Annual exponential in %	Compounded annual in %
Jammu & Kashmir	0.92	61.4	0.68	58.2	0.24	36.0	3.1	0.5
Himachal Pradesh	0.44	33.4	0.79	72.3	-0.36	-44.8	-5.9	-7.4
Punjab	0.98	29.6	1.64	59.1	-0.66	-40.1	-5.1	-6.7
Chandigarh #	0.00	12.0	0.01	31.5	-0.01	-87.8	-21.1	-9.2
Uttarakhand	0.65	45.9	0.82	68.4	-0.17	-21.1	-2.4	-3.9
Haryana	1.30	43.9	1.75	71.3	-0.45	-25.6	-3.0	-4.7
NCT of Delhi	0.02	23.7	0.06	37.1	-0.04	-70.2	-12.1	-4.4
Rajasthan	7.63	80.4	6.11	85.4	1.51	24.8	2.2	-0.6
Uttar Pradesh	19.93	78.2	16.63	80.8	3.30	19.8	1.8	-0.3
Bihar	13.95	82.4	10.90	86.1	3.05	28.0	2.5	-0.4
Sikkim	0.01	15.9	0.04	40.6	-0.02	-60.6	-9.3	-9.0
Arunachal Pradesh	0.09	47.3	0.09	52.7	0.01	6.9	0.7	-1.1
Nagaland	0.09	30.8	0.09	35.4	-0.01	-6.5	-0.7	-1.4
Manipur	0.05	14.0	0.07	22.5	-0.02	-29.5	-3.5	-4.6
Mizoram	0.02	15.4	0.02	20.3	0.00	0.6	0.1	-2.7
Tripura	0.11	18.5	0.12	22.1	-0.01	-5.3	-0.5	-1.7
Meghalaya	0.19	46.1	0.20	59.9	0.00	-1.4	-0.1	-2.6

(Contd.)

Assam	2.17	40.4	1.71	40.4	0.47	27.3	2.4	0.0
West Bengal	7.31	53.3	8.16	73.1	-0.85	-10.4	-1.1	-3.1
Jharkhand	4.33	92.4	3.55	93.4	0.78	21.8	2.0	-0.1
Odisha	7.00	85.9	6.26	92.3	0.74	11.8	1.1	-0.7
Chhattisgarh	3.75	85.5	3.19	94.8	0.56	17.6	1.6	-1.0
Madhya Pradesh	9.66	86.9	7.40	91.1	2.26	30.6	2.7	-0.5
Gujarat	4.53	67.0	4.61	78.3	-0.08	-1.8	-0.2	-1.6
Daman & Diu #	0.01	48.6	0.02	68.0	-0.01	-58.7	-8.8	-3.3
Dadra & Nagar Haveli #	0.03	73.5	0.03	82.7	0.00	-4.0	-0.4	-1.2
Maharashtra	8.07	62.0	8.99	81.8	-0.92	-10.3	-1.1	-2.7
Andhra Pradesh	9.66	67.8	10.38	81.9	-0.71	-6.9	-0.7	-1.9
Karnataka	5.63	71.6	5.51	82.6	0.12	2.1	0.2	-1.4
Goa	0.04	29.1	0.07	51.8	-0.04	-50.3	-7.0	-5.6
Lakshadweep #	0.00	1.9	0.00	6.9	0.00	-86.6	-20.1	-11.9
Kerala	0.28	6.8	0.92	18.7	-0.65	-69.9	-12.0	-9.6
Tamil Nadu	7.34	76.8	7.09	85.6	0.26	3.6	0.4	-1.1
Puducherry #	0.06	61.0	0.06	78.6	0.00	2.2	0.2	-2.5
Andaman & Nicobar Islands#	0.02	39.8	0.03	57.7	-0.01	-18.0	-2.0	-3.6
India	116.25	69.3	107.97	78.1	8.28	7.7	0.7	-1.2

Note: # denotes Union Territories.

Source: As in Table 1.

attributed to geographical, natural, social, cultural and local factors. The 7.7% rise in the number of rural households not having availability of latrine facility within the premises from 2001 to 2011 was due to the rise in the number of deprived households in the states of Assam, Bihar, Chhattisgarh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh and North-Eastern states like Arunachal Pradesh and Mizoram.

The Baseline Survey 2012-13 reports that the number of households without toilet is 111.1 million (61.22 %) and the number of households with toilet is 70.4 million (38.78 %) in rural India (Table 3) (Source: MoDWS, <http://sbm.gov.in/tsc/NBA/NBAHome.aspx>). The states which reported very high proportion of households without toilets were Odisha (88%), Bihar (79%), Jammu & Kashmir (75%), Telangana (74%), Madhya Pradesh (74%), Rajasthan (73%), Jharkhand (72%), whereas the states which reported very less proportion of such households were Mizoram (26%), Haryana (25%), Punjab (25%), Sikkim (18%), Himachal Pradesh (14%) and Kerala (5%). Out of the 70.4 million households with toilet, 14.5 million households (or 20.58% of the households with toilet) have dysfunctional toilet, and rest have functional toilet (55.92 million). Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Manipur, Odisha, Rajasthan, Tamil Nadu, Tripura and Uttar Pradesh are among states which reported high percentages of household having dysfunctional toilets.

It also reported that 60.5% and 61.7% of the BPL and APL (card holders) households are without toilets respectively with noticeable state-wise variation especially in backward states where the access is more in favour of BPL households than the APL (Table 4).

However, poor households were found to have a very low annual rate of decline in case of deprivation of access to latrine facilities in the house as compared to non-poor households from 1993 to 2008-09, resulting in high levels of deprivation in 2008-09 (Table 5). Disparities in the deprivation among poor and non-poor households (as measured by Modified Sopher's Disparity Index), were observed to be substantially increasing as suggested from the increasing values of the index from 1993 to 2008-09.

The ST and SC households were found to have higher levels of deprivation in access to latrine facilities in the house and also the low annual rate of decline for the deprivation in access to latrine facilities in the house as compared to Others households during 2001 and 2011 according to Census (Table 6). Disparities were observed to be increasing marginally between SC and ST households, between SC and Other households, and between ST and Other households, as suggested by the marginal increase in values of the Modified Sopher's Disparity index during 2001 and 2011.

This gap in the rate of decline among poor and non-poor households and among ST, SC and Others households was also found across all the states, along with the state-wise variations between 1993 and 2008-09 (Table 7).

Table 3: State-wise base line survey - 2012, Ministry of Drinking Water and Sanitation (abstract) for individual households toilet coverage and functional status in rural India

	Total HH				No. of HH with Toilet			(%age of defunct toilets)
	With toilet	(%age of with toilet	Without toilet	(%age of without toilet	Functional toilets	(%age of functional toilets	Defunct toilets	
A & N Islands	24542	53.8	21104	46.2	23741	96.7	801	3.3
Andhra Pradesh	2553530	33.9	4985147	66.1	2345667	91.9	207863	8.1
Arunachal Pradesh	72993	41.5	102931	58.5	51102	70.0	21891	30.0
Assam	2315288	40.8	3362257	59.2	1678023	72.5	637264	27.5
Bihar	4582088	21.4	16817153	78.6	2827811	61.7	1754253	38.3
Chhattisgarh	1752468	39.6	2676670	60.4	720708	41.1	1031760	58.9
Goa	113168	60.7	73224	39.3	113168	100.0	0	0.0
Gujarat	3708132	52.8	3321047	47.3	3142755	84.8	565377	15.3
Haryana	2303961	75.1	763946	24.9	2284176	99.1	19785	0.9
Himachal Pradesh	1276401	86.0	207168	14.0	1217462	95.4	58939	4.6
Jammu & Kashmir	412948	24.6	1268892	75.5	372149	90.1	40799	9.9
Jharkhand	1443274	28.1	3698728	71.9	486337	33.7	956937	66.3
Karnataka	3015284	35.4	5499270	64.6	2887981	95.8	127303	4.2
Kerala	4921674	94.7	276793	5.3	4731832	96.1	189842	3.9
Madhya Pradesh	3204566	26.2	9039497	73.8	2369422	73.9	835144	26.1
Maharashtra	5918819	47.8	6471124	52.2	5213076	88.1	705732	11.9

(Contd.)

Table 3: (Contd.)

	Total HH				No. of HH with Toilet			
	With toilet	(%)age of with toilet	Without toilet	(%)age of without toilet	Functional toilets	(%)age of functional toilets	Defunct toilets	(%)age of defunct toilets
Manipur	221232	51.3	210146	48.7	163465	73.9	57767	26.1
Meghalaya	214925	52.2	196685	47.8	194421	90.5	20504	9.5
Mizoram	84375	73.7	30067	26.3	82761	98.1	1614	1.9
Nagaland	130892	49.8	132047	50.2	127613	97.5	3278	2.5
Odisha	1038127	11.5	7981980	88.5	564064	54.3	474063	45.7
Puducherry	45425	50.0	45403	50.0	45315	99.8	110	0.2
Punjab	2378013	75.2	785947	24.8	2352047	98.9	25966	1.1
Rajasthan	3136072	27.3	8369638	72.7	2368356	75.5	767716	24.5
Sikkim	47593	81.6	10768	18.5	47593	100.0	0	0.0
Tamil Nadu	4272829	44.8	5267470	55.2	2970931	69.5	1301898	30.5
Telangana	1159123	25.8	3334057	74.2	1116815	96.4	42308	3.7
Tripura	511174	62.6	305577	37.4	394417	77.2	116757	22.8
Uttar Pradesh	10122490	35.2	18598354	64.8	6862807	67.8	3259065	32.2
Uttarakhand	1041586	67.1	509830	32.9	931085	89.4	110501	10.6
West Bengal	8389983	55.3	6777830	44.7	7235473	86.2	1154448	13.8
India	70412975	38.8	111140750	61.2	55922573	79.4	14489685	20.6

Note: Report is based on entries done by 248675 Gram Panchayats until December 2015 and it may get changed because of continuous data entry.

Source: Ministry of Drinking Water and Sanitation, Accessed online from <http://tsc.gov.in/tsc/NBA/NBAHome.aspx>

Table 4: State-wise base line survey - 2012, Ministry of Drinking Water and Sanitation (abstract) for individual households coverage by BPL and APL IHHL in rural India

	Total IHHL (APL + BPL)	Total IHHL without toilets (APL + BPL)	BPLHHS		APLHHS		
			Total	(%) age of with toilet	Total	(%) age of with toilet	
		(%) age of without toilet	(%) age of without toilet	(%) age of without toilet	(%) age of without toilet	(%) age of without toilet	
A & N Islands	45646	21104	46.2	39.4	60.6	56.4	43.6
Andhra Pradesh	7538677	4985147	66.1	32.6	67.4	54.9	45.1
Arunachal Pradesh	175924	102931	58.5	39.7	60.3	45.7	54.3
Assam	5677545	3362257	59.2	72.1	27.9	25.6	74.4
Bihar	21399241	16817153	78.6	22.7	77.3	19.8	80.2
Chhattisgarh	4429138	2676670	60.4	56.1	43.9	27.5	72.5
Goa	186392	73224	39.3	18.5	81.5	70.4	29.6
Gujarat	7029179	3321047	47.2	49.5	50.5	53.8	46.2
Haryana	3067907	763946	24.9	71.5	28.5	76.3	23.7
Himachal Pradesh	1483569	207168	14.0	87.5	12.5	85.7	14.3
Jammu & Kashmir	1681840	1268892	75.4	19.2	80.8	28.5	71.5
Jharkhand	5142002	3698728	71.9	50.2	49.8	7.1	92.9
Karnataka	8514554	5499270	64.6	33.2	66.8	39.3	60.7
Kerala	5198467	276793	5.3	86.8	13.2	99.3	0.7
Madhya Pradesh	12244063	9039497	73.8	32.3	67.7	21.4	78.6
Maharashtra	12389933	6471124	52.2	46.5	53.5	48.4	51.6

(Contd.)

Table 4: (Contd.)

	Total IHHL (APL + BPL)	Total IHHL without toilets (APL + BPL)	(% age of without toilet	BPLHHS		APLHHS		
				Total	(% age of with toilet	Total	(% age of with toilet	Total
Manipur	431378	210146	48.7	203392	63.5	227986	40.4	59.6
Meghalaya	411610	196685	47.8	260107	52.6	151503	51.5	48.5
Mizoram	114442	30067	26.3	46407	68.9	68035	77.1	22.9
Nagaland	262939	132047	50.2	211709	43.0	51230	77.6	22.4
Odisha	9020107	7981980	88.5	4278713	12.7	4741394	10.4	89.6
Puducherry	90828	45403	50.0	56736	34.8	34092	75.4	24.6
Punjab	3163960	785947	24.8	565563	64.2	2598397	77.5	22.5
Rajasthan	11505710	8369638	72.7	2164049	28.0	9341661	27.1	72.9
Sikkim	58361	10768	18.5	20151	48.5	38210	99.0	1.0
Tamil Nadu	9540299	5267470	55.2	3440321	41.1	6099978	46.9	53.1
Telangana	4493180	3334057	74.2	4296626	25.5	196554	31.8	68.2
Tripura	816751	305577	37.4	331824	61.3	484927	63.5	36.5
Uttar Pradesh	28720844	18598354	64.8	10011355	51.4	18709489	26.6	73.4
Uttarakhand	1551416	509830	32.9	599904	66.6	951512	67.4	32.6
West Bengal	15167813	6777830	44.7	6341665	49.5	8826148	59.5	40.5
India	181553715	111140750	61.2	77998384	39.5	103555331	38.3	61.7

Source: As in Table 3.

Table 5: Changes in levels of deprivation of latrine facility in the house in rural areas by poor - non-poor, 1993 and 2008-09 (in percentage points and annual compound growth rate)

	<i>Non-poor</i>	<i>Poor</i>	<i>Total</i>	<i>Modified Sopher's Disparity Index (Poor, Non-poor)</i>
No Latrine Facility in the House				
Levels in 1993	84.01	91.65	87.83	-0.07
Levels in 2008-09	59.83	83.8	66.46	-0.23
Changes during 1993-2008-09 (annual compounded)	-2.13	-0.57	-1.75	-0.16
			Changes in Index Value	

Note: Poverty line has been calculated based on old official poverty line method used by Planning Commission. The poverty line in rural areas has been updated using Consumer Price Index for Agricultural Labourers (Base year 1986-87 = 100). Annual compounded growth rate is calculated based upon the proportion of HHs in 2008/09 over the proportion of HHs in 1993 of levels of deprivation.

Source: Author's calculation using National Sample Survey, Housing Conditions Round unit record data for the respective years, Planning Commission and Ministry of Labour, GoI.

Table 6: Deprivation in access to latrine facility within the premise by the households across social groups between 2001 and 2011 in rural India

<i>Rural</i>	<i>ST</i>	<i>SC</i>	<i>Other</i>	<i>Total</i>	<i>Modified Sopher's Disparity Index</i>		
					<i>(SC, ST)</i>	<i>(ST, Other)</i>	
	2011						
Number (in million)	16.96	25.4	73.89	116.25			
as proportion of total HHs (in %)	84.2	77.2	64.4	69.3	0.06	-0.12	-0.19
	2001						
Number (in million)	14.13	23.72	70.12	107.97			
as proportion of total HHs (in %)	88.9	84.9	74.2	78.1	0.04	-0.10	-0.13
	(Changes)						
Number (in million)	2.84	1.67	3.77	8.28	Changes in	-0.02	-0.05
					Index Value		
Decadal growth in %	20.1	7.1	5.4	7.7			
Annual exponential in %	1.8	0.7	0.5	0.7			
Compounded annual in %	-0.5	-1.0	-1.4	-1.2			

Note: ST – Scheduled Tribe, SC – Scheduled Caste, Other – Other than ST and SC.

Source: As in Table 1.

Table 7: Changes in levels of no latrine facility in the house for states and UT's in rural areas by social groups and economic groups, non-poor and poor, 1993 to 2008-09 (in annual compound growth rate percentage)

	<i>ST</i>	<i>SC</i>	<i>Others</i>	<i>Non-Poor</i>	<i>Poor</i>	<i>Total</i>
Andhra Pradesh	-0.62	-1.49	-2.72	-2.45	-1.05	-2.22
Arunachal Pradesh						-5.68
Assam	-1.16	-4.35	-5.37	-4.50	-2.76	-4.66
Bihar	-0.45	-0.33	-1.08	-1.10	-0.43	-0.89
Delhi						-6.90
Goa						-4.02
Gujarat	-1.04	-0.76	-1.95	-1.42	-0.96	-1.49
Haryana				-4.70	-1.80	-4.38
Himachal Pradesh						-3.77
Jammu & Kashmir						-5.23
Karnataka	-0.69	-0.57	-1.31	-1.40	-0.09	-1.07
Kerala	-4.16	-3.62	-13.25	-10.78	-5.65	-10.74
Madhya Pradesh	-0.44	-0.44	-1.20	-1.32	-0.36	-0.81
Maharashtra	-1.31	-1.95	-2.54	-2.63	-1.12	-2.24
Manipur						-13.50
Meghalaya						-9.46
Mizoram						-3.78
Nagaland						7.29
Orissa	-0.27	-0.30	-0.87	-0.96	-0.23	-0.58
Punjab				-4.64	-2.40	-4.58
Rajasthan	0.05	-0.36	-0.98	-0.79	0.00	-0.67
Sikkim						-16.17
Tamil Nadu	-2.96	-0.57	-1.76	-1.35	-0.41	-1.36
Tripura						-4.35
Uttar Pradesh	-0.64	-0.35	-1.19	-1.28	-0.41	-0.96
West Bengal	-2.64	-3.11	-4.94	-4.60	-2.96	-4.15
Andaman & Nicobar						-3.20
Chandigarh						-12.37
Dadra & Nagar Haveli						-3.03
Daman & Diu						-5.28
Lakshadweep						
Pondicherry						-2.01
Total	-1.14	-1.04	-2.15	-2.13	-0.57	-1.75

Note: Three states were carved out in the year 2000 namely Chhattisgarh, Jharkhand and Uttaranchal from Madhya Pradesh, Bihar and Uttar Pradesh respectively. For the purpose of comparability, estimates of the new states were merged with their respective parent state using respective household weights for each category. Reporting is done based on the sufficiency of sample sizes and left blank where there was an issue of fewer sample sizes. The demarcation of non-poor and poor across states here is done using national poverty line and not the state specific.

Source: As in Table 5.

Table 8 reports non-availability of latrine facility for the household within the premise of the house among social groups and across states in rural areas. ST and SC households in the rural areas were found to be most deprived in backward states like Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and those in states like Andhra Pradesh, Karnataka, Tamil Nadu and West Bengal in the year 2011.

According to NSS during 2008-09, 66.4% of rural households did not have latrine facility in the house. Among the economic groups - household type categories, Agricultural Labourers (ALs) (83.1%) were found to be highly deprived in access to latrine facilities in the house followed by Other Labourers (OLs) (68.1%), Self Employed in Agriculture (65.2%), Self Employed in Non-Agriculture (52.8%) and lowest for Others (41.3%) with similar patterns across the states (Table 9). Other Backward Classes (OBCs) households were having slight better access than the ST and SC households but lesser than that of Others. Hindus (69.9%) witnessed highest levels of deprivation among religious groups followed by Muslims (50.6%) and Other Religious Minorities (38.2%) households (Kumar, 2014b).

Even in identical MPCE quintiles (poor and non-poor), ST and SC households lagged behind Other households in their levels of access to latrine facility and the corresponding rates of improvement, also, the disparities were observed to have increased. The results suggest that there are factors based on social backgrounds that act as constraints and lead to the denial of access to basic amenities (Kumar, 2014 b).

Determinants of Households having Access to Latrine Facility in the House

The results (estimated marginal effects) of the econometric exercise (probit model) that was carried out to examine the determinants of households having latrine facility in the house by rural households in India during 2008-09 are reported in Table 10.

The results elucidate that across Economic Groups – MPCE quintiles, as we move towards bottom quintiles, the probability for households having latrine facility in the house lowers as compared to the top quintiles' (reference category) households, controlling other factors. The pattern across household types shows that AL and OL households were found worse with lesser probabilities as compared to Others household types. The pattern across social groups suggests that ST and SC households were found to be worse with lesser probability followed by OBCs relative to Other households. Across the religious group, Hindus households followed by Muslims households were found to have lesser probabilities relative to Other Religious Minorities. Across states, households in backward states such as Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh were mostly found to have lesser probabilities than other states as compared to the reference category state i.e. Kerala.

Table 8: Levels of households not having latrine facility within the premise (public and open latrine use) among social groups across states and UT's in rural India, 2011 (in percentage)

	<i>ST</i>	<i>SC</i>	<i>Others</i>	<i>Total</i>
Andhra Pradesh	89.7	78.6	61.9	67.8
Arunachal Pradesh	48.8		43.4	47.3
Assam	61.2	39.5	36.3	40.4
Bihar	90.7	92.3	80.0	82.4
Chhattisgarh	87.5	89.2	83.0	85.5
Goa	46.6	33.0	25.5	29.1
Gujarat	85.1	69.9	60.9	67.0
Haryana		54.6	40.4	43.9
Himachal Pradesh	40.4	38.8	30.7	33.4
Jammu & Kashmir	77.0	86.7	54.3	61.4
Jharkhand	96.3	95.7	89.2	92.4
Karnataka	84.4	83.6	66.8	71.6
Kerala	32.6	16.7	4.7	6.8
Madhya Pradesh	94.7	91.4	81.9	86.9
Maharashtra	78.9	67.4	57.6	62.0
Manipur	19.7	16.9	8.6	14.0
Meghalaya	46.3	43.9	44.4	46.1
Mizoram	15.4	11.2	19.9	15.4
Nagaland	31.3		23.5	30.8
NCT of Delhi		40.1	19.4	23.7
Odisha	94.7	91.3	80.0	85.9
Punjab		42.8	21.1	29.6
Rajasthan	96.5	82.7	75.1	80.4
Sikkim	16.9	21.3	14.7	15.9
Tamil Nadu	86.3	87.2	72.8	76.8
Tripura	38.0	6.0	4.9	18.5
Uttar Pradesh	83.7	86.7	75.1	78.2
Uttarakhand	64.3	66.5	39.4	45.9
West Bengal	81.7	59.9	46.6	53.3
UTs				
A & N Islands	12.3		43.7	39.8
Chandigarh		20.8	10.4	12.0
D & N Haveli	89.7	24.9	18.3	73.5
Daman & Diu	80.0	33.1	44.7	48.6
Lakshadweep	2.0		0.0	1.9
Puducherry		88.0	51.1	61.0
India	84.2	77.2	64.4	69.3

Source: As in Table 1.

Table 9: No latrine facility in the house for states and UT's in rural areas by economic groups (occupational structure, non-poor and poor) during 2008-09 (in percentage points)

	SEinNA	AL	OL	SEinA	Others	Non-poor	Poor	Total
Andhra Pradesh	49.40	82.63	63.72	60.20	37.92	62.24	80.29	65.25
Arunachal Pradesh								17.83
Assam								14.22
Bihar	80.22	96.40	90.17	65.75	64.98	75.93	87.43	80.29
Chhattisgarh	71.07	93.21	87.09	79.97	64.49	76.17	89.04	84.03
Delhi								13.02
Goa								38.08
Gujarat	48.99	90.88	81.84	63.26	31.30	65.89	82.92	68.26
Haryana	39.02	52.63	66.12	39.26	32.53	43.03	69.74	45.48
Himachal Pradesh								47.06
Jammu & Kashmir								41.07
Jharkhand	76.96	91.34	97.17	85.37	64.75	80.44	93.17	84.85
Karnataka	61.24	89.37	60.33	77.02	38.49	68.93	92.21	75.69
Kerala	3.20	14.91	7.64	2.10	2.33	5.44	16.38	5.90
Madhya Pradesh	71.93	97.06	93.43	81.78	62.52	78.78	94.55	86.07
Maharashtra	51.30	84.65	66.17	61.91	31.58	60.80	81.08	65.93
Manipur								1.57
Meghalaya								11.43
Mizoram								1.21

(Contd.)

Nagaland												4.44
Orissa	83.36	97.74	98.16	88.53	63.29	82.19	94.70					88.67
Punjab	36.98	56.86	44.31	22.21	29.24	36.09	60.58					37.34
Rajasthan	68.62	80.00	94.83	85.04	56.67	79.67	94.76					82.29
Sikkim												2.52
Tamil Nadu	51.82	89.46	78.25	72.78	50.40	72.81	90.34					75.03
Tripura												3.68
Uttar Pradesh	73.54	91.34	88.33	76.92	70.18	74.68	88.02					79.76
Uttaranchal	20.63	78.39	80.22	60.08	31.36	51.50	75.15					54.05
West Bengal	32.32	61.39	41.90	29.46	30.11	39.11	55.14					43.37
Andaman & Nicobar												42.49
Chandigarh												12.42
Dadra & Nagar Haveli												59.38
Daman & Diu												32.05
Lakshadweep												
Pondicherry												65.39
Total	52.80	83.11	68.16	65.26	41.35	59.83	83.80					66.46

Note: SEinA – Self Employed in Non-Agriculture, AL – Agricultural Labour, OL – Other Labour and SEinA – Self Employed in Agriculture.
Source: As in Table 5.

Table 10: Results of maximum likelihood probit model for latrine facility in the house in rural India during 2008/09

<i>Dependent variable: Households having latrine facility in the house</i>	<i>dF/dx</i>	<i>Robust Z</i>	<i>P>z</i>
<i>CEC MPCE Quintile Categories</i>			
Quintile 1 (0-20)*	-0.245	-28.73	0.00
Quintile 2 (20-40)*	-0.203	-24.52	0.00
Quintile 3 (40-60)*	-0.164	-20.11	0.00
Quintile 4 (60-80)*	-0.126	-15.40	0.00
<i>Household Types</i>			
Self Employed in Non-Agriculture*	-0.073	-6.52	0.00
Agricultural labourers*	-0.294	-30.32	0.00
Other Labourers*	-0.188	-17.41	0.00
Self Employed in Agriculture*	-0.142	-14.58	0.00
<i>Social Groups</i>			
ST*	-0.180	-17.96	0.00
SC*	-0.158	-19.46	0.00
OBC*	-0.112	-15.27	0.00
<i>Religious Groups</i>			
Hindus*	-0.113	-6.62	0.00
Muslims*	-0.074	-4.16	0.00
<i>States & UTs</i>			
Andhra Pradesh*	-0.348	-30.72	0.00
Arunachal Pradesh*	-0.196	-8.60	0.00
Assam*	-0.107	-5.43	0.00
Bihar*	-0.366	-35.93	0.00
Jharkhand*	-0.326	-33.19	0.00
Delhi*	-0.182	-3.39	0.00
Goa*	-0.288	-8.95	0.00
Gujarat*	-0.325	-30.19	0.00
Haryana*	-0.293	-21.23	0.00
Himachal Pradesh*	-0.298	-26.96	0.00
J and K*	-0.293	-21.22	0.00
Karnataka*	-0.334	-32.59	0.00
Madhya Pradesh*	-0.351	-38.65	0.00
Chattisgarh*	-0.317	-26.83	0.00
Maharashtra*	-0.341	-31.80	0.00
Manipur*	0.270	6.62	0.00
Meghalaya*	-0.091	-3.22	0.00
Mizoram*	0.249	3.26	0.00

(Contd.)

Nagaland*	0.004	0.09	0.93
Orissa*	-0.343	-40.29	0.00
Punjab*	-0.292	-19.42	0.00
Rajasthan*	-0.351	-40.64	0.00
Sikkim*	0.221	4.87	0.00
Tamil Nadu*	-0.341	-33.93	0.00
Tripura*	0.213	5.21	0.00
Uttar Pradesh*	-0.426	-40.91	0.00
Uttaranchal*	-0.303	-21.52	0.00
West Bengal*	-0.283	-20.90	0.00
Andamand and Nicobar Islands*	-0.292	-13.42	0.00
Chandigarh*	-0.204	-3.13	0.00
D and N Haveli*	-0.281	-9.25	0.00
Daman and Diu*	-0.260	-7.50	0.00
Pondicherry*	-0.300	-13.08	0.00
Number of Observations	97089		
Pseudo R ²	0.2721		

Notes: Reference categories – MPCE: quintile 5 (80-100); Household types: Others; Social groups: Others; Religious groups: Other religious minorities; States & UTs: Kerala. (Lakshadweep dropped from the estimation as it predicts success perfectly) Df/dx are marginal effects, i.e., the change in probability of having latrine facility in the house with a one unit change in the right side variable (discrete change of dummy variable from 0 to 1)

A “*” implies the variable is dichotomous.

z and $P > |z|$ correspond to the test of the underlying coefficient being 0.

dprobit option from STATA have been used for estimation using vce(robust) command and using the sample weights as given by NSS.

Source: Estimated using unit record data from the National Sample Survey on Housing Conditions during the 65th round (2008-09).

These results on determinants of rural households having latrine facility in the house reiterate the fact that there exist vast socio-spatial exclusions in rural India.

Decomposition by Social Group of Probabilities for Accessing Latrine Facility in House

This section looks into how much of the mean difference in the accessing latrine facility in the house between households in the different social groups is due to differences between them in their (non-group) attributes (attributes contribution) and how much is due to the fact that the household belonged to different community groups (caste contribution). The purpose of this section

is to answer these questions with respect to the following binary comparisons – upper caste (Others) versus ST households; Others versus SC households; and Others versus OBC households.

The structural probabilities for the various social groups show that if the entire sample had comprised of respective social groups (using sample weights), the (caste based) probability of accessing latrine facility in the house, were lower for SCs, STs followed by OBCs as compared to the reference group of Others households. The probability for Others, ST, SC and OBC households were 56%, 24%, 23% and 30% respectively for households having latrine facility in the house in 2008-09 (Table 11).

It also shows that the observed difference of probabilities (gap) or differences in sample mean access rates of latrine facility in the house were very high between Others and SC households (32.9 percentage point), and Others and ST households (32.0 percentage point), followed by Others and OBC households (25.9 percentage point). Of these gaps, 55%, 52% and 56% were due to differences in coefficients/caste (affiliation to particular social groups) for Others and ST households, Others and SC households, and Others and OBC households, respectively, and rest could be explained by the attributes differences (non-group) between them. The decompositions obtained are by using the Others (upper caste) coefficient estimates (that is, the estimates obtained when the equation was estimated over the observations pertaining to Others households) as the common coefficient vector.

The results of the decomposition of the differences in the probabilities for accessing latrine facility in the house, into attributes and coefficient (caste) contribution, indicates the significant presence of coefficient contribution in the observed differences for STs, SCs and OBCs as compared with the reference category of Others households (along with high gap).

Conclusion

Though there has been an improvement in the proportion of rural households having latrine facility within the premise of the house over time, the existing level of deprivation is very high and calls for immediate attention towards sanitation in rural India for enhancement of the quality of life of the people, and achieving SDGs. The improvement in percentage terms is however not reflected in its entirety in the absolute terms, during 2001–2011, as there was a marginal increase in the absolute number of households deprived of latrine facility within premise of the house, adding a cause of concern for the policymakers.

Households in backward states like Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh were found lagging behind other states in the rate of decline for deprivation of latrine facility within the premises and also found to have high levels in the present situation. Poor households as compared to non-poor households and Scheduled Tribe

Table 11: Decomposition results (observed differences, attribute and coefficient contributions to differences) between upper caste and other (STs/SCs/OBCs) caste households in their respective proportions in access to latrine facility in the house in rural India, 2008/09

Community X↓	P_x	P_o	Observed difference/ Sample average ($P_x - P_o$)	Explained difference (due to endowments)	Attributes contribution [^]	Coefficient contribution ^{^^}
Households having Latrine Facility in the House						
ST	0.235	0.555	-0.320	-0.143	45	55
SC	0.226	0.555	-0.329	-0.159	48	52
OBC	0.296	0.555	-0.259	-0.113	44	56

Notes: Decompositions were computed using upper (Others) caste (non-ST/SC/OBC) coefficients/Community X attributes evaluated using Others coefficients and using the sample weights as given by NSS.

[^] Difference in households proportions in access to latrine facility due to inter-group differences in attributes as a percentage of the overall difference; ^{^^} Difference in households proportions in access to latrine facility due to inter-group differences in coefficients as a percentage of the overall difference.

Source: As in Table 1.

and Scheduled Caste households as compared to Others households were found to have a slower annual rate of decline for the deprivation in access to latrine facilities in the house, resulting in their high levels of deprivation in the existing levels and persistence of the gap. Besides, the disparities in the deprivation between poor and non-poor households, between Scheduled Tribe and Scheduled Caste households, between Scheduled Caste and Other households, and between Scheduled Tribe and Other households were observed to be increasing as suggested from the increasing values of the Modified Sopher's Disparity index.

Overall, households in backward states and those belonging to poor, Wage labourers (Agricultural and Other Labourers), Scheduled Tribe and Scheduled Caste were found to be most deprived and lagging in accessing latrine facilities in rural areas. The result of determinants of households having latrine facility in the house further supports these findings. The decomposition of the differences between the access rate of latrine facilities in the house of households belonging to Other (upper caste) and weaker sections (ST, SC and OBC) shows that majority of these (high) gaps/difference is explained by significant caste-based factors, establishing the presence of caste-based exclusion and discriminations.

The situation in rural areas and literature also suggest that the hemlets of weaker sections in our village society lack the most in access to basic amenities and services like roads, etc., highlighting the issue of socio-spatial situatedness and hence, need for focussed delivery of such facilities in hemlets of marginalised and excluded communities.

Thus, the experiences with several programmes like the TSC, PURA, NBA and others show that the policies adopted for providing sanitation in rural India did create a pace in the development process and delivery. However, that pace needs to be further enhanced on an urgent basis so as to achieve the SDGs, along with complimentary measures with a focus on backward states and targeted group-specific policies (economic and social) to tackle exclusion and to provide safeguards to marginalized sections towards equal access to basic services, as also noted in the Inclusive Growth agenda of the Twelfth Five-Year Plan of the GoI and also suggested by the World Bank (2013) and United Nations (2013). The recently launched SBM(G) needs to focus on these lagging regions and also address the prevailing socio-economic exclusions by engaging with the communities to achieve its ambitious target by 2019.

Acknowledgements

The author would like to acknowledge Prof Sukhadeo Thorat, Prof. Amitabh Kundu, Prof. Preet Rustagi, Ajaya Kumar Naik, Dr. Nitin Tagade, Dr. Reena Kumari, Khalid Khan, Simi Mehta, Vishruti Gupta, Shivani Ahuja for their helpful comments.

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Strategies for Poverty Alleviation

Adya Mishra

Symbiosis Centre for Information Technology
Rajiv Gandhi Infotech Park, MIDC, Pune – 411057
adya.mishra@associates.scit.edu

Introduction

Poverty and inequality are timeless cankers that have plagued the world since the beginning of times. They exist not only in the developing economies but also in the developed world. Poverty and social disparity are global concerns and, therefore, the first and tenth sustainable development goals for UN are to “End poverty in all its forms everywhere” and to “Reduce inequality within and among countries”.¹

Across the ages of civilized society countless efforts have been made to ensure equitable distribution of wealth across different sections of society. When the world got disillusioned with the regime of kings, queens and tsar’s, it turned towards ideas like socialism, communism and democracy. When USSR tried to eradicate poverty through communism, it led to emergence of a new class of affluence. China, though ruled by a communist party, put economic reform before social reform and adapted to the changing global scenario. Harold Joseph Laski, the British Political Theorist, has rightly said that “I have no right to eat cake if my neighbour cannot afford bread” or in other words before someone has a maximum, each should have a minimum. In such a scenario state taxes the rich to create opportunities for the poor. However, the Marxist dream of a utopian society and USSR’s failed attempt² to achieve it goes a long way in making us realise the challenges associated with poverty eradication and implementing socialist ideals.

Capitalism poses its own set of difficulties with the concentration of wealth in hands of a few. Democracy is the only form of governance that gives us the freedom to follow a balanced path where we can implement both capitalist and socialist ideas to ensure inclusive growth. The endless debate between Capitalism and Socialism has at last agreed upon one point i.e. the welfare state concept wherein the state takes the responsibility for the social

¹ Agenda for Sustainable Development, UN.

² A history of Socialism in Russia. <https://fee.org/articles/the-soviet-tragedy-a-history-of-socialism-in-russia-1917-1991-and-russia-under-the-bolshevik-regime/>

and economic well-being of those citizens who do not have financial or family support. It has been a part of the government policy in economies like the United States and Britain since a long time. In India the government has taken initiatives along the same lines by removing subsidy on LPG for the affluent class so that it can be given to those who truly need it at subsidised rates. Linking adhaar cards to bank accounts to expedite the processing of government benefit schemes for the poor is another step in that direction.

India continues to be home to a quarter of the world's undernourished population. A large percentage of Indian children are underweight, women are malnourished and proper healthcare facilities are scarcely available. After 69 years of independence we as a country with numerous resources at our disposal have little to show for it.

Objectives

1. The study is aimed at understanding and analysing the strategies in place for poverty alleviation in India.
2. Assessing their success according to available studies and reports.
3. To comprehend their effectiveness towards achieving financial inclusiveness in the country.
4. To ponder upon the limitations of the current schemes and discuss the possibility of a more comprehensive approach towards poverty eradication.

Literature Review

India has seen a large number of economic reforms aimed at bridging the rich and poor divide. Many successful and unsuccessful experiments have been carried out since the time of independence. In the words of the Second Five Year Plan, "The benefit of economic development must accrue more and more to the relatively less privileged classes of society, and there should be a progressive reduction of the concentration of incomes, wealth and economic power."

Economic enthusiasts and different organizations have often tried to gather the true estimate of poverty in India, According to a study conducted by B.S Minhas we had around 210 million poor people in rural areas in 1967-68. Dr. P.K. Bardhan was sceptical about the validity of GNP deflator used in Dr. Minhas study and suggested the use of labour price index as a more suitable deflator. Another researcher, Montek Ahluwalia followed the trends in incidence of poverty in rural India between the period 1956-57 and 1973-74 using the concept of poverty line (Datt and Sundharam, 2003).

In the measurement of poverty two distinct problems must be faced, viz., (i) identifying the poor among the total population, and (ii) constructing an index of poverty using the available information on the poor. Dr. Amartya

Sen's paper published in 1976 talks about the shortfalls of the two methods of estimating poverty, namely the head count method and the poverty gap measure. The paper stresses that the wealth isn't static and its movement among the poor can't be ignored. A more comprehensive method would have been to multiply head count ratio by income gap ratio, augmented by the Gini coefficient of distribution of income among the poor (Sen, 2008).

According to another article by Andre Beteille, poverty and inequality follow no direct relationship. Therefore it is essential to specify which aspect of poverty and which aspect of inequality is being taken into consideration (Beteille, 2003).

In 2007 an article appeared in EPW analysing the pattern of debt in rural and urban areas and different steps taken towards financial inclusion which was a mandate to ensure overall development of the nation. In the post liberalisation, privatisation and globalisation period, the major share of the priority sectors further got diverted as many different segments were added. The period also observed a decline in banks opening new branches in rural area (Datt and Sundharam, 2003). This brings us to the conclusion that despite the progress of banking and finance sector, the lower strata of the society was not benefited significantly..

According to an article by Dr. N.C. Saxena, former secretary of the erstwhile Planning Commission, analysing the intention behind the Integrated Rural Development Program, its execution and the challenges faced in implementing it, one can see that subsidising the prices of assets or making easy credit available alone does not ensure that people below the poverty line will be able to avail the benefits to climb their way out of poverty. Rather a multi-dimensional approach needs to be followed to ensure the success of such programs.³

Scope

The scope of the paper encompasses critical analysis of the Indian government's poverty alleviation schemes and strategies and their current status. It focuses primarily on how far the current government's schemes have been put into action and measures their success against previously defined parameters based on data available on government forums. However, in absence of relevant data, reasonable amount of speculation has been done. The limitations include heavy dependence on secondary data available on government e-forums and lack of time for cross verification. Also the scope of study is limited to the present Indian scenario.

³ Dr. NC Saxena, Integrated Rural Development Program. Available at: "<http://planningcommission.nic.in/reports/articles/ncsxn/index.php?repts=irdpm.htm#>", last accessed on 8 January 2017.

Analysis

Integrated Rural Development Programme, one of the largest initiatives by the government to assist micro-enterprises and alleviate rural poverty, began in 1979. It is essentially a centrally funded scheme. It has reached a massive number of borrowers i.e. 50 million. However, according to an evaluation conducted by the government, only 15% of the beneficiaries have been able to cross the poverty line by availing the benefits of this programme. Contrary to its intended purpose IRDP seems to be guided by the availability of subsidised funds and not demand of credit as was desired.

Table 1 highlights the reluctant attitude of the lower sections of society towards borrowing from financial institutions, out of innate fear, lack of knowledge, reluctance to adapt and a general dislike for the multitude of legal processes needed.

Table 2 is the snapshot of the National Social Assistance Programme which came into effect in 1995 and aimed at fulfilling the Directive Principle in Article 41 of the Constitution of India. It comprises at present, Indira Gandhi National Old Age Pension Scheme (IGNOAPS), Indira Gandhi National Widow Pension Scheme (IGNWPS), Indira Gandhi National Disability Pension Scheme (IGNDPS), National Family Benefit Scheme (NFBS) and Annapurna. The snapshot (Table 2) gives the number of beneficiaries under the scheme (<http://nsap.nic.in/>).

The National Maternity Benefit scheme also falls under the National Social Assistance Programme. According to this programme a sum of Rs. 500 is provided to an eligible mother above 19 years of age for pre and post-natal care for upto two live births. In 2005, the scheme was renamed Janani Suraksha Yojna and the amount was revised to Rs. 1400 for institutional births. However, it has been observed that the amount received by the recipients was insufficient and often took a long time to process and was on an average received 7/8 months after filling the form. (http://planningcommission.nic.in/reports/sereport/ser/maker/mak_cht5b.pdf)

Looking at the more recent schemes aimed at reducing the rich and poor divide and focusing on financial inclusion, similar conclusion can be reached.

The Direct Benefit Transfer and its linking to adhaar card was a commendable initiative and according to the reports available on the website of Direct Benefit Transfer; the scheme is well underway in achieving its desired objectives. However, as has been seen after linking LPG subsidies to Adhaar card, the implementation is clumsy and problematic owing to the general inertia of people. Also other subsidy schemes like the PDS or MGNREGA may not be as compatible with the Adhaar card authentication design.

Table 1: Distribution of SBAs by credit limit as on March 31, 2004

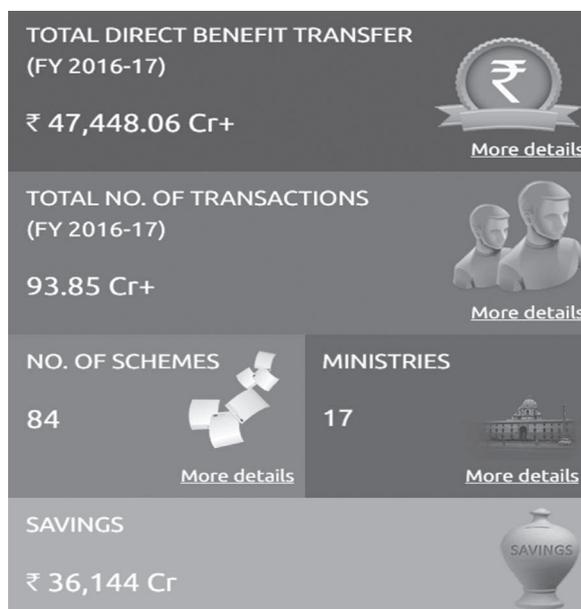
<i>Credit</i>	<i>Percentage share in no. of accounts</i>	<i>Cum per cent of no. of accounts</i>	<i>Per cent share in total credit outstanding</i>	<i>Cum per cent share in total credit outstanding</i>	<i>Average amount outstanding account (Rs)</i>
≤ 2500	5.1	5.1	0.4	0.4	1990
2500-5000	7.3	12.4	1.1	1.5	4016
5000-10000	13.5	25.9	3.7	5.2	7178
10000-15000	9.9	35.8	4.0	9.2	10762
15000-25000	20.0	55.8	12.5	21.8	16433
25000-50000	20.5	76.3	20.3	42.1	26029
50000-75000	6.9	83.2	10.1	52.2	38461
75000-100000	6.7	89.9	14.9	57.1	58453
100000-150000	5.6	1	13.7	80.8	64868
150000-200000	4.5	100.0	19.2	100.0	111248
Total	100.0		100.0		

Source: 'Survey of Small Borrowal Accounts', RBI Bulletin, July 2006.

Table 2: National Dashboard (NSAP) w.r.t Data Digitized

Total Beneficiary	Central Scheme	State Scheme	Total Aadhaar	Verified Aadhaar	Aadhaar seeded with bank
32446111	32076754	369357	15180583	5009823	2251027
With Bank A/C	With PO A/C	Through MO	Through Cash	Bank With Aadhaar	PO With Aadhaar
18716241	2476289	4731019	6453170	9094822	1517902
Total Sanctioned	New Applicants	Male	Female	Transgender	
32446111	103682	12894795	19545190	1668	

Source: <http://nsap.nic.in/>

**Figure 1:** Direct Benefit Transfer, 2016-17.

Source: <https://dbtbharat.gov.in/>

Conclusion

In our onward march towards Capitalism, it becomes even more essential to remain steadfast in our commitment to socialism as a country. Thankfully democracy allows us the freedom to have the better aspects of both capitalism and socialism in our economic policies. With the exponential growth of MNCs in India in the last two and a half decades after liberalisation, privatisation and globalisation, unprecedented employment opportunities opened up for the skilled workers to benefit from; however, for the lowermost strata of society to benefit from the government's policies, a more inclusive approach is needed.

1. India due to its population has a large pool of unskilled labour. Providing these people the benefits to develop skillsets will go a long way in bringing about financial inclusion.

2. Knowledge and skills need to be imparted at free or nominal costs to ensure inclusive growth.

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Microfinance and Poverty Reduction in India

Dev Karan* and Ms Rekha

Department of Economics, Jai Narayan Vyas University
Jodhpur, Rajasthan – 342011

*genwajnvu@gmail.com

Introduction

One of the greatest challenges before the Indian sub-continent which accommodates more than one-third of the population is poverty. The poverty has been described as a situation of “pronounced deprivation in well-being” and being poor as “to be hungry, to lack shelter and clothing, to be illiterate and not schooled” (World Bank, 2000, 2001). Mehta and Shah (2001) defines poverty as “the sum total of a multiplicity of factors that include not just income and calorie intake but also access to land and credit, nutrition, health and longevity, literacy and education and safe drinking water, sanitation and other infrastructural facilities.”

The poor stay poor, not because they are lazy but because they have no access to capital. Lack of loan and other financial services from banks and other institutions forces them to rely heavily on relative or local money lenders at the time of need. Usually interest rate of money lenders is very high. So the vicious circle of low income, low saving, low investment, low production and low employment rate are found in economy. Yunus (2003) believed that poverty is caused by the system and the poor are credible borrowers and small loans can make a big difference to the poor.

Since 1970 microfinance has been proven to be one of the most effective and sustainable tools in poverty fighting. Microcredit plays an important role in fighting the multi-dimensional aspects of poverty and offers financial services to low income populations. According to Robinson (2001), microfinance refers to small-scale financial services for both credits and deposits—that are provided to unemployed or low-income individuals or groups who would otherwise have no other means of gaining financial services. At last the goal of microfinance is to give low income people an opportunity to become self-sufficient by providing a means of saving money, borrowing money and insurance. Most of the major MFI’s deliver very small loans to unsalaried or poor borrowers and reverse vicious circle into virtuous circle of low income,

injection of credit investment, more income, more saving, more investment, more production and more employment. It plays an important role in women empowerment and poverty reduction, particularly in developing countries like India.

Objectives

This study is based on the following objectives:

1. To understand the relationship between micro-credit and poverty alleviation.
2. To analyze the growth of microfinance sector and Self Help Groups in India.
3. To make an overall current status of microfinance in India.
4. To study the impact of microfinance on per capital income.

Review of Literature

The various economists made exclusive study on usefulness of development link with the micro finance. Some of the literatures are mentioned below.

Yunus (2003) won the Nobel Peace prize and popularized the benefit of microloans; donor countries and international charitable organizations were eager to help, if millions can help themselves to escape poverty. Another realization was that the poor often had to cope with irregular or seasonal income and must develop the habit of savings to build the capability of consumption smoothing. Microcredit transformed into microfinance because many microcredit programmes also require their clients to demonstrate regular savings habit. With very high recovery rate of microloans and high profitability private equity poured into the sector. Similarly, Narasaiah (2004) in his study mentioned that the change in women's contribution to society is one of the striking phenomena of the late twentieth century. According to him micro-credit plays an important role in empowering women. On the other hand, Barr (2005) argues in his article that by focusing on microfinance, development policy can strengthen the links between financial development, economic growth, and poverty alleviation. Rather than focusing exclusively on microfinance as an anti-poverty strategy, microfinance should be seen as an integral component of a developing country's broader financial development strategy.

Kakade and Bhau (2007) in their case study found that the SHGs are dominated by females and it has helped in improving the quality of life of the women. There is positive impact of SHGs in people's income, savings, consumption and expenditure. The SHG can act as an alternative institutional asset to tackle the problems of unemployment, poverty and gender justice. Glennerster and Kinnan (2009) studied the impact of microfinance in urban

slums of Hyderabad, India. The authors found that not all who qualified for loan borrowed from the new MFI branch opening. More new businesses were opened and those businesses realized higher profit. Households who started business increased spending on investment rather than consumption. The households which were less likely to start a business spent more on consumption. Since the loans were not specifically for business purposes, the authors were unable to conclude whether the effect was the direct result of microloan or came from indirect effects. The study was for 15-18 months and could not find any impact on health, education or women's empowerment (Rosenberg, 2010).

Methodology

This is a descriptive research paper based on secondary data. Data have been collected from different websites, books, research papers and journals collected. Simple calculation, graph and tables are used by researchers to explain the facts and finding the results.

Origin of Microfinance

With the emergence of informal financial institutions in Nigeria in 15th century, they were first established in Europe during the 18th century as a response to the enormous increase in poverty since the end of the extended European wars. In 1720 the first institution targeting poor people was founded in Ireland by the author Jonathan Swift. At this time, they provided financial services to almost 20% of Irish households. The concept of microfinance can be traced as long back to the middle of the 1800s when the theorist Lysander Spooner was writing over the benefits from small credits to entrepreneurs and farmers as a way of getting the people out of poverty. Friedrich Raiffeisen founded the first cooperative lending banks to support farmers in rural Germany. But the modern use of the expression "Micro financing" has a root in the 1970s when Dr. Muhammad Yunus started Grameen Bank in Bangladesh. The Grameen Bank Project (Grameen means 'rural' or 'village' in Bangla language) came into operation extending banking facilities, eliminate the exploitation, and create opportunities for self employment to poor people in rural Bangladesh.

Microfinance in India and Needs

In India, the legal framework for establishing the co-operative movement was set up in 1904. But actually microfinance in India started in 1974 in Gujarat with Shri Mahila SEWA (Self Employment Women's Association) Sahakari Bank. Microfinance later evolved in early 1980s around the concept of informal Self-Help Groups (SHGs). During 1992, NABARD started linking SHGs to banks in India.

In India around 21.9% population is living below the poverty line and about 60% of the poorest households do not have access to credit. Only 20% access loan from the formal sources. Annual credit demand by the poor is estimated to be about Rs 60,000 crores and only Rs 12,000 crores are disbursed (Planning Commission, 2015).

Concept, Features and Overview of Indian Microfinance

“Micro finance has proved its value, in many countries, as a weapon against poverty and hunger. It really can change people live for the better especially the lives of those who need it most.”

Kofi Annan, United Nations Secretary-General

In India, microfinance has been defined by “The National Microfinance Taskforce, 1999” as “provision of thrift, credit and other financial services and products of very small amounts to the poor in rural, semi-urban or urban areas for enabling them to raise their income levels and improve living standards”. “The poor stay poor, not because they are lazy but because they have not access to capital.”

The Main Features of Microfinancing

1. Loan is given without security.
2. Loan to those people who live BPL (Below Poverty Line).
3. Even members of SHG enjoy microfinance.
4. The terms and conditions given to poor people are decided by NGOs.

Channels of Microfinance in India

In India microfinance operates through two channels:

1. SHG-Bank Linkage Programme (SBLP).
2. Micro Finance Institutions (MFIs).

SHG-Bank Linkage Programme: This is the bank-led microfinance channel which was initiated by NABARD in 1992. Under the SHG model the members, usually women in villages, are encouraged to form groups of around 10-15. The members contribute their savings in the group periodically and from these savings small loans are provided to the members. The SHGs are self-sustaining and once the group becomes stable it starts working on its own with some support from NGOs and institutions like NABARD and SIDBI.

Micro Finance Institutions: Those institutions which have microfinance as their main operation are known as micro finance institutions. A number of organizations with varied size and legal forms offer microfinance service. These institutions lend through the concept of Joint Liability Group (JLG). JLG is an informal group comprising 5 to 10 individual members who come together for the purpose of availing bank loans either individually or through

the group mechanism against a mutual guarantee.

Specialised Agencies in Rural Credit: Relative Performance

The co-operatives in India could not play any major role in mitigating the miseries of the villagers till the early decades of the twentieth century. Accordingly, the All India Rural Credit Committee (1945) felt the need for the commercial banks to purvey credit for agriculture in specialized areas and recommended the conversion of the Imperial Bank of India into State Bank of India.

The study group (1968) under the Chairmanship of Prof. D.K. Gadgil emphasized the need to involve the commercial banking system in providing rural credit. However, nationalization of commercial banks (CBs) resulted in limiting their role as provider of rural credit. The Government of India took cognizance of this fact and appointed a working group under the chairmanship of Shri Narasimhan in July 1975 for setting up a new institution.

Accepting the recommendations of the Narasimhan committee the Government passed the Regional Rural Banks Act in 1976 (RRB Act, 1976). The RRBs started providing agricultural credit and other rural banking services along with Co-operatives. Apart from these two agencies, CBs too provide rural credit services, of course along with many other banking services. The share of Co-operatives (Co-ops) and RRBs in the total credit off-take in the country is quite poor, though there has been steady and constant growth over the years. The share of Co-operatives and RRBs in agricultural credit as of FY 2015-16 (provisional), banks have disbursed 8,77,224 crore (provisional) credit to the agriculture sector, against a target of 8,00,000 crore. Commercial banks, cooperative banks and RRBs disbursed 1,53,295 crore (provisional), 6,04,668 crore and 1,19,261 crore, respectively as shown in Table 1.

Table 1 and Figure 1 show that credit-flow from NABARD in India shows tremendous growth from 2006-07 to 2015-16. The credit inflow from NABARD in 2006-07 was Rs. 229,400 crore, which raised to Rs. 877,224 crore in 2015-16 (P). It shows an almost four times increase in credit inflow in ten years. The commercial banks contribute around two-third of total credit inflow in rural areas followed by Cooperative banks which contribute 15-18% in credit inflow and Regional Rural Banks contribute around 8-10% in total credit inflow in rural areas. Rural credit helped in poverty alleviation through micro credit. The rise in total credit inflow in rural areas showed strengthening of poor people through microfinance.

Current Status of Microfinance in SHG-BLP

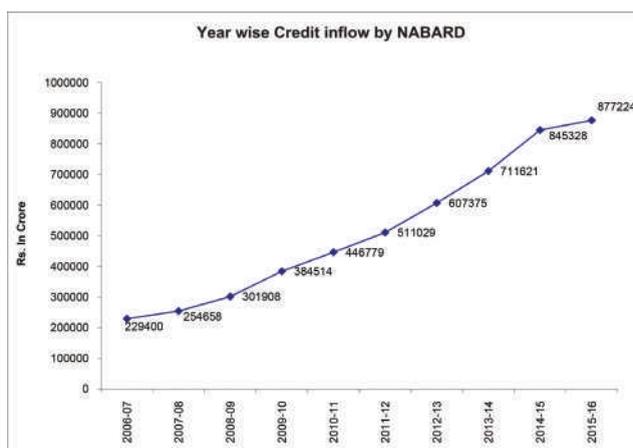
The programme is being expanded with a view to covering all eligible poor rural households, with a focus on resource-poor states, providing livelihood opportunities to SHG members and covering the areas which have not been

Table 1: Agency-wise ground-level credit flow (Amount in Rs crore)

Financial Year	Agency			Total & %
	Co-operative	RRB	Commercial bank	
2006-07	42480 (18.52)	20435 (8.91)	166485 (72.57)	229400 (100)
2007-08	48258 (18.95)	25312 (9.94)	181088 (71.11)	254658 (100)
2008-09	45966 (15.30)	26765 (8.87)	228951 (75.83)	301908 (100)
2009-10	63497 (16.51)	35212 (9.16)	285800 (74.33)	384514 (100)
2010-11	70105 (15.69)	43968 (9.84)	332706 (74.47)	446779 (100)
2011-12	87963 (17.22)	54450 (10.65)	368616 (72.13)	511029 (100)
2012-13	111203 (18.31)	63681 (10.48)	432491 (71.21)	607375 (100)
2013-14	119964 (16.86)	82652 (11.61)	509005 (71.53)	711621 (100)
2014-15	138469 (16.38)	102482 (12.12)	604375 (71.50)	845328 (100)
2015-16 (provisional)	153295 (17.7)	119261 (13.60)	604668 (68.93)	877224 (100)

*CBs: commercial banks; RRBs: regional rural banks; Coops: cooperative banks.

Sources: NABARD (based on reporting by RRBs and cooperative banks) computed; Indian Banks Association (for commercial banks)

**Figure 1:** Financial year wise credit flow by NABARD.

Sources: NABARD (based on reporting by RRBs and cooperative banks)

reached. Efforts are being made to revive dormant SHGs and prevent the functional ones from disintegrating, through measures such as capacity-building and hand-holding support. In close coordination with the National Rural Livelihoods Mission (NRLM), an attempt is being made to form and nurture groups by involving NGOs; community support system for promoting and nurturing SHGs is being suitably incentivized.

The SHG saving in Banks from 2006-07 to 2015-16 shows a tremendous growth. The SHG saving at bank in the year 2006-07 was Rs. 3512.71 crore raised to 13,631 crores in 2015-16. Similarly, loan disbursed by SHG in year 2006-07 was Rs. 6570.39 crores which raised to 37,286 crore in 2015-16, which shows almost six times increase in loan disbursed. The loan outstanding in 2006-07 was 12,366.49 crore raised to Rs. 57,119.23 crore in 2015-16.

Table 2 shows SHGs saving with banks, in year 2006-07. The saving deposited in bank was Rs 3512.71 crore, the deposits increased by 7.8% in 2007-08 and reached Rs 3785.39 crore. In successive years there was increasing trend and the amount in saving account was Rs 13,691.39 crore with the growth rate of 23.79% during 2015-2016 respectively. Loan disbursed to SHGs in 2006-07 was Rs 6570.39 crore, the amount increased by 11.0% in 2007-08 and reached Rs 8849.26 crore. In 2015-16 amount was Rs 37,286.90 crore with the growth rate of 35.18%. Table also shows data about loan outstanding against SHGs and that amount in 2006-07 was Rs 12,366.49 crore, the amount increased by 25.3% in 2007-08 and reached Rs 57,119.23 crore. In 2015-16 amount was Rs 57,119.23 crore with the growth rate of 10.81%.

Concept of Poverty-line in India

Inside India, both income-based poverty and consumption-based poverty statistics are in use. Outside India, the World Bank and institutions of the United Nations use a broader definition to compare poverty among nations, including India, based on purchasing power parity (PPP), as well as nominal relative basis. Each state in India has its own poverty threshold to determine how many people are below its poverty line and to reflect regional economic conditions.

Few methods used in India to officially estimate poverty are:

1. The Task Force (1979): The Task Force (reported in 1979) defined the poverty line as monthly per capita consumption expenditure (MPCE) level of Rs. 49.09 for rural areas and Rs. 56.64 for urban areas at 1973-74 prices at national level. These corresponded to the money value of a basket of goods and services that would cover per capita daily calorie requirement of 2400 kcal in rural areas and 2100 kcal in urban areas.
2. The Expert Group (Lakdawala Committee, 1993): The poverty line approach anchored in a calorie norm and associated with a fixed consumption basket (as recommended by the Task Force) might be

Table 2: Overall progress under SHG-Bank linkage programme

Financial year	SHG saving with banks as on 31 st March		Loan disbursed to SHGs during the year		Loan outstanding against SHG as on 31 st March	
	No. of SHGs	Amount	No. of SHGs	Amount	No. of SHGs	Amount
2006-07	41.60	3512.71	11.05	6570.39	28.94	12366.49
2007-08	50.09	3785.39	12.27	8849.26	36.25	16999.91
2008-09	61.21	5545.62	16.10	12253.51	42.24	22679.84
2009-10	69.53	6198.71	15.87	14453.03	48.51	28038.38
2010-11	74.62	7016.30	11.96	14547.73	47.87	31221.17
2011-12	79.60	6551.41	11.48	16534.77	43.54	36340.00
2012-13	73.18	8217.25	12.20	20585.36	44.51	39375.30
2013-14	74.30	9987.42	13.66	24017.36	41.47	42927.52
2014-15	76.97	11059.84	16.26	22782.31	44.68	51545.46
2015-16	79.03	13631.39	18.32	37286.90	46.73	57119.23

In table the amount is in rupees crore and number in lakhs.

Source: Status of microfinance in India report 2006-07 to 2015-16.

continued. However, the Expert Group further recommended that the state-specific poverty lines (for the base year 1973-74) be worked out.

3. Tendulkar Committee (2009): Tendulkar Committee's approach made four major departures which, in their view, constituted significant improvements over the existing official poverty estimation procedure: (i) consciously moving away from calorie anchor; (ii) recommending to provide a uniform 'poverty line basket' (PLB); (iii) recommending a price adjustment procedure and (iv) incorporating an explicit provision in price indices for private expenditure on health and education.

India's current official poverty rates are based on its Planning Commission's data derived from so-called Tendulkar methodology. It defines poverty not in terms of annual income, but in terms of consumption or spending per individual over a certain period for a basket of essential goods. Further, this methodology sets different poverty lines for rural and urban areas. India set its official threshold at ₹ 26 a day (\$0.43) in rural areas and about ₹ 32 per day (\$0.53) in urban areas, while these numbers are lower than the World Bank's \$1.25 per day income-based. The World Bank's international poverty line definition is based on PPP basis, at \$1.25 per day. The World Bank sets the international poverty line at periodic intervals as the cost of living for basic food, clothing, and shelter around the world changes. In the 2008 update, the poverty line was set at \$1.25 per day.

Impact of Microfinance on Poverty Reduction in India

Microfinance is a powerful instrument for poverty alleviation and women's empowerment in the new economy. There are two dimensions of the impact of microfinance. Firstly, it facilitates the SHGs members in general, enhancing their income which helps in strengthening their livelihood, and increases the self confidence in managing their microfinance programmes. In India microfinance is dominated by SHGs and MFI bank linkage programme, aimed at providing a cost effective mechanism for providing finance services to the poor. Microfinance for the poor and women has received extensive recognition as a strategy for poverty reduction and for economic empowerment. However, there is perceptible gap in financing genuine credit needs of the poor especially women for the empowerment and poverty reduction. Rural development is primarily concerned with addressing the needs of the rural poor in the matter of sustainable economic activities. Reduction of rural poverty can be achieved by starting income generating programmes with focus on micro credit as the basic input for socio-economic development. Microfinance is powerful instrument for innovative and hard working micro entrepreneurs to start any small business. From the income of these small businesses the borrowers of micro credit live quality life, health facilities, education, and nutrition for their family and keep hope for a better future.

Data Analysis and Interpretation

From the previous studies it's found that microfinance helps poor people by providing loan for lifting them from the poverty line. By that they increase their per capital income and reduce the poverty percentage. This study focused on per capital income and poverty relevant data. On the basis of that the finding of the study has been elaborated.

Figure 2 shows that the per capita income of India is continuously growing, but after 1990s the rate of per capita income increased more because SHG provided money as a loan to the poor people for self employment . By that poor people get employment, increase per capita income and lift him from poverty line. On the basis of that observation it may be said that microfinance may be one of the factors to increase per capita income and negative relation between per capita income and population under poverty line.

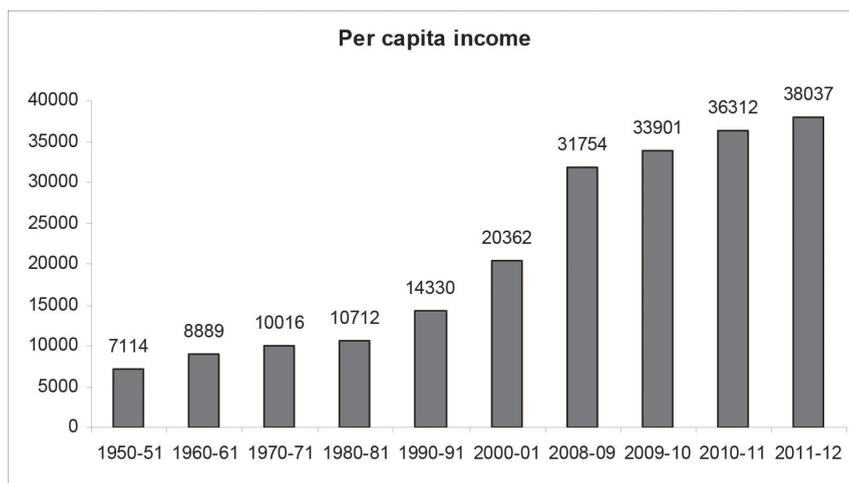


Figure 2: Per capita income at 2004-05 price.

Source: Central Statistics Office (CSO)

From Table 3, it is observed that percentage of poverty in India is continuously reduced. In 1993-94 poverty percentage in India is 45.3%. In rural area the poverty is 50.1% and in urban area the poverty is 31.8%. It shows that rural area is more affected by poverty. But the rate of poverty in India is decreased because SHG provided money as a loan to the poor people for self employment. Impact of microfinance on poverty line is shown in Table 3. In 1993-94 poverty percentage in India is 45.3% according to Tendulkar Committee method, the percentage of poverty decreased by 8.1% and reached 37.2% in 2004-05. In 2009-10 poverty percentage is 29.8% and 2011-12 is 21.9% . On the basis of data, we found that providing microfinance by SHGs and MFIs helps to reduce the poor population in India.

Table 3: Percentage of poor in India

<i>Year</i>	<i>Poverty ratio in percentage (%)</i>		
	<i>Rural</i>	<i>Urban</i>	<i>Total</i>
1993-94	50.1	31.8	45.3
2004-05	41.8	25.7	37.2
2009-10	33.8	20.9	29.8
2011-12	25.7	13.7	21.9

Source: Planning Commission (Estimated by Tendulker Committee methodology)

Suggestion and Conclusion

In India, many poverty alleviation programmes are implemented for poverty reduction but the desired results are yet not obtained. The outcome of this paper will help to understand the relationship between poverty alleviation and microfinance on one hand and on the other hand, the outcome of this paper will also throw light on impact of poverty alleviation programmes on poverty reduction through microfinance in India. Microfinance has become more widespread over the last couple of decades, as it has been shown to be effective in alleviating conditions of poverty. Creating self employment opportunities is one way of attacking poverty and solving the problems of unemployment. There are over 24 crore people below the poverty line in our country and microfinance activities can give them a means to climb out of poverty. Microfinance could be a solution to help them to extend their horizon and offer them social recognition and empowerment. The scheme of microfinance has been found as an effective instrument for lifting the poor above the level of poverty by providing them increased self-employment opportunities and making them credit worthy. The present study found that microfinance is an important factor for living a better life by increasing per capita income and reducing and lifting up the population under poverty-line.

The following suggestions are made for making the microfinance as effective tool for alleviation of rural poverty:

- There is a need of designing financially sustainable models and increase outreach and scale up operations for poor in India.
- Large population of India belongs to villages and most of them are uneducated, so they are still unaware about banking policies and credit system. So NGOs should communicate to them and share their view with villagers and educate SHGs group members, how to utilize the funds properly.
- Banks should convert and build up professional system into social banking system for poor.

- Micro credit loans are too small to make a dent in poverty alleviation and growth. Micro credit has to do with accumulations of assets: physical, financial and human.
- Government of India and state governments should also provide support for capacity building initiatives and ensure transparency and enhance credibility through disclosures.

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The Legal Infrastructure for Realization of the Sustainable Development Goals in India

Janvi Manek* and Urjitah Srikanth

ILS Law College, Pune
*janviprek95@gmail.com

Introduction

“Law, strictly understood, has its first and principle object of ordering the common good.”

St. Thomas Aquinas

Poverty and inequality are two evils which have crippled society, retarding the pace of development, both present and future. The brunt of poverty and inequality is borne by both, individuals and the economy as a whole, alike. The framers of the Constitution of India had laid down three broad purposes of the Constitution, in the Preamble. One of the purposes was to secure to the citizens of India social, economic, and political justice. Thus, achieving the ideal of social justice has predominantly influenced the working of the various governments since. This is evident from the efforts undertaken to curb the evils of poverty and inequality.

In order to assess the viability of achieving the Sustainable Development Goals 1 and 10 by 2030, as a first step the study will provide an overview of the state of affairs with respect to poverty, and the income inequalities that exist in India.

Poverty

India is the second most populous country in the world, with a population of 1.311 billion.¹ In 2011-12, 29.5% of the whole population in India were living below poverty line.² During this period, India was found to be home

¹ Source: Poverty and Equity Data, World Bank.

² Source: Report of the Expert Group to Review the Methodology for Measurement of Poverty, Dr. C. Rangarajan, 2014.

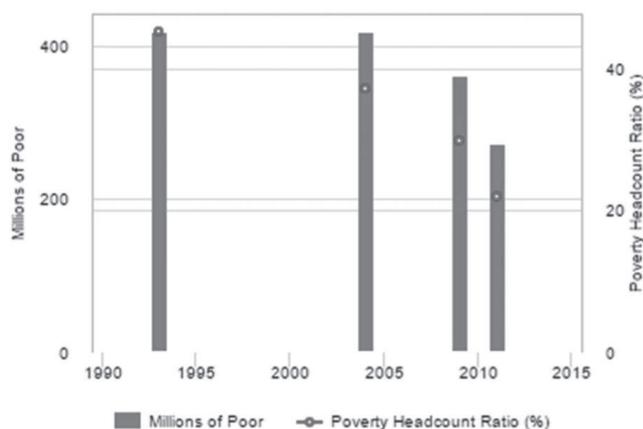


Figure 1: Poverty rate and number of poor in India.

Source: World Bank

to the largest number of poor people in the world.³ While these figures may seem alarming, if one observes the poverty trend in India, there is a statistical decline in both, the number of poor and the ratio of poor. From 1993 to 2011, the poverty in India has nearly halved.⁴

This favourable decline has been possible with an enabling legal framework, and the goal of eradicating poverty can only be effected with the same. Bearing in mind that the goal to ‘End Poverty in All Forms Everywhere’ is to be achieved by 2030, the process of eradicating poverty in India must be expedited and efficiently so.

Income Inequality

Inequality, in its several forms, resonates across India and is experienced by its people in their daily lives. In some instances, one form of inequality doesn’t exist by itself; it may coincide with other forms to add to the detriment of society. In addition, India is diseased with many discriminatory laws and policies.

In pursuit of economic development, promotion of shared prosperity is being neglected. India is one among the 10 richest countries in the world, with a total individual wealth of \$5,600 billion, but at the same time, India is also home to the largest number of poor people in any country.⁵ In India, the richest 1% own 53% of the country’s wealth.⁶ This concentration of wealth is a result of unequal distribution of income as reflected in India’s GINI Index of 35.2.⁷

³ Ending Extreme Poverty and Sharing Prosperity: Progress and Policies, World Bank, 2015.

⁴ Source: Poverty and Equity Data, World Bank.

⁵ Source: World Bank Report, 2012

⁶ Source: Global Wealth Report, Credit Suisse, 2016

⁷ Source: Poverty and Equity Data, World Bank

In such a scenario, law is one effective tool which must be utilised to achieve income inequality, to give effect to Goal 10 in our country by 2030.

Poverty and Inequality

Food, clothing, and shelter are the most essential requirements for human survival. Simply put, without these essentials, any human being can be considered to be living in poverty. There are certain basic requirements which are essential for survival of human beings. However, there is a large proportion of global population that is devoid of these basic requirements. In order to quantify the population that is devoid of these basic requirements, at a national and an international level, a threshold is determined, known as the

Table 1: Share of different commodity groups in poverty line (%)

<i>S.No.</i>	<i>Items</i>	<i>Rural</i>	<i>Urban</i>
1	Cereals & substitute	14.6	10.3
2	Pulses & products	3.5	3.0
3	Milk & milk products	6.3	6.4
4	Salt & sugar	2.0	1.7
5	Edible oil	4.5	3.8
6	Egg, fish & meat	4.8	4.0
7	Vegetables	8.4	6.0
8	Fruits	1.7	2.1
9	Spices	3.9	3.3
10	Other Food	7.2	6.1
	Food Total	57.0	46.7
11	Pan, tobacco & intoxicants	2.9	2.1
12	Fuel and light	9.7	7.9
13	Medical (Instt & non-Instt)	4.5	3.4
14	Conveyance	3.6	7.3
15	Rent	0.1	5.3
16	Clothing & bedding	7.8	8.3
17	Footwear	1.0	0.9
18	Education	3.0	8.1
19	Durable goods	1.9	1.5
20	Other non-food	8.5	8.6
	Non-food Total	43.0	53.3
	Total MPCE-Poverty Line	972.30	1406.96

Source: Report of the Expert Group to Review the Methodology for Measurement of Poverty, Planning Commission, 2014

‘poverty line’. The poverty line serves to delineate those living in conditions of extreme poverty.

In 2014, the Planning Commission revised the poverty line in India to Rs. 32 in rural areas and Rs. 47 in urban areas, per capita per day from Rs. 27.2 and Rs. 33.3 respectively. This line has been arrived at taking into account everything that encompasses human need, in keeping with the current socio-economic relevance.

However, only using the poverty line to quantify the population living in impoverishment would provide a very narrow and incomplete representation of what is an expansive and pervasive problem. Therefore, in making any attempt to alleviate poverty, a holistic approach should be adopted wherein along with persons living below the poverty line, the condition of vulnerable and marginalized sections should also be ameliorated. This approach has been endorsed by the Sustainable Development Goals.

Goal 1 of the 17 Sustainable Development Goals is to *End Poverty in All its Forms Everywhere* by 2030. In order to achieve this Goal, seven targets and two sub-targets have been set. These targets range from eradicating extreme poverty to bringing about an overall socio-economic advancement of all vulnerable members of society.

Income inequality is the gap between the rich and the poor while poverty is a state of total deprivation. Income inequality and poverty are so related that any attempt to reduce poverty is automatically an attempt to reduce income inequality. Although, complete eradication of poverty may not mean achieving total income equality, it is a movement in the same direction. The fact that in any society there exists a group of people living a better standard of life than another group is indicative of income inequality.

Goal 10 is to *Reduce Inequality Within and Among Countries*. Of the seven targets and three sub-targets set to achieve this goal, this paper will focus on measures for reduction on income inequalities and inequalities of opportunities. The goals of removal of poverty and reduction of income inequality cannot be realized in isolation from each other. The goals are interdependent, as must be the measures taken to achieve them. There is a wide gap in the proportion of population residing in rural and urban areas in India – 68.84% and 31.16% rural and urban respectively. Thus, the rural and urban population comprise two separate sectors in the country. Owing to this

Table 2: Population of India between 2001 and 2011 (in Crore)

	2001	2011	Difference
India	102.9	121.0	18.1
Rural	74.3	83.3	9.0
Urban	28.6	37.7	9.1

Source: Census of India

gap in the distribution of the population, in order to successfully progress towards sustainable development, it is important to address the problem of poverty and income inequality in these two sectors, separately. This has been the rationale behind the efforts taken by the Government of India in resolving the problem of poverty and income inequality.

Constitutional Protection

In order to attain the purposes enshrined in the Preamble, the Constitution imposes certain negative obligations on the State to not interfere with the liberty of the individual, and positive obligations to take steps for the welfare of the individual. These obligations are contained in Parts III and IV of the Constitution. Part III guarantees to all individuals civil and political rights known as the Fundamental Rights. Part IV provides certain guiding principles which are fundamental in the governance of the country, though they are not enforceable. The State is obligated to apply these principles, which take the form of social, economic, and cultural rights, in making laws. Parts III and IV of the Constitution of India are described by Chief Justice Chandrachud to be ‘the conscience of the Constitution’.⁸All these principles, in conjunction, pave the way for an economy with reduced poverty and inequalities in income.

Occupational and Financial Vulnerability

In the battle against poverty, creation of employment and employment opportunities have emerged as the most efficient and permanent measures for its eradication. Employment, whether manual or skilled, ensures not only a steady source of income but also a secure livelihood for one entire household. Occupational vulnerability means precarious livelihoods, dependence on informal sector for employment and earnings, lack of job security, poor working conditions etc. Financial vulnerability is a situation in which a person has no income or no source of income, and his capacity to assist himself is limited. In order to reduce occupational and financial vulnerability of the poor in the country, the government is taking steps to create employment, and at the same time, skill training is also provided to enable the poor to seek employment or set up their own income generating activity.

Article 21 guarantees the Fundamental Right to unqualified protection of life and personal liberty, in all its variations. This right has become an *inexhaustible source of many other rights*.⁹ The Hon’ble Supreme Court in the *Olga Tellis* case¹⁰ has brought within the Right to Life, the Right to Livelihood. The Court observed:

⁸ *Minerva Mills v. Union of India* (1980) 2 SCC 591

⁹ *Maneka Gandhi v. Union of India* (1978) 1 SCC 248

¹⁰ *Olga Tellis v. Bombay Municipal Corporation*, AIR 1986 SC 180

“....the question which we have to consider is whether the right to life includes the right to livelihood. We see only one answer to that question, namely, that it does. The sweep of the right to life conferred by Article 21 is wide and far-reaching. an equally important facet of that right is the right to livelihood because, no person can live without the means of living, that is, the means of livelihood.”

Thus, reducing occupational and financial vulnerability can be considered to be a natural extension of the Right to Livelihood. Measures to reduce occupational and financial vulnerability as a means to eradicate poverty and reducing income inequality in India is of primary importance because of the deprivation and irregularity in the sources of income. In the urban areas, 57.57% of the total population was found to have no source of income. Whereas in the rural areas, a high percentage of 51.18% of the total population were found to be manual casual labourers having no job security. Other sources of income of the poor around the country are unstable and unregulated like rag picking, begging, domestic service etc.¹¹

Measures for Removal of Occupational and Financial Vulnerability

The Mahatma Gandhi National Rural Employment Guarantee Act, 2005

The National Rural Employment Guarantee Act was passed in 2005 with enhancement of livelihood security as its primary objective. The Act, later renamed as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2008, seeks to address the problem of poverty by providing minimum 100 days of wage employment per year to rural households.

From this legislation emerges the Mahatma Gandhi National Rural Employment Guarantee Scheme, suitable to each state, based upon the national guidelines as fixed by the Ministry of Rural Development from time to time. The Act has established authorities for implementing and monitoring the working of the Scheme at the Central, State, and the District level. The Panchayati Raj Institutions at the district level are the principle authorities for planning and implementation of the Schemes under the Act (Section 13).

Mahatma Gandhi National Rural Employment Guarantee Scheme

Adult members of every rural household, who are willing to do unskilled manual work, have been given the right to work for at least 100 days in every financial year. The general procedure follows that adult persons belonging to rural households may submit applications for registration and employment under the Scheme to their local Panchayats (Schedule II).

The Scheme guarantees a stable source of income, where employment is granted, by requiring the payment of wages to be made on a weekly basis, or

¹¹ Socio Economic and Caste Census, 2011

in any case, not later than 15 days after the completion of the work (Section 3). Where employment is not granted within 15 days from application, the applicant is entitled to receive an unemployment allowance (Section 7). All payments of wages must be in compliance with the Minimum Wages Act, 1948, which prescribes the minimum rates of wages (Section 6).

There are certain conditions enlisted in Schedule II that must be fulfilled in the Scheme of every state. These conditions are set to further the object of strengthening the livelihood resource base of the rural poor. Furthermore, other essentials such as clean drinking water, crèches for beneficiaries with children, treatment in case of injury at the time of employment, etc. have been covered in this Schedule, giving the Scheme the character of a social security programme, as envisioned in the targets of the Goals.

Analysis and Viability

The State, by enacting MGNREGA, has discharged the obligations created by the Constitution of India vide Articles 43, 41, and 39. This Act, by its very object and nature, is in consonance with *Article 41* which provides that the State shall make effective provisions for securing the right to work and the right to public assistance in cases of unemployment.

MGNREGA is predominantly a social security scheme in the form of a labour law, prevalent pan India. One of the significant features of MGNREGA is that the permissible works and projects allotted thereunder, are aimed at ensuring sustainable development in India which is an agricultural economy. This being one of the goals of MGNREGA, the Act creates employment that address the cause of chronic poverty such as draught, deforestation, soil erosion etc.¹² The Act not only seeks to build a stronger base of natural resources, it also makes an attempt in creating durable assets in rural areas, such as irrigation canals, roads, etc.

One of the unique features of the MGNREGA is that it establishes a *rights based-demand driven* Scheme, which entails that there is a choice to the adult members of the rural households to exercise the right to employment as guaranteed under the Act. Since the funding for the Scheme is largely by the Central Government, there is an incentive for the State Governments to spread awareness and create demand for employment in the first place. Setting of a time limit for allotment of works and the payment of unemployment allowance on crossing the limit, acts as a disincentive in the second place.

In order to implement the choice conferred on the adult members to exercise their right to employment, they must submit an application to the Gram Panchayat. However, there is a downside to this, as the power to resolve any discrepancies relating to allotment of employment, wage payment, and unemployment allowance, all lie with the same institution. This makes the implementing and the adjudicating agency the same body, which in effect

¹² NREGA Guideline, 3rd Edition

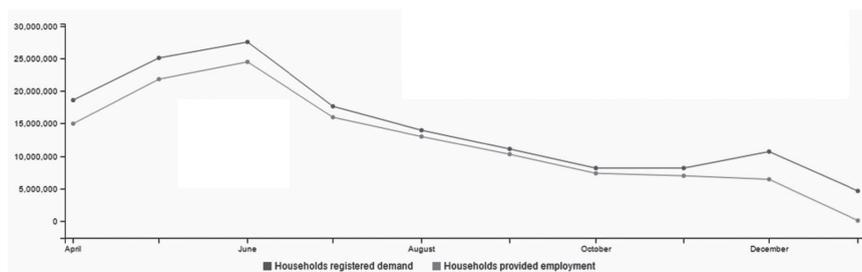


Figure 2: Employment given to household by MGNREGA.
 Source: MGNREGA 2016-17 Report

authorises the agency to resolve a discrepancy in which it has an interest. This is in contravention to the principle of natural justice *nemo judex in causa sua* meaning ‘no-one should be a judge in his own cause’. The principles of natural justice are significant to protect the rights of the public against excesses of the State. *Nemo judex in causa sua* implies fairness and embodies the rule against bias.

This shortcoming is not overlooked by the Judiciary in India. The Hon’ble Supreme Court in *Swaraj Abhiyan – (II) v. Union of India & Ors.*¹³ took a proactive role by directing the Government of India to ensure that compensation for delayed payment is made to the workers in compliance with MGNREGA, thus reinforcing the right of the workers. The outcome in the second year of the programme¹⁴ was that 99.06% of the employment demanded was met with, i.e., out of 2.12 crore households that applied for employment, 2.10 crore households were beneficiaries under the Scheme. Although, this success rate could be maintained in the years to follow, the overall performance of the Scheme has not been disappointing.

MGNREGA has been instrumental in reducing poverty by 32%. It prevented 14 million people from falling into poverty. Furthermore, it was established that there was an inverse relationship between participation in the Scheme in a state and the poverty estimates of that state.¹⁵ All of this has been possible because the Act is guaranteeing a steady source of income which enables the people to lead a life of dignity and of good standard. Under *Article 43*, securing a living wage and good conditions of work in order to provide a decent standard of living to all workers is a duty of the State.

The Act grants priority to women by requiring that at least one third of the total beneficiaries are women. The Standing Committee on Rural Development submitted a report in 2013 which observed that the participation of women, Scheduled Tribes, Scheduled Castes and other marginalised sections was

¹³ Writ Petition (Civil) No. 857 of 2015

¹⁴ Report of the Second Year April 2006 – March 2007 NREGA, 2005, Ministry of Rural Development

¹⁵ Planning Commission poverty estimates in 2013 and MoRD 2013

significantly higher than the set target. Furthermore, one third of the non-official members in the implementing and monitoring councils at the Central and State Level, shall comprise women, and Scheduled Castes, Scheduled Tribes, Other Backward Classes, and Minorities. The Scheme is non-discriminatory and the Equal Remuneration Act, 1976 is to be complied with in every employment in furtherance of the duty imposed by *Article 39. Article 15* permits the State to make any special provision for the advancement of women, socially backward classes, Scheduled Castes, and Scheduled Tribes.

However, despite these achievements, the Scheme is not without flaws. Corruption still remains a big problem seeing as the programme is largely funded by the central government. Delay in payment of wages, non-payment of wages or the unemployment allowance, incomplete works, fluctuations in planning and funding by the Centre, fabrication of job cards, etc. are some of the concerns that inhibit the progress of the Scheme.

Deen Dayal Antyodaya Yojana

National Rural Livelihoods Mission (DAY–NRLM)

DAY–NRLM is the largest poverty reduction programme in the world in terms of its goal.¹⁶ It seeks to establish efficient and effective institutional platforms for nearly seven crore rural households. Launched in 2011 as NRLM, and reconstructed as Deen Dayal Antyodaya Yojana in 2015, this mission aims at improving access to financial services to the rural poor and improve their livelihood on a sustainable basis. The Mission seeks to enable better access to the poor in rural areas to their rights, entitlements, public services, etc. The Mission has fixed its focus on social and financial inclusion of the rural poor.

The predecessor of DAY–NRLM, Swarnajayanti Grameen Swarojgar Yojana (SGSY) was unsuccessful in the eradication of poverty through income generating assets and economic activities. Thus, a need for a revised programme adopting a ‘Livelihoods Approach’ was felt. NRLM recognises that the poor have a strong desire to come out of poverty. This being one of the guiding principles of the Mission, it takes a holistic approach in eradication of rural poverty.

Approach

This Mission primarily aims to effectuate social and financial inclusion of households in rural areas. The aims are materialised by:

- (a) Promoting the formation of institutions of the poor such as Self Help Groups (SHGs) and Livelihoods Collective for providing space, voice, resources, and reducing dependence on external agencies. The SHGs act as centres of production and commercial activity, and also knowledge and technology dissemination. The purpose of the Livelihoods Collective is to enable the poor to effectively mobilize their limited resources.

¹⁶ India’s National Rural Livelihoods Mission: An Overview, World Bank

- (b) Providing skill training and capacity building to the poor for managing their own institutions and livelihoods, improving their credit worthiness, etc.
- (c) Creating funds for future utilisation and providing capital subsidies for easy access to finance at reasonable rates.
- (d) Creating financial literacy among the rural poor and providing access to Information, Communication and Technology (ICT) based financial technologies.
- (e) Encouraging the rural poor to avail loans up to Rs. 1 lakh per household at an interest subsidy.

The Mission is implemented with the help of support structures at the National, State, district and sub-district levels. These support structures are:

- (a) National – NRLM Advisory, Coordination and Empowered Committees and National Mission Management Unit
- (b) State – State Rural Livelihoods Missions (SRLMs) as autonomous bodies and State Mission Management Units
- (c) District and sub-district – District Mission Management Units, Sub-district units (at block/cluster levels)

Progress

The successful progress of this Mission is clearly demonstrated by the achievements of the Mission which have surpassed the annual targets for the current financial year. The number of gram panchayats in which intensive strategy was to be initiated was set as 7,252. But, in the current financial year, the Mission is already in function in 7,476 gram panchayats. The total number of SHGs formed and included is 3,31,224 while target was set at 3,07,954.¹⁷

NRLM is manifesting the target of social inclusion in Goals 1 and 10 as it does not restrict its implementation to BPL households. Instead, it has a much extended coverage of vulnerable sections of people in India. This coverage has been calculated using the Participatory Identification of Poor (PIP) comprising 50% Scheduled Castes/Scheduled Tribes, 15% minorities, and 3% persons with disability, while keeping in view the ultimate target of 100% coverage of BPL families.¹⁸ This is in furtherance of *Article 46* which expects the government to promote the economic interests of weaker sections of people.

National Urban Livelihoods Mission (DAY – NULM)

The urban parallel of DAY–NRLM is the National Urban Livelihoods Mission (NULM) was launched in 2013, replacing the Swarna Jayanti Shahari Rozgar

¹⁷ DAY – NRLM Month Wise Progress, 2016

¹⁸ NRLM Framework for Implementation

Yojana (SJSRY). The aim of the Mission is to reduce poverty and vulnerability of urban poor, and improvement of their livelihoods on a sustainable basis. This is to be accomplished by providing urban poor households access to self-employment and skilled wage employment. In addition to this, the Mission addresses the residential vulnerability of the urban homeless. Street vending being one of the common means of self-employment of the urban population, the Mission also gives separate and special support to street vendors for their upliftment. The primary target of the NULM is the urban poor, including the urban homeless.

Approach

The Mission consists of six components:

- (a) **Social Mobilisation and Institution Development**
Promotion and formation of Self-Help Groups with access to financial and banking facilities such as credit, opening of basic saving account, affordable insurance, etc., and a Revolving Fund support. Establishment of City Livelihood Centres where for marketing and exchange of information regarding services provided by the urban poor.
- (b) **Capacity Building and Training**
The objective of this component is to establish assistance at Central, State and City levels (Mission Management Units (MMUs)) to confirm the implementation of NULM. Training and capacity building of the technical resource persons of the MMUs at National, State and City level is to be carried out.
- (c) **Employment Through Skills Training and Placement**
This component of NULM will focus on providing assistance for development/upgrading of the skills of the urban poor so as to enhance their capacity for self-employment and salaried employment. This sub-component intends to provide training to the urban poor as per the skill demand from the market, so that they can set up self-employment ventures or secure salaried employment.
- (d) **Self-Employment Programme**
This component seeks to provide financial services to assist them in the establishment of self-employment ventures or micro enterprises. Furthermore, credit facility in the form of a bank loan is provided with an interest facility.
- (e) **Support to Urban Street Vendors**
NULM aims at facilitating access to suitable spaces, institutional credit, social security and skills to the urban street vendors for accessing emerging market opportunities.
- (f) **Scheme of Shelter for Urban Homeless**
NULM seeks to provide shelter, equipped with the basic services to the poorest of the poor segment in the urban population.

The administrative structure of NULM comprises the Mission Management Units and the Technical Advisory Groups at the Central, State and city Levels.

Progress

Since its inception, the performance of NULM has been declining. This decline can be attributed to the decline in the allocation of funds by the centre. The Central:State share for the funding of the Mission for North Eastern and Special Category States is 90:10 and for all other States and Union Territories is 75:25. This shows that there is a considerable financial reliance on the centre for implementation and progress of the Mission.

Table 3: Benefits under National Urban Livelihoods Mission (NULM)

<i>Sl.No.</i>	<i>Components under SJSRY/ NULM</i>	<i>2012-13</i>	<i>2013-14</i>	<i>2014-15</i>	<i>2015-16</i>
1.	Total number of beneficiaries assisted for setting up Individual/Group micro-enterprises	1,42,991	1,34,160	35,449	35,640
2.	Total number of urban poor imparted skill training	5,35,779	7,05,507	1,82,037	1,45,124
3.	Number of SHGs formed	19,900	25,008	47,772	38,672
4.	Number of SHGs given Revolving Fund (RF)	1,86,311	4,13,291	18,677	19,603

Source: Annual Report 2015-16, Ministry of Housing and Urban Poverty Alleviation

Table 4: Financial progress of National Urban Livelihoods Mission (NULM)

<i>Sl.No.</i>	<i>Financial Progress (Rs. in crore)</i>	<i>2012-13</i>	<i>2013-14</i>	<i>2014-15</i>	<i>2015-16 (As on 31.12.2015)</i>
1.	Total Central funds released to the State/UT under SJSRY/NULM	771.46	714.97	672.14	182.62
2.	Total Central funds spent by the State/UT under SJSRY/NULM	558.19	618.66	432.24	334.54

Source: Annual Report 2015-16, Ministry of Housing and Urban Poverty Alleviation

Viability of Deen Dayal Antayodaya Yojana, Rural and Urban

The Mission is an effective social protection measure which seeks to achieve income equality by way of social and financial inclusion, and thus, the duty

cast on the State under *Article 38(2)* to minimise inequalities in income and of status, and of facilities and opportunities, is fulfilled.

Alongside social inclusion, financial inclusion of the poor is sought to be attained through provision of microfinance and credit facilities to the Self Help Groups. To meet this end, various financial institutions are to provide credit of at least Rs. 1,00,000, accessible to every household in repeat doses over five years. However, it is to be noted that microfinance systems in India operate without adequate protection of a legal or regulatory framework. Seeing as the object of microfinance is to provide financial services to assist the poor to work their way out of poverty; this renders the recipients of the credit facilities devoid of any legal protection in case of default or inability to repay the loan, for example, due to *force majeure* events. The NRLM, although has offered an interest subsidy to the Self Help Groups, it has failed to define its role in such contingencies. Furthermore, the Legislature has proposed the Microfinance Institutions (Development and Regulation) Bill, 2012, but the applicability of this legislation post enactment, to the arrangement under the NRLM is questionable due to its narrow definition of ‘micro finance institutions’.

Conclusion

Efforts to reduce occupational and financial vulnerability undertaken by the Government of India are fulfilling a segment of both the Goals combined. Specifically, these programmes, if successfully implemented as envisioned, have the potential to eradicate extreme poverty for people living on less than \$1.90 per day (Target 1.1), and for people living in poverty according to the national poverty line (Target 1.2). This could be possible because of their comprehensive and well-rounded functioning. They also operate as social protection systems and measures having substantial coverage of the poor and the vulnerable, enabling social and economic inclusion (Target 1.3, Target 10.2). All the programmes seek to provide a means of livelihood to the weaker sections and thus have the ability to uplift these sections by way of a sustainable growth in income (Target 10.1). These programmes are progressive as they have adopted not only an egalitarian but also an equitable approach in providing opportunities to the vulnerable groups and disadvantaged sections in India (Target 10.3). The intention of the legislature is evidently to achieve the larger good of the society but, the implementation of these programmes is impaired owing to the inefficiency of the executing bodies.

Returning to Roots: A Social Trend Analysis for the Migrants of Odisha

Lopamudra Lenka Samantaray

Symbiosis Centre for Research and Innovation
Symbiosis International University, Symbiosis Knowledge Village
Pune – 412115
lopa_bindu@yahoo.com

Introduction

Migration as a trend is quite popular in studying the change and dynamism found in demographic features of India. It has captured attention of researchers, planners, policy makers, scholars and academicians worldwide to analyse the growth, nature, impact, scope and features of population behaviour. Several factors are responsible with regard to change in attitude, decision and behavioural pattern of migrants. As the normal trend goes, an individual tends to migrate from rural to urban or less developed to developed or agriculture to non-agricultural sector. Developed countries are quite inclined to stay in countryside where life is said to be more peaceful, healthy and sublime. With the development of agriculture based industries, rural non-farm industries, small scale and cottage industries, the socio-economic life of rural sector has become more appropriate for human inhabitation. As the life's priority changes, people are ready to move towards their own native land being more optimistic for living within rural segments. Those migrants who had earlier migrated to urban sectors seem to be developed, skilled and experienced. The social and cultural life can be well organised when the returnees become more skilled and efficient. They establish their chain of business, cluster of rural industries with their entrepreneurial skill and organisational set up, which provide socio-economic support in rural sector. In present research paper, an attempt has been made to study and analyse the social factors responsible for reverse migration in Odisha.

Objectives

- To study the trend of internal migration (rural-urban) in India.
- To find out social factors responsible for the reverse trend (urban-rural) with respect to selected districts of eastern Odisha.

The Concept of Reverse Migration

In simple words, the reverse migration can be defined as a trend of migration, where the people of rural sector who had earlier migrated to urban sector return to their own native land with some inherent factors associated with migration. Consequently, they obtain some new work with the establishment of new farming, non-farm industries and other job opportunities. Apart from economic factors the social factors like family, marriage, education, health, rural culture and tradition have been considered as some important driving factors for reverse migration. The concept of reverse migration has been widely recognized as the strategic approach towards regional balance, socio-economic growth and all round development of rural sector. The return or the reverse migration is a popular phenomenon for the non-metropolitan cities of United States. The returnees bring both short term and long term population growth for rural sector. They also bring back much needed human capital, including education, job skills, and life experiences, and fill professional positions in rural communities (Christiane von Reichert et al., 2014). Entrepreneurial activities and self-employment of many return migrants bring favourable impacts for rural economies by improving the employment base and expanding available services. The most interesting part of return migrants is, they develop familiar social network and are influenced by the simple village lifestyle. In USA, the latest research on return migration have turned an attention for studying the non-metro population change, notably immigrants, Hispanics, baby boomers, retirees, amenity seekers, and the poor (Brown et al., 2011; Lichter and Johnson, 2006).

The Reverse Migration being an Instrument for Meeting Sustainable Development Goals in Rural Segments

As per the World Bank the agriculture growth and rural poverty eradication have been the main focus for rural development strategy. About 70% of world poor who are the custodian of land, water and biodiversity were the main targets of millennium development goals (1990-2015). Again it has been projected that a thorough research work and policy implementation can go a way to deal with the crisis like poverty, unemployment, illiteracy, poor health, and other socio-cultural pitfalls. As a successor to Millennium development goals, the strategy of sustainable development goals have been introduced on 25th September 2015. This policy included the 17 goals and 169 targets to deal with poverty and to bring about reformation through sustainable development agenda. The broad range of sustainable goals include the issues like poverty, hunger, health, education and climate change, which have been adopted by India for the development of rural segments. In the present analysis, factors like poverty, education, health and family have been taken to reconcile the factors responsible for augmenting the flow of reverse migration. Other driving

factors are high cost of living, unemployment, congestion, and pollution found in urban areas. Thus reverse migration can bring socio-economic support for rural poor who can be gainfully employed with some entrepreneurial and farming and non-farming activities.

Agriculture labour force has been reduced from 268 to 231 million in the year 2004 to 2012. Consequently about 3.7 crores of farmers left farming (CRISIL). Similarly as per CRISIL the diminishing employment opportunities in urban sector and high rate of inflation can be considered as a prime factor in accelerating reverse migration to rural areas. Thus the policy of reverse migration can be taken as a part of inclusive growth in India. As per the projection made by CRISIL based on NSSO data, about 12 million people are going to join agriculture and there will be less involvement of people in manufacturing and construction between the years 2012 and 2019. More than half of the world's rural people can be found in the most populous countries of India and China (Vinayagum Chinapah et al., 2012). Hence with the proper policy framework, the Indian villages have been facilitated with infrastructure and other amenities for sustenance. The rising trend of employment for various sectors can be presented with the help of Table 1.

Table 1: The number of people employed (in millions)

<i>Year</i>	<i>Agriculture</i>	<i>Industry</i>	<i>Manufacturing</i>	<i>Construction</i>	<i>Services</i>
2004-05	268	84	54	25	106
2011-12	231	115	60	50	127
2018-19	243	135	62	67	145

Source: National Sample Survey Organisation, CRISIL

Table 1 clearly shows that the employment is shifting from agriculture to industry, manufacturing, construction and services. Moreover, in industry and services, the number of employed have been increased. So far the transformation of Indian villages are concerned, it is the responsibility of the government to enhance the job opportunities. Infrastructure development can be regarded as the prime factor to set up various small scale and medium scale industries. For example in Gujarat, with electrification scheme, good roads, and other infrastructure facilities, many small and medium scale industries have been set up. People have come back to villages to earn their living with all opportunities available in the villages.

In India about two out of ten people are internal migrants. Although the employment has been the prime cause for this internal migration, marriage plays as a driving factor in shaping the economic, social and political life of these migrants. About 70% of all internal migrants are women where marriage stood as the main reason for their migration. The rural female migrants constitute about 91% due to marriage and urban women constitute

about 61% due to marriage. Among the male migrants about 56% migrate due to employment and rest of the urban migrants move due to the reasons like family, business and education (Abbas and Varma, 2014). It has also been observed that the government response to internal migrants and the issues related to migration is found to be minimal. Indian village economy has been largely affected by chronic agrarian distress, unemployment, and debt crisis resulting in increasing number of farmer's suicide cases. It further encourages the large scale labour mobility to urban sector. However, Table 2 represents the prime socio-economic factors responsible for internal migration in India.

Table 2: All-India proportion of internal migrants in percent by reasons of migration

<i>Reasons for migration</i>	<i>Male</i>		<i>Female</i>	
	<i>Rural-rural</i>	<i>Rural-urban</i>	<i>Rural-rural</i>	<i>Rural-urban</i>
Employment	29.1	60.9	0.5	2.6
Studies	10.5	7.8	0.5	2.5
Marriage	12.2	1.6	92.6	62.8
Movement of family head	23.7	22.8	3.6	28.2
Other reasons	24.4	6.9	2.9	4.0
All	100	100	100	100

Source: NSS 64th Round, Report; Migration in India: July-2007 to June-2008.

Table 2 shows that the rural to urban migration for employment reason is quite high which is 60.9% and the lowest migration rate due to marriage is about 1.6 among males as per NSS 2007-08 report. On the contrary the rural to urban migration rate is highest among women due to marriage which is about 62.8% and low followed by studies which is about 2.5%. Almost same is the case for the rural to rural migration both for the male and female as per NSS 2007-08 report. According to World Bank data internal migrants are widely recognized from education, income levels, skills, caste, religion, family composition, age, and other characteristics. Some micro-surveys suggest that most migrants are between age group of 16 to 40 followed by above mentioned factors. Scheduled tribes and castes migrants are reflected for short-term migration flows. They engage themselves in various sub-sectors like construction, domestic work, textile, brick, manufacturing, transportation, mining and agriculture. Labour migration flows include permanent, semi-permanent, and seasonal or circular migrants.

Much of the available data reflects migrants in the permanent and semi-permanent categories. On the other hand considerably less large-scale

statistical data are available on the numbers and characteristics of circular migrants (Abbas and Varma, 2014). The major migrant-sending states of India are Rajasthan, Madhya Pradesh, Andhra Pradesh, Chhattisgarh, Jharkhand, and Odisha. Due to low social and economic development, people migrate to other developed states to earn livelihood. The cities of Mumbai, Delhi, Hyderabad, Bengaluru, Pune and Kolkata are the largest destinations for internal migrants in India. Many of the migrants of these cities are intrastate migrants, who migrate from rural areas and settle at urban units. The following factors have been taken from literature to define the major factors accompanying the reverse trend of migration.

Family as a Factor

In a family, where men migrate, its impact on the family including women, children and the elderly left behind can be quite significant. The absence of men brings about financial and psychological insecurity, causing burden over extended family members (Rogaly et al., 1998). It further raises the women migration to work as a labourer. Similarly it can have adverse impact over children who fail to continue their education. In case of girls, they often have to bear the additional domestic responsibilities and take care of younger siblings. The absence of male supervision further reduces their chances of acquiring an education. Where women migrate together with the male members of their households, it is common for younger siblings and older children to accompany their parents, which drastically reduce their chances of getting any formal education. So the overall family migration leads to lessen the responsibility towards old members. It further results in emotional stress and affects the attitudes, habits and awareness levels of migrant workers towards the availability of scope of development.

Poverty Alleviation as a Factor

The Planning Commission estimates that about 26.1 per cent of population in India lives below the poverty line. Over the past decade, the positive impact of return migration have attracted a great deal of attention from both researchers and policy-makers. It is generally recognized that return migration can contribute to the economic development of origin communities as it represents the inflow of both savings and brought human capital back to origin. Past migration experiences help them to reflect entrepreneurial skill to add socio-economic changes in the village. It has been observed that the return migrants are more likely to establish their own entrepreneurship than the non-migrants. With better knowledge and skill, they create better scope for the rural communities as a whole. A study conducted by Démurger and Xu (2013) shows that past migration experience has brought about the changes through eradication of poverty in comparatively less developed regions of China through entrepreneurial skill. The government plays a crucial role

in augmenting employment opportunities at villages for which the rural poverty can be easily alleviated. In order to motivate the young leaders and entrepreneurs, the Communist Party of China Central Committee issued a policy statement to recruit a total of 20,000 college graduate students for village based posts nationally from 2008 to 2012 (The Communist Party of China Central Committee, 2010). Sometimes domestic non-farm sector helps to bring self-sufficiency with respect to product's processing, packing, and distribution services. Unlike urban industries, it creates own chain of support to minimise loss and achieve profitability. Consequently, it enhances the capacity building and scope of employment in rural sector.

Health as a Factor

Migrant labourers, whether in agricultural or non-agricultural activities, in rural or urban areas, usually live in disgraceful conditions with scanty provision of drinking water and basic facilities. Migrant labourers live in open spaces, in squatter settlements or slums. As labour migrants are not registered and have no access to PDS and temporary ration cards, their expenditure for survival becomes high. Due to obligation they forcibly live in harsh and unhygienic conditions for which they become vulnerable to diseases and health hazards. Due to poor and unhygienic living conditions, and exposure to dust at the work site, children suffer from various health problems. Moreover, they lose the flow of education and dropout numbers increase. Devoid of social security and legal protection, they often face labour market discrimination. The minimum wages are often neglected and employers bear no responsibility for health, shelter and other basic requirements of migrants.

Education as a Factor

Migrants are concentrated in different types of work in rural and urban areas. In the rural areas, self-employment is the major activity for both male and female migrant workers, followed by casual work, where, according to the NSS fifty-fifth Round findings, 33.4 per cent of male migrant workers and 44.2 per cent of female migrant workers were active in 1999-2000. Data on individual migrants from micro surveys show a significant amount of gathering among migrants found in the 16 to 40 year age group (Connell et al., 1976). This type of clustering is specially found among poorer semi-permanent or temporary labour migrants. In terms of education, migration rates are high among both the highly educated and the least educated, while there is a high preponderance of illiterates among seasonal migrants (Connell et al., 1976; Rogaly et al., 2001). It has been keenly observed that, the people with the age group of 18-21 tend to migrate urban areas to get higher education at the university level. Also the retaining of young people in rural areas would restrict their scope of personal development. There are lot of positive impacts of education in rural sector which further adds to employment generation, rural entrepreneurship

and large scale rural in migration. The policy of reverse migration can be made successful in a massive scale, if people will be highly educated and skilled. Hence education is said to be the prime factor in obtaining high level of socio-economic progress.

Marriage as a Factor

In case of women, apart from employment, marriage is the principal factor for internal migration. Women in general migrate with their spouse after marriage. Migration due to marriage as a factor predominates for both rural and urban migrants. Among women, 91.3 per cent in rural areas and 60.8 per cent in urban areas, have mentioned marriage as the reason for migration in 2007–2008. Marriage-related migration has increased as a percentage of female migrants, over the consecutive surveys. Among all migrants, marriage-related migration of women alone constitutes 68.5 per cent of all migration. The distribution (per 1000) of migrants by reason of marriage during 1993, 1999–2000 and 2007–2008, by NSSO has been presented for internal migration in Table 3.

Table 3: Marriage as a reason of migration

<i>Marriage as a reason of migration as per NSSO Rounds</i>	<i>Rural</i>		<i>Urban</i>	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
49th Round (1993)	23	616	9	317
55th Round (1999-2000)	94	888	16	585
64th Round (2007-2008)	94	912	14	608

Source: NSSO Report on Migration in India, 2007–2008.

In both rural and urban cases the migration due to marriage as a factor is found as high for female in both the cases. However, in rural sector the female migrants per 1000 male followed by marriage as a reason of migration has been found to be high as compared to urban female migrants. The marriage stands as the major reason behind migration decision among the women constituting 91.3% in rural sector and 60.8% in urban sector (NSSO, 2007-08). The census of India 2011 Report says, about 49% of migrants migrate followed by marriage related factors.

Methodology Adopted for Analysing Social Factors and Its Impact on the Reverse Migrants of Odisha

The concept of reverse migration has got a greater potential for the achievement of rural development. Odisha has emerged as a major labour sending region across all the regions of the country. The majority of population live in rural Odisha and agriculture forms the main stay of livelihood. The Planning Commission Vision 2020 document says that from 9th Plan onwards, the

unemployment rates in the state have experienced a declining trend but the conditions of work are far from ideal. The employment generation is found to be minimal in an organized sector. The number of workers employed in the organized sector in Odisha has actually fallen from 7.98 lakh to 7.22 lakh in 2011 (Government of Odisha, 2014). About 94.5 percent of the work force is engaged in the unorganized sector, as per National Commission of enterprises for unorganized sector (NCEUS, 2007). As workers find it difficult to make a living in urban areas, more of them are now going back to villages and comparatively less rural people are migrating to towns. In the present study of research, the entire work has been focussed over the state of Odisha. The traditional migration pattern of Odisha has been observed for the rural out migration. Here the emphasis has been made for the category of people who had earlier migrated to urban areas, do return and continue to stay in their own native rural lands. However due to successful government policy implementation, and all other availed facilities, people have started returning to their villages with additional skill and efficiency. Apart from other positive benefits, reverse migration helps in replenishing human capital lost due to initial rural out migration, in augmenting skill development and bringing back both financial and human capital needed to start up rural entrepreneurship (Ahlburg and Brown, 1998; Kevin and Thomas, 2008). Even though urbanization seems to be the need of developing countries, rural sector should never be neglected in a divesting way. It is always desirable to bring a balance between rural and urban units to ascertain an ideal management of different natural, socio-economic and biological properties. The data has been collected both for inter-state and intra-state migration. Similarly an attempt has been made to study the pattern of inter-state and intra-state migration. Also the focus has been made for indicating the social factors responsible for migration, reverse migration and its impact over the socio-economic condition of villages.

For the present study, the data has been collected from the selective districts of Odisha for depicting the social trend analysis of reverse migration. Among the social factors, age, caste, family, health and education are some of the key ingredients in bringing about reverse migration. The data has been collected for the selective districts of Odisha, namely Cuttack, Jagatsinghpur, Jajpur, Kendrapara, Khurda, Nayagarh and Puri. Reverse migration has been taken as dependent variable and social factors as independent variable. The factors like age, caste, poverty alleviation, family, marriage, health and education have been taken into consideration. Here the basic hypothesis assumes that, there is no association between the social factors and the trend of reverse migration (urban to rural). Since, the dependent variable had two possible values, the binary logistic regression has been run to indicate the relationship between reverse migration and the associated social factors. The observation over the present statistical output which have been drawn by the application of SPSS tool can be stated one after another. Moreover, the total number of cases are 333 and the split has been mentioned in Table 4.

Table 4: The case processing summary

<i>Unweighted cases</i>		<i>N</i>	<i>Percentage</i>
Selected cases	Included in analysis	333	100.0
	Missing cases	0	.0
	Total	333	100.0
Unselected Cases		0	.0
Total		333	100.0

As mentioned in Table 5, the age has been taken in a categorical value indicating the frequency for young, mid age and old as 60, 179, and 94 respectively.

Table 5: The categorical variables coding

		<i>Frequency</i>	<i>Parameter coding</i>	
			<i>(1)</i>	<i>(2)</i>
Age_category	Young	60	1.000	.000
	Mid age	179	.000	1.000
	Old	94	.000	.000

As shown in Table 6, the model predicts the correct value in 56.5% of the cases.

Table 6: The classification table

		<i>Predicted</i>			<i>Percentage correct</i>
		<i>Has_reverse_migrated</i>			
<i>Observed</i>		<i>No</i>	<i>Yes</i>		
Step 0	Has_reverse_migrated	No	0	145	.0
		Yes	0	188	100.0
The overall ercentage					56.5

- a. Constant is included in the model.
- b. The cut value is .500

The Hosmer and Lemeshow test result shows that model adequately fits the data. Here the significance value is 1 which is greater than 0.05 as shown in Table 7 and hence the model has been accepted.

Table 7: The Hosmer and Lemeshow test

<i>Step</i>	<i>Chi-square</i>	<i>Df</i>	<i>Sig.</i>
1	.000	1	1.000
2	.000	2	1.000

Also in model summary as stated in Table 8, the *R*-square is found to be 0.989 in Step 2. It further shows that the step 2 involves more variation on dependent variable. The classification table found in the binary logistic regression analysis presented in Table 9.

Table 8: The model summary

<i>Step</i>	<i>-2 Log likelihood</i>	<i>Cox & Snell R Square</i>	<i>Nagelkerke R Square</i>
1	16.628a	.733	.983
2	10.431a	.738	.989

Table 9: The classification table^a

<i>Observed</i>		<i>Predicted</i>			<i>Percentage correct</i>
		<i>Has_reverse_migrated</i>			
		<i>No</i>	<i>Yes</i>		
Step 1	Has_reverse_migrated	No	143	2	98.6
		Yes	0	188	100.0
	Overall percentage				99.4
Step 2	Has_reverse_migrated	No	143	2	98.6
		Yes	0	188	100.0
	Overall percentage				99.4

a. The cut value is 0.500

As mentioned in Table 10, the poverty alleviation and Family as factors are added in Step 2. This indicates that both poverty and family as most significant factors for the occurrence of reverse migration in Odisha.

Table 10: The variables in the equation

		<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
Step 1a	Reason_for_reverse_migration_poverty_alleviation	-23.372	2071.566	.000	1	.991	.000
	Constant	49.880	4143.132	.000	1	.990	4.599E21
Step 2b	Reason_for_reverse_migration_Family	-17.274	1965.249	.000	1	.993	.000
	Constant	70.598	5558.557	.000	1	.990	4.576E30

a. Variable(s) entered on step 1: Reason_for_reverse_migration_Poverty alleviation.

b. Variable(s) entered on step 2: Reason_for_reverse_migration_Family

Table 11 represents the descriptive analysis for showing the percentage factor contribution for the 333 cases collected from seven districts of Odisha.

Table 11: The social reasons of reverse migration

<i>Reasons of reverse migration</i>	<i>Percentage</i>
Poverty alleviation	76.5
Education	19.4
Health	41.3
Marriage	23.0
Family	76.5
Others	29.6

Source: Primary data collected from selected districts.

As found in the descriptive statistical analysis both poverty alleviation and family play a major role for the trend of reverse migration, each carrying an equal percentage of 76.5%. In other words, people tend to migrate to their own villages for balancing personal, social and economic life.

It has been assumed that migration is a weak force for urbanization in developing countries as urbanization has been proved to be a result of high population growth instead (Preston, 2013). Moreover, the high urban population growth has been the concern point for the government of developing countries. The measures have been taken to reverse the trend of rural to urban migration flows. As per the World Bank (2007), most of the development policy and practices are equated with agricultural growth and rural development. Again majority of the world poor live in rural sector. Hence, the development of rural sector leads to reduction of poverty. Unfortunately in India the most popular rural schemes like MNREGA fails to bring radical socio-economic impact due to reduced government spending. The factors like low wage rate, high cost of living in urban areas etc. are quite responsible for reverse trend of migration in Odisha. However, with the right kind of policy framework, successful implementation of government schemes like MNREGA and cooperation of entire village community, people can be encouraged to resettle themselves in their respective rural regions.

Agriculture being a significant component of rural occupational structure, has been hugely impacted due to migration. Sometimes middleman exploitation affects immensely in decision making of village farmers and traders. However it cannot be the profitable affairs with respect to large scale trading establishment (Pedersen, 2000). Endorsing rural industries to absorb surplus labour, while decreasing migratory pressure on cities have long been the objectives of many national Governments of Asia. In China, the contribution of township and village enterprises (TVEs) grew immensely between 1978 and 1994. It raised the share of the gross national industrial output from 9 per cent to 42 per cent, and total state revenue from 4 per cent to 22 per cent. It also increased the employment level for nearly 30 per cent of the rural labour force by the year 1997 (Kirkby et al., 2000).

Conclusion and Recommendation

The social elements of rural sector has got greater potential in augmenting the flow of reverse migration; it has been found in the statistical analysis that both poverty alleviation and family are major driving forces for the reverse migration in Odisha. Various government schemes and initiatives for alleviating poverty and raising standard of living of the rural people are the key ingredients for the success of reverse migration. The government can go a long way in motivating people to migrate to their own native lands through various poverty alleviation programmes and schemes. In fact the strategy of reverse migration can go a long way in achieving the sustainable goals for rural transformation of India. Consequently the people can actively maintain a balanced socio-economic life to a greater extent. However due importance must be given with following recommendations for an overall growth and development of this sector.

- A continuous awareness programme must be carried out to bring effectivity of these schemes. Both transparency and accountability should go hand in hand to avoid corruption at grass root level. The Government of India's Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act of 1979 was passed to address the unfair working conditions of migrant workers which includes gaining of employment through middlemen contractors or agents. It aims to articulate ideal working conditions for interstate migrants, but due to lack of enforcement and awareness, it could not be put into practice.
- The social awareness should be enhanced for migrants of both destination and source areas. Extremely poor people must be given special attention with due provisions of livelihood. It has been revealed that 54 per cent of rural households are without agricultural land in Odisha. Similarly out of total about 21 lakh ST rural households, only 0.65 per cent of households are with salaried jobs and only 0.80 per cent of rural SC households are with salaried jobs. The incidence of landlessness is highest among dalits. Some of the NGOs supporting poor migrants such as Lokadrushti in western Odisha for children of brick-making workers, SETU in Gujarat for children of migrants working in salt pans, and Janarth in Maharashtra for children of sugar cane cutters are best examples for giving social awareness.
- The per capita income of rural households need to be improved, so that their standard of living can be raised. It is found that 75 per cent of the all rural households have an average monthly income below Rs 5,000, whereas only 9.68 per cent of rural households have salaried jobs that includes jobs in Government departments, corporate sector and other private sectors. The Socio Economic and Caste Census 2011, published in 2015, says nearly three-fourth of households of the country are living in rural areas and 30.1 per cent of rural households depend on cultivation as their main source of income and employment.
- Multiple schemes and policies have been formulated from time to time in order to raise the growth, employment and standard of living of the

people in rural Odisha. Special attention has to be given to ensure welfare of workforce. About 38.4% workers have been accounted for MNREGAS from the total workers till today. Also the minimum wage rate scheme should be highly prioritised to avoid unnecessary miseries in the rural sector. The success of any employment schemes depends on its implementation and active participation of the stake holders.

- The state government should focus for agriculture and food safety programmes to avoid malnutrition in such areas. The food security act, public distribution system, cold storage facilities and all other information and awareness system must be facilitated to bring overall improvement of these regions. The regular monitoring and social auditing need to be carried out to ensure wider coverage of the targeted group. All the developmental schemes should be made sustainable to meet the socio-economic and ecological objectives of the rural sector.
- The special service should be provided to migrants such as, registration and photo ID cards, skill development, training, legal aid and literacy programmes, financial assistance and access of banking and social security services and strengthening the support systems for women, children and family members for augmenting reverse migration. Moreover corporate sector should be encouraged to participate in rural entrepreneurship and government should motivate them through different measures such as, tax benefit schemes.

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Track 2: Education and Gender

Cooperative Mastery Learning in Urban India: Means of Transforming Education

Kushal Shah* and Kaustubhi Shukla

Symbiosis School of Economics (SSE)
Symbiosis International University, Pune – 411004
*kushal_taurus@hotmail.com

Introduction

Education is the most effective bridge that enables developing economies to compete with the Third World nations through social and economic mobility (Benjamin, 2014). Therefore, it becomes imperative to enhance the qualitative aspect of education through increased supply of qualified teachers, quality, equitable and proficient primary as well as secondary education and provision of effective learning environment as stated in the targets of the Sustainable Development Goal (SDG) of “Quality Education” (United Nations, 2015).

Education acquires a close link to the term “accountability” (Caponigri, 1972) when the targets are scrutinized upon. Accountability in education reiterates the idea that tutors are to be held liable for the educational outcomes (Barro, 1970). Hence, having qualified educators with an established and sophisticated set of teaching skills becomes of immense significance. Teaching for mastery is one of those skills/methods that education in the 21st century has compelled tutors to enhance upon (Benjamin, 2014). However, mastery learning seems to be scarce if not inexistent in a country like India; where the educators are devoted towards practicing this nation’s own product of traditional learning (Caponigri, 1972). Moreover, the Indian education system places significant emphasis on the concept of “individual excellence” in schools which contrasts to the fact that cooperation in lieu of competition leads to greater achievements by students in a group by using superior strategies, peer support and encouragement for learning (Johnson et al., 1980). Also according to Johnsen (2009), working cooperatively is a significant skill that learners can exercise outside the classroom to help work effectively with others to solve any problem.

Operational Definitions

Mastery learning: A mastery method or strategy is one which attempts to control the individual outcome by experimental manipulation of the variables involved in learning the subject through innovation and personalized catering (Carroll, 1963). In contrast to the conventional method, in a mastery teaching environment student grades are controlled (for example “A”) and the variable that is independent could be “time” and allowed to vary until the desired grade is not achieved by the students.

Cooperative Learning: Cooperative learning is a learning situation in which students work together in small groups towards a group goal (Slavin, 1989). The idea is to not just work in the traditional group system but instead engage in group work which is carefully organized, planned and supervised by the instructors (Jacobs, 1997).

Traditional Learning: A system education where the teacher is the sender or the source, the learning matter is the information or message and the student is the receiver of the information (Damodharan and Rengarajan, 2012). The tutor adopts a “chalk and talk” method for the delivery of instruction and usually possesses control over teaching content and instructional procedure leaving the students to play a minimal part (Olrlich et al., 1998).

Purpose of the Research

The objective of this secondary research is to evaluate any existence of a significant impact through Cooperative Mastery based learning on the student outcomes, grade variability, motivation and other parameters (Wang et al., 1993) and compare it with the traditional method of learning followed usually in India, Pakistan, China etc. Following are the objectives the paper aims to achieve:

- To find out methods in which cooperative mastery learning can be implemented in higher education system in urban India.
- Identify the evidences of superiority of cooperative mastery learning over the traditional method of learning throughout all the levels of education – primary, secondary and tertiary in India.
- Analyze and evaluate the impacts of cooperative mastery learning on students’ outcomes, student motivation and gaps in achievement through evidences in past literature and instructors’ perspectives.
- Assess whether teachers are willing to implement this system and will the students be willing to accept it.
- Identify and evaluate the conditions and barriers to setup a mastery system in higher education in India.

The attempt to answer these questions would be made in review of literature, and the subsequent sections of this paper.

Scope of Research

The scope of cooperative-mastery learning is not bounded by geographical or economical means. It can be and has been (majorly) implemented in many Scandinavian nations like Norway, Sweden etc. Norwegian government had taken necessary steps to make their education system relevant, mastery-based and challenging (Norwegian Ministry of Education and Research, 2012).

The target of the paper is chosen to be India as it satisfies all the criteria of relevance for the reader of this paper and the effects of this study can be reflected in India through the results achieved by other nations with a few difficulties however.

The focus is mainly on urban areas for the reason that the problems in both rural and urban area tend to differ in nature and degree. There undoubtedly, stands severe aspects of education in the rural areas where enrolment, gender and drop-out ratios are extensively poor—which shall not be the subject to be discussed in this paper. However, that does not restrict the scope of this method of instruction to be implemented in the rural areas by any extent (Caponigri, 1972).

This paper focuses on the higher education sector and compares differences between private and public sector implementation. Cooperative-mastery learning can be generalized and executed well in any level—primary, secondary and/or tertiary (Bloom, 1968) but it is also to be noted that implementation of any system from the foundation is intuitively superior to change in the process (Quinn, 2006). When it comes to studies related to cooperative-mastery learning in India, the literature seems to be rare and limited to certain areas only (it will be discussed in the literature review and other sections). This method of instruction is unique and has great potential in terms of execution and development of studies related to the same in urban India.

Literature Review

An exploration of the literature reveals that the concept of group-based mastery learning is not modern. It is a product of successful studies undertaken 100 years ago in Winnetka, Illinois (Caponigri, 1972).

Meaning and Ways of Implementing Cooperative-Mastery Learning

Cooperative-mastery strategy of learning is an amalgamation of the two aspects (Cooperative and Mastery learning) where initially a high-quality instruction is implemented on small groups of students, structured on the basis of their weaknesses and strengths by the tutor. A *formative* assessment (Bloom et al., 1971) is then conducted by the instructor which locates all the gaps and weaknesses of the students learning in a group. The instructor then conducts

a *corrective* session which is a form of feedback given to the groups about how the students could correct their learning difficulties and enhance learning outcomes (Guskey, 2010). Next topic is not taken up until all the students in the groups have mastered the material, which is assessed after the *second parallel formative test* (Bloom, 1971).

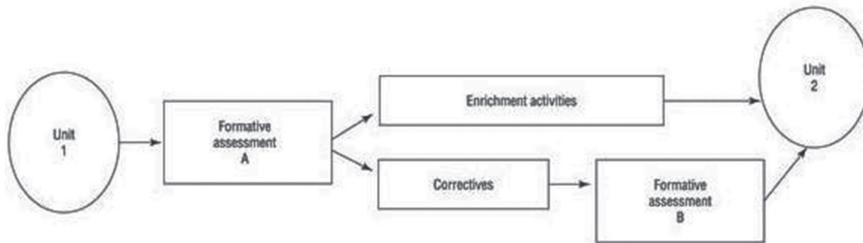


Figure 1: The cooperative-mastery instruction process.

This formation would drastically diminish the disparity in students' achievement levels and eradicate achievement gaps (Bloom, 1976). Bloom emphasized on the idea that reducing disparity in students' achievement does not entail making all students equal. Even under these more constructive learning conditions, some students unquestionably will gain knowledge more than others, particularly those involved in enrichment activities. However by recognizing applicable, individual differences among students and then altering instruction to better meet their diverse learning needs, the dissimilarity among students in how well they study precise concepts or master a set of articulated education goals could eventually reach a "vanishing point" (Bloom, 1971).

The past literature reveals that there are numerous models and frameworks of cooperative- mastery learning. However, there are certain prerequisites that set up an ideal condition to practice the process. Teachers should be flexible, trained and adaptive to the process (Guskey and Gates, 1986). Tutors should create an atmosphere where cooperative-mastery learning is possible by educating students about the mechanisms of social coordination, cooperation and learning to master even without any instructions given to them (Quinn, 2006).

Working in small heterogeneous groups is an essential element in this system. Every group should consist of a right mix of achievers varying from high, average and low (Steinbrink and Jones, 1993). Peers recognize that their incentives are dependent on the success of their teammates and are more likely to provide support for each other's learning. This enables cross references, discussions, transfer of ideas and an overall enhancement of an integrated form of mastery learning (Abrami et al., 1995). Pre-assessment is one significant element where the student's foundational knowledge should be assessed, reviewed and corrected, before commencing the teaching of core material (Leyton, 1983). Bloom (1971) recommended that tutors should plan

extensive and enlargement activities for the group of students who performed well in the first formative test to expand their knowledge base, however, limited to a degree where peer competition remains healthy and equitable.

Bloom (1968) proposes that Carroll's (1963) "model of school learning" recognizes most of the variables that could be scrutinized and manipulated to achieve mastery in learning. In line with these variables, various elements of cooperative learning should also be considered (Nesbit and Rogers, 1997). They were as listed in Table 1.

Table 1: Five elements of cooperative-mastery learning

<i>Variables of mastery learning</i>	<i>Elements of cooperative learning</i>
• Students' aptitude for particular kinds of learning	• Positive interdependence
• Students' ability to understand instructions	• Individual accountability
• Time allowed for learning	• Collaborative skills
• Perseverance	• Monitoring
• Quality of instruction	• Processing

Certain set of skills and aptitudes are more strongly related to the learning tasks (Kim, 1968). As memory relates to a language like Hindi, number organizing and reasoning relates to statistics etc. Instructors need to identify, monitor and assess the students' aptitudes in groups. "The ability to understand instruction has been defined as the interaction of the learner, the teacher and the instruction materials" (Caponigri, 1972). The requirement of a student may tend to differ in terms of the teacher and the material to genuinely master a concept. Students' social skills and coordination becomes useful when the subject material is difficult and there are some gaps in achieving specific academic targets.

The quality of instruction is an extent to which the presentation, explanation and organization of fundamentals of a concept approaches equilibrium for a learner (Carroll, 1963). It is essentially the hardest variable to manipulate due to the varying needs of the students individually.

A student tends to take agency over learning when rewards and incentives (material or emotional) are high (Lawson, 1965) along with the variables mentioned (Table 1) favourable to the student.

Evidences of Positive Impacts on Students' Outcomes in India and Outside

Various studies by Buch (1979) and Jangira and Singh (1982) have delineated that traditional method of learning broadened the student achievement gap throughout the years and caused underachievement amongst the majority of

the student population in India. There exists a significant quantity of literature that confirms positive impact of cooperative-mastery learning on students in India (Goreyshi et al., 2013; Ali, 2000; Kaur, 2009). Studies conducted by Kaur and Singh (2015) in Ludhiana (Punjab), with a sample of 210 students from government higher secondary school for social studies classes, concluded the following:

- The mean score of the experimental group (following the cooperative-mastery procedure) was 34.39; much higher than the control group's (following the orthodox method) mean score of 12.82 for the same.
- The standard deviation of the experimental group and the control group was 3.50 and 6.43 respectively showing less variability in student outcomes and hence more equitable approach.
- All the results significant at 0.01 level with a *t*-ratio of 5.82.

Table 2: Cooperative-mastery learning superior to traditional method

<i>Groups</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>t-ratio</i>
Control group	12.82	6.43	5.82
Experimental group	34.39	3.50	

Source: Kaur & Singh, 2015

Same result was found in a similar study conducted by Rani (2014) who studied the differences in outcomes for a group of 40 students studying Economics, situated in Dharuhera (near New Delhi). The mean value of the mastery-based learners was higher than the traditional-based learners and statistically significant. An additional finding was that the *t*-ratio for various dimensions—fluency, flexibility, originality, and compound creativity—was 2.32, 2.01, 2.68 and 2.93 respectively which are significant at 0.05 levels.

In line with these results, there exists a trend observed in almost every empirical study on cooperative mastery learning. This trend can be explained in Guskey's (2009) paper where a distribution graph indicates the superiority of mastery-based learning over conventional methods.

It is depicted in Figure 2 that the dotted curve which represents the distribution of student outcomes in a traditional system has a comparatively low mean score and higher standard deviation (portraying higher gaps in outcomes) than the negatively skewed solid curve which delineates high mean score and less variability in student outcomes. Research also substantiates that the positive effects of mastery learning are not limited to cognitive or achievement product. The procedure also obtains development in students' self-confidence in learning situations, school attendance, commitment in class activities, approach toward learning and a mix of several other variables (Block et al., 1989; Whiting et al., 1995).

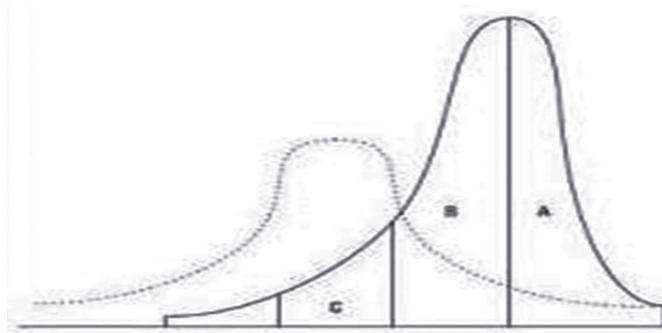


Figure 2: Comparison of mean score and variability in student achievement.

There exist other evidences to illustrate a cooperative-mastery based curriculum in school education at all levels—primary, secondary and tertiary (Kaul, 2010; Kumar and Hameed, 2000). A series of 25 studies on student performance in elementary and secondary school was delineated in the paper of Guskey and Gates (1986). All the studies reported positive effects on student achievement and retention as a result of implementation of group-based mastery learning. The usage of Mastery Learning in institutions of higher education is promoted by the prevalence of experimenter-made tests and hierarchically sequenced units in the university programme. Personalized system of instruction (PSI) emerged as a more superior choice than Learning For Mastery (LFM) for the implementation of Mastery Learning (Wong and Kang, 2012) since it allows scholars to master concepts at a pace corresponding with their own ability and prevents educators from holding faster students back. The older age of university students further makes PSI viable for universities because PSI demands higher self-discipline and individual initiative.

Anderson (2005) studied 420 junior and senior college students in a comparison of cooperative-mastery learning and traditional lecture-based biochemistry curriculum. Results proved students in cooperative-mastery learning environment scored higher than their peers in standardized testing of the curriculum. There are evidences from studies that suggest divergence between the fast and slow learners' outcomes tend to decrease with an effective implementation of coordinated mastery learning (Arlin, 1982). This happens with increasing learning rates as a result of persistent practice of mastery learning.

Chicago Mastery Learning Reading Program (CMLR) is a primary part of linguistic-arts instruction in many schools. It was implemented by the Chicago Board of Education in order to standardize mastery learning as the education process throughout the city's schools. CMLR is a structured mastery programme from kindergarten through eighth class programme that consists of learner workbooks, tests and teacher handbook dealing with word attack, study skills, and comprehension notions. It has specific purposes and standards of mastery for every unit along with a model that reiterates

essential prerequisites in logical augmentation (Levine, 1985). Three schools, one in California, one in Ohio, and one in Missouri each have productively implemented this mastery learning model. Few points come into view from these successful programmes:

1. Mastery learning provides a model of instruction that is effective for a wide range of students.
2. The skills and concepts have been internalized and put to use in other areas of the curriculum. Along with educational gains, student attitude and self-image have also improved. In regards to the implementation in these schools it should be noted that the transition was voluntary, the teachers played a role in decision making, and staff development was a major factor.

Patterson (1993) discussed the reform plan at a high school in Colorado based on requirement for advanced standards and higher student accomplishment. The school abolished old policies and practices and adapted mastery learning standards. Executed changes consisted of 75% achievement on each unit and retakes for those who did not meet the 75% requirement. This change in mastery level led to an eight-period schedule with four 90-minute periods per day in order to meet student needs. One of the 90-minute periods was designated as the *Encore* period in which students could seek assistance in areas of decreased mastery or work on other areas of study.

Research Methodology

Post the completion of literature review on meaning, implementation and impacts of cooperative mastery learning, the focus can be diverted towards the question of *applicability*, observed through the perception of instructors in the higher education of India, which is the essence of this research.

Research Design

Given the constraints of access, limited time and resources, this research was restricted to a small sample size with a *descriptive* and *analytical* design (including a survey).

1. Single questionnaire was prepared under the advice of experts to gauge the scenario from a teacher's perspective. The purpose of the questionnaire was to comprehend teachers' experiences and perspectives of student related variables post the implementation of cooperative mastery learning and realizing other stated objectives (see section *Purpose of the Research*).
2. The sample was restricted to higher education (colleges) in Pune city.
3. Analysis of the data collected will be made through research tools, like, tabulization, pie-chart, drawing inferences, etc.

Methodology

The questionnaire was divided into three parts:

- The first part focuses on the nature of the subject being taught, size of the classroom in terms of student strength and a highlight of the awareness on cooperative mastery learning by the professors.
- The second part emphasizes on views of the professors on issues and barriers to implement cooperative mastery learning in their classes.
- The third part underlines the views of the professors on the quality of the current Indian education system and a linkage is drawn with filling the gaps through cooperative mastery learning.

In total fifteen questions were designed to answer the above stated research questions. On getting 44 responses they were further analyzed and the research questions were answered.

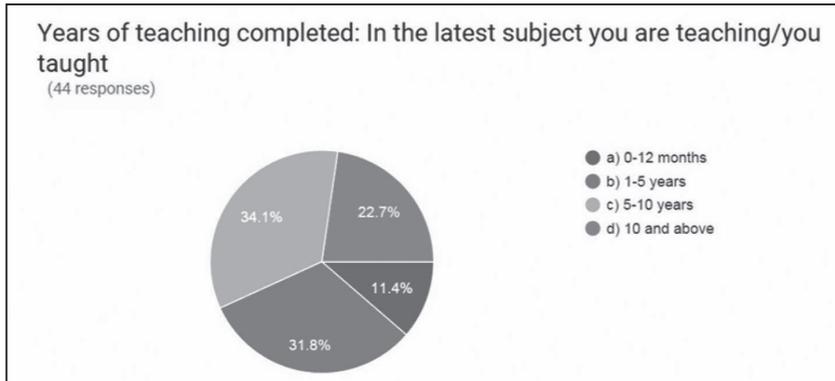
Hypothesis

1. The teachers wish to implement or already have implemented cooperative mastery learning in their pedagogy after being aware of it.
2. The impact on student grades, motivation and gaps in achievements is positive.
3. Students will accept cooperative mastery learning in their set of courses when implemented.
4. Indian curriculum constraints are one of the major barriers in implementing cooperative mastery learning effectively.
5. Cooperative mastery learning can fill the gaps in the higher education sector of India if the implementation problems are minimized.

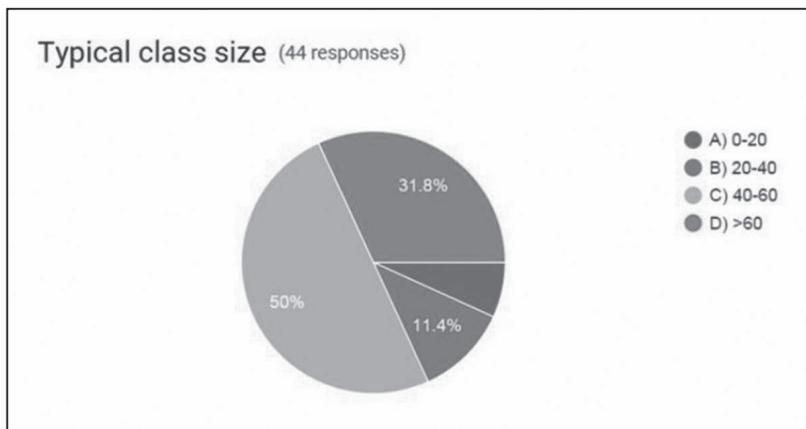
Analysis

The study which was conducted first gave the teachers the idea of what exactly is cooperative mastery learning so that they would know that in which way they have to answer the questionnaire.

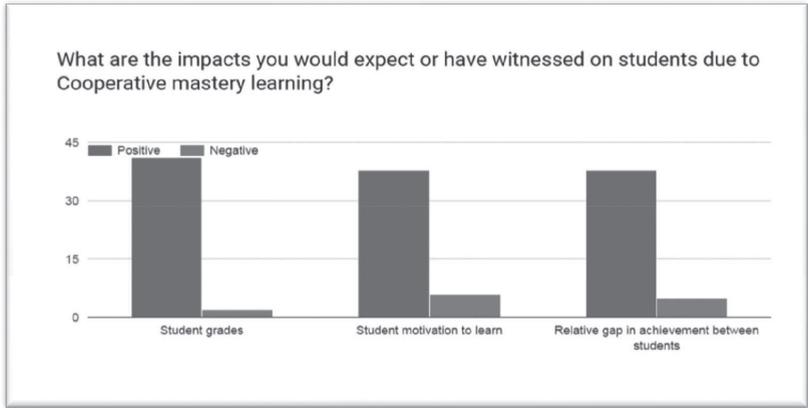
Thirty female and twelve male respondents specified their age which was ranging from 23 to 58. Majority of the respondents specialized in what they were teaching the students. Roughly 32% had spent 1-5 years in the latest subjects they were teaching. 34.1% had spent 5-10 years and approximately 23% had spent above 10 years. This clearly specifies that majority of the respondents have been in the field of teaching with sufficient and considerable amount of time. It was learned that 36% respondents were aware of this teaching methodology.



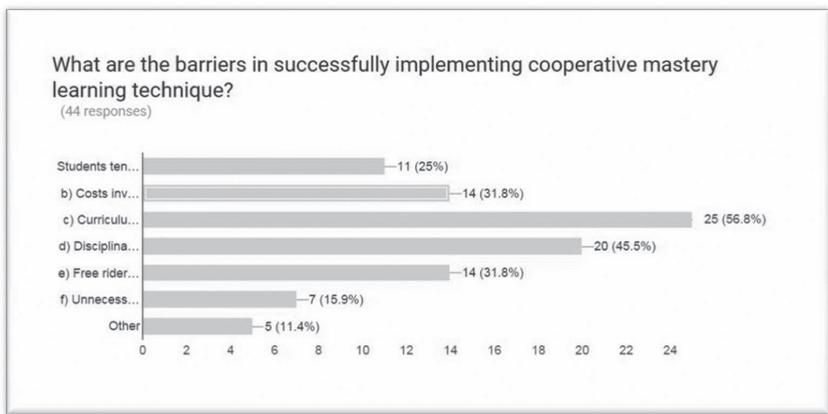
Approximately 82% had a typical class size of students above 40 per lecture of which 32% had a class size above 60 students. This implies that with such a high teacher pupil ratio it would become difficult to cater to all the individual students' need on mastering the material. This acts as a barrier to implement the technique of cooperative mastery learning till the time more scholars and professors enter the Indian education system.



A very high percentage of teachers (86% respondents) wished to include this technique in their teaching pedagogy. It is a clear sign that if prerequisite steps are taken and the barriers like curriculum constraints and disciplinary problems are removed teachers would be willing to cooperate and adapt this new measure. All the respondents expect or have witnessed positive impacts related to improvement in student grades, student motivation to learn and reduction in the relative gap of student achievement as mastery learning would specifically focus on all students to master that course before moving to another course. Although some respondents were in doubt regarding students motivation and acceptance of this new technique of learning as they have not experienced this technique being implemented in India.



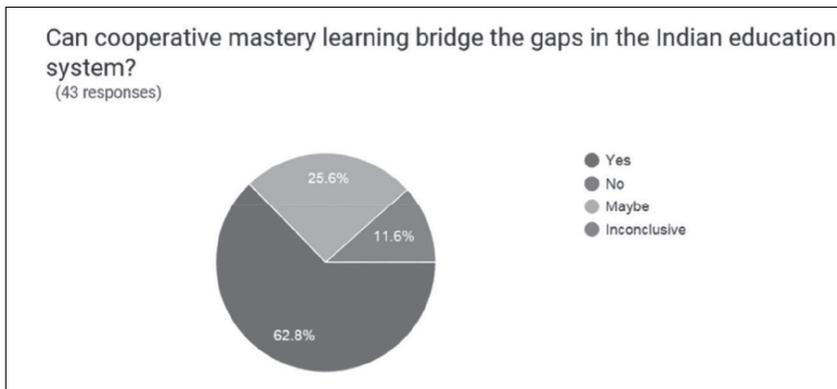
The barriers in successfully implementing this technique included curriculum constraints, which was viewed as a major barrier. Following that, disciplinary problems among students but also free rider problem in the group, students tending to wear off task, unnecessary emphasis on students social skills and costs involved in the implementation process being great. These barriers are not clearly identified or understated in the past literature which makes a significant difference in the entire outcome of cooperative mastery learning.



Respondents either agreed or were not sure whether cooperative mastery learning would help in achieving skills that are more practical in the real world. As none of the respondents disagreed, we can easily say that this is either because the teachers have not implemented it before or because of so many obstacles being present in this process but they definitely agree that this technique would not bear any negative results if not positive.

The next part of the questionnaire focused on the Indian Education System and the quality of education in India.

- 62% of the respondents believed that the education system is not up to the mark.
- 22% were inconclusive and only 17 % marked a yes.
- More than half of the teachers have been teaching for more than five years and thus have had prior experience and sufficient knowledge in this field. With experiences, they believed that in order to be at par with the other countries in the world we need to adapt new techniques or make the required changes of which this technique can be a successful measure.



Although 25% were inconclusive whether cooperative mastery learning would be able to bridge the gaps in the Indian Education System they agreed that if the implementation problems are minimized it would definitely generate positive results.

Findings

Important findings of the research may be discussed as follows:

The very first hypothesis holds true i.e. the teachers wish to implement cooperative mastery learning in their teaching pedagogy (86%) or have already implemented (7%) and only 5% do not wish to or they are inconclusive whether they want to implement this technique or not. The large difference between the two categories of respondents who wish to and who already have implemented clearly signifies that there is a lot of scope of development of this technique in India. The very first hurdle of making teachers and pupils interested in this technique of learning is removed as the teachers are already interested.

The second hypothesis also holds true. The impact on student performance (in terms of improvement in student grades, motivation to learn and reduction in the relative gap of achievement among students) has been positive according to those respondents who have already implemented it with more than 95% success ratio. Thus there is a very high chance and scope of this learning technique to yield positive results when adopted by the other

willing respondents and teachers/professors in primary, secondary and higher education in the country.

The third hypothesis stated that students will accept cooperative mastery learning in their set of courses when implemented is found inconclusive. The responses and interests of not only the teachers/professors/scholars need to be taken care but the students on whom this technique would be implemented also hold equal importance. In order to minimize all the hurdles in the implementation process it is necessary to build coordination among the professors and learners.

Fourthly, majority of the respondents believe that Indian curriculum constraint is a major barrier in implementing successful cooperative mastery learning. With the current course structure and teaching pedagogy it would definitely be difficult to change the learning process in the country specially above the senior secondary level of education because this not only involves teachers and pupils but also the Indian government, scholars, researchers, implementers etc. for successful application.

Lastly, cooperative mastery learning can bridge the gaps in the higher education system in India subject to the implementation problems being minimized which includes successful participation from both the sides i.e. the students and professors, the course structure being amended according to the concept of mastery learning, identification and removal of any gap that may occur during cooperative learning, infrastructural constraints being cleared and disciplinary and free rider problems among students being solved.

Concluding Remarks and Recommendations

Methods which need to be adopted to implement Cooperative Mastery Learning successfully in India firstly, include removal of curriculum constraints. Curriculum constraints can be removed if the higher authorities at the undergraduate level i.e. deans, chancellors, vice chancellors and directors collectively recognize and chalk down the constraints at the higher level with reference to the rules stated by the government. Then the directors can communicate this to the teachers and students i.e. the people who will be directly involved in this process. Recommendations and ideologies of teachers after their interaction with the students can be taken into account and should be communicated to the higher authorities. They can then successfully include the curriculum changes.

Students should be given a priori knowledge of this concept and then the results should be recorded as results would vary from subject to subject. Student grades and the time taken should be regularly monitored so that the problems can be identified and solved within the formulated time limit. Regular workshops of some members from the higher authorities with the students should be conducted so that if students are facing certain problems which they are not able to communicate to their teachers can be rectified. New methods

of interactive sessions, decreasing the class size and regular monitoring of students social skills should be adopted to eliminate the disciplinary problems among students.

Students should be shown documentaries and short movies or videos or should be made to read short articles motivating them to work in teams and learn from their group members instead of being free riders. Distinct strategies and methods should be formulated for elementary, secondary and higher education as the capacity of learning and the requirements at each stage are different. The process of implementation after successful analysis is definitely not an easy task and covers various other aspects from the point of view of people indirectly involved in the process (for example parents of the students) and the primary research needs to be conducted from the point of view of the students and officials formulating the education policy but teachers definitely play a very important role which cannot be neglected for successful implementation.

Thus cooperation in lieu of competition can definitely lead to better achievements by greater support of group members and peers, usage of superior strategies, encouragement to learn and better skill development. These social skills would not only help in better understanding and learning of the curriculum but also of the outside world.

Acknowledgements

This paper is dedicated to all the teachers in India thriving to mend, carve and chisel a student's life towards excellence through efforts beyond the boundaries of the conventional system. Firstly, we would like to show our courtesy to Symbiosis School of Economics for giving us an opportunity to develop ourselves and expose us to the field of research at a very tender age. In our desire to write this paper, we have in no way any claim to come out with a perfect piece of work. We would also like to show our gratitude to the Research Methodology (RM) professor, Dr. Shuchi Misra to mentor and educate us on the mechanisms and techniques of research in a comprehensive manner. We take this opportunity to thank all the distinguished researchers on whose shoulders we climbed to produce this paper. To everyone involved directly or indirectly in the completion of this paper, we extend our appreciation.

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Assessing Personal Laws for Muslim Women

Anamika Das

Symbiosis School for Liberal Arts
Viman Nagar, Pune – 411014
anamika.das@ssla.edu.in

Introduction

The 5th Sustainable development goal which emphasizes on ‘achieving gender equality and empowering all women and girls’ has been developed to implement gender equality at a global level, with an objective of eradicating all possible forms of discrimination against girls and women at every level. While designing of the goal, women were recognised as a segment of the global human resource which carries the potential to educate multiple layers within a community, thereby speeding up the spread of education. The Indian scenario, however, has been a complex one with the country acting as a residence to several religions, communities and cultures, making it difficult to codify policies in favour of women from all communities and groups. On one hand, where there is a question of sustaining democratic values such as cultural pluralism and freedom of religion; on the other, minority groups including women remain subjugated owing to difference in their treatment politically and legally.

Objective

This paper attempts to study a small segment of the Indian female population i.e. Muslim women, which has recently confronted the judiciary in favour of establishing a Uniform Civil Code, as Muslim Personal Law (Sharia Law) is still uncodified, even after 79 years of independence. In the past, women from other religions have also questioned religion-inclined policies in terms of personal laws and have up to a certain extent, achieved the choice to practice uniform personal laws for their communities.

Method

By reviewing secondary data and case histories that aided with bringing amendments and change in the past, the paper attempts to understand why

the Sharia law has not been substituted/complimented with similar codes to rectify the issue of gender discrimination in terms of personal law in the country and also analyse whether the Uniform Civil Code is an effective strategy for eradicating discrimination.

Literature Review

Previously available literature on the theme of Uniform Civil Code and gender biased policies have majorly questioned current issues from a political perspective, rather than focusing on gender equality. Even though this paper shall attempt to highlight on previous amendments and potential amendments in terms of personal laws which can help encourage social equality in terms of gender, it is essential to delve into the historical time sweep as well, for gaining a proper understanding of the current scenario. For the purpose of this paper, the main timeframe starts with the year 1947, when the drafting of our constitution began. Since India gained independence from centuries of colonial oppression, and also owing to the fact that it serves as a residence to a diversity of religions and communities, our constitution decided to address the rights of both the minority communities and also the values of cultural pluralism within a democracy. Therefore, Article 25 of the Constitution grants every citizen, an absolute freedom to practice any religion of his/her choice. Since institutions like marriage, adoption, inheritance etc. have been historically guided and affirmed by religious scriptures and doctrines, different communities within our country practice personal laws differently (according to religious scriptures and historically established communal practices).

The difficulty in decision making arises when in order to maintain the democratic ideals of equality before law, through Article 44 of the Constitution, our founding fathers established the implementation of the Uniform Civil Code as a directive principle of state policy.

The Colonial Era

The period of colonization, even though it lies outside the framework of the chosen time period, can also contain some answers as to why the emphasis was and has always been on maintaining a non-uniform and in some cases, uncodified personal laws for different communities. During the colonial period, the British officers resolved both inter and intra communal conflicts with the help of Qazis, Pundits and other religious authority figures, as they themselves belonged to a foreign land, away from the communal practices of the native land. However, under the same period, it was also deemed important by the colonial rulers to codify laws for a more efficient and uniform administration over the land. Therefore, 1726 witnessed the Anglo-Mohemmeden and Hindu law codification, which can almost be labelled as ‘partial’ codification for two reasons. First, the laws were codified on the basis of communal practices

that were historically dominant, since help was taken only by a few religious authority figures. Also, most importantly, even though the main objective of the colonial officers was to establish uniform rule of administration, the fear of opposition from the more collectivistic rural regions prevailed in the minds of the administrators and rulers very strongly. Therefore, the partial codification of communal and personal laws was not extended to the rural regions.

A major shift occurred during 1772, when the Warren Hasting plan allowed codification of personal laws based on community beliefs and religious scriptures. Therefore now, the Hindu personal laws were based on the Shastras and the Sharia law was based on the Quran. As mentioned above, a major issue occurred when even though laws were codified based supposedly on the scriptures, many practices were based on historically established customs as well. This is where finer differentiations between scriptures, which exist in multiplicity and customs were not emphasised on, later giving rise to different forms of power dynamic issues. However, fortunately after a few years, the Mayor's court (which became the supreme court in 1781) did recognise that there lies vast differences between customs and religious scriptures due to which they deemed it appropriate to revise and translate the codified personal laws themselves.

The process of legal codification finally drastically changed in 1857, when the administration of India officially shifted from the East India Company to the direct hands of the British crown. The Supreme Courts in the three presidencies lost their autonomous powers, and a more unified legal identity for all religions and communities was directed by the crown for convenient administration. However, personal laws remained only partially codified till post-independence.

However interestingly, under the colonial rule itself, there were important markers of history which aided policy making for a democratic nation in the post-independence period. One of the most widely remembered case is the *Dadaji Bhikaji v/s Rukmabai* case (1885), in which Dadaji Bhikaji filed a case against Rukmabai in Bombay High Court in 1884. Rukmabai opposed the legal directions set by the colonial rulers, with the help of religious authority figures towards marriage consummation and maintenance as she rejected to be bound to a marriage which was non-consensual and took place when she was only 11 years old. Pinhey J. in a historical verdict passed a judgement in favour of Rukmabai stating that forcing her to consummate the marriage, when there has been no cohabitation within the non-consensual child marriage would be unethical and cruel towards the woman, and hence the verdict was made in favour of the woman. As it seemed to be a benchmark and a victorious moment for Hindu women across the country, political pressure began to grow in strength as the Hindu conservatives interpreted the decision as interference of the British in the sacrosanct arena of Hindu customary practices. The fear due to which they earlier did not extend the codified personal laws to the rural areas began to seep into reality with the Rukmabai case as well. Therefore,

the political pressure led to the rejection of Pinhey J's verdict stating that married persons are bound to live together and by refusing to cohabit and consummate within the arena of marriage, Rukmabai has violated conjugal rights, and must by legal order, pay the amount of compensation or cohabit as a married woman. She opposed the verdict vehemently, refusing the changed nature of it and after paying the compensation amount, travelled abroad to study medicine.

Even though the final verdict was changed due to an increased political pressure, a woman opposing and demanding her rights for consensual marriage in 1885, and establishing herself as an example for other women highlighted a major transformation in the ideological beliefs prevailing during that time period.

The Post-Independence Period

Our founding fathers who were the main reformers in the post-independence period inclined more towards modernisation and a unified codification of laws for every citizen of the country. The very first steps for unified codification had begun in the 1950s itself, when Hindu scriptural texts began to be revised to eliminate the customary practices included later to minimise the role of historical beliefs. Apart from differentiation between customs and religious scriptural doctrines, the bulk of text available also as a part of subaltern and marginal communities within the religion of Hinduism made it very difficult for the personal laws to be codified completely based on scriptures. Therefore a secular codification was done first, based on which the Special Marriage Act of 1954 was brought into action which permitted any two citizens belonging to different religions and communities getting married under it treating all the citizens (even based on gender) equally. Under the light of partition and recent sufferings, secular codification of laws was deliberately not brought to the citizens following Islam as their religion. As mentioned above, the UCC was established as a directive principle precisely because the founding fathers decided to wait for a less sensitive time when the tensions between the two religions would be nullified, and the chances of Muslims feeling marginalised would lessen.

The Hindu marriage codification that took place during the 1950s included the following acts: The Hindu Marriage Act (1955), which established Hindu marriages as being monogamous, allowed bilateral divorce and remarriage especially in favour of women. In 1956, with the Hindu Succession Act, equal inheritance rights were granted to daughters, which led to a large number of female relatives including mothers, widows, wives of pre-deceased sons etc. become class 1 heirs. In the same year, the Hindu Minority and Guardianship Act was also passed in which the mother was deemed natural guardian of the child after father and they were also given a right to appoint to guardian. The Hindu Adoption and Maintenance Act, 1956, also allowed the adoption

of girls as opposed to earlier, when only boys were allowed to be adopted. Consent of the wife became mandatory for adoption, along with the granting of right for a separate residence and maintenance of wives and widows.

Before entering and delving into the details of the Sharia law, it is important to consider the sources of law under Islam. The primary source of law is Quran, the religious holy text, believed to be the word of God. Extracted from it, are the three other legal sources under Sharia – which are *Sunni*, which means tradition (in the past has also been used interchangeably with ‘customs’). *Qiyas*, which lays down rules for interpretation of laws mentioned in the Quran and something that has been lost in the past called *Ijma*, which is a historical agreement among legal scholars on being able to change laws with changing times and contexts. In the later parts of its usage, and as many scholars have claimed, in order to secure the religion better, this source and system was lost behind as being elitist under academic circles, detached from the common circles.

In the originality of the Sharia legal framework, the rights of women can actually be extremely simplistic to be implemented. Apart from the existence of a system such as *Ijma*, which so flexibly allowed amendments in legal systems, the sharia as opposed to the Hindu traditionally uncodified laws was not central to the concept of the feudal land. Since the first practitioners of the sharia were the tribal populations from the Arab lands, who mastered in trade and business, the idea of a contractual marriage was very explicitly observed. Therefore, unlike the fixated notions of marriage in a Hindu environment, marriages within Islam were much more open towards contracts and mutual agreements. Another striking feature of Islamic marriage that has been mentioned in the scriptures is the concept of *Mehr*. It is material wealth and possession that is handed over to the daughter at marriage as a compulsory source of security in her post marriage period.

However, there is no doubt that even as the nature of the Islamic marriage is increasingly contractual, it was always patriarchal in nature, thereby somewhere leaving room for men to interpret the rules subjectively. Therefore in the current scenario with the history of our country and the Islamic community, we had a case famously labelled as the ‘Shah Bano case’ that took place in 1978. The case was a basic one in which a Muslim woman named Shah Bano from Indore claimed maintenance from her husband after divorce, and was turned away with the justification of *Mehr* acting as the securing element under Islam, already securing Muslim women’s rights. In 1979 and 1980, Justice Krishna Iyer keeping a humanitarian perspective placed the rights of Muslim women the right to survival and basic dignity. However, the court’s stance, verbal justifications and comments in public forums evoked a communal annoyance and led the then ruling party (INC under the leadership of Rajeev Gandhi) to pass the Muslim Women (Protection of Rights on divorce) Bill which excluded Muslim women from the legal field of Iyer’s placement of women’s rights. This was severely opposed by several women’s

organisations, as being siding communal interests more than women's rights, thereby showing very explicit forms of neglect towards gender injustice. Due to extreme societal pressure, Shah Bano herself subverted from her claim and inclined towards her religious decisions more than her own economic requirements and more so, her rights.

Even after almost 30 years since that case stirred the nation, Muslim women today are still struggling over the concept of 'triple talaq' which is such a drastic consequence of an uncodified section of law, which even allows divorce by men over emails and text messages. After both the controversies, under a modernist discourse, the concept of a Uniform Civil Code (UCC) was brought into after a lot of debate. Along with combining elements of national integration and modernity, it majorly was supposed to cater to gender justice.

Having recognised the differences and the intensity of the issue of the uncodified Sharia law and its consequences on Muslim women, I shall now delve into the specificities, debates and the significance of the UCC, and discuss whether its implementation is actually useful and foolproof.

Strategies to Eliminate the Consequences of the Uncodified Sharia

A scholar called Sabeeha Bano in 1995 recognised that one of the reasons why Muslim women's accounts are so silent is because legal research does not come directly from them, thereby giving no original accounts of the Muslim women's first hand experiences. Therefore, she conducted a survey on how many Muslim women from the university preferred the Muslim laws to change. 57 percent of women strictly believed that changes and amendments were necessary. However, they also believed that all changes must take place within the framework of Islamic law. This is where I will take a pause and go back to the Islamic source of law – the Quran. One of the biggest challenges while using the holy text as a source of law is that it cannot be contested or amended, thereby eliminating what the majority of the sample population has asked for. Since the narrator of the text is believed to be God himself, contesting His words will most certainly involve communal backlashes and other unwanted scenarios. Therefore, changes within the Sharia framework seems difficult unless the entire community unanimously agrees on the amendments.

As mentioned above, the Uniform Civil Code is a modern idea which was put under the directive principle of the state, as a measure to be established in future. Since the Criminal and Civil laws of India, both are uniform in nature, the UCC shall encompass only a very small section of coding of civil laws such as marriage, succession, maintenance and adoption.

In every debate that brought up the matter of the UCC, the time has been deemed inappropriate for welcoming a uniform code. The same argument was also adopted by the drafting committee of the Indian Constitution, due

to which a middle ground was taken and the implementation was postponed. It is important to note that defining the arrival of the right time will always be a problem with a minority community of any country. There will always be political and religious pressure from orthodox groups, along with the unneglectable fact that our Constitution has held us in a dichotomous situation granting both the freedom to practice the religion of choice, as well as putting UCC as the state's directive principle. Therefore, even though UCC appears to be a useful tool that may rest power and make personal laws just for Muslim women, it appears farfetched. Another aspect of the UCC that might be contestable is the feminist legal theory has recognised that it fails to acknowledge differences among women themselves. If implemented, women themselves might witness issues since differences that arise from their cultural backgrounds may be nullified altogether, raising questions on their identity and individuality.

On the other hand, it can also be questioned that if religious scriptures also lay down guidelines for punishments for wrong doings, why are criminal laws codified in a uniform manner? In that case, personal laws should not observe any difficulty in codification at all. Also in a country like India, a uniform code might be easier to cater to all women as all sections of the Indian population might not be equally equipped to understand the intricacies of such diverse laws. Diversity in laws may also be misinterpreted and bended according to the community's whims. Therefore carrying very strong pros and cons, the implementation of the UCC holds a lot of debates and makes it appear farfetched and difficult.

Therefore, perhaps it is important now to look for a middle ground to resolve issues. Previous literature on strategies have put forth some diplomatic ways of dealing with the current problem. Instead of implementing UCC throughout the country, which might overwhelm the minority communities, an optional code for some time might be more viable. This optional code (something similar to the special marriage act, 1954, in context of the Hindu marriage laws) may run side by side, wherein the religious determination of the couple is not required. With time as the community grows more tolerant towards this 'option,' debates can be started all over again towards making it permanent.

Another process can entail slowing down the speed of the change. Under the Sharia law, each section can be codified one at a time. For example, the legal system can begin with succession and across years, involving debates and feedback, codify the entire bunch of Muslim personal laws as a whole.

Going back to Sabeena Bano's reason for beginning her study, the feminist legal approach of 'consciousness raising' in which through narration of individual experiences, Muslim women can provide with legal directions towards creating laws that are more advantageous to them by sharing their first hand personal experiences. Therefore, legal research should inculcate documenting of women's own voices and using it to design policies that support their desires as women.

Having put forth my less direct strategies for ensuring equality in marriage within the Muslim community and at the same time, maintaining the religious scenarios of the country, I would conclude by saying that ideally, a drastic change in approach is the best strategy. If the now obsolete source of Sharia law *Ijma* can be brought forth by department of religious studies in educational institutes and it is emphasised that the text itself deems it mandatory to change laws with change in times and contexts, amendments themselves can be based on the 'word of God'. Perhaps such a drastic change in approach also requires beginning with the above mentioned, more minor strategies. If gender justice in marriage for this small but significant section of women is needed, then gradual but powerful steps need to be taken, both in legal and academic circles as powerful strategies.

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Study on Influence of Socio-economic Status on Children's Educational Aspirations and Attitude Towards Academics

Delshad Kalantary

Mithibai College, Suvarna Nagar, Vile Parle (W), Mumbai – 400056
del2199@gmail.com

Introduction

The aim of the research was to study the impact of the socio-economic background and its influence on the youths' educational aspirations and attitudes towards academics. Socio-economic status (SES) is measured as a combination of education, income and occupation. It is commonly conceptualized as the social standing or class of an individual or group.

Although most students of middle and lower socio-economic statuses both attend school, the effect of lower socio-economic status on student achievement is difficult to ignore. Recent findings from a large international study on tackling inequalities in health indicate that socio-economic inequalities in health are present throughout Europe and that there are enormous opportunities for reducing them in many countries. Reducing such inequalities in health is undoubtedly an important target of public health policy. It has particular relevance for youth, since young people still have great potential for avoiding the undesirable, cumulating consequences of social disadvantage (Mackenbach et al., 2008).

Low SES and its correlates, such as lower education, poverty and poor health, ultimately affect our society as a whole. Inequalities in wealth distribution, resource distribution and quality of life are increasing in India. Society benefits from an increased focus on the foundations of socio-economic inequalities and efforts to reduce the deep gaps in socio-economic status in India (Mihaela Mihai et al., 2015).

Research indicates that children from low-SES households and communities develop academic skills more slowly compared to children from higher SES groups. Initial academic skills are correlated with the home environment, where low literacy environments and chronic stress negatively

affect a child's preacademic skills. Inadequate education and increased dropout rates affect children's academic achievement, perpetuating the low-SES status of the community. Improving school systems and early intervention programmes may help to reduce these risk factors, and thus increased research on the correlation between SES and education is essential (Morgan et al., 2009).

Families from low-SES communities are less likely to have the financial resources or time availability to provide children with academic support. Children's initial reading competence is correlated with the home literacy environment, number of books owned and parent distress. However, parents from low-SES communities may be unable to afford resources such as books, computers, or tutors to create this positive literacy environment (Aikens and Barbarin, 2008).

In a nationwide study of American kindergarten children, 36 percent of parents in the lowest-income quintile read to their children on a daily basis, compared with 62 percent of parents from the highest-income quintile (Coley, 2002). When enrolled in a programme that encouraged adult support, students from low-SES groups reported higher levels of effort towards academics (Kaylor and Flores, 2008).

Socio-economic Status and Education

Society benefits from an increased focus on the foundations of socio-economic inequalities and efforts to reduce the deep gaps in socio-economic status in the United States and abroad. Behavioural and other social science professionals possess the tools necessary to study and identify strategies that could alleviate these disparities at both individual and societal levels. Inadequate education and increased dropout rates affect children's academic achievement, perpetuating the low-SES status of the community. Improving school systems and early intervention programmes may help to reduce these risk factors, and thus increased research on the correlation between SES and education is essential.

Vygotsky's Socio-cultural Theory

Research conducted by Vera John-Steiner and Holbrook Mahn (1996) used three central tenets of a Vygotskian framework to examine the relationship between learning and development: (a) social sources of individual development, (b) semiotic (signs and symbols, including language) mediation in human development, and (c) genetic (developmental) analysis.

The research is based on Vygotsky's *socio-cultural theory* of human learning which describes learning as a social process and the origination of human intelligence in society or culture. The major theme of Vygotsky's

theoretical framework is that social interaction plays a fundamental role in the development of cognition.

The role played by culture and language in human development is an essential aspect of the Vygotskian framework which provides an overarching theme for this article. The methodological foundation of this framework is examined, particularly as it contrasts with other perspectives on the process of internalization of social interaction in the construction of knowledge.

Lev Vygotsky views interaction with peers as an effective way of developing skills and strategies. He suggests that teachers use cooperative learning exercises where less competent children develop with help from more skillful peers - within the zone of proximal development. The zone of proximal development is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peer. Vygotsky believed that when a student is in the ZPD for a particular task, providing the appropriate assistance will give the student enough of a "boost" to achieve the task.

The ZPD has become synonymous in the literature with the term scaffolding. However, it is important to note that Vygotsky never used this term in his writing, and it was introduced by Wood et al. (1976). Once the student, with the benefit of scaffolding, masters the task, the scaffolding can be removed and the student will then be able to complete the task again on his own. Wood et al. (1976) offer the following definition of scaffolding: 'Those elements of the task that are initially beyond the learner's capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence'.

The power of Vygotsky's ideas lies in his explanation of the dynamic interdependence of social and individual processes. He arrived at his views by analyzing the crisis in psychology he saw in the two predominant schools in the field, "each of which claim[ed] to possess an explanatory system adequate to become the basis of general psychology".

The Poverty Trap of Education

People who live in poverty are aware of the fact that sending their children to school will give them opportunities that they didn't have. Traditional studies of development and education focus either on the benefits of education for lifting the poor out of poverty, or on the vicious circle created when poor cannot afford education (Mihaela Mihai et al., 2015).

Thus, these findings shed light on recent theoretical work and provide new insights on the channel through which intergenerational mobility takes place, indicating that maternal aspirations, rather than maternal (or paternal) education, drive household investment in child education.

Methodology

Before distributing the questionnaires the participants were informed about the purpose and the nature of the study. They were informed that the purpose of the research was to study the influence of socio-economic status on children's educational aspirations and attitude towards academics. Confidentiality and privacy of responses was assured to the participants. Data was collected from 20 parents belonging to low socio-economic strata and 20 parents belonging to middle socio-economic strata. The sample ranged in the age group of 35-50 years, having children in the range of 10-15 years of age. Further, the children of those parents were also contacted for their responses on the same variables through questionnaire. Self-designed questionnaire method was employed. The tool of data collection containing questions on parental background and the parental involvement in their child's education was used to obtain quantitative data from the respondents. For each question on parental involvement, the respondents were asked to mark one of the following responses: 'yes', 'sometimes', 'no', for each item regarding the parents' involvement in their child's education. After the data was systematized, classified and tabulated, the data was analyzed and interpreted. Statistical differences between perceived support given by parents and perceived support received by the children for both the socio-economic strata were calculated through the student's *t*-test using Statistical Package of Social Sciences (SPSS).

Although most students of middle and lower socio-economic statuses both attend school, the effect of lower socio-economic status on student achievement is difficult to ignore.

The present study examines the following hypothesis:

1. There exists a significant relationship between socio-economic factors and educational aspirations in children.
2. There exists no significant relationship between perceived support given by parents to their children and the perceived support received by the children.

Result and Discussion

Data obtained from parents and children from low and medium socio-economic status was calculated using student's *t*-test. Analysis indicates whether there is statistical difference in the perceived support given by parents and perceived support received by their children in both socio-economic strata and whether the support given between the two socio-economic strata differ significantly.

As can be seen in Table 1 the statistical difference between the perceived support given by parents and support received by children belonging to *low strata* has been obtained. Descriptive statistics indicates that the *mean* value obtained by 20 (N) children is 11.45, while the *mean* value obtained by 20 (N) parents is 13.75. To determine whether there exists a significant difference

between the two means a two tailed, independent samples *t*-test was computed with *df* at 38. Data obtained was *non-significant* at $p > 0.05$.

This indicates that there is no significant difference in the perceived support given by parents and the perceived support received by their children in the low socio-economic strata. Such data can be interpreted to reveal that the support given by parents in the low SES to their children is acknowledged and received in a similar quantity and quality by their children. Children are able to perceive and accept the support their parents give to them, specifically for their educational aspirations in the lower SES.

Existing literature supports these findings; the role of parental expectations in affecting children's academic progress has received substantial attention from psychologists and sociologists over the past half century. In general, parental expectations have been found to play a critical role in children's academic success. Students whose parents hold high expectations receive higher grades, achieve higher scores on standardized tests, and persist longer in school than do those whose parents hold relatively low expectations (Davis-Kean, 2005; Pearce, 2006; Vartanian et al., 2007). Research has indicated that low-SES parents may lessen parents' reliance on school feedback when evaluating their children's academic performance, and thus diminish its value in predicting how the child will do in the future. And parents' sense of self-efficacy in supporting their children's schooling is conditioned by available resources and sources of support. Parents with limited resources and support, especially low-SES and/or immigrant parents may underestimate the likelihood of their children's future academic success even when past performance has been high because they do not feel personally capable of helping their children attain the required skills.

As can be seen in Table 2, the statistical difference between the perceived support given by parents and support received by children belonging to *medium strata* has been obtained. Descriptive statistics indicates that the mean value obtained by 20 (N) children is 26.25, while the *mean* value obtained by 20 (N) parents is 24.65. To determine whether there exists a significant difference between the two means a two-tailed, independent samples, *t*-test was computed with *df* at 38. Data obtained was *not significant* at $p > 0.05$.

This indicates that there is no significant difference in the perceived support given by parents and the perceived support received by their children in the medium socio-economic strata. Such data can be interpreted to reveal that the support given by parents in the medium SES to their children is acknowledged and received in a similar quantity and quality by their children. Children are able to perceive and accept the support their parents give to them, specifically for their educational aspirations in the medium SES.

Socio-economic Background Matters

While aspirations are generally high among young people, their parents' socio-economic background determines young people's outlook on success

Table 1: Statistical difference between the perceived support given and received by low strata

Low Strata	0 = LSC 1 = LSP		N	Mean	Std. Deviation	Std. Error Mean
	0	1				
	20	20	20	11.45	6.878	1.538
			20	13.75	6.298	1.408

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means							
Low Strata	Equal variances assumed	F	.074	.788	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper
	Equal variances not assumed				-1.103	38	.277	-2.300	2.085	-6.522	1.922
					-1.103	37.709	.277	-2.300	2.085	-6.523	1.923

Table 2: Statistical difference between perceived support given and received by medium strata

Group Statistics		N	Mean	Std. Deviation	Std. Error Mean				
	0 = mSC 1 = mSP								
MedStrata	0	20	26.25	5.350	1.196				
	1	20	24.65	4.859	1.086				
Independent Samples Test									
t-test for Equality of Means									
		Levene's Test for Equality of Variances		T		95% Confidence Interval of the Difference			
		F	Sig.	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MedStrata	Equal variances assumed	.725	.440	38	.328	1.600	1.616	-1.671	4.871
	Equal variances not assumed			37.653	.328	1.600	1.616	-1.672	4.872

in life. Those from disadvantaged backgrounds express lower aspirations and expectations to succeed. According to study conducted by the Prince's Trust, 26% of young people aged 16 to 24 from poor homes felt that "people like them don't succeed in life".

Attitudes are Transferred from Parent to Child

For example, parental experiences and attitudes to education influence a young person's likelihood of wanting to stay in further education after 16. The Department of Education's longitudinal study of young people in England (LSYPE) recently found that 90% of 13-year-olds whose parents are in "higher managerial and professional occupations" plan to continue with school, compared to 67% whose parents have "routine occupations". Studies conducted by researchers from the London School of Economics and Political Science have proven that parental attitude plays a significant role in their children's educational aspirations and attitudes.

With reference to Table 3, the mean and SD value for 20 children belonging to low socio-economic strata were 11.45 and 6.878 respectively, whereas the mean and SD for 20 children belonging to medium socio-economic strata were 26.25 and 5.530 respectively. To determine whether there exists a significant difference between the two means a one-tailed, random group, *t*-test was computed with *dF* 38. Data obtained was *significant* at level $p < 0.05$.

Research conducted by Ahmad Kainuwa and Najeemah Binti Mohammad Yusuf (2013) studied the Influence of Socio-Economic and Educational Background of Parents on their Children's Education in Nigeria. The aim of the study was to explain how children's education is significantly affected by the socio-economic status and educational background of their parents and to provide some suggestions for parents on how to overcome personal and economic challenges and to help in the educational process of their children. Parent's socio-economic status and educational background are based on family income, parental education level, parental occupation, and social status in the community such as contacts within the community, group associations, and the community's perception of the family. One of the biggest problems with children in today's society is youth apathy. Parental involvement in school can help solve this problem by emphasizing the importance of a good education, and getting their children excited about learning. "For most children to succeed in school, their parents' interest in their learning is of paramount importance. But this interest ought to be with what happens on a daily basis, because this is how the child lives, and this is how he understands his life. The essential ingredient in most children's success in school is a positive relation to his parents" (Bettelheim, 1987). Parents' personal educational backgrounds and economic backgrounds have a significant effect on their children's education. However, if parents are a positive influence in their children's everyday lives, and most importantly in their everyday education, the future of our society will look brighter and brighter every day.

Table 3: Statistical difference in perceived support received between low and medium strata

Group Statistics		N	Mean	Std. Deviation	Std. Error Mean
0 = LSC					
1 = mSC					
Children	0	20	11.45	6.878	1.538
	1	20	26.25	5.350	1.196

Independent Samples Test		t-test for Equality of Means								
		Levene's Test for Equality of Variances								
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Children	Equal variances assumed	.002	.964	-7.596	38	.000	-14.800	1.948	-18.744	-10.856
	Equal variances not assumed			-7.596	35.828	.000	-14.800	1.948	-18.752	-10.848

Ancillary Observations

1. Pattern in increase in number of siblings/children with perceived support in low strata

<i>No. of siblings</i>	<i>Perceived support received</i>
0	15
1	15.8
2	8
3	9.6

The following table indicates the increase in number of children/siblings with perceived support belonging to low strata. As can be seen families with three children have had a significant impact on the children as a result of which they receive least support (mean score of support 9.6) as compared to families with one child (mean score of support 15.8). This data reveals to us that with increase in the number of children in the family, each child tends to get divided attention and support from their parents in the low strata. These findings suggest that number of siblings in a family plays a significant role in the support parents can offer to their children. This in turn may affect their educational aspirations as well as their opportunity to receive further education, owing to the poor financial stability of the lower SES in the country.

Further, empirical evidence suggests that sibling structure influences children's educational outcomes especially to those children belonging to low strata: While the negative effect of the number of siblings is quite consistent, there are mixed findings for birth order and birth spacing. According to the resource dilution hypothesis, differences between siblings occur because siblings have to share family resources. Having a larger number of siblings, being a later-born child as well as narrow age gaps between siblings can affect the parental resources available for each child, which may thus negatively affect educational outcome.

2. Pattern in increase in number of siblings/children with perceived support in medium strata

<i>No. of siblings</i>	<i>Perceived support received</i>
0	23.62
1	28

The above table indicates that the perceived support received by children having one sibling is 28, and the perceived support received by children having no siblings is 23.62. This indicates that the presence of children plays a significant role in the educational aspirations received by children.

3. Pattern between working parents and perceived support received

<i>Strata</i>	<i>Single parent working</i>	<i>Both parents working</i>
Low	10.125	12.33
Medium	28.09	24

The above table indicates the pattern between working parents and perceived support received in low and medium strata. As can be seen from the table in low strata when a single parent is working the perceived support received by children is 10.125, while when both the parents are working the perceived support by children is 12.33. There only seems to be a slight increase in the perceived support received by children belonging to low strata. When single parents are working or when both parents are working the perceived support received is almost the same.

Research conducted by Chris Belfield, Jonathan Cribb, Andrew Hood and Robert Joyce¹ indicates that nearly two-third of the parents from low income families are working. Reasons are obvious: poverty, needs to sustain their family and mainly to ensure stability. This could have a significant impact on the children. These children mostly receive less family support and this affects their educational aspirations. Due to obvious reasons majority of parents belonging to low strata work. Both parents work because they belong to low income families, they need to sustain their as well as their family needs and duties.

Further another reason why children belonging to low strata receive more support when both parents are working could be due to the major obvious reason that majority of parents belonging to low income families lack educational knowledge and background themselves. Seeing both their parents work and realizing the value of education could instill a spirit of zeal in them.

On the contrary children belonging to medium strata receive more support. As can be seen from the above table when single parents are working the perceived support received by the children is 28.09 as compared to both parents working which is 24. This indicates that the presence of a parent at home plays a very vital and crucial role in the children's educational aspirations.

Strengths and Limitations

Strengths

Society benefits from an increased focus on the foundations of socio-economic inequalities and efforts to reduce the deep gaps in socio-economic status in the United States and abroad. Behavioural and other social science professionals

¹ Embargoed copies of the full report, *Living Standards, Poverty and Inequality in the UK: 2015*, are available on request. The report is also available on the IFS website.

possess the tools necessary to study and identify strategies that could alleviate these disparities at both individual and societal levels.

Limitations

Low SES and its correlates, such as lower education, poverty and poor health, ultimately affect our society as a whole. Inequalities in wealth distribution, resource distribution and quality of life are increasing globally. Increasing evidence supports the link between lower SES and learning disabilities or other negative psychological outcomes that affect academic achievement.

Children from lower SES households are about twice as likely as those from high-SES households to display learning-related behaviour problems. A mother's SES was also related to her child's inattention, disinterest, and lack of cooperation in school (Morgan et al., 2009).

Conclusion

Socio-economic status (SES) is often measured as a combination of education, income and occupation. It is commonly conceptualized as the social standing or class of an individual or group. Socio-economic status is a broad and a powerful term. The tool of data collection containing questions on parental background and the parental involvement in their child's education was used to obtain quantitative data from the respondents. From the data obtained, it could be concluded that there was *no significant* difference obtained between perceived support received and given in low strata. Similarly there was *no significant* difference between perceive support received and given in medium strata. However there was a *significant* difference between perceive support received by children in low and medium strata, which underlies the hypothesis.

Ancillary observations also indicated that in low strata single and both working parents have a significant impact on their children's educational aspirations, thereby leading to low educational attitudes. However in the medium strata the data proven is different. The presence of a parent at home is a must. Thus children receive more social support and guidance.

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Appendix

Questionnaire for parents

Name: _____

Age: : _____

Income: : _____

Marital status: _____

: _____

Occupation: : _____

Gender: : _____

- Q.1. Are both of you (parents) working?
(a) No (b) Yes
- Q.2. With whom do your children stay with in your absence?
- Q.3. How many children do you have?
- Q.4. Do your children go to school?
(a) No (b) Yes
- Q.5. Do your children like studying?
(a) No (b) Yes
- Q.6. Do you like that your children are studying?
(a) No (b) Yes
- Q.7. How many hours do you spend with your child everyday?
(a) 0-2 (b) 3-5 (c) 6-8
- Q.8. How many hours does your child study in a day?
(a) 0-2 (b) 3-5 (c) 6-8
- Q.9. Do you show interest in your child's academics?
(a) No (b) Sometimes (c) Yes
- Q.10. Do you want education to be their first preference?
(a) No (b) Maybe (c) Yes
- Q.11. Do you take interest in your child's everyday activities in school?
(a) No (b) Sometimes (c) Yes

- Q.12. Do you drop and pick your child from school?
 (a) No (b) Sometimes (c) Yes
- Q.13. What has been the record of your child's attendance?
 (a) Less than 50 % (b) 50-80% (c) Above 80%
- Q.14. Do you attend the parent teacher meetings?
 (a) No (b) Sometimes (c) Yes
- Q.15. What has been the most common reason why your child misses school?
 (a) Health issues (b) Lack of interest and boredom
- Q.16. Do you think your child's social circle motivates his/her educational aspirations?
 (a) No (b) Maybe (c) Yes
- Q.17. Do you see academic competition between your children?
 (a) No (b) Sometimes (c) Yes
- Q.18. Do your children get bullied at school?
 (a) No (b) Sometimes (c) Yes
- Q.19. Does your child often bully other people?
 (a) No (b) Sometimes (c) Yes
- Q.20. Do you read regularly with your child?
 (a) No (b) Sometimes (c) Yes
- Q.21. Do you have material resources such as a computer at home for your child's academic benefits?
 (a) No (b) Yes
- Q. 22. Do your child go for private tuitions?
 (a) No (b) Yes
- Q.23. Has your child been a subject of suspension from school?
 (a) No (b) Yes
- Q.24. Do your children have academic goals?
 (a) No (b) Yes
- Q.25. Do your children aspire to be something?
 (a) No (b) Yes
- Q.26. Do you and your children talk about their future plans?
 (a) No (b) Yes
- Q.27. In what ways do you encourage your children towards academics?
 (a) Self-talk (b) Constant reminder
- Q.28. Have your children failed in school? What are the reasons?

Questionnaire for children

Name: _____

Age: _____

Gender: _____

- Q.1. Are both of your (parents) working?
(a) No (b) Yes
- Q.2. With whom do you stay with in your parents absence?
- Q.3. How many siblings do you have?
- Q.4. Do you go to school?
(a) No (b) Yes
- Q.5. Do you like studying?
(a) No (b) Yes
- Q.6. Do your parents like that you are studying?
(a) No (b) Yes
- Q.7. How many hours do your parents spend with you everyday?
(a) 0-2 (b) 3-5 (c) 6-8
- Q.8. For how many hours do you study in a day?
(a) 0-2 (b) 3-5 (c) 6-8
- Q.9. Do your parents show interest in your academics?
(a) No (b) Sometimes (c) Yes
- Q.10. Do you want education to be your first preference?
(a) No (b) Maybe (c) Yes
- Q.11. Do your parents take interest in your everyday activities in school?
(a) No (b) Sometimes (c) Yes
- Q.12. Do your parents drop and pick your child from school?
(a) No (b) Sometimes (c) Yes
- Q.13. What has been the record of your attendance?
(a) Less than 50% (b) 50-80% (c) Above 80%
- Q.14. Do your parents attend the Parent Teacher Meetings?
(a) No (b) Sometimes (c) Yes
- Q.15. What has been the most common reason why you miss school?
(a) Health issues (b) Lack of interest and boredom
- Q.16. Do you think your social circle motivates your educational aspirations?
(a) No (b) Maybe (c) Yes
- Q.17. Do you see academic competition with your siblings/peers?
(a) No (b) Sometimes (c) Yes
- Q.18. Do you get bullied at school?
(a) No (b) Sometimes (c) Yes
- Q.19. Do you often bully other people?
(a) No (b) Sometimes (c) Yes
- Q.20. Do your parents read regularly with you?
(a) No (b) Sometimes (c) Yes
- Q.21. Do you have material resources such as a computer at home that you use for your academic benefits?
(a) No (b) Yes

- Q.22. Do you go for private tuitions?
(a) No (b) Yes
- Q.23. Have you been a subject of suspension from school?
(a) No (b) Yes
- Q.24. Do you have academic goals?
(a) No (b) Yes
- Q.25. Do you aspire to be something?
(a) No (b) Yes
- Q.26. Do you and your parent talk about your future plans?
(a) No (b) Yes
- Q.27. In what ways do your parents encourage you towards academics?
(a) Self-talk (b) Constant reminder
- Q.28. Have you failed in school? What are the reasons?

Indian Women in Science

Srushti Borkar* and Nikita Anil Kumar

Symbiosis School for Liberal Arts
New Viman Nagar Campus, Pune – 411014
*srushti.borkar@ssla.edu.in

Introduction

Indian women have pursued careers in science for over a century. Modern education for women in India started in the early 1800s, and by the turn of the century, universities started accepting women students. Starting with Anandibai Joshi (1865-1887), who is regarded as the first Indian woman to become a qualified practitioner of Western medicine, Indian women have been entering all subfields of science since. Janaki Ammal (1897-1984), an Indian botanist, conducted scientific research in cytogenetics and phytogeography. Her chromosomal studies threw light on the evolution of several garden plant species and varieties, and her work in hybridisation contributed vastly to plant diversification. In the late 1930s, Dr. Kamala Sohoni was the first Indian woman to get a doctorate in a scientific discipline. She went on to work at the Indian Institute of Science, where she was initially turned down by the then director Professor C.V. Raman, who believed that women were not competent enough to conduct research. However, after some persuasion, she was accepted on probation and managed to impress Raman, who then gave her permission to pursue further research.

Until the 1920s, progress was extremely slow due to low literacy rates among women. Except for a few who came from well-educated, upper middle class families, not many women pursued education, especially not in the sciences. The pace of progress in women's education quickened after the 1920s; however substantial progress was made only after independence in 1947. Other women scientists such as Anna Mani, Asima Chatterjee, Darshan Ranganathan and Maharani Chakravarty have also made valuable contributions to their respective fields, but real success of these women lies in fact that they have been trailblazers in pushing the boundaries set by a patriarchal society, becoming beacons of inspiration for today's women scientists.

However, despite the growing number of women scientists, gender-based disadvantages in a patriarchal culture continue to persist. Indian society is characterized by a "patri-focal family structure" (Mukhopadhyay et al.,

1994), which gives precedence to men over women. The patri-focal structure is not necessarily just patriarchal; rather it emphasizes strict gender roles, boundaries, and subordination of the individual for family welfare. Historically, this structure has been a determining factor in women's lives and education, and its effects are prevalent even in modern India. Most scientific settings in India today carry a masculine ethos. The field is plagued by glass ceilings, leaky pipelines and sticky floors. There is also a hierarchical segregation in terms of gender. The participation of women has been limited and confined to subordinate positions. Furthermore, most of this participation is observed to come from women from privileged urban backgrounds, which leads us to believe that women from rural areas, or underprivileged backgrounds do not seem to have access to or the inclination to pursue science fields. There is also a prevalence of unequal treatment and gender-based discrimination in interpersonal relations due to socio-cultural norms within the country. This discrimination component is much higher in scientific and technical fields compared to that among social science and other related fields (Duraishamy and Duraishamy, 1998). The socio-cultural context forces women scientists to assume "triple-burdens". All working women have the dual burden of managing a job and domestic responsibilities; however women in science have the additional burden of problems specific to scientific professions.

The statistics collected clearly display the lack of representation of women in the STEM fields. According to UNESCO, in 2013 women only made up 28.4% of the world's researchers. In addition, women tend to be better represented in the public sector than in the more lucrative private sector. These statistics do change, however, depending on the country in question. In the United States, women represent half of those who are college educated but only 29% of the science and engineering workforce are women. Women also tend to seek out careers in the social sciences rather than in engineering, the IT industry or mathematics. In the UK, only 14.4% of individuals working in STEM fields are women.

Unfortunately, there is a lack of reliable statistics relating to women scientists in India. While there are statistics regarding educational demographics, very little exists on career representation. This gap in knowledge should be filled to help progress of the status of women in skilled professions. It is known, however, that 14% of all Indian researchers are women and 30% of the IT workforce is made up of women. The representation of women faculty in institutes such as IIT and TIFR stands at 10-12% presently.

The aim of this paper is to ascertain the role of various factors such as caste, socio-economic background, rural vs. urban upbringing, family history of literacy, societal restrictions, and parental attitudes towards education and to examine how they influence women to choose careers within the STEM fields. The paper will also address the problems faced by women in the sciences, in terms of gender inequality, underrepresentation and bias and

explore the prevalence of glass ceilings, leaky pipelines, and sticky floors experienced by women in scientific professions.

Factors Influencing Women to Choose Science Fields

Socio-Economic Factors and Education

In any culture, children are exposed to gender roles right from the beginning. From an early age, boys are geared towards exploring the physical world; curiosity and problem solving skills are encouraged. On the other hand, girls are oriented towards developing social skills, and are encouraged to take part in relationship-based activities (Dasgupta and Stout, 2014). A very common example of this is that young boys are encouraged to play with science kits, whereas girls are generally given dolls and kitchen sets. Most children learn associations between gender and job roles by age 3 (Hilliard and Liben, 2010), due to which it is imperative to give young girls exposure to the sciences at an early age.

It is alarming to note that in primary school, parents have lower expectations for their daughters' maths and science abilities than for their sons. Girls' efforts and successes in schools are attributed to conscientiousness and hard work, whereas boys' efforts and successes are attributed to innate talent. (Stout et al., 2010). Surprisingly, these stereotypes are enforced more by mothers than by fathers, due to which a supportive mother is a strong predictor of adolescent girls' motivation to take up STEM fields. This may be one of the reasons for the low number of women in India from rural backgrounds pursuing STEM fields. Lack of education within rural women would then explain why their daughters are less likely to pursue science fields. Within the women scientists interviewed by us, all had working mothers. When working women scientists were surveyed, it was found that 98% of them had parents who were encouraging and supportive of their education and careers (Suresh, 2013). If women in the community do not support young girls in pursuing science, and continue to push pre-established gender roles, then they are less likely to even consider that as an option. Research shows that girls between the ages of 6 and 9 have implicit beliefs that boys are better at mathematics and science than girls, and test scores reveal that these beliefs far exceed performance (Stefens et al., 2010; Dasgupta and Stout 2014). These implicit stereotypes may be the reason girls lose interest in science fields at a young age and are an important factor in the dropout of female students from mathematical fields of study (Stefens et al., 2010).

Rural settings are also important determining factors in girls' education. Seventy percent of India's population lives in rural areas, where lack of educational infrastructure at the primary, secondary and high school levels

hinders education. In India, where 37.2% of the population is below the poverty line, parents cannot afford private education for their children, and thus parents were forced to send their children to government funded schools. The primary goal of these schools is to impart fundamental literacy skills. To expect such institutes to focus on science seems almost unattainable currently. It is also observed that several girls from low income families drop out of school, mostly between 8th and 12th grade to work and contribute to the income of the family.

Additionally, families in rural and conservative communities often force girls into early marriages. In several cases, girls are a financial burden for parents. Thus, educating girls is the least of the parents' concerns, because after marriage, benefits of a daughter's education would accrue to her husband's family. A highly educated girl also entails greater difficulty in finding an equally or higher qualified groom, especially in rural areas (Mukhopadhyay et al., 1994). These factors become almost obsolete among the urban middle class, where most families have now started expecting women to pursue higher studies and even encourage interest in STEM fields. Most of these parents can afford to send their children to private or semi-private schools, which generally have higher standards of teaching as well as more resources. Early marriage is also not as prevalent in the urban middle class, and in recent years there has been a significant increase in women's enrolment in STEM fields. A few social reasons for this change are the prestige associated with scientific professions, increased chances of getting a highly-qualified groom and the attraction of "earning wives".

As per Government of India statistics (2004-05), the drop-out rates of girls from classes I-VIII was about 50.8%, and from I-X the drop-out rate was 64% in the same year. Hence, only about 36% of the country's young women complete their basic education. There is also a significant difference between primary and secondary school enrolment ratio for boys and girls per UN statistics (2001-2008).

On a brighter note, the enrolment of women in undergraduate engineering and technology courses has increased from 0.09% in 1971 to 10% in 1991 and 15% in 1998 (Chanana, 2000), (Research & Development Statistics 1996–97). The proportion of female students in pure science subjects has observed a similar increase, from about 7% in 1950 to 34% in 1997 (Chanana, 2000).

Tertiary level enrolment gaps are also prominent in India. A report from the Department of Science and Technology's National Task Force for Women highlights that university level enrolment of women is 20% less than that of men. The report also mentions that women in India are significantly underrepresented in STEM fields. It is observed that the highest representation of women is in education, possibly because it is compatible with a woman's duties as a mother. However, recently there has been a trend showing that women who do pursue higher studies have been choosing science and technology subjects more and more (Subrahmanyam, 1998).

Role Models

As mentioned earlier, mothers and other female role-models and mentors are important predictors of a young woman's disposition to participate in STEM fields. A recent study co-authored by MIT economist Esther Duflo confirms the importance of female role models. The study focused on the West Bengal region, where quotas for female politicians in local governments have been in place since 1993. Families with children ages 11-15 in 495 villages were surveyed for attitudes on education and achievement and then compared against villages without any female political leadership. The results showed that in areas with long-serving female leaders in local government, the gender gap in teen education goals disappeared, due to the fact that girls had set higher goals for themselves. Parents were also 25% more likely to report having more ambitious education goals for their daughters, significantly narrowing the gender gap. "We think this is due to a role-model effect: Seeing women in charge persuaded parents and teens that women can run things, and increased their ambitions. Changing perceptions and giving hope can have an impact on reality," says Duflo.

Conversely, in villages with only male leaders, they found a huge divide in expectations for girls and boys. Parents were 45% less likely to want their girls to graduate from school compared to their boys. Teens were also divided by gender on the issue of educational goals, with girls 32% less likely to want to complete school.

Although this study focused on female politicians in society, research on the gap between men and women in STEM fields points to the scarcity of readily available role models for girls as they consider STEM careers (Goodman and Damour, 2011). The underrepresentation of women in high positions is affecting young women in two major ways. First, as young girls begin to consider career trajectories, the choice of STEM fields is not reinforced by respected role models; second, the lack of female role models reinforces some negative stereotypes held by girls and young women about STEM. The lack of prominent women scientists in India is thus an influential factor determining whether young girls choose to participate in science fields in the future.

Problems Faced by Women Scientists

Dual Burden

The patri-focal structure predominant in India ascribes the responsibility of well-being of family to the woman; her domain is limited to her home. The focus has shifted slightly to accommodate a space for women outside the home; however even as the number of working women in India continue to increase, the community has yet to accept the independent status of a woman. Women are expected to give their family responsibilities precedence over

their career aspirations. Traditionally, the responsibility of raising children lies heavily on the mother. It has been observed that women who work outside the home do a larger share of the household work than men. Such work includes childbearing, cooking, cleaning and other home-related tasks. As per the Time Use Survey conducted by the Government of India (2000), women spend about twice the amount of time that men do in activities related to taking care of children. These demands of both a career and home lead to a double burden, also termed as the 'dual burden', 'second shift', 'role overload' or 'dual role syndrome' (Rout et al., 1999; Hochschild and MacHung, 1989; Chakravarthy, 1986; Hirsch and Rapkin, 1986). A study of women academic scientists in India showed that 92% of respondents felt that there was a dual burden on them (Gupta and Sharma, 2002). A majority (52%) of these respondents felt that the responsibilities of marriage, motherhood, living in a joint family, and managing the house, all involving time and effort, when combined with a career, left them stressed at the end of the day. Additionally, in the Indian patri-focal system, marriage increases the social obligations of a woman. Not only must the woman give in-laws and the husband special attention, but she is also expected to maintain social relationships and interact with a larger circle of friends and relatives. More than 90% of women respondents agreed that marriage affects career due to added social obligations (Gupta and Sharma, 2002). Most of the respondents also agreed that marriage affects the career of a woman professional due to migration (following norms of patrilocal residence) from one place of work to another. Thus, women scientists must shoulder the difficulties of maintaining a balance between work and home. This dual burden greatly influences women's scientific progress.

However, various studies have found that urban middle and upper class women in India are in an excellent position to efficiently balance a career and family life (Carrier, 1995). This is due to the availability and accessibility to paid help, to whom domestic work can be delegated. However, paid help is not easily available in all cities, and even if it is available, educated women typically believe that it is not secure to leave an infant with such help, since the carers are likely to be illiterate and untrained. Facilities for childcare in institutes are dismal.

Due to these double demands of being both a family care giver and a scientist, there is a disproportionately large number of women scientists who choose to remain single. They shun marriage to avoid the difficulty of combining career and marriage. However, even this decision is not easy, as they are compelled to struggle more than their male counterparts, if only to prove that their decision was right. A comparison of research activity of married and single women showed that the research activity of married women is higher in terms of average number of publications and participation in conferences as compared to single or widowed women (Gupta and Sharma, 2002). A possible explanation for this is that single women are less respected and more socially

isolated in the Indian social system, which is more favourable towards married women. Thus, interaction and collaboration with male counterparts may be even more difficult for a single woman, which may hinder her progress.

Leaky Pipeline

According to research reviewed by Dasgupta and Stout, there is a “leaky pipeline” in STEM fields – women gravitate away from STEM at multiple stages from childhood to mid-career. This means that simply exposing young girls to science fields is not enough. Remedies for the barriers women face in the sciences need to be introduced from childhood through adulthood. The strategies the authors propose focus on removing and overcoming structural barriers, because too often “women deal with professional barriers as individuals, handling them on an ad hoc basis” (Dasgupta and Stout, 2014). During childhood, the reason behind the leaky pipeline is that young girls internalize the fact that “boys are better at science and math”. However, even young women who have completed higher studies are vulnerable to the leaky pipeline. This vulnerability is greatest at two points for women: during pregnancy and after childbirth. All working women take maternity leave during the last stage of their pregnancy, and statistics show that only 18-34% of women return to their jobs after pregnancy. For many women, after children arrive, the situation comes down to a choice between job and children. Few employers provide flexible working hours or crèche facilities, so many working mums end up quitting their jobs after having children.

A common factor between STEM fields is adversely long working hours. While adhering to strict timings may be possible in other fields, academic research in the sciences needs far more than the 8-hour workday if success is to be achieved. Thus, women are unable to focus on both research and family, and obviously, due to the patri-focality of Indian culture, a clear majority of women choose children over their careers. Thus, the period of pregnancy and motherhood leads to several women breaking away from their careers. Of those who do return to their jobs after maternity leave, about 53 percent of respondents agreed that motherhood leads to a decline in scientific productivity (such as, writing research papers and project reports), but only 36 percent agreed that it brings a decline in job involvement (Gupta and Sharma, 2002). Respondents from this study also reported a break of one to five years due to motherhood. It is interesting to note that due to successful internalization of social norms, these women did not regret the loss of these years. However, this time off always affects careers adversely, especially in scientific academic research where the job requires a lot of teamwork and infrastructure. If a working scientist loses touch completely for a couple of years, coming back becomes that much more difficult, especially when employment rules frequently tend to have upper age limits for positions.

Due to these hindrances in the initial years, as well as a gendered work environment, women scientists in India have a delayed career peak (Gupta and Sharma, 2002). Women scientists in academic positions seem to reach a peak in their research activities only in their 50s. In India, where promotions are based on merit and recognition, this is already too late, and most women tend to retire before reaching senior positions. There is also a significant drop in research activity of women in the 40-45 age group. This decrease in research activity in the early 40s is probably due to the fact that the children of women in this age group are likely to be in crucial years of schooling in India, when the career of a child depends on the examination results of these classes. The age distribution of biotechnologists in India showed that approximately 60 percent represent the youth as they are within the category 20-30 years of age. It is also indicative of the dynamism and potential of this industry. 34 percent are in the 30-40 years category, usually in the middle order of the organisational hierarchy. Only 4.9 percent are in the age group of 40-50 years, and 1 percent in the bracket of 50-60 years (Suresh, 2013).

The Glass Ceiling Effect

The term 'glass ceiling' was originally coined by Carol Hymowitz and Timothy Schellhardt. It can be defined as 'an imaginary barrier to progress in a profession, especially affecting women and members of minorities'. Different types of glass ceiling barriers can exist, ranging from different pay for comparable work; sexual, ethnic, racial, religious discrimination or harassment in the workplace; lack of family-friendly workplace policies; to exclusion from informal networks; stereotyping and preconceptions of women's roles and abilities; failure of senior leadership to assume accountability for women's advancement; lack of role models, and lack of mentoring (Baker and Lightle, 2001). Within STEM fields in particular, the glass ceiling effect locates the problems in the institutions themselves, in which discrimination against women based on biases about their cognitive abilities to do hard science play a role in procedures of recruitment, promotion and selection for awards. This trend, combined with the leaky pipeline, shows a hierarchical segregation – there is a significant gap between the numbers of women enrolling in STEM fields at the undergraduate level and the numbers of women who make it to the top (Schiebinger, 1999). There is also a horizontal segregation, which is the poor participation of women in certain fields such as technology, mathematics and geology.

Thus, even those women who try to break gender barriers to provide better living conditions for their families while simultaneously pursuing their interest in STEM fields are faced with many hurdles. Many lose out in the pursuit of their professions in the early phases, and even those who manage to cross the initial hurdles are made invisible within the profession, not rising far enough or getting well-deserved recognition.

The Sticky Floor

The term “sticky floor” is used to describe a discriminatory employment pattern that keeps certain groups of people at the bottom of the job scale, occupying low-paying, low-mobility positions. The sticky floor can be compared to the glass ceiling in terms of low mobility and lack of progress and recognition; however the difference between the two lies in the fact that even running into the glass ceilings is a privilege enjoyed by urban middle and upper class women. The nature of jobs is very different at the two ends of the distribution. Women working at the upper end are more likely to be urban elite, and may be in a better position to act against any discrimination. This contrasts with a situation where a woman who is relatively less educated and comes from a rural, less privileged background and is paid a minimal wage by the employer. In this case, it would be easier for the employer to discriminate and even suppress the progress of the worker.

This issue is even more significant in India where caste is an important factor in hiring workers. Even with reservations in place, members of the lower castes and minority groups are still at a social disadvantage. This can be illustrated through a study conducted by Thorat and Attewell, where the researchers sent applications to private sector companies with identical resumes where they only changed the name of the applicant. The results showed that, “Statistically applications submitted by high caste Hindu names were more likely to result in a positive job outcome than those with Muslim or Dalit names, despite their identical qualifications. The odds of a Dalit being invited for an interview were about two-thirds of the odds of a high caste Hindu applicant. The odds of a Muslim applicant being invited for an interview were about one-third of the odds of a high caste Hindu applicant” (Thorat and Attewell 2009). Caste composition of women biotechnologists in India also shows that in a predominantly Hindu representation, Brahmin or upper caste constitute 50 percent, with upper caste South Indians having a fair share of representation. These castes are again strong in socio-economic, cultural and educational indicators. Another factor to be noted is that women from Scheduled Castes and Scheduled Tribes remain poorly represented in this sector (Suresh, 2013). This shows that in India, social strata are so ingrained in people’s psyche, that minorities are at an immediate disadvantage when it comes to hiring.

Social Relationships and Discrimination in the Workplace

One of the major problems faced by women scientists in the workplace is male dominance. Women scientists in Indian institutes generally constitute only 7-10% of all employees. Of these women, half are at a lower level in the professional hierarchy, occupying entry-level jobs. It is also observed that committees appointing women researchers and academicians often question the commitment of the women to their jobs. This is particularly because

as mentioned before, many Indian women quit working after marriage or childbirth. There is also the issue of women shifting depending on where their husbands find jobs. Due to this, research centres and companies are hesitant to spend time and effort training women, most of whom will not continue working.

Respondents of the survey conducted by Gupta and Sharma (2002) almost unanimously agreed that women must work much harder than their male counterparts to prove themselves. Many believed that men questioned their commitment and their intellect, and were unable to view the women as their equals. In some cases, men were 'too appreciative of small achievements' of women, or 'they are extra polite' towards them, which reflects a condescending approach, and gives an impression that a woman is not on a par. Many of the respondents reported that their capacity to work was compromised by the psychological pressure created by need to be recognised in a male-dominated environment. One of the respondents of our survey said, "There is immense psychological stress due to male colleagues who dominate the field. Males have less responsibilities at home compared to their female counterparts, and hence spend most of the time in their workplace. This further leads to a lot of comparison and competitions when it comes to promotions and higher perks. All these issues add up to a lot of mental and physical stress. Many a times, even the higher reporting authorities are also males and tend to have a lesser understanding of women's problems at workplace. Ironically, it is not the quantity of time that you spend, but the quality of work that you do that counts is seldom understood by these people."

Women also feel subordination due to gender stereotypes in the workplace. They face a dilemma of reconciling their gender role with their professional roles. Women are expected to be submissive and agree with their male colleagues; women who speak assertively are not considered to be 'normal'.

Social isolation in the workplace is also one of the problems faced by women scientists in India. Due to stringent gender roles, informal communication is limited for women. Informal communication is imperative in networking and exchanging professional information. Due to the norms of social segregation, male and female inter-mixing is frowned upon. Hence, women themselves maintain social distance from men. Men outnumber women in almost all STEM field workplaces, and it is observed that men tend to exclude women from informal communication. Male colleagues form their own groups, and although women are not denied access to these groups, their presence is not welcome. Furthermore, women also have the added burden of managing the home, due to which they may not be able to participate in after-work social gatherings. Women are also less geographically mobile than men due to family responsibilities, and thus are unable to attend seminars and conferences as frequently as their male counterparts. More than half of all women scientists in India perceived that they did not have easy availability of contacts, especially with professionals outside their respective institutes. Out

of the women interviewed by us, the women who had children unanimously agreed that they did not attend networking events and conferences, whereas one scientist who did not have children said she attended local events frequently. Social isolation such as this can be a major obstacle in progress for women scientists.

Underrepresentation and Lack of Social Recognition

Recent investigations show that there is no significant difference in the quantity and quality of women's publications, and in certain fields, women are in fact at par with men. However, only 0.02-0.04% of Bhatnagar award recipients are women and only 0.04% Indian Academy of Sciences fellows are women (Kumar, 2009). Kumar finds that equally productive women are not recognised and do not achieve higher academic rank. Studies also note that male mentors in Indian institutions were condescending towards women researchers and often reproduced the hierarchies of family relations at the work place (Subramanian, 2007), due to which women remain underrepresented at higher positions.

Policies and Schemes

Government Agencies

The Indian government has enacted numerous policies to combat the underrepresentation of women in STEM fields, which are created and implemented by specific agencies under the government.

The most prominent of these agencies is the *Department of Science and Technology* (DST), which was founded in 1971 with the express purpose of "promoting new areas of Science & Technology and to play the role of a nodal department for organising, coordinating and promoting S&T activities in the country." To further this objective the DST also runs programmes that cater specifically to women scientists by combating issues raised by relocation and so on.

Another agency that has a scheme specifically for women is the *Department of Biotechnology* (DBT). It was started in 1986 to improve the state of biotechnology in India. It also launched a scheme specifically to target women biotechnologists and empower them.

The *University Grants Commission* (UGC) has a scholarship programme for girls; however this scholarship does not target scientists alone.

Government Policies and Schemes

Department of Science and Technology

The DST has set up a programme for women called "*Knowledge Involvement in Research Advancement through Nurturing*" (KIRAN). Under KIRAN, a

standing committee was created to discuss women in science and implement changes that must be made to make a career in science more viable.

Three types of fellowships with research grants have been started by the DST called WOS-A, WOS-B and WOS-C. The first two provide opportunities for research in basic or applied science and the development of technology, respectively. WOS-C raises the opportunity to take up an internship in Intellectual Property Rights for Self-Employment.

These fellowships attempt to target women who are re-entering the field after taking a break from their careers and are unemployed at the time of application. To qualify for the scheme, a woman must have obtained a Post Graduate degree, a Ph.D. in the Basic or Applied Sciences, or equivalent qualifications to an M.Phil. or M.Tech. Additionally, the women must be between the ages of twenty-seven and fifty-seven.

The DST also set up a 'Mobility Scheme' in 2014, which attempts to counteract the negative impact of relocation on women working in governmental organisations. It offers monetary awards to women which can then be used to carry out independent research during interim period of unemployment after relocation. This is also beneficial to women who wish to carry out research while simultaneously fulfilling more domestic duties. The award's tenure lasts for a period of five years and the award money is paid to the women in a series of monthly payments.

KIRAN also set up the "*Consolidation of University Research for Innovation and Excellence in Women Universities*" (CURIE) programme in 2009, which has been availed by six universities as of 2016. Through CURIE, the DST intends to better the functioning of Science and Technology Departments in Women's only Post Graduate Colleges. Selected colleges will receive up to 200 lakh rupees, which can then be used to improve teaching resources and research and laboratory facilities. By improving the infrastructure, it is hoped that more women will be interested in these educational institutes.

Finally, KIRAN is also funding the construction of Women Technology Parks (WTP). These parks serve as demonstrations of the use of technology to benefit women, and act as centres where women can improve their living conditions. While not specifically targeting women scientists, WTP's aim to encourage more girls to study STEM in colleges after seeing the benefits of technology.

While KIRAN is useful in empowering the lives of women pursuing graduate and post graduate degrees, it does not cater to school or offer scholarships to girls attempting to enter higher education in the STEM fields.

Department of Biotechnology

The DBT has put forth a scheme called the "*Biotechnology Career Advancement and Re-orientation Programme (Bio-CARe) for Women Scientists*". Bio-CARe was launched to aid the career development of women scientists up to 55 years of age by supplying research grants to both employed

and unemployed women. As such, women who are attempting to re-enter the field after taking a break are catered to under this scheme. However, the grant is only supplied to women working in the Life Sciences, which includes agriculture, veterinary science and medicine.

University Grants Commission

While there are no government sponsored scholarships that cater only to female scientists, the “*Post-Graduate Indira Gandhi Scholarship for Single Girl Child for PG Programs*” is a scheme that aims to help families compensate for the money spent on the girl’s education if that girl is the only girl of the family. The scheme hopes to promote education for girls by reducing the economic impact of educating them.

Schemes by Academicians

While government policies are important, schemes conducted by academicians are equally important. These schemes tend to attempt to popularise science for the common masses and make it seem like a conceivable career opportunity for women. As such, they target a younger audience and attempt to introduce more young girls to the idea of pursuing science as a serious career choice. This is done through the organisation of workshops for children, commencement of role model programmes, publications of books and so on.

The Indian Academy of Sciences (IASc)

The IASc is an autonomous institute that is funded by the Department of Science and Technology. In 2003, the Academy Fellows set up a committee to discuss “Women in Science”. The committee was created to plan initiatives to combat the issue of underrepresentation of women in STEM fields. In 2005 the Panel for Women in Science was formed. The panel, called the WiS Panel oversees implementation of initiatives suggested by the committee.

As mentioned earlier, academicians tend to favour role model and mentorship programmes. Many of the WiS panel’s initiative fall under this category. The purpose of role model and mentorship programmes is to allow young girls to find ways to realise their potential by using already established female scientists as templates for what they can do. It is considered very important in India to carry out such measures as it is not societally common for girls to enter scientific careers.

Of the initiatives carried out by the panel, the publication of the book “*Lilavati’s Daughter’s*” is perhaps most well-known. It is an example of a role model programme wherein a list of famous women scientists in India was published to familiarise the public with famous female scientists from India. The panel states that these women are largely unknown to the common Indian who does not associate science with women. The book was published to change that viewpoint and to motivate young girls to follow in the footsteps of these eminent personalities.

Also under the mentorship objective is the programme “A Career in Science”. This consists of seminars with presentations conducted by women scientists at the top of their fields. The scientists discuss recent developments in their fields with an audience of mixed genders. The initiative hopes to motivate women to follow careers in science, make them aware of the different career options within science, and help them become entrepreneurs using science. The seminars are usually conducted on college campuses.

The Panel also took on the task of conducting a survey to discover how many women were leaving the scientific community after obtaining Ph.Ds. as compared to the number of men. This is an important study considering the lack of reliable statistics on Indian women scientists today. The study was titled ‘*Trained Scientific Women in Power: How Much are we losing and Why?*’ It also attempted to discern the reasons behind women either leaving the field or continuing to pursue it in order to better tailor future policies to target problems highlighted by the survey.

Finally, the WiS Panel has compiled a Database of Women in Science to create a forum for women scientists. Using the forum, scientists can discuss their ideas on what it means to be a woman working in a science field, which may help improve policies that target women.

Indian Women Science Association (IWSA)

The IWSA is a voluntary non-profit organisation that aims to use science and technology to aid the underprivileged as well as attract more women to science and technology. It follows many similar methods to the WiS Panel, relying on mentorship programmes. Additionally, the IWSA undertakes many projects to improve the community around its branches.

One of the objectives of the organisation is to popularise science to the public. To this regard, it started a “Popular Science Lecture Series”. The lectures are conducted by female scientists across colleges in Mumbai and are an attempt to make science interesting to students. The lectures are also used as a platform to advise students on how to pursue a career in science.

The IWSA also has a scholarship and award programme funded by donations to the NGO. They are awarded to girl students pursuing a science career depending on merit as well as need. The scholarships range from those given at the Junior College level to the Ph.D. level.

In accordance with their community based programmes, IWSA conducts workshops in their laboratory aimed at young children to get them interested in science. This programme is run for students of both genders and is a general approach to popularising science among the youth.

Schemes by Private Institutes and Companies

The private sector is also involved in promoting women enrolment in STEM fields. These policies are taken up by individual institutes in the hope of improving diversity within their campuses. Universities and private companies tend to employ these schemes.

Universities

An example of a university with a scheme for women is Tezpur University. It has set up incentives meant to attract, retain and promote women in scientific professions. For example, it has set up a Women's Studies Centre that focuses on North East India but also undertakes more general issues related to women. Their Equal Opportunity Cell also organises workshops to promote gender sensitivity and development of entrepreneurship skills for women.

In the name of representation, the university also ensures the presence of women faculty in all their academic and administrative bodies as well as providing women faculty with incentives. These incentives include fast-track promotion and favoured allotment of housing within the campus.

For improvement of infrastructure in terms of support for women students and faculty, the university has planned to provide child care and education. This includes a crèche and school within the campus. This is an important consideration as many women are unable to pursue STEM careers due to familial responsibilities and the related time constraints.

Tezpur is just one example of a university based scheme. Other institutes carry out their own initiatives. Some, like Delhi University, have formed association that exist specifically to discuss the status of women within campus.

Companies

Private companies also set up various schemes of their own. IT, biopharmaceutical and many other such firms attempt to promote diversity among their staff by providing incentives that attract women to take up careers in the private sector.

One such company is Biocon Limited, a biopharmaceutical firm. It has over 1000 women employees and offers them numerous incentives and benefits.

Biocon has an extended maternity leave that functions beyond the parameters set up by the government. Women can continue to take unpaid leave after the stipulated time after consulting with their managers. Furthermore, they are permitted to work part-time for a short period after they return from their leave. A crèche has also been conducted, where women can leave their young children, making the transition back to a career life easier.

In terms of protection from sexual harassment, there exists a strong policy to protect women, and employees are escorted to their homes if they need to return in the late hours of the night.

Foreign Schemes

Schemes to combat underrepresentation exist worldwide. In order to develop a more well-rounded understanding of common methods employed to counter underrepresentation, a few examples of foreign schemes should be discussed.

U.S.-India Women in Science Cooperation

The United States and India have partnered to share developments in science and technology. One of the objectives of this partnership was to increase the women's access to science and technology by sharing adopted practices between countries.

The practices shared by the U.S were carried out by the University of California, specifically to target faculty within STEM fields. This included a pre- and post-tenure part time track, wherein women who have started families can work part time after their maternity leave. This enables mothers to return to work faster and thus keep up with the fast-moving developments that occur in technical fields.

The second practice shared was that of allowing paternity leave. While India has mandatory maternity leave it is rare to find new fathers being given any form of leave. By introducing this practice, the University of California, hoped to ease the burden on mother's so a primary caregiver would always be available to care for the child.

Keep in Touch Programme – U.K.

The United Kingdom introduced a voluntary programme as an addition to mandatory maternity leave. Every employee on maternity leave receives 26 weeks of ordinary maternity leave. In addition to this leave, the employee receives 10 'Keeping in Touch' days. These days are optional and can only be taken up with the agreement of both employee and employer. By availing of a day, women can come in to work and still receive her mandated pay for maternity leave. The purpose of this programme is to allow women to attend workshops, appraisals or training models that will help them 'keep in touch' with their profession. After the end of their maternity leave, women should find re-entering the industry easier as they will not have been completely isolated from it for too long.

Review of Policies

While at first glance the policies can seem all encompassing, there are a few gaps in the current policy.

Firstly, the lack of statistics is a major drawback affecting current policy. Without reliable data, it is difficult to know what problems are disproportionately affecting women. Only once this is known, can policy be created that will specifically target problem areas. While organisations like the WiS Panel have attempted to collect some data, the Department of Science and Technology should set up a task force whose purpose is to collect as much data as possible on women scientists in the country. After this is done, the data can then be collated and compared to policy in existence now. New policy should be implemented in light of the results of the survey as well.

Secondly, there are no policies aiding women in international mobility, which is very important to advancement in STEM careers. Networking and

learning from peers in other countries can be vast improving to a career. Schemes should be set up that allow women to take part in exchange programmes to other countries at the graduate and post graduate level. It should also be made sure that women are aware of these schemes and that orientation programmes are run to make the process easier. If a short-term conference is taking place outside the country, it should be made mandatory that a woman scientist accompany the delegation so there is representation. When women are attending conferences, attempts should be made to provide them with child day care. It would also be beneficial to encourage women to act as visiting faculty in foreign universities, both to gain better experience and to promote diversity within the teaching faculty.

As stated before, government schemes target women who are already established in the field. There is a need for national policy that affects women who are at the beginning of their career and study. Scholarships should be set up that encourage girls to study science after school. Monetary compensation could serve as an incentive for families to not oppose a girl child's interest in studying the STEM fields. Furthermore, the government should also set up workshops and schemes aimed at making the public more aware of the different careers that exist in scientific fields, with special focus on these careers being a viable option for women as well.

Training courses could be set up for women to aid in their gaining technical knowledge to succeed in the field as well as orientation courses for women just embarking on the career. This would help combat the problem of the sticky floor, as more technical expertise makes it easier to rise in a professional setting. Entrepreneurship should also be put forward as an alternate career path for women, especially those who require more flexible working hours.

Finally, a Keep in Touch Programme, on the lines of the one implemented in the United Kingdom should be created. This would be especially helpful to early career scientists as they are more likely to avail of maternity leave and thus need help with reintroduction to the industry.

Conclusion

Due to historical and cultural factors, Indian women are late starters in the scientific profession. History points to the fact that women's participation in the sciences is a measure of development, a predictor of the social atmosphere, and a reflection of scientific productivity and progress. In India, the participation of women in STEM is still a continuing journey. Despite the increasing recognition of the importance of women in science, women scientists continue to work in a male-dominated environment. To a large extent, this can be ascribed to the education system, social structure and employment structure in India. However, in recent years, Indian society has realized that women have tremendous potential in scientific fields. Due to the

socio-cultural context of the situation, women's participation does not depend on government initiatives alone; it requires community actions. To this effect, various national policies have been put in place to encourage women's enrolment and participation in STEM. Some of these schemes and policies have been discussed in this paper.

Governmental organisations, academicians, companies, universities and women's associations have been seeking to raise problems of equality between men and women in the work place and to expand women's role in public social life, and have so far achieved substantial results. Some additions to the above policies could be beneficial, including, conducting studies to determine the exact statistics related to Indian women scientists, promoting international mobility for women and implementing more schemes that would aid women who are beginning their careers in science. With the right initiatives and steps, one can hope that the future will hold equal opportunities and level playing fields for women scientists.

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Elements Affecting Academic Performance: An Empirical Study of Pune City

Subha Pratik Satapathy

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
satapathysubham13@gmail.com

Introduction

A pronounced difference between the living and the dead is their characteristic to transmit. When the non-living is subjected to pressure and stress, it crumbles down leaving no history of its own. While the living would try to assimilate the stress to create experience, passing it to the future generation in the form of knowledge. This knowledge transmitted from one generation to another to deal with the ordeals and predicaments of life with ease came to be known as education. The person transmitting knowledge became the educator and the person receiving his student.

Knowledge transmission, from one generation to another, was undertaken verbally and through signs by narrating stories. Knowledge of the Vedas was transferred from one generation to another verbally, hence they are referred to as śruti. These were findings through experiences of the ancient sages. The structured form of education is centered on designated spaces whose sole purpose is teaching students. The systems are so designed to mould around certain set of ideologies, which defines the curriculum.

The Sustainable Development Goals of the United Nations lists, 'quality education for all' as one of its priorities. Non-discriminatory and good quality education sets the foundation of people's lives. Even though strides have been made to increase enrolment in schools and colleges, the sustenance of the rate is not seen at higher levels of education (United Nations, 2015). As per United Nation International Children's Emergency Fund (UNICEF), quality education consists of the following traits:

- Learners who are healthy, well-nourished and ready to participate and learn, and supported in learning by their families and communities;
- Environments that are healthy, safe, protective and gender-sensitive, and provide adequate resources and facilities;

- Content that is reflected in relevant curricula and materials for the acquisition of basic skills, especially in the areas of literacy, numeracy and skills for life, and knowledge in such areas as gender, health, nutrition, Human Immunodeficiency Virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) prevention and peace.
- Processes through which trained teachers use child-centred teaching approaches in well-managed classrooms and schools and skillful assessment to facilitate learning and reduce disparities.
- Outcomes that encompass knowledge, skills and attitudes, and are linked to national goals for education and positive participation in society.

The components of the definition help analyse the feud on what comprises quality in a global scenario taking into account the issues constricting the local geographies. Education in India is offered by both public sector (central, state and local governments), and the private sector (non-governmental organisations (NGOs), trusts and commercial).

Under the Right of children To free and compulsory Education Act, 2009 children within the age group of 6-14 have rights provided under Article 21 A of the Indian Constitution for attaining free education at no cost (Ministry of Human Resource Development, Governemnt of India, 2009). Despite the astronomical primary enrolment ratio of 111%, it slides down to 24% when it comes to tertiary and 69% for secondary (The World Bank, 2014). As per Pratham's Annual Status of Education Report (ASER) about 50% of 10-year olds couldn't read the material meant for 6 year olds. Half of the students leave formal education by the age of 14.

Unlike countries such as Thailand and Mexico, which did not invest in education, their contemporaries such as, South Korea invested in high quality education and have propelled themselves into innovative and high growth economies. India's effort has continuously been to increase enrolment rates without focusing much on enhancing infrastructure and learning (Dhawan, 2015).

In Programme for International Student Assessment (PISA), a standardized test conducted by Organisation of Economic Cooperation and Development (OECD) countries to assess the scholastic performance of 15-year-old students on mathematics, reading and science, India secured 73rd rank among the 74 participating countries. As a country famed for leading the race of Chief Executive Officer (CEO) exports, the revelations were startling.

Literature Review

Differences in academic performance arise out of influence of various factors on individuals at varying degrees. With the current generation youth spending their time on various activities other than their studies, it becomes imperative to identify and analyze how these affects pupils. By categorizing factors into groups, one

can easily identify where the specific factors originate from and how these factors interweave each other (Steinmayr et al., 2014).

Analogous to success of a business not being determined by the raw materials used for production alone, success of an educational system must not be dead set on the physical infrastructure and school related factors alone. A holistic view must be taken into consideration (Dhawan, 2015). Although there exist a wide array of factors affecting the performance of students in academics, the choice of the broad factors and the specific ones have been made based on the feasibility of testing them in the current scenario and the capabilities of the researcher.

Personal Factors

A student's academic performance might be impacted by a plethora of factors other than the school factors. Amongst the personal factors, motivation is the most widely analyzed factor of student performance. Motivation can be defined as a person's self-driving force to achieve a goal. In recent studies, a positive relationship has been observed between personal efficacy and performance. An additional category of performance determining variables is societal and family factors. With an ever-increasing realization of parents' role in the success and development of their children, family background can be appraised as one of the most noteworthy factors (Diaz, 2003).

Time Devoted to Home Assignments and Leisure

Homework is the schoolwork that students are assigned to do at their home for better understanding of the concerned subject matter. It helps students to practice, prepare and extend their knowledge base on a topic rapidly. Practice assignments bolster the knowledge of a newly acquired skill. For example, a newly learned technique to solve a problem in mathematics is reinforced by exercises on the same topic. Preparatory home tasks help students to get a precursor on the topic to be covered in their class at later point of time. Extension assignments help students to get practical knowledge of the topics and are generally continued in parallel to the coursework. Examples of it include research papers and science fair projects (kidsource.com).

A good education does not depend upon the fate of an individual; rather it is coupling of effective learning and self-practice. Over years with new regulations coming into existence the amount of homework has been decreasing exponentially with the notion that students are overburdened with home assignments. McMullen (2007) found in his study that by engaging in an additional hour of mathematics assignments per week a student is able to improve his achievement in mathematics by 0.243 standard deviation. This is big enough to carry him up from 50th percentile in class to 59th percentile. Moreover, he realized a link between low performing students achieving better returns with the increase in home assignments delegated to them. Hence, it is possible for students to get over past bad performances and do better by spending more time on home assignments.

The amount of time dedicated for homework varies by grade of study. Many districts in United States believe that about 30 minutes of home assignments should be expected for each academic course taken by the student. The return to scale line climbs between 90 to 150 minutes and then starts diminishing. Proponents of homework claim that it helps student build the habit of self-study and builds their cognitive skills. Opponents argue that it also has negative impacts with an increase in boredom, as something can remain interesting for so long. It takes away their leisure time and does not teach important life skills. In addition to that, parents getting over indulging with it and pressurizing their children to work harder can deteriorate the situations further (Cooper, 2008). Further, it marginalizes students who are financially challenged. There might also exist other factors such as conducive home environment, which affect the feasibility to work at home. In addition to that teachers might not be well versed with the individual; wants of the students might not be able to design effective home assignments which will help them complete specific goals and objectives (Carr, 2013).

All work and no play makes Jack a dull boy. Leisure can be defined as the free time in which one is not occupied with any work. It provides individuals the much-required respite from work and helps their mind and body relax. There exists a wide array of activities in which individuals engage to spend their leisure time. Reading newspapers, gardening, photography, cooking, social work, gaming, trekking, writing, etcetera. Each of the activity is unique and teaches something or the other to every individual. One can get lost in the plethora of experiences obtained and start analyzing life in a new perspective altogether. It helps us obtain a healthy mind, body and spirit by breaking away the conviction and burden of work (Sid, n.d.).

With the advancement of technology, much of the leisure activities revolve around utilization of smart phones and computers to engage in socializing or watch television series contrary to their expected productive use. Hence, these devices serve the purpose of disrupters for their users. Scholars have observed that smart phones negatively affect the physical activity of their users and in turn have an unwarranted effect on the education attainment of the students. In addition to that, the subjects in the study were distracted within six minutes of the study undertaken by notifications from social media accounts and texts (Lepp et al., 2015). The effects of television viewing on cognitive development in children are a widely studied concept. While proponents claim it broadens the perspective of students/children, opening in front of them the gateway of knowledge, but then there are always two sides of a coin. A different set of researchers believe that watching television has negative effects on a child's cognitive development (Fujita, 2006).

Adolescence is the transition phase for individuals to move to adulthood and shoulder upon responsibilities in everyday life. Leisure time activities, which are structured help reflect in individuals' values such as reaction and resolution to issues, critical thinking and problem solving skills, need for socializing and assimilating in new environment with ease. It provides an opportunity for personal growth (Livazovic, 2010). Dolton et al. (2001) found out in their study that individuals even after allocating less time to self-study ended up with better

academic performance than their peers due to a greater motivation and higher grasping capability. Even with identical leisure preferences, individuals performed differently academically with high ability students performing better than their peers do. Hence, it ultimately boils down to how effectively one utilizes his/her time than how much one dedicates to any activity.

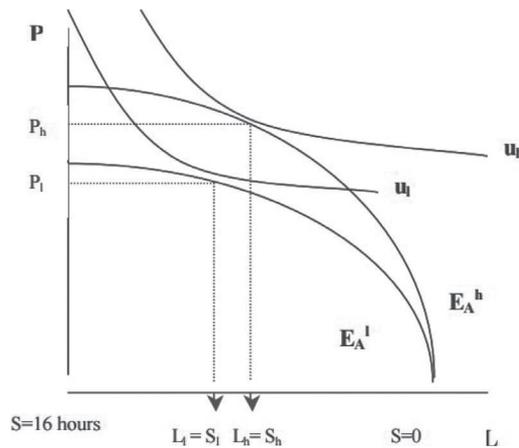


Figure 1: Student preference: Study vs leisure.

L: Leisure, S: Self study, P: Performance in exams, EA: Education attainment, u_h : 'u' is the utility function: $u = u(P, L)$. In subscripts and superscripts, 'h' and 'l' represent high achievers and low achievers respectively for the variables.

Source: Student time preferences (Dolton et al., 2001)

Being in a Relation and Academics

Any involvement that takes up a person's time, energy and in addition is emotionally as well as physically demanding can affect the normal workflow of life. The impact of a romantic relation clearly depends upon the work-social life balance by the individual (Newman, 2016).

Romantic relationships have become an inseparable part of youth life. Most of the talks with their friends centre on either their own relationships or their friends' relationships. Relationships evokes in partners' strong sea of emotions, which are strongly positive or negative (Pham et al., 2013). During the adolescence period, as students become aware of their roles in the society they actively indulge in dating and heterosexual relationships develop distinctly. The deficiency of literature on dating earlier shows that earlier researchers considered it an insignificant factor based on the assumption that they are short lived and did not have potential impact. However, current analysis has discovered that relationships vary based on degree of involvement and seriousness, which differs on a case-to-case basis (Giordano et al., 2006).

Deep involvement in a relation has been widely considered as a transitional point of one's self into adulthood. Failure to achieve it during this time span is

considered to be hindering development as well as have an impact over lifetime of the student. With adolescents getting into relationships at an earlier age and with the rising age of first marriage, youngsters have elongated the period of premarital relationships by years. Further, by elongating the period, adulthood itself has become a moving variable in the life of many depending upon their relationships goals and future course of action (Rauer et al., 2013).

Analogous to any other relation in one's life, a good relation is likely to boost performance in college. There will be a helping hand in standby on demand. It acts as a positive motivator to work harder and get better grades (Newman, 2016). Being in a relation boosts self-esteem and morale as the individual is constantly in interaction with the opposite gender. A number of research has been conducted over the years on dating status and academic achievement; they have ascertained that being in a relation affects individuals adversely or favourably on a case-to-case basis (Kopfler, 2003).

As per the research conducted by Chilman and Meyer (1963), using stratified random sampling technique established that married undergraduates obtained higher GPAs compared to their peers. The former displayed a more goal-minded approach towards life. A person's plan for the future course of actions affect their present. Results varied depending upon social parameters such as family background, future targets, expectations, dating, etc. One faces a constant dilemma to make a choice at every point between their academics and relationships. The issue of time management and appropriate division between not just relationships and academics but also leisure, hobbies, work, etcetera is constantly faced.

The circadian pattern of college life brings with it new work leisure habits alongside new responsibilities. Students are highly prone to live under constant stress due to the change in lifestyle and adjusting away from home. Romantic relationships might pacify the situation with lessons of equity, mutuality, trust and responsiveness. For a student it brings additional responsibilities to strive hard for achieving academic success. While a positive impact has been observed with a student being indulged in a romantic relationship, overt indulgence has highlighted negative impact on social and health of students (Umar et al., 2010).

Further being indulged in a romantic relationship, an individual tends to be swayed by their partner to change their own priorities towards them. Alongside that with the constant innovations in technology, one can remain virtually connected to the person concerned timelessly throughout the day. Hence, with the advent of greater time devotion of time towards their partner youngsters tend to remain socially inactive and in addition to that devote less time towards academic work (Huggins, 2015).

Parent's Education Attainment and Income

A plethora of research undertaken has established a significant positive link between parental education and its value on children's educational attainment. Fubow et al. (2009) in their study displayed the beneficial impacts on their children with higher education level attained until middle adulthood. They highlighted indirect effects on

the child by the means of higher aspirations as opposed to direct effects such as a greater Intelligence Quotient (IQ). In addition to that, students whose parents have lower educational attainment are reported to earn lower income themselves. They attain behavioural problems of aggression and as a result of which their ability to learn is marred. For instance, a student constantly exhibiting behavioural problems is more likely to be punished and in turn might develop hatred against schooling in general (Seifert, n.d.).

When parents are educated better, they are more likely to choose and consider the quality of school they will be sending their child to study. Further, they are highly likely to keep a check on the quality of teachers and keep a tab on the performance of their child in school with regular parent teacher meeting. Additionally, they are more likely to use complex vocabulary helping their child to develop a better speaking and literature skills. With their parent's strong and influential social network, students are better prepared to attain high levels of academic success. They prepare their children by channelizing and restricting them to the cultural influence of the societal elites. The impact the methodology of upbringing has on any individual's success is substantial (Egalite, 2016).

Homologous to parental education, parental income has a notable role to play on their child's future course of action. With the rise in family income, variability in outcomes of schooling fell down drastically (Cooper and Stewart, 2013). Parents with higher income do enjoy the liberty to send their children to the best available schools irrespective of the cost of the tuition. They can ensure that their child is not deprived of any extracurricular and co-curricular activity. They can choose to relocate to expensive neighbourhoods to maintain a social and psychological standpoint to influence their child's thinking and living standards. Further, parents who are financially unsound do not have the time to keep a tab on the whereabouts of their child. They are constantly on a run to attain stability in their own lives. Even miniscule diversion to family time in the growth years is capable of bringing sizeable differential outcomes on the growth of a child (Egalite, 2016).

The effect of income is nonlinear on the educational attainment with every additional dollar spent making a greater difference for the students belonging to family with lower incomes than those with higher incomes. Further, some of the scholars focused on the 'who' factor of disbursement of additional income on the additional benefit to students. The study highlighted that with an additional increase in earning of mothers' educational outcomes of children increased. The result is congruent with the 'purse versus wallet' theories, which envisage that mothers are more likely to spend their additional income on children (Cooper and Stewart, 2013).

School Factors

Academic achievement is the parameter on which formal educational institutions gauge the understanding of concepts attained by students on the lines of the curriculum designed. A wide array of tools is available to measure it catering to the

vastness of academics and research. One of the tools used to measure academic achievement is Grade Point Average (GPA). It is of two types:

1. Absolute: Students get their GPA based on marks obtained in a course. The marks are then converted to GPA on a predefined scale.
2. Relative: Students obtain their GPA based on relative marks obtained by their peers (Back2college, n.d.).

Attendance Rate and Academics

Attending is the act of being present at any place or event. Institutions generally assume that barring sickness and a few other events a student is present in class on all weekdays. As it is not kept on check constantly, it becomes difficult to check its impact on the overall development of a student. Although there exists a miniscule amount of proof to highlight the systematic impact of absenteeism on academics, a study by Romer (1993) charted out a positive relationship between attendance of students and their performance. There are multiple questions arising out of the same.

1. What is the extent to which students miss classes?
2. What is its impact on their learning?
3. What can be done to curb absenteeism?

Absenteeism is pandemic in colleges around the world. Further, there is a significantly high correlation between absenteeism and academic performance with a paramount causal element. Few decades back in most universities, attendance was optional, as they wanted the students to discover what is genuinely good for them.

Durden and Elis (1995) obtained a non-linear effect of attendance rate on academics, controlling for individual factors such as background, motivation and grasping capability. They observed that while missing a few lectures did not have any impact, unrestrained absence resulted in lower grades for the students.

In the recent past utilizing panel data, two sets of researchers exploit the availability of richer data sets, which includes varying responses of the same set of students over years for the same questions. The utilization of panel data made it possible to constraint time defying characteristics of both students and exam questions. Marburger (2001) gauged a probit model where the probability of the student providing an incorrect response be linked with his/her attendance in the lecture when the subject matter was covered. It was observed that missing a lecture increased the chances of responding incorrectly by 7 to 14 percent. Stanca (2006) and Cohn and Johnson (2006) detected a significant positive impact of academic performance and attendance rate accounting on time defying individual heterogeneity on panel data estimators. There was an increment of 4 to 15 basis point of performance for every 100 basis point increase in attendance rate.

Andrietti and Addazio (2012) brought out that by simply using the OLS method a quintessential student with a 100% attendance rate would on an

average achieve 9% points higher grades compared with a student securing only 50% attendance rate. Nevertheless, when time defying characteristics of panel data estimators were accounted they observed that attendance does not have any significant impact on academics. Further, college and university schemes designed to incentivize attendance rate might have undesirable impact on student's learning. When one correlates cognitive ability and motivation, it becomes quite unlikely that teachers can encourage students to perform better by flooring attendance rates. Under their assumption, uninspired students are less likely to pay attention in class and hence gain marginally from such strategies in addition to driving the morale of the entire class down.

The primary issue is analysing the impact of absenteeism on academics is endogenous and there exists a wide array of factors such as financial well-being which affect attendance rates on a regular basis. Adherence to a definite level of attendance levels are management policies entrusted to safeguard completeness and accuracy of records. With the advancement in information technology traditional methods and modes of education needs to be reassessed. As systems like distance learning have been devised, it highlights the importance of reassessment of the foundations of traditional education and lecture delivery mechanism (Aden et al., 2013).

Forced attendance makes humans grumpy. Physically they will be present while mentally or psychologically they would be cantankerous. Humans rebel against control. They would avoid engagement and interaction. Even the most interesting topics by the most enchanting professor would be lacking lustre if the class were not gathered voluntarily (McGregor, 2016). Further, a recurrent complain brought by the student community is that, as tuition fee payers, they should not be penalised for something they are tipping for. In addition to that one should take into consideration unwarranted troubles and disturbances caused by students who attend lectures only for the sake of attendance and indulge in every possible interfering activities diverting the attention of the entire class. Students in colleges and universities have attended the age of adulthood; hence, universities should relax on such policies letting students take the driving seat of their education attainment and careers (Osman, 2012).

Extracurricular and Academics

Any activity that does not fit in the normal curriculum of the school/college can be categorized as an extracurricular activity. Extracurricular activities come in a variety of forms such as sports, clubs, governance, student magazines, music, art, etc. They are voluntary in nature, so students are not bound to opt for them. They provide students with the same flexibility as the elective courses. Alongside that, they provide participants with skills and experiences that are not included in normal education courses.

In the past decade, we have seen the importance of extracurricular activities escalate to new heights. Athletics, singing, dancing, indoor games, etc. are no longer

activities that students pursue alongside their normal coursework but at times prefer it to pursue as a full-time career. Educational institutions are encouraging more number of students to pursue extracurricular activities enticing them with scholarships and attendance holidays (Schlesser, 2004).

The primary impact of extracurricular activities is on a student's behaviour. As per various reports, students with greater affinity to extracurricular activities have reduced behavioural problems. They have a general tendency to show discipline, behave responsibly, and perform tasks correctly. When they perform their tasks with utmost perfection, they are rewarded for the same and they take pride in their accomplishments. The pride obtained boosts their confidence levels and self-esteem (Massoni, 2011).

According to historical perspective, participation in interscholastic sports catalyzes character development and enhances social ties among students, parents and schools and this benefit explains the positive achievement of participation on achievement. Athletics' impacts on academic performance have been debated over the years. While proponents say it has a positive impact, there are some studies, which show that the results produced through earlier analysis were inconsistent. One study indicates that with the exception of a few communities, participation in sports is generally unrelated to educational achievement (Broh, 2002). A team of researchers concluded after reviewing 40 studies that non-participant in athletics has a slightly better performance in academics than the participants (Stephens and Schaben, 2002).

As per numerous studies conducted linking extracurricular activities and academic performance, it has been found that Total Extracurricular Activity Participation (TEAP) has a positive relation with the GPA obtained by students, it increases attendance and reduces absenteeism, increases positive attitudes towards the school and enhances academic aspirations. Numerous extracurricular activities have been beneficial in laying a strong foundation for academic achievement, even if the activity is not directly related to the course (Fujita, 2006).

Extracurricular activities further help in reducing gender bias. Enrollment of girls in Science, Technology, Engineering, and Mathematics (STEM) subjects can be improved by encouraging them to participate in team sports. Adolescent girls, who were involved in conventional male-dominated spheres like sports would be better prepared for the male-dominated culture of science classrooms and work settings (Hanson and Kraus, 1998).

Extracurricular activities are effective as they carry out the objectives of present day democratic life. They offer students an opportunity to get a first-hand experience of administration through student council. Students acquaint themselves with a wide array of skill set like planning, organizing, leadership and controlling various other aspects. Extracurricular activities have become well integrated into present day lifestyle. They help students to integrate knowledge and experience from various domains and apply them in a fashion to synthesize many aspects of real life situations (Lunenburg, 2010).

After school, activities can be a major contributor to the broader developmental needs of children. Structured post-class activities have been linked with greater educational outcomes. How adolescents spend their time post classes is a critical determinant of both performances in schools and societal as well as behavioural outcomes (Cosden et al., 2004).

On one side where extracurricular activities nourish the skill set of a student, on the other side, they pressurize students to outperform their peers. It adds to various complexities in a student's life where the student outperforms in only one aspect and fails on all others. For some, it would be a gigantic task to manage the numerous activities every day. Secondly, it reduces the time a student spends with his/her family. If students indulge in balancing their studies and passions, the leisure and bonding time with family is put at risk. Last but not the least, physical activities drain away all the energy out of a student implying in frequent fatigues resulting lacklustre attitude towards studies (Healthresearchfunding.org, 2014).

Many parents these days are troubled with the mere idea of their pupils getting distracted from participation in extracurricular activities and it will inhibit their children's academics. Even if there exist inhibitions, most extracurricular activities have a connection to better higher education opportunities. Students who outstand in sports, have achieved medals in Olympiads, are part of student clubs, etc. may be entitled to fellowships, grants, and scholarships. The social component of extracurricular activities instills in students a feeling of belongingness, responsibility, and involvement. Moreover, participations also prove a student's ability to balance all sectors in his/her life (Rivers and Media, n.d.).

Parents who want to see their children grow as an all-rounder, by making them participate in multiple activities, are exposing them to high degrees of stress. Jennifer Fredricks found that students devoting more than 17 hours a week for extracurricular activities harmed their education prospects, where their grades dropped significantly (Daily Mail Reporter, 2011).

As the saying goes, 'excess of anything is bad'. Protein is an essential nutrient for our body, but its excess consumption can lead to leaching of bone minerals. Similarly, in Economics, after equilibrium every additional unit of consumption leads to diminishing returns to scale. Students who are overscheduled with too many activities observe that benefits of participating in out of school activities may actually diminish (Wilson, 2009). A perfect curricular-extracurricular balance is necessary for students to achieve the best of both worlds.

Statement of the Problem

Although by conviction one can assume that the above factors affect academic performance of students, not much research has been undertaken in India to establish a causal relation for the same. Hence, the study has ascertained the factors affecting the academic performance.

Objectives

1. To examine and identify the factors affecting academic performance of students.
2. To establish a relation between various socioeconomic factors identified by the researcher and students' performance in academics.
3. To understand how the factors affect academic performance and come up with suggestions for the student community for better performance.

Methodology

For conducting an empirical analysis, the following framework has been adopted:

Operational Definitions

1. Extracurricular activities in this study has been divided into four components.
 - Performing Arts: Dance, skits/drama and music.
 - College involvement activities: Student Council, Event management and Placement Cell.
 - Sports: Team (Football, cricket, etc.) or individual (athletic, badminton, table tennis, squash, chess etc.)
 - Social Activities: Community service, volunteering for social cause, youth groups
2. Co-curricular activities can be defined as the activities, which supplement the class work and helps students polish their academic skills. These are Academic Clubs such as debate, Model United Nations (MUN), finance, writing and publications, science clubs, etcetera.
3. Higher income individuals are taken to be individuals falling in the highest tax bracket of an annual income greater than ₹1000,000 as per Government of India (GOI).
4. Individuals with good education are ones who have attained at least a Bachelor's degree in any field.

Hypothesis

1. H_0 : Extracurricular activities have no significant impact on the academic performance of an individual.
2. H_1 : Students involved in extracurricular activities perform poorly than the ones not involved due to various time commitments and distractions that force students to overlook studies in favour of extracurricular activities.
3. H_0 : Academic performance of the student is independent of the attendance rate obtained.
4. H_1 : Higher attendance rate ensures that the student has understood the concepts taught and hence the result of which is reflected in examinations.

5. H_0 : Romantic relationships have no significant impact on the academic performance of an individual.
6. H_1 : Being in a relation distracts the students from zeroing on his/her studies and it negatively affects his/her performance.
7. H_0 : Academic performance is unaffected by the number of hours allocated between self-study and leisure.
8. H_1 : More the number of hours spent on assignment, solving problems and homework significantly improves the ability to score better grades while spending more time on leisure activities like watching TV, social media and partying hampers the interest to study.
9. H_0 : Parental income has no significant impact on performance of students in colleges. H_1 : Parental income has a significant impact on educational performance of an individual.
10. H_0 : Parental education has no significant impact on performance of students in colleges. H_1 : Students belonging to a family where their parents have had good education are more likely to perform better than students who do not have such backings.
11. H_0 : GPA is invariable to the Gender of an individual.
12. H_1 : Gender affects academic performance in terms of GPA.

Target Group

The study comprises students enrolled in the BSc. Economics (Hons) and MSc. Economics program at Symbiosis School of Economics, SB Road, Pune. Sample size: 130 (TY) + 140 (SY) + 50 (MSc. SY) = 320 students.

Data Collection

1. Attendance rate and logs information has been collected from Teemac (Teemac manages the student information portal, Curiosity)
2. Questionnaire method: Data regarding relationship status, time spent on extracurricular and co-curricular activities, GPA, parental education and income level has been collected from the students over the internet by using Google Forms.

Statistical Methods

1. Chi-Square Test: Impact of gender (M/F) on academic performance (GPA).
2. Multiple regression analysis: To check the significance of each factor on the academic performance.

$$G = \beta_1 + R_S\beta_2 + S_T\beta_3 + P_E\beta_4 + P_Y\beta_5 + E_C\beta_6 + C_C\beta_7 + A_R\beta_8 + \varepsilon$$

where G : GPA, R_S : Relationship Status, S_T : Study Time, P_E : Parental Education, P_Y : Parental Income, E_C : Extracurricular Activities, C_C : Co-Curricular Activities, A_R : Attendance Rate and ε : Errors.

Analysis and Findings

This section aims at presenting the findings of the study affecting the academic performance of students at Symbiosis School of Economics. It is based on 62 cases of responses. To keep a check on unjustifiable conclusions statistical significance has been considered at all times. Further, the graphical analysis has been reconstructed as per the preferences at SSE, Pune.

Chi Square Semester 1

Table 1: Chi-square test: Gender vs GPA Semester 1, 2015-16

<i>Tests</i>	<i>Value</i>	<i>df</i>	<i>Asymp. Sig. (2-sided)</i>
Pearson Chi-Square	76.984 ^a	84	.693
Likelihood ratio	85.976	84	.420
Linear-by-linear association	2.637	1	.104
N of valid cases	62		

As the Chi Square value (76.984) < Critical Value (100.98) at 0.1 level of significance, the alternate hypothesis of a significance relation of gender with GPA in the first academic session in 2015-16 is rejected. It confirms independence between GPA and gender of an individual for the data points from the first academic session of 2015-16.

Chi Square Semester 2

Table 2: Chi-square test: Gender vs GPA Semester 2, 2015-16

<i>Tests</i>	<i>Value</i>	<i>df</i>	<i>Asymp. Sig. (2-sided)</i>
Pearson Chi-Square	70.322 ^a	66	.335
Likelihood ratio	74.732	66	.216
Linear-by-linear association	2.879	1	.090
N of valid cases	62		

As the Chi Square value (70.322) < Critical Value (81.08), the alternate hypothesis of significance relation of gender with GPA in the second academic session of 2015-16 at 0.1 level of significance is rejected. It confirms the independence between GPA and gender of an individual for the data points from the second academic session of 2015-16.

Hence, it is observed that GPA of an individual is independent of his/her gender.

Regression Analysis Session 1

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. error of the estimate	Change statistics				
					R Square change	F change	df1	df2	Sig. F change
1	.560 ^a	.314	.120	28.35768	.314	1.617	13	46	.115

With a R^2 -value of 0.314 and adjusted R^2 value of 0.12 one can say that the model is not a good fit. Despite of the model not being a good fit, as $F_{Calc} (1.617) > F_{Table} (1.16)$, one can be tempted to reject the null hypothesis of joint insignificance but given the p value is greater than 0.1 the results are insignificant. The hypothesis can neither be accepted nor be rejected in such a case.

In Table 4 age, gender, real attendance session 1 and performing arts have a p value less than 0.1, making its coefficient statistically significant at 90% level. While other variables have statistically insignificant coefficients, there is lack of credible evidence to prove whether they affect a student’s GPA in the first session. Further, as someone ages his/her GPA is affected by negative coefficient of 7.847. This might be happening due to decrease in memory power and cognitive skills with an increase in age. Gender and attendance rate have a positive association with GPA. It is increasingly being observed that women are performing better than men as society progresses to a gender-neutral one. Attendance in class signifies the actual time devoted by an individual in polishing his/her concept and base. It marks the importance of class attendance. Further, students opting for performing arts have a good chance of getting a higher GPA. With significant degree of involvement in performing arts, GPA amplifies by a factor of 21.733.

Regression Analysis Session 2

With a R^2 value of 0.628 and adjusted R^2 value of 0.467, one can say that the model is a moderately good fit. As $F_{Calc} (3.903) > F_{Table} (1.66)$, the alternate hypothesis of joint insignificance is rejected which shows the variables are significantly related.

In Table 5 age, session 1’s GPA, real attendance session 2 and mother’s occupation are statistically significant at 90% level with their p values < 0.1 . While other variables have statistically insignificant coefficients, there is lack of credible evidence to prove whether they influence a student’s GPA in the second session of 2015-16. Moreover, as was the case with the previous academic session, with an increase in age GPA is marred by a negative coefficient of 13.894. GPA obtained in the previous semester influences GPA obtained in the current semester positively, as the ones performing better are most likely to repeat history. In addition to that, mother’s occupation had a positive impact as the quality time devoted to their children increases. Lastly, the attendance rate influences GPA positively ascertaining its importance in a student’s life and proving there is no substitution to classroom teaching.

Table 4: Regression analysis – GPA semester 1 vs test variables

<i>Model</i>	<i>Unstandardized coefficients</i>		<i>Standardized coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>90.0% confidence interval for B</i>	
	<i>B</i>	<i>Std. Error</i>	<i>Beta</i>			<i>Lower bound</i>	<i>Upper bound</i>
(Constant)	119.877	93.239		1.286	.205	-36.639	276.393
Age	-7.847	4.197	-.298	-1.870	.068	-14.892	-.802
Gender	12.418	7.127	.380	1.742	.088	.455	24.381
Real attendance session 1	.645	.331	.281	1.951	.057	.090	1.200
Father's annual income	-.344	3.444	-.014	-.100	.921	-6.125	5.437
Father's education level	3.602	5.210	.106	.691	.493	-5.143	12.347
Mother's annual income	-.919	3.512	-.039	-.262	.795	-6.814	4.976
Mother's education level	.783	5.531	.021	.142	.888	-8.501	10.068
Relationship status in 2015-16	4.828	5.683	.156	.849	.400	-4.712	14.368
Performing arts	21.733	9.608	.314	2.262	.028	5.605	37.861
College involvement activities	-1.984	9.775	-.029	-.203	.840	-18.393	14.426
Academic Clubs	-8.580	11.884	-.107	-.722	.474	-28.529	11.369
Sports	7.044	10.774	.097	.654	.517	-11.042	25.130
Social activities	-5.876	8.301	-.095	-.708	.483	-19.811	8.059

Table 5: Model summary semester 2 regression analysis

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>	<i>Change Statistics</i>				
					<i>R Square Change</i>	<i>F Change</i>	<i>df1</i>	<i>df2</i>	<i>Sig. F Change</i>
1	.792 ^a	.628	.467	24.08324	.628	3.903	16	37	.000

Table 6: Regression Analysis - GPA Semester 2 Vs Test Variables

<i>Model</i>	<i>Unstandardized coefficients</i>		<i>Standardized coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>90.0% confidence interval for B</i>	
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>			<i>Lower bound</i>	<i>Upper bound</i>
(Constant)	262.365	87.444		3.000	.005	114.839	409.891
Age	-13.894	4.291	-.487	-3.238	.003	-21.133	-6.655
Gender	7.444	6.842	.211	1.088	.284	-4.100	18.987
GPA 2015-16 Session 1 %	.386	.141	.358	2.747	.009	.149	.623
Real attendance	.782	.346	.273	2.258	.030	.198	1.366
Father's annual income	3.504	3.382	.132	1.036	.307	-2.201	9.209
Father's education level	-4.435	6.234	-.101	-.711	.481	-14.952	6.082
Father's occupation	-3.515	4.266	-.101	-.824	.415	-10.713	3.682
Mother's annual income	-4.268	3.573	-.167	-1.195	.240	-10.297	1.760
Mother's education level	-2.020	5.047	-.053	-.400	.691	-10.534	6.495
Mother's occupation	11.366	6.510	.245	1.746	.089	.382	22.349
Relationship status in 2015-16 Session 2	-1.883	5.204	-.054	-.362	.720	-10.663	6.897
Performing Arts	13.157	8.874	.176	1.483	.147	-1.815	28.129
College involvement activities	2.659	10.443	.036	.255	.800	-14.960	20.279
Academic	-3.519	10.408	-.042	-.338	.737	-21.078	14.041
Sports	4.796	8.913	.063	.538	.594	-10.241	19.833
Social activities	-4.782	7.533	-.072	-.635	.529	-17.490	7.926

Time Distribution (Average)

Assumption: All students attend college for six hours.

From Figure 2, one can identify that on an average about 38% of a day’s time of an individual is dedicated to studying while 17% is reserved for miscellaneous activities. Leisure can be defined as the fun time, sleep and a part of miscellaneous (free) time. It comes around a minimum of 34% of the day and a part of miscellaneous time. To adjudge the actual time distribution in a day, the miscellaneous part needs to be diagnosed with a detailed study of behaviour and habits of individuals. Miscellaneous works includes daily biological activities, doing unplanned activities like attending guest, running errands, etc.

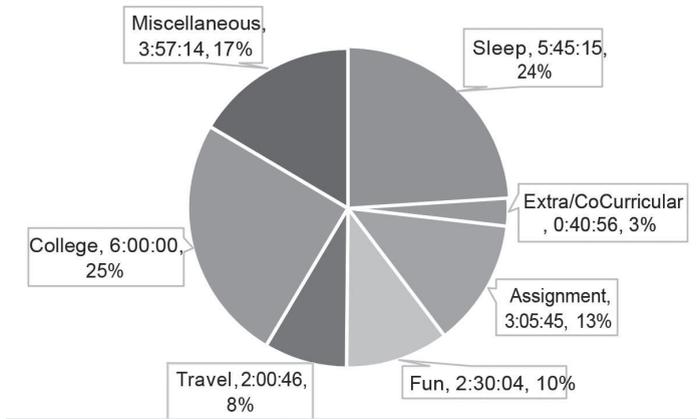


Figure 2: Weekdays time distribution.
Source: Author compilation from primary data

From Figure 3, one can observe that study time reduces to 14% of the entire day during weekends while leisure time increases to minimum of 54% along with part of miscellaneous time. Travel time remains constant at 8% while sleeping hours increases by 5%. With no college, students increase their leisure activities like sleeping and fun. Although one can see an increase in time devoted to assignments, a large chunk is going towards the miscellaneous category making it difficult to adjudge the reason for such behaviour.

Time Spending Pattern (Average)

Average time spending pattern for high achievers (GPA > 3.2 or 80%) and low achievers have been tabulated (GPA < 3.2 or 80%).

Assumption: All students attend college for six hours.

Figure 4 displays the time distribution and pits the patterns of high and low achievers against each other. While average travel time falls by 10 mins for high achievers during weekend, the same increases by 15 mins for low achievers. There is a substantial amount of time devoted to the miscellaneous factors, which needs to be ascertained by undertaking a detailed study. For both low and high achievers

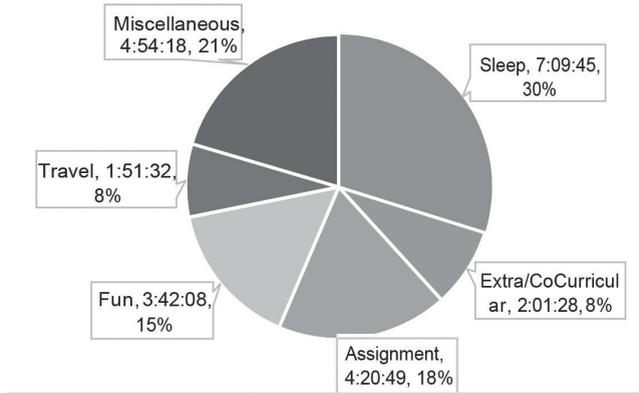


Figure 3: Weekend time distribution.
 Source: Author compilation from primary data

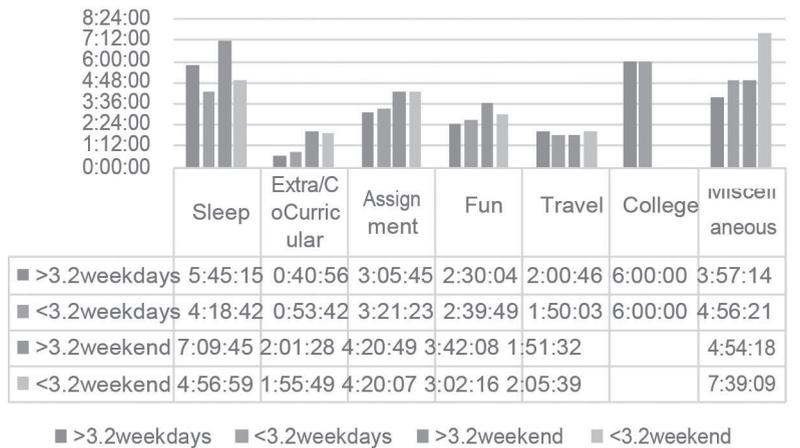


Figure 4: Average time distribution comparison.
 Source: Author compilation from primary data

time devoted to assignments during weekends on an average remains same. While time devoted to Extra/Cocurricular activities increases by two times for low achievers the same increases by three times for high achievers during weekend.

In Figure 5, the notations are as follows:

- S: Self study, EA: Education attainment
- P: Performance in exams u_h : 'u' is the utility function: $u = u(P, L)$

In subscripts and superscripts, 'h' and 'l' represent high achievers and low achievers respectively for the variables.

Figure 5 depicts that high achievers put in less hours of time for studying during weekdays, yet have a higher GPA and utility. High achievers even with less amount of time into studies are able to gain more because of the higher utility derived by

them as was in the literature. As the average time devoted during weekends is identical, no separate graphs have been made for it.

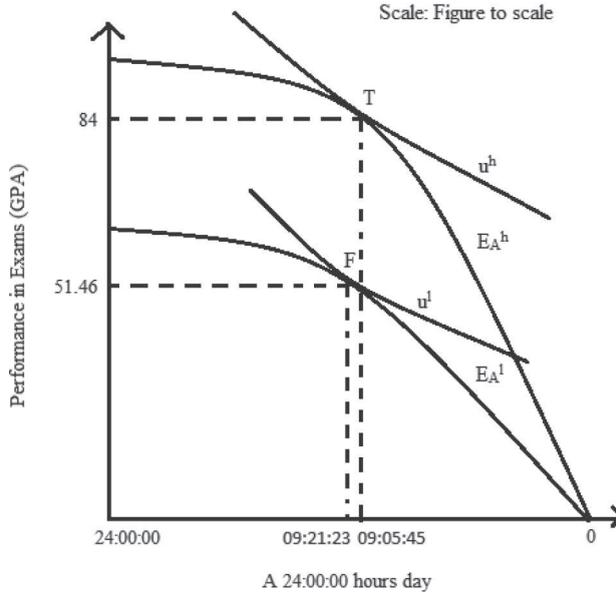


Figure 5: Student time preferences revisited.
Source: Author compilation from primary data

Conclusion and Discussion

The literature on academic performance linking extracurricular/co-curricular activities is expanding. Nevertheless, there is a scope of further additions. From the literature review, one can clearly identify that there are two sides of the coin. On one hand where these do a lot of value addition to the knowledge and skill set of individuals, on the other high degree of involvement with time mismanagement can create havoc in one’s life. To achieve the best of both worlds a structured activity is highly beneficial. This is exactly what the study tried to display.

Differences in academic performance spurt out of influence of various factors on individuals at varying degrees. With the current generation youth spending their time on various activities other than their studies, it becomes imperative to identify and analyze how these affect pupils. Analogous to success of a business not being determined by the raw materials used for production alone, success of an educational system is not conditional to the physical infrastructure and school related factors alone. A holistic view must be taken into consideration.

The above study found the significant influence attendance rate had on the GPA of an individual. Moreover, in the first session gender had a significant positive relation on the GPA obtained by an individual highlighting that women performing better than men in line with the analysis as done in the article by Economist (2015).

In the second session, student who had performed better in the first session of the academic year outshone others. In addition to that as the age of the student group increased they performed poorly compared to the younger ones. Moreover, the high achievers spent relatively less time in gaining and polishing their knowledge base but performed better while the low achievers even after a greater devotion of time could not achieve the same standards of performance in accordance with the study by Dolton et al. (2001).

Hence, the study ascertained some of the factors affecting the academic performance. The outcome would assist all stakeholders to plan strategies to enhance the curriculum to produce well-rounded students. Students would benefit by adopting the ideal strategies, molding themselves in the ideal environment performing better.

Limitations

1. Willing respondents in the target group did not have responded on time and a major chunk of students in the target group did not have respond at all, resulting in lowering of sample size.
2. The research is limited to analyzing the impact of the factors as identified by the literature. There exist several other factors affecting academic performance, which could not be measured due to lack of resources and time constraints.
3. The sample is limited to the students of Symbiosis School of Economics, Pune only.

Scope of Further Research

The field of studying the factors that impact a student's academic is here to stay. For future research diversity as a factor can be considered. As education is meant to be equally accessible by all it would be interesting to gauge if everyone has an equal opportunity of growth and social upliftment. In addition to that, an extensive study can be undertaken over a period of time to ascertain the factors that influence academic performance and remained latent under the miscellaneous category. Further, the tests should be replicated with a larger sample with a different mix to ascertain its applicability and generalize causes and issues affecting academic performance.

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Computer Based Training of Ex-Convicts for Unemployment and Crime Reduction: A Project for Maharashtra Prisons

**Pradnya Chitrao*, Brig (Retd) Rajiv Divekar
and Vanishree Pabalkar**

Symbiosis Institute of Management Studies (SIMS), Pune
*pradnyac@sims.edu

Introduction

“He who opens a school door, closes a prison”. —Victor Hugo

The primary purpose of prison work in the 20th C was to keep the prisoner occupied in a regime of ‘positive custody’ (Simon, 1999). The danger implied is that a representation of the real outside world that does not accurately reflect it, can act to mock that outside rather than encourage prisoners to adapt to it. However, in an environment that is simultaneously ‘real’ and a representation, a person can never be prepared or ‘fitted’ for an alternative outside ‘real’. In prison work environments the men are always ‘prisoners’ doing work. However much the work is run like an outside business, with real machines and real orders, the context of prison life, the fact that you do not really get paid, and the fact that you get fed whether you work or not, make this activity meaningful in its own terms and not as a preparation for the world after release.

It is also true that a society that has able bodied citizens capable of contributing in some measure to its economy but cannot do so because the same society does not want to include them is a major threat to the well-being of that society both in terms of crime rate as well as prosperity. If these same ex-convicts can be absorbed back into society in an innovative manner so that society accepts their contribution as also these former inmates start feeling a sense of dignity and pride in their own honest labour; it will both lead to lowering of crime rate as also lead to inclusive and sustainable growth. Today more and more emphasis is on vocational training and work that will prepare the prisoners to get back into civil society and not revert to a life of crime.

Literature Review

In the 21st C, many penal systems are slowly transforming from retributive to restorative justice. Martinez (2010) suggests role accumulation theory as a way to understand how successful re-entry into the community will be and focuses on the “accumulation” of non-criminal social roles. According to this theory, those offenders who can acquire new pro-social roles which enhance self-esteem are less likely than others to recidivate. According to this view point, prison programmes need to be designed to lessen potential stressors an offender may face on release, by addressing educational, employment, and housing issues. In this way they should address problems of strain and anger.

To successfully transition an offender so that he or she is prepared for the re-entry requires assessing the skills, abilities, and behaviours that the offender will need to re-enter society. To be effective, this process must begin when the offender is first incarcerated. The compilation and processing of the assessment information should then be used to identify the skills, abilities, and behaviours that the offender will need to make a successful transition back into the community (Andrews et al., 2006).

The Indian Jails Committee in 1920 unequivocally declared that the ultimate objective of prison administration was the reformation and rehabilitation of offenders. This declaration was later echoed in the proceedings of various Prison Reforms Committees appointed by the Central and State Governments of the international influences. The All India Committee for Jail Reforms stipulated that prisons must try to reform and re-assimilate offenders in the social milieu by giving them appropriate vocational trainings. Prisoners should be encouraged to undergo educational programmes that are designed to increase their confidence, develop amongst them social responsibility and consciousness, and habits and attitudes necessary for adjusting in the community.

Challenges Involved in the Successful Re-entry of Prisoners

Re-entry involves implementing programmes that promote the effective reintegration of offenders back to communities upon release from prison and jail (USDOJ, 2009). Empirical studies suggest that a variety of programmes are needed in order to effectively assist offenders in the re-entry process, and should include pre-release programmes, drug rehabilitation and vocational training, and work programmes (USDOJ, 2009). Without such programmes, many ex-offenders recidivate. In other words, newly released offenders reinitiate themselves into criminal activity as a means for survival. As opposed to rehabilitating an “imprisoned offender” and releasing an “ex-offender” the policy mandates of many prisons and jails result in the unintentional release of offenders to neighbourhoods and societies already ravished by crime (Travis,

2005). Many parolees have difficulty managing the most basic ingredients for successful reintegration—reconnecting with jobs, housing, and their families, and accessing needed substance abuse and health care treatment.

Many offenders returning home after imprisonment face a lot of challenges that include finding employment and shelter, lack of family and community support and an inability to obtain resources, programmes, and services from governmental agencies or community providers (Clear, 2007). Generally, offenders who recidivate do so within 12 to 18 months of release from prison (Petersilia, 2005). Offenders tend to possess low levels of workplace skill and education and with the addition of a custodial term to an ex-offender's personal history this further diminishes employability (Allen et al., 2007). As the ex-offender reintegrates back into the community steadily, they often find daily stresses and frustrations as they re-enter into the community with their families and workplace (Visher et al., 2004). Ideally, after-care programmes can assist the offend behaviour required as they enter into society (Snyder, 2004). Without a formal and structured programme in place that builds upon earlier treatment protocols, offenders may relapse without the service and social support (MacLellan, 2004).

Gerber and Fritsch (1993) evaluated the outcomes of the adult education programmes in prison. They focused on the relationship between prison education and offender behaviour, the effects of prison control strategies on prison education programmes and the effects of academic and vocational programme participation on inmate misconduct and re-incarceration. The findings of the project present outcomes about what effective prison education programmes do and why they are successful at reducing recidivism. For example, inmates exposed to education programmes have lower recidivism rates than those who do not participate.

For an ex-offender re-entering mainstream society, finding legitimate, gainful employment is an essential step toward creating a productive new life. But whether due to a lack of education and skills on the part of the job applicant or to bias on the part of employers, getting hired can be a formidable challenge for someone with a criminal record. Recycling ex-offenders into the job market with reduced job prospects will increase unemployment in the long run. Helping ex-offenders find employment doesn't just improve the financial circumstances of the former inmates themselves; it also has positive secondary effects that accrue to society in the form of reduced incarceration costs, increased income and payroll tax receipts, lessened reliance on social services, and decreased crime, among others.

Contrary to the arguments of detractors, prison education does not waste money; it saves it by shrinking prison populations. At the same time, education can ease the burden on law enforcement and the judicial system as educated prisoners find jobs and give up their criminal ways. It makes sense to enable offenders to acquire the skills that will make them attractive to employers so that they can find and keep jobs on release or whilst serving a community

sentence, i.e., to become an asset rather than a burden to society. Whilst the investment in giving offenders the skills they need to help them get and keep jobs is significant, it is a fraction of the prize on offer to society if we can prevent the creation of future victims of crime, with the associated economic and social costs, by cutting their reoffending. Skills help people to become active in their local economies and their local communities, from which people in the criminal justice system are liable to find themselves excluded. Workforce development programmes for ex-offenders is thus an innovative way of absorbing them back into society to the benefit of both society as well as the individual ex-convict.

As the changes to the way prisoners work come on stream, they will bring major opportunities. A prison that is a place of work and industry will instil in offenders the disciplines of working life: they will learn to be orderly, work in a time bound manner, meet deadlines, and take orders from seniors. They will, in short, learn to be responsible. When allied to vocational skills, ex-offenders who have gained these 'life-skills have the potential of becoming in demand in the corporate world, and at the same time, better husbands, parents, neighbours and friends.

Objectives of the Study

The study seeks to analyze the kind of vocational training imparted to Maharashtra prisoners with a view to their rehabilitation and adjustment to civil society living.

Research Methodology

- The researchers accessed a significant amount of secondary research about vocational training and rehabilitation of prisoners both within India and abroad.
- The researchers conducted surveys of Corporate to find out willingness and any policy regarding recruitment of ex-convicts.
- They also surveyed computer programmes available in Pune. They took inputs of NGOs as also prison authorities.
- They organized a focussed group discussion wherein they invited senior people from Symbiosis, the Prayas Team of TISS, Mumbai as also senior executives from the industry and inputs from NGOs.
- The researchers also conducted three pilot training programmes and took feedback from the prisoners.

Findings

The current vocational training provided by the Government of India focuses more on physical skills involving labour (agriculture) or fine skills (tailoring

and weaving). However these skills provide the inmates with seasonal or demand based employment (once they re-join society). Considering the education level of the inmates, we find a remarkable gap in soft skill training. Such skills will enable the inmates to have long term employment and reduce internal immigration for work (agriculture is major factor in internal immigration).

The researchers found that only a few rudimentary computer trainings were conducted by a couple of NGOs like Vedanta and Navi Mandal after donating a couple of computers. After completing these training programmes, there was very little effort to continue the same with the donated computers or train through the trainer schemes.

Yerawada Jail

At Yerawada Open Jail the two donated computers were very old and not in use. A pilot training course of IT Fundamentals was designed and conducted for two batches of prisoners of the Yerawada Open Jail Prison and which terminated in April along with a test conducted at the end of the training. Certificates also were issued to the participants keeping in mind the objective of designing certificate based courses for prisoners to facilitate the process of getting employment post release. The feedback from the participants was basically that the programme was very good. They expressed a desire to undergo more such courses in order to increase their employability.

Nashik Central Jail

The researchers found at Nashik Central Jail that while some of the prisoners had been given basic computer training, there was a dire need to conduct more training on a massive scale. Women prisoners were not given any computer training. Prisoners were engaged in preparing various items like fabrication units, boxes, plates, drums, watercan, ladder, chairs, pipes, beds, barriers. They were also into weaving bed sheets, towels, carpets, etc. On the basis of the information about the inmates provided by the Deputy Superintendent of Nashik Central and Open Jail, and the previous training by Vedanta on two old computers in basic computer fundamentals as also the preferences indicated by the prison authorities, an Advanced IT Fundamentals course was designed and delivered to the prisoners in June itself. The course was very well received. The prisoners said that if they are taught basics like Microsoft word, they could at least hope to earn a decent income. Most of the prisoners who were part of the training were well qualified with one of them being an Ayurvedic doctor and the other an engineer.

Nashik Borstal School

The Nashik Borstal school authorities said that they tried to include ITI courses but they did not work out. The reason was that date clashes made the

courses less feasible since these courses start and are carried out for a fixed period but the presence of offenders is varied. Hence, they wanted short term courses for the short-term inmates since they could apply their knowledge in society immediately after release.

Focused Group Discussion

The focused group discussion held by the researchers yielded many interesting and useful insights from academia as well as corporate and NGOs. The researchers proposed that start-ups could hire the ex-convicts for non-sensitive roles. The Prayas team of TISS, Mumbai revealed that around 20,000 prisoners are released every year. The team also pointed out that prisoners cannot bear the humiliation and rejection that they face when they attempt to get back into society as normal citizens. It is therefore necessary for trained social workers to work on this psychological aspect of the prisoners so that they become more emotionally stable and learn to control their anger even when they face humiliation in the outside world post release. Dr Vijay Raghavan of Prayas, TISS, Mumbai urged that Symbiosis should focus on quality training to prisoners with certification. He also recommended imparting training of Paithani embroidery to women prisoners. According to him, many of them have little education and are not accepted by their families post release. This training will help them earn their livelihood in an honourable manner.

Corporate panel members of the focused group discussion agreed with the researchers that it is essential to impart entrepreneurial inputs to prisoners so that they could start some business venture of their own if faced with rejection from corporate after release. A survey conducted by the researchers showed that employers react negatively to prison record or its tell-tale signs like a spotty work history. Even in the U.S., over 60 percent employers in a survey indicated their reluctance, while only 12.5 percent said that they “definitely will”. In contrast, at least 80 percent said that they would consider hiring individuals from other stigmatized groups like welfare and GED recipients and the long-term unemployed (Hölzer et al., 2006).

Mr Arun Wakhlu, Executive Chairman and Founder of Pragati Leadership Institute Pvt. Ltd. suggested bringing about inner spiritual and value based development in the prisoners. This way, the ex-convicts will learn to control their anger and also learn the importance of abiding by the legal norms of society for their own and society’s good.

Recommendations

Employers should help shape local systems, so that the nation gets the most from the Government’s investment. They should be willing to work with prisons to specify particular skills and qualifications in return for offering interviews, jobs or Apprenticeships on release.

- There is a need to educate the community about the importance of getting back into civil society as many ex-convicts as possible so that they do not revert to a life of crime out of sheer frustration of either not being able to earn a livelihood in an honourable manner or of being rejected and humiliated by family, neighbours, colleagues, and society in general.
- Prison officials in daily contact with prisoners also need to be sensitized to the prisoners' frustrations and be taught to have a more humane and understanding approach towards them without defaulting on the discipline that needs to be implemented.
- Prison authorities should work with universities like Symbiosis International University who provide these job oriented trainings that result in certification. They should co-operate and in fact invite such educational institutions to impart such programmes.
- Corporate and other funding agencies should come forward to bear the cost that is involved in these trainings. Corporate can work with Symbiosis International University and allocate a portion of their CSR funds for covering the costs incurred in these trainings.
- Prisoners should be given access to real time, relevant and up-to-date careers advice that will help them make the right decisions about their future and focus on the expectations of employers offering jobs where they resettle.
- Counselling of both prisoners as well as their families both pre and post release should be conducted so that both are prepared for their absorption back into society as productive, law abiding and self-respecting citizens.

The researchers conclude that over a period of time, society can bring back into its fold a potentially very productive labour force and propel it towards achieving long term development and sustainability.

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Track 3: Sustainable Cities

Developing New Strategies to Make Indian Cities Financially Sustainable*

Gargi Patil^{1*} and Jyoti Chandiramani^{1,2}

¹Symbiosis School of Economics (SSE)

Symbiosis International University, Pune – 411004

²Faculty of Humanities and Social Sciences (FHSS)

Symbiosis International University, Pune – 411004

*gargi.patil90@gmail.com

Introduction

The United Nations has been committed to make the world a better place and, therefore, the 17 Sustainable Development Goals (SDGs) with 169 targets were adopted on September 25th, 2015 by members at the United Nations (UN) Summit. The 17 SDGs of the 2030 Agenda for Sustainable Development officially came into force on 1st January 2016. A set of goals to ensure no poverty, gender equality and prosperity for all as part of sustainable development agenda were adopted and built of the success of Millennium Development Goals (MDGs) (United Nations, 2015).

In the year 2014, about 54% of the world's population lived in urban areas, and migration to urban areas continues depicting a way forward. Until 2014, the most urbanized areas include Northern America at 82%, Latin America and the Caribbean together with 80%, and Europe with 73%. On the other hand, Africa with 40% and Asia with 48% of urban population, remained mostly rural (UN World Urbanization Prospects, 2014).

The need for cities that can drive sustainable economic growth and prosperity has never been more apparent, with 3.3 billion people living in cities across the world in 2013 and a number that will double by 2050 (US-India Business Council, 2015). Cities are considered as growth engines of a country and good governance is the crucial factor required for cities to effectively function. Strategic infrastructure development is of utmost importance for the future development of cities. The planning, financing and implementation of urban infrastructures are among the few policy instruments, where the government has considerable control over shaping urban development in the long run (Rode and Shankar, 2014). With reference to the world's great cities

* This is the revised version of paper submitted in 2017.

like London, New York, Shenzhen, Mumbai, Lagos to name a few, even amidst the intense volatility associated with accelerated geo-economic restructuring, such places clearly do still exist, and in fact, their size and strategic economic importance appear to be growing, and not diminishing (Brenner, 2014).

As economies start to concentrate in cities, so do people – about 3.4% (258 million) of the world's total population migrated in the year 2017 (UN Migration, 2018). The migration to urban areas, especially in developing countries, is characterized by a desire for a better life with more opportunities. The McKinsey Global Institute (MGI) report has estimated that between now (2017) and 2025, the world's urban population will grow by 65 million people a year, or almost 1,79,000 people every day. Meeting the needs of this changing demographic will be difficult for cities across the globe (Bouton et al., 2015a). The resulting demand for infrastructure will mean that each year, India alone will need to provide, as much floor space as, twice of what exists in Chicago and China together. The way the world builds now will determine urban sustainability – in emissions, waste production and water use – for decades (Bouton et al., 2015b).

Many countries are looking at their cities as engines for advancing national growth. Cities alone account for approximately 80% of GDP generated worldwide. As the world continues to urbanize, the highest concentration of growth is expected to be in Asia and Africa – regions that are home to some of the poorest countries in the world. Further, inequality is highest in urban areas – one out of three urban residents in the developing world lives in a slum. Cities are the highest consumers of energy and responsible for 70% of greenhouse gas emissions (World Bank Report, 2015).

Capital and human resources are driven by financial resources; in fact it is the most important element that propels growth. Therefore, to achieve the SDGs post 2017, the availability and organisation of finances is the most significant step. It is actually the stepping-stone for financially sustainable cities. The aim of this paper is to conduct a financial evaluation for Indian cities to achieve the SDGs. In particular, the paper looks at financial strategies, which should be followed by India to achieve the SDGs. In the background of 9th SDG (to build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation) and 11th SDG (to make cities and human settlements inclusive, safe, resilient and sustainable) the study focuses on how to make Indian cities financially sustainable so that robust infrastructure facilities can be provided.

The present paper therefore highlights the growing urbanization across the world and the state of urbanization in India. It highlights the importance of urbanization in India and the financial capacity of Urban Local Bodies (ULBs), which govern the cities and provide for the 18 functions as mandated by the 12th Schedule of the Indian Constitution. Given the very meagre financial capacity of ULBs constraining them with respect to Urban Service

Delivery, the papers through review of literature explores and collates various strategies to make Indian cities financially sustainable. While the first part of the paper speaks of urbanisation across the globe, the second part addresses the extent and state of urbanisation in India, elucidating the poor state of urban finances of the ULBs, the third part of the paper put forward various innovative strategies to finance Indian cities and the final segment of the paper gives the pertinent conclusions.

Urbanisation in India

Census 2011 data reveals that about (377 million) 31% of Indian population lives in urban areas distributed over 5161 cities, contributing to nearly 60% of India's GDP. Urbanization in India has become an important determinant of economic growth and is an irretrievable process (Toutain and Gopiprasad, 2006). About 44% of the urban population growth in India experienced between 2001 and 2011 is attributed to natural increase in population, about 29.5% attributed to the reclassification of rural settlements into census towns and the remaining 26.5% was due to migration from rural to urban areas (Ellis and Roberts, 2016).

Further, with over 377 million urban residents, India ranks second in the world in terms of total urban population. Paradoxically, India also figures amongst the least urbanized countries worldwide. A panoramic overview of the present urban milieu shows that 300 towns with a population of above 100,000 inhabitants represent 65% of the urban population in India, the remaining 35% are spread over 3396 smaller towns (IIHS, 2014).

Cities in India, which form the third level of the government, are administered by ULBs. The legal and institutional framework of ULBs is envisaged in the 74th Constitutional Amendment Act (CAA) of 1992. The 74th CAA increased the functional jurisdiction of cities but did not pay much attention to their finances. Aggregate revenue of all cities in India is very low at around 0.75% of the country's Gross Domestic Product (GDP). In contrast, the ratio is 4.5% for Poland, 5% for Brazil and 6% for South Africa in 2001-02 (RBI Executive Summary, 2011). Thus, there has been a complete miss-match between a city's revenue and its expenditure, which has in turn resulted in financially unsustainable cities, poor infrastructure facilities and inadequate delivery of basic urban services (Mathur, 2006). Adequate financing of urban infrastructure and other services is thus a major problem facing cities in the country (Rao and Bird, 2010).

Several studies indicate a financial shortfall of Rs. 533 lakh crores (USD 8.5 trillion) over the mandated 15 years for achieving SDGs. Per year, on an average; this becomes Rs. 36 lakh crores (USD 565 billion) for Indian cities (Bhamra et al., 2015). Table 1 explains the need and gap for finances for Indian cities to fulfill SDGs.

Table 1: Need and gap for finances for India to complete the SDGs

<i>Sr. No.</i>	<i>Study</i>	<i>Finance required</i>	<i>Gap</i>
1	UNCTAD – annual investment needed globally to achieve SDGs	USD 5-7 trillion	
2	UNCTAD – annual investment needed in developing countries to achieve SDGs	USD 3.9 trillion	USD 2.5 trillion
3	Present study – annual spending needed in India to achieve SDGs	USD 0.96 trillion	USD 0.56 trillion

Source: Bhamra et al., 2015).

The performance of Indian cities has been dismal in terms of urban planning, building capacities and improving resources. In recent years, no Indian city has made sufficient and consistent progress in these areas. Thus, the scores of Annual Survey of Indian City-Systems (ASICS), 2018 indicates that a lot of work needs to be done in terms of providing basic urban services and infrastructure by ULBs in India (ASICS, 2018).

How do Indian Cities Finance Themselves?

India has a three-tier federal structure – central government, state governments and local governments. Cities in the country form the third tier and are governed by the ULBs. Following items form the three main sources of revenue for cities in the country:

- (a) Funds provided by central government
- (b) Share in state government taxes
- (c) ULBs own tax and non-tax revenue

The main sources of revenue for ULBs in India are taxes, shared revenues, charges and fees, loans and grants from government and non-governmental sources (Nallathiga, 2008). The local governments also get a part of their revenue from central and state governments. Further, they can also get funding from international organisations, if the cost of a project is too huge and with approval from the state government.

In decentralised fiscal system, own-source revenues raised directly by local governments or shared by higher levels by law or local government discretion are critical. Globally, even in the most advanced economies, local governments suffer from natural fiscal imbalances and invariably need intergovernmental transfers. Local governments, especially in urban areas, have great requirement for infrastructure finance. As local governments mature and decentralisation occurs, subnational borrowing can become an important source of funds for urban infrastructure development. In order to ensure fiscal responsibility, a well-defined borrowing framework is needed (Ellis and Roberts, 2016).

Originally, basic urban services have been financed either with budgetary allocations or with ULBs' own internal revenue generation. However, in the background of SDG-9 (to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) and SDG-11 (to make cities and human settlements inclusive, safe, resilient and sustainable), the cities have to look for alternative and private sources of financing development. On the debt side, these include issuing municipal bonds and pooled finance mechanism. On the equity side, emphasis can be given to Public Private Partnerships (PPPs), both to obtain the finances and to improve the service delivery mechanisms (Khan, 2013).

Urban Infrastructure, Services and Required Finances

According to the Government of India's High Powered Expert Committee (HPEC), approximately \$640.2 billion is needed until 2031 for investment in urban infrastructure and services, if India is to maintain and accelerate economic growth. The investment required for the eight major sectors of urban infrastructure (roads, transport, traffic support, street lighting, water supply, sewerage, storm water drains and solid waste management) is estimated at \$506.3 billion (World Economic Forum, 2015).

According to the HPEC report of 2011, the current deficit in urban infrastructure and service provision can be attributed to a combination of factors such as chronic neglect of urban planning and infrastructure development by state governments, the Government of India's lack of leadership, fragmented and/or overlapping institutional responsibilities, and low recovery of operating and maintenance costs by utilities (HPEC, 2011).

Alternative Strategies towards Financially Sustainable Cities

The following section is divided in two sub-sections. The first sub-section explains comprehensive financial strategies for Indian cities to fulfill the SDGs in particular SDG-9 and 11. The second section provides supplementary alternative strategies and sources of revenue generation for cities in the country.

Financial Strategies

Public Private Partnership (PPP)

An agreement between a government owned organisation on one hand and a private sector unit on the other is known as PPP model. It is a contract between a public sector and a private sector firm, in which the private firm provides a public service or a project and assumes substantial financial,

Table 2: Investment requirements for select emerging economies

<i>Sr. No.</i>	<i>Country</i>	<i>Absolute change in urban population from 2010-2050 (thousand)</i>	<i>Investment on roads at USD 100 per capita</i>	<i>Required water investments, USD 400 per capita</i>	<i>Required sanitation investments, USD 700 per capita</i>	<i>Total of urban infrastructure costs, 2010-50</i>	<i>Total infrastructure cost in urban areas in %</i>
1	Bangladesh	59,881	59,88,100 (8.3%)	2,39,52,400 (33.33%)	4,19,16,700 (58.33%)	7,18,57,200	8.67
2	India	4,96,608	4,96,60,800 (8.3%)	19,86,43,200 (33.33%)	34,76,25,600 (58.33%)	59,59,29,600	71.94
3	Pakistan	91,677	91,67,700	3,66,70,800	6,41,73,900	11,00,12,400	13.28
4	Total in SAR	6,90,356	6,90,35,600	27,61,42,400	48,32,49,200	82,84,27,200	100

Source: Leveraging Urbanization in South Asia Report, 2016, by the World Bank Group.

Note: SAR – South Asian Region.

technical and operational risk in the project. PPP provides assets for public services, wherein investments made and managed by the private sector entity are given for a defined period. In the PPP model, the risk is shared between the private sector and the public entity. Further, payments given to private sector firm are performance-linked and are based on certain specified and pre-determined performance standards, that are measurable by the public entity or its representative (Ministry of Finance, 2011). Although there is a growing awareness, there are only a few functional PPPs in the urban sector in India. The PPP model for water supply and sewerage projects have been a success in the cities Belgaum, Gulbarga and Hubli-Dharwad in Karnataka and Nagpur in Maharashtra. Significantly, better water supply situation along with considerable improvement in revenue generation has been possible because of PPP in water supply projects in Karnataka and Maharashtra (Khan, 2013).

Pooled Financing

Small and medium cities are not able to access capital markets directly on the strength of their own balance sheets. Further, the cost of transactions also acts as a barrier, in this situation; pooled financing mechanisms can play an important role. Pooled financing options encourage state governments and small to mid-sized ULBs to pool their projects together and achieve a sizeable share of market finances. Further, it creates an environment that is friendly for the capital and financial markets at large. Indian cities thus, get a good opportunity to invest and build strong infrastructure, promote inclusive and sustainable industrialization and foster innovations to make cities and human settlements inclusive, safe, resilient and financially sustainable (Khan, 2013). However, pooled financing models have not been used on a wide scale in India and therefore there is scope for further development. Tamil Nadu and Karnataka are the only states to have issued municipal bonds by pooling municipalities. Based on pooled financing model of Tamil Nadu and Karnataka, the Government of India (GoI) created a central fund that enables capital investments to be pooled under one state-borrowing umbrella in order to get the benefits of economies of scale. Thus, the Ministry of Urban Development under the GoI set up a Pooled Finance Development Fund (PFDF) Scheme to enable ULBs to access market borrowings through state-level pooled mechanism. Along with appropriate credit enhancement measures, this has also led to reduction in the cost of borrowing to local bodies (Khan, 2013).

Municipal Bonds

A municipal bond is issued by the local government of the city. It is a debt instrument, which is issued by a Municipality and bears certain amount of interest. A bond generally promises to pay a specific amount on a specific date and includes periodic interest payments. In India, it is the Securities and Exchange Board of India (SEBI) that regulates and governs issuing of municipal bond market. SEBI regulations provide a governing framework

for issuing of municipal bonds in India (Kumar, 2015). In 1997, Bangalore Mahanagar Palika was the first ULB to have raised resources through private placement of municipal bonds. Ahmadabad Municipal Corporation (AMC) was the first to make a public offering in 1998. AMC was also the first municipal bond without a state government guarantee. Since 1997, to the present day in 2017 only 28 municipal bonds have been issued in India, which have included taxable and tax-free bonds. Thus, the size of the municipal bond market in the country is small and is distributed only over a few strong municipalities of Bangalore, Ahmedabad, Nasik and Nagpur (Khan, 2013). For municipal bonds market to succeed, the credibility of the local government as the institution of good governance will be most important. Further several key reforms are needed for Indian cities to deepen its municipal bond market and to raise finance for its infrastructure. The opportunity to expand municipal bond market is extensive in India, but the existing institutional and legal framework limit its potential growth (Ravi and Bhatia, 2016).

External Commercial Borrowings (ECB)

Another way for financing cities is through ECB. It refers to borrowing or taking loans from foreign entities. It is an instrument used to help access foreign capital by Indian corporations and Public Sector Undertakings (PSUs). The ECB guidelines and policies are monitored and regulated by the Department of Economic Affairs (DEA) under Ministry of Finance, Government of India (GOI) with the help of Reserve Bank of India (RBI). Through ECB, a funding up to 50% is allowed in India for infrastructure development, Greenfield projects and telecom sector (Kanungo, 2013). In fact, the urban local governments have a greater chance to access foreign funds through the ECB route. However, a careful approach is needed while using external commercial borrowing with respect to financing of urban infrastructure. One major disadvantage of foreign financing is that a large cost has to be paid in terms of exchange rate volatility. It is therefore very important to have strict evaluation before accessing external finance (Khan, 2013). In April-June 2011, the external commercial borrowings (ECB) by domestic companies in India had reached \$8.05 billion. Until June 2011, JBF Petrochemicals (\$416 million), Mercedes Benz India (\$232 million) and JSW Steel (\$225 million) were among the top borrowers in terms of ECB (Businessline, 2011).

Land Monetization

Land monetization in its simplest form, is the process wherein land can be monetized through land disposition, i.e. through the leasing or selling of it. In its complex forms, land can be used as the underlying asset for the creation of new and easily transferable financial instruments (less common in India, but widely practiced in the West) (Balakrishnan, 2014). A number of developing countries are now following this course as part of the mix for capital financing of urban infrastructure projects. Tapping land value for

infrastructure development has special merit because funds are mobilized upfront thereby adding flexibility to infrastructure financing decisions and reducing dependence on debt and the associated fiscal risks (Ahluwalia and Mohanty, 2013). Higher Floor Space Index (FSI), Transferable Development Rights (TDR), Impact Fee, Area Linked Development Charge, External Development Charge, Betterment Levy, etc. have been used as tools for financing urban development in India (Vaidya, 2009). The Magarpatta model of township development in Pune, Maharashtra is a good example of how land can be pooled for the purpose of urban planning and development. Under this scheme, owners are encouraged to participate in planning instead of just providing monetary compensation for their land (Ahluwalia and Mohanty, 2013).

Crowd Funding

It is the practice of funding a project or venture by raising money from a large number of people who each contribute a relatively small amount, typically via the Internet. While this concept has arguably been around for centuries, it is still formally recognized as a new industry to many consumers, particularly those outside the United States. In a seemingly nonstop recession wave, small businesses are struggling more than ever to stay afloat, and entrepreneurs are not facing great odds. Crowd funding offers these individuals a chance at success, by showcasing their businesses and projects to the entire world (Prive, 2012). There are three primary types of crowd funding: donation-based, rewards-based, and equity crowd funding. (A) Donation-Based Crowd funding is a campaign in which there is no financial return to the investors or contributors. Common donation-based crowd funding initiatives include: fund raising for disaster relief, charities, nonprofits and medical bills. (B) Rewards-Based Crowd Funding is a campaign that involves individuals contributing to your business in exchange for a “reward,” typically a form of the product or service the company offers. Some popular crowd funding platforms include Kickstarter and Indiegogo. They are popular because it lets business-owners incentivize their contributor without incurring much extra expense or selling ownership stake. (C) Equity-based crowd funding is a campaign that allows contributors to become part owners of your company by trading capital for equity shares. As equity owners, your contributors receive a financial return on their investment and ultimately receive a share of the profits in the form of a dividend or distribution (Fundable, 2017).

Besides the obvious interventions that will empower cities to make them financially viable, relevant and sustainable – Indian cities have a long way to go even after 25 years since the implementation of 74th CAA and therefore some additional strategies and interventions have been highlighted in the section below – keeping the objective in mind of preparing Indian cities to be SDG 9 and SDG 11 complaint.

Additional Strategies for ULB's Financial Sustainability

For SDG-9

Based on projections provided in the Mid-Term Appraisal of the 11th Five Year Plan, in order to attain a 9% real GDP growth rate, infrastructure investment should be on an average almost 10% of GDP during the 12th Five Year Plan (2012-2017). Various studies have estimated a financial requirement of Rs. 119 lakh crores (USD 1900 billion) over a period of one year. Assuming budgetary resources will meet 50% of the investment, Rs. 59.5 lakh crores (USD 950 billion) would need to be met through debt and equity (Bhamra et al., 2015).

For SDG-11

For making cities inclusive, safe, resilient and sustainable, India will require a sum of Rs. 131 lakh crores (USD 2067 billion). This includes housing for all, development and planning of cities, efficient transport systems, public spaces and other components of urban infrastructure costs. Of the Rs. 131 lakh crores required for such urban development, India at present faces a financial gap of Rs.76 lakh crores (USD 1202 billion), which needs to be addressed with PPP models, issuing of municipal bonds and/or crowd funding (Bhamra et al., 2015).

Achieve Smart Growth

An important aspect is to plan for change. Developed cities foresee how economic growth influences the changing needs of the city. Environmental management should be included in the plan; this means developing an agenda that uses a variety of policies – such as regulations, zoning laws, market mechanisms and incentives – to set environmental goals and standards. It is better and cheaper to deal with green issues, such as air quality, land and water use, before they become problems. Several cities across the world had to take expensive remedial action to fix problems that could have been prevented. For example, traffic congestion is not only time consuming, frustrating and increases the cost of doing business, but the resulting air pollution also damages peoples' health. Sometimes cities can make major improvements just by using available infrastructure in a better way. For example, Singapore's congestion system has shown that pricing not only reduces traffic but also improve its flow. High-density development such as building up, rather than building out is also a valuable strategy. In fact, it uses land more efficiently since land is one resource that is constant in its supply (Bouton et al., 2015).

Doing More with Less

It will be a rare situation for any city across the world that believes it has enough money to accomplish all it wants and needs to do. Cities need to make effort to collect, manage and spend their money efficiently in order to deal with rising expenditures pressures. For example: since 2007, São Paulo has offered a rebate on sales tax paid by consumers who send in their paper receipts and has

increased value-added-tax revenues not by raising the rate but by improving tax collection system. Ever since stores have stopped under-reporting to a large extent. Cost efficiency is an important aspect of high-performing cities; they assess and manage expenses well. Another important action, which has proved useful, is the outsourcing of administration work to lower-cost centres emphasizing strategic procurement, and using zero-based budgeting (in which the budget is built from scratch and every line item must be approved) (Bouton et al., 2015). In addition, powerful cities accept that not every facility needs to be provided directly by government and they understand that the role of government changes over time. In most cases authorities are unwilling to give up control but it has been proved repeatedly that well-designed public–private partnerships are capable of delivering infrastructure and services, at lesser price and better quality. Cost-benefit analysis and rigorous performance metrics can be used to define concrete measurable goals. An example of this is Britain. It has done this, by establishing high-level guidance and setting out the conditions under which toll roads can be built with road-building partnerships (Bouton et al., 2015).

Win Support for Change

Most business, communities and political interests will resist change. This is, of course, easier said than done. The need of the hour is to nurture city leaders who are persistent and resilient in their outlook. There will be more support change, if they can deliver fast, positive and visible results. High-performing civil servants, who are seen to be accountable for their work, will be required in order to achieve the above (Bouton et al., 2015).

Future of Urban Development Services (FUDS) Initiatives

The Future of Urban Development Services (FUDS) initiative provides three strategic recommendations for the Government of India to advance the debate around the newly announced policies and initiatives on urban development (World Economic Forum, 2015):

Integrate Spatial Planning at all Governmental Levels: National, State and City

Spatial planning is the key instrument for achieving social, territorial and economic development within India and with neighbouring countries. Its primary role is integrating housing, strategic infrastructure and urban infrastructure and improving national and local governance in the context of urban development. Spatial planning has both regulatory and developmental functions. For India to take on board this recommendation, the Government of India should initiate comprehensive work on developing a national spatial strategy by the end of 2015 and link it to the ongoing activities of the industrial corridors programme, the Smart Cities programme, and other urban planning and regeneration initiatives.

Create a Stable Policy Framework for Private Investment in Urban Infrastructure

India, like several countries around the world, faces an acute need to provide new or modernized infrastructure and public services. Once the policy environment is stable and the right conditions for investors have been created, the Government of India needs to look at the various tools available to enable investments in strategic infrastructure and urban development. One such tool is PPP. This report provides best-practices framework and checklists to facilitate the review of the Indian PPP model of urban development. PPPs can accelerate infrastructure development by tapping the private sector's financial resources and skills in delivering infrastructure effectively and efficiently on a whole lifecycle-cost basis.

Create Institutions to Stimulate Capacity Building and Attract Talent to Grow Businesses

An analysis of India's economic competitiveness reveals two facts: manufacturing accounts for less than 15% of India's GDP, which is low; and India needs to grow its number of white-collar jobs to retain and attract talent. India also needs "lighthouse" projects with the potential for interdisciplinary collaboration in the area of urban development.

Conclusion

Indian cities face several financial problems in terms of lack of revenue generating resources. In order to build resilient infrastructure – along with promoting inclusive and sustainable industrialization and foster innovation and to make cities and human settlements inclusive, safe, resilient and financially sustainable – various market-based financing options and PPP can be implemented. Under market based financing options, pooled financing and issuing of municipal bonds should be encouraged. Moreover, if cities are to meet the capital expenditure that is essential for adequate provision of public goods and services, they will have to resort to borrowing from banks, financial institutions and capital markets. Two important reforms that can be further suggested include – broadening the revenue base of Indian cities and reforming inter-governmental transfer system.

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*Transforming India 2030:
Strategies for Sustainable Development Goals*

Un-choking Mula Mutha: Moving Towards Decentralized Urban Wastewater Management

Animesh Gautam

Symbiosis School for Liberal Arts, Symbiosis Campus
Viman Nagar, Pune – 411014
animesh.gautam@ssla.edu.in

Introduction

In order to engage in discussion about sustainable management of ecological resources such as rivers, the paper is going to refer to Arun Agarwal's paper titled 'Forests, Governance and Sustainability: Common Property Theory and its Contributions' in a later section. In the referred paper, Arun Agarwal explores four clusters of variables that are relevant to successful governance of the commons: the characteristics of the resource system, the user group, the institutional arrangements, and the external environment. This essay will explore the river Mula Mutha in Pune City as an ecological resource that is managed by stakeholders as a common property. Agarwal's variables as part of a common property management framework will be further used to recommend such a framework for the management of Mula Mutha.

The concept of sustainability has gained utmost importance in the 21st century. The adoption of the Sustainable Development Goals has given the global community fresh targets to be achieved in order to transition into a world where resources can be governed, managed, consumed and replenished sustainably. The modern concept of sustainable development was brought to utmost importance by the UN in the report published by the World Commission on Environment and Development known as 'Our Common Future' or as the Brundtland Report. The report not only outlines the definition of sustainable development, it further gages in the concept of sustainability placing importance in the interlinked complexity of the ecology and the need for social inclusiveness. The report expands the concept of sustainability to integrate the domains of not only ecology but also politics, economics and culture—hence recognizing the interconnectedness and complexity of the

concept. An appropriate conceptual definition which emphasizes on this message would be

“Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.”¹

Therefore, in the case of river as a resource system, sustainability would imply not only the protection of the river from environmental degradation but also ensuring that user groups linked to the river experience social inclusiveness via the policies implemented to protect the river.

In developing countries, urbanization has played a large role in the creation of the ‘urban poor’. The creation of the urban poor as a result of mass population shifts from rural to urban areas in developing countries is mostly characterized by their colonial history where colonial law structures were mostly implemented to provide for smaller agricultural societies. Developing countries witness stark consequences for rapid and uncontrolled urbanization which can for instance be seen in the form of inefficient and insufficient sewage and waste management. The issue of wastewater and sewage management in developing countries directly affects the health of rivers that flow through urban agglomerations such as Pune.

Objectives and Motivation

The objective of the paper is to study the wastewater management system of Pune City and identify problems in the system. The paper will lay emphasis on the protection of the river Mula Mutha which passes through the city of Pune. Wastewater management hence will be studied in terms of its contribution to the pollution of the Mula Mutha. The motivations of the paper originates from the urgent need for a sustainable wastewater management framework for Pune City keeping in mind the goals put forth by the SDGs which both emphasize on the sustainable management of water resources and human settlements in general. The paper is focussed specifically by goals 6 and 11 of the SDG which emphasize on the sustainable use of water resources, sanitation and its management and the goal of achieving sustainable urban human settlement planning and management. The goals are mentioned below:

Goal 6: “Ensure availability and sustainable management of water and sanitation for all.

6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials,

¹ Our Common Future, Chapter 2: Towards Sustainable Development Retrieved January 30, 2017, from <http://www.un-documents.net/ocf-02.htm>

halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.”²

Goal 11: “Make cities and human settlements inclusive, safe, resilient and sustainable.

11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.”³

The Case of Mula Mutha

The Mula Mutha river forms when the two rivers Mula and Mutha merges at the confluence located in Pune. The rivers originate from the Western Ghats in Western Maharashtra and are perennial rivers. Mula originates from Mulshi dam (Mulshi Lake) which serves as a source of irrigation water as well as for electricity generation in other parts. It flows further downstream to merge with Mutha river to form the Mula Mutha river. Mutha downstream has dams installed in three locations: Panshet, Khadakwasla and Temghar dams which all serve majorly as drinking water sources for the city of Pune. The Mula Mutha further merges into the Bhima river that further merges into the Krishna river which eventually flows into the Bay of Bengal. The river stretch that passes Pune is exposed to numerous drains and nullahs⁴ that are either leaked in the river bed directly or from the banks. The management of the discharge of untreated sewage is unorganized and the extent to which various drains contribute to the discharge of untreated sewage has not yet been determined.

India as a nation has shown conscious efforts in sustainable development especially in the energy sector. The Sustainable Development Goals however lay emphasis on various other areas where nations lag. One such area where India needs to lay emphasis is wastewater management in urban areas. Amongst all cities in India, Pune is one of the only eight cities that have, as of 2013, sewage treatment capacity to treat more than 50% of sewage generated.⁵ However, the emphasis on river conservation, its health and in general sewage treatment is of urgent importance especially in the state of Maharashtra as it accounts for 13% of the country’s sewage generation.⁶

² Water and Sanitation - United Nations Sustainable Development. Retrieved January 25, 2017, from <http://www.un.org/sustainabledevelopment/water-and-sanitation/>

³ Sustainable Development Goal 11. Retrieved January 25, 2017, from <http://www.un.org/sustainabledevelopment/cities/>

⁴ Sewage drains

⁵ National status of waste water generation & treatment: SulabhENVIS Retrieved January 26, 2017, from http://www.sulabhenviis.nic.in/Database/STST_wastewater_2090.aspx

⁶ Ibid.



Figure 1: The course of Mula and Mutha through Pune.
Source: Jeevit Nadi Initiative

A Note about the Inconsistency of Data

Figures essential to evaluate the sewage requirements and governance in the city however lack credibility due to the differences in figures published in different reports and in different times. The lack of consistency in various reports create misleading impressions for the purpose of effective municipal sewage management and governance in the city. The PMC have released inconsistent figures on different occasions. Table 1 mentions figures from different reports published by the PMC or external bodies about Pune city’s sewage generation, sewage treatment, STPs and installed STP capacity.

While stressing on the importance of transparency in governance, for the purpose of the paper the most recently published figures are taken into consideration, hence those mentioned in the JICA Press release (2016): sewage generation - 728 MLD, sewage treated - 476 MLD, sewage untreated - 252 MLD.

The city of Pune generates about 728 Million Litres per Day (MLD) of sewage water. The Pune Municipal Corporation has in place six Sewage Treatment Plants (STPs) all together with the capacity of treating 476 MLD. Therefore Pune city is able to treat only 65% of the sewage treated with its current installed capacity. The remaining untreated sewage wastewater is discharged into the Mula Mutha river along with the treated water. Several years of such disposal of untreated wastewater in addition to pollution of other forms has led to the deterioration of the health of the river posing threats to the river ecology and to communities or user groups that depend upon the river as a resource. The current deteriorating state of the health of the Mula Mutha can be seen in the report that the Central Pollution Board (CPBC) of India published stating the names of river stretches categorized according to the Biochemical Oxygen Demand (BOD) levels of the river. The BOD of a water body is an indication of the levels of dissolved oxygen present in the water body which determines organic activity. High BOD levels indicate a

Table 1: Inconsistency of sewage-related figures of Pune city

	<i>PMC/Environmental Status Report (TER) 2010⁷</i>	<i>City Sanitation Plan 2011⁸</i>	<i>Revised City Development Plan 2012⁹</i>	<i>CPBC Report on Performance Evaluation of STPs in India 2013¹⁰</i>	<i>PMC Datasheet on STPs 2015¹¹</i>	<i>JICA press release 2016²</i>	<i>Smart City Proposal 2016³</i>	<i>PMC Affidavit submitted to National Green Tribunal 2016⁴</i>
Sewage generated (MLD)	744	744	575.2	474	-	728	-	744
Sewage treated (MLD)	497	527	527	305	567	476	-	-
Sewage untreated (MLD)	247	217	48.2	169	-	252	355	-

- ⁷ Environmental Status Report 2009-10 Pune Municipal Corporation Retrieved January 30, 2017, from https://www.researchgate.net/publication/270565053_Environmental_Status_Report_2009-10_Pune_Municipal_Corporation
- ⁸ Draft Pune city sanitation plan 2011 - India Environment Portal | News Retrieved January 30, 2017, from <http://www.indiaenvironmentportal.org.in/content/331175/draft-pune-city-sanitation-plan-2011/>
- ⁹ City Development Plan: Pune, Maharashtra, India Final Report - USAID. Retrieved January 30, 2017, from http://pdf.usaid.gov/pdf_docs/pdacw408.pdf
- ¹⁰ 2013, September 4. Performance Evaluation of Sewage Treatment - CPCB. Retrieved January 30, 2017, from http://www.cpcb.nic.in/upload/NewItems/NewItem_195_STP_REPORT.pdf
- ¹¹ 2015, December. STP Projects executed by PMC till 2015- PMC opendata.punecorporation.org
- ¹² 2016, January 13. Signing of Japanese ODA Loan Agreement with India: Support ... - JICA. Retrieved January 30, 2017, from https://www.jica.go.jp/english/news/press/2015/160113_01.html
- ¹³ Pune Smart City Proposal (SCP). Retrieved January 30, 2017, from [http://www.punsmartcity.in/wp-content/document/challenge2/Pune-Smart-City-Proposal-\(SCP\)-Part-I.pdf](http://www.punsmartcity.in/wp-content/document/challenge2/Pune-Smart-City-Proposal-(SCP)-Part-I.pdf)
- ¹⁴ 2016, April 27. PMC gets 10 days to boost STPs' capacity - Times of India. Retrieved January 30, 2017, from <http://timesofindia.indiatimes.com/city/pune/PMC-gets-10-days-to-boost-STPs-capacity/articleshow/52001713.cms>

greater introduction of pollution whereas low levels indicate lower levels of pollution. In the case of the Mula Mutha, the report published by the CPBC places Mula Mutha river stretches in Pune alongside various other stretches that have alarming high BOD levels.¹⁵ The report states the source of pollution as the sewage discharged by Pune City.

Sewage Wastewater Pollution

The mass pollution of the Mula Mutha river usually begins as it enters urban agglomerations. The major contributors of pollutants in the urban areas is domestic sewage discharge and industrial effluents. The increase in pollution in the form of sewage discharge from households and industrial effluents is directly related to the proliferation of urbanization in these agglomerations. It is further adversely affected by a large gap in water management by the municipal governments of the urban areas. In terms of government structures, laws and policies put in place to protect water resources, there seems to be ample; however the policies in general fail to account for rapid urbanization which implies a rapid growth in urban population and settlements. In addition, municipal governments also fail in the implementation of basic sewage infrastructure. The implementation of the infrastructure—which include sewage treatment plants, sewage pipeline systems and drainage systems— involves largely the operation, management, maintenance and upgradation (where required) of the infrastructure. The sewage wastewater discharged can be of three kinds in general: (i) industrial, (ii) agricultural and (iii) domestic. Out of the three types, the Mula Mutha sewage discharge mainly comprises industrial and domestic wastewater.

Another broader way of distinguishing water pollution according to its source is by dividing it into: (i) Point source pollution and (ii) non-point source of pollution. When the source of pollution is single, well specified and generates a significant amount of pollutant, such a source is known as point source.¹⁶ Urban centres harbour major point sources of pollution in specific domestic and industrial pollution. The wastewater from domestic households majorly constitute of organic matters, microorganisms, chemicals, nutrients, detergents, oil and grease, etc. Industrial waste comprises generally pulp and paper, sugar, distilleries, textiles, leather, chemical, pharmaceuticals, oil refineries, thermal power plants, food, etc.¹⁷ On the other hand, non-point source or diffused source is defined as unspecified; numerous in numbers

¹⁵ Polluted River Stretches in India Criteria and ... - CPCB. Retrieved January 30, 2017, from http://cpcb.nic.in/upload/NewItems/NewItem_172_FinalPollutedStretches.pdf

¹⁶ Rai, R.K., Alka Upadhyay and C.S.P. Ojha. 2010. Temporal variability of climatic parameters of Yamuna River Basin: spatial analysis of persistence, trend and periodicity. *Open Hydrology Journal* 4, no. 1: 184-210.

¹⁷ Ibid.

and of which contribution is of less significance, though, in combination the resulting contribution is significant.¹⁸ In the urban areas, this type of pollution is usually caused by drainage and surface water runoff during monsoon but is also contributed from the entire river basin. In the case of the Bhima river basin, under which Pune district falls, the region's strong and regular monsoon usually contributes in the larger role of pollution caused from non-point sources. Hence the proliferation of excess unauthorized housing settlements in urban area is a major diffused source owing to the absence of accountability for sewage infrastructure in illegal slum settlements.

Policy, Governance and Management

Pune city contributes to the pollution of Mula Mutha in all of the ways discussed above. To counter the levels of pollution in the river PMC currently has in place 10 STPs in various locations in the city with a total installed capacity of treating 567 MLD of sewage. While it is true that there are 10 STPs, however as mentioned earlier, there are discrepancies in data about sewage treatment. The efficiency and maintenance of the current installed STPs however is another area of major concern in efficient wastewater management. The discrepancy in data gives onlookers another opportunity to question the efficiency of the STPs. Nevertheless, PMC, as part of the Smart City Mission initiative, plans to expand this capacity with the help of funds from JICA (an external Japanese funding agency). This particular project, also as part of the National River Conservation Plan, aims to increase Pune's STPs strength by 11.¹⁹ The project comprises many components some of which include: (i) Construction of 11 new STPs, (ii) Raising treatment capacity by 396 MLD (addition to the existing 477 MLD)²⁰, (iii) Addition of 113.6 kms of sewer pipelines and (iv) renovation of existing pumping stations. The project has been proposed keeping in mind the estimated sewage infrastructure requirements of 2027. The project aims to create a highly centralized sewage system keeping in mind urbanization growth rates. The inconsistency in data however yet exists in this press release by the Ministry of Environment and Forests clearly highlighting the absence of efficient management.

National Governance

The Right to Water?

The Indian Constitution, though does not recognize the right to water, it does imply it indirectly in Article 21 i.e. right to life. In many cases, the courts have

¹⁸ Ibid.

¹⁹ Loan Agreement signed between Government of India and JICA ... - PIB. Retrieved January 30, 2017, from <http://pib.nic.in/newsite/PrintRelease.aspx?relid=134415>

²⁰ Ibid.

emphasized the relation between access to safe and clean water and the right to life. The laws fail to see water as important to environmental sustainability and to the ecology; however in relation to the survival of humans it places great importance. This was seen in several cases such as in *Subhash Kumar v. State of Bihar* (1991), where the Supreme Court recognized that the right to life 'includes the right of enjoyment of pollution-free water and air for full enjoyment of life'²¹. In general the Supreme court has also emphasized on the importance of water as the basic need for the survival of the human beings, hence making it an implied part of Article 21. Therefore it can be concluded that the framework places importance in the pollution of water sources like rivers owing to its close relation to Article 21.

The River Boards Act (1956)

In the management of water, the River Boards Act (1956) serves as an important law that allows the Central Government to set up organizational structures in the regulation of water resources. The purpose of the Act is to create central river boards that advises states in the regulation of interstate rivers and river valleys. River boards also have the authority to advise states on conservation, control and optimum utilization of water resources, the promotion and operation of schemes for irrigation, water supply or drainage, or the promotion and operation of schemes for flood control systems.²² However, currently, the River Boards Act has hardly been used in practice. The Central government has failed to constitute any River Board on the basis of this Act since the time it was enacted in 1956. The basic framework for this particular act did not emphasize on the pollution and health of the river; however the purpose was to solve interstate water disputes of ownership rights which would dictate irrigation policies and infrastructure.

On Ownership

The colonial framework of the state having the right to decide the use of surface water remains. As a result the course of the Mula Mutha river accommodates major canals and dams as described in the earlier sections of the paper. However the colonial framework for groundwater sources where landowners have complete right to groundwater still also remains and as a result groundwater sources such as borewells have become more frequent in the PMC region despite of the surplus of water supply from nearby dams. The passing of the Bihar Irrigation Act (1997) is the most recent example of how all rights in the water of any natural source of supply is vested in the Government.

²¹ Cullet, Philippe and Joyeeta Gupta. 2009. India: Evolution of water law and policy. *The Evolution of the Law and Politics of Water*: 157-173.

²² Ibid.

The Water (Prevention and Control of Pollution) Act (1974)

This particular act is one of the most important acts to protect water sources from pollution. Along with the Water Pollution Cess Act of 1977, this particular act seeks to prevent and control water pollution and maintain and restore the wholesomeness of water. It vests the power in the government to create water boards to set standards and regulations for the prevention and control of pollution. In a crucial case, the Supreme Court affirmed, in *M.C. Mehta v. Kamal Nath* (1997), that water is a public trust, with the state as ‘the trustee of all natural resources which are by nature meant for public use and enjoyment’²³. This further emphasizes on the framework of government power over the regulation of water resources in the country. However, the Act is seen as vague with no specifications regarding the level of wholesomeness to be maintained or restored in rivers of the country. An important provision of the Act is the creation of the Central Pollution Control Board (CPCB) at the Centre and State Pollution Control Boards (PCBs) in state-level which in this case is the Maharashtra Pollution Control Board (MPCB). Functions and powers of the PCBs include:

- Comprehensive programmes for the prevention, control or abatement of water pollution
- Collecting, analysing and disseminating water pollution information
- Inspecting sewage and effluents generated
- Evolving economical methods of sewage treatment, utilization and disposal of sewage
- Prohibition of the use of rivers or aquifers for effluent disposal
- Using the powers of withdrawal of consent (for waste discharge into rivers)

However, the policy fails as an institutional system due to the lack of clarity especially in the case of sewage systems and infrastructure. The decentralized system in effect gives municipal authorities the control to monitor and implement sewage systems. However the inefficiency, absence of prioritization and lack of funds in the municipal government leaves no space for the refurbishing of sewage systems which directly affect the quality of water in the rivers.

Centralized Vs. Decentralized

PMC has in store various goals set in order for the Smart City Mission to come true. Some of the goals were mentioned above with regard to wastewater management. Apart from the debate about discrepancy and inconsistency in data and information about the wastewater management in Pune City one of the biggest criticisms against the PMC wastewater management framework

²³ Ibid.

is to do with its centralized nature. Decentralized wastewater systems is an alternative approach to wastewater management from the conventional and unsustainable systems. In developing countries, “the lack of research and development activities leads to the selection of inappropriate technology in terms of the local climatic and physical conditions, financial and human resource capabilities, and social or cultural acceptability”²⁴. Wastewater management comprises three main phases: collection, treatment and disposal. Out of the three, “collection costs more than 60 percent of the total budget for wastewater management in a centralized system, particularly in small communities with low population densities”²⁵. Centralized STPs systems do not only require high investments; however it also requires high operation, and maintenance costs. It is essential for centralized STP systems to be constantly monitored and upgraded in accordance to the growth rate of the urban area. In the case of developing countries, centralized systems become unviable and cost ineffective because of the lack of budget, funding and expertise.

The basic difference between decentralized and centralized wastewater treatment systems lies in the quantity involved in collection, treatment and discharge. While centralized systems involve the collection, treatment and discharge in large scales and quantity, decentralized systems are able to manage the same in smaller scales. In addition, decentralized systems function as clusters of systems that may all be finally linked to a greater sewage system. “They not only reduce the effects on the environment and public health but also increase the ultimate reuse of wastewater depending on the community type, technical options and local settings.”²⁶ What is also relevant for urban areas in developing countries such as Pune is that decentralized systems are specifically suitable keeping in mind improper urban planning where population is mostly scattered. This is relevant for numerous suburban districts in India.

However, decentralized systems are also people-centric in nature. While it needs low maintenance and hence consuming less energy, it also needs public participation and organization which comes through awareness about decentralized wastewater treatments. The awareness would in turn only come with citizens becoming conscious and aware about the importance and implications of the sustainable use of water as a resource. Decentralized systems are hence community driven as opposed to state-governed centralized systems that have not been successful in India. Decentralized systems hence also add transparency to resource management systems and hence gives opportunity for community-driven governance. Decentralized systems also

²⁴ 2008, August 12. Decentralized approaches to wastewater treatment and management Retrieved January 31, 2017, from <https://courses.washington.edu/h2owaste/assignments/2009%20Discussion%20Articles/Decentralized%20Approaches.pdf>

²⁵ Ibid.

²⁶ Ibid.

help in bringing about better sanitation and hence improving public health. Unhygienic sanitation practices such as open defecation is a huge problem in the country especially prevalent amongst the urban poor seen in slum settlements. With this regard, decentralized systems if supported by local government policies can serve to be a major step towards the SDGs related to water and sanitation.

In addition, decentralized systems also encourage the reuse of reclaimed water. Local communities that adopt decentralized systems are enabled and empowered by reusable reclaimed wastewater which could be used for various purposes such as flushing toilets and for gardening and farming purposes. This may also bring about social change and upliftment of the urban poor in Pune City. This method would also abandon the practice of the discharge of untreated wastewater into river bodies and therefore improving the health of the ecology of rivers. The implementation of this system by a Delhi-based NGO in an area in New Delhi has seen successful outcome. The decentralized wastewater treatment plant in Vasant Vihar, New Delhi also helped in the reclamation of water sufficient for landscaping. “This plant was set up in coordination with the local Residential Welfare Association and the Municipal Corporation of Delhi (MCD). The plant has a 40 KLD (Kilo-litre per day) capacity with 75-80% remediation efficiency and the water supplied meets the desired municipal standards and is supplied to 5-6 acres (25,000 sq. m.) of parks.”²⁷ The key objective of the project in this case was to help reduce untreated wastewater discharge into the Yamuna. Pune city hence has a huge scope in implementing such a framework of community-driven wastewater plants that are sustainable in nature.

Flaws in Local Governance and Management

In the case of Pune, the PMC since 2002 has made it mandatory under the Development Control Rules for all housing schemes and societies with more than 150 tenements to have decentralized wastewater treatment systems.²⁸ This also included the incentivized use of reclaimed water as part of municipal rules. The use of treated wastewater for flushing purposes was also made clear by PMC. However the framework for this decentralized system was not community-driven which meant the involvement of local governance structures in the operation and maintenance of the systems which is seen

²⁷ Decentralized Wastewater Management – An ... - India Water Portal. Retrieved January 31, 2017, from [http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Decentralized_wastewater_management_An_overview_of_a_community_initiative_in_New_Delhi_\(India\)_2009.pdf](http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Decentralized_wastewater_management_An_overview_of_a_community_initiative_in_New_Delhi_(India)_2009.pdf)

²⁸ Draft Development Control and Promotion Regulations - 2015 for Pune Retrieved January 31, 2017, from [http://www.punecorporation.org/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](http://www.punecorporation.org/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

as a drawback. The involvement of local governance has brought about hindrances in the implementation of the projects which can be seen currently as residential schemes of the required standard either do not possess at all or have nonfunctional decentralized wastewater treatment systems. PMC has also institutionalized for certain layouts to have rainwater harvesting infrastructure:

“All buildings on plots having area, not less than 500 sq.mt., shall have one or more Rain Water Harvesting structures having a minimum total capacity.”²⁹

However this particular rule is not seen to be strictly implemented within the city limits as the rules have it. Therefore, there is a gap in local governance. This calls for greater efforts of local governance to draft policies related to sewage management that encourages the use of community-driven systems. Apart from this, there is also urgency in bringing about transparency in governance by involving third-party audit bodies. Therefore it can be seen that while there has been efforts seen by local governance in institutionalizing sustainable policies yet the goals face a shortfall in its proper implementation and hence calling for a decentralized community-driven system. In the next section the Development Control Rules will be further analysed with regard to the framework provided by Arun Agarwal’s findings about governance of resource systems.

Pune Development Control Rules in Perspective of Arun Agarwal’s Framework

As mentioned in the earlier section of the paper, Arun Agarwal’s framework discussed in his paper ‘Forests, Governance and Sustainability: Common Property Theory and its Contributions’ (2007) will now be used in the case of the Development Control Rules (DCR) of PMC. The resource taken into consideration is water resources in general in order to bring both surface and groundwater sources under the purview. Agarwal, in his research, states four sets of variables that are relevant to successful governance of the commons: the characteristics of the resource system, the user group, the institutional arrangements, and the external environment. Taking into consideration each variable, it will be analysed if the particular policy is apt for the sustainable governance and management of resources.

Characteristics of a Resource System

According to Agarwal’s research, it is essential for a policy framework that governs common property resources such as rivers to identify and acknowledge

²⁹ All buildings on plots having area, not less than 500 sq.mt., shall have one or more Rain Water Harvesting structures - [https://pmc.gov.in/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](https://pmc.gov.in/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

the characteristics of the resource system. Without having understood the complexity of the characteristics of a resource system, especially in the case of a river, it only becomes meaningless and unsustainable to exercise policies as this might result in the dismissal of important ecological or non-ecological features that is essential to. Agarwal states examples of such characteristics, taking the case of the forest commons resource system, such as “size of the resource system, its boundaries, whether the resource is mobile, the extent to which resource units can be stored, rate and predictability of flow of benefits from the resource system, and ease of monitoring resource conditions.”³⁰ The Development Control Rules (DCR) however only acknowledges a few characteristics of water resources as shown below:

““Water Course” means a natural channel or an artificial one formed by draining or diversion of a natural channel meant for carrying storm water and waste water;

“Major Water Course” means a water course which carried strong water discharging from a contributing area of not less than 160 ha;

“Minor Water Course” means a water course which is not major.”³¹

The three definitions mentioned, while it may count as characteristics of water resources relevant to urban areas; however there is no acknowledgment of other important characteristics. There are various other important and relevant biophysical characteristics of water resources that have been avoided in the DCR. Agarwal states in his paper that these characteristics “are the set of boundary conditions within which humanly devised rules of the game must be situated.”³² Hence with regard to this particular variable the DCR certainly has gaps to be filled.

Characteristics of the User Group

In his paper, the next variable that Agrawal highlights is the importance of the recognition of the relationship of the resource system with user groups. Policies hence should not only recognize relationships but also understand the relationship between various user groups and the resource system. In the case of the DCR there are a few references to individuals which could be

³⁰ Agrawal, A. (2007). Forests, Governance, and Sustainability: Common Property Theory and its Contributions. *International Journal of the Commons*, 1(1), pp. 111–136. DOI: <http://doi.org/10.18352/ijc.10>

³¹ Draft Development Control and Promotion Regulations - 2015 for Pune Retrieved January 31, 2017, from [http://www.punecorporation.org/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](http://www.punecorporation.org/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

³² Agrawal, A. (2007). Forests, Governance, and Sustainability: Common Property Theory and its Contributions. *International Journal of the Commons*, 1(1), pp. 111–136. DOI: <http://doi.org/10.18352/ijc.10>

interpreted as a vague acknowledgement of the relationship between user groups and resources. In its definition of an ‘owner’ the following definition is provided:

““Owner” means a person who has legal title for land or building.”³³

In this definition, ‘land’ could be interpreted as the resource while the ‘owner’ as the user group. Hence the DCR does recognize the relationship between the user group and the resource system. However the word ‘land’ mostly refers to property rights and hence falls in the realm of ownership. It is important to talk about ownership of resources while talking about the politics of ecology; in this case ‘land’ does not serve as a resource system with biophysical features. If land is defined as any type of a resource system it could refer to forests land, or rivers or any other resource systems; however the DCR provides with no definition of ‘land’. In addition, there is also no acknowledgement of the types of user of surface water resource such as the Mula Mutha river. Abstractive users (users that make use of water resources by means of collection and transportation of water) and non-abstractive users (users that directly make use of the water which includes but not limited to bathing). The distinction of such user groups and their relationship with the resource system is vital while formulating the development policy of an urban area through which rivers pass. In the case of water resources or any other resources, the DCR provides no definitions and acknowledgement of user groups and their characteristics.

Characteristics of Institutional Arrangements

Agarwal in his paper states that “institutions and how their variation influences forest conditions are the intense focus of scholars...”³⁴. In this section of his paper, the writer emphasizes on the importance of the study of the cause-effect relationship between institutional arrangements and resource systems. In the case of the DCR, there is in fact mention of various institutional arrangements made in order to influence resource systems. In reference to water resources, the DCR provides with the description of the Green Belt under which institutional arrangements relating to river front development is mentioned:

“(iii) River front development by Municipal Corporation,”³⁵

³³ Draft Development Control and Promotion Regulations - 2015 for Pune Retrieved January 31, 2017, from [http://www.punecorporation.org/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](http://www.punecorporation.org/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

³⁴ Agrawal, A. (2007). Forests, Governance, and Sustainability: Common Property Theory and its Contributions. *International Journal of the Commons*, 1(1), pp. 111–136. DOI: <http://doi.org/10.18352/ijc.10>

³⁵ Draft Development Control and Promotion Regulations - 2015 for Pune Retrieved January 31, 2017, from [http://www.punecorporation.org/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](http://www.punecorporation.org/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

The DCR also frequently mentions the role of the Maharashtra Pollution Control Board (MPCB) with regard to the discharge of treated effluents of all type (gaseous, solid, liquid). This part of the policy, provided there is good implementation, can stand as a good example of characteristics of the institutional arrangements. The clause indicates the power vested in institutional bodies to curb pollution which is a characteristic of the MCPB and the PMC that directly determines the pollution of water resources and hence the Mula Mutha. However as mentioned earlier, the framework seen in the DCR in terms of its nature is highly centralized. There is no scope for public participation especially in the case of decentralized STPs. The rules mention institutional arrangements for the provision of basic sewage disposal systems in the case of ‘special buildings (such as educational structures)’³⁶; however it is not mentioned how this provision will be made possible and the roles of various stakeholders in operation, management and installation.

Nature of the External Environment

External environment, in this case, is a reference to the possible roles and the extent of involvement and influence of all other external bodies in perspective of the resource system apart from the user and the state. Agarwal in his research states examples with regard to forest based commons such as “demographic, cultural, technological, market-related factors, the nature of state agencies, and the level of involvement of other actors and forces such as NGOs and international aid flows”³⁷.

In the case of the DCR, apart from the mention of the owner and institutional structures, there is no mention of an external environment relevant to resource systems and not especially in the case of water resources. There are however references to external actors but not in the context of resource extraction or use. For example the DCR describes ‘Business Buildings’ as:

““Business Buildings” means any building or part of building, which is used for transaction of business for the keeping of accounts and records for similar purposes; offices, banks, professional establishments, I.T. establishments, call centre, offices for private entrepreneurs, courthouses, libraries shall be classified in this group insofar as principal function of these is transaction of public business and the keeping of books and records;”³⁸

In the above definition, the external actors mentioned are banks, professional establishments, IT establishments etc. which while they may be

³⁶ Ibid.

³⁷ Agrawal, A. (2007). Forests, Governance, and Sustainability: Common Property Theory and its Contributions. *International Journal of the Commons*, 1(1), pp. 111–136. DOI: <http://doi.org/10.18352/ijc.10>

³⁸ Draft Development Control and Promotion Regulations - 2015 for Pune Retrieved January 31, 2017, from [http://www.punecorporation.org/Draft_Plan_Old_Village/28\(4\)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf](http://www.punecorporation.org/Draft_Plan_Old_Village/28(4)/DCPR%20PUNE%20-%202015%20-%20vol%20-%201.pdf)

identified as external actors yet the identification does not add value to the drafting of a sustainable policy as the roles and characteristics of such actors in relation to resources is not described. Therefore, it is yet again an indication of the highly centralized framework the local governance has adopted towards the sustainable development of the city.

Scope of Study

With the help of this paper, the importance and the need for a decentralized community-driven city development plan is clearly highlighted especially with regards to the maintenance of the health of water resource systems such as Mula Mutha river. There is an urgent need for the local government authority to place importance on further research and organization of data related to sewage generation, treatment and discharge. The institutional structures made to carry such duties need to be more vigilant and conscious about the importance of consistent data. Discrepancies in data collection would lead to incorrect projection about the scope of growth of sewage generation and hence may in turn lead to further pollution of the river. The paper will further suggest a transparent assessment of the current STPs by a third party in order to generate basic data related to wastewater management. Additionally, there is also a need for the local government to assess and study the feasibility of decentralized community-driven and incentivized STPs in unplanned zones such as slum areas. The paper strongly supports the opinion that priority should be placed upon ensuring the efficient functioning of the current STPs before investing large amounts of capital in the construction of more STPs.

Conclusion

This paper, which consists of the analysis of current national and local laws that concern the health of the river Mula Mutha in Pune City and the analysis of the DCR in reference to Arun Agarwal's 'Forests, Governance and Sustainability' in general provides a review of the policies in place which are proven not necessarily to be helpful towards the conservation of the Mula Mutha river. The conservation and governance of rivers are important especially when they pass through urban agglomerations because of the variables that Agarwal mentions in his research and how they interrelate. All four variables are interrelated because they affect each other for instance, the presence of sound institutional structures will ensure that there are sustainable provisions for the user groups and the resource system both. In addition, without having recognized the relationship between the user group and the resource system there is a possibility that institutional structures and external actors may overlook the fate of river communities while putting in place stringent extraction and ownership policies. Considering the characteristics of the user group i.e. the various ways the dwellers of Pune City depend on the

river must be taken into consideration while formulating policies that govern the fate of the health of the river. There is an urgent need for the health of the river to be given utmost importance because of the risk of an outbreak of health issues which directly affect non-abstractive user groups of Mula Mutha. The paper however intends to conclude with the message that the general theme of centralized management and governance of resource systems may not always be an appropriate framework.

Urban Governance: High Time to Help Our Cities Face the Challenges of Urbanisation, Rains, Floods and Cyclones

V. Eshwar Anand*

Introduction

Our cities seem to be breaking down because of multifarious problems. Kolkata is, of course, often referred to as the ultimate in urban chaos. Conditions in Mumbai are rapidly deteriorating. There has been no respite to Chennai from the floods in 2015 (Anand and Gagan, 2016). Even as Chennai was struggling to recover from the 2015 deluge comes the cyclone on December 12, 2016 (*Frontline*, 2017). Certain parts of Delhi are, no doubt, well maintained. However, the havoc caused by heavy rains in Gurgaon and Delhi, which disturbed the visiting US Secretary of State John Kerry and made him pass a caustic comment on our national capital's state of preparedness to unprecedented rains, speaks volumes about the official apathy, sloth, insensitivity and lackadaisical attitude to the problems at hand.

Smaller cities like Pune, Kanpur, Guwahati, Madurai or Visakhapatnam often seem unbearably congested. However, the surprise lies in civic degeneration in places that were once the pride of urban India. Bengaluru, for instance, was not long ago hailed as the "Garden City" and the "City Beautiful"; it was a haven that drew people, particularly the elderly, from all parts of the country, to an extent that it came to be labelled "Pensioner's Paradise" (Issar, 1988). Decaying perceptibly and fast, Bengaluru, perhaps, merits an entirely different label today. Its roads which were once the city's pride are now often badly maintained, being totally unsafe for vehicles and pedestrians alike. The standard of street lighting is increasingly becoming poor; so is the drainage system and garbage clearance. The principal cause of all this would seem, at first sight, to be Bengaluru's multiplicity of

* Late Dr V. Eshwar Anand was Professor of Journalism and Media Studies, Symbiosis Institute of Media and Communication, Symbiosis International University, Lavale, Pune.

administrative authorities – the Bengaluru Mahanagara Palike being only one of them – with each seemingly functioning in total disregard of the rest. This problem is as serious in Bengaluru as in other cities like Delhi, Chennai, Mumbai and Kolkata (Anand, 1989).

Of the 495 cities in India, Mumbai is the largest city with a population of 12,478,447, followed by Delhi (11,007,835) and Bengaluru (8,425,970). The issue in question is whether our urban planners and policymakers have formulated plans to cater to the needs of this increasing population. Equally important, the other question is whether our overcrowded cities are in a position to bear the load of the burgeoning population.

The galloping growth rate of these cities and consequent overcrowding does impose an intolerable strain on all civic services. Mumbai has a significantly higher growth rate. But given its already large population base, this creates a grim situation. According to 2011 figures, Mumbai's population is higher than that of Delhi, Bengaluru and Kolkata. What is worse, almost half of Mumbai's population lives in slums.

Viewed by many as a pampered city, Delhi is also becoming increasingly congested. Let us not be swayed away by the huge pristine enclaves and beautiful bungalows with large acres of green lush lawns in the VIP areas of Lutyen's Delhi. Those privileged to reside in these magnificent buildings constitute only two per cent of Delhi's population: the less fortunate ones suffer from problems of acute congestion and the lack of proper amenities. Already, the national capital is among India's worst polluted cities and the swelling numbers will not exactly improve the situation. Remember how Delhi's schools were closed for a couple of days recently because of the capital city's high pollution levels? The condition of other Indian cities, which are far less prosperous than Mumbai and far less cared for by the Centre than Delhi, is clearly much worse.

The main problem everywhere seems to be shortage of funds. Chennai, for instance, suffers from chronic water scarcity and monsoon-ravaged roads, and both problems keep getting worse because there is never the money needed for remedial action. Three points stand out in various reports about our cities. One, of course, is the need to unify the several bodies or departments now in charge of various civic amenities in most cities. Such merger has been talked about for quite some time, especially in respect of Delhi, but has yet to take place. There is growing suspicion, meanwhile, that the autonomous bodies which have developed into little empires are actively resisting such unification. A more disturbing point is that it is the politicians, with their eye on vote banks, who are responsible for increasing urban chaos and who cynically ensure the perpetuation of unauthorised constructions, shanty colonies and even slums. Their tactic is to sabotage every effort at orderly urban growth by canvassing for the "regularisation" of these derelict habitations. An even more disturbing point to emerge from these reports is that virtually all migrants to

the higher Indian cities these days are from the rural areas. Apart from what this trend might reveal of conditions in the countryside, with their inherent preference for a large number of children, these migrants effectively frustrate all efforts at family planning.

Crumbling Infrastructure

The core problem confronting our cities is the appalling state of infrastructure that seems incapable of facing a sudden heavy downpour and consequent waterlogging or a cyclone. A careful survey of the state of preparedness of various cities to heavy rains and floods over the years would suggest that no city worth the name fits the bill. Unfortunately, the ‘Maximum City’ of Mumbai is as ill-prepared as the ‘Millennium City’ of Gurugram or Gurgaon (Chakravarty, 2016). One remembers the harrowing time Mumbaikars passed on July 26, 2005 following heavy rains, followed by unprecedented waterlogging. This was the worst rainfall Mumbai faced in 31 years. An estimated 1.5 lakh commuters were stranded at the Chatrapathi Shivaji Terminal and Churchgate railway stations in Mumbai. The estimated loss is said to be Rs 550 crore.

Visakhapatnam bore the brunt of Hudhud cyclone in 2014. The city airport and railway station, to mention a few, were severely damaged. It lost vital infrastructure like roads, street lights, power transformers and mobile towers. Almost all trees were uprooted. The city had to start from scratch. The same is the case with Surat and Srinagar.

The Gurgaon episode is far worse. Though it is proximate to the National Capital Territory of Delhi and is thus expected to be ready to face any contingency, the sudden heavy downpour on July 26, 2016 shook both Gurgaon and Delhi. Traffic came to a standstill on the critical NH8.

The breach in Badshahpur drain, which carries storm water, is said to have caused heavy waterlogging, disturbing the peak hour rush in the morning. But then, instead of working in close cooperation with each other, the Chief Ministers of Haryana and Delhi – Manohar Lal Khattar and Arvind Kejriwal – indulged in political mudslinging and blamed the other for the malady. Table 1 provides a glimpse of the urban chaos in various cities over the years together with the reasons and the extent of losses.

Chennai: A Case Study

Undoubtedly, Chennai is considered the most important metropolitan city in the South. Notwithstanding Bengaluru’s importance as the IT Capital of India and Asia’s Modern Technopolis, Chennai has an edge over Bengaluru for various reasons. Indeed, it is the cradle of the 5000-year-old civilisation and the seat of art, cinema, music, dance and theatre. Chennai is not only famous for being the South’s most important automobile manufacturing hub, but also for software services and hardware manufacturing, which are said to

Table 1: No end to urban chaos

<i>City</i>	<i>Reason</i>	<i>Losses</i>	<i>Period</i>
1. Chennai	Cyclone Vardah	Thousands of trees uprooted; lampposts toppled; transformers damaged plunging the city into darkness; mobile phones die as signal towers collapsed.	December 12, 2016
2. Mumbai	Heavy rains	Many parts flooded; road and rail traffic disrupted; long traffic pile-ups	September 23, 2016; August 6, 2016; July 3, 2016
3. Gurgaon and Delhi	Heavy rains	Massive traffic jams during peak hour rush; waterlogged roads due to clogged drains; poor connectivity; Delhi High Court puts the authorities on the mat	August 31, 2016
4. Chennai	Heavy rains and floods	Large-scale destruction of life and property	November-December, 2015
5. Vizag or Visakhapatnam	Cyclone Hudhud	Extensive damage to Visakhapatnam city, Vizianagaram and Srikakulam districts; Rs 30,000 crore loss	October 12, 2014
6. Srinagar	Heavy rains, floods	215 killed; 2600 villages hit; 390 villages submerged; infrastructure damage over Rs 6000 crore; huge crop loss	September 2014
7. Hyderabad	Heavy rains	52 residential areas in and around city inundated; 20 tanks and storm water drains overflow; 14 killed	August 2008
8. Surat	Sudden floods in the Tapi river	22 cities and towns in Gujarat hit; diamond industry worst hit; 7 wards in Surat city inundated; uninsured loss at \$2 billion.	August 8, 2006
9. Mumbai	Unprecedented rains (worst rainfall in Mumbai in 31 years)	Huge loss of life and property; 700 killed; Collapse of transport and communication systems; 1.5 lakh commuters stranded at CST and Church Gate railway stations; Rs. 550-crore loss	July 26, 2005

Source: Author's compilation

be fairly cheaper than those available in Bengaluru. Chennai is also known for excellent healthcare facilities. By one reckoning, Chennai is considered the Health Capital of India for the sheer range of affordable specialised hospitals the city has that suit all categories of people in the country. Indeed, the cost of living in Bengaluru is higher than in Chennai because of the former's importance in information technology. More to the point, not long ago, reports indicated how Chennai was competing with Dubai and Hong Kong in giving a fillip to financial services.

As in other major cities like Mumbai, Kolkata, Delhi and Bengaluru, there has been an exponential rise in Chennai's population, too, year after year. In 2014, its population was close to five million. With a population density of 14,350 per square kilometre, Chennai is India's third density city, after Kolkata (23,900 sq.km) and Mumbai (29,650 sq.km) respectively. Its migrant population has also been rising by leaps and bounds. The total population of Chennai Metropolitan Area is said to be nearly 10 million today. However, like in other major cities, Chennai has been witnessing haphazard growth with little check on the unregulated expansion.

The bane of Chennai and the State of Tamil Nadu has been that despite its typical cyclone-prone topography, even though half of its population live in urban agglomerations, little has been done to prepare the City and its neighbourhood as well as the adjacent districts for the typical October-November-December rains.

According to the Chennai Metropolitan Development Authority's Second Master Plan of Chennai (2008), Chennai is a "flat coastal city subject to regular cyclonic storms and extensive inundation during the North-east monsoon period." Moreover, Chennai's unprecedented rainfall in November-December 2015 and in December 2016 did not come as a surprise. The city did face heavy rains leading to floods and consequent inundation of vast tracts in the city limits and neighbourhood in 1964, 1976 and in 2005. However, no action has been taken by successive governments to prepare the city to tackle contingencies of this nature, dimension and magnitude.

The flood havoc, primarily because of official apathy, insensitivity and lackadaisical attitude, in December 2015 is well known. While no one disputes the unprecedented heavy rains in Chennai and other districts in Tamil Nadu on November 8, 9, 12, 13, 15 and 23, 2015, and on December 1, 2015, reports suggest that flooding occurred only because the authorities, in a thoughtless, irresponsible and callous manner, ordered large-scale release of water from Chembarambakkam reservoir on November 16 and December 2, 2015 (*Frontline*, 2016).

It is said that had the authorities proceeded with caution each day and released small quantities of water from Chembarambakkam reservoir right from November 8 or 9, 2015, the city would not have been flooded and consequently wreaked havoc in the city, bringing untold hardship to the people. Thus, there is every reason to believe that the authorities were not

only ill-prepared to face the unprecedented situation but also made knee-jerk reactions, out of panic, in the form of releasing huge quantities of water from the huge Chembarambakkam reservoir in the city's outskirts (Radhakrishnan, 2016).

At the same time, one cannot overlook the larger problem of rapid urbanisation and the extent of encroachments in Chennai. Most of the city's colonies and streets have come up, in past two decades or so, on areas which were once huge tracts of wetlands and waterbodies. Indeed, according to a report, IT parks, malls and residential areas have come up on many waterbodies in the city. Indeed, Chennai and Mumbai are striking examples of indiscriminate concretisation of roads and unapproved, ill-planned constructions, obviously because of political pressure (Janardhan, 2015). In Chennai, political interference is mainly responsible for having flattened its typical topography. Chennai has as many as 600 waterbodies in the 1980s, as illustrated in Figure 1.

According to New Delhi's Centre for Science and Environment (CSE), supported by Tamil Nadu Government's Water Resources Department,



Figure 1: Waterbodies in and around Chennai.

Source: *Frontline*, Chennai, December 25, 2015

while only a fraction of the lakes are said to be in a healthy condition, “the area of 19 major lakes has shrunk from a total of 1,130 hectares (ha) in the 1980s to around 645 ha in the early 2000s, reducing their storage capacity”. Worse, the drains that carry surplus water from tanks to other wetlands have also been encroached upon by greedy land sharks, contractors and builders. Furthermore, the CSE analysis makes a startling revelation that there has been no desiltation for years even though the storm water drains spread over a long stretch of 855 kilometres constructed to drain flood waters are clogged to the hilt (*Frontline*, 2016).

Surprisingly, if reports were to bear scrutiny, the Tamil Nadu Government seemed to have ignored warnings of unprecedented heavy rainfall in November-December 2015 even though it was an El Nino year (Ramachandran, 2015). When Chennai City and the rest of the State was hit by the first spell of heavy rain in the first week of November 2015, the Government, especially the political leadership and the higher bureaucracy, seemed to have ignored the early warning. It did not bother to take contingency measures even when Mumbai was hit by heavy rains, followed by large-scale flooding, during June-July, 2015. Had the Tamil Nadu Government took the Mumbai rains seriously and treated them as a wake-up call, it would have been in a position to handle the large-scale destruction of life and property triggered by the November-December rains.

Undoubtedly, the manner in which Chennai and other coastal districts of Tamil Nadu experienced a whopping metre-and-a-half of rain speaks volumes about the casual approach and the lack of preparedness of the authorities concerned to tackle the emergency. According to the data of the Indian Meteorological Department, between December 1 and December 4, 2015, Chennai received 1,522.7 mm of rainfall as against a normal of 662.6 mm (130 per cent excess).

The range and scale of devastation in Chennai and other parts of Tamil Nadu during Cyclone Vardah on December 12, 2016, was no less compared with the 2015 deluge. As the winds were blowing over 100 kilometres an hour, thousands of trees were uprooted, lampposts toppled and hoardings tore apart. Worse, these trees fell upon many electrical transformers. As a result, Chennai and other parts of the city have been plunged into darkness. Power supply is yet to be restored in many parts of Chennai city and students and others continue to face problems in the absence of Internet and Wi-Fi. Figure 2 shows the record rainfall events over 24 hours in Chennai and other districts of Tamil Nadu during the north-east monsoon since 1917.

A major problem with Chennai is the poor governance structures for dealing with rains, floods and cyclones. Same is the case with essential services such as plan approval for multi-storey buildings, provision of water, sewage collection and sanitation, fire control and police. The Chennai Municipal Corporation is India’s oldest civic body, set up by the legendary Lord Ripon in 1913. Named after him, the all-white building is called the Ripon Building,

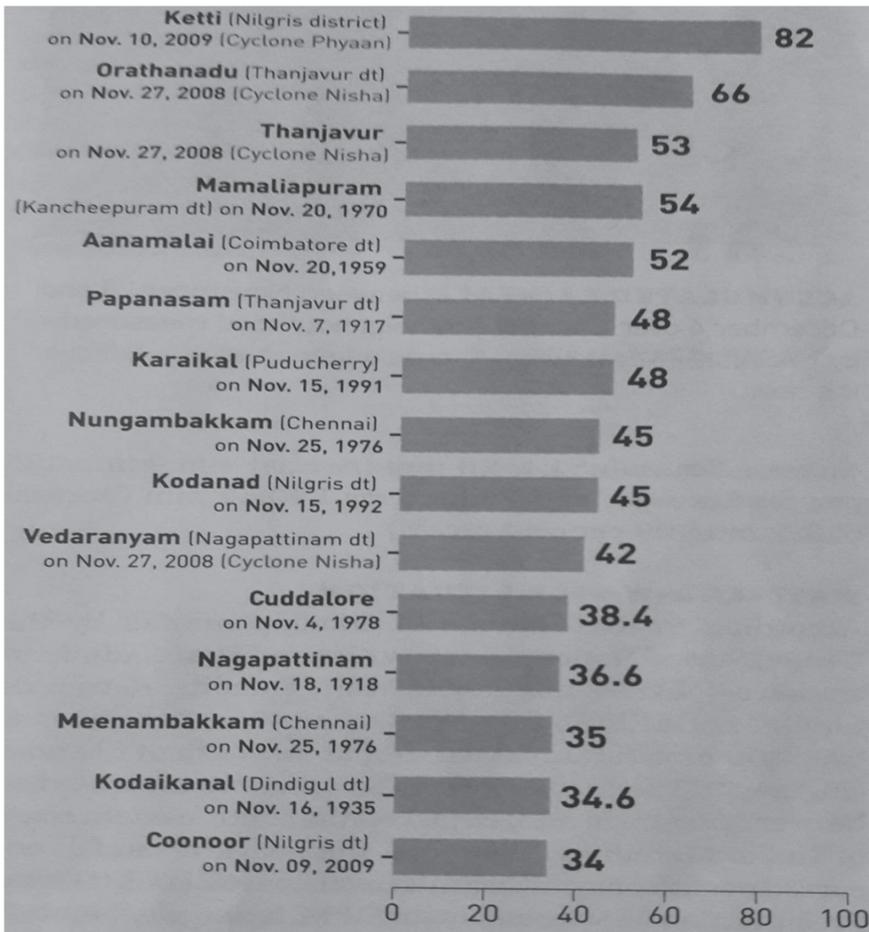


Figure 2: Record rainfall in Chennai and other parts of Tamil Nadu since 1917 (in cm).

Source: Indian Meteorological Department (*Frontline*, Dec 25, 2015)

built in Neoclassical style of architecture, a combination of Gothic, Ionic and Corinthian. Spread over 174 sq.km, it was expanded in 2011. As many as 42 local bodies, including nine municipalities, eight town panchayats and 25 village panchayats were merged with the Corporation. Today, it has 200 wards and 15 divisions.

Unfortunately, despite its rapid expansion, the Chennai Municipal Corporation has not been able to tackle the problem of unapproved layouts in its jurisdiction, little knowing that these have resulted in narrow roads, leaving no space for storm water drains. According to a survey by *Frontline*, the Tamil Nadu Housing Board regularly approves layouts on lake beds which results in flooding every year during the October-November-December rains (*Frontline*, 2016). The Slum Clearance Board makes things worse. It is said

to be a “specialised Board” in creating canal encroachments. No questions are asked for this lopsided growth and there is no transparency and accountability on the part of the authorities concerned. The Corporation seems unable to do anything as it has no teeth to act: all important departments are run by the State Government and not the Corporation. The Mayor is only a nominal head, a golden zero. And the Corporation Commissioner is only a Secretary-level IAS officer, taking orders from the Chief Secretary, Additional Chief Secretary and Principal Secretaries of various other departments.

Multiplicity of Authorities

One problem that almost every city has been facing in urban governance is the multiplicity of authorities. This issue has been examined in official fora from time to time, but no concrete action has been taken for reasons best known to the authorities. The Sitaram Yechury-led Parliamentary Standing Committee on Urban Development examined the problem, but did not recommend measures to resolve the problem. One fails to understand how can one fix accountability and improve governance when so many authorities are involved in taking a particular decision. In Delhi, for instance, it is difficult for the authorities to fix accountability on any particular agency or official for lapses because the persons involved with a particular decision are far too many – the Lieutenant Governor, the Chief Minister, the Deputy Chief Minister, the Municipal Corporation of Delhi (MCD), the New Delhi Metropolitan Corporation, the Urban Development Department, Government of India, the Ministry of Home Affairs, Government of India and the Delhi Police (*The Hindu*, 2014).

Same is the case with Mumbai. Coordination suffers when too many agencies are involved – the Mumbai Metropolitan Region Development Authority (MMRDA), the Municipal Corporation of Greater Mumbai, the Maharashtra State Road Development Corporation (MSRDC), the Maharashtra Industrial Development Corporation (MIDC), the Maharashtra Housing and Area Development Authority (MHADA), the Slum Development Authority (SDA) and the Mumbai Police.

The problem with this kind of institutional arrangement or mechanism is that these agencies or departments work independently without any coordination and direction from the top notch authority like the Governor or Chief Minister. Sometimes, they are also in conflict with each other which, in its turn, disturbs the decision making process and ultimately, the day-to-day administration and governance. If there is no coordination in urban governance, it would be difficult for one to ensure effective service delivery and growth.

The importance of coordination and the imperative need for a singly coordinating authority is particularly felt whenever a city’s life goes haywire because of heavy rains, floods, cyclone, earthquake or other natural calamity. Disturbingly, the response of the state government – at the Centre or in the

States – seems to be limited to order the transfer of the District Collector or the Commissioner of Police as it did in Gurgaon after many roads, including NH8, were waterlogged following heavy rains on August 31, 2016. After the Gurgaon episode, the first casualty was the peremptory transfer of the Commissioner of Police by the Haryana Chief Minister.

Discussion and Findings

Issues concerning urban governance are too important to be left to the discretion of the government, the political leadership or a few authorities. There is a need to involve specialists and experts in the day-to-day governance so that a structured and coordinated response can be given to these crucial issues on a case-by-case basis. There are lessons to learn from the Chennai deluge in 2015, followed by Cyclone Vardah in 2016. The municipal corporation authorities need to be tough on matters pertaining to approval of sites for residential colonies. In principle, they should not allow residential colonies, malls or IT parks on waterbodies, wetlands or near lakes. Strict action should be taken against those flouting the rules and regulations and no leniency should be shown towards those flouting the law with impunity.

Experts say, climate change, global warming and increasing urbanisation are contributing to the intensity of floods in urban areas. As the drainage systems in most cities are very bad, it is time the Centre and the States prioritised this important issue for improving urban governance. If drains are maintained and desilted regularly, waterlogging following heavy rains can be checked and this would help check people's hardship immensely.

According to Raina Singh, Senior Fellow, Centre for Research on Sustainable Urban Development and Transport Systems at Delhi-based think tank – The Energy and Resources Institute, the propensity of the authorities to allow reclamation of wetlands for development have choked avenues of natural drainage. This should not be allowed anymore. Poor management of urban drainage has worsened the situation in most cities, he adds, warning that the risk of floods today is three times greater due to increased urbanisation because of unplanned development of apartments and residential colonies (*Frontline*, 2016).

Of late, the Chennai Municipal Corporation has been trying to restore the city's buffer zones. But it will take a very long time for rebuilding a wetland that is destroyed by irrational policies of the authorities in no time. There is a need to understand, appreciate and recognise the significant role played by wetlands in checking floods and waterlogging of our urban cities. Though Guwahati and Panjim are trying to follow suit, other cities are lagging far behind.

Any discussion on urban governance should necessarily highlight Delhi's overall importance in the scheme of things since it is among world's top ten most populous cities. According to United Nations Projections for 2025, with

a population of 15 million, Delhi is expected to overtake Sao Paolo, Mexico City, Dhaka, New York and Shanghai. Moreover, it has the highest per capita income and wages and has more vehicles than Mumbai, Kolkata and Chennai (Chandra, 2016). Why is it that our planners and policy makers have failed to take effective measures to make Delhi ready to face any eventuality? One heavy downpour and the entire city infrastructure crumbles, raising questions on the government's ability and capacity to handle urban flooding.

Delhi does receive intermittent rains because of its typical topography. As a result, drains are not cleared periodically throughout the year and consequently, they are choked often. When desilted, the waste is rarely disposed of properly and is often kept along the drain. Soon, it ends up back in there. More important, these drains were built 30-40 years ago for much lower levels of rainfall. With global warming, increasing urbanisation and higher rainfall patterns, these have outlived their utility and need immediate replacement to cope with the changing dynamics of weather.

There is need for a single, cohesive entity for effective urban governance on issues like tackling heavy rains and floods. The main problem in most urban cities is how to deal with multiplicity of urban governance structures while tackling a problem that requires a cohesive approach.

Encouragingly, Surat stands out in the country as a role model in improved coordination, especially for the steps it has taken to ensure effective coordination in urban governance in times of heavy rains and floods. The city was affected very badly when there was flood in the Tapi river suddenly on August 8, 2006. It took a toll of 120.

The Southern Gujarat Chamber of Commerce, TARU Leading Edge, a reputed consulting firm, the Surat Municipal Corporation and other government bodies and the US-based Rockfeller Foundation together formed the Surat Climate Change Trust. It played a crucial role in setting up a comprehensive early warning system for flooding in the city. This Trust, being monitored by a Chief Resilience Officer, helps Surat prepare for all kinds of environmental, ecological and social shocks but also traffic congestion, air pollution, water scarcity and social cohesion (Chatterjee, 2005).

Odisha, too, deserves to be commended for the manner in which it handled Cyclone Phailin in October 2013. The toll could be restricted to 45 only because of the government's contingency measures in terms of early warnings, quick response teams with heavy equipment, rescue teams, choppers at standby, closure of schools and suspension of vehicular and train traffic after it faced the horrendous experience during the Super Cyclone of 1999 which took a toll of 10,000. The thousands of shelters the government had built after the Super Cyclone came in handy during Cyclone Phailin. Moreover, the State's innovative forecasting model that helps it predict accurately weather a week in advance came to its rescue.

Significantly, the Odisha government collaborated with the Government of India's National Cyclone Risk Mitigation Project in implementing the Global

Facility for Disaster Reduction and Recovery (GFDRR). The World Bank has, in a report on Stories of Impact, lauded the Naveen Patnaik government for its pro-active role in checking the devastation during Cyclone Phailin (World Bank, 2014). The United Nations also honoured Chief Minister Naveen Patnaik in tackling Cyclone Phailin well through pragmatic policies in a pro-active manner.

It is time we gradually moved away from the outdated municipal corporation Acts and dovetail our current urban planning and governance strategies with the changing times. We need to improve the urban governance systems with primary focus on better service delivery, transparency and accountability. Admittedly, no city or town can develop through failures arising out of wrong, faulty or misinterpretation of the rules and guidelines. Suffice it to mention, the need for using the cutting edge technology and progressive management techniques in urban governance seldom needs overemphasis (Apte, 2013).

The Narendra Modi Government's Smart City Mission is a unique project. However, this cannot be treated as a model for urban governance throughout the country for the simple reason that the mission deals with only 100 out of 495 cities in the country. Nonetheless, our policymakers could draw a leaf or two from the goals of the Smart City Mission and include them in the overall framework of urban governance.

The imperative requirement of domain expertise in urban flood management needs seldom overemphasis. The days of generalist administrators with IAS officers at the top of the administration are over. As the challenges of urban governance have increased manifold with newer and newer issues coming to the fore, the governments at the Centre and the States need to induct specialists and experts into the administrative mechanism.

Conclusion

Increasing urbanisation has become a big challenge to our planners, experts, policy makers, academics and journalists. If the present trend is any indication, a majority of the country's population will soon be living in its towns and cities which will, certainly, lead to an increase in the urban population growth rate. What this means is that pressure on urban infrastructural services from water and power supply to collection and disposal of waste will become increasingly intolerable and that, in consequence, our cities will inevitably decline into slums that breed filth, pollution and disease.

The World Bank Report of 1991 was the first to sound such a warning. Our own National Commission on Urbanisation concluded in the late Eighties that the brutal and inhuman living conditions in urban areas would result not only in abject degradation of human life but, in addition, touch off considerable political tension and physical violence. The commission raised several basic questions. Some of these can be summarised thus. How will the phenomenal

numbers living in cities and towns be housed? Could these people hope for a strong enough infrastructure to serve them? How can the present seemingly inexorable conversion of cities into slums be arrested? How can the galloping urban decay be halted and a regeneration process initiated? And how are city administrations to be enabled to become financially self-sufficient?

These are not problems that worry authorities over much at least partly because 60 per cent of Indians live in the countryside which is, therefore, the ultimate repository of votes and political power. But as the countryside becomes impoverished more and more people will migrate to the cities in search of jobs.

These are questions of no ordinary importance since the new urban India, accounting for almost half the country's population, will have a decisive impact on the future economic growth of the country as a whole. The answer, perhaps, lies in increasing the productivity of the urban economy, by removing constraints, and thus enabling cities and towns to pay for their own upkeep and become truly prosperous. There is no denying of the fact that there is considerable rural distress on the government's apathy to the people's problems arising out of rapid urbanisation. If there was no distress in some pockets, it only mean that our urban slum dwellers are so inured to hardship that they do not even expect redress of their legitimate grievances. But that is no reason to neglect what threatens to be the most important challenge of the next decade, demanding more and more attention as people flock from country to town and urbanisation makes rapid progress (Parthasarathy, 1992).

It was with great optimism and fanfare that the Jawaharlal Nehru Mission for Urban Renewal was launched by the then UPA Government in 2005. Crores of rupees were spent on the project. However, it did not come up to the expectations. The Comptroller and Auditor-General of India has pinpointed several irregularities in the implementation of the project (Ramachandran, 2012). The Narendra Modi Government has now scrapped JNNURM and instead rechristened it with a new name – Atal Mission for Rejuvenation and Urban Transformation (AMRUT) – after former Prime Minister Atal Behari Vajpayee (*The Times of India*, 2015). The Modi Government also launched the National Urban Livelihood Mission after distinguished social reformer Deen Dayal Upadhyaya as the Deen Dayal Upadhyaya Urban Livelihood Mission (*The Hindustan Times*, 2015).

Earlier, the JNNURM worked on components like treatment of sewage and garbage, augmentation of water supply, building flyovers and roads. The new programme will include digitisation and wi-fi zones in the cities as well (*India TV*, 2015). There is no problem with new policies and programmes of the government. An elected government has every right to launch programmes of its choice. However, the bane of most of these programmes is the lack of effective supervision and monitoring at various levels. The Chennai deluge in 2015 is a classic example of the total collapse of authority and accountability on the part of the political leadership and administrative mechanism to respond

to the challenge and mitigate the hardship of the people expeditiously. Reports suggest that while the late Chief Minister J. Jayalalithaa was not in her best of health and thus could not respond to the situation swiftly and decisively, there was a failure on the part of the top IAS officials to rise to the occasion promptly and help the people in distress. In sharp contrast, the new Chief Minister, O. Panneerselvam, promptly responded to the cyclone on December 12, 2016, inspected the affected areas and issued timely directions to the officials to help restore normalcy in Chennai city and neighbourhood.

It is also time politicians stopped meddling in affairs of urban governance. Politics of appeasement with an eye on vote banks must end. This researcher was witness to the slanging match between the then Governor of Punjab General S.F. Rodrigues and former Union Minister Pawan Kumar Bansal in Chandigarh. The Punjab Governor is *ex-officio* Administrator of the Chandigarh Union Territory. Designed by noted French architect Le Corbusier, Chandigarh is a planned city. However, politicians always interfere with Chandigarh Administration affairs, especially in getting slums regularised for the simple reason that these are vital vote banks. Clearly, General Rodrigues, who was the Chief of Army Staff, refused to buckle under political pressure and it was only because of his strong determination to call a spade a spade that Mr Pawan Kumar Bansal, despite his political clout, could not have his way in Chandigarh.

Suggestions/Recommendations

1. As global warming has perceptibly increased the risk of urban floods, the Centre and the States should formulate a comprehensive strategy to maintain our cities' drainage systems properly and efficiently.
2. The strategy should not only provide for proper planning, maintenance and use of the storm water drains but also their regular cleaning up, including timely desilting operations.
3. No permission should be given to the construction of residential apartments, IT parks and malls over river beds, lakes and storm water drains. The authorities concerned will have to crack the whip on this and there should be no deviation from rules and regulations which need to be enforced scrupulously.
4. The State Governments should conduct vulnerability assessments and demarcate no-development areas in their respective cities.
5. As recommended by experts, the States should go in for optimal location- or area-specific retrofitting measure to check urban flooding. Our cities need porous pavements to allow infiltration of water and large tanks to store rainwater for use in thirsty summers.
6. The days of multiple governance structures in cities are over. There is need for a single cohesive authority so that accountability can be fixed on the official concerned for lapses.

7. There is a need to induct domain expertise in urban governance, including urban flood management. Urban governance is too critical and specialised an area to be left to the discretion of amateurs and generalist administrators.
8. The Surat model of coordination between various agencies for effective urban governance is a best practice worthy of emulation in all cities. The Surat model is not confined to issues pertaining to rains and flooding only. It deals with multifarious issues such as traffic congestion, air pollution, water scarcity and social cohesion.
9. All States should explore the possibility of replicating the innovative weather forecasting model of the Odisha Government in their respective States. This would help them to accurately predict the weather pattern before one week and consequently prepare for any eventuality so as to check the extent of devastation and minimise the threat to human life and property. The Odisha Government had done this successfully during Cyclone Phailin in 2013 and saved thousands of lives and property from devastation.
10. There is need for using cutting edge technology and progressive management techniques in urban governance.
11. The primary focus should be on effective service delivery, transparency and accountability for better urban governance.

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Financing Strategies for Achieving Sustainable Cities

Ravikant Joshi

Faculty of Humanities and Social Sciences (FOHSS)
Symbiosis International University, Pune – 411004
ravikant.joshi@gmail.com

Introduction

The world including India has been on the path of unsustainable development for many decades, putting in danger the future of mankind. Realising need to implement sustainable development ways, after years of discourse, all the nations have finally adopted the Sustainable Development Goals (SDGs) at the end of year 2015, which were agreed upon at the Rio+ 20 Summit in 2012. SDGs are composed of 17 goals, 169 targets and proposed 304 indicators each interlinked with the other, thus recognising the need not to compartmentalise development.

The next 15 years (starting from 2015) are going to be decisive for India, if it is to achieve the SDGs. In a highly globalised world, it is not feasible to have redistribution follow growth, and development must work its way from the bottom to up. There is a need for a constructive approach to fortify both development and democracy, engaging citizen bodies, research institutes and varying levels of governance.

Each of the SDG is important and India needs to adopt an approach that integrates the social, economic, and environmental dimensions and concerns, which form the very foundation of sustainable development. To formulate such holistic and integrated policies, there is a need to develop strategy not only for the main 17 SDGs but also for each of the 169 targets and proposed 304 indicators.

Formulation of holistic and integrated strategies for achieving SDGs will be different for each country. In case of India the SDG-11 of achieving Sustainable Cities will be very crucial in the light of the following:

- Urbanisation world over has crossed the 50% threshold in 2008 and is likely to inch up to 70% by 2050 (The World Bank, 2016). In the Indian context, the largest democracy presently has the second largest urban population in the world at 377 million (31.7%), after China (749 million), in 2014, with

the urban numbers having increased up to 429 million in 2016, and have been further projected to rise to 600 million (40%) by 2031 (HPEC, 2011). This is likely to result in an increase of nearly 160 to 200 million urban population during the period 2015-2030, rendering a daunting image of the future of urbanisation in India.

- By 2030 India may be far more urbanised than what is projected (600 million or 40% share of urban population) on the basis of the Census Report figures. The same World Bank Report (2016) characterises India's urbanisation process as "hidden" – because the share of India's population living in areas with urban-like features in 2010 stood at 55.3% (according to the Agglomeration Index)¹. Going by these standards, by 2030 India's urban population will be much more (more than 60%).
- The same World Bank Report (2016) has characterised India's urbanisation process as "messy" – because 65.5 million Indians live in slums and 13.7 million below the poverty line (Census of India, 2011). This uncontrolled and expansive urbanisation has been marked with significant gaps in urban infrastructure resulting in pressure on land, water supply and its quality, sewerage network services, disposal of solid waste, lack of open landscaped spaces, deterioration of public transport, resulting in environmental degradation and poor quality of urban life. 94% of the cities/towns in India do not have even a partial sewerage. 64% of urban population is covered by individual water connections and stand posts in India, waste collection coverage ranges from 70% to 90% in major metropolitan cities, and is less than 50% in smaller cities. Most Indian cities do not have water metering system for residential establishments. Non-revenue water accounts for 50% of water production. Even partial sewerage network is not available in 4,861 cities.
- Further, public transport accounts for only 22% of urban transport in India. 13% of urban households do not have any form of latrine, less than 20% of the road network is covered by storm water drainage and scientific disposal of solid waste is not there in most of the cities (Planning Commission, 2011). There was a shortage of around 19 million dwelling units as per 12th Five Year Plan (FYP). With such poor level and quality of urban infrastructure, it is no surprise that none of the cities in India is among the top 90 sustainable cities of world.

The message coming out from India's urbanisation process clearly indicates that, if India would like to achieve the SDG, it will have to make its cities financially sustainable. Further, a development, which is not financially sustainable fails to deliver its intended benefits to the beneficiaries either failing apart much early than expected life or makes non-beneficiaries to pay for the development through process of cost exportation or simply turns out

¹ It is a globally applicable alternative to calculate urbanization.

to be very costly (cost inefficient) and thus drains out the precious resources meant for other developments.

Thus, for any development to become sustainable, it must have financial sustainability along with other important sustainabilities like ecological, political and cultural. In the context of above this paper proposes to undertake critical inquiry in terms of financing of ‘Sustainable Cities’ in India. The study conducted is based on following questions:

- (a) How India has financed its cities in the past and how currently it is financing its cities and urban infrastructure? Has financing of cities and urban infrastructure in India followed or does it follow financial sustainability norms?
- (b) If past and present ways of financing cities are not sustainable, then what sustainable financing strategies will have to be adopted by India to achieve SDG-11 of ‘Sustainable Cities’ and other SDGs by 2030.

Before examining these aspects, the paper first proposes to describe financial sustainability, followed by a historical review, time lines, issues and present status of municipal finances (or financing of the cities). Next section analyses two questions – Has India financed its cities in sustainable ways? And is India financing them in sustainable ways? Lastly, the final section of the paper dwells on what should be the way forward.

Defining Sustainability and Financial Sustainability

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). The concept of sustainable development has three constituent parts: environmental, economic and socio-political sustainable. A more consistent analytical breakdown distinguishes it in four domains of economic, ecological, political and cultural sustainability.

Sustainability thus simply defined is a capacity to endure, while fiscal sustainability can be defined as the ability of a government to sustain its current spending, tax and other policies in the long run without threatening government solvency or defaulting on some of its liabilities or promised expenditures.

There is no consensus on precise definition of financial sustainability. Different studies use their own, often similar, definitions of financial sustainability. Financial sustainability concept is same at generic level but differs in application to some extent depending upon subject of study or level of government or type of organisation or project. For example – the financial sustainability with respect to a non-profit organization may get defined as – capacity of non-profit organisation to obtain revenues in response to a demand, in order to sustain productive processes at a steady or growing rate to produce results and to obtain a surplus.

Financing of Cities in India – Time Lines, Issues and Current Status

Since independence, though municipal finances in India have shared an insignificant position in the country's public finance, largely characterized by poor resource base, lack of autonomy, low capacity to mobilize revenues and high dependence on central and state level transfers and grants-in-aid coupled with internal inefficiencies for financial management, the period since independence can be divided in to three broad phases/periods:

1947 to 1992 – Era of Dark Age for Municipal Bodies in India

During this period the only reference in the constitution to local bodies was in the Directive Principles of State Policy, which stated, "*The state shall take steps to organize village panchayats and endow them with such powers and authority as may be necessary to enable them to function as units of self-government.*" There existed distinct anti-urbanisation bias in public policy at all levels. Cities, urbanisation, urban development being state subject, ULBs were left to the State.

As a result of all this most of the urban local government institutions were either routinely superseded or elections were not held on time, resulting in complete subversion of the system of local governance. State Governments appropriated most of the functions and financial sources of the urban local governments which were provided in Municipal Acts of erstwhile British Rule. In last phase of this period, that is post 1970, large scale parastatalisation of municipal functions happened.

There was no funding assistance from Central Government. States provided funds but they were meagre, as a result municipal bodies could spend very little on urban infrastructure development. Exception to this were some of the bigger cities of Gujarat and Maharashtra who managed their finances on 100% basis, otherwise ULBs across India depended heavily even up to 90% on State Government's non-formulae based adhoc, meagre subsistence level grants. Naturally all the cities of India suffered from inadequate urban infrastructure development, urban governance and acute poor quality of urban life which persist even today.

During this period few studies about urbanisation, urban development and ULBs did take place but suggestions of these study reports were hardly implemented. In the end part of this period in 1988 came the most important study on National Commission on Urbanisation (NCU) under the chairmanship of Charles Correa. The NCU in its report emphasized close links between urbanisation and economic development. The NCU marked a significant departure from the policy pronouncements of earlier government policies and plans as it abandoned the concept of backward area because "it was felt that instead of forcefully inducing investments in areas, which are backward

and have little infrastructure and in which the concessions are likely to be misused, the identified existing and potential urban centres at intermediate levels could be developed to attract the migrants as they are located in closely related regions.” Consequently, the Commission identified 329 cities called GEMs (Generator of Economic Momentum) and 49 Spatial Priority Urban Regions (SPURs). The future growth in urbanisation was expected to take place along these nodes and corridors. The 74th Constitutional Amendment Act (CAA) was a result of NCU recommendations.

1993 to 2005 – Era of Constitutional Status and Ensured Existence to Democratically Elected Municipal Bodies

India embarked on economic and structural reforms in 1991 when the 74th CAA 1992 came into force in 1993. With passing of 74th CAA what really started was the discourse about existing status, role, relevance, functions, finances and macro implications of municipal bodies.

The India Infrastructure Report prepared by the Rakesh Mohan Committee in 1996 made macroeconomic implication of non-development of urban infrastructure very clear. Report estimated the total requirement for financing water supply and sanitation at Rs. 2,22,051 crores over the period 1996-2006 that is Rs. 22,051 crores per annum. As against this, the flow of plan funds was estimated at Rs. 5,000 crores per annum during the period leaving a resource gap of Rs. 17,051 crores per annum during the period. Thus, the investment gap was 77%. Rakesh Mohan committee strongly recommended development of municipal bond market in India.

The National Commission set up to review the working of the Constitution of India also joined in the discourse about the role, functions and place of municipal bodies. The National Commission proposed that municipalities should have a set of exclusive functions, and the concept of a distinct and separate tax domain for municipalities should be recognized. Only then will the municipalities be able to serve as institutions of local self-government (National Commission Report, 2002).

During the period of 1993–2005 various strategic initiatives as listed below were taken targeting all tiers of government to streamline municipal finances.

- Giving constitutional status to municipal bodies through 74th CAA and ensuring existence of municipal bodies democratically elected through fair and independent elections by State Election Commissions.
- Laying down the parameters for the constitution of municipalities, and defining how these might be composed (representation to SC, ST, OBC, Women).
- Providing a constitutional framework for redesigning intergovernmental transfer mechanism for improving the fiscal relationship between central, state and local government in the following ways:

- (a) Mandating the Central Finance Commission (CFC) to look in to needs for municipal finance. As a result Central Finance Commissions 10th, 11th and 12th tried to look into the needs for municipal finance and issues associated with it provided central funds for municipal sector for the first time in the history. The allocations were small and were worked out on adhoc basis due to lack of data base.

Table 1: Amount proposed by Central Finance Commission for devolution to municipal bodies from Government of India (GoI)

<i>Central Finance Commission</i>	<i>Period</i>	<i>Amount (Rs. in crore) provided for devolution</i>	<i>Details/Conditionalities</i>
10 th	1995-2000	1000	Worked devolution amount on Adhoc Basis. Grant not for establishment costs, matching contribution by local bodies required
11 th	2000-2005	2000	Worked devolution amount on Adhoc Basis. Grant to be used for O&M of core functions like primary education, health, drinking water, street lighting, sanitation but not for establishment costs

- (b) Creation of the institution of State Finance Commissions to look into sharing of state resources between state and municipal bodies. Some of the states constituted State Finance Commissions but most of the States delayed their constitution. These first generation SFCs started outlining various devolutions taking place from State to Urban Local Bodies.
- (c) Successful development of municipal bond system under United States Agency for International Development (USAID) funded Financial Institutions Reform and Expansion–Debt and Infrastructure (FIRE-D) Project, which started in 1993.
- (d) Ahmedabad Municipal Corporation (AMC) made the first municipal bond issue in India, without a state government guarantee. This involved raising Rs. 1000 million from the capital market and comprised 25% public placement and 75% private placement.
- (e) As part of the FIRE-D project, in 2000-01 amendment of Income Tax Act 1961 was done to allow municipal bodies to issue Tax Free Municipal Bonds. The first launch of tax-free municipal bonds was made by the Ahmedabad Municipal Corporation in 2002, for Rs. 500 million.
- (f) During 1998 to 2005, in all 26 Municipal Bond issues of Rs. 1590 crores were structured but two issues (Kolkata and Chennai) did not take place. Through 24 issues Rs. 1445 crores were raised. Out of

this 18 issues were by municipal bodies, 4 issues were by city level water and sewerage boards and 2 issues were of pooled finance nature done by Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) and Tamil Nadu Urban Development Fund (TNUDF) for multiple smaller municipal bodies.

- With introduction of Municipal Bond System, Credit Rating of municipal bodies become necessary. USAID and FIRE-D project helped in getting municipal rating system developed in India. India's first municipal credit rating was in February 1996, when Ahmedabad received a municipal credit rating, conducted by CRISIL.
- Introduction of Pooled Finance Development Fund (PFDF) was created by the Government of India at the same time as the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) (in 2006) with a corpus of Rs. 400 crore. It required setting up of a 'State Pooled Finance Entity' in every state. Andhra Pradesh, Assam, Karnataka, Kerala, Nagaland, Orissa, Rajasthan and Tamil Nadu have created such entities.
 - (a) Tamil Nadu Water and Sanitation Fund has during 2002 to 2013 raised a sum of over Rs. 222 crores by issuing bonds under the pooled bond framework.
 - (b) Karnataka Water and Sanitation Pooled Fund (KWSPF) has raised Rs. 100 crores in 2005 for the Greater Bangalore Water Supply and Sewerage Project.
- The most important development came through in the end part of this period when in year 2002 GoI put in place two incentive linked reform funding schemes – City Challenge Fund and Urban Reform Incentive Fund.
- City Challenge Fund –Urban Reform Incentive Fund was started (28th June 2003) as an Additional Central Assistance (ACA) with an outlay of Rs. 500 crores per annum during the 10th FYP to provide reform linked assistance to States, so as to incentivise and accelerate the process of seven urban reforms identified by Government of India. The allocation of each state was worked out on the basis of state's urban population to total urban population. It was provided to the States on 100% grant basis and on the basis of completion of reforms.
- Putting in place policy and operational guidelines regarding Public Private Partnerships (PPPs) for augmenting and delivering municipal services.

2005 to 2014 – Era of Unsustainable Funds Flow to Incapable, Non-empowered, Non-accountable Municipal Bodies

This period begins with the announcement of seven years (2005-12) Rs. 66000 crore outlay Additional Central Assistance Scheme called Jawaharlal Nehru National Urban Mission (JNNURM) and commencement of Twelfth Finance Commission award period.

Table 2: Reform area and proposed weightage

<i>Reform area</i>	<i>Proposed weightage (% of State's share of URIF)</i>
Repeal of the Urban Land Ceiling and Regulation Act	10
Rationalisation of stamp duty	20
Reform of rent control laws	20
Introduction of computerized processes of registration	10
Reform of property tax	10
Levy of reasonable user charges	20
Introduction of double entry system of accounting in ULBs	10

This is also the period in which due to efforts of Twelfth, Thirteen and Fourteen Finance Commissions to collect data about finances of municipal bodies, comprehensive national picture about municipal finances and its share in national finance become available. On the basis of comprehensive data collected and analysed, the CFC worked out strategies for its recommendations about devolution of central funds to municipal bodies. Thus, the Thirteen and Fourteen Finance Commissions increased devolutions to the municipal bodies substantially (see Table 3).

Table 3: Amount proposed by Central Finance Commission for devolution to municipal bodies from Government of India

<i>Central Finance Commission</i>	<i>Period</i>	<i>Amount (Rs. in crore) provided for devolution</i>	<i>Details/Conditionalities</i>
12 th	2005-2010	5000	Grants to be utilized to improve service delivery in respect of water supply and sanitation schemes subject to their recovering at least 50 per cent of the recurring cost in the form of user charges.
13 th	2010-2015	23108	Collected Data of All ULBs
14 th	2015-2020	87144	Collected Data of All ULBs

Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

JNNURM which hailed as a recognition of the phenomenon called “urbanization” was launched in December 2005 with Rs. 66,000 crores seven-year terms officially ended in March 2014 with two years extension but even today some of the works sanctioned under this are getting completed.

The JNNURM comprised two sub-missions: (i) Urban Infrastructure and Governance (UIG) and (ii) Basic Services for the Urban Poor (BSUP) focused on the 65 mission cities selected by the GoI on the basis of their size of population, economic, political, strategic, cultural and religious importance.

The mission also has two sub-schemes: Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) and Integrated Housing and Slum Development Programme (IHSDP) to cover all the other urban centres under which around 650 towns participated and got funding under JNNURM. For these sub-schemes, the states are empowered to prioritize urban cities on the basis of existing infrastructure, population size and on being inclusive of the socially and economically disadvantaged groups.

Under the JNNURM, cities (ULBs) were provided grants at the rate of 50% to 90% of the project cost from GoI and matching grant at the rate of 10 to 20% by the State Governments depending upon the size of population and other criteria. Thus, cities (municipal bodies) were required to put in their own matching share at the rate of 10 to 50% of the project cost. The release of grant was linked to physical progress and reforms implementation progress. The State Governments and ULBs were required to pursue in all 23 reforms: six reforms specifically by the ULBs, seven reforms by the State and 10 reforms concurrently by the State and ULBs.

By the end of the Mission (March 2012), against a total project cost approved of Rs. 1056.46 bn covering a total of 2712 projects under four components of JNNURM, the funds released by GoI amounted to Rs. 258.51, or only 39.2% and finally the actual amount by ULBs spent stood at Rs. 257.09 accounting to only 52% of the total funds approved (Refer Table 4). In physical terms by March 2012, only 10% or less of the projects were completed. Although, some reform progress at the state and ULB level was observed, most of the reforms are incomplete even in February 2017.

After March 2013 progress data of JNNURM has not been shared publicly, while actual amount spent data was stopped sharing much before. What is known now is by end of March 2014, when Mission ended, the GoI had released almost entire amount of Rs. 66,000 crore it had promised under JNNURM and total projects approved under JNNURM were of more than Rs. 1,20,000 crores. Hoping that entire amount of JNNURM got spent by March 2015, then it can be assumed that during the period 2005-06 to 2014-2015 urban infrastructure development projects of Rs. 1,20,000 took place.

Three Major Shortcomings of the JNNURM

The first and foremost major shortcoming was that JNNURM financed cities in unsustainable ways or in other words though not intentionally but JNNURM accentuated financial unsustainability of the recipient ULBs. This happened because of its structure of providing 80 to 90% of project cost without hard budgetary constraints. Lack of hard budgetary constraints and failure to make completion of grant conditions (resource mobilisation reforms, leveraging

Table 4: JNNURM Progress as of March 2013

<i>Progress as on March 2013</i>	<i>Sub Mission for Urban Infrastructure and Governance</i>	<i>Urban Infrastructure Development for Small and Medium Towns</i>	<i>Sub Mission for Basic Services to the Urban Poor</i>	<i>Integrated Housing and Slum Development Program</i>	<i>Total</i>
Total Allocation Envisaged	Rs. 315.00 bn	Rs. 114.00 bn	Rs. 163.56 bn	Rs. 68.28 bn	Rs. 660.00 bn
Cost of Projects approved	Rs. 625.51 bn	Rs. 141.21 bn	Rs. 297.70 bn	Rs. 119.36 bn	Rs. 1183.78 bn
ACA committed	Rs. 285.23 bn 90.55%	Rs. 113.19 bn 99.29%	Rs. 147.00 bn 90.0%	Rs. 76.45 bn 112.0%	Rs. 621.87 bn 94.2%
Funds released	Rs. 187.04 bn 59.38%	Rs. 94.65 bn 83.0%	Rs. 97.09 bn 59.0%	Rs. 57.05 bn 74.6%	Rs. 435.83 bn 66.03%
Funds spent	Not Available	Not Available	Not Available	Not Available	
Numbers of Projects approved	553 Projects	807 Projects	525 Projects	1083 Projects	2,968 Projects
States/UTs covered	30 States/UTs	30 States/UTs	30 States/UTs		
Cities/Towns covered	62 Cities	640 Towns	62 cities		
Total Funds Released	Rs. 432.00 bn 69.0 %	Rs. 115.23 bn 81.6 %	Rs. 183.45 bn 61.6 %	Rs. 82.21 bn 68.9 %	Rs. 812.89 bn 68.7 %

Source: Author's compilations

funds through PPP and borrowing) upfront resulted in no implementation of various fiscal reforms by ULBs, especially the property tax and user charge reforms to mobilise existing resources or efforts to raise new tax resources. As a result own revenue of ULBs did not improve but on the other hand Operations and Maintenance cost increased due to additional infrastructure created under JNNURM, which finally resulted in impoverished fiscal health of the ULBs and unsustainable financing of the cities.

Second major shortcoming was long drawn implementation and slow physical progress of the projects resulting in time and cost overruns. As Mission did not provide for cost escalation, ULBs were required to bear cost overruns and as most of the ULBs lacked financial capacity to shoulder cost overruns, projects got further delayed, curtailed and ultimately it were the State governments, in most of the cases, who were required to fund them.

The third major drawback was that even after spending Rs. 1,20,000 crores in 10-year period there was not much improvement in the availability and quality of urban infrastructure services to the people.

Other Shortcomings of the JNNURM

Not much success in the fund leveraging through PPP. As a matter of fact, by the end of 2012 around 70 projects of Rs. 7,823 crores (14% in terms of numbers and project outlay) have had the PPP structure (Planning Commission, 2011). These were earlier estimates; by end of the scheme many of these PPP projects failed for one or the other reason and actual fund leveraging through PPP was less than 5%.

Although temporary and adhoc increase in grants to ULBs by the State Governments was observed, subsequently it did not result in an increase in the formulae based devolution on a permanent basis (JNNURM Primers, 2005).

No improvement was seen in the creditworthiness of ULBs. As per the assessment carried by GoI in mid 2008, from the 63 JNNURM cities, not a single ULB had an 'AAA' rating. 10 cities acquired 'AA' rating, while another 10 cities had 'A' credit rating. The remaining 43 ULBs received credit rating of 'BBB' and below.

With huge (53% out of overall sanctioned investment of JNNURM coming from GoI and another 25 to 30% coming from State Governments) no cost (free) funds becoming available under JNNURM, the success story of Municipal Bond of the earlier 1993-2005 period decelerated completely. Since announcement of JNNURM in December 2005 in all only four Municipal Bond issues raising paltry Rs. 221 crores have taken place and since 2013, not a single bond issue has taken place. Out of these four bond issues only one was issued by Vishakhapatnam Municipal Corporation in 2007, while rest three bond issues were issued by TNUDF for smaller municipal bodies. 'This rightly sparked concerns regarding the 'crowding out' of commercial funds by government money, as evidenced by lower levels of municipal bond issuances after the advent of the JNNURM. Programmes such as JNNURM or the newly

proposed 100 Smart Cities Mission (SCM) needs to explicitly require that grant funds be leveraged with debt from the capital markets, thus ensuring that scarce government resources are spread across many more critical public projects than would be possible if each project were to be financed completely or substantially using these grants' (Sahasranaman and Prasad, 2014).

It is not only the availability of JNNURM and other grant funds, which killed the willingness to borrow, but lack of capacity of municipal bodies to raise adequate internal resources (as enumerated in the next section) is also responsible for non-borrowing. This is because external sources, whether in the form of bank loans, bonds or other capital market instruments, will be available to municipalities only on the basis of the internal revenues they generate now and are expected to generate in the future. Any debt is just an upfront source of funds which is predicated on predictable, regular repayments from revenue that the municipality is reasonably expected to generate in the future and, therefore, cannot be thought of as an additional source of funding. Debt therefore provides for maturity transformation, enabling longer term planning by cities. A municipality will need to demonstrate that it is capable of generating this stable stock of funds on an on-going basis before it can expect to attract external debt. Therefore, the internal sources of funding of a municipality need to be in healthier order prior to contemplating leverage by external, commercial debt (Sahasranaman and Prasad, 2014).

It can be noted from these timelines that even after 74th CAA, municipal bodies did not receive new tax or non-tax resources or fiscal autonomy i.e. powers to set tax rates and or change the bases of collection without the explicit approval of state governments. Lack of the financial autonomy of local governments is evident from the fact that state governments have abolished important sources of own revenue for municipalities without providing adequate substitute sources of revenue; for example in recent years abolition of octroi from municipal corporations by Gujarat and Maharashtra Government. Similarly Rajasthan and Haryana abolished the property tax without consulting urban local governments, or when Punjab, again with no consultation, raised the threshold for the property tax so high that almost two-thirds of the properties were exempt from taxation or introduction of the Local Body Tax (LBT) by Maharashtra Government in lieu of Octroi and then again abolition of newly introduced tax.

Similarly for sustainable delivery of a basic minimum quality of a service, it is essential to charge user levies that cover for the on-going Operating & Maintenance (O&M) costs. Despite the fact that this has received considerable focus under the JNNURM, less than 10 cities have achieved full cost recovery for water supply and sewerage services, while less than five cities have achieved full cost recovery in solid waste services. It is pertinent to add here that, in most cases, cities have to get the approval of state governments for levying user charges and this hampers their ability to set user fee rates that they consider appropriate.

Has India Financed its Cities Sustainably in the Past?

The nation-wide data about financing of cities by municipal bodies, which is available from the studies conducted by National Institute of Public Finance and Policy (NIPFP) for Twelfth, Thirteenth and Fourteenth Finance Commissions clearly shows that cities have been financed in an unsustainable way, but what is really worrying is that the financing of cities, which was looking to go on in a sustainable manner during 1997 to 2002, became progressively more and more unsustainable in recent years as enumerated below.

It can be observed from Table 5 that during the period 1997 to 2002, the size of the municipal sector has registered a marginal expansion, both in terms of its share in the total publicly-raised revenues and combined Gross State Domestic Product (GSDP). Municipal share in the total revenues of the three tiers of government has risen from 2.84% in 1997-98 to 3.07% in 2001-02, while relative to GSDP, its share has increased from 0.61% to 0.63% during the same period. Municipal own revenues (nominal terms) have risen at an annual average growth rate of 10.32%. The same conclusion emerges with a simple look at the aggregated expenditure levels of municipalities. As a proportion of the combined GSDP, municipal expenditures have risen gradually from 0.74% in 1997-98 to 0.75%, 0.77% and 0.75% respectively in the successive years.

Table 5: Revenue significance of municipalities

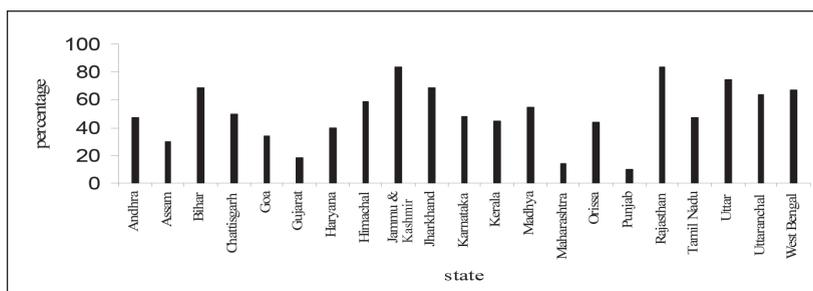
Year	Municipalities own revenue (Rs. crore)	Per cent of GDP	Relative shares of own revenues (%)		
			Municipalities	State governments	Central governments
1997/98	8,434.9	0.61	2.84	33.4	63.8
1998/99	9,451.7	0.59	2.97	34.3	62.7
1999/00	10,372.7	0.59	2.80	34.4	62.8
2000/01	12,018.4	0.63	2.98	35.1	61.9
2001/02	12,748.1	-	3.07	39.5	57.5

Note: Figure for municipal own revenues are adjusted to reflect the revenues for all statutory towns and cities.

Source: Author's compilations

In the case of ULBs, the transfers and devolutions from states amounted to 35.18%, all states taken together, in 2001-02. The dependence of ULBs was as high as 83.71% in Jammu and Kashmir, 83.33% in Rajasthan, and 74.48% in Uttar Pradesh. However, dependence was as low as 10.23% in Punjab, 13.82% in Maharashtra, and 17.81% in Gujarat (see Graph 1).

The Mathur and Thakur's (2004) study for NIPFP revealed that the services provided by ULBs do not reach the desired standards of the 1960s. The gap exists with both whether core services or all services are considered.



Graph 1: Transfers as a percentage of total revenue receipts, 2001-02.

Source: Mathur and Thakur, 2004.

In Maharashtra, the state in the best municipal financial position, the gap is 60%, in Gujarat, Tamil Nadu and Haryana the gap is about 70%, and in Andhra Pradesh, Kerala and Karnataka, the study found gap of about 90% (elsewhere it is 95%).

There have been some attempts to assess the adequacy of municipal finances to provide services conforming to norms. The same NIPFP study also concluded that the municipal revenues and expenditures are grossly insufficient for maintaining services at minimum levels. Compared with the Zakaria Committee norms, the current level of municipal expenditure, placed at Rs. 577 per capita in 2001-02, is about 130% lower; underspending of this magnitude is one of the key manifestations of the low level of services in India's cities and towns. The Zakaria Committee norms are related to water supply, sewerage and sewage disposal and storm water drainage, roads and footpaths and other services, but excludes garbage collection which is a major local government expenditure².

Comparisons of actual expenditures on a particular service with the financial norm for that service can give an idea on the extent of under-spending. Taking Zakaria Committee norms, which was determined in the 1960s, a study for the period 1999-2000 to 2003-04 shows that in 30 municipal corporations in India, on an average, actual spending is only about 24% of the requirements, or the extent of under-spending is as high as 76% (Mohanty et al., 2007). Another study on the urban local bodies of Jharkhand (Bandyopadhyay, 2013) estimates that the actual revenue expenditures can cover only 41% of the revenue expenditures requirements and actual capital expenditures can cover 3% of the capital expenditure requirements on urban services.

² The Zakaria Committee average annual norms for maintaining municipal services at 2001/02 prices are Rs.194.69 for water supply; Rs.218.8 for sewerage; Rs.37.63 for roads; and Rs.52.79 for street lighting. In comparison with the current levels of municipal expenditures, adjustments have been made to account for expenditure on establishment and such services as garbage disposal, which are otherwise not accounted for in the Zakaria Committee recommendations.

Bandyopadhyay (2013) shows that comparing the services in a particular size class of city with the norms suggested by HPEC Report (2011), in the smaller cities in Karnataka, it is water supply which has the minimum shortfall from norms, in the medium sized cities it is road density which is closest to the norms and in the largest city size class it is the solid waste management which performs the best with zero shortfall from norms. On an average for all the services there is a shortage of 57% of the O&M expenditure norms, the shortage being the highest (64%) in the biggest size class of cities.

It can be observed from Table 6 that in 2007-08, own source revenue of municipal bodies as percentage of GDP declined from 0.59 to 0.53% during 2002-07. Similarly Municipal tax to GDP ratio also declined from 0.39 to 0.35%. In absolute figures, total municipal revenue income amounted to Rs. 44,429 crores against a total municipal expenditure of Rs. 47,026 crores, which in per capita terms, stood at Rs. 1,430 and Rs. 1,513 respectively. Own revenues in 2007-07 constituted 53% of the total revenue whereas it was 63.5% in 2002-03 (Planning Commission, 2011). This decline in own revenue by 10.5 percent highlights the fact that despite several initiatives enumerated earlier, municipal bodies in India become less self-reliant during 2002-07.

Revenue expenditure constituted 60.5% of the total expenditure in 2007-08, declining by 12 percentage points as compared to 2002-03 when it was 72.5%. This was mostly on account of increased capital expenditure available under various schemes from Central and State Governments. Between 2002-03 and 2007-08, capital expenditure grew at a Compound Annual Growth Rate (CAGR) of 25.64% as against CAGR of 12.62% for revenue expenditure. In terms of service delivery, in 2007-08 municipal governments in India spent Rs. 18,594 crores (0.43% of GDP) on creating new infrastructural assets and Rs. 28,431 crore (0.66% of GDP) for infrastructure maintenance, establishment charges and salaries.

The decline in self-reliance of ULBs has continued during 2007–2012 period also. It can be observed from Table 7 that municipal own source revenue as percentage of GDP declined from 0.60 in 2007 to 0.48 in 2012³. Municipal Own revenues amounted 55.7% of total revenue in 2007; this share declined to 51.6% in 2012, thus during the period 2002-2012 municipal self-reliance has come down by 12% (from 63.5% to 51.6 %). It can further be observed that the total municipal revenue as percentage of GDP declined from 1.08% in 2007 to 1.03% in 2012, which indicates, that in spite of increased devolution from Central and State Governments, growth in total municipal revenue has not kept pace with growth in GDP.

The above averages are only a peek into the municipal finance situation in India and do not convey the gravity of the situation in many municipal bodies,

³ The data for the year 2007-08 of Tables 2 and 3 does not match exactly as it was collected during the different times but still both tables together establish decline trend emphatically.

Table 6: Municipal finances in India (All States 2002-2007)

Finances	2002-03		2007-08		CAGR%
	Amount Rs. Crore	Per Capita Rs	Amount Rs. Crore	Per Capita Rs	
<i>Revenue Income</i>					
Own tax revenue	8,838.13	311	15,277.72	492	11.57
Own non-tax revenue	4,441.84	156	8,243.66	265	13.16
Total own revenue	13,279.97	466	23,521.38	757	12.11
Assignment and devolution	3,657.06	128	9,171.11	295	20.19
Grants-in-aid	2,259.76	79	5,676.25	183	20.23
Others	1,137.52	40	2,818.32	91	19.90
Transfers from the Central Government	308.86	11	2,372.97	76	50.35
Finance Commission Transfers	276.53	10	869.02	28	25.74
<i>Total Revenue Income</i>	20,919.69	733	44,429.05	1430	16.26
<i>Expenditure</i>					
Revenue expenditure	15,691.46	550	28,431.45	915	12.62
Capital expenditure	5,938.28	208	18,594.08	598	25.64
Total expenditure	21,629.74	758	47,025.53	1,513	16.80
<i>Gross Domestic Product (GDP) (India)</i>	22,61,415	21,415	43,20,892	37,969	13.83
Own tax as % of GDP	0.39		0.35		
Own revenue as a% of GDP	0.59		0.54		
Municipal expenditure as % of GDP	0.96		1.09		

Source: NIPFP, 2013.

which are virtually reduced to becoming state government departments, since even the salaries are paid by state governments.

The share of municipal revenues in combined state and central revenues have declined from 3.71% in 1990-91 to 2.43% in 2000-01 (Mohanty et al., 2007). It can be observed from the Tables 8, 9 and 10 that share of municipal tax revenue in total publically raised tax revenue has declined over the

Table 7: State of the finances of municipalities (All States, 2007–12)

<i>Structures</i>	<i>Year 2007–08</i>		<i>Year 2012–13</i>	
	<i>Own Sources</i>		<i>INR (Crore)</i>	<i>Per cent</i>
	<i>INR (Crore)</i>	<i>Per cent</i>		
Tax revenue	18,366	37.2	30,912	32
Non-tax revenue	9,134	18.5	19,002	19.7
<i>Sub total</i>	27,501	55.7	49,913	51.6
	<i>Transfers</i>			
Government of India	3,515	7.1	5,387	5.6
Finance Commission	986	2	3,760	3.9
State devolution and assignments	9,342	18	18,537	19.2
State grant-in-aid	6,653	13.5	14,809	15.3
Others	1,355	2.7	4,232	4.4
<i>Sub total</i>	21,851	44.3	46,727	48.4
	49,352	100.0	96640	100.0
Size of GDP		4569630		9382525
Own source revenue as per cent of GDP		0.60		0.48
Total municipal revenue as per cent of GDP		1.08		1.03

Source: Studies commissioned by the Fourteenth Finance Commission

Table 8: Year-wise revenue share of different tiers of government

<i>Tiers of government</i>	<i>1997-1998</i>	<i>1998-1999</i>	<i>1999-2000</i>	<i>2000-2001</i>
Central government	63.84	62.78	62.90	62.01
State government	33.42	34.35	34.44	35.17
Municipalities	2.74	2.87	2.66	2.82

Table 9: Revenue share of different tiers of government including Panchayats

<i>Year</i>	<i>Centre</i>	<i>State</i>	<i>Municipalities</i>	<i>Panchayats</i>
2002-03	44.1	53.2	2.5	0.2
2007-08	50.0	48.1	1.7	0.2

Sources: Indian Public Finance Statistics, Government of India and 13th Finance Commission.

Table 10: Tax revenues of the Centre, States and municipalities

Year	Centre (Rs. in crore)	Centre's Share in Total Publicly- raised Resources (in per cent)	States (Rs. in crore)	States' Share in Total Publicly- raised Resources (in per cent)	Municipal Bodies (Rs. in crore)	Municipal Share in Total Publicly- raised Resources (in per cent)
2012/13	741,877	42.46	974,239	55.77	30,912	1.77
Municipal tax revenue as a percentage of Centre	4.2 per cent		3.2 per cent		-	-
2007/08	439,547	49.45	430,782	48.48	18,366	2.07
Municipal tax revenue as a percentage of States	4.2 per cent		4.3 per cent		-	-

Source: India Public Finance Statistics, Ministry of Finance 2009–10, and data collected by the 14th Finance Commission.

years clearly indicating inadequate efforts to mobilise tax revenue by the municipal bodies.

The Report of High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services stood at Rs. 3.92 million crores – as the investment needs to provide urban services conforming to national benchmarks for urban infrastructure over a period 2012-31. The operations and maintenance costs would amount to another Rs. 2 million crores (HPEC, 2011). Thus, per annum India need to spend Rs. 0.3 million crores (or Rs. 3 lakh crores); against this in the year 2012-13, India managed to spend Rs. 96,640 crores, which is one third of what is required. The unsustainable financing of Indian cities during 2002-12 discussed above can be summarised as follows:

- Municipal tax revenue to GDP ratio declined from 0.39 to 0.32%
- Municipal non-tax revenue to GDP ratio declined from 0.20 to 19.8
- Municipal total revenue to GDP ratio which had increased slightly from 61 to 63% during 1997-2001 declined during 2002-12 as Central and State Governments started devolving more and more project based funds from 63.5 to 51.6%.
- In other words funding of cities through national and regional sources increased to 49 per cent from 37% during 2002-2012.
- An approach of funding cities through grants and programmes like the JNNURM instead of funding them through local/municipal taxes and user charges, which Central and State adopted since 2005, is unsustainable as it exerts considerable fiscal burden on upper tiers of governments and results in to large scale negative spill over effect or ‘cost exportation’. Considering the scale of investment that is required and the fiscal situation of both the central and state governments, this overwhelming fiscal dependence that local governments have developed on state and central governments is unsustainable.

Is India Currently Financing its Cities in a Sustainable Way?

In May 2014 current National Democratic Alliance Government came to power at national level and in many States across the country. New national Government has put in place several schemes for financing urban infrastructure development as follows:

- **Smart Cities Mission (SCM)** with outlay of Rs. 48,000 crores over five years, announced on 25th June, 2015 will cover 100 cities selected and nominated by the State Governments. Under SCM each smart city will get funding of Rs. 100 crore per annum (maximum Rs. 500 crore in five years) and equal amount will have to put in by the State and the city together (Rs. 50 crores by the State and ULB, in all Rs. 250 crores by State

and ULB in five years). These 100 cities and their respective States will have to incorporate Special Purpose Vehicles (SPVs) and then implement smart city projects with private partner under PPP models. The names of 98 cities⁴ selected were announced on 27th August 2015. These 98 cities submitted their SCPs by the end of January 2016 and the first batch of 20 cities got selected at the end of first round under the Mission. Another 13 cities were selected in April 2016 under fast track round and 27 cities were selected under second round. Thus, till date Smart City Projects (SCPs) of 60 cities have been approved. By March 2017, SCPs of remaining 40 cities will get approved. Many of the 60 cities have constituted SPV and are in the process of appointing people and Project Management Consultants; however by end of January 2017, no real development expenditure has taken place under SCM.

SCM is being promoted heavily as a great way forward and that very soon India will have world class smart cities but ground reality is precious time of 26 months has been lost – first 13 months (May 14 to June 15) to formulate the scheme and another 13 months (June 15 to September 16) to select 60 cities under the scheme. On the ground, with exception of one or two ULBs, no development work had started by end of January 2017.

- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** with outlay of Rs. 50,000 crores over five years for all the Cities in India having more than 1,00,000 population (Class-I), to create infrastructure to provide basic services to households and to build amenities. Allocation of funds to the States on basis of total population and number of Statutory Towns. The State contribution has to be minimum of 20% or more, thus State will have to put in minimum Rs. 10,000 crore as matching contribution. Cities having population less than 1 million will get AMRUT funds at the rate of one half (1/2) of the project cost, while cities with more than 1 million population will get funds at the rate of one third (1/3) of the project cost. Each city has to prepare Service Level Improvement Plan (SLIP) and based on these plans State to prepare State Annual Action Plan (SAAP), which will be sanctioned by GoI and funding will be provided on the basis of SAAP. This mission mandates a set of 11 reforms to be completed in five years. 10% funds (Rs. 5000 crores) set aside as incentive funds, which will be given to States on the basis of each year's reform achievement. For appraisal and approval of individual projects State is empowered.

As observed in JNNURM and in SCM, most of the States have put in their share (matching contribution) at the rate of full 50% as their ULBs do not have funds to put in their share. Therefore, under this scheme as well most

⁴ Initially Jammu and Kashmir and Uttar Pradesh failed to nominate even one city from the quota allotted to them, which they later on nominated; beside that additional seven cities were included in the list at the request of the State by GOI, so now smart cities list stands at 107.

of the ULBs will be getting funds on a 100% basis making them dependent on higher levels of government.

- **Prime Minister Awas Yojana (Urban Housing for all)** launched on 25th June, 2015 to cover all 4041 statutory towns and beneficiaries belonging to Economically Weaker Section (EWS) (a family with annual income up to Rs. 3 lakh) and Low Income Group (LIG) (a family with annual income from Rs. 3-6 lakh) categories to overcome estimated shortage of 20 million housing units. States/UTs may decide a cut-off date for eligibility of beneficiary needs to be resident of that urban area. State to prepare city-wise and in case of bigger cities sub-city wise ward/zone 'Housing for All' Plan of Action (HFAPoA). Mission has four components, beneficiary can take advantage under one component only:
 - (a) "In situ" rehabilitation of existing slum dwellers using land as a resource through private participation, GoI grant at Rs. 1,00,000 per house;
 - (b) Credit Linked Subsidy (CLS) for new house or incremental housing – Upfront subsidy @ 6.5% for EWS and LIG for loans up to Rs. 6 lakh, calculated at NPV basis;
 - (c) Affordable Housing in Partnership – Central Assistance of Rs. 1.5 lakh per EWS house in projects where 35% houses for EWS category;
 - (d) Subsidy for beneficiary-led individual house construction or enhancement - For individuals of EWS category for new house or enhancement; cities to prepare a separate integrated project for such beneficiaries; Central assistance of Rs.1.5 lakh per beneficiary.
- **Swachh Bharat Mission (SBM)** launched in 2014 with the total outlay of Rs. 62,009 crores to achieve scientific disposal of solid waste in all 4041 urban bodies by constructing household toilets for 1.04 crore urban households, 2.56 lakh public toilets, and 2.52 lakh community toilet seats. The sharing of cost will be in the manner as shown in Table 11.

Table 11: Sharing of cost under SBM

<i>Component</i>	<i>Central share</i>	<i>Minimum State contribution</i>
Household toilets	Rs 4,000/- per unit	Rs 1,333/- per unit
Community toilets	Rs 26,000/- per seat	Rs 8,666/- per seat
Solid waste management	Rs 240/- per capita	Rs 80/- per capita

Source: Author's compilations

- **National Heritage City Development and Augmentation Yojana (HRIDAY)** scheme with outlay of Rs. 500 crores over four years (Completing in November, 2018) was launched on 21st January, 2015, with a focus on holistic development of heritage cities. The scheme aims to preserve and revitalise soul of the heritage city to reflect the city's unique character by encouraging aesthetically appealing, accessible, informative

Table 12: Summarised resource plan for funding 60 smart cities plan

<i>Particulars</i>	<i>% share</i>	<i>ULBs</i>	<i>Amount</i>
GoI and State Government Assistance under SCM	36.70	60 ULBs	54354
Convergence with GoI and State Govt. Schemes	18.70	58 ULBs	27582
GOI and State Contribution Sub-total	55.40		81936
ULBs contribution as mandated under SCM	2.05	15 ULBs	2924
Additional contribution by ULBs from their funds	2.10	17 ULBs	3297
From surplus of Special Purpose Vehicle created	2.05	16 ULBs	2989
ULBs contribution Sub-total	6.20		9200
Land Monetisation	10.85	06 ULBs	16091
Sale of additional FSI/FAR	1.20	02 ULBs	1766
Land based revenue sub-total	12.05		17857
Public Private Partnership	21.50	52 ULBs	31858
Corporate Social Responsibility Funds	0.40	08 ULBs	597
Beneficiaries Contribution	0.50	07 ULBs	757
Others (community share, Donor Agencies)	0.30	04 ULBs	489
Funds from market and people Sub-total	22.70		33701
Loans and borrowings	3.75	17 ULBs	5557
Total	100.00		148246

Source: Based on SCPs of 60 SCM cities by author.

and secured environment. The scheme is being implemented in 12 identified cities namely, Ajmer, Amaravati, Amritsar, Badami, Dwarka, Gaya, Kanchipuram, Mathura, Puri, Varanasi, Velankanni and Warangal.

With these schemes GoI has committed Additional Central Assistance (ACS) of more than Rs. 1,50,000 crores for the period of 2014-2019, which is almost triple of Rs. 30,000 crore on per annum basis compared to average amount of Rs. 10,000 crores or less during the period 2004 to 2014. Such a large flow of funds from Government of India, accompanied by matching contribution at the rate of at least 50% from State Governments to the municipal bodies, which is not matched and insisted by equal or appropriate revenue efforts by the municipal bodies, as it was observed in the past, is going to make financing of our cities more unsustainable. This is because, although JNNURM failed to make our cities financially sustainable, few other reforms linked incentive funding scheme and some resource mobilisation efforts by municipal bodies did take place. However, the new funding schemes especially SCM, will be funding cities without such conditionalities on municipal bodies. Out of all these schemes of GoI and several other schemes of State Governments, only SCM is taken here as a case study to demonstrate the fact that – as in the past Indian Cities were financed in an unsustainable

way, at present as well they continued to be financed in unsustainable manner. The following section describes the total financial picture and trends emerging from the analysis of SCPs of 60 ULBs.

Smart Cities Scheme has two components – Area Based Development (ABD) and Pan City Development (PCD). 60 ULBs in all have submitted smart city cost proposals of Rs. 1,38,828 crores out of which Area Based Development proposals constituted Rs. 1,04,147 crores (75% share) and Pan City Development proposals constituted Rs. 26,877 crores (19.4% share) while Rs. 7,803 crore (5.6% share) are estimated for administrative and operating cost of Smart City Plan implementation.

Smart cities proposals comprising ABD, Pan City and other components ranged from Rs. 6,199 crores (Chandigarh) to Rs. 778 crores (Port Blair). Average of 60 proposals amounting to Rs. 2,314 crores were forwarded. 34 smart cities plans account for above Rs. 2,000 crore, while 14 cities plans outlays ranged within Rs. 1500 to 2000 crores, 10 cities SCPs ranged between Rs. 1,000 and 1,500 crores. Namachi–Sikkim has like Port Blair submitted SCP of less than Rs. 1,000 crore.

Against the total smart cities' cost proposals of Rs. 1,38,828, the winning 60 smart cities have submitted/developed resource plan of Rs. 1,48,246 crores. Various resources identified for funding smart cities proposals, which formed resource plans are listed in Table 12.

These 60 smart cities, as per guidelines, are expected to receive maximum grants of Rs. 45,000 crores (Rs. 30,000 crores from GoI and Rs. 15,000 crores from the State Governments). Against this, the smart cities' resource plans have amounted to Rs. 1,48,246 crores, thus smart cities have proposed or achieved convergence and leveraging of 3.3 times the funds allocation. The financial unsustainability of the Smart Cities Plans or the unsustainable ways of financing cities under SCM are as follows.

Absence of Concept of Financial Sustainability in SCM and its Guidelines

'Financial sustainability' has been mentioned only at one place in the smart city plan format but it is neither defined nor the financial sustainability indicators or parameters, which will be considered while analyzing the SCP of the city have been outlined in the guidelines or any other SCM documents. Similarly, it is not made clear whether financial sustainability of SCP will be examined or not. Financial sustainability has not been made a mandatory condition or prerequisites to receive funds.

ULBs have not been complied with submission of an Action Plan to achieve Financial Sustainability

The review of all 60 SCPs have clearly indicated that barring some exceptions, ULBs have not submitted any action-plan for resource improvement which could make the ULBs financially self-sustaining as was asked in the Smart

City Proposal. This fact can be noticed from SCPs and in reality all the SCPs have got approved without asking any further explanation or raising any doubt about the action-plan submitted for making the ULBs financially self-sustaining.

Smart City Proposal and its Cost disproportionate to ULBs Financial Standing

The first and foremost financial sustainability distortion or unsustainability is with regard to annual financial outlay or cost of the proposed SCP and annual average revenue or operating receipts of the ULBs – the variation is extreme. For example in case of Pune City, the annual cost of its smart city proposal implementation is just 0.20%⁵ of Pune city's average annual revenue, while in case of Dharmashala City annual cost of its smart city proposal implementation is whopping 77 times⁶ of average annual revenue of the Dharmashala City.

If annual cost of smart city plan implementation is compared to operating surplus (operating receipts – operating expenditure), then the picture looks very grim and absurd since around 40 cities out of 60 cities do not have operating surplus. In case of Dharmashala, if it is compared to annual operating surplus of Rs. 50 lacs, then SCP annual cost will be 926 times but in case of Pune average annual operating surplus is of Rs. 1,500 crores and annual SCP cost will be little higher about 0.50%.

The impact of disproportionate SCPs will be disastrous on already financially weak cities (which are almost 40 out of 100 cities) in both circumstances – successful or unsuccessful implementation of SCP. For example if in case of Dharmashala, its SCP gets successfully implemented then that city will have infrastructure of Rs. 2,310 crores; however, the local body will not be able to recover annual operation and maintenance cost of such a big investment from its 15,000 tax payers (direct beneficiaries), as it will be too high for them to bare and maintain. In the second unfortunate scenario, where SCP does not get implemented as per plan, a city will not have adequate and complete infrastructure or it may get infrastructure, which is less and much more costlier than what was envisaged.

Miniscule Resource Contribution of ULBs to Smart Cities' Plans

The second financial sustainability distortion or unsustainability of SCPs of ULBs is with regard to funding structure of SCM and ULBs lack of capacity to put in their designated share of resources as per SCM guidelines. The close analysis of resource plans submitted by 60 ULBs for funding their SCPs

⁵ Pune – SCP of Rs. 2960 crore = annual expenditure = Rs. 592 crore. Average annual operating revenue of Pune was Rs. 3000 crore = $\text{Rs. } 592/3000 = \text{SCP annual expenditure is just 0.20 per cent of its operating revenue.}$

⁶ Dharmashala – SCP of Rs. 2318 crore = annual expenditure = Rs. 463 crore. Annual average operating revenue of Dharmashala Rs. 6 crore = $\text{Rs. } 463/6 = \text{SCP 77 times larger than operating revenue.}$

shows that most of the ULBs have not fulfilled mandatory condition of putting 25% share that is Rs. 250 crores from their own funds for financing SCP. Only 10 (cities from Gujarat and Maharashtra) out of 60 cities have fulfilled this mandatory condition. As other ULBs lacked financial resources, their respective State Governments have shouldered responsibility of putting ULBs share by providing them additional and special grant. All 60 cities together will be contributing only 6.2% resources (Rs. 9,200 crores out of Rs. 1,48,246 crores resource planning for 60 SCPs), while 54% will come from higher level governments and 40% from private and land based sources.

Exclusionary or Non-Inclusive Scheme with Unsustainable Development Cost in terms of Per Capita and Per Sq. Km. Area

Smart cities challenge winner 60 cities constitute 18.7% of total urban population (70.5 million out of 377 million) of India in 2011. Out of this 70.5 million population, the direct beneficiaries residing in ABD areas are 6.16 million. In other words, just 8.74% of the population of these 60 cities or 0.02% population of total urban population is covered under ABD component and on such a small population, Rs. 1,04,000 crores will be spent under SCM. The average per capita cost of proposed ABD is around Rs. 1,69,072 ranging from minimum of Rs. 23,467 for Ludhiana City to Rs. 12,56,636 for Chandigarh City followed by New Town Kolkata with proposed Per Capita Development cost of Rs. 9,86,945.

There are not many benchmarks available about ideal per capita urban infrastructure development cost. The recent and the only benchmark available is of HPEC. The HPEC benchmark of per capita urban services development cost of Rs. 43,386 is for the year 2009-10, and therefore it is converted to current 2016 prices, which stands at Rs. 54,110⁷. In the HPEC benchmark, however, there is absence of various other non-municipal urban services like electricity, use of renewable sources of energy, education, health etc. which SCPs have included in their ABD proposals. If we calibrate HPEC figure on these two counts, it will be around Rs. 70,000, but the average per capita cost of Rs. 1,69,072 is double than the HPEC norms at current prices and 50 out of

⁷ Indexation of HPEC per capita Municipal Services Development Cost

<i>Year</i>	<i>WPI</i>	<i>HPEC Per Capita Rs.</i>
2009-10	123	43386.00
2010-11	130	45855.12
2011-12	139.5	49206.07
2012-13	147.1	51886.83
2013-14	151.5	53438.85
2014-15	155.1	54708.69
2015-16	153.4	54109.04

60 cities have proposed per capita development cost more than that of revised HPEC norms of Rs. 70,000.

On an average per capita per annum amount spent by municipal bodies is Rs. 2000 to Rs. 2500. Some exceptional municipal bodies like Pune and Mumbai spent around Rs. 5000 per capita per annum. SCPs project spend Rs. 30,000 or more per annum per capita; this clearly indicates how unsustainable and unrealistic expenditure would be under SCM.

The aggregate municipal area of 60 cities is 9104 sq. km. and these cities together have proposed ABD of 285 sq. km., that is just 3.31% area of the cities have been proposed for smart development at the cost of Rs. 1,04,147 crores under Area Based Development component of smart cities scheme. This translates in to average per sq. km. ABD cost of Rs. 366 crores and about 28 cities out of 60 cities have per sq. km. cost above the average per sq. km. cost of Rs. 366 crores.

With regard to per sq. km. urban development cost, no such official benchmark is available, but some studies indicate that cost per sq. km. ranging from Rs. 80 to 100 crores on the basis of green field development at the assumed density of 100 people per hectare is recommended. If we use Rs. 70,000 per capita norm discussed earlier, per hectare cost at density of 100 people per hectare would be Rs. 7,00,000 and per sq. km. urban development cost would be Rs. 70 crores. Compared to green field development, retrofitting or brown field development should cost less but in actual field it may cost more than the green field development cost. Therefore, against the Rs. 70 to Rs. 100 crores green field urban development cost even if we take Rs. 100 to 120 crores as per sq. km. cost even then the average cost of Rs. 366 crores per sq. km. is almost three times. At benchmark of Rs. 120 crores per sq. km. urban development cost, for 59 out of 60 cities is above this range – making it unsustainable.

Forgetting such a low coverage (3.31% of area or 8.74% of population) the smart city programme, even if it is assumed an area development of 10% and 20% population coverage over five years, it will require 50 years to develop all the area of a city or it will require 25 years to cover entire population of the city under Smart Cities Mission. Similarly, even if we keep aside 4000 statutory towns and 3500 census towns, there are 500 cities having population of 1,00,000 people and above, which will require 25 years to get covered by the Smart Cities Mission.

Unreliability of the Various Resources Proposed and Resource Plan

Last but very important unsustainability aspect is with regard to feasibility of raising proposed funds through PPP models. 52 ULBs out of 60 have proposed to raise in all Rs. 31,858 crores through PPPs. Though India has many successful PPP projects at national and state level but there are not many successful examples at city level due to several factors – such as

lack of capacity among ULBs and among the private entrepreneurs, lack of appropriate revenue model, lack of appropriate sharing of risk, proximity to people, etc. The second doubtful resource is land monetisation, Rs.16,091 crores that is 10.85% resources have been estimated from this resource to fund SCPs.

India Needs to Build Sustainable Cities

The foregone discussion has clearly established the fact that, over the years, India has increasingly financed its cities in unsustainable manner and at present and in near future same financing strategies are continued. India has financed its cities in financially unsustainable manner or through unsustainable financing strategies means that:

- Higher level governments especially after 2002 have devolved more and more free funds (without hard budgetary constraints and financial cum performance accountability) to municipal bodies, which has resulted into greater dependence of municipal bodies on higher level governments, which has reached 55% in actual terms by 2012 and as a result of SCM and other schemes it will cross the level of 60% by 2019.
- Even after 25 years of 74th CAA, municipal bodies have not been given any additional functional and fiscal powers or new funding source or increased autonomy to explore existing sources of revenue.
- Municipal bodies have not been forced to optimise their revenue from whatever tax and non-tax resources they have.
- 13th Central Finance Commission had clearly indicated that municipal bodies have poor assessment rate of properties at 56% and poor collection efficiency at 37%, as a result less than 25% property tax gets collected compared to its potential.
- Similarly, User Charges for public services such as water supply, sewerage and garbage disposal are not being used. These are goods that have a private characteristic, in sense that, the benefits of these services can be said to be ‘private’ at the level of the household. Since, there are no public ‘spill-over’ effects to contend with, levying user charges on these services is eminently feasible. However, revenues generated from user charges are abysmally low in India, as evidenced by the statistic that non-tax revenues from all ULBs amounted to only 0.13% of the GDP.
- Municipal bodies have not been forced to adopt sustainable technologies or have not been forced to undertake governance, accounting, budgeting and other financial reforms to become operationally and financially efficient. Municipal bodies are highly cost inefficient in their expenditure and operations.

The failure to sustainably finance the cities that is, the failure to finance provision of basic levels of infrastructure and service delivery in our cities will

significantly hamper India's ability to achieve SDG-11 of 'Sustainable City', and further other SDGs by 2030. India therefore, needs to adopt following sustainable financing strategies to achieve SDGs by 2030.

Financing City to Maximum Possible Extent from Tax and Non-tax revenue Generated Locally Collected by Municipal Bodies

The first and foremost important financing strategy or important condition for achieving Sustainable Cities would be to finance development and maintenance of city to maximum possible extent (minimum 70% to maximum 80%) through the tax and non-tax revenue generated from the city itself.

HPEC Report (2011) also has suggested on similar lines as evident from following figures (refer Table 13). According to the HPEC report, there should be increased share of municipal own revenue from 33% in 2011 to 55% in 2021 and 68% in 2031.

Table 13: Financing of Urban Expenditure as % of GDP

<i>Year/ Period</i>	<i>Municipal own revenue</i>	<i>JNNURM/ improved JNNURM</i>	<i>State Govt. transfers</i>	<i>GOI transfers & JNNURM</i>	<i>Deficit</i>	<i>Total expenditure</i>
2011-12	0.50	0.10	0.55	0.13	0.21	1.59
2021-22	1.17	0.25	0.16	0.13	0.39	2.10
2031-32	1.47	0.25	0.16	0.13	0.15	2.16

Source: HPEC, 2011.

In order to make municipal bodies capable of funding expenditure of their respective cities up to 70% or more, HPEC recommended following financial reforms which can no doubt be termed as sustainable financing strategies for achieving SDG of 'Sustainable Cities':

Tax Reforms to Improve Tax Revenue of Municipal Bodies

- Introduce a 'Local Bodies Finance List' in the Constitution
- Empower ULBs with 'exclusive' taxes
- Constitutionally ensure sharing by the state governments of a pre-specified percentage of their revenues from all taxes on goods and services with ULBs
- Provide for formula-based transfers and grants-in-aid to ULBs from the divisible pool
- Replace octroi and entry taxes in all states
- Undertake reforms in property tax so as to levy tax on constructed building under an Area Based System and levy of vacant land tax on the basis of ready-reckoner capital value

Unlocking Land Value

- Tapping land-based financing sources including conversion charges, betterment charges, impact fees, and development charges
- Pricing of Floor Space Index (FSI) above a certain limit, within overall planning guidelines
- Preparing city-wide inventory of land assets
- Putting in place a transparent and accountable mechanism for monetisation of public land with due attention to the needs of the poor and the marginalised

Reforms to Strengthen Non-tax Revenues

- Municipal Service Regulator should be assigned the responsibility of revising user charges regularly. Even when different segments of the population are charged differently, the cross-subsidisation should be such that the overall O&M cost is recovered and a minimal surplus generated. Automatic indexation will ensure smooth increase over time without the challenge of having to defend cumulative adjustment every few years.
- User charges to be so structured as to meet O&M cost, debt servicing, and depreciation towards the cost of the project. In addition, they must also generate some surplus to enable building the equity base of ULBs, supported, where appropriate, with Viability Gap Funding (VGF)
- Levy water and sewerage charges separately rather than built into the property tax
- Introduce parking fee to enhance revenue streams and promote the use of public transport
- Collect trade licensing fee on the basis of a self-assessment return

Other Reforms

- State governments to set up state financial intermediaries to work with small ULBs
- Government of India to create a 'Regulatory Guidelines Handbook for Municipal Borrowings'
- ULBs to prepare 'Intended Use Plans', requiring them to prepare a borrowing programme based on their investment needs and repayment capacity
- Remove fixed cap of 8% on annual interest on municipal bonds to make the bonds attractive
- Housing and Urban Development Corporation Limited (HUDCO) to have a professional Board; to receive benefits available to infrastructure financing companies; and be regulated by the Reserve Bank of India (RBI).

Spending money on Development and Service Delivery of Urban Infrastructure judiciously and in cost efficient ways to achieve Sustainable Development

Present approach towards undertaking expenditure on development and

service delivery of urban infrastructure need to change. With free funds (funds without performance and financial accountability) becoming available from higher governments, the expenditure by municipal bodies is becoming more and more cost inefficient, exclusive (benefitting only small percentage of people) and of visual impact or cosmetic nature. The best testimony to this is expenditure which took place under JNNURM in recent past and the expenditure which is proposed by the 60 cities in their SCPs under SCM. The per capita average area based development cost of Rs. 1,69,000 against the benchmark cost of Rs. 70,000 per capita or per sq. km. area based development cost of Rs. 366 crore against benchmark cost of Rs. 80 to 100 crore per sq. km. is in all respect financially unsustainable and unaffordable. Municipal bodies should not be allowed to spend money at such rate even if they raise it local or from beneficiaries. Similarly the expenditure benefiting only 3.5 percent of area of the city and less than 10% of city population is by all means exclusive which should not be allowed. Worst is while approving SCPs such a costly, unsustainable and exclusive expenditure has not been questioned.

Besides making expenditure of municipal and other agencies cost efficient, judicious, inclusive etc. it must be for attaining 'Sustainable Development and Sustainable City'. Carbon footprint and climate change impact of each and every major expenditure should be assessed. Thus expenditure of municipal bodies and other agencies should not only ensure financial sustainability but must also for attaining economic, political and social sustainability.

Municipal bodies should be given full autonomy in fiscal and functional terms but at the same time they should be made fully accountable for spending their funds judiciously, responsibly, sustainably and in cost efficient ways. For this purpose appropriate independent regulators should be created.

Implementing Fiscal Responsibility and Budgetary Management (FRBM) Regime at Municipal level and Other Agencies dealing with urban infrastructure development and service delivery

Government of India, followed by State Governments have adopted Fiscal Responsibility and Budget Management (FRBM) concept, practices and necessary structure to ensure its implementation. It is necessary to adopt suitable FRBM practices and regulatory structure to ensure financial sustainability, cost effectiveness, inclusiveness etc. of expenditure undertaken by municipal bodies and other agencies and also of the resources generated by these agencies.

Facilitating and Developing PPP Mechanism for Urban Infrastructure Development and Service Delivery

Raising maximum possible funds locally by municipal bodies and funding support by higher level governments will not be sufficient to finance future urban infrastructure needs. It is necessary to supplement these efforts by

private sector funding, technical expertise, efficiency and capacity etc. But what HPEC observed in 2011 that ‘success stories in the urban infrastructure sectors such as water supply, sewerage, solid waste management, and urban transport are few and far between’, still holds good in 2017. JNNURN had envisaged sizeable leveraging from PPP but that did not happen. SCM has mandated creation of SPV and use of PPP mode for implementation of urban infrastructure projects and for urban service delivery, but just by creating SPV, PPPs are not going to happen. PPPs in urban infrastructure sector are different and need much higher level of facilitation, capacity building and innovating but prudential financial structures.

Adopting Comprehensive Municipal Finance Reforms Vision

Efforts to reform and improve municipal finances in the past have been piecemeal and as a part of project funding. There is need to adopt a comprehensive municipal finance reforms vision as presented in Figure 1, and an independent implementation programme (not part of a project funding) and it should be pursued in sustained manner with annual incremental achievement targets.



Figure 1: Comprehensive municipal financial reform vision.

Summing Up

Indian cities are at the bottom of Sustainable Cities Index, but it is the cities in the country, which needs to pursue SDG-11 of ‘Sustainable Cities’ rigorously and on an urgent priority basis in order to achieve other SDGs. This becomes imperative since by 2030 as per official estimates, more than 40% of India’s population about 600 million people, will be living in the cities. If ‘hidden’ character of India’s urbanisation process as reported by a World Bank Report (2015) is taken in to account, then by 2030, India’s urban population will be more than 60% (900 million or more out of 1500 million population).

Though there is lack of specific data about whether India finances its cities in sustainable ways in past or at present, various data put together in the paper clearly points out that India has not financed its cities in sustainable ways in past.

- During 1947–1992, cities were neglected by all in all terms; they were financed bare minimally. Though the per capita receipt and expenditure was miniscule, barring few municipal bodies of Maharashtra and Gujarat, most of the cities and their municipal bodies were in impoverished condition and financially dependent up to 90%.
- During 1993–2002, the economic liberalisation and structural reform programme, which started in 1991 and 74th CAA, which came in force in 1993 started churning and discourse about relevance, role, functions, finances and macro-economic implications of municipal bodies. Cities got constitutionally protected, independently elected, democratic, representative governance structure but lacked functional and fiscal autonomy. They continued to be financed in unsustainable ways as neither any new revenue resources or fiscal autonomy came to their way mainly due to constitutional amendment, nor municipal bodies tried to optimise revenue from the meagre sources they had and thus, the per capita revenue and expenditure continued to be very low.
- During 2002-2014, with macro-economic implications of underdeveloped urban infrastructure becoming clear Central Government first came out with schemes like Urban Reforms Incentive Funds, City Challenge Fund and then with massive Rs. 66,000 crores outlay of JNNURM. State Governments also realised implication of urban infrastructure bottleneck and started urban infrastructure funding. The results of JNNURM and other state schemes have been disastrous, as they provided project linked funding support with very soft budgetary constraints to the ULBs. Further with ULBs failing to improve resource mobilisation, dependence of municipal bodies increased and financing of cities become more and more unsustainable.

Like recent past schemes, the present schemes like SCM, AMRUT etc. which will be pumping much more grant funds in urban infrastructure sector also lack sustainable financing strategies. Analysis of SCPs of 60 cities show that the per capita cost and per sq. km. area development cost envisaged by these cities is unsustainable in all respect. Therefore, at present and in near future, India will not be financing its cities in sustainable ways, unless appropriate course correction is undertaken.

There is an urgent need for course correction, in how India is financing its cities since attainment of SDGs by India depends heavily on making Indian cities as ‘Sustainable Cities’. Any city to become a Sustainable City inevitably requires sustainable financing strategies along with ecological, political, social and cultural strategies.

India needs to adopt following sustainable financing strategies to achieve SDG-11 - 'Sustainable Cities' by 2030.

- (a) Financing city to maximum possible extent from tax and non-tax revenue generated locally by municipal bodies that is from the city itself
- (b) Spending money on development and service delivery of city (urban) infrastructure judiciously and in cost efficient ways to achieve sustainable development
- (c) Implementing FRBM regime at municipal and other agencies dealing with urban infrastructure development and service delivery
- (d) Facilitating and developing PPP mechanism for urban infrastructure development and service delivery
- (e) Adopting comprehensive municipal finance reforms vision.

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Affordable Housing as a Part of the Smart Cities Mission: An Empirical Study of Pune City

**Arshaan Furniturewalla*, Abhishek Agarwal,
Aranya Chakravorty, Nikita Chalana, Pratham Patankar,
Roopali Tangri, Sachin Simon and Shuchi Benara Misra**

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
*arshaanfur@gmail.com

Introduction

The term “smart city” can be rather nebulous when taken by itself; there exists no widely accepted definition (Ministry of Urban Development, 2015). The significance of a smart city varies across countries and cities, making it imperative to examine what the name means in the Indian context. As per the government, a smart city has three major features: a strong infrastructural core that induces high-quality living, a sustainable, clean environment and “smart solutions” (Ministry of Urban Development, 2015). Even this concise description of smart cities seems to depict a highly dense, multi-faceted landscape and thus it perfectly conveys the complexity of a city that is to be considered “smart”.

Naturally, implementing such an ambitious model for urban development in India would require tackling an endless number of issues. This is why the following report chooses to focus on but one, examinable, component of a smart city; that being, affordable housing. It can be inferred (and is stated by the government) that affordable housing fits into a smart city as a part of its infrastructural core. More specifically, it is clarified that this provision is aimed, “especially at the poor” (Ministry of Urban Development, 2015) prompting us to analyze the meaning of the word “affordable” in this context.

Looking into the criteria suggested for evaluation of smart cities, the government emphasizes that achievements in affordable housing are indicated by slum redevelopment, slum up gradation and provision of housing (Ministry of Urban Development, 2015). It is thus clear that the policies meant to provide affordable housing for the “poor” should mainly focus on the urban poor dwelling in slums.

Although at first glance the meaning of the word “slum” seems clear, in many cases there is only a fine difference between what would be considered a slum and what would not. As such, the actual definition of the term must be agreed upon.

As per the United Nations, there are five characteristics that define a slum and these are (UN Habitat, 2016):

1. Insufficient access to water.
2. Insufficient sanitation and infrastructure.
3. Poor housing structures.
4. Overcrowding.
5. Insecure tenure.

Specifically, in the Indian context, the government follows its own, similar (although technically different), definition of a slum.

As per the Slum Area Improvement and Clearance Act (1956) a slum is any area with dwellings that are “in any respect unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and designs of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light, sanitation facilities or any combination of these factors which are detrimental to safety, health and morals” (Government of India, 2013).

Keeping the above definitions in mind, it seems obvious that having a segment of the population living in slums is detrimental to a nation’s development. Tragically though, the number of slum dwellers in the world has increased by 55,000,000 since the year 2000 (UN Habitat, 2016) and some sources estimate that up to two billion people in the world will be living in slums by 2030 (Eaves, 2007). Clearly then, policies must be put in place to address this issue and this is where the idea of “slum upgrading” comes in. In contrast to relocating slums or abolishing them by evicting their residents all together, upgrading slums aims at improving the living conditions in existing slums to better the lives of those who dwell there (Patel, 2013). However, the smart cities mission as a whole does not solely focus on slum upgrading. As was mentioned, in its emphasis on affordable housing, the mission also evaluates states for slum redevelopment or provision of housing in general. Clearly then, the prospect of relocating slums might also be open to a city. Moreover, the smart cities mission is not the only government scheme that currently wishes to tackle the issue of slums and affordable housing in India; both the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the Housing for All initiative will address this problem. At the same time, officials have stressed that there would be some “convergence” between all of these urban schemes (Ministry of Housing and Urban Poverty Alleviation, 2015).

Taking up the case of Pune in particular, the Pune Municipal Corporation (PMC) has stated that the Special Purpose Vehicle (SPV) is to take on the

task of slum redevelopment in the Aundh-Baner-Balewadi (ABB) region, in association with the Slum Rehabilitation Authority (SRA). The SPV would also provide affordable housing to the Economically Weaker Sections (EWS) of society and individuals that fall into Low Income Groups (LIG) while ensuring adequate skill development, healthcare and education in the ABB area (Pune Municipal Corporation, 2015). Having established this background of how affordable housing relates to the smart cities mission, taking up the case of Pune in particular, it seems useful to answer the question - What can be done to ensure that the goals of slum redevelopment and provision of affordable housing (for the poorer sections of society) in the area of Aundh-Baner-Balewadi, Pune are addressed as a part of the smart cities mission? Hence, a detailed literature review has been conducted.

A Review of Literature

This section attempts to overview past literature in a concept-centric manner as per the recommendations of Webster and Watson (2002).

Affordable Housing and Slum Redevelopment in a Global Context

In the year 2050, nearly 70 percent of the world is expected to be living in urban environments; Asia itself is projected to have to accommodate 120,000 persons into its cities each day, which requires roughly 20,000 housing units, per day (Habitat for Humanity, 2014). Naturally, this huge increase in the urban population across the continent will inevitably lead to a rise in number of slums.

Clearly then the problem of slum redevelopment is one that extends far beyond India or any one country for that matter; as such, it is important to go over literature concerning international organizations and foreign nations in order to take into account recommendations and evaluations of policies from across the globe. There is a far-reaching consensus that policies aimed at improving the basic infrastructure in slums are absolutely necessary for their redevelopment. Improvements in infrastructure here include the betterment of access to sanitation, water, durable housing and sufficient space to live along with secure land tenure; essentially, addressing all of the factors that define a slum (Sheuya, 2008; Majale, 2008; Field and Kremer, 2006). The most complicated of these needs is that of *land tenure*. Minnery et al. (2013) suggest that this issue of securing legal land ownership can be especially hard to overcome in more centralized states with complicated regulations regarding personal property, as was the case in Hanoi, Vietnam.

The Habitat for Humanity (2014) notes that developing countries usually feature land tenure in terms of unofficial recognition as opposed to any official legal standing, limiting access to mortgages and decreasing a dweller's ability

to invest in improving his or her home. Majale (2008) also emphasizes that a lack of proper tenure is detrimental to slum upgradation since it discourages the inhabitants from improving structures they live in on their own accord, as they fear being evicted. Minnery et al. (2013) confirm that a lack of land tenure has held back slum upgrading in many South East Asian countries.

With reference to Cambodia, some researchers have claimed that in addition to secure tenure, regulations that feature lofty minimum requirements for housing along with complicated legal processes to go through are also disincentives for slum redevelopment by the poor themselves. This is because too many requirements for building a home undermine the market for cheap, affordable housing and the ability of the poor to incrementally improve their slums legally. Also, long legal procedures in developing countries often lead to the system being run by bribes, which makes legally improving homes too expensive for those in slums (Payne, 2005).

Majale (2008) proposes that secure tenure would help employment generation for the poor as it strengthens the foundations of small-scale industries based in slums, going on to recommend that the government help support these informal businesses. Similarly, according to Field and Kremer (2006) evidence suggests that an increase in tenure security leads to a boost in employment, although they attribute this to individuals wasting less time protecting their communities and houses. On the other hand, case studies of South East Asian countries indicate that in many cases, despite improvements in tenure security, there have been no developments that uplift slum dwellers out of poverty (Minnery et al., 2013). Sheuya (2008) claims that the delivery of core infrastructural components is a necessary but not sufficient condition for improving the lives of slum dwellers; here, infrastructure is considered “hardware” contrasted by empowerment that acts as “software”. The latter term refers to policies that go beyond physical infrastructure and tenure in addressing the problems of slum residents. These “empowerment” policies could focus on skill-based education, strengthening community organisations, microcredit and so on.

Field and Kremer (2006) also suggest that beyond basic requirements, *health and education* must also be considered as indicators when evaluating the state of slums; the paper even recommends that emphasis be drawn upon non-traditional health indicators (mainly that of mental health) in order to assess the development a slum has undergone. The need for policies addressing issues beyond basic infrastructure is evident in South East Asian countries where, despite significant improvements in physical capital, there has not been a significant betterment in the livelihood of slum residents given the under-utilisation of *skill-based training* and poor microfinance schemes (Minnery et al., 2013).

Microfinance is heavily emphasized by the Habitat for Humanity (2014) as it is said to help slum residents in incrementally improving their homes. They point to a successful pilot project to provide affordable housing via

housing microfinance loans in Tajikistan that worked through making credit available and providing technical assistance to borrowers. On the other hand, Minnery et al. (2013) point to the only partial success of microfinancing schemes (even that beyond loans specifically for housing) in the Philippines, where repayment rates were very low and only a few of the borrowers used their credit to start up new business ventures.

The much-celebrated Baan Mankong slum upgrading programme in Thailand took a very distinct approach to redeveloping slums by placing a heavy emphasis on slum communities working together for their own betterment, that is, *empowering communities to drive the slum upgradation process* as opposed to viewing them as nothing more than beneficiaries. Provision of credit to large groups of people and the usage of collective savings accounts helped finance these communities, allowing them to themselves purchase the tenure they required and upgrade or relocate their slums. It is even suggested that strengthening the power of communities helped prevent individuals from selling their high-value newly acquired legal homes in order to move back to slums (Boonyabancha, 2009). In other instances, successful outcomes have been achieved not necessarily by communities themselves taking the lead but via general participation from a civil society that looks out for the interests of slum dwellers more closely, as was the case in the Philippines (Minnery et al., 2013).

Although most sources support the idea of involving slum communities in the process of redevelopment as opposed to taking a top-down approach, Field and Kremer (2006) point to the lack of convincing evidence which can support the claim that directly involving beneficiaries and encouraging local participation leads to better outcomes.

Clearly then, evidence from across the globe suggests that the process of slum upgrading extends beyond the provision of basic infrastructure and land tenure; it also includes policies that work towards better health and education, skill-development, provision of credit or finance and the inclusion of beneficiaries or local communities into the process of upgradation. At the same time, as was illustrated, the success of these “empowerment” policies vary greatly in different contexts and it is difficult to give objective recommendations to countries as to what process they ought to follow for slum redevelopment. As such, it is important to study the case of India in particular, and examine how it fits into this global context.

Affordable Housing and Slum Redevelopment in India

Although most international literature suggests that the idea of slum upgradation extends beyond provision of basic infrastructure, some authors suggest that the luxury of basic infrastructure is not available to all slum dwellers in India, but only to those that are identified, or “notified” by the government; Subbaraman et al. (2012), through quantitative and qualitative observations

made on a non-notified slum in Mumbai, claim that the government does not bother to address the basic needs of many slum dwellers. Subbaraman et al. (2012) emphasize that a *weak legal framework* has led to the needs of these slum dwellers being overlooked due to there being no objective criteria to define a “legal” or notified slum, leading to many slums falling under the category of non-notified.

Naturally, *legal tenure* is uncertain for most of these slum-dwellers; however both Subbaraman et al. (2012) and Burra (2005), citing the case of Mumbai, argue that demolishing slums has not been effective in India as most residents will only end up rebuilding their dwellings elsewhere. Burra (2005) even suggests that government schemes should not only focus on delivering infrastructural upgrades to those slum residents who have secured land tenure, but should also consider the needs of the majority of slum residents as a whole, in order to truly address the problems of slum-dwellers. Evaluations of government schemes in Ahmedabad confirm that, even in India, securing land tenure encourages slum dwellers to consider upgrading their settlements themselves.

Evidence from the Slum Networking Programme in Gujarat goes on to suggest that, in order to achieve positive results, slum dwellers must be encouraged to *act as community* and their collective suggestions must be considered by the government when formulating schemes (Ministry of Housing and Urban Poverty Alleviation, 2013). Similarly, observations made by Patel (2013) on the government’s Basic Services for the Urban Poor (BSUP) programme propose that not actively engaging slum-dwellers in the redevelopment process leads to negative outcomes. The author criticizes the top-down approach taken by the government and how many of the contractors were not accountable to the beneficiaries of the programme, even though the quality of housing they put forth was not in line with the needs of slum-dwellers. Interviews conducted with the beneficiaries even highlight how many of them would have preferred to have the funds for the programme directly distributed to themselves, so they could take on the task of incrementally improving their housing on their own as opposed to receiving homes made from the ground up by the contractors.

Interesting models for slum upgrading are presently being implemented in Mumbai and Gujarat. Both cities use high real-estate prices to their advantage and encourage private contractors to take on the task of re-housing slum dwellers in vertical complexes free of cost, allowing the contractors to use the freed land for their own commercial purposes. Although Mumbai goes through with these upgrades only after the consent of slum-communities themselves, Gujarat has recently decided to take a more top-down approach (Srinivasan and Viswanathan, 2014; Nair, 2015); the repercussions of this are yet to be evaluated.

As a whole, it seems that the Indian government takes a linear, one-dimensional approach to slum upgradation, mainly focusing on providing

slum dwellers with basic infrastructure and housing. In order to do so, many schemes it seems do not consider the needs of the beneficiaries themselves or take into account their suggestions. Still, some literature would suggest that having slum dwellers involved in the redevelopment process is necessary for positive outcomes to be achieved, even in the Indian context.

Affordable Housing and Slum Redevelopment in Pune

As of 2012, up to 1.2 million people in Pune can be classified as slum dwellers, with nearly a fourth of these residing in non-notified slums (Pune Municipal Corporation, 2012). Clearly then, the problem of *insecure land tenure* is very prominent in Pune. Joshi et al. (2002) stress, citing their own data collection, that more *cooperation between the government, communities and NGOs* helps tremendously with respect to collecting information regarding (and mapping) slums, steps that could assist the process of declaring slums.

The Shelter Associates, an NGO in Pune, criticizes the BSUP initiative by the government for focusing exclusively on particular slums, one at a time, and aiming at a simple conversion of infrastructure to fortified houses, *without considering the needs of the slum dwellers* (Shelter Associates, 2016). However, Kulkarni (2015) notes that slum redevelopment in Pune is largely conducted by private builders, through the SRA, as opposed to the PMC. Finally, having overviewed the case of Pune in particular, one can now look into the avenues that are open for research pertaining to the delivery of affordable housing as per the requirements of the smart cities mission.

In Pune, the Pune Municipal Corporation (PMC) has stated that the Special Purpose Vehicle (SPV), a distinct legal entity created explicitly for the smart cities mission, is to take on the task of slum redevelopment in the Aundh-Baner-Balewadi (ABB) region, in association with the Slum Rehabilitation Authority (SRA), *specifically, for the Dr. Babasaheb Ambedkar Vasti (BAV)*. Questions will inevitably arise concerning how this slum redevelopment is to take place. Although the problems faced by slum-dwellers are recognized globally, there is no real consensus as to what policies are definitively effective when it comes to slum redevelopment.

It is true that the necessity of improving the *basic infrastructure* present in slums is widely accepted (Sheuya, 2008; Majale, 2008; Field and Kremer, 2006); however many authors further place emphasis on policies focusing on the “empowerment” of slum-dwellers in the long-run, for example, through skill-based education (Field and Kremer, 2006; Minnery et al., 2013; Sheuya, 2008). In particular, Pune’s SPV has committed to ensuring adequate *skill development and education* in the ABB area (Pune Municipal Corporation, 2015) as a part of its wider goal for slum redevelopment. It is then imperative to inquire into what the most urgent needs of slum-dwellers actually are and the manner in which they would be willing to partake in skill-development programmes (if at all). Further policies aimed at the “empowerment” of slum-dwellers include *microfinance schemes*, which are heavily pushed for

by the Habitat for Humanity (2014), although other authors emphasize their ineffectiveness in the past, given the inability of slum-dwellers to use credit effectively (Minnery et al., 2013). Microfinance is not conventionally used in India as a tool for slum redevelopment, which only means that its prospects are still to be evaluated.

A contentious topic in slum redevelopment arises concerning the extent to which slum-dwellers should be involved in the process. Many successful schemes have actively incorporated slum-dwellers (as a community) into the redevelopment process, both in India (for instance, through the Slum Networking Programme in Gujarat) (Ministry of Housing and Urban Poverty Alleviation, 2013) and overseas (for example, through the often-praised Baan Mankong slum upgrading programme in Thailand) (Boonyabancha, 2009). The extremely successful Baan Mankong programme in Thailand even financed slum communities as a whole (through joint-credit and collective savings) as opposed to looking after the needs of individual slum-dwellers one at a time. On the other hand, some authors find the evidence regarding the *involvement of beneficiaries* leading to better outcomes in the slum redevelopment process highly unconvincing (Field and Kremer, 2006). In India at least, many schemes seem to overlook the need for the participation of beneficiaries; research seems to suggest that the requirements and suggestions of slum-dwellers are largely ignored and, in some instances, slum-dwellers might even be pressurized to relocate while not being fully willing to do so (Patel, 2013; Shelter Associates, 2016). This raises questions of whether slum-dwellers would be willing to conduct the redevelopment process as a community, the extent to which they would wish to be involved in the redevelopment process and whether they would actually be willing to relocate away from their slum.

Considering then, the numerous questions that rose from past literature and the highly focused scope of the smart cities mission with regard to slum redevelopment in Pune, it is imperative to conduct a primary investigation into the needs of slum-residents in the Dr. Babasaheb Ambedkar Vasti, Aundh and their attitude towards policies for slum redevelopment.

Objectives

The broad objectives of this study are to:

1. Discover the needs of slum-dwellers.
2. Investigate the attitude slum-dwellers have towards different schemes for slum-redevelopment.

Considering the needs and requirements of slum-dwellers, the investigation will:

- Determine the quality of infrastructure in the slum and, specifically, determine the extent to which slum dwellers have access to robust shelter, clean water, sanitation, electricity, proper waste disposal methods and a clean environment.

- Collect information regarding the major areas slum dwellers wish for future development to be focused on, be it in employment, health, education, waste management, sanitation, water supply, water quality or air quality.
- Collect information regarding whether slum residents would be willing to take part in skill development programmes initiated by the government and which skill development programmes they desire the most.

To evaluate the feasibility of specific policies, the investigation will:

1. Determine if slum residents are willing to participate in community-based schemes wherein credit and funds are provided to the slum community as a whole as opposed to individual families.
2. Determine if slum residents are willing to take micro-credit home improvement loans to assist themselves in upgrading their houses.
3. Determine whether slum residents are interested in being involved in the process of redevelopment by giving consistent feedback and suggestions or if they wish to leave the intricacies of the process to the government.
4. Determine whether slum residents are willing to relocate away from their current slum if the government provides them with an affordable home that can be bought in another area.
5. Investigate the reasons as to why slum residents may or may not wish to relocate away from their current slum.
6. Determine whether slum residents are willing to purchase an affordable home built on the site of their slum, and present information relevant to the government's possible pricing strategy for these affordable homes.

Methodology

According to PMC, the functions of the smart city's SPV in slum redevelopment are limited to the Dr. Babasaheb Ambedkar Vasti in Aundh. As such, the scope of the study was also confined to this specific area. The area can be seen from a bird's eye view in Figure 1(Google Maps).

The *target group* for this research consisted of all the residents of the BAV, regardless of whether they lived in the slum on rent or if they owned a house. The *method for data collection* used was a questionnaire. The total *sample size of this survey was 52 individuals*. Although this sample size is not ideal, VanVoorhis and Morgan (2007) along with Harris (1985) would concede that a sample size of 52 would be more than the minimum required to run the planned regression and data analysis. The study takes into account the following *operational definitions* where microcredit has been taken to mean the provision of credit to individuals at low interest-rates (Boonyabanacha, 2009). Regarding the categorisation of houses according to their robustness, as per the Ministry of Statistics and Programme Implementation (2011) a "Pucca" house is one that is built out of sturdy materials such as stones enforced with cement, bricks, concrete and so on, a "Kutchha" house follows



Figure 1: A bird’s eye view of the Dr. Babasaheb Ambedkar Vasti.
 Source: Google Maps

a negative definition, being a house built out of material not considered to be used in a Pucca house; this would include most non-sturdy materials such as grass, thatch, mud, and so on, a “Semi-Pucca” house is identical to a Pucca house except in that its roof is made up of non-Pucca materials.

A measure of the “income elasticity of price” is taken (Schwab and Zampelli, 1987), such that:

$$\text{Income elasticity of price} = \frac{\text{Percentage change in price}}{\text{Percentage change in income}}$$

The above is not to be confused with the income elasticity of demand, an entirely different concept; the significance of this measure of income elasticity of price will be discussed in the next Section along with the analysis and explanation of the regression.

In order to gather information regarding possible pricing strategies by the government, a log-log multiple regression model with the following specification has been applied to the gathered data:

$$\ln(P_i) = \beta_0 + \beta_1 \ln(M_i) + \beta_2(R) + u_i$$

where i = observation number, P = price person i is willing to pay for an affordable home, M = income of person i , and if t = number of years person i is residing in the slum, then R = a dummy variable that is 1 when $t > 20$ and 0 when $t \leq 20$.

It is observable that the specification here takes the form of a constant-elasticity equation (Baker, 2013), as such, the term β_1 will represent the income elasticity of price. The term e^{β_2} denotes the proportional increase or decrease in the prices that are willing to be paid by those individuals who have stayed in the slum for more than 15 years compared to those who have stayed in the slum for 15 or less years.

Data Analysis

Slum-dwellers and Their Needs – Descriptive Analysis

Figure 2 shows the education levels of the slum dwellers. The mode of slum dwellers have had no experience with education; however, the median slum dweller has had five years of education. Interestingly, one slum-dweller had even completed his graduation in commerce (having effectively completed 12 + 3 or 15 years of education).

Given the level of education of the slum residents, it is not surprising to see a huge majority of them employed in “Housekeeping” or cleaning jobs as shown in Figure 3. This indicates towards their employment in low-skilled jobs.

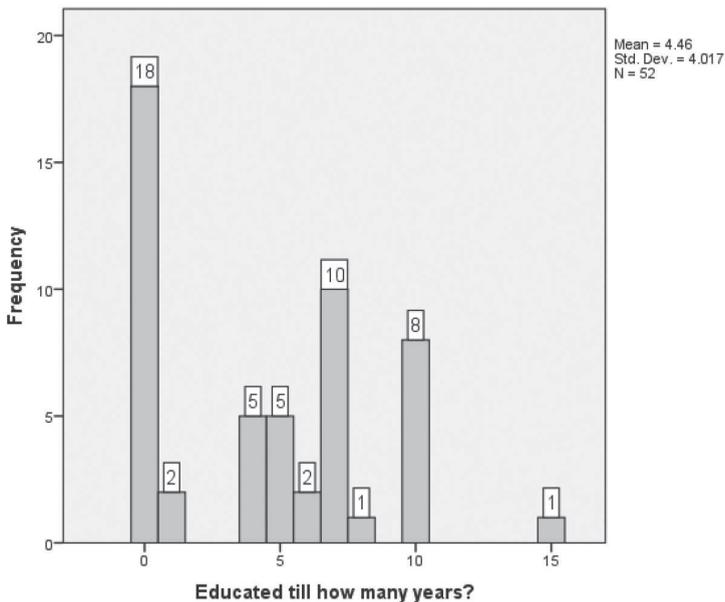


Figure 2: The level of education of slum residents.

Figure 4 represents the type of houses the slum dwellers are residing in. It is clearly observed that a large majority of slum residents (82.69%) live in solid, “Pucca” houses. Further examining the availability of basic amenities in the slum, the study discovered the minute details (Table 1) regarding water, electricity and sanitation.

Table 1 reveals that mostly all slum dwellers have some form of access to water, toiletries, electricity and proper waste disposal methods. Figure 5 gives specific details regarding the water supply residents get.

As can be seen from Figure 5, a majority of slum dwellers do not feel like they get sufficient access to water. It was also observed that water was available to the slum residents once in two days. Moving on to the case of

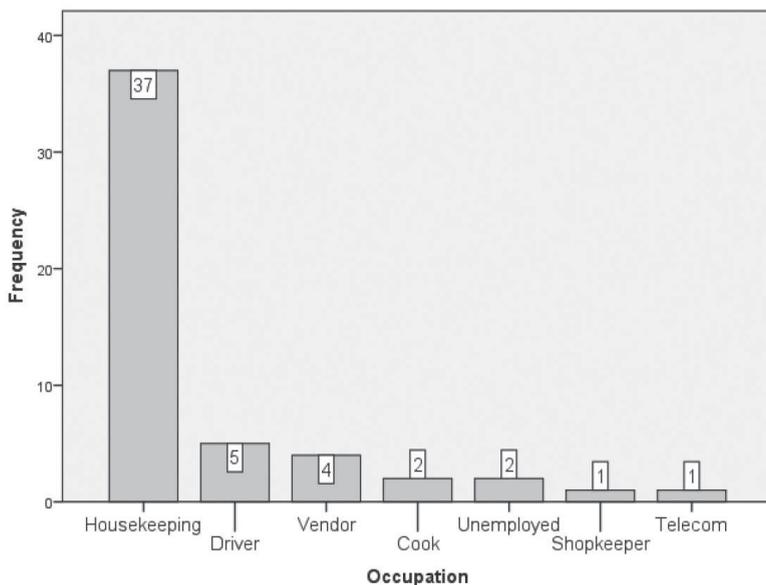


Figure 3: The occupations of slum residents. *Source:* Calculations by authors

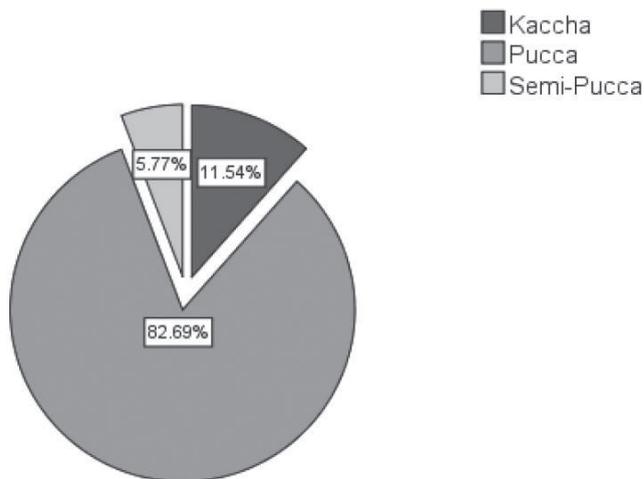


Figure 4: The type of housing. *Source:* Calculations by authors

sanitation and the accessibility of toilets, Figure 6 shows the results of the survey.

Figure 6 points that accessibility of toilets was far better than that of water, with the maximum responses (40.38%) being that there are no troubles faced in accessing a toilet. Although toilets might not be a major concern for the slum, that does not rule out the possibility that the environment of the slum is not good for sanitary. As such, the slum dwellers’ perceptions of how clean their environments are were recorded, the results are shown in Figure 7.

Table 1: Details on water electricity and sanitation

		<i>Count</i>
Source for water access	Tap in residence	16
	Public tap	36
Source for toilet access	Inside the house	4
	Common toilet outside the house	48
	No access	0
Location used for waste disposal	No place as such	0
	Common trash point	43
	Open land	3
	Collected from home	6
The presence of electric connections	Yes	52
	No	0

Source: Survey by authors

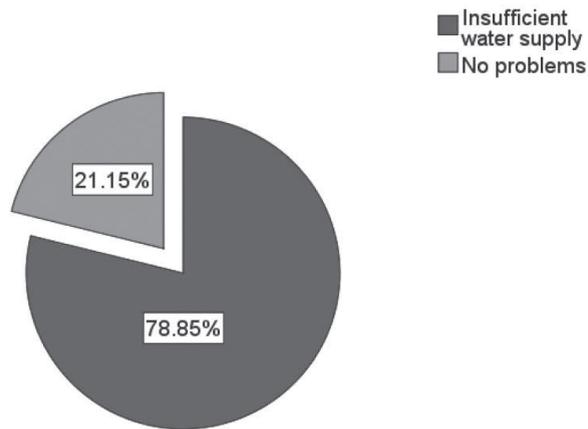


Figure 5: Troubles faced in accessing water. *Source:* Calculations by authors

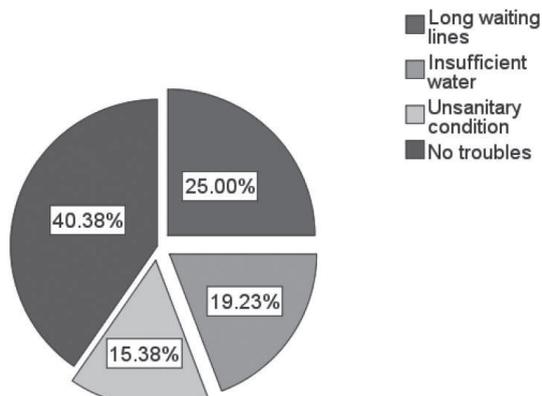


Figure 6: Troubles faced in accessing the toilet. *Source:* Calculations by authors

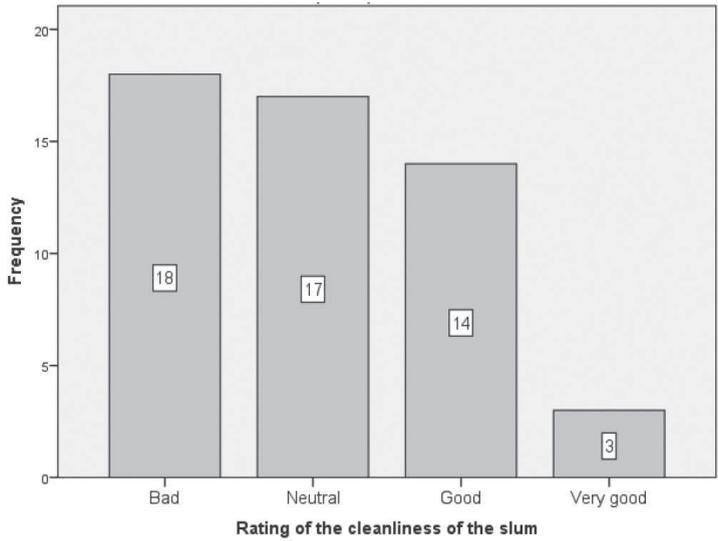


Figure 7: Slum resident’s perception of cleanliness. *Source:* Calculations by authors

As can be seen in Figure 7, many slum-dwellers considered their environment as unclean, with the mode rating being “bad”. At the same time though, the median rating is still “neutral”.

With respect to the reasons the BAV has established a population of slum residents, as shown in Figures 8 and 9.

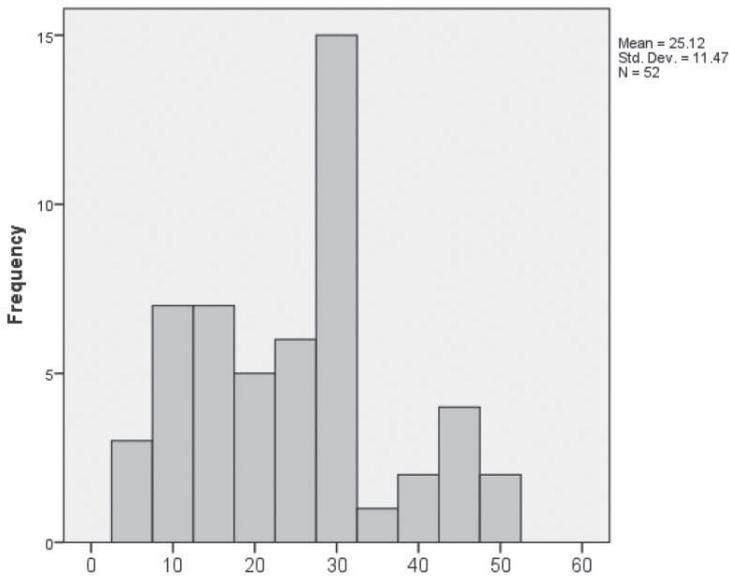


Figure 8: The years residents have been staying in the slum. *Source:* Calculations by authors

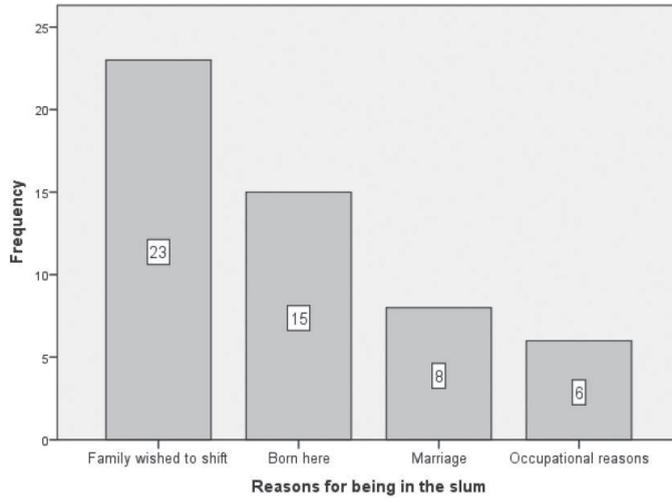


Figure 9: The reasons for residing in the BAV. *Source:* Calculations by authors

It seems that most residents of the BAV have been residing there for a very long time (more than 25 years). The most common reason for having chosen to stay at the BAV is that the resident’s family (usually their parents) moved to the slum, likely when they were relatively young. The next most common reason is simply that they were born at the BAV. Finally, the research considers the importance slum dwellers place on the different factors that form a part of the smart cities mission.

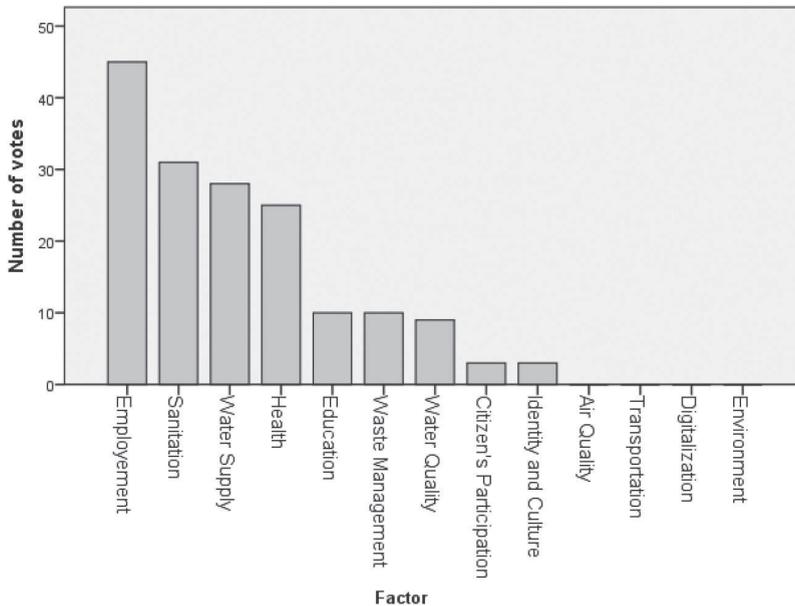


Figure 10: Factors considered important by slum residents. *Source:* Calculations by authors

Given the rest of the data collection, it is no surprise that slum dwellers value (and vote for) (Figure 10) employment, sanitation, water supply and health significantly more than all other factors associated with the smart cities mission.

Slum Dwellers and Their Attitude towards Policies – Descriptive Analysis

Figure 11 presents the response of slum residents with respect to their willingness to engage in skill development programmes.

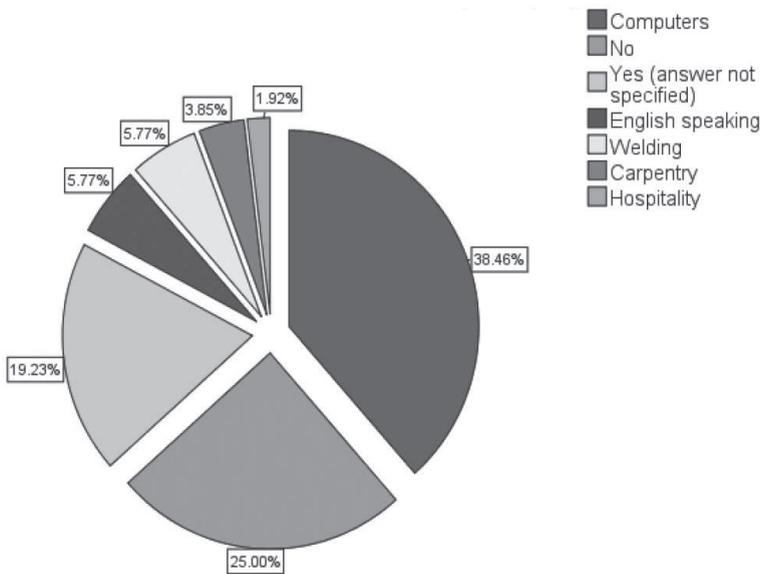


Figure 11: The demand for different skill development programmes.

Source: Calculations by authors

Although 25% of respondents were not interested in skill development programmes (mainly due to their age), the majority of respondents were interested, particularly in learning computers (38.46%).

Looking at the applicability of community-focused schemes (wherein funds and credit are allocated to slum communities as a whole as opposed to individual families and persons), as can be seen in Figure 12, 67.31% i.e. majority of individuals voted “No” against community-focused slum redevelopment programmes.

The other scheme to consider is that which focuses on providing slum dwellers with microcredit. From Figure 13, it can be said that slum residents are in general unwilling to take micro-credit loans since an overwhelming majority of them replied “No” to the question posed from the questionnaire.

As shown in Figure 14, most slum residents in the survey did not actually want to take part in the process of redevelopment, preferring to leave the

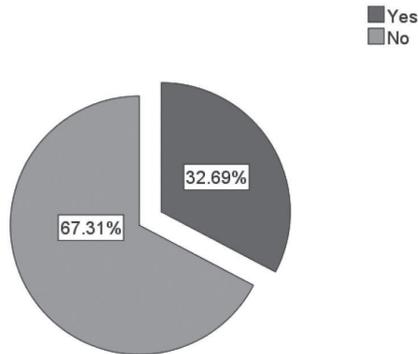


Figure 12: The support for community-focused programmes.
Source: Calculations by authors

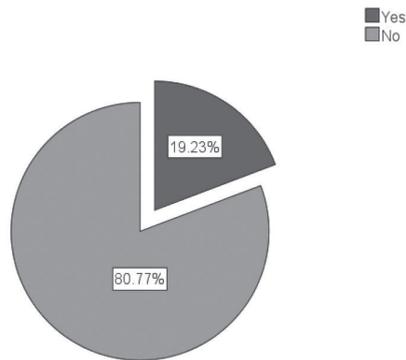


Figure 13: Are slum dwellers willing to take on micro-credit home loans?
Source: Calculations by authors

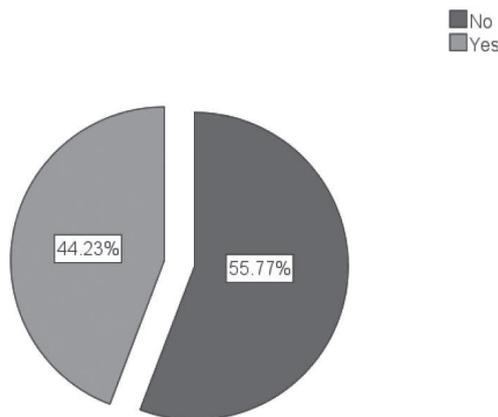


Figure 14: Slum dwellers' willingness to participate in slum redevelopment.
Source: Calculations by authors

intricacies of the matter to the government.

Most slum dwellers do not wish to relocate away from their slum (refer Figure 15). From the set of persons who would, in fact, not want to resettle somewhere else, the mode reason for this is that the person has resided in his current slum since birth (refer Figure 16).

Finally, the last concern addressed in this section would be regarding the proportion of slum dwellers that are willing to buy a new affordable home in-situ. As seen in Figure 17, more than half of all slum dwellers might be willing to purchase a new home in their slum, post upgradation, contingent on the price of this home.

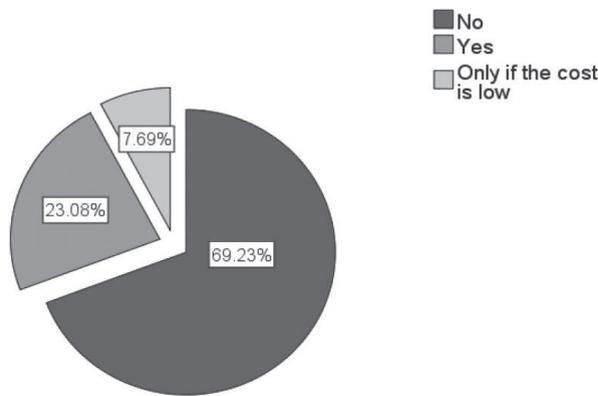


Figure 15: Slum dwellers’ willingness to relocate. *Source:* Calculations by authors

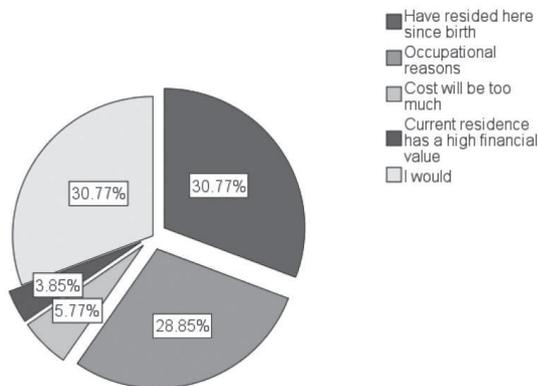


Figure 16: Reasons for not relocating. *Source:* Calculations by authors

Regression Results Pertaining to the Pricing Mechanism

In order to study a slum resident’s willingness to pay for an affordable home, the following regression will be conducted:

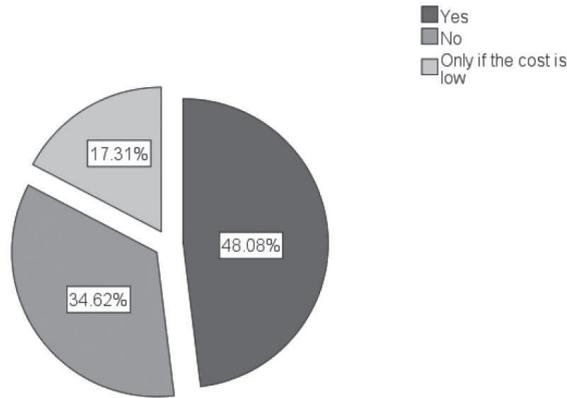


Figure 17: Slum dwellers’ willingness to purchase a new home in-situ.

Source: Calculations by authors

$$\ln(P_i) = \beta_0 + \beta_1 \ln(M_i) + \beta_2(R) + u_i$$

The purpose of using a log-log regression is that, firstly, this model better fits the data that was collected than a simple linear regression and secondly, this model allows for a very intuitive and pragmatic interpretation of the β coefficients. The sample size is also suitable for this regression as per the requirements set out by Harris (1985) and VanVoorhis and Morgan (2007).

The hypothesis testing would be as follows:

$$H_0: \beta_1 = \beta_2 = 0$$

$$H_1: \text{Any one } \beta \neq 0$$

We would expect the value of β_1 to be positive as a proportionate increase in income likely also causes a proportionate increase in price.

As for β_2 in Figure 16 it was revealed that many individuals who have lived in the slum longer (since birth) than others are not inclined to relocate away from the slum. As such, one might also expect that these individuals would also not be inclined to purchase a new house at the expense of their old place of residence. Conducting the regression backward, we arrive at the output table (Table 2).

Table 2: Coefficients^a

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. error	Beta		
1. (Constant)	1.427	1.120		1.274	.214
R	.190	.113	.165	1.677	.106
ln Income	.977	.118	.816	8.292	.000
2. (Constant)	.861	1.105		.779	.443
ln Income	1.045	.114	.873	9.147	.000

a. Dependent Variable: ln Price

Source: Calculations by authors

As can be seen, in the first model since R was insignificant, it was dropped, the new significant, model used is therefore:

$$\ln(P_i) = \beta_0 + \beta_1 \ln(M_i) + u_i$$

And replacing the values obtained from the regression we arrive at:

$$\ln(P_i) = 0.861 + 1.045\ln(M_i) + u_i$$

The interpretation of 1.045 here is that, for a percentage increase in the income of person i the amount of money he would be willing to pay for an affordable home increase by 1.045 percent.

Findings

Although the data itself speaks volumes about the needs and prospective behaviour of slum residents, there are certain additional inferences that the author himself will add to a summary of the results of the survey in this section.

Firstly, given the low education of the slum dwellers and the fact that they are largely employed in housekeeping or cleaning jobs, it is likely that they will stand to gain a lot from additional skill development programmes delivered in a structured manner. They too are, by and large, very willing to participate in skill developing programmes, especially those focused on technology and computers.

Focusing again on the needs of slum dwellers, it seems that the BAV is a relatively well-off slum. At least in terms of its physical infrastructure, the BAV is almost entirely composed of “Pukka” houses. Moreover, a non-insignificant number of residents seem to have no troubles with the infrastructure present in the BAV and the only real infrastructural concern repeatedly brought up by residents is that of sanitation and water supply; over and above this, their largest concern is of employment. Moreover, every individual in the slum has access to electricity, waste disposal is handled at a common trash point, and toilets are accessible by everyone.

Additionally, most individuals living in the BAV have been doing so for a long time, many were born in the slum and many others started living there as children. This then explains the resilience shown by most slum dwellers against relocating away from the slum. At the same time, more than half of all slum dwellers surveyed were willing to purchase a new affordable home if the slum were upgraded in-situ, contingent on the price of the home. Strangely, most slum dwellers prefer not to actively engage in the government with feedback and supervision if the government is to carry out the process of slum redevelopment. They largely trust the government with the intricacies of the project. Slum dwellers were also, as a whole, unwilling to accept micro-credit loans or support community-based funding and credit programmes.

Finally, the results indicate a strikingly large responsiveness of price to income such that the income elasticity of price is elastic. This means that slum

dwellers focus a good amount of their increased incomes on purchasing fixed assets such as homes when they receive a boost in their livelihood.

Conclusions

Addressing the topic as a whole, it seems that most schemes that were brought up in international discussions on the topic of slum redevelopment would largely fail in the case of the Dr. Babasaheb Ambedkar Vasti, Pune.

The policy to provide slum dwellers with microcredit pushed for by the Habitat for Humanity (2014) would not be applicable in the BAV as most slum dwellers aren't willing to take on microcredit loans in the first place. At the same time there are no lessons to be learned from the Baan Makong affair in Thailand. Although its community based solutions worked well over in its own country and its achievements are universally acclaimed (Boonyabancha, 2009), residents of the BAV are largely against the idea that funds should be provided to the community as a whole. Tragically, although the Indian Government has been criticised for overlooking the desires of slum dwellers when redeveloping slums (Patel, 2013), the survey undertaken here shows that most slum residents are unwilling to engage themselves in the process of redevelopment if the government offers to conduct it for them. Ironically, it seems that the survey has shown that the most effective policies to be undertaken in the BAV for slum redevelopment are those already being pushed for by the SPV as a part of the smart city's project.

The provision of affordable housing at low cost would be welcomed by the slum dwellers as per the responses received in this survey and the skill development programme would be even more positively received. As a whole, it would seem that the Special Purpose Vehicle is on the right track to redevelop the Dr. Babasaheb Ambedkar Vasti and integrate it into the fabric of a new smart city.

Recommendations

This study puts forth the following recommendations, taking into account the limitations of the study in terms of small sample size. Given the otherwise stable environment of the BAV in terms of its infrastructure, it seems that the government can, if it wishes to, satisfy the problems present in the slum by solely focusing on sanitation, employment and water supply since most slum residents have no major concerns about the slum beyond these three things. On the other hand, there is a necessary step the government must take if it wishes to properly redevelop the slum and that would be to ensure that proper feedbacks and suggestions are taken from the slum residents.

Finally, as the income elasticity of price was shown to be greater than one, this could, in safer terms, be interpreted to mean that the prices slum residents are willing to pay for a new home rise quite rapidly as their income

risers. Given this proposition, one could then go on to say that the Government would gain by providing skill-based training to slum-dwellers to improve their employability while the slum redevelopment process is being undertaken. This is because, given their increased incomes when the time to buy the affordable house comes, the slum dwellers would now be willing to pay much higher prices, allowing the government to recover the costs of training the slum dwellers and perhaps even gaining additional revenue on top of this.

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Subsidy in Parking

Tarun Khandelwal

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
tarun.khandelwal@sse.ac.in

Introduction

Parking is an essential component of the transportation system. A typical vehicle is parked after reaching destination. As a result, a typical vehicle is parked for most of the day. Parking facilities are required to be created in town planning stage. Pune is planned according to the Development Plan of 1987. Prior to the 1980, the city was mainly a city of bicycles. After 1980s, motor vehicles started displacing bicycles.

Planning for parking is important. Non-availability of parking lots results in reduced road space and reduced open spaces as they are occupied by the parking. Many countries across the world have faced these problems. However, recently there has been growing concern over the pollution created by the vehicles. This concern has helped to fuel innovative thinking to overcome the problem of private transport vehicles and parking. Few success stories of the cities who overcome this problem will be discussed later. The major research question for this paper is whether the government for the city of Pune should subsidize the public transport or not? To address this question we have focused on the cost benefit analysis of parking.

In the following section, we will discuss about the parking spaces. This will include the basic classification of parking spaces, the cost of parking spaces, pricing and profitability.

In the case of Pune, it was not possible to access the total area of parking lots in the city because the town plan of the city has not made provisions for parking. There were hardly any changes made during the plan period to accommodate the recent developments in the city. When a city is dependent on private vehicles to such an extent even then the lack of planning of parking spaces has given a new dimension to the problem. Now the problem is not only that there is a lack of parking spaces but also the spaces of parking are mostly on roads or footpaths or on the cycle tracks and such parking spaces do not generate the revenues to cover the costs.

In order to estimate the parking space required in the city, the total number of vehicles registered in the city have been used to estimate the parking requirements of the city. Calculation of the losses due to parking has been estimated in following sections.

Research Methodology

Initially, parking spaces are classified into four different categories. The cost of these parking spaces is estimated by dividing the total cost into three different components. These components are land area value, the cost of construction and operation and maintenance cost. To value the price of land, the price of nearby land has been used. To estimate the cost of construction the standard cost of construction per unit of land has been used. The cost of operations and maintenance is estimated by the labour requirement, electricity, power back-up and sundry costs. Environmental costs are not taken into account due to lack of data. Thus, the three costs, land area value, the cost of construction and operation and maintenance cost, were added to arrive at the estimated total cost of the parking space; all of them are estimated via primary survey.

Pricing of the parking space has been done for two different cases namely, for breakeven and with 10% rate of return on investment. Breakeven refers to the situation where businesses incur neither any loss on investment nor any profit. It is a situation where businesses are just able to recover their investment. The 10% rate of return is required to incentivise the businesses to take risk by investing in the project. Load factor shows that how much percentage of parking capacity has been used. In other words, load factor represents the efficiency of parking space which varies according to the location. Average number of days of operation in a month was taken to be 25 days factoring holidays.

Profitability analysis has been done by comparing the total costs of parking with the revenue generated from the parking space.

Classification of Parking Spaces

For this study, we have classified parking spaces into four different types. The cost of parking space should ideally include the cost of acquiring land, the cost of construction, operating cost and other indirect costs. The cost of acquiring land in the city of Pune is very high. The cost of construction is the cost incurred in building the space. The four basic categories in which parking spaces can be divided into are as follows:

- (a) On-Street Parking
- (b) Off-Street Parking
- (c) Surface Parking
- (d) Structured Parking

On-Street Parking consists of parking lanes provided within the public roads right-of-way. On-Street parking has some of the crucial benefits. These benefits include higher efficiency, uses of fewer spaces and shields pedestrians from high-speed traffic. However, this has its own disadvantages. These disadvantages include slowing of traffic and not the best use of space available on street.

Off-Street Parking are parking facilities on their own land, not on roads right-of-way. Off-street parking mainly focuses on quantity over quality. Most of the off-street parking lots are asphalt break in the urban fabric. The market gives developers a strong incentive to provide adequate parking because lenders are unwilling to finance projects with inadequate parking and tenants are unwilling to rent space in them. But the market provides less incentive to



Figure 1: On-street parking.



Figure 2: Off-street parking.

developers to improve parking design because many of the benefits of better parking design accrue to the community rather than to the property owner.

Surface Parking refers to large paved areas used only for extensive vehicle parking. It generates both direct and indirect externalities.

Externalities include the effects of impervious surfaces on water flow which may reduce groundwater recharge and in addition, the land used for parking is not available as open spaces, thus reducing the open areas available for recreation and for ecosystem services.

Structured Parking refers to an above-grade, ramp-accessible (also known as ramps) structure specifically designed to accommodate vehicle parking. It uses less of land area and saves valuable land for other uses. They are often present in the form of underground parking and multi-storey car park.

It is expensive to build.



Figure 3: Surface parking.



Figure 4: Structured parking.

Cost of Parking Lots

Land Area and Value

A typical parking space required by a car in Pune is 8.5-10 feet in width and 17-20 feet in length, totalling around 144.5 to 200 square feet (sq.ft) and for two wheelers (motorbikes and scooters) parking space required is 3.5-4.5 feet in width and 7-8 feet in length, totalling to 24.5-36 (sq.ft) square feet. Off-street parking space requires additional area due to the additional space required for the access lanes and landscaping. Land costs vary from semi-rural (₹6500 per sq.ft in outskirts) to Central Business Districts (₹38,000 per sq.ft in CBD).

The single greatest challenge is to value any type of land accurately on a large scale. In urban areas where nearly all real estate sales data represent transfers of land with improvements, it is difficult to divide prices between land and building components. Besides this, land valuation presents special problems in the analysis. To estimate the cost of land we have used comparable sales method. This is the most straightforward method for calculating the price of the land. In this method we use the price of the previous sale in that region as the price of the property. This method is applicable in Indian case as the transaction of property is mainly done with a reference price of previous sale in that region. In case of urban spaces the underground parking lot land has been valued at one-fourth ($1/4^{\text{th}}$) of the price of land, and in case of CBD we have valued the land for underground parking at one-fifth ($1/5^{\text{th}}$) of the value of land. These valuations have been estimated by distributing equal weights to all the floors. For on-street parking, the value of land has been taken from the value of nearby shops.

In this study, we have divided the city into three parts. These three parts are suburban areas, urban areas and central business district. The *suburban* part of the city is the outer parts of a town or city. In case of Pune, areas like Hadapsar and Baner are suburban. The *urban* area of city is characterized by higher population density and vast human features in comparison to the areas surrounding it. We have Sadashiv Peth and Model Colony as its examples. *Central Business District (CBD)* of the city is the commercial and often geographic heart of a city. Laxmi Road and J.M. Road are the example of CBD.

Construction Costs

Construction costs of parking facilities depends on size and shape of site (small and irregular shaped sites increase unit costs), number of levels (more levels increase unit costs), design (exterior aesthetic treatments can increase costs), and geographic location. The cost of construction for basement is usually higher than cost of construction above the surface level. The cost of construction ranges from ₹750 per square metre for the sub-urban surface parking to ₹1000 per square metre for the basement in central business district.

Operations and Maintenance Costs

Operations and maintenance costs include the cleaning, lighting, maintenance, repairs, security, fee collection, and labour. Parking facilities require at least two employees working per shift and shifts are usually of 12 hours each. They are responsible for the security, fee collection and optimum usage of the available space. There is no skill set required for the job so the jobs are usually very less paid i.e. the salary of the employee's ranges between ₹7000 to ₹10,000 per month. In case of on-road (on-street) parking higher manpower is required because it has huge spread in terms of the length of the road and hence cost is escalated. Additionally, multilevel (structured) parking lots usually have at least two employees managing each floor other than the fee collector who sits at the entry/exit gate. Additionally, lighting expenses and other expenses constitute around ₹3000-₹8000 per month depending on the area. Parking facilities require resurfacing and repaving every 5-10 years. In the case of multilevel parking there are additional costs in terms of maintaining the proper fire control system, mechanical ventilation and elevators. Furthermore, for the multilevel automated parking there is additional requirement of power backup. In Pune power-cuts are very less, even then in order to overcome these situations there is a requirement of power backup, for which there are generators. However important fact here is that even multilevel parking structures have less power requirement as compared to the automated multilevel parking.

Environmental Costs

Parking infrastructure affects environment. Most of the vehicles spend most of their lives parked. Usually in Pune we have a lot of surface parking, this simply means that vehicles occupy the land. This in turn reduces the land available for the parks and trees. Because abundant free parking encourages solo driving and thus discourages walking, biking, and the use of public transit, it greatly contributes to urban congestion, as most of the times the parking on-street don't generate revenues. We will discuss this in a later section. The environmental costs were not taken into account due to lack of data.

Total Cost of Parking Space

Table 1 shows the estimated cost of one acre of land at market price. The estimated cost of land for on-street has been taken as the value of the land of nearby area. The cost of land under each category has been taken by averaging the cost of five areas covered under them. Suburban includes only outskirts of the city, for example Baner and urban includes the old and most connected parts of the city for example, Sadashiv Peth and central business district (CBD) are the commercial property in the city.

Table 1: Factors affecting costs

	<i>Suburban</i>	<i>Urban</i>	<i>CBD</i>	<i>On-Street</i>	<i>Notes</i>
Land costs (per acre)	₹2918,52,000	₹5140,08,000	₹14520,00,000	Varies	This is land acquisition cost.
Surface space per acre	630	630	630	1263	This is the number of parking spaces per acre of surface area (including landscaping and access lanes).
Interest rate	12%	12%	12%	12%	Interest rate for long-term capital investments.
Years of payments	20	20	20	20	Years of payments
Average number of days of use per month	25	25	25	25	Typical number of days that parking space can be rented for each month.

The spaces per acre have been based on observation. This varies a lot between on-street and others places. In case of on-street space the whole space is utilized, while in other places, like structured parking, spaces have to be left vacant for access lanes, etc. A typical parking space required by a car in Pune is 8.5 -10 feet width and 17-20 feet length, totalling around 144.5 to 200 square feet (sq.ft) and for two-wheelers (motorbikes and scooters) parking space required is 3.5-4.5 feet width and 7-8 feet length, totalling to 24.5 to 36 square feet (sq.ft). The rate of interest that has been used for the calculation of the cost of financing the project was taken as 12% per annum which is the market rate of borrowing. The maximum tenure for the repayment of the loan is 20 years, which we have incorporated in our study. On an average, there are six working days in the week and hence, we take only 25 working days per month.

Cost of construction is shown in Table 2. The cost of construction varies from ₹750 to 1,000 from the suburban surface to CBD underground

respectively. The reason for this variation in the cost of construction is mainly because of the cost of labour. In case of underground parking the cost increases because of the additional cost for digging and for construction materials. The cost of construction on-road (on-street) has been taken as zero because it can be used as it is for parking.

Table 2: Cost of construction (in rupees)

<i>Type of facility</i>	<i>Cost of construction per sq. metre</i>
Suburban, On-Street	0
Suburban, Surface, Free Land	0
Suburban, Surface	750
Suburban, 2-Level Structure	800
Urban, On-Street	0
Urban, Surface	800
Urban, 3-Level Structure	850
Urban, Underground	1,000
CBD, On-Street	0
CBD, Surface	800
CBD, 4-Level Structure	850
CBD, Underground	1,000

Table 3 shows the cost of each kind of space in different regions of the city. Cost of land and cost of construction has to be amortized in 30 years (maximum tenure for which loans on property can be financed). The tax collection from the parking is zero. In fact, no taxes are imposed on the parking. The other important aspect of the cost is the operations & maintenance costs. Usually the cost includes the cost of personnel hired, electricity and other operating costs. These costs increase as the size of the parking increases. However, there is always some minimum cost that has to be incurred irrespective to the size of parking, for example for even smallest size of parking there will be at least two employees required. The table also shows the costs of operations and maintenance per space. Second last and last column of the table show the monthly and daily cost per space, respectively.

Pricing of Parking Space

When we estimate the pricing of the parking we estimate the ideal pricing given the above-mentioned costs. We have defined the ideal pricing as the price which will result in 10% profit for the business or at least breakeven revenue. Table 4 shows the average number of days in a month for which space is used, which in our case is 25 days. The load factor shows that how

Table 3: Table reflecting cost per space (in rupees)

Type of facility	Structured parking stories	Land costs, per acre	Land costs, per space	Annualized land cost per space	Construction costs per space	Annualized construction costs	Total capital costs	Annual O&M costs	Annual tax	Total annual cost	Monthly cost	Daily cost
Suburban, On-Street		2918,52,000	2,31,078	30,936	0	0	2,31,078	352	0	31,288	2,607	104.29
Suburban, Surface, Free Land		2918,52,000	4,63,257	62,020	0	0	4,63,257	629	0	62,649	5,221	208.83
Suburban, Surface		2918,52,000	4,63,257	62,020	2,403	322	4,65,660	610	0	62,952	5,246	209.84
Suburban, 2-Level Structure	2	2918,52,000	2,31,629	31,010	2,563	343	2,34,192	724	0	32,077	2,673	106.92
Urban, On-Street		5140,08,000	4,06,974	54,485	0	0	4,06,974	399	0	54,884	4,574	182.95
Urban, Surface		5140,08,000	8,15,886	1,09,230	5,139	688	8,21,025	667	0	1,10,584	9,215	368.61
Urban, 3-Level Structure	3	5140,08,000	2,71,962	36,410	5,460	731	2,77,422	838	0	37,979	3,165	126.60
Urban, Underground		5140,08,000	2,03,971	27,307	6,424	860	2,10,395	610	0	28,777	2,398	95.92

(Contd.)

Table: 3 (Contd.)

Type of facility	Structured parking stories	Land costs, per acre	Land costs, per space	Annualized land cost per space	Construction costs per space	Annualized construction costs	Total capital costs	Annual O&M costs	Annual tax	Total annual cost	Monthly cost	Daily cost
CBD, On-Street		14520,00,000	11,49,644	1,53,913	0	0	11,49,644	409	0	1,54,321	12,860	514.40
CBD, Surface		14520,00,000	23,04,762	3,08,559	2,563	343	23,07,325	667	0	3,09,569	25,797	1,031.90
CBD, 4-Level Structure	4	14520,00,000	5,76,190	77,140	2,724	365	5,78,914	990	0	78,495	6,54	261.65
CBD, Underground		14520,00,000	4,60,952	61,712	3,204	429	4,64,157	610	0	62,750	5,229	209.17
Notes	<p>Land costs for structured parking is divided among all users. Underground parking is assumed to have no incremental land cost.</p> <p>Annualized land values</p> <p>Annualized Parking facility planning, permits and construction costs.</p> <p>Annualized construction costs</p> <p>Total capital costs (land and construction)</p> <p>Includes repairs, maintenance, cleaning, lighting, property taxes, insurance, administration, access control, and enforcement.</p> <p>Property tax imposed on parking facilities.</p> <p>Annualized capital and O&M costs divided by 12 months.</p> <p>Monthly costs divided by monthly days of use.</p>											

Source: Author's compilation

efficiently space has been utilized. In the case of CBD, we found that the load factor is more than 100%; this simply means that space is accommodating more than its capacity. This is possible because when a vehicle pays the parking charges per hour but leaves before the completion of an hour, the space gets available for another vehicle. Thus, for that place where first person had already paid for an hour but left early, second person also pays. This leads to double charging for the space which increases the profitability.

Table 4: Factors affecting price

	<i>Suburban</i>	<i>Urban</i>	<i>CBD</i>	<i>Off-street</i>
Average days of use per month	25	25	25	25
Monthly load factor (percent)	90%	110%	120%	110%
Annual profit	10%	10%	10%	10%

Table 5 shows the revenue required for the business to be at breakeven i.e. the situation of no profit and no loss. This table also shows that revenues that are required for the business to earn normal rate of return has been taken as 10% per annum. The other important aspect of the analysis is that the incremental cost has been taken as ₹3000 for underground parking. This amount reflects the additional costs that only underground parking has to bear. This basically includes cost of maintaining additional fire ventilation and safety equipment.

The Profitability Analysis

In this section, we discuss the profits and losses incurred during the process of providing the parking at existing prices. The revenues generated by the businesses are ₹2 per hour per two-wheeler and ₹5 per hour per four-wheeler. 80% of the total population of private vehicles is two-wheeler and rest 20% of the vehicles are cars. However, if we take the simple weighted average of rates then we find that monthly revenue generated by the parking house is ₹780 per space when it serves 20% cars and 80% two-wheelers at the above rates. The total population of vehicles in Pune is 23 lakhs as per Pune Traffic Police statistics, with a growth rate of 10% per annum. Table 6 also shows that the revenue collected from the on-street parking is ₹0. This is because earlier Pune had outsourced the collection of on-street parking charges on nine specific roads to private businessmen; however, the scheme was not successful and hence it was discontinued.

Most of the time urban underground parking are cross-subsidised by the shops in the malls. And therefore, they are private property; they do not reflect the losses incurred by the local government. Table 8 also shows that loss per space is minimum 70% and goes up to 100% in different regions of the city. The city of Pune has vehicle population of about 23 lakhs and this shows huge quantum of revenue loss to local government.

Table 5: Pricing of parking (in rupees)

Type of facility	Pricing system	Annualized facility costs	Annual pricing costs	Total annual costs	Breakeven monthly revenue	Breakeven daily revenue	Monthly revenue for expected profit	Daily revenue for expected profit
Suburban, On-Street	Pay-And-Display	31,288	0	31,288	2,897	115.88	3,187	127.47
Suburban, Surface, Free Land	Pass	62,649	0	62,649	5,801	232.03	6,381	255.24
Suburban, Surface	Pass	62,952	0	62,952	5,829	233.15	6,412	256.47
Suburban, 2-Level Structure	Pass, Pay-And-Display	32,077	0	32,077	2,970	118.80	3,267	130.68
Urban, On-Street	Pay-And-Display	54,884	0	54,884	4,158	166.32	4,574	182.95
Urban, Surface	Pass, Pay-And-Display	1,10,584	0	1,10,584	8,378	335.10	9,215	368.61
Urban, 3-Level Structure	Pass, Pay-And-Display	37,979	0	37,979	2,877	115.09	3,165	126.60
Urban, Underground	Pass, Pay-And-Display	28,777	3,000	31,777	2,407	96.29	2,648	105.92
CBD, On-Street	Pass, Pay-And-Display	1,54,321	0	1,54,321	10,717	428.67	11,788	471.54
CBD, Surface	Pass, Pay-And-Display	3,09,569	0	3,09,569	21,498	859.91	23,648	945.90
CBD, 4-Level Structure	Attendant	78,495	0	78,495	5,451	218.04	5,996	239.85
CBD, Underground	Pass, Pay-And-Display	62,750	3,000	65,750	4,566	182.64	5,023	200.90
		From "Cost" table	Incremental costs to price parking, including any additional equipment, operations and administration.	Facility and pricing costs.	Monthly revenue needed to cover costs	Daily revenue needed to cover costs	Monthly revenue needed to cover costs and provide expected profit	Monthly revenue needed to cover costs and provide expected profit

Source: Author's compilation

Table 6: Losses in parking at various regions (in rupees)

	Monthly rates	Load factor	Gross annual revenue	Total annual costs	Net annual revenue	Profit margin
Suburban, On-Street	0	90%	0	31,288	(31,288)	-100.000%
Suburban, Surface, Free Land	0	90%	0	62,649	(62,649)	-100.000%
Suburban, Surface	780	90%	8,424	62,952	(54,528)	-86.618%
Suburban, 2-Level Structure	780	90%	8,424	32,077	(23,653)	-73.738%
Urban, On-Street	0	110%	0	54,884	(54,884)	-100.000%
Urban, Surface	780	110%	10,296	1,10,584	(1,00,288)	-90.689%
Urban, 3-Level Structure	780	110%	10,296	37,979	(27,683)	-72.890%
Urban, Underground	1,500	110%	19,800	31,777	(11,977)	-37.691%
CBD, On-Street	0	110%	0	1,54,321	(1,54,321)	-100.000%
CBD, Surface	780	120%	11,232	3,09,569	(2,98,337)	-96.372%
CBD, 4-Level Structure	780	120%	11,232	78,495	(67,263)	-85.691%

(Contd.)

Table 6: (Contd.)

	<i>Monthly rates</i>	<i>Load factor</i>	<i>Gross annual revenue</i>	<i>Total annual costs</i>	<i>Net annual revenue</i>	<i>Profit margin</i>
CBD, Underground	1,500	120%	21,600	65,750	(44,150)	-67.148%
	Monthly rates charged users	Portion of parking revenue	Total revenue	Annual costs, including facilities, operations and pricing expenses	Gross revenue minus costs	

Source: Author's compilation

One of the major reasons for the high density of private vehicles is that public/mass transit does not function well. In Pune, buses are run by PMPML (Pune Mahanagar Parivahan Mahamandal Limited). The conditions of buses are bad in terms of cleanliness. The buses of PMPML do not have proper connectivity between different parts of the city. And the other major problem that passengers of PMPML have to face is that buses do not have enough frequency to serve the needs of the city. PMPML serves Pune city with a fleet of just 1400 buses which is not enough.

Among the metros, Pune has the worst public transport system in place. Table 7 brings out the comparison of Pune with Delhi, Mumbai and Bangalore (Bengaluru). Among all four metros mentioned in the table, Pune has the worst mass transit. Other cities have at least thrice as many buses as Pune. The other important fact is that all other metro cities have at least one more mode of mass transportation besides buses, whereas Pune is still depended only on buses. In case of Mumbai, which already has an extensive network of local trains, addition of Monorail to city mass transportation system and construction of Metro rail is also in progress. However, in case of Pune, Metrorail project has received approval recently. Pune is also required to increase the frequency of buses and for this PMPML is required to expand rapidly.

Table 7: Comparison of Pune with other Metros

	<i>Delhi (Including NCR)</i>	<i>Mumbai</i>	<i>Bangalore</i>	<i>Pune (Including Pimpri & Chinchwadgaon)</i>
Geographical area (sq. kms)	1483	604	1276	716
Population	1.10 crores	1.25 crores	96.45 lakhs	55 lakhs
Vehicle population	70.75 lakhs	23 lakhs	40 lakhs	31 lakhs+
Road length	3100 km	2000 km	4200 km	3283 kms (PMC- 1850, PCMC-1297, PCB-48, KCB-88)
Public transport	8000 buses Metros & Railways	4680 buses Local train & Monorail (recently)	6000 buses & Metros	PMPML 1400 buses

Source: Author's compilation

However, in case of Pune, Metrorail project has received approval recently. Thus the city will get its Metrorail in distant future only. Therefore, it is important to note that there has to be a proper bus transport system for

the near future. Pune is also required to increase the frequency of buses and for this PMPML is required to expand rapidly. Additionally, Metro can only reduce the more number of vehicles on road if and only if it is complemented by other mass transit. If it is not complimented with other mass transit in that case it might just change the incidence of the problem of parking.

In order to win the customer base in the city, PMPML needs a complete face lift. Given the size of the city the number of buses has to be increased significantly. The frequency on certain routes is very poor. There is a need to redevelop the existing route maps and develop new routes for the better and efficient mass transit. The PMPML is also suffering losses due to the lack of efficient maps.

Economic Cost/Opportunity Cost of Land

Land used for parking facilities has huge opportunity costs. The land used in parking could have been used alternatively for regular business. That would reflect the true value of the land. There is a common tendency to perceive the land used for parking has no alternative uses. However, if we analyze the location on which the parking is built, then it reflects a completely different story. Parking is usually built on the places near residential or commercial or industrial places. The market value of the land at these places are very high.

If we focus on the residential area, then we find that the land is wasted due to excessive ownership of vehicles. We also find that a lot of open spaces have been sacrificed for keeping private vehicles. The situation gets worse as we move our focus to posh areas. In posh areas, even more spaces are wasted due to excessive ownership of vehicles. Many cities have faced this problem and the result of this excessive ownership vehicles in some cities was that public parks were converted into parking lot. This simply puts costs on the future generations as they face scarcity of open spaces for outdoor activities.

The other important parts of city are industrial and commercial spaces. These are the places where economic activities take place. These places have important resources for society. These resources include physical connectivity, electricity and virtual connectivity (High- Speed Internet) and many other facilities. These resources should be used optimally. Devoting such valuable resources to the activity of parking (to such an extent) is definitely not the best usage of the resources.

One of the important point to note here is that government is incurring losses by not being able to generate the comparable revenues from the land when used in parking (as compared to other commercial, residential and industrial land). In most of the cases, parking is done on the government land (Municipal Corporation's land). This simply means that the losses on the parking facility are the losses of government. *So we may say that it is an indirect subsidy to the private vehicle owners.* This simply means that by

providing such a subsidy, government is actually promoting the ownership and wide usage of private transport. This subsidy is huge if estimated in terms of actual values. However, it is clear from our analysis that even at best, when government is able to collect all the revenues from the vehicle users for parking (including on-street), still the government will incur the loss of at least 70%.

As we know that parking of private vehicle is a private good, not public good (by definition public good is a good that is both non-excludable and non-rivalrous in that individuals cannot be effectively excluded from use and where use by one individual does not reduce availability to others). This implies that if parking is underpriced, it does not benefit society as a whole. Hence providing it under-priced is in a way subsidy to the private vehicles owners. The main purpose of the subsidy, in a country like India (where poverty is high and widespread malnutrition) should be to help the poor. However, the subsidy on parking is in no ways helping the poor. The other important implication is that if the government had charged appropriately for parking, it could have utilized the funds generated from it. If those funds had been used in improving the public transport, then city of Pune would have definitely built one of the best public transport models. In fact, if such amount of funds had been deployed for welfare schemes, it could have been a much better subsidy.

Conclusion

Pune is currently developed according to the plan of 1987 which was completed in 2007. There were very less changes made in the plan during the course of the plan. The plan did not explicitly contain any provisions for parking as the vehicle population during that period was very low. From the period 1987 to now, the population of city has grown more than double and vehicle population has grown exponentially. The population of Pune is around 31 lakhs and vehicle population is about 23 lakhs as per latest estimates. Now the situation is that city is finding it tough to accommodate these vehicles. The result is simply visible in the form of vehicles parked on roadside and parked on the free land.

Pune is the seventh largest metropolis in India and the cultural capital of Maharashtra. Since 1950-60s, Pune had traditional old-economy industries which continued to grow. The city is now also known for manufacturing, automobile, government and private sector research institutes, information technology (IT) and educational, management, training institutes that attract migrants, students and professionals. Given all this, Pune should have a good mass transport system as we have in many other cities of India, like Mumbai and New Delhi. The lack of public transport has forced people to use private vehicles. These private vehicles create more pollution, congestion on roads

and are parked at the roadside or on government land which could have been used in some better way.

The scope of the problem of lack of public transportation has diversified itself in other problem of exponential growth of private vehicles which is creating traffic on the roads and pollution. Other major impact of such a high number of private vehicles is that the government is incurring potential losses in terms of the revenue forgone on the land used for parking. Places where the cost of land is as high as ₹38,000 per square feet (sq.ft) are being used for parking. The revenue generated on such lands is too low (when generated) as compared to the alternative uses. This indirect transfer of resources (land for parking of private vehicles) can be viewed as a subsidy.

The purpose of any subsidy should be to increase the welfare of the society as whole, but subsidy in the case of parking is just a subsidy given to that section of the society which is already rich in resources as compared to a worse-off section of society. This simply means that the government needs to think on the pricing of the parking. The price of the parking should reflect all the costs associated with parking. These costs should include cost of acquiring the land or the market value of the land, cost of building the structure and operations and maintenance. The cost of land (whether acquiring or imputed whichever is higher) and cost of building represents the major portion of the cost.

Another purpose of highlighting the losses in parking is that the problem cannot be solved fully by raising the parking charges that would reflect the total cost of the project. However raising the charges will enable the government to get funds which could be further invested to grow the size of public transport. Public transport is very important, as it promotes the optimal usage of the resource i.e. land. Public transport has also other advantages like it creates less pollution per capita per kilometre, it occupies less of road per capita and many other benefits.

Pune City Development Plan, 2041 and Jawaharlal Nehru National Urban Renewal Mission (JnNURM), under the scheme of Government of India has also started. This plan also lacks the proper planning for the growing number of vehicle population of the city. The city of Pune has already grown a lot (more than 400 kilometres), and the population of the city is also growing. This growing population will require more vehicles, which would further increase the problem of parking.

The city of Pune has started realising that the problem of parking is just the outgrowth of the problem of lack of public transport. The steps have been taken to solve the problem. These steps include approval of Metro Rail, introduction of Bus Rapid Transit (BRT) and most importantly promoting the public transport by publicly campaigning for them like 1st November as “Pune Bus Day”. However, a lot has to be done specifically in case of buses. The frequency of buses is still a problem; cleanliness is not properly

maintained. The other important problem is that buses do not cater all routes and the frequency for each route has to be redesigned such that routes with heavy traffic should have more number of buses. The waiting time per travel has to be significantly reduced.

In the next section we will discuss about the other major cities of India and the world. These cities have come with innovative solutions to the problem of traffic and the related problem of parking. The traffic congestion reduces the average speed, occupies the land when parked. Examples of these cities will show us how the problem can be tackled effectively.

Future Ahead

The problem of lack of mass transport which has now diversified as problem of parking needs to be solved. The problems arising due to the higher traffic have diversified themselves into many more forms. These forms include a higher number of accidents, higher pollution affecting the environment, lower average speed and more wastage of space in terms of parking. When there are more vehicles in the city, there is a pressure on the roads as there is a carrying capacity of roads. It is noted that traffic expands like air i.e. it expands to occupy the whole road. When the supply of roads is constrained, the demand of private vehicles automatically shrinks and hence cities become greener.

Here we will discuss examples from some cities which dealt with the problem of ever growing traffic. In the last 10 to 15 years the vehicle population of the city of Pune has increased many folds. Hence, the city is facing crisis in terms of unavailability of parking spaces and hence vehicles are parked on open spaces and roads. The problem with parking on roads is that once the vehicles are parked, the effective width of the roads declines and congestion increases further. This is other than the problem of losses incurred for the parking. Yet another important problem that Pune is facing is the growing number of vehicles on the road and hence the demand for parking space. In order to build these spaces government will have to invest money for creating the physical infrastructure. The cost of building this required infrastructure is huge. The government will have to spend a sizable proportion of resources in creating this infrastructure for the people with resources. This is a subsidy to people with resources only because recovery from the parking is very low. The losses from parking spaces are at least 37% in real terms. The other way to overcome this problem could be investing in mass transport. The supply of mass transport is an alternative to the private transport. This way many cities have checked the growth of private transport. In Delhi, creation of Metro Rail helped to check the problem.

Now we will discuss some examples in which we see how some cities have benefited themselves in many dimensions by innovatively displacing the private transportation by public transportation. These examples will include cities across the world.

Seoul, South Korea

Before we start discussing the case study of Seoul, we should first sight its relevance. The city of Seoul has been redeveloped according to new town plan that was very different from the previous town plan. The new town plan actually redeveloped the town in more sustainable manner. This was done in order to revive the river Cheonggyecheon. In case of Pune, the Jawaharlal Nehru National Urban Renewal Mission (*JnNURM*) has started which is expected to complete by the year 2041. One of the major drawbacks in this plan is that it neither contains any provision for planned structures for the parking nor it lays enough emphasis on developing public transport in a popular manner.

South Korea is one of the developed countries in the world. It is one of the Asian Tigers. It has been one of the fastest growing economies of Asia since 1960s. Seoul is the capital of South Korea. It is the city where the river Cheonggyecheon flows. During 1970s elevated freeway was built above the river Cheonggyecheon. This freeway was considered as a symbol of progress. But with the passage of time area became congested and noisy. In early 2001 it was realised that revival of the river was important for the city, culturally and environmentally.

In 2001, Lee fought the election, and his charter included the revival of the river. In order to revive the river freeway had to be demolished. He won the election, and work of the demolition began. This simply meant reduction of traffic in the city by significant amount (about 50%). The project was completed by 2005. And the success of the project led Lee to next President of South Korea.

Figure 5 shows the freeway, prior to its demolition. When this freeway had to be demolished, there was concern in the people of Seoul that how will

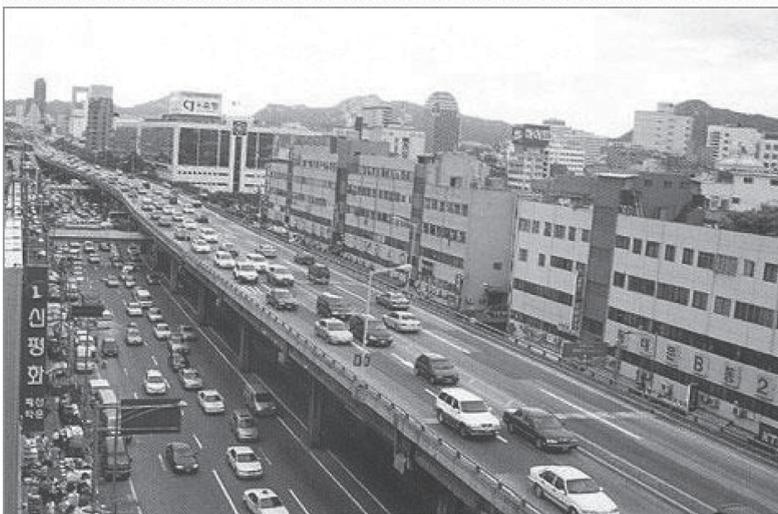


Figure 5: The Chenoggye freeway ran through the centre of Seoul.

Source: Author's compilation

the city be able to accommodate such a high number of vehicles. The answer to this question was that Seoul will not require that much amount of traffic in the first place. The new plan was aimed at providing public transport. The new plan accommodated very large scale incentives to use public transport instead of private vehicles.

Figures 6 and 7 show the view of city after the river was restored. To substitute the private vehicles, city planned various modes of public transportation. Among them first was Bus Rapid Transit (BRT), which Pune has also implemented; however in Seoul, the programme was of larger scale. Another reason for the success of BRT in Seoul was that people did not have any other option as using the private vehicles meant wasting time and energy



Figure 6: The restored Cheonggyecheon flows through the centre of Seoul.

Source: Author's compilation



Figure 7: The restored Cheonggyecheon at night. *Source:* Author's compilation

in traffic jams. In order to deliver required amount of public transport, Seoul created more than 400 bus routes where buses were colour coded. In other words, the government committed itself in providing more public vehicles instead of creating additional roadways for the private vehicles. The subway rail transport of Seoul was also enhanced. Currently, there are 17 lines operational. This makes Seoul Subway Rail Transport System amongst one of the longest Metro Rail System. Railways were also integrated in the public transport. This created a multi-modal transport system which is efficient.

One of the most important reasons that this public transport system was able to displace private vehicles is that the time consumed in travelling from one part of the city to another was considerably reduced by public transport. Public transport is usually cheaper than private vehicular transport. The other thing that was given importance in public transport was the comfort of the traveller. This encouraged the public to use public vehicles instead of private vehicles.

So the most important lesson to be learned from the success story of Seoul is that it is not only the creation of public transport which can reduce the number of vehicles on roads. It has to be complemented by other methods. Such as limiting the supply of roads and importantly passing on the full cost of externalities of private vehicles to the owners. The other important point to note is that government is not just providing better quality of public vehicles for people who were already using the public vehicles. The target group is now the people who are using the private vehicles. So in order to be able to incentivise people for using public vehicles instead of private vehicles, the comfort, time taken for the travel and cost of travelling has to be comparable with private vehicles.

Mumbai, India

Mumbai is the city which travels by public transport. According to a report, 88% of people travel by public transport in Mumbai. Mumbai has bus service provided by the BEST. The other important mode of public transportation in Mumbai is “local trains”. They are also called as lifeline of the Mumbai city. Recently Mumbai has further enhanced its existing network by adding Monorail.

The city of Mumbai has a population of 1.25 crore. However, the population of private vehicles in the city is only 20 lakhs (as of March 2011). The statistics are impressive as compared to Pune which has the population of 31 lakhs and private vehicle population of 23 lakhs. The number of buses catering the Mumbai city is more than 4500 while Pune has just 1400 buses. Other than buses Mumbai also has the local trains. These local trains network is wide spread. This network consists of more than 2300 local trains. This connectivity provided by the local trains and buses makes it possible to travel by public transport without spending much of the time in waiting.

The common man in Mumbai prefers travelling by public vehicle because when travelling by public vehicle he will not have to park the vehicle; hence, the time that could have been wasted in finding parking space is saved. The connectivity of the public transport is widespread. It reaches every corner of the city thus making it more convenient for the people of Mumbai to travel by public vehicles.

The other aspect is that even though there is a very widespread public transport in the city, but still the city has the demand for more public transport vehicles. This has fuelled the creation of Monorail and the proposed Metro Rail.

Templin, Germany

To mitigate automobile-caused externalities, the city of Hasselt in Belgium came up with an innovative plan. This was later followed by Templin in Germany. The plan was to subsidise public vehicles instead of private vehicles. In order to reduce the number of vehicles plying on the road the city made its city buses fare free. That is, the city buses were free of cost to be travelled in. This was in line with the example set by Hasselt, Belgium which was the first city to implement the free public transport. However, after 16 years of free transport, Hasselt has now transformed its policy by just allowing people up to the age of 19 to travel by bus for free. This was done in order to control budget deficit. However, if we take the example of either of the cities we will find that after the implementation of free public transport, the ridership of public transport increased by many folds. Recently, Delhi also tried to incentivise the use of buses for transport by reducing fare to flat ₹5 and ₹10 for non A.C. and A.C. buses respectively. This reduced fare is step towards free buses since the fare are very nominal (The Hindu, 2016).

When we take example of free public transport it has to be noted that the subsidy is given to all of the people of the city. The subsidy is not restricted to any subsection of society. The poor who were not getting any benefit from the indirect subsidy (in case of parking) will get their share of benefit from this policy. One of the major criticism of this policy is that people who don't require the subsidy will also get the subsidy. However, if we compare this with the current situation where only rich people are getting subsidy in the form of under-pricing of the parking, the situation of free public transit looks better.

The free transit system increases the load on the system which would not have been there if fares were charged. However, given the situation of Pune if we want to reduce the spaces used for the parking then we will have to reduce the number of private vehicles used for the transportation in the city. Therefore, the number of public vehicles are required to be increased and that too significantly. The number of passengers will increase in the situation of free public transportation. This increase will include the people who would

not have used the public transport if it had not been free or rather would have used bicycles to commute or would have commuted by walking. But now when they commute via buses, the welfare of these people will be increased. Hence the total welfare of society will increase. Society as a whole will be benefitted from this form of public transportation. No section of society will be left out. The other point to note here is that, public transport is still not a profitable business for the government. The losses to the government can be seen as subsidy for the public transport.

One of the major problems with the complete subsidization of the public transport may be that it will require the huge amount of resources which will have to be spent in order to maintain and expand the public transport. This problem is not as bad as it seems. The problem of finances can also be solved. Some cities which have this free public transport generate revenues from advertisements. The other important way to deal with such problem is reducing the expansion of the existing roadways and creation of new flyovers, etc. This will save the government resource and will also incentivise the people of the city to use public vehicles.

Conclusion

The amount of revenue generated from the parking of vehicles is significantly lower than the cost of these spaces. The price of the parking is quite standard in all the regions of the city. The rates are ₹2 per hour per two-wheeler and ₹5 per hour per car. The existing rates show that there has been more than 37% loss per annum. These are estimated with respect to the opportunity cost of the land.

The city of Pune has the population of more than 31 lakhs as per the latest census of 2011 and the vehicular population of 23 lakhs, more than that of Mumbai. The composition of this vehicular population is around 80% two-wheeler and rest four wheelers. The growth rate of the vehicular population is around 10% per annum.

A deeper look into the distribution of the vehicular population has revealed some important facts. The city requires these many numbers of private vehicles only because the public transport has not been able to match with the requirements of public. The comparison of any other Metro city with Pune shows that Pune has the worst public transport. According to the figures, Mumbai has more than 4200 buses and local trains and now monorail, Delhi has more than 8000 buses and Metro. However, Pune has only 1400 buses catering the city. Hence there is shortage of public vehicles which caused the huge demand for the private vehicle for transportation in the city.

If we look at the “vicious cycle of predict and provide” we see how simply the supply induces more demand of private transport vehicles. The first step towards this cycle is to predict the total demand for the future. Then the study usually ends up finding that current capacities are not enough for the

future. And then, the roads are expanded for the future needs and new costs are incurred. This expanded capacity induces the people to use more of the private vehicles. When more people travel with their vehicles, the ridership of public vehicles will decrease and gradually they will start incurring losses. The increased number of private vehicles also creates externalities for the non-motorised transport (NMT) i.e. cycles and pedestrians. This is because the presence of motorized vehicles creates pollution of air and sound which affects the quality for the others. Also, as the number of vehicles on the road increases the safety of NMT users is compromised. This increase in the number of private vehicles leads to the congested roads. And then again the capacity will have to be predicted. And hence we are again at the starting position. Figure 8 shows this cycle.

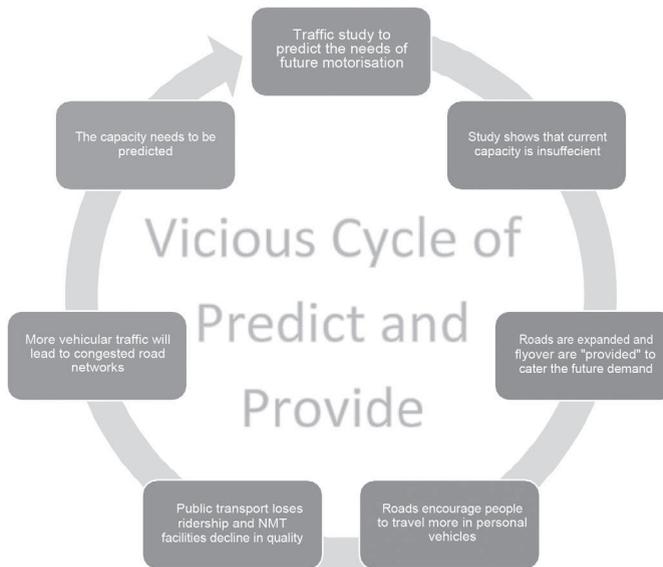


Figure 8: Vicious cycle of predict and provide. *Source:* Author's compilation

Pune is currently stuck in this vicious cycle. The roads are expanded, new flyovers are built in order to decongest the roads and create the future capacities and it ends up getting more congested. However, it is quite clear from the cycle that the situation is not going to improve. The past experiences of many cities show this, as the capacities are expanded the number of vehicles also increase so that the roads are once again congested. Therefore, there are lessons to be learnt from the success stories around the world.

One such success story is Seoul, South Korea, which demonstrated to the world that demolition of the roadways (freeway) can actually cure this problem of ever increasing number of private vehicles. The city demolished the road in order to revive the river, which has cultural importance to them. The demolition of the freeway came with the start of 400 new buses. The service

of the public transport was further improved by continuously increasing the number of buses. The Subway was also increased to 17 lines, which is currently among the largest Subway system in world.

Pune currently has 1400 buses to serve the city, which is a very low number as Pune does not have any other mode of public transportation. The other important flaw of Pune public transport system (or most of the other public transport systems in India) is that it tries to reduce the number of private vehicles merely by increasing the supply of the public transportation system. The public transportation system has other disadvantages also. However, the quantum of disadvantages associated with public transport are less than private transport.

Private vehicles offer more comfort than the public transport vehicle. This is one of the major problem of the public transportation system which it fails to account. Its impact is that even when the public transport caters with the full capacity and further expands the capacity, there will not be a significant increase in the ridership or in the revenue. There will still be a lot of private vehicles used for the transportation within the city. The problem can be rectified only by targeting the people who are using their own vehicles. The comfort of the travel by public vehicle has to be matched with the comfort of travelling in personal vehicle. In other words, comfort of travelling in personal vehicle is one of the important variables.

Pune's public transportation suffers from the dual problem – connectivity and frequency. The connectivity implies that the network of public transport is not widespread and does not reach to every part of the city. The frequency of public buses is also very uneconomical. The busy routes don't have enough frequency. This lack of frequency results in overcrowded buses with long waiting time. The other important problem with public transport buses is that they are unhygienic. The basic cleaning standards have to be improved.

The problem of imputed losses on the parking cannot be solved only by increasing the cost of parking. The losses are huge and to raise the cost of parking to that extent will only cause the public rage. The indirect cost of parking is borne by the government. This indirect cost can be viewed as subsidy. This subsidy works progressively with the income distribution. This is because the higher the income of a person, more and bigger will be the size of the vehicle that the person owns. The cost of parking is same for the small hatchback car and a large sedan. Bigger car will occupy more space at the same price. On the other hand a poor person who does not have any vehicle of his own will not be benefitted by such policy. Hence, this policy needs to be changed because subsidies are meant for the poor people, not for the rich people.

This brings us to another innovative solution so that poor people get benefitted out of the public transport system and at the same time public transport system gains popularity. This solution suggests that the public transportation should be made free of cost. This will enable each and every

person to be able to take the benefit of public transportation. This was first done in a city in Belgium (but has been reformed currently due to high deficit) and now in many cities of the world. The important aspect of this system is that it will include the whole society; no section of the public will be left out.

The new Development Plan, 2041, of the city does not work in unilateral direction of either promoting public vehicle or private vehicles. The new development plan on one hand lays the emphasis on increasing the quantity of public transport and on the other provides incentive to purchase the private vehicles by increasing the flyovers and by giving other incentives. The only silver lining to new development plan in public transport sector is building of new mode of public transportation i.e. Metro Rail.

In the end, there are costs which are to be incurred if the government follows the “Vicious cycle of Predict and Provide”. The costs include the cost of estimating the future needs and then developing them. And at the same time as the number of vehicles increases, the requirement of parking space will also increase, and since the parking space is highly subsidised (in some cases), the subsidy will increase. The other problem with new development plan is that it fails to predict and provide the parking spaces. The use of personal vehicles became popular in 21st century. Even then there were no provisions made to cope with the increasing number of vehicles. The City Development Plan of 1987 ended in 2007 and new Development plan of 2041 is now in the process. Currently some roads, like F.C. Road and J.M. Road have been converted into one-way to deal with the problem of traffic congestion. But due to the lack of parking spaces, vehicles are parked on roads which ultimately creates more congestion.

Hence, the only solution to reduce this loss can be achieved in two steps. The first step is to revive the public transport system. Thus, the comfort level of the public vehicles should be comparable to the comfort level of personal vehicles and the time spent in travelling by public vehicles should not be too high as compared to personal vehicles. Further connectivity and frequency has to be improved. The second step is to increase the parking charges significantly. The increase cannot be high enough that it will cover the cost because in that case there will be public outrage. So the parking charges should be high enough so that people are induced to use public vehicles for their day-to-day purposes like going to work.

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A Study on Pollution Abatement Projects of Urban River Stretches in India: A Case of Mula-Mutha and Sabarmati Rivers

Urvashi Gill Dhingra* and Madhura Bedarkar¹

Symbiosis School of Economics

Symbiosis International University, Pune – 411004

¹Symbiosis Institute of Business Management

Symbiosis Knowledge Village, Lavale, Pune – 412115

*urvashi.dhingra@sse.ac.in

Introduction

Rivers in India are personified as goddesses and worshipped. Prayers are offered in their glory and their blessings are sought. However, they have been exploited and reduced to nothing more than polluted and filthy nullahs. Over dependence and inappropriate usage of rivers has led to their deterioration and degradation causing detrimental effects on human health and welfare. Not only has the quality of water in the rivers deteriorated over the years, the quantity of water is also diminishing. In India the annual per capita availability of renewable freshwater has fallen from around 6042 cubic metre in 1947 to 1845 cubic metre in 2007 (CPCB, 2013).

70% of the pollution load in rivers comes from partially or untreated sewage in India (CPCB, 2015). Untreated domestic waste water from urban centres, as indicated by the Biological Oxygen Demand (BOD) levels in river water, is one of the major sources of river pollution apart from industrial and agricultural runoff. Two reasons are cited by CPCB for increased river pollution, firstly, shortage of capacity of STPs to handle increasing load of sewage generation and secondly, insufficient water in the rivers to dilute the pollutants (CPCB, 2015). In India, total sewage treatment capacity of metropolitans, Class I cities and Class II towns is 23,277 MLD approximately, while total generation of sewage is about 62,000 MLD.

There exists a clear need for restoring the water quality of our rivers. River restoration involves repairing rivers which are not able to provide essential ecological and social functions which includes mitigating floods,

providing clean drinking water, removing excessive levels of nutrients and sediments, supporting fisheries and wildlife. In addition, a healthy river also enhances property value and can be used for recreation purposes (Palmer and Allan, 2006). Under Water Act, 1974 and Environment (Protection) Act, 1986, Ministry of Environment, Forest and Climate Change has set up National River Conservation Directorate (NRCD) which makes plans and provides financial assistance for implementation of pollution abatement works across rivers under National River Conservation Plan (NRCP).

The Central Pollution Control Board (CPCB) has identified 302 polluted river stretches across India for restoring water quality (CPCB, 2015). Out of these, 49 river stretches are in Maharashtra, the highest number in any state and 20 are in Gujarat. It is observed that stretches on Mula, Mula-Mutha and Mutha rivers in Pune covering 33 km in total are most polluted in Maharashtra and stretches on Sabarmati river flowing through Gandhi Nagar and Ahmedabad are most polluted in Gujarat. Hence, the present study will focus on the proposed pollution abatement project for Mula-Mutha river of Pune and compare it with similar project already implemented for Sabarmati river of Gujarat. Moreover, Pune features second in the list of the awardees of the 'Smart City Projects', which has provisions for cleaning the river and development of riverfront.

Mula-Mutha River—Present State

Mula-Mutha river, a tributary of river Bhima, is formed by the confluence of two rivers, Mula which originates from Mulshi dam and traverses the area of Paud, Lavasa, Wakad, Balewadi, Baner, Aundh, Khadki, Vishrantwadi and ends at Sangamwadi and Mutha originates at Khadakwasla dam and traverses Dhari, Nanded, z-bridge, Juna-bazaar, Pune RTO and also ends at Sangamwadi. From Sangamwadi, both rivers flow as Mula-Mutha river. It flows through the area under the jurisdiction of Pune Municipal Corporation (PMC), Pimpri Chinchwad Municipal Corporation (PCMC), Irrigation department of Government of Maharashtra and Cantonment Boards; as a result it has multiple stakeholders. The river is also very crucial for the development of residential, commercial and industrial establishments in Pune.

Water quality is monitored at six locations along Mutha river and eight locations across Mula and Mula-Mutha river. At several locations, it fails to meet water quality criteria as prescribed by the 'designated best use' (Table 1) water quality parameters of the Central Pollution Control Board. The DO levels in the river range between 1.2 and 3.2 mg/l at various receptor points and mean BOD levels range between 10.2 and 15.9 mg/l (CPCB, 2013). This makes the water unfit for any kind of activity for the 3.1 million population (Census of India, 2011) of Pune city. The poor quality of water is largely due to disposing of un-treated sewage in the river, with around 23 percent of it being

disposed-off untreated (PMC, 2016)¹. It is also supplemented by unregulated dumping of solid wastes, industrial effluents and waste and construction debris, open defecation and encroachment across the river bank. Presence of organic pollution is indicated by the presence of tolerant phytoplankton at some of the monitoring locations (Kshirsagar et al., 2012).

Table 1: Use based classification of surface water in India

<i>Designated-best-use</i>	<i>Class of water</i>	<i>Criteria</i>
Drinking water source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100 ml shall be 50 or less pH between 6.5 and 8.5 Dissolved oxygen 6 mg/l or more Biological oxygen demand 5 days 20°C 2 mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100 ml shall be 500 or less pH between 6.5 and 8.5 Dissolved oxygen 5 mg/l or more Biological oxygen demand 5 days 20°C 3 mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100 ml shall be 5000 or less pH between 6 and 9 Dissolved oxygen 4 mg/l or more Biological oxygen demand 5 days 20°C 3 mg/l or less
Propagation of Wildlife and Fisheries	D	pH between 6.5 and 8.5 Dissolved oxygen 4 mg/l or more Free ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 and 8.5 Electrical conductivity at 25°C micro mhos/cm Max. 2250 Sodium absorption ratio Max. 26 Boron Max. 2 mg/l

Source: Status of water quality in India 2012, CPCB, 2013

Mula-Mutha Pollution Abatement Project

The National River Conservation Plan (NRCP) has allocated Rs. 990 crore for restoration of Mula-Mutha river, which accounts to around 22 percent of the total sanctioned cost of NRCP. Japan International Cooperation Agency

¹ Presently, about 744 mld of sewage is generated in the city. Out of which only 567 mld is treated by 10 STPs.

(JICA) has agreed to provide a soft loan to Government of India (GOI) of Rs. 1000 crore at an annual interest rate of 0.30 per cent for a duration of 40 years. The project cost will be shared between GOI and Pune Municipal Corporation (PMC), in the ratio of 85:15, respectively with PMC being the implementing agency for the project. The proposed project covers Pune city, 13 adjoining villages and the Cantonment areas and is scheduled to be completed by 2022.

The project is segregated into three important components: (i) creating infrastructure for augmenting the present sewage treatment capacity, (ii) using technology for monitoring infrastructural facilities created and (iii) generating public awareness and capacity building. The first component includes building of 11 new STPs with a cumulative treatment capacity of 396 mld, which would add to the existing treatment capacity of 477 mld and cater to the sewage generation upto the year 2027. These new STPs would be designed to treat effluents having BOD < 10 mg/l and TSS < 10 mg/l, along with removal of nutrients. The estimated cost for building these STPs is Rs. 608.10 cr. Sewer lines of around 113 km would be built, which would involve an expenditure of Rs. 179.80 cr. Out of the six existing pumping stations, four would be renovated. Construction of 24 community toilets would be undertaken in identified slum areas to reduce open defecation (PMC, 2016).

The project would also include installation of SCADA system for STPs and pumping stations to assess and regulate plant inflow and water quality process parameters. Proposed also is introduction of GIS/MIs for management of newly created infrastructure.

PMC has appointed HCP Design, Planning and Management Pvt. Ltd., (HCPDPM), Ahmedabad as the project consultant, the agency which also played a critical role in planning and implementing Sabarmati Riverfront Development Project. There is a greater possibility that Mula-Mutha development project would be a replica of Sabarmati Riverfront Development Project. It is largely claimed as a pioneering river project in India and pushed as a role model for many urban river projects in India, such as Yamuna, Ganga and Mula-Mutha. Thus, it is imperative to look at what has been done to restore the river Sabarmati in Gujarat.

Sabarmati Riverfront Development Project

Sabarmati River originates in Rajasthan; however, flows through Gujarat for most parts before it joins Gulf of Khambhat. Like Mula-Mutha river, it also faced the issue of untreated domestic sewage, with around 33% of waste water released into the river untreated. Additionally, the river also suffered from release of partially treated industrial waste and reported very high levels of pollution (CSE, 2007). The maximum BOD levels of the river at Gandhi Nagar stand at 7 mg/l, which is above the minimum standards. The river being primarily a rain fed river, also shows the lowest per capital availability of

water in India at 360 m³ against the national average of 2208 m³. This shows extreme water scarcity conditions in the region (CPCB, 2012).

The construction work for Sabarmati Riverfront Development Project (SRFDP) began in 2005 with a 3-fold objective: environmental improvement, creating social infrastructure and sustainable development. A special purpose vehicle, Sabarmati Riverfront Development Corporation Ltd. (SRFDCL) was set up as wholly owned entity by Ahmedabad Municipal Corporation. The cost of this project was estimated to be Rs. 11,520 million and was largely self-financed through proceeds from sale of reclaimed land created by the project. The project proposed to rehabilitate almost 12,000 hutments belonging to slum dwellers, develop space for hygienic informal markets, develop laundry campus, event area, gardens, two-level promenade, religious ghats and sewage systems. Storm water and sewage system with interceptor lines of 10 km length were built across both the banks of the river to collect sewage discharged through 38 points. These sewer lines were diverted to the newly built sewage treatment plants/sewage pumping stations. Additionally, to make the river perennial, water from Narmada main canal was channeled to Sabarmati river.

The project received many accolades. KPMG International included it in its report, 'The Infrastructure 100: World Cities Edition', wherein 100 innovative infrastructure projects are showcased. A study by Bhatkal (2015) reported that there is an improvement in the city's environmental conditions and especially water quality due to the project.

However, this ambitious project of State Government of Gujarat has also been criticized heavily on several grounds. Firstly, it has been noted that the ecological character of the river has changed as its channel was uniformly narrowed to 275 metres, while naturally the average width of the river had been 382 metres. Thus, due to this 'pinching of the river', its original character has changed. Its seasonal nature is destroyed. Secondly, it is criticized for the treatment given to river banks. Reclaiming of river banks has damaged fauna and biodiversity on the edges. There has been ignorance towards protection, sustenance and enhancement of the riverine ecosystem. Thirdly, with regard to the source of water, it is found that water which flows through Sabarmati river is brought from Narmada main canal and is meant for drought-prone areas of Kutch, Saurashtra and North Gujarat (Pradhan, 2014). Fourthly, the reclaimed land and the narrowing of the channel have been affecting the carrying capacity of the river. The project was at standstill during August 2006 to March 2007, for almost a span of eight months due to heavy floods. National Institute of Hydrology and Indian Institute of Technology (Roorkee) were appointed to re-assess the project design with respect to river's carrying capacity and to study the impact of the project on river's ecology. The report submitted by IIT (Roorkee) stated that riverfront development is not a flood control scheme and Ahmedabad Municipal Corporation will have to undertake other measures

to retaliate floods. Rather, channelizing of river water, constructing concrete walls increase possibility and intensity of floods. Fifthly, it is observed that pollution problem was not addressed adequately, it just got pushed by 10.5 km downstream.

Lastly, the project has largely been criticized for poor rehabilitation of evicted people. According to Mathur (2012), 14,000 households were officially evicted directly and indirectly. Under an 'interim rehabilitation' scheme, these families were shifted to a marshland, an area at city's peripheries, which hosts electricity transmission towers and adjacent to a municipal solid waste dump ground. They were left with infrequent and inadequate access to drinking water and sanitation facilities. These families were offered negligible compensation. The author observes sarcastically:

"The experiences of hunger, malnutrition, loss of livelihood, loss of life and loss of will to live were some of the benefits first experienced by Ahmedabad's working poor who lived on the riverbank by the grand urban vision of the riverfront development project. It almost seemed like "planning for rehabilitation" had never been a priority or even a mandate for the urban planner."

Thus, the project is rather seen as dealing with real estate rather than river rejuvenation. A special report of Down-to-Earth (2008) comments that the river is being squeezed to yield land for commercial, residential and open spaces. Pradhan (2014) opines that the project has not really cleaned the river but rather transferred the polluted water downstream of the 10.5 km stretch.

Recommendations and Conclusion

Sabarmati riverfront development project, proclaimed as a pioneering project, has inspired several riverfront development projects in India such as Yamuna riverfront development project, Ganga action plan, Brahmaputra riverfront development project, Gomti riverfront development project, including Mula-Mutha pollution abatement project. The study recommends the following for Mula-Mutha pollution Abatement Project.

While designing river projects, drawing comparisons between Indian rivers and the Thames, the Seine or the Hudson could be misleading, as these rivers are largely snow-fed rivers, while rivers such as Mula-Mutha and Sabarmati are monsoon fed rivers, hence more uncertain and unpredictable.

A third-party Environmental Impact Assessment should be conducted and projects must be designed based on its recommendations. A comprehensive analysis must be made of a project's impact on river's ecosystem and its hydrological cycle, especially the impact on the downstream of the river.

Rehabilitation of project affected people (PAP) is a major concern for any development project in India. The hardship and pain linked with such

involuntary resettlement should be minimized and incomes to be maintained. Efficient and sensible administration can play a pivotal role in avoiding violence during eviction and minimizing post eviction suffering.

Riverfront development projects when implemented mindlessly change the very nature of the river. Further, stream channelization and reclaiming river banks for commercial purposes disconnects the river from its surrounding ecosystem and increases the risk of habitat degradation, affects its flow and carrying capacity. Also, it is very difficult to resettle and rehabilitate PAPs. Under such peculiar pressures, we must look for alternate solutions. We can also look at the 'Dutch' way by giving more space to our monsoon fed rivers. It is the need of the hour. The city of Nijmegen in Netherlands implemented 'Room for the River' plan² for its river Waal. The city had an 800 years old tradition of building higher and higher dikes to contain river water from flooding the city. However, the heavy floods of 1990s resulted in evacuation of 250,000 people. This prompted the government to take the very drastic decision of moving the dykes back by 350 metres and digging a new channel. The local authorities also sought involvement of local people through many discussions, especially in the area of riverfront development. This helped in reducing resistance.

The solution doesn't definitely lie in replicating or blindly following international best practices. Benchmarking best practices in river restoration is important. However, we also have to tailor them to suit our rivers. More importantly, the thrust should be on safer and cleaner river catchment areas.

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² 'Room for River' project includes four rivers: The Rhine, the Meuse, the Waal and the IJssel.

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Sustainable Cities: The Dark Knight the World Needs

Archana M.V.* and Bhavani Kumara Masillamani

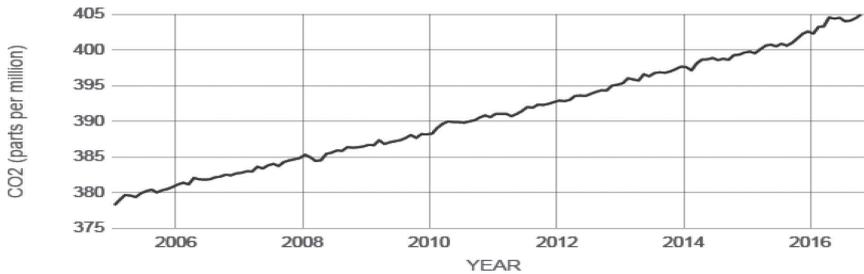
Symbiosis School of Economics
Symbiosis International University, Pune – 411004
*archana.mavnur@gmail.com

Establishing the Relationship between Climate Change and SDG

Introduction and Background

Climate Change as defined by Intergovernmental Panel for Climate Change (IPCC) is ‘the change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in no addition to natural climate variability observed over comparable time periods’. Climate change has been the talk of the hour for quite some time now. It is pretty much on every agenda to be discussed at every formal and informal session. How many of us actually do know that the very first report by IPCC on climate change was published in 1990? The gravity of the issue took about two decades to sink into us. A large section of the world is still unaware of the climate change happening around them. Our technological advancements have reached a new high trying to take over nature. However, nature has proved to us, time and again, what her fury could do to us and no technological advancement will be able to offset the damage of her fury. The global sea level rose about 17 cm in the last century. Statistics reveal that the rate is alarmingly almost double of that in the last decade.

Figure 1 shows us that the increase in carbon emissions level in the last decade has not only been increasing, but has been increasing at an exponential rate. The rapid pace at which the world is advancing in terms of its technology is doing more harm than good to the environment. Defying the laws of the nature and altering the natural course of things by human beings have left us here. The effects of climate change is witnessed by every one of us when we complain of the heat in our city, when we hear of new health hazards coming up, when we wonder if there was enough rainfall in the particular year, or when we prefer shifting to organic farming than the local produce available. Unknowingly, we have been dealing with climate change and its consequences on a daily basis yet, fail to address the bigger issue at hand.



Source: climate.nasa.gov

Figure 1: Carbon emissions (CO₂) parts per million.

A significant portion of the awareness spread is directly accountable to the celebrities addressing climate change at public forums. Mark Ruffalo, Leonardo DiCaprio, Ian Somerhalder, Robert Redford, and Pharrell Williams, have created their own niche when it comes to taking their stand on climatic issues. Apart from the awareness spread across by the famous personalities, a lot of initiatives have been taken up by international organizations. This was primarily done to not just lay down the importance of being aware of the climatic changes around us, but also to emphasize on the severity of its consequences. UNESCO has made climate change education a part of the UNESCO's Education for Sustainable Development (ESD) programme. The Paris Agreement and UNFCCC¹ Article 6 follow from these programmes that support and guide countries to address climate changes. The intention of the programs is to not just make the people of these nations aware of climate change but, also to ensure that the nations adopt policies that address them. One has to understand that the awareness has to reach the grass root level as every individual has a role to play when it comes to either contributing to climate change or the redressal of climate change. Climate change, a prevalent phenomenon has been gaining importance amidst the policy makers for all the right reasons. The increasing level of emissions, regardless of the source, contributes towards making the earth warmer causing climate change. The developed and the developing countries are together fighting the consequences of climate change.

A study using the 2007-08 Gallup World Poll data, 'Predictors of public climate change awareness and risk perception in the world', was conducted by a few researchers from universities like Yale University, Columbia University, etc. to understand the awareness level across different sections of the world and the perception of risk to them (see Figure 2).

The study revealed alarming results when it came to the level of awareness about climate change existing amongst the various sections of people across the globe. About 40 per cent of the adults across the globe have not heard of climate change and this number increases to approximately 65 per cent in

¹ United Nations Framework Convention for Climate Change

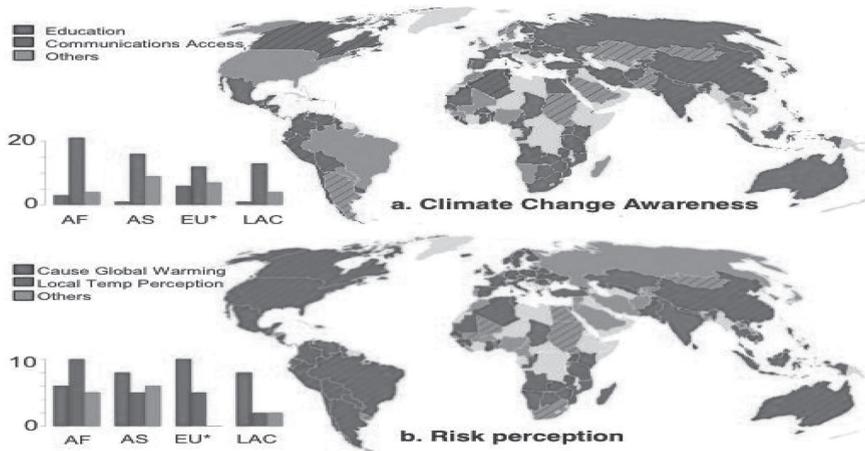


Figure 2: Climate change awareness and risk perception in the world.

Source: Predictors of public climate change awareness and risk perception in the world

certain developing nations like Egypt, Bangladesh and India. There was a vast difference in the understanding of climate change between nations and also, the perception of risk associated with it. For example, people in Latin America and Europe felt more threatened by climate change and its consequences when they realized humans were the primary cause. However, people in African and Asian countries perceive it in more tangible nature like, temperature changes. This brings us to the crux of the paper that climate change is happening pretty much in every part of our nation and a large part of our society have failed to identify the issue.

Literature Review

In this section, we attempt to bring in different studies which have been undertaken with regard to climate change and the migration associated with it. Permanent displacement due to climate changes would take place under three scenarios, such as, increasing the temperature, increase in the sea level and lastly, the extreme weather conditions. It is a well-established fact that the rise in temperature will lead to a decline in the productivity of the agriculture and also, undermines the soil and water resources in the areas affected by climate changes. Since in India the rural population is reliant on agriculture for their sustenance, drought will pose a major challenge for cultivation of crops which will lead to large scale displacement of labourers to urban cities in search of employment. Areas situated in the coastal regions continue to be at risk because of sea level changes which is expected to displace millions of people living in these cities (Panda, 2010). The lack of information to determine the exact number of people displaced because of natural disasters leaves very little scope for defining climate migrants.

However, a few studies in India have explained the climate migration scenario by using the Census and NSSO statistics. According to the available set of data, migration from rural areas has been consistent over the years. While rural-rural migration shows an increasing trend, rural-urban migration is high between different districts in the same state. The major reason cited for rural-urban migration is urbanization, which is combined with a certain level of mobility within the urban areas. While other reasons are cited for migration, employment related reasons are considered to be causing large scale migration. With migration, the process of urbanization has accelerated leading to challenges in the cities (Upadhyaya, 2015).

Along with the migration that happens to urban areas, the pace with which urbanization has been taking place in India disrupts the sustainable growth of the city. The increasing carbon emissions in the cities is causing climate change which is the outcome of the increased population in the cities and over reliance on the non-renewable energy sources. However, the lack of sufficient mechanisms to combat climate change in the cities increases the vulnerability of people residing in the urban cities to climate change. A few studies have focussed on the involvement of the citizen groups and the Local Self Government (LSG) to develop mechanisms which will enable better adaptability to climate change. Archer et al. (2014) brings into perspective the challenges present in the urban cities to adapt to climate change. The existence of Community Based Approach (CBA) helps to tackle the climate change at the ground level because of the involvement of the local groups to bring up mechanisms to adapt to climate change issues in the cities. CBA is a result of rapid urbanization, wherein the involvement of citizens is inevitable because of the large urban areas and scarce resources. Community participation helps to create potential for effective risk reduction whilst, building capacity and devolving authority to the community. Therefore, the urban governance should focus on mainstreaming CBA in making the cities climate change resilient.

The need of involvement of the LSG in adapting to climate change has been highlighted by other researchers as well (Satterthwaite, 2008). Predominantly the lower income groups of people are bound to be affected by any natural disaster. Additionally, the common pool resources such as water, transport and electricity in the urban areas are frequently over utilized, causing mismanagement of resources. Hence, an effective role played by LSG would enhance the utilization of resources and offer mechanisms to tackle climate change.

Climate migration, although a widely known phenomenon, causes slight difficulty for the governments to identify the set of climate migrants. Although there is acceptance at the international level that climate change induced migration has been in prevalence, there are certain difficulties in identifying the section of people who migrate because of environmental factors. In developing countries, where agriculture continues to employ half of the labour force, environmental change tends to affect the agricultural

productivity and cause crop failure resulting in a fall in the amount of food available for the people. In cases of exodus migration, humanitarian efforts will not meet the requirement, and there calls a need for measures to adapt to climate change (Newland, 2011).

The process of urbanization in India is no mean task and comes with a lot of underlying challenges. The transition to urbanization cannot happen unless the challenges are rightly identified and looked into. Amidst the various challenges of urbanization, affordable housing is a major concern in the country. Few researchers have enlisted the challenges of affordable housing in an urban area. The real estate sector in India largely focuses on building houses for the upper middle class society and the responsibility of bringing down housing shortages by providing them with affordable housing lies with the government. Developed land for such purposes at affordable rates is hardly available in the urban areas. The existing laws and title risk mitigation and insurance is yet another aspect that is to be looked at while looking for developed land for construction. From the governance point of view, there exists along process of approvals and clearances which results in delay and confusion. The government struggles to find suitable builders for the same as the cost of capital is alarmingly high with really low return. The banking sector is hesitant to provide loans to such builders as there is a higher risk of the loan turning into a Non-Performing Asset (NPA). The concentration has to be shifted to providing houses that is capable of being bought and rented out. Currently, the focus is simply on houses that is capable of being bought and hence, affordable housing becomes a distant dream (Rana and Rana, 2016).

The levels of urban poverty have fallen through the years; however the absolute numbers still show an increase. The living conditions and access to services for the urban poor is one of the toughest challenges to overcome urban poverty. Lack of access to basic necessities and unhygienic environment puts the urban poor at a risk of being exposed to a larger section of health hazards. The levels of unemployment associated with low or no income in an urban setup where the cost of living is quite high brings their life to a standstill. The schemes to be adopted to reduce the level of urban poverty should ideally have focused on improving the quality of life and sense of security into them. (Loughhead, 2001).

The urban poor is the section of the urban population that have the least access to health services and they're also the ones that happen to need it the most. It is important to look into the aspects of health services and ways to improve the same. The slum residents of the urban population are maximum exposed to health hazards. Malnutrition/under nutrition is yet another prevalent problem amongst the urban poor. Almost more than half of India's poor children are either underweight and/or stunted. The social exclusion is on a large scale when it comes to slum areas as some of the slums are also illegal slums. There also exists the problem of not just inadequate public sector health services but, also ineffective health services. The country's policies prioritize rural poverty

over urban poverty and this makes the process of effective urbanization even slower. Public sector alone cannot meet the demands of the health services in the slum areas and hence, public private partnerships are suggested in the same field. Innovative urban health programming has to be taken up to create awareness and rope in the different stakeholders. (Agarwal, 2007).

Research Gap

The existing literatures largely focus on the aspects of sustainable cities without paying much attention to the need to adapt climate change in the policies designed. Climate change and the concept of sustainable cities cannot be studied in isolation, globally and in India. The change in perception globally and in India for an ideal sustainable city needs to be addressed, too. The challenges caused by climate change induced migration initiate the need to develop a suitable mechanism to mitigate and adapt to climate change related events both in the short and long run. In the next few sections the study follows the reasons for migration from the rural economy and develop the challenges in urban areas caused by the exodus migration. In the conclusion, it reviews the policy recommendations to address the urbanization challenges due to climate changes through mechanisms which are reliable and sustainable.

Objective

To study the potential challenges in urban cities caused owing to the climate induced migration and further contextualize the aspect of sustainable cities and suggest policy recommendations to make the cities sustainable by adapting to climate change.

Methodology

The paper has utilized both quantitative and qualitative research methodologies. The secondary data has been collected from authentic sources such as NSSO, Census data and international research papers to name a few. With the help of descriptive analysis technique the data has been analyzed. Additionally, various methodologies have been used in the study to understand the situation and also provide probable courses of action needed to develop a near perfect sustainable city model.

Climate Change and Sustainable Development Goal

According to a statement released by the United Nations, climate change is one of the challenges facing the nations and acts as a barrier for sustainable development. The SDGs are designed to ensure environment sustainability which were not clearly addressed through the MDGs. The SDGs are intended

to be more inclusive since all the developing nations were a part of the creation of the agenda providing a more systematic approach to tackling the world's problems. While the SDGs are spread across the horizon of problems, it is hard to ignore the way climate change is woven throughout the seventeen goals. In the subsequent paragraphs we discuss in brief a few goals which could get affected for not considering climate change.

The thirteenth goal, which is dedicated to combating climate change, aims to reduce the carbon emission in the atmosphere and also tries to include the aspect of climate change while designing policies at national and international level. Though an exclusive goal addresses climate change under the SDG, all the other goals however get indirectly affected by climate change and issues of adaptability. If poverty needs to be eradicated, the livelihoods of the people should be improved alongside with improving the prosperity and fostering a healthy environment which needs to be passed on to the future generations.

The agricultural growth is directly impacted by the changes in weather and climate related conditions. Higher temperatures and changing precipitation patterns will severely affect the production patterns of different crops. Agricultural productivity will also be affected due to increased carbon dioxide in the atmosphere. Several recent analyses have concluded that the higher temperatures expected in coming years will disproportionately affect agricultural productivity. Therefore, the second goal which focuses on creating new paths for nutrition, agriculture and food systems should consider the impacts of climate change to be successfully achieved.

In order to achieve the target set by the Paris Agreement, there needs to be a significant increase in the clean energy sources and sustainable management and restoration of such ecosystems which in a way help to reduce the greenhouse gas emission while also assisting countries to adapt to mechanisms which help to combat climate change. Current action to combat climate change, including under the 10 year-old Kyoto Protocol, is acting as a catalyst to rapid growth and tumbling costs for renewable energies, such as wind and solar. The seventh SDG could be directly connected to the climate change which ensures access to affordable, reliable and sustainable energy for all. The shift towards a renewable energy means of production and less reliance on the conventional sources of energy for power generation and production needs would enhance the growth of the renewable energy sector. The advancement in the technology and the reduction in the cost of generating renewable energy has spurred the demand for the energy from this sector. Hence, a shift to renewable energy is definitely one of the major steps towards combating climate change. The employment generated in the renewable sector, either directly or indirectly is expected to triple by 2030, which was estimated at 5.7 million people in 2012. Investment in renewable energy, organic farming and sustainable agriculture and livestock could improve environmental sustainability along with combating climate change and generating jobs.

The proposed SDG nine which is aimed at building a climate resilient infrastructure, and promote inclusive and sustainable industrialization along with fostering innovation supports the need to build infrastructures which generate lesser carbon emissions and pollution including the greenhouse gases. Such viable infrastructure options are necessary to combat the change in the climate conditions and offer mechanisms to adapt to a more sustainable means of building infrastructure.

The eleventh goal of the SDG which focuses on sustainable cities and human settlement targets lays focus on adapting to sustainable transport and resource efficient urban areas which have developed mechanisms for garbage management and treatment of water while also allocating resources for the purpose of sanitation. These climate resilient features in urban setup provide solutions for disaster management. However, the urban centres face specific challenges with respect to utilization of resources wherein the resources are often over utilized and mismanaged. The later section of this research paper deals with these challenges in detail and points out how sustainable growth of urban centres could be achieved with the right utilization of resources.

Several other goals, including the proposed SDG twelve and fourteen, focus on the sustainable management of production and consumption and also protection of coastal ecosystems by 2020. Thus, the nexus between the climate change and the SDGs are established and the link is seeming to be getting more evident as the targets which are supposed to be achieved are becoming clearer.

The role of UNFCCC in mitigating climate change and the signing of Paris agreement represents an extraordinary mobilization of understanding that the way humanity has been managing the world needs a radical reset if the future is to be one of promise and opportunity for the many rather than the few. Unchecked climate change threatens to undermine nearly two decades of development gains as a result of increasing and more intense extreme weather events such as droughts, floods and storms. Indeed, achieving the SDGs will be almost impossible if average global temperatures are allowed to rise above the 1.5°C limit. Both the SDGs and the Paris agreement also convey an understanding that there are no quick fixes and that we need to be all together in this sustainable development endeavour over the long haul.

Climate Change in India

Climate change in India is seen in the Himalayan ranges where the caps of the mountains are melting and the hilly regions face landslides, avalanches, floods more often than not. Being a tropical region, some parts of the nation like Gujarat and Rajasthan have seen an increase in their average temperature by each year. The droughts, the frequent cyclones, the floods and increase in pollution levels, are signs that a country like India needs to take up climate change as one of the persistent issues of the country.

According to Agriculture Census 2010-11 report, India has been showing a declining trend in the area operated under operational holdings. Although the number of operational holdings have increased by seven per cent from 2005-06 Census Report to 2010-11 Report, there has been just 0.80 per cent increase in the area of operational holdings. The seven per cent increase is also attributed to the inclusion of Jharkhand in the latest report, undermining the actual increase in the period. About 27 per cent of the GDP is contributed through agriculture and when there are rising concerns about the food security levels in India, the statistics do not paint an optimistic picture. Having concentrated on rice and wheat all these years as our staple produce, the need for pulses have increased through the years and the food security with respect to pulses is fairly low in comparison to the demand for the same. The average size of an operational holding has declined in the latest report, adding to the reasons behind the increase in the number of operational holdings, but not a comparative increase in the area. Apart from various other reasons, the decline in the quality of soil and lesser availability of irrigated area are major concerns for the agricultural population. Climate change affects a developing country in ways that may not be a rising concern for a developed country. The awareness and reach out in the developed countries is not just higher, but also the perception of it varies. Hence, when we look at the effects of climate change on a developing country like India, the resultants are in the productivity decline of agricultural produce, increase in health problems with no increase in average per capita expenditure on health services.

Climate Change as a Hindrance to Sustainable Development

The link between climate change and sustainable development stems from the fact that climate change poses a challenge for the development. Economic development is considered key for the equitable distribution of wealth and resources in the society. While several factors contributing for the growth of an economy are measurable and tangible, there are certain other factors which support the growth indirectly by providing a suitable environment for production and other activities. Climate change is continuing to impact the ecological balance and the human health, whilst impacting the pattern of migration in the world. The effects are also seen on the aspects of education, poverty and access to health care affecting the poorest and the most vulnerable sections of the society.

Although climate change does not get featured in the economic or environmental policies of the developing nations, the adverse effect of climate change is observed in the development of the country. The main concern of the developing countries now are to reduce the risks and vulnerabilities which come in a way of sustainable development. The mechanisms adopted to reduce the carbon emissions into the environment include large scale

shift to renewable energy means of production; however, the infrastructure bottlenecks often constrict the expansion and penetration of renewable energy.

The data collected by IPCC shows that, from 1880 to 2012, average global temperature increased by 0.85 degree Celsius, which when put in context implies that for each 1 degree of temperature increase, grain yields decline by about 5 per cent (IPCC, 2014). This establishes a direct relationship between climate change and agricultural production, making agriculture vulnerable to climate change.

Climate change has also been responsible for changes in livelihood and in a few cases have caused large scale deaths. The report by the UN suggests that, from 1990 to 2013, more than 1.6 million deaths have been reported due to natural disasters around the globe. Additionally, climate change has been causing displacement in the form of exodus migration. Though climate induced migrants have not been given a separate status-quo, the phenomenon has been observed internationally. According to the Global Internal Displacement report of 2015, there are 19.2 million people displaced in 113 countries, of which India (3.7 million), China (3.6 million) and Nepal (2.6 million) accounted for highest numbers.

The further analysis into displacement caused due to climate change shows that the high income countries had a displaced population of 1.8 million people while in the low income countries 9.8 million people were displaced due to climate/weather hazards. This large difference in number signifies that the lower income countries have less capacity to mitigate displacement being caused due to climate change and they do not possess adequate aid and assistance needed to adapt to climate change. The displacement often takes the form of forced migration to urban setup which increases the pace of urbanization. While the growth of urban centres is guaranteed, what often questioned is whether the growth is sustainable and promises welfare.

To achieve this, there is a need to adopt to sustainable living in all the aspects of life. From a low carbon emission means of production to a sustainable transport, the inclusion of sustainable approaches are critical and indispensable.

Issues Combating Climate Change and Adopting Sustainable Development

There is a two-way relationship between climate change and sustainable development. While climate change impacts the natural and human living conditions which is the basis for the economic development, the over utilization of resources for the purpose of development increases the carbon emission and other effluents in the atmosphere. Hence, there is a trade-off between the level of emission and the development which takes place.

Studies which have been undertaken for India with respect to climate change shows that India is vulnerable to climate change and the mechanisms

adopted by India to tackle the impact of climate change is not sufficient. The problem of sustainable development in India is fuelled by the lack of availability of clean energy sources and dependence on the conventional sources of energy for the purpose of production. India at present produces 60 per cent of energy from coal while only 16.2 per cent of electricity is sourced from renewable energy. Norway has the highest percentage of electricity sourced from renewable energy (98%), followed by New Zealand (79%).

At the Climate Conference held in 2015, India made a pitch to generate electricity from the clean energy sources if the funding from the developed nations is adequate to invest in technology.

The impact of climate change is also observed on agricultural output in India. As discussed earlier, agriculture is one of the major source of greenhouse gas emission. According to a study conducted by the Indian Council of Agricultural Research (ICAR), the annual wheat output may decline by four to five million tons with every one degree increase Celsius rise in temperature. The impact of climate change can be mitigated by modifying the farming practices, such as, reduce the emission of greenhouse gases which arises from the paddy fields and farm animals. Agriculture sector is marginally dependent on the weather conditions and any slightest change in the climate is expected to harm the productivity levels. Over the last decade or so, climate change in terms of high temperatures and lower precipitation levels seem to have impacted Indian agriculture. According to the State Action Plans on Climate Change (SAPCC), 65 per cent of the Indian terrain is drought prone, 12 per cent area is flood prone and the 8 per cent of the area is cyclone prone. Apart from impacting agriculture, climate change impacts the allied activities such as fisheries and forests. Kannur in Kerala and the areas near Sunderbans have been included in the high vulnerability list because of the mangrove forests. With rising sea levels, islands are disappearing and the increasing salinity in the water and soil has severely threatened the health of mangrove forests and the quality of soil and crops. Therefore, the vegetation and allied activities often take a setback because of climate change.

To understand the impact of climate change on agriculture, we have considered the area under cultivation and compare the trends over the years (Table 1).

The area under cultivation has not increased significantly over the last four decades. Similarly, the production (million tons) is growing at a slow pace. Although the area under irrigation has increased substantially, the yield in comparison to the area sown has been nearly consistent. It has been already observed that the percentage of people employed in agriculture has fallen considerably over the past few decades which could be cited as one of the reasons for the constant yield. A few studies have suggested that production of labour intensive crops like rice and wheat are often affected due to the non-availability of labour. The economic survey 2015-16 has showed that the yield of crops like wheat, rice and pulses are low. The reason cited for

Table 1: The impact of climate change on agriculture

<i>Year</i>	<i>Area</i>	<i>Production</i>	<i>Yield</i>	<i>Area under irrigation (%)</i>	<i>Annual rainfall</i>
1950-51	97.32	50.82	522	18.1	1117.4
1960-61	115.58	82.02	710	19.1	1277
1970-71	124.32	108.42	872	24.1	1235.95
1980-81	126.67	129.59	1023	29.7	1176.5
1990-91	127.84	176.39	1380	35.1	1285.8
2000-01	121.05	196.81	1626	43.4	1070.3
2010-11	126.67	244.49	1930	47.8	1064.13

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Rainfall Data, IMD

the low productivity is that the land dedicated to growing pulses is mostly un-irrigated and hence there is heavy dependency on inconsistent monsoon for the production of pulses. Therefore, the movement of labourers from agriculture to another sector within a rural set up or to an urban city is not exclusively wilful but also brought about by certain changes in climate which adds up to forced migration.

Taking the area cultivated under two important principal crops, rice and wheat, it can be observed that there has been a persistent decline in the areas under these two crops. This falling productivity could be attributed directly to the lower rates of employment, however, the decline is also brought about by the changes in climate conditions. Considering only ~50 per cent of the land is brought under irrigation facilities, the reliance on rainfall for the crop production is still high. Hence, a failure of monsoon is often followed by drought and failure of crops. Studies conducted in this regard show that 53 per cent of the land being rain-fed, good monsoons increases reduction and offers incentives for the farmers to continue with their cultivation and vice versa.

Climate Change Induced Migration

The analysis above shows that climate change induced migration, which is to some extent a new phenomenon is causing forced migration from areas which are vulnerable to climate change. The World Bank estimates of 2013, shows that of the total employment, 50 percentage of the employment is in agricultural sector for India. This employment ratio, however, has reduced from 60 per cent in 1994. Agriculture, however, continues to be a source of living for the rural population despite the growth of the small scale industries in villages. The declining levels of employment in agriculture suggests that people are seeking employment in other sectors.

The lack of mechanisms to adapt to sustainable agriculture which is aggravated by climate change causes shift in employment from traditional

agricultural sector to formal or informal sectors in urban areas. The movement of agricultural labour is apparent; nonetheless, the migration could also take place amongst the unemployed or underemployed skilled and unskilled labourers in rural area. In the table below, we have represented the migration data from the rural areas specific to the reason of seeking employment. The data shows a declining trend of migration among both males and females in search of employment. Although there is an absolute increase in the total migrants moving from the rural areas, the proportion of migrants who are moving in search of employment is lower than the people migrating for other personal reasons. The report published by the NSSO for 2007-08, showed an increasing trend for the inter-district rural-urban migration between the states (Table 2).

Table 2: Inter-district rural-urban migration between the States

<i>Year</i>	<i>Male</i>	<i>Female</i>
1993	47.70%	8.30%
1999-2000	30.30%	1.00%
2007-08	28.60%	0.70%
2011	16.98%	0.01%

Source: NSSO 2007-08, Census 2011

The migration data collected by CSO as a part of Census categorizes the reasons for migration under different sub-headings. For the purpose of our study, we have not considered migration taking place for the purpose of education and marriage but only focusing on the migration taking place seeking employment. The net rural urban migration increased by 56 per cent from 2001- 2011. The migration seeking employment has shown a decreasing trend because of the exclusionary characteristics of the urban economy where there is a high competition among the labourers to get employed. Additionally, the high standard of living in the urban cities does not work as a pull factor for migration. However, the migrants who are locating to the urban cities in search of new means of livelihood includes a section of people who migrate because of low returns from cultivation. The rural-urban migration induced by climate change, though not exodus at present, definitely throws light on the possibility of the sudden spur of internal migration in case of a large scale natural disaster. As discussed previously, the climate change which is forcing certain sections of population to migrate to the cities in search of employment increases the burden on the already existing population in city who are unemployed. Hence, the migration to the urban cities is often accompanied by the challenges which could worsen the standard of living of the people migrated. The migration data showcased above includes seasonal migration, which implies that there could be reverse migration in cases where the change in weather conditions are temporary.

The rate of migration from rural-rural has seen an increase over the years indicating that the rural population is migrating between the traditional economic activities. The penetration of the informal economy into the rural area is seeming to be absorbing the additional labour supply who are moving away from cultivation. The employment generation schemes which are introduced in the rural areas as a part of providing employment does not offer a longer duration of employment and the wage levels do not attract many labourers. Additionally, many agricultural labourers seek employment under these schemes only in the non-agricultural season, which implies that in the time of crop failure, the agricultural labourers has an option of either migrating to another rural area or get employment under the scheme. Hence, the larger part of rural-rural migration consists of labourers who are moving away from cultivation or labourers who move to cultivate land in different rural area.

In our paper, since the focus is laid on migration to urban cities, it also seems important at this point to speak about the climate change challenges which are majorly prevalent in the cities and the adaptation mechanism in place to fight climate change.

Climate Change and Sustainable Cities

Linking Climate Change and Sustainable Cities

The cities are more than often considered to be the origin of climate change issues and contributing the most for the greenhouse gas emission, approximately 70 per cent². However, this overshadows the fact that the cities could also be the incubators for solutions to climate change. The increasing pace of urbanization and the failure of the cities to manage the impact on the environment is the core of the problem. Understanding the contribution of cities to climate change will necessitate the intervention of the local level bodies and with better urban planning and greater citizen participation it is easier to combat climate change.

There are multiple solutions which are listed down to make the cities sustainable and capable of combating climate change. The COP21 brought cities into spotlight by making the mayors and the LSG to act in time to make policies to include climate change. This is indeed necessary to achieve the goals which are set forth in the accord. Sustainability of cities is also promoted through the SDGs which is intended to consider the changing face of urbanization. The report published by the UN on the SDGs shows that more than half the world's population are city dwellers at present, and the numbers are expected to increase by 2030. As the demand for urbanization increases there is a demand for well-managed cities which adapts sustainable measures of urban processes. Despite numerous challenges the sustainable approaches

² http://mirror.unhabitat.org/downloads/docs/E_Hot_Cities.pdf

in the cities could play a major role in promoting sustainability and be the key driver of sustainable development.

However, the exodus migration to cities seeking better life and opportunities often leads to an unbalanced growth of cities with limited access to housing, water and sanitation and other civic necessities. The growth in urban centres is often accompanied by the growth in the slum-like conditions. Globally, more than 880 million people were living in slums in 2014. This estimate does not include people in inadequate or unaffordable housing. Additionally, as the population in the cities outpaces the available land, the cities tend to expand beyond their formal administrative boundaries which becomes a challenge for the civic authorities to connect the mainstream city population with the urban sprawl. Unplanned urban sprawl undermines other determinants of sustainable development. For example, for every 10 per cent increase in sprawl, there is a 5.7 per cent increase in per capita carbon dioxide emissions and a 9.6 per cent increase in per capita hazardous pollution. This illustrates the important interlinkages across the goal of sustainable cities and combating climate change.

The cities also need to adopt to mechanisms to manage the solid waste since the increase in urban population will intensify the per capita waste generation and the process of the collection and safe disposal of solid waste will continue to require serious attention. Additionally, the increase in levels on urban pollution disrupts the sustainable growth of the cities. The quest for sustainable and coordinated urban development starts with national policies and regional development plans. As of 2015, 142 countries had a national urban policy in place or under development. Those countries are home to 75 per cent of the world's urban population.

The SDG which lays focus on the sustainable cities aims to support positive economic, social and environmental factors which links the urban and rural areas by strengthening the planning process. By adopting inclusiveness and sustainable urbanization the cities are expected to be integrated and offer sustainable human settlement along with planning and management.

Concept of an Ideal Sustainable City

Sustainable city, as envisioned, is ideally sustainable from a larger perspective. However, the problem lies within the definition of an ideal sustainable city. A universal definition cannot be given to an ideal sustainable city that each nation may readily adopt and work towards achieving the same. The perception varies from a developing nation to a developed nation.

Predominantly, in a developed nation, the indicator of a sustainable city is moving towards a greener city; however, in a developing nation, existence of a city and delivering services to make the city habitable are a bigger concern. In a developed nation, a sustainable city is a city where there are green urban

areas, biodiversity friendly, and respect for urban heritage, green mobility and sustainable land use, amongst others. Such urban centres do not face issues relating to adequate sanitation, sewage treatment, housing needs, medical facilities as much as the issues are prevalent in a city of a developing nation.

India, being one amongst the developing nations and also, one of the highest populated country, cannot ideally take up a global definition of a sustainable city and work towards achieving the same, when the basic services to improve on are non-existent in the nation. The richest one per cent of Indians own 58 per cent of the nation's wealth, showing where we stand on the levels of inequality existing in the country. Indian cities, with the rapid urbanization and population explosion, have to be looked at in a way to provide better housing facilities, transportation accessibility, safer sewage treatment, increase in employment opportunities, drinking water facilities, food security, higher quality of medical services and a pollution-free habitat to live in. Indian cities have an urgent need to be on the global front of an ideal sustainable city; however they are also the ones largely failing to achieve the same.

Indian Cities and Sustainability

Transforming the sustainable development goals into reality is a vision to be achieved by 2030. India, being a developing country with rapid urbanization, is predicted to gain almost 75 per cent of its GDP from its urban India. At the Global Partnership Summit on Smart Cities last year at Delhi, Union Minister Prakash Javadekar called urban planning our single most failure after independence in 1947. The statement was primarily due to the lack of waste treatment in India, which happens to be one of the biggest challenges of the urban cities.

The increased need for addressing sanitation in the country arises from the millions of people forced to live in illegal settlements due to the disparity in the need for housing and the availability for the same. The urban poor community have never been able to put adequate pressure on the government to have their needs met, despite their political importance and participation, as a community. This brings us into the lack of adequate governance and the failure of existing governance prevailing in the country. By 2050, India's urban population is expected to double the current population level. As per McKinsey's Report on sustainable cities in India, it has been predicted to have a population of 590 million, which is almost twice as the population of United States, in 2010.

While talking about India's development as a nation, creating sustainable cities is not just beneficial from the income perspective, but the quality of life promised in a city is higher than in rural areas. Adequate capital funds to meet our nation's rising demands have always posed itself as an issue, being World

Bank's highest borrower as of December, 2015. The proportion of the funds spent on improving and delivering the services is cost effective by around 30-50 per cent when it's planned across densely populated areas in comparison with providing the same in sparsely populated areas. Drawing a comparison with cities of developed countries like New York or London, the investment made across these urban centres have a huge gap. In every annual Financial Budget, Mumbai always has a higher budget than the fellow cities. As per the 2013-14 budget, Mumbai's budget was about Rs. 29,415 crore which was about six times lesser than the budget for New York in the year 2014-15, with lesser levels of population.

Challenges Faced by Indian Cities

Climate change is real and happening and so is the rise in the climate change induced migration. Having established the changes that's happening around in India, it's time we look into the most important aspect of how the country should be tackling the migration taking place. Our urban cities are ever expanding, intentionally or unintentionally. However, the question arises as to if the urban cities are growing at a rate higher than the population increase in the urban areas. Climate refugees are on an increasing trend with most of the urban areas being unequipped to absorb them.

As per Census report in 1993, the urban poverty headcount ratio was at 31.8 and the most recent Census report of 2011 stands at 13.7. There has been a fall in the ratios over the years; however, the urban population has been increasing in a way that the statistical data show us a percentage decrease and remain on the increasing trend in the absolute numbers. The biggest challenge when it came to urban poverty was the increase of slum areas in the vicinity. The rising inequality gaps in the urban areas is more prevalent in most of the major cities of the country. 17 per cent of urban population live in slums as per the report which showed an increase from 15 per cent in the 2001 report (see Table 3). The two figures are hard to compare, as in the 2001 report, only the statutory towns that had population over and above 20,000 were taken into account and in 2011 report, all of 4041 statutory towns were considered. It is presumable that the 15 per cent in 2001 has been largely understated and there has been a sharp increase in that decade. Apart from this, there's a proportion of slums, which is slightly over 37 per cent, that is unrecognized. The state governments refuse to categorize them as defined slum areas as they would have to work on providing basic services to a larger section of people. Maharashtra is on top of the list with the highest number of slum households followed by Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Orissa and West Bengal. Ironically, Mumbai is the metropolitan city with the highest GDP in the country, but also has an exorbitant rate of 41.3 per cent of the total slum households.

Table 3: Number of slum households in the States

<i>All-India/State/Union Territory</i>	<i>Total (%)</i>	<i>Rural-2011 (%)</i>	<i>Urban-2011 (%)</i>	<i>Difference (%)</i>
Assam	37	28.4	84.1	55.7
Bihar	16.4	10.4	66.7	56.3
Maharashtra	83.9	73.8	96.2	22.4
Odisha	43	35.6	83.1	47.5
Uttar Pradesh	36.8	23.8	81.4	57.6
All-India	67.2	55.3	92.7	37.4

Source: Census Report, 2011; Access to electricity

Census 2011 report reveals that almost 93 percent of urban India has access to electricity. In a country where the inequalities in the cities is the highest, a large portion of it may be taken up for consumption by industries, service sectors and households above the poverty line. Access to electricity cannot be the only factor of concern here; it is more important to ensure that it is being efficiently used by different sections of the society and more evenly spread out in terms of ease of accessing the same. The sharp contrast in access to electricity between the rural and urban areas in states like Assam, Bihar, Uttar Pradesh and Orissa has to be brought to notice as access to electricity may push the rural population to migrate towards urban areas.

The migration of rural population into urban areas also puts a strain on the existing medical facilities in these areas. The biggest challenge that we perceive is providing access to medical facilities to every individual in these areas. However, there is a need to shift focus from providing access to improving the quality of medical facilities. The gap between the private sector medical facilities and the governmental medical facilities has to be brought down in order to have a smooth transition into urbanization of the cities.³ The carbon emissions level in India has shown an increasing trend with increase in urbanization. The carbon emissions here is higher than in countries like Australia where the atmosphere has a depleted ozone layer. Interestingly enough, the per capita expenses on health services there is higher than India. The pollution levels in the cities do not see any fall despite the governmental measures. As per the Eleventh Plan reports, 59 per cent of pregnant women in the rural areas face anaemia as a health hazard and it comes as a surprise that there isn't much of a difference in the percentage in the urban areas which stands at 54.6 per cent. The prevalence of anaemia in children of the age group 6 months to 35 months is pretty high in the urban areas at 72.7 per cent. The doctors in position as of 2015 reports, surpasses the need for doctors

³ Data collected from WHO and CDIAC; http://apps.who.int/nha_database; http://cdiac.ornl.gov/trends/emis/meth_reg.html

in a given area. However, when it comes to specialists, the need for these specialists is five times more than what is available. This emphasizes that the holistic picture shows an increase in medical facilities but, the quality of medical facilities is still unevenly spread. Speaking about illnesses and diseases, malnutrition is still a major issue in India. WHO and UNICEF reported the child malnutrition levels in 2013-14 in which India had about 30 per cent of the children under the age of 5 termed as 'underweight' and 38.7 per cent were termed as 'stunting' which means they were below minus two standard deviations from median weight and height, respectively. Ensuring food security in India is a necessity when there's an increase in the urban poor, but no proportionate increase in their level of income.

The migrated population to the urban areas usually fall into lower income category and hence, the divide between the skills they possess and what the labour market is looking for is quite large. The employment opportunities have to be improved to ensure the unemployment levels are reduced. However, there is a bigger need to improve the skills of these people. The education sector has to be more inclusive in nature and provide quality education to meet the needs of the market. The World Bank report tells us that India is listed 113th on teacher-student ratio, despite being one of the most populated countries of the world. India is a country rich in human capital and there's a large section of the society with unstable income. There's a heightened sense of need for that section of people to earn better incomes and with rapid urbanization, it is a necessity to tap the potential and absorb them into the working force of the nation.

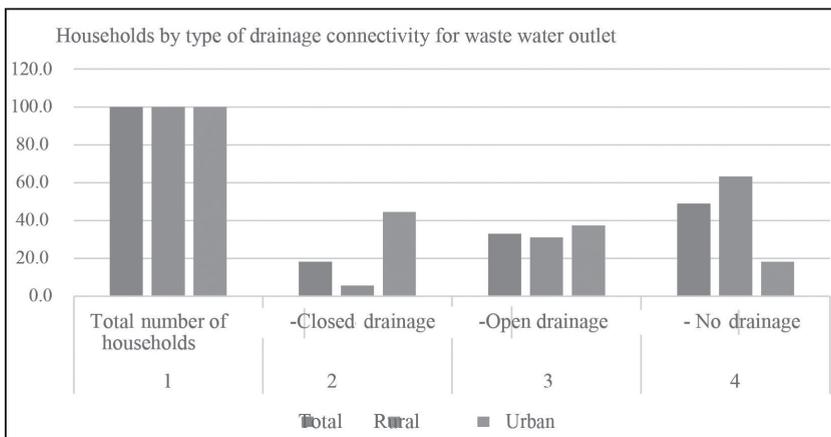


Figure 3: Type of drainage connectivity for waste water.
Source: Census Report, 2011.

One of the prevalent issues of urbanization is the housing problem in urban areas. The problem can be looked at in two different angles: affordable housing and spacing restrictions. Urban real estate reached an all-time high in the late

2000s and has become stagnant now. As per the 2011 Census Report, about 68.5 per cent of houses are termed as 'good' in the urban areas. Apart from the housing shortage in the urban areas, the quality of the houses being built in the area is also largely debatable now. In an era of construction processes using the latest technologies, only 30 per cent of the households in the urban areas are predominantly covered with mosaic/floor tiles. An estimation of number of households requiring a separate dwelling unit to take care of the congestion problem in households came up to 14,986,312 houses which is about 19 per cent of the estimated households. Rampant shortages in terms of housing is one of the biggest concerns in urban areas. The ever increasing population and the urbanization growth rate need to go hand in hand to curb these issues. However, the macroeconomic issues in terms of housing show that in order to improve these conditions, the pace of implementing these policies have to be faster and effective in nature. The paradox here is that urban India witnesses a high housing shortage on one side and an increasing stock of vacant houses in different parts of the cities. The shortage couldn't be mapped with the vacant houses though, as the vacant houses are built primarily for the middle income and higher income category of people. This is where the affordability of the housing in India is brought into picture. These houses remaining vacant also brings another issue to our notice that the space occupied in constructing the vacant houses have been wasted away when spacing of building infrastructure into the urban areas is a growing issue.

There is a dearth of developed land at affordable rates to meet the housing needs of the poor. Macro economically speaking, it is not possible to accommodate the ones facing the shortage into the vacant houses as we run a risk of lowering the GDP value of the real estate sector in the urban areas. The existing households also face a problem of proper sanitation and drainage facilities which in turn leads to increase in health hazards to the sections of the society that are not equipped with enough medical facilities. Garbage management has always been a concern for India and addressing this issue will also make the other related issues comparatively easier to handle. Only about 62 per cent of the households in the urban areas are facilitated with treated tap water and the proportion of these households pertaining to the urban poor is lesser, understating the water needs of the urban poor further. 55.5 per cent of the households do not have the facility of a closed drainage system, out of which 18.2 per cent have no drainage facilities at all (Figure 3). Inefficient drainage systems make the people more prone to various diseases, hygiene issues and also, undisposed sewage increases the level of carbon gases in the atmosphere damaging the environment in the process.

Policy Recommendations

In this section, we bring forth a few policy recommendations to tackle the extent of climate change migrants and also suggest a few measures to adapt to

climate change in cities and focus on a sustainable urbanization to incorporate the climate migrants.

Renewable energy: While renewable energy is considered as one of the best mechanisms to adapt to climate change, the knowledge and the adaptation of renewable energy in India is limited to certain section of people in the urban cities. Renewable energy sources help in displacing the emissions from fossil fuel. The penetration of wind and solar energy has been remarkable in both Wind and Solar energy. The energy sector in India has seen a transformational change with progressive policy-level changes and effective implementation of directives. These changes promise enormous opportunities for various stakeholders and market players.

Energy, which is one of the key enablers of economic development, is demanded by various sectors of which power sector is the largest consumer of the energy. While the per-capita electricity consumption has been increasing at a faster pace, the generation of electricity as on June 2015, stood at 275 gigawatts (GW) with a contribution of 69 per cent from thermal energy, 15 per cent from hydro, 13 per cent from renewable, and 2 per cent from nuclear sources. In recent past policymakers have initiated multiple steps to increase the contribution of the renewable energy sector. According to the Ministry of New and Renewable Energy (MNRE) grid connected renewable energy sources include small hydel projects (<25 MW), bagasse cogeneration, biomass power, urban and industrial waste power, wind and solar power.

Expansion of renewable energy resources could increase India's energy security while reducing its dependence on imported fuels. Not only are renewable energy resources generally immune to fuel price escalations, they also accrue significant environmental benefits through near zero carbon emissions.

The renewable energy sector in India faces major infrastructural issues in terms of connectivity to grid and availability of land for the generation of solar and wind energy. Although several state governments have taken up the initiatives to promote renewable energy by floating tender, the existing infrastructural problems pose a greater challenge for the generation of energy from renewable source. Alongside with improving the infrastructural facilities for the generation of renewable energy, people should be made aware of the need to shift to renewable energy source. A seamless shift to renewable energy source in both urban and rural area is bound to slow down the setting of climate change. The IPCC 2014 suggests that the new technological adaptation in the renewable energy sector has caused the decline in the costs of the renewable energy equipments. Hence, the need for investment in the renewable energy sector is driven by the need to curb the carbon emissions into the atmosphere and slow down the onset of climate change.

The target set by India to meet the renewables production cannot be achieved by relying on solar energy alone. There needs to be equal encouragement given to renewables from other sources, such as from wind mills, small hydro

and biomass. Though the contribution from these renewable sources are less as when compared to solar, they are however needed to achieve the targets of renewable energy production in India. MNRE has been taking up a few measures to promote the renewable energy production in all the states. While it is necessary to draw in policies to promote renewable energy, it is also equally important to bridge the gap in infrastructure and distribution losses to enable that the private investment in these sectors take place. A few recent projects have been initiated in Tamil Nadu and Karnataka to enhance the penetration of solar energy to combat climate change has been accepted and appreciated. These efforts need to be deployed pan India to be able to achieve the renewable targets and also to control the temperature change as a means to combat climate change.

Adaptation mechanism by the Local Self Government (LSG): The earlier discussions show that the ability of the city municipalities to adapt to climate change in the urban cities is limited. The urban governance should be inclusive of mechanisms to address the climate change problems arising in the urban space. The municipal government in each city level should need to integrate climate change and other hazard mitigation concerns into the primary landuse and zoning instruments, into city structure and development plans, and into zonal development plans and appropriate building regulation and infrastructure development guidelines.

Apart from involving the municipal governments, there should be good amount of representation from the neighbourhood level in addressing the climate change. Literature in this regard have supported the involvement of communities to enable them to protect the common pool resources such as water, electricity and other commonly owned resources. Hence, involvement of the neighbourhood in the informal settlements in the urban areas to educate people about climate change and the mechanisms to adapt to climate change will prove beneficiary. Disseminating knowledge about climate change and the need to opt for a sustainable livelihood will help to reduce the carbon emissions.

The biggest challenge of adapting to climate change in urban area is the declining quality of urban governance and the weak institutional capacity to manage urbanization, ensure equitable and quality public service delivery, and access to housing markets via appropriate planning and regulation. Without these institutional changes, the structural vulnerability of large populations cannot be addressed, providing a weak foundation on which to build climate adaptation.

Table 4 provides municipal budget in the year 2013-14 for the top five cities. It is evident that about 30 per cent of the budgeted figure is spent on capital expenditure. Inadequate capital expenditure in urban areas is an issue that needs to be addressed, if we are setting the global cities as our benchmark. The pace of meeting the infrastructural needs of the cities has to outclass the pace of urbanization. While looking at the per capita figure, the budgeted

figure may seem sufficient to meet the needs. However, implementation of policies and execution of most policies remain just on paper.

Table 4: Top five cities with the highest municipal budget

<i>City</i>	<i>Budget (2013-14) in Rs crore</i>	<i>Budget per capita (in Rs)</i>	<i>Capital expenditure (in Rs Crores)</i>	<i>CapEx per capita in Rs.</i>
Mumbai	29415	23641	9440	7587
Bangalore	9730	11523	3083	3652
Hyderabad	4476	6649	1313	1950
Ahmedabad	4136	7414	1816	3256
Pune	3633	11628	1253	4010

Source: Municipal Budget 2013-14

Execution of policies has always been an issue in India. According to the Municipal Budget 2013-14, in the major cities of the nation, for every 100,000 citizens, the highest is 1260 employees in Delhi with decreasing numbers in the other cities (Table 5). With faltering budgets, disproportionate distribution of the budget, lack of municipal employees, addressing the issues of urbanization is bigger than it may seem. The local bodies need to be given more freedom in making use of the allocated budget, apart from improving the standard of the municipal employees employed and increase in the distributed proportion of allocated budget.

Table 5: Employee per 100,000 population for top five cities

<i>City</i>	<i>Total employees</i>	<i>Employees per 100,000 population</i>
Delhi	139000	1260
Mumbai	111339	895
Kolkata	36424	810
Ahmedabad	33219	596
Bangalore	27245	323
Hyderabad	25738	382

Source: Municipal Budget 2013-14

Awareness and perception of climate changes: Creating awareness amongst the people poses itself as a challenge while moving towards a climate resilient urban centre. An unimpressive literacy rate combined with the lack of vocational education system does little to create awareness across the country. The reach might be slightly better in the urban areas, however, a large section of the population still live in the rural areas and it is important to spread across the awareness and how it is to be perceived. Every individual's smallest of

actions lead to climate change is the concept that has to be imbibed into the nation emphasizing that it takes a similar participation of every individual in addressing the issue.

SMART cities: This programme is essentially a bottom up approach towards urban development where the citizens are involved into making their livelihood a better environment in terms of pollution levels, resource management, better governance, efficient urban mobility and transport, health and education, amongst the others. However, since the plan involves citizens on a large scale, it is important to ensure that the citizens are well informed about the plans and envision the same goals as a society. Also, the information technology sector need major reforms in how they secure the large amount of data. Cyber security policies need to be given top priority to prevent the scheme from turning out to be counterproductive. The planning committee for this programme needs to ensure that the committee consists of people of various expertise ranging from architecture and planning, urban economists and practitioners, environmental specialists to big data analysts.

Urban development in India is seen largely from the civil industry perspective and does not factor in the socioeconomic impacts of building such a city. Urban development across the globe goes hand in hand with urban economics and forms an integral part of the planning process. The understanding of the need for including an urban economist during the planning stages of such cities and the importance given to them is fairly new in India. This can be accounted to the failure in building a sustainable city when the socioeconomic impacts of building a city is not given ample significance. Unplanned cities, constructing households over marsh lands, lack of sufficient lighting and spacing within the houses, non-eco-friendly houses, and inefficient sewage systems are the resultant of such haphazard planning, which creates further more challenges. Addressing new challenges created by faulty planning and governance at a time when the focus is on creating and developing sustainable cities takes away the time, funds and focus of the main issue at hand.

Conclusion

The globalization process has more or less helped in the easing of the geographical barriers across nations. In today's world, no country can go forward with growth and development isolating itself from the rest of the world. This brings us to the acknowledgment of climate change in different parts of the world and also, look at how it's impacting India. Our analysis shows that different sections of the economy in India are being affected by climate change. There is a need to address climate change in the country and also, ensure that the macroeconomic policies implemented for the development of the economy are keeping the environmental concerns in

mind. The process of developing a sustainable city cannot be taken up by ignoring the climate change prevalent across different sections of the country. Urbanization, in itself, causes detrimental effects to the environment and hence, it is important to not let it convert into a vicious cycle. The programmes and schemes proposed for urbanization will be ineffective in the long run, if climate change are placed low on the priority list. The adaptation mechanism to climate change's challenges in urban centres should be coupled with the mitigation programmes which promotes spatial adaptability. Therefore, an effective implementation of the suggested policies by spreading awareness about climate change and by endorsing the usage of clean energy, the impact of climate change can be minimized. Additionally, LSGs should act independently and focus on adapting to mechanisms which would promote sustainability.

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Assessing Double Injustice of Climate Change and Urbanisation on Water Security in Peri-Urban Areas: Creating Citizen Centric Scenarios

Arvind L. Sha, Priyanka Agarwal* and Manasi Nikam

Public Affairs Centre, KIADB Industrial Area
Bengaluru – 560105, Karnataka
*priyanka@pacindia.org

Introduction

Urbanization is a prominent vehicle of development in the global south. Studies of development have traditionally categorized space into urban and rural, with each category being prescribed certain characteristics. Over the past decade, a new amalgamated space that straddles the boundaries of both these categories has been drawing the attention of scholars. Known as the ‘Peri-Urban Interface’ (PUI) or ‘Peri-Urban Area’ (PUA), this area is defined as a zone of (dynamic) transition or interaction between urban and rural areas (Simon, 2008b). The PUI is a result of continued urbanization. This zone is characterized by the conversion of agricultural and forested land into residential, industrial, commercial and recreational spaces, often accompanied by select infrastructures such as roads and power stations (Simon, 2008a). Accompanying changes in land use is a shift in the livelihoods of peri-urban dwellers from agriculture to secondary and tertiary services. Peri-urban areas are often characterized by a lack of institutional capacities and governance structures to respond to the changes happening in their area (Shawn, 2005). This can be ascribed to the jurisdictional ambiguity that arises, as municipalities manage cities and villages are managed by panchayats – which body has authority over which sectors of the peri-urban space can vary (Prakash, 2014). Also, lack of cooperation and the absence of coordination among the various governmental bodies often results in peri-urban issues not being addressed effectively (Prakash, 2014).

The 2011 Census of India reports that the urban population grew by 31.8 percent, as compared to the rural population, which grew by 12.18 per cent. Over 2774 new towns have come up in a decade (Census, 2011).

Many of these towns are part of Urban Agglomerations. A consequence of this urban expansion is the unprecedented pressure it puts on infrastructure and resources, especially water. Most cities in India are facing severe water insecurity, in terms of quality and quantity of water as well as access to water. Municipal corporations are unable to cope with the rising demand for water due to the unwarranted exploitation of existing resources within the urban core. Over time, an enormous informal water market has risen in several cities to bridge the rising demand–supply gap. Water is sourced from the peri-urban regions, which are usually richer in surface and groundwater, and is supplied to the increasing urban economic class who are willing to pay for a constant supply of water. Such exploitation has led to over-extraction of surface and groundwater in peri-urban areas, causing resource depletion as well as a shortage of water supply to the peri-urban communities themselves. Thus, the requirements of peri-urban communities are not met. In addition to this, peri-urban areas are at the receiving end of the wastewater, industrial and domestic wastes produced within cities, and suffer consequences in the form of polluted rivers, and damaged ecosystem. Along with increasing demand, climate change has negatively affected precipitation patterns, making water a scarce resource. This battle for water, a scarce resource, has given rise to a resource conflict between urban and peri-urban communities.

Research suggests that water security in peri-urban issues have been overlooked in urban planning. The targets of Sustainable Development Goal 11 underscore the establishment of positive linkages between urban and peri-urban areas by strengthening national and regional development planning. This paper emphasizes the need for cohesive planning between urban and peri-urban communities to ensure that resource scarcity does not lead to resource insecurity. In line with the targets of SDG 11, the paper provides a platform for communities and policy actors to interact and thus undertakes a participatory approach in urban planning. Similarly, administrative systems of both these spaces must collaborate and review their resource management policies to realize the goal of an inclusive, sustainable and resilient city. The paper also highlights the need to support and strengthen local community participation to improve water and sanitation management as mentioned in SDG 6.

The city of Bengaluru is expanding rapidly and to meet the needs of development and rising population, it draws water from the river Cauvery, which is around 200 km away from the city. According to an analysis by IndiaSpend, 2016 Bengaluru consumes 50 percent of the Cauvery water reserved for domestic use in the state of Karnataka. Meanwhile, the city also draws water from its peri-urban areas. This research paper documents the experiences and perceptions of peri-urban communities on water security, through a case of peri-urban areas around Bengaluru. Manchanayakanahalli gram panchayat Ramanagar district of Karnataka was selected as the study area. This gram panchayat was selected due to its proximity to Bengaluru and

the Bidadi Industrial Estate located in its periphery. Seven villages namely, Manchanayakanahalli, Shanamangala, Hejjala, Talakuppe, Billakempanahalli, Lakshmisagara and Inorapalya, were studied.

Literature Review

Increasing urbanization has put unprecedented pressure on urban infrastructure and resources, especially water. So how is urban India accessing its water resources? Narain (2011) in his analysis of water issues in peri-urban areas highlights that the problem is not merely one of *scarcity* but that of *security*. Water security is ‘the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability’ (UN-Water, 2013). Narain identifies three domains over which conflicts to water resources take place—quantity of water, quality of water and access to water sources. These three categories also emerge in Allen et al.’s (2006) investigation into a group of people termed as the ‘peri-urban water poor’. The defining features of this group include ‘informal/illegal access to water, access to poor-quality water and insufficient access to water’ (Allen et al., 2009).

Given the proximity of peri-urban areas from the city and the free availability of open spaces, peri-urban areas often become dumping grounds for urban waste (Prakash, 2014). Such a state is largely attributable to the lack of industrial regulations in peri-urban areas, where effective environmental governance is present in negligible amounts (Simon, 2008b). Several scholars even suggest that it is precisely this lack of stringent regulations in the peri-urban area that drives polluting industries away from the urban core (Shaw, 2005). Unregulated waste disposal results in severe environmental and health issues for peri-urban populations and contaminates the land and water resources that households depend on for livelihoods and sustenance (Simon, 2008b). A study by Musa et al. (1999) in peri-urban areas of Omdurman, Sudan found a high faecal coliform count in drinking water, which put communities at a risk of diarrhoea. Depending on the extent of contamination, peri-urban households may resort to buying water from sources such as mineral water companies. However, it is not uncommon for low-income households to consume water of poor quality due to the lack of alternatives (Simon, 2008b).

Apart from contamination problems, there is an increased pressure on the water in peri-urban areas as urbanization of previously rural space inherently increases demand for water thanks to population expansion and industrialization (Lakshmi and Jakarajan, 2005). Moreover, the densification of cities and the depletion of sources of water that had originally been supplying water to cities, puts additional pressure on the water in peri-urban areas, causing the flow of water to shift from peri-urban to urban areas (Ahmed and Sohail, 2013).

Janakarajan et al. (2008) describe how the Metro Water Board transports 6000 tankers of water daily to Chennai city from its peri-urban areas. Thus, the availability and accessibility of water for peri-urban residents becomes contested. Also, mineral water companies extract groundwater, purify and sell it, further increasing the pressure on peri-urban water resources (Janakarajan et al., 2011). In May 2016, 4000 bore wells in and around Bengaluru went dry, possibly due to overexploitation (Deccan Herald, 2016). Thus, adversely affecting the regenerative capacity of groundwater systems. Narain (2011), while analyzing peri-urban water security in Gurgaon, states that the water table has lowered drastically over the past decade, at times 300% lower than before. Most peri-urban areas lack piped water supply and with a falling water table, low-income households lacking resources to extract water from great depths have no access to water.

At times, peri-urban households have limited access to water sources, owing to their proximity to economic markets resulting in loss of water for other purposes. For example, the dumping and filling up of water bodies, upon which communities have traditionally relied for urban acquisition (Narain, 2010). Water bodies can also become inaccessible to public if their management is transferred to corporate bodies. In their analysis of the peri-urban interface in Shahpur Khurd, Narain and Nischal (2007) note that three ponds in the village, traditionally used by residents, are now auctioned off by the village panchayat to fisheries contractors. Such emerging market relations further threaten the water security of peri-urban communities.

Climate variability has also negatively impacted the quantity of water. For instance, in their study of the Orangi Township in Karachi, Ahmed and Sohail (2013) highlight how continuous poor rainfall over a 10-year period led to a severe water shortage in the region, which previously had ample supply of water. Along with quantity, climate change impacts other parameters such as quality of water and temperature, which further affects urban, industrial, agricultural uses and aquatic eco-systems (IPCC, 2007).

Literature on peri-urban areas is quite scant, which can be attributed to the fact that peri-urban areas are ill-defined and considered short-term transitional zones (Simon, 2008a). Being areas that change quickly, data collection is a tedious task (Sandra, 2016). Furthermore, information of population and other socio-economic variables is not easily available. Most analyses use proxies from urban and rural data instead. There are also insufficient analytical and management approaches tailored to the particularities of PUAs (Allen et al., 1999; Simon 2008b; Thapa, Marshall and Stagl, 2008). This paper aims to complement existing peri-urban literature which is limited and thereby contributes to the research of this dynamic zone.

Agenda 2030 calls for policies based on stakeholder participation, leading to inclusive policy making in addition to monitoring and evaluation is a key component to planning and build effective climate resilience among communities (Tanner et al., 2009). Research by Action Aid (2006) indicates

that communities are conscious of risks associated with urbanization and exacerbated by the changing climate and are proactively mitigating their vulnerability. Wamsler (2007) mentions that communities in El Salvador, inhabiting 15 disaster prone areas, have invested in risk reduction activities by diversifying livelihoods and investing in saleable assets. Hasan et al. (2005) in their paper stress the need to allow urban poor to influence decision-making as an effective way to meet the goals underlined within urban development. This paper underscores that stakeholder engagement based on knowledge of local communities and participatory human settlement planning will lead to effective resource management. The evidence-based decision-making and engagement with policy actors espoused in this paper promotes a positive and collaborative relationship between urban and peri-urban communities thus making a pathway for sustainable urbanization.

Methodology

This study uses Climate Change Score Card¹ (CCSC), an innovative tool which supports communities with evidence and rationale to prioritize issues on planning adaptation to climate and environment degradation. CCSC considers three important dimensions: Communities, Climate and Governance. Based on the principles of constructive engagement, it is an attempt to move away from top-down, extractive information gathering towards participatory, bottom-up and inclusive knowledge generation. The tool provides a platform for dialogue with relevant decision makers based on the knowledge generated and helps in evidence-based policy decisions.

CCSC was improvised with the addition of cognitive mapping approach to capture hazy and uncertain knowledge among stakeholders. Cognitive maps are models of how a system operates based on defined variables and the causal links (relationships) between these variables. The variables can be measurable physical quantities or complex aggregate, abstract or fuzzy ideas. Cognitive maps are especially applicable and useful tools for modelling complex relationships among variables. In addition, the effects of different policy options can also be modelled. Maps can be drawn with local communities, who often have a detailed understanding of the ecosystem (Özesmi, 1999a). Their input can be important for decision-making and for the public to accept the chosen solutions. In ecology, the use of Cognitive Mapping approaches to ecosystem based adaptation has been limited. This paper describes the use of FCMs to capture stakeholder perceptions and how this information can be used to develop a participatory management plan.

The paper elaborates the use of the above approaches in three distinct phases.

¹ Climate Change Score Card (CCSC), a social accountability tool developed by PAC is an adaptation of the Community Score Cards (CSC).

Exploratory Phase

Primary visioning exercises were undertaken in the initial phase of the study. It consisted of identification of study areas and scoping visits to the field to understand the field conditions. A questionnaire-based household survey was conducted to assess the drinking water security of households in the study area. Broadly, the questionnaire covered information on availability and usage of drinking water sources, access, adequacy, frequency, and quality of drinking water supplied. The survey also assessed the coping mechanisms adopted by local communities to tackle insecurity and/or inconsistency faced regarding the parameters studied.

Furthermore, 240 Fuzzy Cognitive Maps (FCMs) were drawn with the help of various stakeholders. The purpose of these maps was to develop qualitative models of the system, consisting of variables and the causal relationships between different variables within the system. The system here refers to the impact of climate change (variations in rainfall and increase in temperature) and urbanization on water security. The stakeholders were chosen based on the demographics of the study villages which included agricultural labourers, livestock herders, industrial labourers and farmers. Each group drew three maps identifying the impact of an increase in temperature, variation in rainfall and urbanization on water security in their respective villages. Maps were developed with the aid of local communities to assess their perceptions of how urbanization coupled with changing climate has impacted water security in peri-urban areas.

Table 1: Classification of stakeholder for drawing cognitive maps

<i>Categories</i>	<i>No. of groups</i>		<i>Total number of maps</i>
	<i>Men</i>	<i>Women</i>	
Agricultural Labourers	1	1	6
Livestock Herders	1	2	9
Industrial Labourers	1	1	6
Farmers	1	2	9
Total per village	4	6	30

Source: Authors' compilation

Drawing FCM

The variables listed by the interviewees were drawn in relation to the variable in the centre of the paper. The interviewees were asked to draw lines between the variables to represent their relationships. They were asked to label the lines with arrows to indicate their directions, and give them signs of positive or negative, and strengths of high (1), or moderate (0.5). For example, if the interviewee thought that urbanization has negatively influenced the availability of water resources such as groundwater and surface water bodies as is seen in Figure 1, the arrow head lead away from urbanization and the

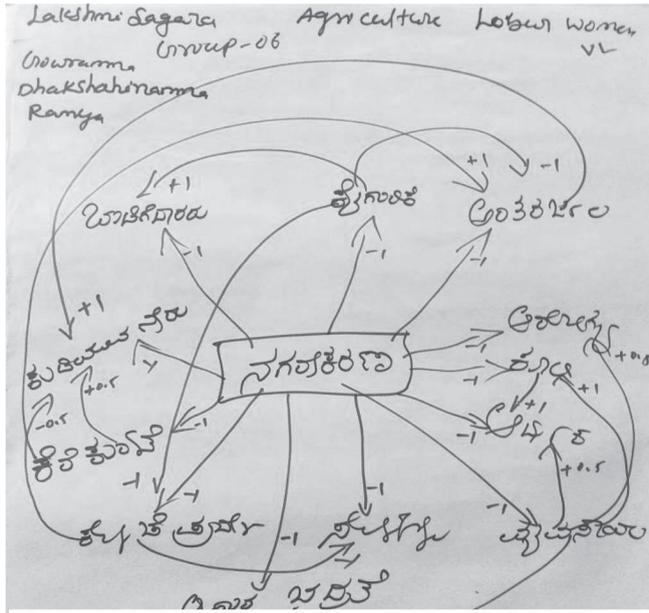


Figure 1: Example of a FCM drawn by community members.

relative strength was provided. If the interviewees seemed to be confused or not focused on the mapping, they were asked non-directional questions such as: “Are there any variable that affects this variable or does this variable affect any other variables?” The process continued until the interviewees felt that their maps were complete and they had nothing more to add. The reaction of the interviewees when drawing their cognitive maps varied from great enthusiasm to neutrality.

Time Series Analysis of Climate Data (1901-2002)

The paper in addition to gathering primary data from field surveys and fuzzy cognitive maps, used climate data (rainfall, diurnal temperature range, cloud cover, potential evapotranspiration, and reference crop evapotranspiration and vapour pressure) available from secondary sources² for assessing rainfall variation and increase in temperature in the study area. The objective was to get an idea of climatic variations over the last century in the area.

Analytical Phase

The second phase of the study involved the assessment of the vulnerability of the local communities based on the data collected in the exploratory phase. Household surveys were analyzed to identify issues which make households vulnerable regarding drinking water resources. FCMs were utilized to identify

² The data for these variables have been obtained from the Indian Meteorological Department for the years 1901 to 2002.

the factors which are responsible for the vulnerability of the communities in response to urbanization coupled with climate change. Moreover, interviews were conducted with key industries and Gram Panchayat members of the study area. The interviews were used to identify policy options that can be implemented with stakeholder interactions and coordination.

Condensed Cognitive Maps

As FCMs can be quite complex, graph theory indices provide a way to analyze their structure. FCMs were transformed into adjacency matrices in form $A(D)_{[aij]}$ (Harary and others, 1965). The square matrices of the individual stakeholder maps were then combined into stakeholder group cognitive maps by adding the augmented matrices (Kosko, 1986). Each stakeholder map was given an equal weight. Then these group maps were condensed. Condensation is a way to simplify fuzzy cognitive maps, as they can be quite complex with many variables and connections. In condensation, groups of variables connected by lines, called subgraphs, are replaced by a single unit (Harary and others 1965). The connections of variables within subgraphs with other subgraphs are maintained when replacing groups of variables. This grouping and replacing is also called aggregation. This paper used qualitative aggregation to combine variables into categories that were represented by a larger encompassing variable. Finally, all the individual stakeholder maps were combined into one social cognitive map, where each stakeholder group map was given an equal weight. After condensing the maps, they were drawn with connections showing the weight and sign of the causal relationship and a Cognitive Interpretation Diagram (CID) was generated as shown in Figure 3.

First, the number of variables (N) and the number of connections in a map were determined. Indexes were calculated after counting the number of different types of variables. The variable types were defined by their outdegree [$od(v_i)$] and indegree [$id(v_i)$]. Outdegree is the row sum of absolute values of a variable in the adjacency matrix and shows the cumulative strengths of connections (a_{ij}) exiting the variable:

$$od(v_i) = \sum_{k=i}^N a_{ik}$$

Indegree is the column sum of absolute values of a variable and shows the cumulative strength of variables entering the unit:

$$id(v_i) = \sum_{k=i}^N a_{ki}$$

The contribution of a variable in a cognitive map can be understood by calculating its centrality (c), whether it is a transmitter, receiver or ordinary variable. The centrality of a variable is the summation of its indegree and outdegree (Harary and others 1965):

$$C_i = td(v_i) = od(v_i) + id(v_i)$$

Refer Figures 4, 5 and 6 in the next section for the details on the indegree, outdegree, and centrality of the variables respectively.

Synthesis Phase

In the third and final phase of this paper, different policy options were simulated based on graph theory formulae and neural network computations. Initially, models were run to identify the steady state and develop business as usual scenario. Model assumptions were then postulated to develop scenarios with the intention of improving water security in the study area. The model assumptions were based on issues identified in the previous two phases. The purpose of this whole process was to identify points of action which were discussed with a group of experts and local communities. This sharing of the outcomes helped us to identify any missing connection and develop an action plan for improving the status of water resources in the area thus creating a water secure ecosystem.

Scenario Analysis

As a part of this, models were run to ask ‘what-if’ questions and to determine the state of the system under different conditions or upon implementation of different policy options. These calculations were made on the condensed cognitive map resulting from the addition of eighty individual cognitive maps with urbanization as the main influencer of water security in the study area. The results of these policy options by developing scenarios were then compared to the steady state results. Through this kind of scenario-based analysis, it is possible to determine which policies and combination of policies would increase water security as per people’s experiences and perceptions. In the scenario analysis, FCMs indicate the direction in which the system will move given certain changes in the driving variables. Given an initial state of the system, three scenarios were assumed in the model.

The models were run in a way as to increase water security through enforcement of stringent pollution control norms, reduction in slum population through provision of better housing and other facilities and improving vegetation and agriculture practices. The first model was run under the assumption that agricultural patterns will be improved and pollution will be reduced by 40 percent through existing norms and policies. The model also assumed that the forest cover will be increased. The second model was run under the assumption that pollution will be reduced and there will be a reduction in the slum population by 50 per cent. The model also assumed the sale of land will continue to operate as business as usual scenario.

Results and Findings

The results from the analysis of the information gathered and generated in all the phases of the study reveals that water insecurity in these areas is more

likely to be a function of high demand and poor management, rather than absolute scarcity of water. The specific findings through the lens of availability, accessibility, and quality of water are detailed in the following section.

Drinking Water Security

The survey findings revealed that most of the households possess a tap at home (73 per cent) which is the main source of drinking water. Apart from this, public taps formed the next major source of drinking water as reported by nearly 24 percent of the respondents. The availability of drinking water is also not a major issue as 95 percent of the respondents have access to water sources within less than half a kilometre from their homes. The survey highlights that all the households (100 percent) are satisfied with the timings of the drinking water supply and its adequacy, be it tap water or public tap. On the contrary, 58 percent of the respondents purchase mineral water for drinking purposes from water vendors. This raised questions about the quality of water used by the communities for drinking, and household usage. The supply of salty and muddy water was also reported in a few villages.

This resulted in the collection of seven drinking water samples, from the villages where the quality of water was not up to the standards in addition to depending on other sources such as water vendors. The samples included water from drinking water sources³, groundwater, and water supplied through public tap by the Gram Panchayat. The water samples from the RO plants had slightly higher pH values highlighting that the water supplied is acidic in nature. Two samples including a sample from the RO plant was found to be slightly muddy or earthy in addition to the presence of metal in one of the water samples collected from a household.

Similar issues were also reflected in the interviews with the Gram Panchayat members and industrial representatives. The overarching issue of unsustainable rate of groundwater extraction connects all stakeholders interviewed. The levels of fluoride in the groundwater are too high for direct drinking consumption, necessitating water treatment. The government of Karnataka has also declared that the groundwater is unsafe for consumption. The water table in the area has decreased from approximately 450 feet ten years ago, to around 850 feet at present. Considering that all stakeholders in the area draw water from a common aquifer, the decisions of individual stakeholders impact the entire community in the area. Given the current lack of formal regulations against excessive water extraction, policy intervention may be necessary to ensure sustainable water management.

Apart from the above findings, it was also revealed that there is a lack of awareness among the households regarding measures that can be adopted by households to improve both surface and groundwater sources. Only 44 per

³ Reverse Osmosis plant and handpump serve as a major source of drinking water in some villages.

cent of the households mentioned to have gathered some information about rainwater harvesting from television and other sources of media. Improving water sources through modern techniques and rejuvenation of water bodies may have a considerable impact on overall water and livelihood security.

The time series analysis confirms with the community experiences which shows an increase in variation of rainfall patterns and increase in temperature in study areas. Figure 2 depicts that as vapour pressure and reference crop evapotranspiration increases, the average annual temperature also increases. Furthermore, the temperature is found to decrease with an increase in potential evapotranspiration and an increase in cloud cover. All the variables considered are significant at 95% Confidence Interval (CI) and the effect of reference crop evapotranspiration is significant at 99% CI. It is also observed that potential evapotranspiration (90%) and cloud cover (99%) have a significant impact on the rainfall in the region, as against any other climatic variables. Further, it can be concluded that a slight increase in diurnal temperature range has a huge negative impact on rainfall in the region. In addition, reference crop evapotranspiration can also be attributed to having a negative impact on rainfall.

	(1) a_rainfall	(2) a_temp
a_temp	75.46 (0.14)	
a_vp	152.9 (0.91)	0.0627* (2.02)
a_peva	14827.5** (3.21)	-2.194* (-2.58)
a_cc	314.3*** (3.55)	-0.0386* (-2.35)
a_dtr	-13228.4 (-1.41)	
a_rcep	-9279.9 (-1.56)	9.980*** (19.78)
_cons	73756.6 (0.74)	-7.081 (-1.80)
N	102	102

t statistics in parentheses
 * p<0.05, ** p<0.01, *** p<0.001

Figure 2: Regression analysis of temperature and rainfall with various climate parameters. *Source:* Calculations by authors

Urbanisation and Water Security: Scenario Analysis

The cognitive interpretation diagram (CID) for urbanization is shown in Figure 3. The size of the bubbles indicates the influence of the variables. Except land

and financial economy, there exists positive causality among other variables. Urbanization has improved financial conditions of the communities, and increased access to modern infrastructure. It is also observed that urbanization has increased pollution, which has a negative effect on agriculture livelihoods pushing people to work as industrial labourers leading to the conversion of agriculture land for commercial and industrial purposes. It had also negatively influenced drinking water, groundwater and surface water sources in addition to the health of the local communities. Though urbanization has increased financial capabilities, the communities are spending much more to collect drinking water, and on health-related problems, which negates the income generated due to urbanization. This has also resulted in migration among the youngsters to cities and nearby towns.

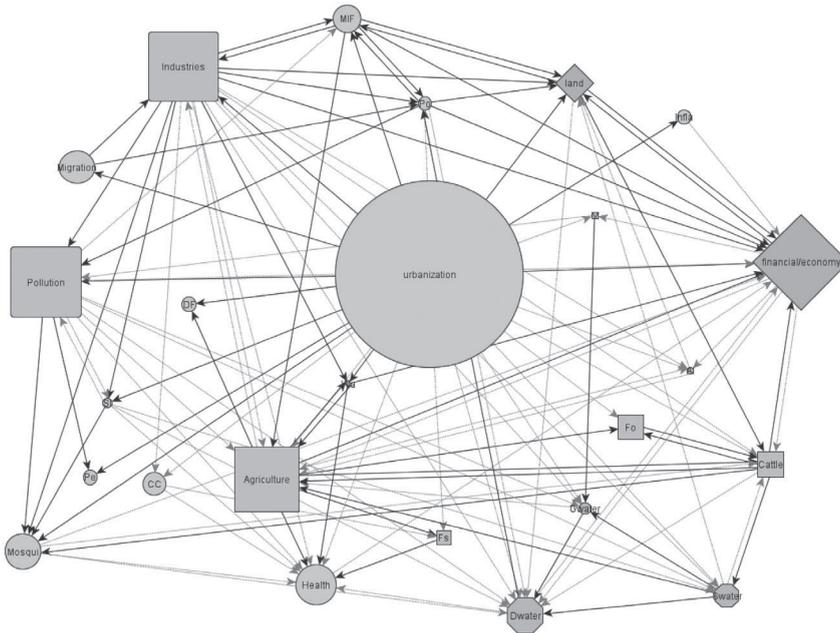


Figure 3: Condensed social cognitive map.

The condensed matrix was then analyzed to identify some of the most influential elements responsible for the current state of water security. This forms a basis for the scenario analysis and helps to identify how to improve the present conditions. Figures 4 and 5 highlight that industries and pollution, including garbage and sewage disposal from urban areas, have a high influence on the socio-economic conditions of the communities. In addition to this, these variables also have a high influence on surface water sources including drinking water. Furthermore, urbanization has also affected the health of local communities and has had a negative impact on agriculture. This has led to an increase in land conversions and sale resulting in improved

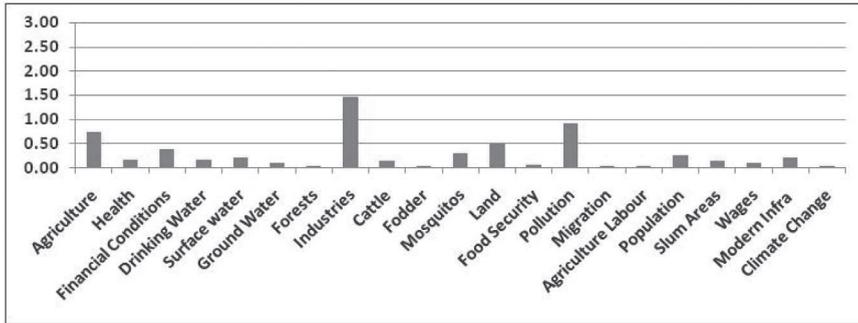


Figure 4: Graph showing the variables which have influence on other (urbanisation). *Source:* Authors' compilation

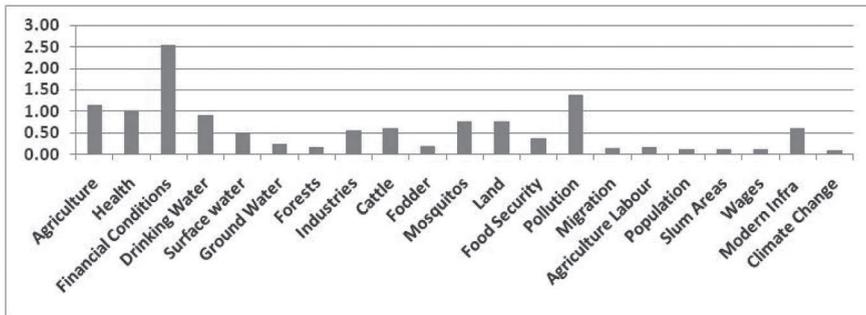


Figure 5: Graph showing the variables which are highly impacted due to urbanisation. *Source:* Authors' compilation

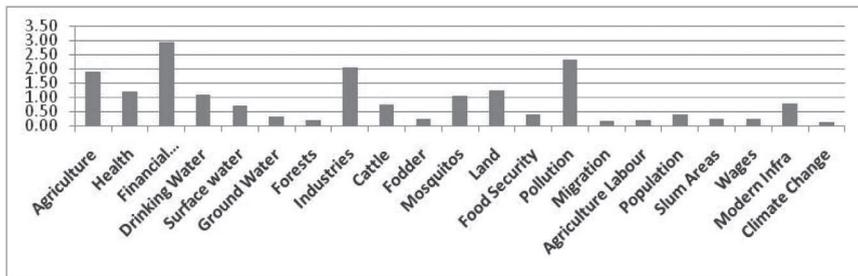


Figure 6: Graph showing the variables based on their level of influence on all other variables (urbanisation). *Source:* Authors' compilation

economic conditions. Spill-over from ever urbanizing Bangalore though has improved the economic conditions and improved infrastructure facilities such as schools, hospitals, job opportunities in the study villages, it has resulted in decreased water availability and accessibility. In addition, water is contaminated from urban sewage rendering the peri-urban communities vulnerable to these negative changes and increasing water insecurity.

Based on the above findings, scenarios mentioned in the methodology section were created to generate policy options. The first (Scenario 1) model predicted a strong positive change in drinking water sources and a moderate positive change in surface water and groundwater sources. The model also predicted a strong positive improvement in the health of the local population which can be attributed to reduced pollution and a reduction in mosquitoes which was perceived by all the respondents to be one of the major factors for decreasing health conditions, apart from contaminated drinking water. Though pollution was reduced by 40 percent, the model predicted a weak negative change in the number of industries and/or industrial establishments affected. This provides a positive outlook, that there is a need for stringent enforcement of effluent laws and a need for the establishment of sewage treatment plants for treating urban sewage which is dumped in water sources along the area.

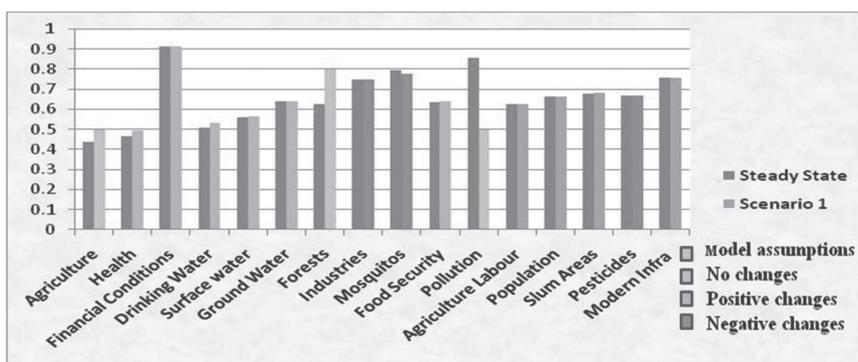


Figure 7: Graph highlighting the model assumptions and implied changes (Scenario 1). Source: Authors’ compilation

Table 2: Results of the first simulated scenario

Positive Changes	Strength (+)	Negative Changes	Strength (-)
Health	Strong Change	Mosquitos	Strong Change
Drinking Water	Strong Change	Pesticides	Moderate Change
Financial Conditions	Moderate Change	Industries	Weak Change
Surface water	Moderate Change		
Ground water	Moderate Change		
Food Security	Moderate Change		

Source: Calculations by authors

The predictions from the second model (Scenario 2) as well show a strong positive change in availability and accessibility of drinking water and surface water, whereas moderate positive change in groundwater sources. It also predicted a positive impact on agriculture which might lead to improved financial conditions. Modern infrastructure facilities will be slightly improved

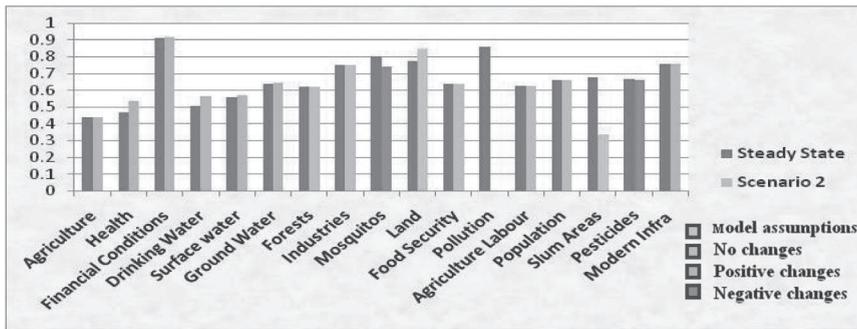


Figure 8: Graph highlighting the model assumptions and implied changes (Scenario 2). *Source:* Authors’ compilation

Table 3: Results of the second simulated scenario

<i>Positive Changes</i>	<i>Strength (+)</i>	<i>Negative Changes</i>	<i>Strength (-)</i>
Health	Strong Change	Mosquitos	Strong Change
Drinking water	Strong Change	Pesticides	Moderate Change
Surface water	Strong Change		
Agriculture	Moderate Change		
Financial Conditions	Moderate Change		
Ground water	Moderate Change		
Modern Infra	Moderate Change		

Source: Calculations by authors

due to a reduction in slum areas. As this model assumed pollution will be reduced 100 percent, the industries will be affected negatively though the effect is very less.

The findings with recommendations were shared with a senior bureaucrat with the department of Ecology, Forests and Environment, Government of Karnataka (GoK) who directed the concerned authorities to undertake specific actions. A stakeholder consultation was conducted with experts from government departments, academia, practitioners and researchers in addition to peri-urban communities. This provided an inclusive platform for the community to share their local experiences with other stakeholders regarding water security.

Conclusion

A focus on robust implementation is strongly reflected in the Sustainable Development Goals, 2030 Agenda. Urban and peri-urban synergies must work together to enhance inclusively and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and

management (SDG 11). The unplanned nature of development has resulted in indirect consequences within Manchanayakanahalli Gram Panchayat and has wider implications on water security of the area. This paper assessed the double injustice brought upon due to unchecked resource extraction and changing the climate on peri-urban communities. Simultaneously, a framework has been delineated for the need of inclusive and participatory planning to achieve the SDGs, specifically the goal 11. The framework highlights how citizen-centered scenario planning is a practical and potentially powerful tool that can be used as an anticipatory action research process.

Involvement of all stakeholders in the planning process is called for in most of the targets under SDGs. A stakeholder-centric design to identify issues based on perspectives of the local communities will help in incorporating multiple stressors into planning. This paper captures local knowledge of the communities and highlights how urbanization has changed the lifestyle of this agrarian Gram Panchayat which is further aggravated due to changes in climate. The issues identified acts as the foundation upon which solutions can be devised. The approach of this paper depicts how social concerns of citizens and communities can be mobilized to forge a collective will. Thus, the paper concludes that *“If we need a sustainable world for 2030 and beyond, we need to ensure responsive, inclusive, participatory and representative decision-making at all levels (SDG 16)”*.

Acknowledgement

We would like to thank all the stakeholders from Manchanayakanahalli; without their participation this research would not have been possible. Special thanks to SACRED, Bidadi for organizing field research and for the hospitality extended. This study has benefitted greatly from discussions with Mr. T.M. Vijaya Bhaskar, IAS, Additional Chief Secretary, Government of Karnataka, in addition to all the experts and researchers in the field of urban water governance. This research is funded by the Environment and Policy Research Institute (EMPRI).

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Track 4: Jobs and Economic Growth

Study on Behavioural Skills of Retail Employees

Komal Chopra and Preeti Kamboj*

Symbiosis Institute of Management Studies, Pune – 411020

*preeti.kamboj@sims.edu

Introduction

The retail sector comprises one of the largest sectors of the private economy in India. It is also identified as a major sector for the growth of local economies (Finn and Louviere, 1996; Warenby, 2004). However, the sector is crippled with a concentration of large retail outlets on one hand and small business on the other. Further, the sector is challenged by various employable factors like huge turnover, part-time workers, and not a great attraction as a career objective for well-qualified individuals. Indeed Retailing has been trapped in a low skill –low pay equilibrium (Skillsmart Retail, 2004).

India's National Skill Development Cooperation has been designed in order to achieve the ambition of raising productivity levels in Indian market. However, in order to develop an effective skills training and development, it is essential to understand what is the right mix of skills necessary for the future of the Retail sector. Skills shortages result in when there are too few people to fill the required gap. There are also skill gaps, which are deficiencies in skills which employs need to carryout their existing task. Then, there are skills which are not currently posed by the workforce, but which employer consider them to be essential for the future business. All these above-mentioned types of skills shortages are likely to be relevant in the Retail sector (Frogner, 2002; Green, 1998).

However, an interesting point to note is that the retail environment has completely changed in last decades primarily due to competition, changing consumer patterns, urbanization etc. While unorganized retailers largely outnumber the large organized chains but they are economically weak with regards to productivity and efficiency. As a result, their number is declining as compared to large organized retailers particularly in sectors like Food and Grocery, Apparels and Footwear, Jewellery and Accessories, Home appliances and Furnishing, Gadgets and entertainment etc. Now, in order to

remain competitive, it is anticipated that small retailers need skillful staff with good customer services skills (Huddleston and Hirst, 2004).

Further, developing technologies have driven efficiencies within retail operations, stores, supply chains, and in the new sales channel. This has been beautifully exploited by the big retail giants as they have required resources, skill sets and know-how to do such things on one hand and on the other small retailers are lacking with respect to resource, skill sets and economies of scale. This technology development in retail will automatically force the retailers to innovate and differentiate and will require an employee with IT literacy both at small and large operations (Skillsmart Retail, 2004).

Hence, the purpose of this paper is, therefore, to examine the specific skills gap associated with the retail employees across Indian market and to investigate the essential training and business implications that arise from these skill gaps.

Literature Review

The paper 'Employers Perceptions of skills gaps in retail: Issues and implications for UK retailers', by Cathy Hart, Andrew M. Farrel, Grazyna B. Stachow, and Gary Reed discusses about the issues with which retail sector is polarised as large business retail and small retailer, with large retailer having the capacity and ability to hire better skillful employees but on the other hand small retailers are mainly concentrated within family business and does not constitute with the right mix of skill sets. The paper also talks about three types of skill shortages that has crippled retail industry. Firstly, it talks about skill shortages defined as deficiencies with respect to labour pool. Secondly, there are skill shortages with respect to the skills required to carry out existing work, and finally, there are skills which are not currently possessed by workers but employer considers them to be essential for future. Further, retail over the decade has taken its new form of modern retail and small business retail. With rapid urbanization, changing customers' demands and upcoming technologies, modern retail business are more capable of exploiting skilled labour and technology-literate labour. On the other hand, small retailers lack resources, economies of scale and the required skills to pace up with new technologies, thus they become incompetent in front of big business.

The Indian retail market has been considered as the second most attractive destination for investment after Vietnam. But the Indian retail sector is highly fragmented and the penetration of organised retail sector is quite low in India as compared to other countries. Organised retail has been valued at 5% growth rate in 2008 and keeping the pace in India, the sector is expected to grow around 9-10% in the upcoming years. On the other hand, unorganised retail which involves local kirana shops, paan/beedi shops, hand cart and pavement vendors still contribute to be backbone of Indian retail sector. The report by National Skill Development talks about the growth rate of retail industry and

the reason behind the growth like changing lifestyle, increase in disposable income, change in demographics, and increase in usage of credit and debit cards. This report also highlights the increase in women employment in retail sector because women have better soft skills which is required on a regular basis in customers dealings and considers education of women and changing lifestyles as the two important reasons for that.

Further, the paper argues that increase in women employment has completely changed the demand pattern of every household and has contributed to increased market share of products like apparels, footwear, eyewear and jewellery etc. It has also led to increase in disposable income which has further led to increase in disposable incomes of households and finally changed the consumer pattern of the Indian retail market. Further, the paper talks about the employment penetration in organised retail. Major proportion of people are hired for front-end retail profiles and nearly 75-85% of manpower in organised retail is used in store operations activities. The education profile of people hired in retail sector, both organised and unorganised, is low and the biggest reason for this lack of proper qualification in India is because there is no as such specific degrees, or education institute designed to teach retail to the young crowd of India. Also, the quality of education profile is very low in tier 2 and tier 3 cities even for organised retail, where merely high school pass-outs are hired to do the job.

Retail indeed is an economically crucial industry to the Indian economy but yet it is perceived as traditionally backward in terms of employing people because of low wages, poor working conditions and hence has difficulty in attracting good and well qualified personnel. The paper 'Experiences, perceptions, and expectations of retail employment for Generation Y' discusses about various reasons why retail is not a good reason for Generation Y like the job within retail sector doesn't permit much of employment flexibility, work-life balance is not that great as it requires long work hours and most of the organisations, and management culture doesn't support much flexibility. However, Generation Y is rightly said to be socially conscious and they value diversity, equality and tolerance in both professional and personal lives (Anon, 2006; Morton, 2002). The rapid development in retail have wide implications for the planning of careers at graduate and postgraduate level but there is no theoretical and disciplinary concept of getting a specialised qualification in Retail education (Baruch, 2009). Further, the paper talks about three perceptions among youth with respect to retail sector: First, student's employment experience in their retail jobs to date. Second, student's perceptions of graduate careers in retail and Third, student's expectations of initial graduate employment in retailing. The paper findings suggest that working conditions are not considered as "poor pay and long work hours", lot of work pressure to meet the sales target and quite a lot of discrimination within the hierarchies in an organisation (Morton, 2002).

The paper 'Part-time employment and communication satisfaction in an Australian retail organisation' by Judy Gray and Heather Laidlaw tries to examine the relationship between work arrangement and employee satisfaction within retail sector. The paper explains the changing phase of retail industry and challenges faced by retailers like majority of supermarkets have to remain open for 24 hours, 7 days in order to meet the demands. This surge of increasing demands by consumer has forced the retailers to hire part-time labour as well (Australian Workplace Relations Survey). There is a considerable literature saying that employers in retail sector find it difficult to hire the personnel with skills but the other side of the story is that there are high levels of dissatisfaction with overall working conditions and that contributes to be the main reason of retail being an unattractive sector. Several authors state that various levels of education programmes which will develop the required skill set are important to influence the job satisfaction (Argenti et al., 1998).

Gap Identification

The Review of Literature has highlighted the following gaps:

1. Research on skill gap in retail sector has been done in India from employee angle but not customer angle. Customer expectation of skills from retail employees to deliver the best service is equally important.
2. Study on whether there is a difference in male and female customer expectation from salesman with respect to behaviour skills has not been studied.

The current study focuses on bridging the gaps found in review of literature.

Research Methodology

The study is exploratory in nature and the objective is to find the most important skill gaps in the retail sector. Based on review of literature, it was found that the employees lacked behaviour skills. Hence the attributes of soft skills were identified from review of literature and a structured questionnaire was designed. The questionnaire was administered to customers in various retail outlets in Pune. Convenience method of sampling was used. 100 responses were received from the customers on different aspects of behaviour skills. As the data was not normalized, Friedman test was used to identify the important skills and Mann Whitney U test was done to identify the gender difference in opinion of respondents. Customers were asked to rate the skill of employees on a 5-point scale where 5 = highest rating and 1 = lowest rating.

Samples were collected from three different outlets in the city (one hypermarket, one speciality store and one departmental store). The outlets

surveyed included Raheja Group’s “Shoppers Stop”, Future Group’s “Central” and Aditya Birla Group’s retail brand called “Pantaloon”. As permission was given to interview customers of the three stores, these stores were selected for survey. Hence, the study is limited to lifestyle retailing.

Ho : There is no significant difference in male and female customer expectation from salesmen.

H1 : There is a significant difference in male and female customer expectation from salesmen with respect to atleast one attribute.

Results and Inference

Friedman Test

Test Statistics ^a		
Males	<i>N</i>	46
	Chi-Square	34.349
	df	6
	Asymp. Sig.	0.0
Females	<i>N</i>	54
	Chi-Square	32.334
	df	6
	Asymp. Sig.	0.0

a. Friedman Test

<i>Gender</i>	<i>Mean rank</i>	
Males	Available on request	4.90
	Complaint mgmt	4.64
	Convincing abilities	4.29
	Politeness	4.08
	Willingness to help	3.59
	Communication	3.45
	Prompt service	3.05

	<i>Soft skill attributes</i>	<i>Mean rank</i>
Females	Convincing abilities	4.81
	Politeness	4.38
	Complaint mgmt	4.24
	Willingness to help	4.16
	Available on request	4.02
	Communication	3.26
	Prompt service	3.13

Inference

1. Available on request, complaint management and convincing abilities are most important male customer expectations from salesmen.
2. Convincing abilities, politeness and complaint management are most important female customer expectations from salesmen.

Hence **convincing abilities** and **complaint management** are common attributes figuring in top three important attributes.

Results of Mann Whitney U Test

	<i>Test Statistics^a</i>						
	<i>Complaint mgmt</i>	<i>Communication</i>	<i>Politeness</i>	<i>Prompt service</i>	<i>Willingness to help</i>	<i>Convincing abilities</i>	<i>Available on request</i>
Mann-Whitney U	997.000	1132.000	1136.500	1234.000	1098.000	1109.500	882.000
Wilcoxon W	2482.000	2617.000	2217.500	2315.000	2179.000	2190.500	2367.000
Z	-1.849	-.862	-.780	-.060	-1.061	-.984	-2.775
Asymp. Sig. (2-tailed)	.065	.389	.435	.952	.289	.325	.006

a. Grouping Variable: Gender
Source: Calculations by authors

Inference

The results of Mann Whitney U test indicates that there is a significant difference between male and female customer expectation of salesmen with respect to gender. Males have a higher tendency for “available on request” service compared to females. Hence alternate hypothesis is accepted.

Conclusion and Discussion

The current study has highlighted two prominent skill gaps i.e. convincing abilities and complaint management. The study also shows that there is a significant difference between male and female customers with respect to availability of salesman for customer service. Males have higher preference for customer service i.e. availability on request than females. The review of literatures focuses on factors such as education, work life balance and service conditions as a reason for skill gap but does not talk of training of employees. This shows that retailers would prefer to “buy skills” rather than develop skills. Investment in full-time employees costs the retailers and there may be no guarantee of retention. Hence as per Argenti et al. (1998), the focus can

be to hire part-time employees in shifts and train them on behavioural skills which can meet both cost and profit requirements. The cost of retail set up and operations in the brick and mortar format is very high (Indian Retail Report, 2015), hence rather than long-term investment, a short-term investment would be a good proposition.

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Inter-state Disparities in Indian Economy: An Analysis of Major Yardsticks

Ramesh B. Golait* and Narayan C. Pradhan¹

Department of Economic and Policy Research, Central Office
Reserve Bank of India, Mumbai – 400001

¹College of Agricultural Banking, Reserve Bank of India
University Road, Pune – 411016

*rgolait@rbi.org.in

Introduction

Regional disparity is the most complex development problem faced by many states in India since their formation. Many regional conflicts are an outcome of disparities in the development of a particular region compared to the remaining parts of the country. No State can afford to ignore its region specific conflicts whether they arise on account of disparities or for other reasons. In this context, strong, sustainable and balanced regional development has been one of the objectives of economic reforms in India. Since state level performance shows considerable variation across states, with many states recording strong growth in the post-reforms period, it is imperative to identify the reasons for their success in order to replicate it in other states lagging behind. Ultimately, the performance of the Indian economy depends on what and how much of its states/regions are doing. Understanding the drivers of growth at a regional level is, therefore, crucial for effective policy formulation. Differences in the income level across regions, if sustained over time, eventually, may have significant implications for the economy.

With the above issues in the background, this paper analyses variations in state domestic product in first Section. Second Section highlights Agricultural Disparities in Indian states including issues in deserted farmers in India. Disparities in regional performance are a matter of concern not just in terms of income indicators, but also human development indicators that are highlighted in third Section. The importance of Foreign Direct Investment (FDI) in the development process of an economy is well recognized. The regional dimension of FDI is set out in next Section. Fifth Section discusses State-wise ranking in the Doing Business Report. The penultimate Section highlights

variations in the Fourteenth Finance Commission, which has recommended for devolution of taxes and other transfers from the centre to the state. Finally, the last Section contains conclusion and policy suggestions to remove inter-state economic disparity.

Variations in State Domestic Product (SDP)

States in the developing countries play an essential role in promoting economic growth and in reducing inequalities and poverty (Kohli, 2007). The Indian states are no exception. Performance of agriculture at state level was examined by looking at growth rate in Net State Domestic Product (NSDP). According to the Five year plan period data, the Eleventh Plan period witnessed states with the lowest PCI register relatively higher rates of growth, particularly, Bihar, Odisha, Uttar Pradesh, Punjab, Andhra Pradesh and Karnataka had the lowest PCI in the Eighth Plan. Due to consistent conducive policy initiatives, all of these have progressively improved their growth rates, particularly in the Eleventh Plan. However, it is noticeable that during the eleventh plan period, the bottom six¹ special category states² have recorded lower growth rate as compared to the tenth plan period. The average gross domestic product (GDP) growth rate of these states increased from 4.3 per cent in the Eighth Plan to 8.4 per cent in the Eleventh Plan. The Charts 1 and 2 indicate the top six special category states at the eighth plan period having less growth rate as compared to other subsequent plan period (Annex 1).

Variations were found in the SDP growth rates during 2005-06 to 2013-14. On an average, nine States and UTs have registered the growth rate in the range of 9.0 per cent to 16.5 per cent. Twelve States including Odisha, Punjab, UP and West Bengal have registered growth rate in the range of 7-8 per cent and only eight states have their growth rate below All India level at 7.6 per cent during 2005-06 to 2013-14 (Table 1 and Annex 2).

Interestingly, barring Assam, J&K and Manipur, all special category states have recorded above all-India growth rate (7.6 per cent) during the considered period. Surprisingly, Andhra Pradesh and Punjab have grown slower than the all-India average. These states have comparatively better infrastructure and known to have pro- market attitude. While Punjab's slow growth may be attributed to stagnation in agriculture and fiscal mismanagement. It appears that reforms undertaken by these States have yet to bear desired fruits.

¹ Based on their growth rate in Net State Domestic Product.

² The special category status is accorded to states based on criteria that include hilly and difficult terrain; low population density and or sizeable share of tribal population; strategic location along borders with neighbouring countries; economic and infrastructure backwardness, and non-viable nature of state finances. At present, 11 states have special category status.

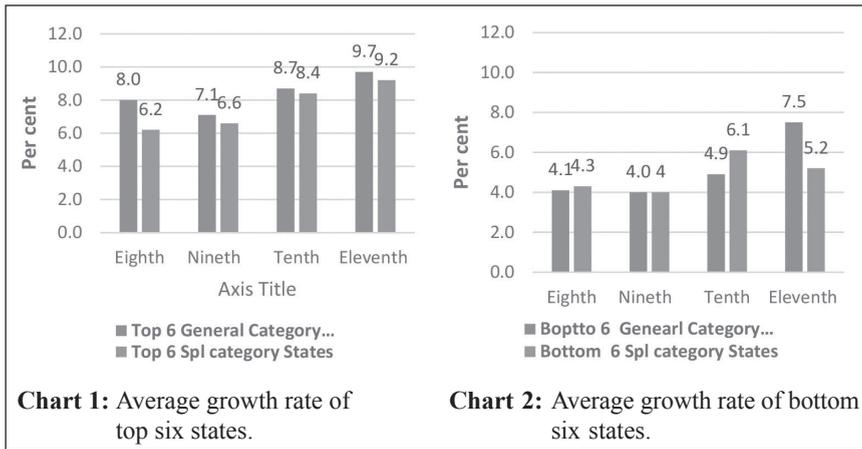


Table 1: Range: Growth of SDP (2005-06 to 2013-14) at factor cost (Constant Prices) Per cent

>9	8-8.9	< 8
Andaman and Nicobar (9.9 per cent), Bihar (9.5 per cent), Delhi (10.0 per cent), Goa (10.3 per cent), Gujrat (9.3 per cent), Maharashtra (9.0 per cent), Puducherry (10.6 per cent), Tamil Nadu (9.2 per cent), Telangana (9.8 per cent), Sikkim (16.5 per cent), Uttarakhand (12.5 per cent)	Chhattisgarh (8 percent), Haryana (8.5 per cent), MP (8.3 per cent), Rajasthan (8.1), Meghalaya (8.3 percent), Mizoram (8.7 per cent), Tripura (8.6 per cent)	AP (7), Chandigarh (7.1 per cent), Jharkhand (7.2 per cent), Karnataka (7.4 per cent), Kerala (7.4), Odisha (6.6 per cent), Punjab (6.7 per cent), UP 6.6 per cent, West Bengal 6.6, Arul Pradesh 6.1, Assam (5.6), Himachal Pradesh (7.8), J&K 5.8, Manipur (5.6 per cent), Nagaland (7.7 per cent)

Source: Respective State Websites.

Agricultural Disparities

In India, with the beginning of era of planned development in 1950-51 it was recognized that agricultural development is the key for rural economic development and eradication of widespread poverty and malnutrition. Performance of agriculture sector was also considered crucial for overall development of vast majority of people of India and for attaining several economy wide goals. It was thus imperative to follow the policy and development strategy which favoured quick and high growth rate of agriculture. Another notable feature of India’s agricultural economy is its diversity. Both, agriculture growth and productivity have shown tremendous variation across regions and states of the country. In the recent period, though

the production of foodgrains is at increasing trend, on the decadal phase it has shown declining trend (Table 2).

Table 2: Performance of agriculture and allied sector

<i>Decade</i>	<i>Production</i>		<i>Agri. and allied sector GDP at 2004-05 prices</i>
	<i>Food grains</i>	<i>Non-food grains</i>	
1950s	4.25	3.66	2.71
1960s	1.85	1.49	1.51
1970s	2.07	2.17	1.74
1980s	2.73	3.77	2.97
1990s	2.09	2.67	3.34
2000-01 to 2012-14	2.52	1.18	3.41
<i>Phases</i>			
1950-51 to 1965-66	2.96	3.6	2.27
1966-67 to 1990-91	2.84	2.96	2.62
1991-92 to 2013-14	1.7	0.55	3.02

Source: Ministry of Agriculture and National Account Statistics, Government of India

Regional disparities and instability in agriculture in India have remained the subject of deep concern in the area of agricultural economics in India. Instability in agricultural production raises the risk involved in farm production and affects farmers' income and decisions to adopt high paying technologies and make investments in farming. It also affects price stability and the consumers, and increases vulnerability of low income households to market. Instability in agricultural and food production is also important for food management and macroeconomic stability. Besides instability, Indian agriculture is also known for sharp variations in agricultural productivity across space which results in various types of disparities. Such regional variations are partly due to disparities in resource endowments, climate and topography and also due to historical, institutional and socio-economic factors (Chand et al., 2011).

Due to availability of irrigation, fertilizer and other favourable facilities, few states namely Uttar Pradesh, Punjab and Madhya Pradesh accounts around 39 per cent of India's total foodgrains production (Table 3). Another important indicator of regional disparity is the differences observed in the levels of agricultural and industrial development among states of the country. In India, states like Punjab, Haryana and part of Uttar Pradesh had recorded a higher rate of agricultural productivity due to its high proportion of irrigated areas and higher level of fertilizer use.

Table 3: Three largest producing states of important crops during 2013-14* (million tonnes)

<i>Group of crops</i>	<i>States</i>	<i>Production</i>
I. Food grains	Uttar Pradesh	50.05 (18.9)
	Punjab	28.90 (10.9)
	Madhya Pradesh	24.24 (9.2)
	<i>All India</i>	264.77
	II. Oil seeds	Gujarat
	Madhya Pradesh	6.66 (20.3)
	Rajasthan	6.07 (18.5)
	<i>All India</i>	32.88
III: Other cash crops		
Sugarcane	Uttar Pradesh	135.16 (38.6)
	Maharashtra	76.55 (21.9)
	Karnataka	35.91 (10.3)
	<i>All India</i>	350.02
Cotton#	Gujarat	10.95 (29.9)
	Maharashtra	8.52 (23.3)
	Andhra Pradesh	7.14 (19.5)
	<i>All India</i>	36.59
Jute & Mesta**	West Bengal	8.62 (74.4)
	Bihar	1.93 (16.7)
	Assam	0.74 (6.4)
	<i>All India</i>	11.58

*Fourth Advanced Estimates. #: Production in million bales of 170 kg each

** : Production in million bales of 180 kg each

Figures in brackets are share in per cent.

Source: Agricultural Statistics at a Glance 2014, Ministry of Agriculture, Government of India

Agricultural Distress

According to the recently released World Health Organization (WHO) Report³, each year over 800,000 people die due to suicide across the world. In India, agriculture has remained traditionally the most important economic activity. In view of the importance of the agriculture sector in the national economy, the Reserve Bank of India, the Government of India have taken several policy initiatives to facilitate hassle-free flow of credit from the institutional financial sector to the agricultural/rural sector. These measures have played a significant role in enhancing credit flow to this sector. Notwithstanding these measures, the Indian agriculture has been facing difficult times and the Indian farmers have been experiencing extreme distress.

Almost everyday reports are coming about the distress and farmers suicide. In India, the problem of farmer suicide has assumed a serious proportion. Among the economic causes for farmers' distress, credit related issues normally play a prominent role. It has also been observed that mostly the small and marginal farmers, as well as, tenant farmers and farm labourers bear the brunt of crop failures (RBI, 2006). Since the impact of such conditions may be less significant for large farmers due to their ability to fall back on their savings in times of need, a differentiated approach is to be adopted in order to address the issue of farmers' distress. The toll of farmers suicide⁴ is aggravating year after year. According to the National Crime Records Bureau⁵, during 2014, a total of 5650 farmers have committed suicides, which accounts for 4.3 per cent of total suicides victims in the country (Table 4).

Table 4: Incidence of farmers' suicides and percentage share to total suicides during 2014

<i>Total number of farmers' suicides</i>	<i>Total number of suicides</i>	<i>Percentage share of farmers' suicides</i>
5,650	1,31,666	4.3

Source: National Crime Records Bureau, Ministry of Home Affairs, Government of India.

³ Preventing Suicide: A Global Imperative, 2015 by WHO.

⁴ Farmers' 'distress' is not due to indebtedness alone. There are several other factors such as social, psychological, genetic and family related developments that contribute significantly.

⁵ NCRB pointed out that bankruptcy or indebtedness was the main cause, accounting for 20.6 per cent, closely followed by family issues (20.1 per cent), failure of crops (16.8 per cent), illness (13.2 per cent), whereas drug abuses/alcoholic addiction accounted for 4.9 per cent cases. These five causes together accounted for 75.6 per cent of total farmer suicides. Small and marginal farmers accounted for about 72.4 per cent of total farmer suicides.

State-wise Farmers Suicide

State-wise, Maharashtra accounted for the highest number of farmer suicides (2568) distantly followed by Telangana (898), Madhya Pradesh (825), Chhattisgarh (443) and Karnataka (321). These five states together accounts for about 90 per cent of total farmer suicides in India (Table 5).

Table 5: State-wise farmers suicide during 2014

<i>States</i>	<i>No. of suicides</i>	<i>States</i>	<i>No. of suicides</i>
Maharashtra	2568	Odisha	5
Telangana	898	Punjab	24
Madhya Pradesh	826	Sikkim	35
Chhattisgarh	443	Tamil Nadu	68
Karnataka	321	Uttar Pradesh	63
Andhra Pradesh	160	Himachal Pradesh	32
Assam	21	J & Kashmir	12
Kerala	107	Gujarat	45
Haryana	14		

Source: State Finances: A study of Budgets, 2015, RBI

According to the Press reports, 32 farmers from the Marathwada region committed suicide in a span of seven days (from September 1 to 7, 2015), bringing the death toll to 660 in 2015. Crop losses and debt were being cited as main reason for the increasing deaths toll of farmers.

Human Development Indicators

Disparities in regional performance are a matter of concern not just in terms of income indicators, but also human development indicators. State-wise data on human development indicators display considerable variation in performance across States. According to 2011 Census, Kerala was the best performer, witnessing a literacy rate of 93.91 per cent and sex ratio of 1084. At the same time, the worst performance in literacy rate was recorded by Bihar (63.82 per cent), Rajasthan (67.01 per cent) and Jharkhand (67.63 per cent). Population density in the National Capital region of Delhi is as high as 11,320 persons per square km as compared to only 17 persons per sq. km. in the north eastern hill state of Arunachal Pradesh. In terms of sex ratio, among the states and UTs Daman and Diu and N. Haveli displayed lowest at 618 and 868, respectively. Among the advanced States sex ratio in Haryana is the lowest (877). The below performance of Haryana and Punjab, two of India's richest States, on indicators such as sex ratio and female literacy rates is a serious concern. Among the special category states, barring J&K (lower literacy rate at 68.47

per cent and sex ratio 883) and Arunachal Pradesh (lower literacy rate at 66.95), have comparably improved (Table 6).

Table 6: Human development decadal indicators, as per 2011 census

	<i>Population growth rate (%)</i>	<i>Density of population</i>	<i>Sex ratio</i>	<i>Literacy rate (%)</i>
Andaman and Nicobar Islands	6.68	46	878	86.27
Andhra Pradesh	11.10	308	993	75.6
Bihar	25.07	1106	918	63.82
Chandigarh	17.10	9258	818	86.43
Chhattisgarh	22.59	189	991	71.04
Dadra and Nagar Haveli	55.50	700	774	77.65
Daman and Diu	53.54	2191	618	87.07
NCT of Delhi	20.96	11320	868	86.34
Goa	8.17	394	973	87.40
Gujarat	19.17	308	920	79.31
Haryana	19.90	573	877	76.64
Jharkhand	22.34	414	948	67.63
Karnataka	15.67	319	973	67.66
Kerala	4.86	860	1084	93.91
Lakshadweep	6.23	2149	946	92.28
Madhya Pradesh	20.30	236	931	70.63
Maharashtra	15.99	365	929	82.91
Odisha	13.97	270	979	73.45
Puducherry	27.72	2547	1037	86.55
Punjab	13.73	551	895	76.68
Rajasthan	21.44	200	928	67.06
Tamil Nadu	15.60	555	996	80.33
Uttar Pradesh	20.09	829	912	69.72
West Bengal	13.93	1028	950	77.08
<i>Special Category States</i>				
Arunachal Pradesh	25.92	17	938	66.95
Assam	16.93	398	958	73.18
Himachal Pradesh	12.81	123	972	83.78
Jammu and Kashmir	23.71	56	883	68.74
Manipur	18.65	122	985	79.85
Meghalaya	27.82	128	989	75.48

(Contd.)

Mizoram	22.78	52	976	91.58
Nagaland	-0.47	119	931	80.11
Sikkim	12.36	86	889	82.20
Tripura	14.75	350	960	87.75
Uttarakhand	19.17	189	963	79.63
<i>All-India</i>	17.64	382	943	74.04

Source: The Office of the Registrar General & Census Commissioner, Govt. of India

As it is expected, improvement in economic growth and per capita income translated, partially in reducing in the level of poverty in the country. Though there are differences in the estimates of the percentage of the poor by different sources, all agree that there has been a spectacular decline in the share of poor in the population, except few States like Arunachal Pradesh, J&K, Andaman and Nicobar Island during 2009-10 and 2011-12 (Table 7).

Table 7: Population below poverty line by States 2009-10 and 2011-12
(Tendulkar Methodology)⁶ (Per cent)

<i>General Category States</i>	<i>2009-10</i>	<i>2011-12</i>	<i>% change</i>
Andhra Pradesh	21.1	9.2	-56.4
Bihar	53.5	33.7	-37.0
Chhatisgarh	48.7	39.9	-18.1
Delhi	14.2	9.9	-30.3
Goa	8.7	5.1	-41.4
Gujarat	23	16.6	-27.8
Haryana	20.1	11.2	-44.3
Jharkhand	39.1	37	-5.4
Karnataka	23.6	20.9	-11.4
Kerala	12	7.1	-40.8
Madhya Pradesh	36.7	31.6	-13.9
Maharashtra	24.5	17.4	-29.0
Orissa	37	32.6	-11.9
Puducherry	1.2	9.7	708.3
Punjab	15.9	8.3	-47.8
Rajasthan	24.8	14.7	-40.7
Tamil Nadu	17.1	11.3	-33.9
Uttar Pradesh	37.7	29.4	-22.0
West Bengal	26.7	20	-25.1
A & N Island	0.4	1	150.0
Chandigarh	9.2	28.8	213.0

(Contd.)

⁶ The Expert Group (Tendulkar) had used the all-India urban poverty line basket as the reference to derive state-level rural and urban poverty. This was a departure from the earlier practice of using two separate poverty line baskets for rural and urban areas.

Table 7: (Contd.)

<i>General Category States</i>	<i>2009-10</i>	<i>2011-12</i>	<i>% change</i>
D & N Haveli	39.1	39.3	0.5
Daman and Diu	33.3	9.9	-70.3
Lakshadweep	6.8	2.8	-58.8
<i>Special Category States</i>			
Arunachal Pradesh	25.9	34.7	34.0
Assam	37.9	32	-15.6
Himachal Pradesh	9.5	8.1	-14.7
Jammu & Kashmir	9.4	10.3	9.6
Manipur	47.1	36.9	-21.7
Meghalaya	17.1	11.9	-30.4
Mizoram	21.1	20.4	-3.3
Sikkim	13.1	8.2	-37.4
Uttaranchal	18	11.3	-37.2
Nagaland	20.9	18.9	-9.6
Tripura	17.4	14	-19.5
<i>All-India</i>	29.8	21.9	-26.5

Source: Planning Commission, Government of India

Regional Dimension: Foreign Direct Investment

The importance of FDI in the development process of an economy is well recognized. Inflows of FDI bridges the gap between the desired and the actual level of capital stock, especially when domestic investment is not sufficient to push the actual capital stock up to the desired level⁷. The FDI flows to India have picked up significantly in the recent years. The rise in FDI flows to India has been accompanied by strong regional concentration. The top six States include NTC of New Delhi, besides Maharashtra, Karnataka, Gujarat, Tamil Nadu and Andhra Pradesh which accounted for over 71 per cent of the FDI equity flows to India during 2012-2015 (Table 8). The top two states, i.e., Maharashtra and N. Delhi accounted for 49 per cent of FDI flows during this period. Maharashtra alone accounted for 29 per cent of FDI flows to India during the same period. Despite impressive growth rates achieved by most of the Indian states as well as aggressive investment promotion policies pursued by various state governments, the concentration of FDI flows across Indian states remained skewed.

The last two decades had seen the introduction/expansion of several anti-poverty programmes and public intervention policies in favour of the poor including public distribution of subsidized food grains. Inequalities in economic and social development across the regions and intra-regional

⁷ Determinants of inter-State variations in FDI inflows in India.

Table 8: Region-wise received FDI equity inflows (Amt. in Rs. Crores)

<i>Region</i>	<i>2012-13 (April- March)</i>	<i>2013-14 (April- March)</i>	<i>2014-15 (April '14-March, 2015)</i>	<i>Cumulative Inflows (April '00- March '15)</i>	<i>% age to total inflows (in terms of US\$)</i>
Mumbai	47,359	20,595	38,933	3,53,022	29
New Delhi	17,490	38,190	42,252	2,49,023	20
Chennai	15,252	12,595	23,361	88,766	7
Bangalore	5,553	11,422	21,255	82,121	7
Hyderabad	6,290	4,024	8,326	49,240	4
Ahmedabad	2,676	5,282	9,416	53,797	4
<i>Top Six States</i>	94,620	92,108	1,43,543	8,75,969	71
Kolkata	2,319	2,659	1,464	14,627	1
Chandigarh`	255	562	234	6,360	0.5
Jaipur	714	233	3,237	6,795	0.5
Bhopal	1,208	708	601	6,096	0.5
Kochi	390	411	1,418	6,150	0.5
Panaji	47	103	211	3,867	0.3
Kanpur	167	150	679	2,444	0.2
Bhubaneswar	285	288	56	1,961	0.2
Guwahati	27	4	29	381	0
Patna	41	9	68	267	0
Jammu	0	1	25	26	0
Region not indicated	21,833	50,283	37,544	3,08,060	24.9
<i>Total</i>	1,21,907	1,47,518	1,89,107	12,33,005	100.00

Note: 1. FDI equity inflows include 'equity capital component' only.

2. Mumbai includes Maharashtra, Dadra & Nagar Haveli and Daman & Diu.

3. N. Delhi includes New Delhi and part of UP and Haryana.

4. Chennai includes Tamil Nadu and Pondicherry.

5. West Bengal includes West Bengal, Sikkim, and Andaman & Nicobar Islands.

6. Chandigarh includes Chandigarh, Punjab, Haryana and Himachal Pradesh.

7. Madhya Pradesh includes Madhya Pradesh and Chhattisgarh.

8. Uttar Pradesh includes Uttar Pradesh and Uttaranchal.

Source: Department of Industrial Policy and Promotion (DIPP), Ministry of Commerce and Industry, Government of India.

disparities among different segments of the society have been the major plank for adopting planning process in India, since independence. Apart from massive investments in backward regions, various public policies have been directed to encourage private investments in such regions for a planned development. While efforts to reduce regional disparities were not lacking, achievements were not often commensurate with these efforts. Considerable level of regional disparities remained in the past. The economic reforms since 1991, with stabilization and deregulation policies have been partially successful in mitigating regional disparities.

Business Environment

According to the World Bank's latest Report on the ease of doing business, Gujarat has topped with a score of 71.14 per cent followed by Andhra Pradesh. The western Indian state, occupied the top five places on the list, which also highlights the poor state of business environment in a large number of states (Table 9).

Table 9: State ranking in doing business

<i>State</i>	<i>Rank</i>	<i>Score</i> <i>(per cent)</i>	<i>State</i>	<i>Rank</i>	<i>Score</i> <i>(per cent)</i>
Gujarat	1	71.14	Himachal Pradesh	17	23.95
Andhra Pradesh	2	70.12	Kerala	18	22.87
Jharkhand	3	63.09	Goa	19	21.74
Chhattisgarh	4	62.45	Puducherry	20	17.72
Madhya Pradesh	5	62.00	Bihar	21	16.41
Rajasthan	6	61.04	Assam	22	14.84
Odisha	7	52.12	Uttarakhand	23	13.36
Maharashtra	8	49.43	Chandigarh	24	10.04
Karnataka	9	48.50	A and Nicobar	25	9.73
UP	10	47.37	Tripura	26	9.29
West Bengal	11	46.90	Sikkim	27	7.23
Tamil Nadu	12	44.58	Mizoram	28	6.37
Telangana	13	42.45	J&K	29	5.93
Haryana	14	40.66	Meghalaya	30	4.38
Delhi	15	37.35	Nagaland	31	3.41
Punjab	16	36.73	Arunachal Pradesh	32	1.23

Source: Assessment of State Implementation of Business Reforms, Department of Industrial Policy & Promotion, Government of India and World Bank September 2015

The effort is part of the government's initiatives to improve India's ranking on the World Bank's 'Ease of Doing Business'. India stands at 142nd on the list, among 189 countries. The Government wants India to be among the top 50 countries of Ease of Doing Business at the earliest. While efforts at improving India's ranking in the Doing Business Report do cover some of the regulatory issues pertaining to state governments, much needs to be done at State Governments' level in order to achieve the Governments vision of making India a successful destination for business progression.

Fiscal Situation

In its recent report, the Fourteenth Finance Commission (FFC)⁸ has recommended for devolution of taxes and other transfers from the centre to the states, and between the states, for the period 2015-16 to 2020-21. They are likely to have major implications for Centre-State relations. The FFC has radically enhanced the share of the states in the central divisible pool of taxes from the current 32 percent to 42 per cent which is the biggest ever increase in vertical tax devolution. (The last two Finance Commissions viz. Twelfth (2005-10) and Thirteenth (2010-15) had recommended a state share of 30.5 per cent (increase of 1 percent) and 32 per cent (increase of 1.5 percent), respectively in the central divisible pool.) Implementing such recommendations will be a new initiative to move the country towards achieving greater fiscal federalism, conferring more fiscal autonomy on the States. For example, based on assumptions about nominal GDP growth and tax buoyancy and the policy measures that are contemplated for 2015-16, it is estimated that the additional revenue for the states could be as much as Rs. 2 lakh crores relative to 2014-15. Of this, a substantial portion represents the difference that is purely due to the change in the States' share in the divisible pool. According to Economic Survey 2015, preliminary estimates suggest that all States stand to gain from FFC transfers in absolute terms. The biggest gainers tend to be the Special Category States (SCS) (Table 10). The major gainers in per capita terms turn out to be Arunachal Pradesh, Mizoram and Sikkim for the SCS states and Kerala, Chhattisgarh and Madhya Pradesh for General Category States.

The 14th FC has removed the distinction between non-special and special category states. It has accorded greater importance to fiscal capacity, with indicators of cost and revenue disabilities being assigned a combined weight of 72.5 per cent as against 57.5 per cent assigned by the 13th FC. Under the new tax devolution formula, the share of 19 states in taxes would be higher than those under the Thirteenth Finance Commission recommendations (Table 11).

⁸ The Report of the Fourteenth Finance Commission (Chairman: Dr. Y.V. Reddy) was submitted in December 2014 and was placed before the Parliament on February 24, 2015.

Table 10: Additional FFC transfers (in 2015-16 over 2014-15)

<i>States</i>	<i>Benefits from FFC (Rs. crore)</i>	<i>Benefits per capita (Rs.)</i>	<i>Benefits as per cent of NSDP</i>
<i>General Category States</i>			
Andhra Pradesh	14620	1728	2.2
Bihar	13279	1276	4.9
Chhattisgarh	7227	2829	5.2
Goa	1107	7591	3.0
Gujarat	4551	753	0.8
Haryana	1592	628	0.5
Jharkhand	6196	1878	4.8
Karnataka	8401	1375	1.8
Kerala	9508	2846	3.1
Madhya Pradesh	15072	2075	4.5
Maharashtra	10682	951	0.9
Odisha	6752	1609	3.2
Punjab	3457	1246	1.4
Rajasthan	6479	945	1.6
Tamil Nadu	5973	828	0.9
Uttar Pradesh	24608	1232	3.5
West Bengal	16714	1831	3.0
<i>Special Category States</i>			
Arunachal Pradesh	5585	40359	51.0
Assam	7295	2338	5.8
Himachal Pradesh	8533	12430	14.6
J&K	13970	11140	22.4
Manipur	2130	8286	19.5
Meghalaya	1381	4655	8.6
Mizoram	2519	22962	33.3
Nagaland	2694	13616	18.7
Sikkim	1010	16543	10.7
Tripura	1560	4247	6.9
Uttarakhand	1303	1292	1.4

Source: Economic Survey, 2014-15

Table 11: Inter-se share of States in tax devolution (Per cent)

<i>State</i>	<i>13th FC</i>	<i>14th FC</i>	<i>State</i>	<i>13th FC</i>	<i>14th FC</i>
Andhra Pradesh	6.937	4.305	Manipur	0.451	0.617
Arunachal Pradesh	0.328	1.37	Meghalaya	0.408	0.642
Assam	3.628	3.311	Mizoram	0.269	0.460
Bihar	10.917	9.665	Nagaland	0.314	0.498
Chhattisgarh	2.47	3.08	Odisha	4.779	4.642
Goa	0.266	0.378	Punjab	1.389	1.577
Gujarat	3.041	3.084	Rajasthan	5.853	5.495
Haryana	1.048	1.084	Sikkim	0.239	0.367
Himachal Pradesh	0.781	0.713	Tamil Nadu	4.969	4.023
Jammu & Kashmir	1.551	1.854	Telangana	-	2.437
Jharkhand	2.802	3.139	Tripura	0.511	0.642
Karnataka	4.328	4.713	Uttar Pradesh	19.677	17.959
Kerala	2.341	2.500	Uttarakhand	1.120	1.052
Madhya Pradesh	7.12	7.548	West Bengal	7.264	7.324
Maharashtra	5.199	5.521			

Source: State Finances: A study of Budgets, 2015, RBI

Conclusion and Policy Measures to Remove Inter-State Economic Disparity

In India, we have very rich history of setting up numerous commissions/committees/working groups to suggest policy measures to feed 1.252 billion population and provide employment opportunities for its growing population. The persistence of regional disparities within countries is a major policy concern, which is being confronted by many Governments in rich and poor countries. Clarity on the causal factors of weak regional performance and careful consideration of potential trade-offs are needed, which would guide policy choice over region specific interventions. No doubt that the Government has a crucial role to play in reducing regional disparities and promoting balanced development in which all regions will be able to develop equally. This role calls for initiatives to identify and remove gaps in human development and basic services and infrastructure with a view to ensure that all regions or sub-regions and groups have equitable access to the benefits of development. Such an equity-promoting role assumes even greater criticality in the changed environment in which, with the opening of the economy and removal of controls, the play of market forces usually exacerbates disparities.

With about 69 per cent of the population in rural areas, and most of them dependent on agriculture, it follows that the strategy for economic reforms

must address the constraints on efficiency and production in the agricultural sector. Much of what needs to be done in this area consists of effective implementation of the basic strategy for agricultural development that has worked well in many parts of the country and needs to be extended to other parts. This calls for substantial investments in land and water management, supply of improved seeds, biodiversity and an effective institutional system for delivery of rural credit. Many of these elements fall within the area of responsibility of State Governments.

A disturbing feature of recent trends in the agricultural sector is that real investment in agriculture, both public and private, has been stagnant for quite some time. Therefore, there is need for substantial increase in public investment in agriculture and irrigation but this can only happen if resources available for investment with the State Governments can be increased. Unfortunately, investible resources with State Governments have been seriously eroded because of large increases in unproductive current expenditure and the heavy burden of losses on the provision of basic economic services in rural areas such as electricity, power and irrigation. Top priority must be given to reducing these implicit subsidies through rational pricing of both water and electricity and also better management. The resources thus saved should be devoted to increased investment in agriculture and related rural infrastructure.

The presence of strong agglomeration effect indicates that the states already rich in FDI flows tend to receive more of them which make it more difficult for the other states to attract fresh investments. In view of this difficulty, a conscious and coordinated effort at the national as well as State levels would be essential to make the laggard states more attractive for FDI flows. The direct method to achieve this objective may be to design the national FDI policy in such a way that a sizable portion of FDI that flows to India move into the laggard states. The indirect way is to provide a boost to the overall economy of the less advanced states, with special thrust on the manufacturing, services and the infrastructure sectors so that they themselves become attractive to foreign investors.

Balanced regional development is an important criteria in the country's planning and various measures including fiscal incentives, industrial policies and directly targeted measures have been used in the past to achieve this objective. In fact, adoption of planning as a strategy of State-led industrialization with plans and policies designed to facilitate more investments in relatively backward areas, were intended to lead to a more balanced growth. It was expected that over time, with such measures in place, regional disparities would gradually disappear. Even though there is no historical consensus on the best mechanism for reducing regional disparities. However, there is a need to fortify the backward areas adequately and target them with additional resources and investments to help them overcome structural bottlenecks that contribute to their backwardness, which hinders the process of growth.

Annex 1: Growth rates in SDP across plan periods (Per cent)

<i>States/Union territories</i>	<i>Eighth plan</i>	<i>Ninth plan</i>	<i>Tenth plan</i>	<i>Eleventh plan</i>
Andhra Pradesh	5.4	4.6	6.7	8.33
Bihar	2.2	4.0	4.7	12.11
Chhattisgarh	n.a.	n.a.	9.2	8.44
Goa	8.9	5.5	7.8	9.02
Gujarat	12.4	4.0	10.6	9.59
Haryana	5.2	4.1	7.6	9.1
Jharkhand	na	na	11.1	7.27
Karnataka	6.2	7.2	7.0	8.04
Kerla	6.5	5.7	7.2	8.04
MP	6.3	4.0	4.3	8.93
Maharashtra	8.9	4.7	7.9	9.48
Odisha	2.1	5.1	9.1	8.23
Punjab	4.7	4.4	4.5	6.87
Rajasthan	7.5	3.5	5.0	7.68
TN	7	6.3	6.6	8.32
UP	4.9	4.0	4.6	6.9
West Bengal	6.3	6.9	6.1	7.32
<i>Special Category States</i>				
Arunachal Pradesh	5.1	4.4	5.8	9.42
Assam	2.8	2.1	6.1	5.5
Himachal Pradesh	6.5	5.9	7.3	5.5
J&K	5	5.2	5.2	4.4
Manipur	4.6	6.4	11.6	4.6
Meghalaya	3.8	6.2	5.6	7.5
Mizoram	na	na	5.9	8.7
Nagaland	8.9	2.6	8.3	3.5
Sikkim	5.3	8.3	7.7	12.2
Tripura	6.6	7.4	8.7	8.0
Uttarakhand	n.a.	n.a.	8.8	9.3

Source: Twelfth Five year Plan

Further, there is a need to improve the overall environment for economic and social growth of less developed States and areas through a judicious combination of major infrastructure interventions, institutional reforms and

Annex 2: Gross state domestic product at factor cost (constant prices) (Per cent)

States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-2012	2012-2013	2013-14	2005-06 to 2013-14
A & N Islands	5.2	18.0	10.1	14.3	13.2	7.8	7.9	7.5	5.1	9.9
Andhra Pradesh	5.3	10.9	13.1	2.1	7.2	6.8	6.2	4.0	7.2	7.0
Bihar	-1.7	16.2	5.6	14.5	5.3	15.0	10.3	10.7	9.1	9.5
Chandigarh	10.7	14.7	7.3	8.1	5.5	1.0	3.4	3.8	9.6	7.1
Chhattisgarh	3.2	18.6	8.6	8.4	3.4	10.6	5.7	8.8	5.0	8.0
Delhi	10.0	12.4	11.2	12.9	8.2	7.2	9.3	9.3	9.3	10.0
Goa	7.5	10.0	5.5	10.0	10.2	16.9	20.2	4.2	7.7	10.3
Gujarat	14.9	8.4	11.0	6.8	11.2	10.0	6.7	6.1	8.8	9.3
Haryana	9.2	11.2	8.4	8.2	11.7	7.4	8.0	5.5	7.0	8.5
Jharkhand	-3.2	2.4	20.5	-1.7	10.1	15.9	4.5	7.4	8.9	7.2
Karnataka	10.5	10.0	12.6	7.1	1.3	10.2	3.7	5.5	5.4	7.4
Kerala	10.1	7.9	8.8	5.6	9.2	6.9	5.9	5.9	6.3	7.4
MP	5.3	9.2	4.7	12.5	9.6	6.3	8.5	8.7	9.5	8.3
Maharashtra	13.3	13.5	11.3	2.6	9.3	11.3	4.8	6.2	8.7	9.0
Odisha	5.7	12.9	10.9	7.7	4.5	8.0	4.0	3.8	1.8	6.6
Puducherry	24.9	3.7	8.6	8.1	16.3	6.2	5.1	12.0	10.7	10.6
Punjab	5.9	10.2	9.0	5.8	6.3	6.5	6.5	4.6	5.2	6.7
Rajasthan	6.7	11.7	5.1	9.1	6.7	14.4	8.3	6.4	4.8	8.1

Tamil Nadu	14.0	15.2	6.1	5.5	10.8	13.1	7.4	3.4	7.3	9.2
Telangana	15.9	11.6	10.5	13.4	1.1	18.0	8.7	4.1	4.8	9.8
Uttar Pradesh	6.5	8.1	7.3	7.0	6.6	7.9	5.6	5.8	5.0	6.6
West Bengal	6.3	7.8	7.8	4.9	8.0	5.8	4.7	7.5	6.9	6.6
<i>Special Category States</i>										
Arunachal Pradesh	2.8	5.2	12.1	8.7	9.4	3.8	5.6	-1.6	8.9	6.1
Assam	3.4	4.7	4.8	5.7	9.0	5.2	4.6	5.1	7.5	5.6
Himachal Pradesh	8.4	9.1	8.6	7.4	8.1	8.8	7.3	6.1	6.2	7.8
Jammu and Kashmir	5.8	6.0	6.4	6.5	4.5	5.6	7.9	4.5	5.2	5.8
Manipur	6.3	2.0	6.0	6.6	6.9	-0.6	9.7	7.0	6.2	5.6
Meghalaya	7.9	7.7	4.5	12.9	6.6	8.6	12.5	3.8	9.8	8.3
Mizoram	7.0	4.8	11.0	13.3	12.4	17.2	-2.6	7.2	7.8	8.7
Nagaland	10.2	7.8	7.3	6.3	6.9	9.4	8.3	6.5	6.5	7.7
Sikkim	9.8	6.0	7.6	16.4	73.6	8.7	10.8	7.6	7.9	16.5
Tripura	5.8	8.3	7.7	9.4	10.7	8.1	7.2	11.2	9.2	8.6
Uttarakhand	14.3	13.6	18.1	12.7	18.1	10.0	9.4	7.4	8.4	12.5
All-India	9.5	9.6	9.3	6.7	8.6	8.9	6.7	4.5	4.7	7.6

Source: CSO

appropriate incentives structures. It would, however, be a repetition that not all imbalances are amenable to positive solutions and that under certain circumstances palliative measures in the form of safety nets may also be necessary for quite some time. Admittedly, the need for investment in social services and infrastructure in the relatively backward States is far greater than in the more developed States. Governance in the poor performance states are fiscally weak and, as a result, not in a position to muster adequate resources to fund the huge investments, which are required to catch up with the developed States. Backward States are usually unable to attract sizable private investment due to poor infrastructure which cannot be upgraded due to lack of resources. The challenge, in essence, is to break this vicious cycle.

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Track 5: Partnership for the Goals

The Impact of Foreign Aid on Human Development: A Panel Study of 96 Developing Countries

Ranjan Kumar Dash

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
ranjandash67@gmail.com

Introduction

Least developed and developing countries face the problems of higher poverty, low economic growth, high mortality rates, low levels of education and overall low human development. Domestic capital is inadequate to boost economic growth and welfare, which consequently warrants the need for external capital. More importantly, most of the low-income countries lack the necessary impetus to attract substantial foreign direct investment to bridge investment-saving gap. In this context, foreign aid plays a major role by providing productive investment and technical knowledge (Chenery and Strout, 1966). Foreign aid, and in general external capital, has been postulated by scholars of development economics to be a vital input to supplement low savings and hence support development in low-income countries (Burnside and Dollar, 2000). Official Development Assistance (ODA) can be critical in enhancing the business environment for the private-sector and indeed quickening growth and development. Addison et al. (2015) states that ODA is also a crucial instrument for supporting education, health, and public infrastructure development. Foreign aid is transferred to recipient countries in the form of programme loan, project aid, commodity aid, technical assistance, emergency relief etc.

The impact of aid on most macroeconomic variables has not been simple and straightforward. It does exhibit more of a mixed picture of relationships rather than clear and significant causal relationships among them in most cases. The causal relationships may also be blurred by the varying policy environments under which aid has been managed in the recipient countries. The impact of foreign aid on human development is problematic and is less clear. The wider literature has indicated that effective aid action is difficult to achieve largely because the human development is multidimensional and complex.

Developing countries have made commitments to implement national development strategies that incorporate SDGs based on domestic resource mobilization and support from the international development community and developed countries (UN, 2015). The implementation of national development strategies incorporating SDGs requires a substantial scaling up of internal and external resources and enhancing their effectiveness. In this context, the objective of this paper is to assess the role of foreign aid in improving human development in developing and least developed countries. The reason for looking at human development instead of economic growth is that the former captures a broad meaning of development.

Although economic growth implies the increase in GDP per capita, it ignores several aspects of development such as levels of education, health, and the standard of living. According to the United Nations Development Program (UNDP), development is much more than “the rise or fall of national incomes”.

In the context of limited literature and mixed findings, this study aims to examine the impacts of foreign aid on human development for 96 developing countries over 1980-2015 by using panel data analysis. The contribution of this study to the existing literature can be explained as follows: First, limited and the mixed results suggest that there is the need for further research on the issue. Second, while there are abundant literatures on FDI/FPI and human development, literature on foreign aid impact on human development are limited.

This paper consists of seven sections. Second Section briefly summarizes some of the most important previous studies that have been conducted in this field. Third Section presents theoretical background of this study followed by a Section which provides a general overview of the Foreign Aid Volumes and Trends. The next Section discusses data sources and methodology. The penultimate Section analyses the results obtained from the fixed effect and GMM model. The last Section explains the most important findings of the study and suggests policies towards development.

The Existing Literature

There is an extensive literature that addressed the impact of foreign aid on growth and a smaller one that looks at aid's impact on education, health and human development. Some studies have found positive effects (Hansen and Tarp, 2000; Karras, 2006; Arndt et al., 2010; Juselius et al., 2014), some conditional effects (Burnside and Dollar, 2000; Kosack, 2003) and others no effects (Boone, 1996; Easterly, 2003; Moyo, 2010; Easterly, 2014). Given the wide range of findings and the debates that they have prompted, it is worth examining some of the relevant recent papers in brief.

Burnside and Dollar (2000) investigated the relationship between foreign aid, economic policy, and growth of per capita GDP using a new database on

foreign aid that had been developed by the World Bank. They find that aid has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies but has little effect in the presence of poor policies. Their results also suggest that one per cent of gross domestic product in aid given to a poor but well-managed country could increase its growth rate by a sustained 0.5 percentage points. In the following period of time many papers emerged studying whether and when development aid works. Hansen and Tarp (2000) claimed that aid worked on average, but with diminishing returns regardless of an unfavourable policy environment. A study by Karras (2006) investigates the correlation between foreign aid and growth in per capita GDP using annual data from the 1960 to 1997 for a sample of 71 aid-receiving developing countries. This paper concludes that the effect of foreign aid on economic growth is positive, permanent, and statistically significant.

In a study of ODA data from 1971 to 1990, Boone (1996) found that most foreign aid had no significant impact on basic development measures such as infant mortality or primary schooling ratios. His findings imply that most foreign aid is consumed rather than invested, and that aid receipts increase the size of government without influencing health indicators. These findings indicate that if foreign aid is used for consumption, the foreign aid will not have its desired effect.

Easterly (2003) re-examines the issue in a different way. By employing Official Development Assistance (ODA) as the measure of aid as opposed to the measure used by Burnside and Dollar, Effective Development Assistance (EDA), Easterly finds that the aid-policy interaction term is no longer significant. After a review of 97 studies, Doucouliagos and Paldam (2009) concluded that there exists positive relationship between aid and growth but the relationship is statistically insignificant. Rajan and Subramanian (2008) also reached similar conclusion by correcting endogeneity problems and that considered a comprehensive number of covariates. In particular, according to this study, there is no clear relation running from more aid to faster growth.

Moyo (2010) and Easterly (2014) find that aid had no substantial impact on growth, savings or investment. According to them official assistance is ineffective, and has harmed poor countries throughout the years and aid is creating dependency, fostering corruption, and encouraging currency overvaluation.

Furthermore, there were studies showing that aid may have even negative effects on developing countries. Rajan and Subramanian (2008) alert in the long run aid can be detrimental for economy. In contradiction, Arndt et al. (2010) developed a better instrumentation strategy, an improved specification and a preferred estimator. Following the data samples used by Rajan and Subramanian (2008), their results support the idea that foreign aid has positive impact on economic growth in long run data samples of 1960-2000 and 1970-2000 periods.

The impact of aid on human development index (HDI) has also been discussed in the literature although small but growing literature that seeks to empirically assess the impact of foreign aid on human development. Kosack (2003) finds that aid has a positive effect on HDI growth but only in democratic countries. His estimates also suggest that aid will have a negative effect on HDI growth in autocracies. Interestingly, he finds that democracy alone has a negative effect on HDI growth. He interprets these findings as implying that more- democratic poor countries have, on their own, lower growth in the quality of life, but that aid to these countries may reverse this negative tendency. In addition, he finds that “both foreign aid (ODA) and Foreign Direct Investment (FDI) have played a significant role in the economic growth and human development in developing countries but Aid is less effective in development vis-à-vis foreign direct investment.

Gomanee et al. (2005) examine aid’s effects on human development as measured by both the HDI and the infant mortality rate. They argue that while aid might not have a direct impact on welfare, it may have an indirect one via pro-poor expenditures (PPE). Using pooled panel of 39 countries over the period 1980 to 1998 they find that aid has a positive impact on welfare through public expenditure and that the effect is greater in countries with lower welfare.

McGillivray and Noorbakhsh (2007) examine the impact of aid on the level of the HDI and allow conflict to enter the analysis. They find that aid alone has a negative impact on HDI scores but disagree with Kosack (2003) in that they do not find either a negative effect of democracy on the HDI or a positive aid–democracy interaction term. Fielding et al. (2006) explored a new avenue in aid effectiveness literature by assessing the impact of aid on diverse human development indicators, including ‘measures of health, education and fertility’. They held that “these dimensions of wellbeing are likely to interact with each other”. Nevertheless, study finds positive effects of aid on many development outcomes.

In a recent study, Gillanders (2011) examines the effect of aid on human development using panel vector auto regression model to a panel of Sub-Saharan African countries. The results on the full sample indicate a small increase in human development proxied by the growth rate of life expectancy following a substantial aid shock. The results also indicate that human development responds more to aid shocks in democracies and good institutional environments.

From above reviews, it is clear that different economists have made the topic of the effectiveness of foreign aid very debatable. Some development economists believe that aid in itself does not bring a spectacular success, since the outcome is determined by the political and economic environment. More importantly, furthermore, wrong policies formulated by the donor or the recipient exacerbate the effects of aid negatively. The motivation of this research is derived from insufficient empirical studies on the relation

between aid and human development and the enormous importance of human development towards sustainable development.

Theoretical Background

The development paradigm of the 1950s was dominated by the Harrod-Domar model, a paradigm in which foreign aid was seen as a source of capital to trigger higher growth through higher levels of investment. However, in the 1960s, with the rise of balance of payments concerns, the two-gap models (investment-savings gap and the foreign exchange gap) became dominant and the role of foreign aid became that of filling the two gaps. First theoretical study about the impact of development aid on the growth was in 1966 by Chenery and Strout which introduced a “two-gap” model. Chenery and Strout (1966) observed that most countries before 1966 were able to achieve economic transformation by clamouring for foreign aid and foreign debt. To them, to achieve accelerated growth, countries must improve in the areas of domestic savings and foreign exchange earnings.

The development paradigm shifted from two-gap model of 1960s to employment generation, basic needs and income distribution in the 1970s and the role of foreign aid was to raise the standard of living of the poor largely through increased employment. In the 1980s, stabilization and structural adjustment policies were adopted and foreign aid was used to mitigate the adverse effects of debt. In the 1990s, the trend towards integrating poverty concerns in development and towards comprehensive models of development emerged.

An alternative to the neoclassical growth models, endogenous growth models, take into account a complex set of inputs besides physical capital as determinants of economic growth, such as technology, human capital, intermediate new goods, R&D activities, foreign capital, fiscal policy, organizational capital, social capital, and institutional design (Easterly, 2003). The model has become a popular theoretical framework used in current aid-growth empirical investigations since it remedies the shortcomings of the neoclassical model of economic growth and provides additional empirical relevance and explanatory power.

In particular, the assumption of increasing returns to capital of endogenous growth model implies that foreign aid may improve growth in long-run and therefore supports the estimation of the long-term economic impact of aid (Kargbo, 2012). Furthermore, the model assumes the non-linear relationship between investment and growth (as opposed to the neoclassical growth model); and so there would be the case of measuring—the quality of investment and the quality of foreign aid (Easterly, 2003). Based on this model, the contribution of external assistance to growth can be estimated through other factors in addition to capital accumulation. The endogenous model, for instance, also stresses the critical role of human capital in the growth process; and therefore

this justifies the assessment of foreign aid on building up human capital in recipient countries. Indeed, aid in the forms of both technical assistance and investment in education and health care system potentially fosters human capacity building and then production outcomes (Kargbo, 2012).

Foreign Aid Volumes and Trends

Foreign aid in the form of official development assistance (ODA) that transfers money from government-to-government is a relatively old concept, with its foundations in the 1948 European Recovery Plan, or Marshall Plan, for rebuilding Europe after World War II. The Marshall Plan and its contemporaries were followed more formally with the establishment of the OECD's Development Assistance Committee (DAC) in 1960 to expand and improve the flow of long-term funds from wealthy donor governments for development. After rising for most years during the 1960s, 1970s and 1980s, total official development assistance (ODA) trended sharply downward from the early 1990s¹. The downward trend for much of the 1990s has now been reversed. Foreign aid grown from 26 billion from 1980 to 131 billion in 2015, on an average compound growth rate of 4.7 percent per year. Notwithstanding the downtrend in 1990s, the average inflows of aid have increased from \$33 billion in 1980s to \$55 billion in 1990s and further to 104 billion in 2000s (see Figure 1).

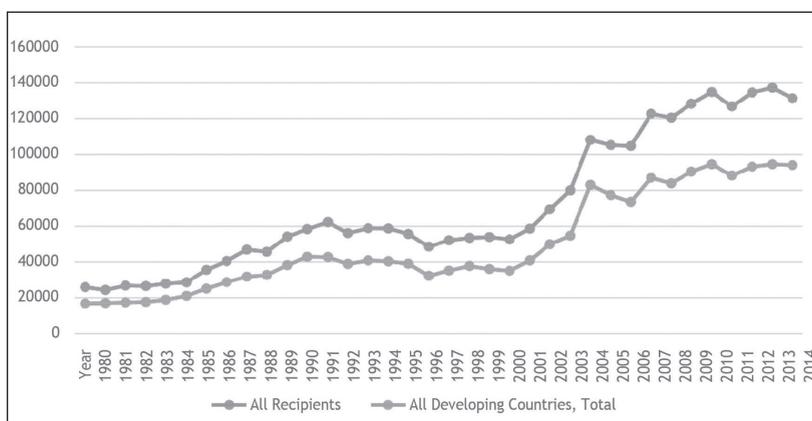


Figure 1: Trends in foreign aid 1980-2015 (in million US\$).

Source: OECD, International Development Statistics online.

Not only foreign aid has increased significantly in 2000s, profile of top countries receiving them have changed between 2000 and 2015. For example, in 2000 Indonesia, China and Viet Nam were top three receiving countries

¹ With the collapse of Soviet Union, aid flows dropped significantly for a decade mainly driven by bilateral flows (Kharas, 2006).

while in 2015 they were replaced by Afghanistan, India and Ethiopia. Between 2000 and 2015, only India remained among the top ten receiving countries (see Table 1).

Table 1: Top ten countries receiver of foreign trade in 2000 and 2015 (million US\$)

<i>Country</i>	<i>2000</i>	<i>Country</i>	<i>2015</i>
Indonesia	1547.79	Afghanistan	3586
China	1271.28	India	2098.55
Viet Nam	1263.49	Ethiopia	1854.57
Egypt	1140.25	Syrian	1834.07
Tanzania	779	Viet Nam	1817.18
Thailand	683.56	Pakistan	1730.8
India	650.51	Kenya	1505.56
Mozambique	624.77	Jordan	1477.79
Bangladesh	623.1	Tanzania	1444.68
Serbia	593.42	Democratic Republic of the Congo	1410.48

Source: OECD, International Development Statistics online.

Methodology and Data Sources

The study focuses on development aid and human development in developing countries including low-income countries. Annual data on foreign aid is collected from Organization of Economic Co-operation and Development (OECD) database. The human development (HD) is proxied by human development index (HDI) which is an index used to rank countries by level of human development. The data for the HDI are obtained from the Human Development Reports published by the UNDP. Data on real per capita income, trade as ratio of GDP, Bank credit as ratio of GDP and total population are collected from Development Indicators (WDI) from the database of World Bank. Aid flows are normalized by dividing total population and later converted to real aid using US dollars in 2010 prices. Countries with no data or insufficient data are dropped from analysis. Total 96 countries of developing and least developed countries are considered in this study.

Methodology

In static panel data models, pooled OLS, fixed-effects (FE) and random-effects (RE) estimators are often used to face the problems of serial correlation, heteroscedasticity and endogeneity of some explanatory variables, and

the estimators used do not consider this problem. The solution for these econometric problems was found by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first-differenced Generalised Method of Moment (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first-differenced and levels equations. In addition to using instruments in levels for equations in first differences, it uses instruments in first differences for equations in levels (Arellano and Bover, 1995). The GMM-SYS estimator is an alternative to the standard first-differenced GMM estimator and found to perform better than standard first-differenced GMM estimator.

Generalised Method of Moment (GMM) proposed by Arellano and Bond (1991) is the commonly employed procedure to estimate the parameters in a dynamic panel data model. In GMM based estimation, first differenced transformed series are used to adjust the unobserved individual specific heterogeneity in the series. But Blundell and Bond (1998) found that this has poor finite sample properties in terms of bias and precision, when the series are persistent and the instruments are weak predictors of the endogenous changes. Blundell and Bond (1998) proposed a system based approach to overcome these limitations in the dynamic panel data. This method uses extra moment conditions that rely on certain stationarity conditions of the initial observation. Consider following Autoregressive (1) or AR (1) model,

$$y_{it} = \alpha y_{i,t-1} + \beta x_{it} + \eta_i + v_{it} \quad (1)$$

where y is dependent variable, x is explanatory variable, η is an unobservable country-specific effect, and v is the error term. The number of countries is denoted by $i = 1, 2, \dots, N$ and the number of time periods is $t = 1, 2, \dots, T$. It is assumed that x_{it} is correlated with η_i and endogenous so to satisfy $E[x_{it}v_{is}] \neq 0$ for $i = 1, \dots, T$ and $s \leq t$.

The two moment conditions for System GMM are:

$$E[x_{it-s}\Delta v_{it}] = 0 \text{ for } t = 3, \dots, T, i = 1, \dots, N, s \geq 2 \text{ and } \Delta v_{it} = v_{it} - v_{i,t-1} \quad (2)$$

$$E[\Delta x_{it-s}v_{it}] = 0 \text{ for } t = 1, \dots, T, i = 1, \dots, N \text{ and } \Delta x_{it} = x_{it} - x_{i,t-1} \quad (3)$$

To establish the validity of instrumental variables, specification tests are conducted. The first specification test is the Sargan test, of which the null is that there is no correlation between instruments and errors. The failure to reject the null of serial correlation of AR(1) can be viewed as evidence in favour of using valid instruments. The null hypothesis of the second test is that the errors are not serially correlated in a first-differenced equation. If the null of no serial correlation of AR(2) model cannot be rejected, it can be viewed as evidence supporting the validity of instruments used. The actual model that is used to test the impact of foreign aid on human development is as follows:

$$\text{HDI}_{it} = \alpha + \beta_1 \text{FAID}_{it} + \beta_2 \text{RYPC}_{it} + \beta_3 \text{Trade}_{it} + \beta_4 \text{FD}_{it} + u_{it} \quad (4)$$

where HDI denotes human development index, FAID denotes per capita real foreign aid, RYPC is real per capita income, Trade is total trade as ratio of GDP, FD is financial development proxied by bank credit to GDP ratio and u is the error term. The number of countries is denoted by $i = 1, 2, \dots, N$ and the number of time periods is $t = 1, 2, \dots, T$. The expected sign of β_1, β_2 and β_3 are positive. GDP per capita plays an instrumental role in human development. If the income level of individuals in a country is high, these people can be expected to have a higher standard of living. Similarly, a well-developed financial market efficiently mobilizes resources that raise investment in human capital through education expenditure, health expenditure and welfare activities (Sehrawat and Giri, 2017). On the other hand, trade affects output growth directly and human development indirectly as trade improves living standards in a country by improving health care, social services and education (Davies and Ouinlivan, 2006).

Result Analysis

As many as two different specifications of equation (4) are estimated by two methods (FE and GMM) and presented in Table 2. The FE regression of the model yielded an adjusted R^2 of 0.68, so 68% of the variation in the dependent variable is explained by the empirical model. The coefficients of all the variables have the expected signs, and all of them are significant at the 0.05 or 0.01 level. The coefficient of foreign aid which is our targeted variable have positive coefficient (see Table 2). Overall, the main determinants of human development are broadly significant and have the expected sign as described in the literature.

It is evident that the GMM system passes all diagnosis test related to Sargan Test of over identifying restrictions and the Arellano-Bond test of 1st order and 2nd autocorrelation. The results show that, as expected, the coefficient of foreign aid is positive and significant at 1 percent level. The results indicate that a 1% increase in foreign aid leads to a less-than-0.1% increase in human development in developing countries after controlling the effect of per capita income, financial development and trade impact on human development. This is in line with previous empirical studies on the impact of foreign aid on human development (Kosack, 2003; Gomanee et al., 2005; McGillivray and Noorbakhsh, 2007; Gillanders, 2011). Therefore, aid is effective in promoting human development in recipient countries. In addition to this, the coefficient of real per capita income is positive and significant and has highest impact on human development. Similarly, trade and financial development has also positive impact of human development.

Table 2: Impact of aid on human development (1980-2015)

	FE		GMM System	
Constant	-0.60** (-18.13)	-0.60** (-17.13)	-1.36** (-22.45)	-0.87** (-23.13)
PAID	0.007** (3.52)	0.005* (2.58)	0.058** (10.09)	0.04** (8.20)
RYPC	0.16** (33.15)	0.15** (30.15)	0.21** (23.85)	0.18* (26.29)
Trade ratio	-	0.005** (5.65)	-	0.003** (9.68)
FD	0.04** (3.24)	0.03** (3.11)	0.07** (4.06)	0.07** (3.45)
	$R^2 = 0.66$	$R^2 = 0.66$		
	Prob > F = 0.0000	Prob > F = 0.0000		
AR(1)			$z = -4.74$, Pr > $z = 0.00$	$z = -2.06$, Pr > $z = 0.04$
AR(2)			$z = -1.32$, Pr > $z = 0.23$	$z = -1.08$, Pr > $z = 0.28$
Sargan test:				
Difference-in-Sargan tests				
of exogeneity of instrument			$\text{chi}^2(26) = 67.24$,	$\text{chi}^2(36) = 104.24$,
subsets: Difference			Pr > $\text{chi}^2 = 0.27$	Pr > $\text{chi}^2 = 0.19$
Tests of exogeneity of				
standard "IV"			$\text{chi}^2(2) = 2.85$, Pr > $\text{chi}^2 = 0.93$	$\text{chi}^2(22) = 3.81$, Pr > $\text{chi}^2 = 0.80$
Instrument subsets:				
Difference			$\text{chi}^2(1) = 100.78$, Pr >	$\text{chi}^2(1) = 89.96$, Pr >
			$\text{chi}^2 = 0.01$	$\text{chi}^2 = 0.03$

Notes: ** and * denotes significant at 1%, and 5% level respectively. Figures in the parentheses are *t*-ratio. AR(1) = Arellano-Bond test for AR(1) in first differences, AR(2) = Arellano-Bond test for AR(2) in first differences.

Conclusion and Policy Implications

Foreign aid remains an important source of foreign capital in most developing and least developed countries. It is argued that foreign aid has been contributory towards fostering broad-based development and complementing national development initiatives in the recipient countries. Developing countries are capital-scarce nations and relies on foreign aid to finance savings-investment gap, fiscal gap, trade gap and improving human development. Many studies in the empirical literature on the effectiveness of foreign aid have tried to assess if aid reaches its main objective, defined as the promotion of economic development and welfare of developing countries. Given the ambiguous result of previous studies, this paper concentrated on the aid-development relationship at the macro-level using 96 developing and least developed countries over the period 1980-2015 using the generalised method of moments (GMM) suggested by Arellano and Bond (1991) which not only takes care of the problem of serial correlation and heteroscedasticity but also endogeneity problem.

The important finding of this paper suggest that foreign aid along with per capita income, financial development and trade positively affect human development. The empirical results also suggest that time lags in the aid-growth relationship, country heterogeneity, and endogeneity of foreign aid should be factored in when assessing the impact of foreign aid.

Important policy implication of this study is that, human development should be a priority for governments and donors alike. Given the positive relationship between aid and human development, recipient countries should provide conducive environment, open trade policy and better institutions to increase development effectiveness of foreign aid. Donor agency should give incentives to recipient countries to increase their savings by encouraging them to cut unproductive private government consumption and reducing corruption. Policy should be prioritized to encourage productive use of foreign aid for education, health and business activities.

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Multi-Stakeholder Partnership for Goals: Pune Case Perspective

Juhi Sadhwani

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
juhisadhwani@rediffmail.com

Leveraging its robust and resilient economic base and growth strategy, the Pune city has emerged as the first smart city committed to the effective realization of the global partnership for Sustainable Development Goals (SDG). To recognize this diligence, the Government of India bestowed the city with the National Award for Innovative Smart Solution in Social and, Knowledge and Intellectual categories, in furtherance of chalking a path for the successful advent and implementation of SDGs in Urban Local Bodies (ULBs); thereby earning the city several accolades from the Government of India and the global community. The city has successfully sought collaboration at both levels – global and domestic; targeting a dual stratum approach: one with the private sector, and the other with the civil society, which is synchronized with the adoption of the ground-breaking multi-nation agreement, Addis Ababa Action Agenda on July 15, 2015, that establishes strong foundation to support the smooth and successful implementation of the SDGs.

The world today is more interconnected than ever before. The time for collective global action has arrived, which is characterized by and ought to be complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources; with the aim of encouraging and promoting effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships.

Pre-partnership Prioritization of Goals

Prior to inviting strategic partnerships, it is crucial that the administrative body of the city, Pune Municipal Corporation (PMC), identify and carve the comprehensive needs of this smart city and its local population to render it in a better-off position to implement the goals in the competitive times. In order to understand the situation with PMC, the author interviewed Mr. Kunal Kumar,

the Commissioner of Pune Municipal Corporation, who asserted the pressing need for prioritizing the goals as per the demography and the demands of the dynamic population. It was also realized that attainment of solutions that address problems posed by rapid urbanization in the domain of social integration for the cities, including but not limited to areas of health, safety and security, and social cohesion becomes indispensable. Consequentially, solutions that address burning concerns in the realm of knowledge and intellect, including, but not limited to areas of education and human development is vital to accelerate progress on SDG targets. As a result, the PMC has dually partnered - one with the corporate world, and the other with the civil society, citing stratum of active contribution in their respective arenas.

Global Partnership for the Rivers of Pune (Aligns to SDGs 6, 7, 13 and 14)

The population of Pune has been proportionately increasing from 2618,000 in 2001 to 3196,000 in 2011 as per the Census, and is estimated to reach 5745,000 by 2027 and 8382,000 by 2047. The requirement for sewerage services has also increased proportionately. Both the Mula and Mutha have been dammed and are the perennial sources of drinking water for Pune. The rivers have earned the dubious distinction of being two of the 35 most polluted river stretches of the country identified by Central Pollution Control Board (CPCB). The Mula-Mutha has been earmarked as having the water quality of Class IV i.e. 'bad to very bad', owing to severe pollution, dumping of garbage, release of untreated sewage and effluents and several other sources of pollution. Almost 22 kilometres of the rivers run through the city, further deteriorating its state with 336 MLD sewage released into the rivers.

The CPCB has recommended an intensive three pronged approach to clean, beautify and rejuvenate the river, an analogous approach also adopted for the cleansing of the 'dying' Mula and Mutha:

- Massive cleaning effort to remove weeds and garbage
- Building sufficient sewage treatment capacity so that untreated sewage is not discharged and
- Use of river cleaning technologies (such as Root Zone Wastewater Treatment which is, both, energy and cost efficient).

To accomplish this, on January 13, 2016, the Japan International Cooperation Agency (JICA), which is the world's largest bi-lateral development agency, signed an ODA loan agreement with the Government of India to provide a Japanese official development assistance (ODA) loan of up to 19.064 billion Yen (about Rs. 1000 crore). This project for pollution abatement of river Mula-Mutha in Pune is undertaken by National River Conservation Plan (NRCP), Government of India. Given the current scenario, the sewage volume treated stands at about 476 million litre per

day (MLD), while the sewage volume generated is about 728 MLD. JICA's assistance will entail construction of a sewer network of over 113.6 kms. The sewage facilities will be fitted with SCADA (Supervisory Control and Data Acquisition) system which enables remote control and monitoring of equipment. The major components proposed under the project include construction of 11 new Sewage Treatment Plants (STPs), which will result in a creation of an additional treatment capacity of 396 MLD over the existing treatment capacity of 477 MLD, and renovation/rehabilitation of four existing intermediate pumping stations. This project is expected to attain completion in 72 months.

The loan assistance for the project has been approved by the Union Finance Ministry at an estimated cost of Rs. 990.26 crore. The venture cost will be shared between Government of India and Pune Municipal Corporation (PMC), the implementing agency for the project, in the ratio of 85:15 respectively. The share of Central Government in project will be Rs. 841.72 crore and share of PMC would be Rs. 148.54 crore. The loan has to be repaid by Government of India within a period of 40 years, including a 10-year grace period. The project is scheduled to be completed by January, 2022. Once the project attains completion, the total STP capacity available shall be 873 MLD, which will suffice to cater to sewage generation for the year 2027. The prudent partnership here is reflected with the Pune Municipal Corporation (PMC) partaking in the development of the sewerage system and restoring of the river by pumping in oxygen, which is scheduled for completion by 2021, whereas, JICA will also assist in designing of the sewerage network, management of its construction and application of GIS (Geographic Information System) and MIS (Management Information System) for capacity building of PMC for subsequent operation and maintenance.

Since the Mula-Mutha rivers flow through the settlements in Solapur, which witnesses migratory birds, a sharp decline in the number has been observed over years resulting in ecological demolition. This project will not only benefit over 5 million inhabitants in Pune and adjoining areas, but also have a significant and direct beneficial impact in terms of reduction of pollution load in the river and improvement of its water quality of the region, thereby putting a cap on the water-borne ailments. Some of the collateral benefits of the project also include use of tertiary treated effluent for irrigation and employment opportunities, particularly in the construction stage. The project will positively clean and rejuvenate the rivers of Pune, but also improve the aesthetics and sanitation of the city, which will help attain the goal of evolving the city into a smart city.

The pollution abatement programme also boasts of certain supplementary benefits. Biogas (methane) from STPs will be used to generate electricity. This alignment will help cater to uniform access to affordable electricity consumption needs of the city's population. To that extent, this will not only be a non-conventional affordable energy source, but will also provide benefits

in terms of reducing greenhouse gas emissions (methane being a greenhouse gas), a city which emits 46 lakh tonnes of carbon every year. An incidental benefit also entails clearing up of the marijuana plants growing and eventually its trade, on the two-and-a-half acre plot on the river-bed in the secluded Mundhwa area, which has come under fire from the Anti-Narcotics Cell. This integrated approach of the PMC and JICA has re-affirmed combat a concern which is endorsed by the Ministry of Environment, Forest and Climate Change and the Plan of Action prepared by the NITI Aayog in lieu of the Paris Agreement of 2015. This venture marks a milestone in forging an enhanced global partnership that aims to foster the implementation of SDGs. Had it not been for the well-thought partnership and the pooling of the financial aid by JICA, it would've been challenging for the city administration and the citizens to address these overlapping sectors. Inclusive partnerships built upon a shared vision and shared goals that place people and the planet at the centre, are required at the worldwide, regional, national and local level. This novice PMC-Japanese partnership for the goals has entitled the city multi-fold obligation towards ensuring the further adoption and implementation of such exemplary investment promotion regimes.

Multi-Lateral Partnership vis-a-vis Robust Solid Waste Management (Aligns to SDGs 3, 6, 7 and 13)

Initiatives by Milhem Ikos: A PPP model

The magnitude and density of Pune's population has proportionately contributed to the city's municipal solid waste (MSW) generation which is about 1600-1700 tonnes per day with a yearly increase of about 5%. Around 160 trucks are deployed to collect waste, with the door-to-door collection of an average of 198 tonnes per day. 563 containers and 116 compactor buckets are dispersed around Pune. However, lack of adequate treatment facilities and inappropriate disposal of waste have been considered to be some of the prudent challenges in this sector. We have estimated that the solid waste in the city in the year 2025 will touch approximately to 3500 tons per day. Thus it is imperative to ensure the proper management of MSW. i.e. collection of waste, transportation, segregation, storage & waste reduction at source, and processing & disposal. A smart city is characterized with a sound framework for waste management that removes household and commercial garbage, and disposes it off in a manner which is environmentally and economically feasible. Rather than viewing it as a disposable commodity, waste is seen as a renewable resource with potential to aid in problems including electricity shortages and resource recuperation.

One of the prominent companies working towards this is a France-based waste management conglomerate, Mailhem Ikos Environment Pvt. Ltd. that provides innovative, sustainable, and comprehensive solutions in the field of MSW management. Mailhem Ikos has partnered with the PMC

to develop innovative waste management solutions to deliver efficiency and performance that ensure sustainability of environmental green initiatives. Originally, the Pune Municipal Corporation has been undertaking 22 biogas waste process plants in Pune, out of which five biogas projects have been undertaken by Mailhem Ikos now. Installation of biogas plants enables a convenient way to treat the biodegradable waste, thereby maintaining a clean, hygienic, pollution-free environment and also avoid all hassles of storage and transportation of waste. Biogas is a preferred source of energy as the energy generated is proportional to the waste loaded per day. This offers a promising and an eco-friendly solution to the energy woes of the present times. Mailhem Ikos have successfully piloted projects in the areas of Aundh, Yerwada and Katraj of 5 TPD (Power Generation) each from these biogas plants. They use indigenously developed Modified Upward Anaerobic Sludge Blanket technology to treat all types of solid waste to generate biogas. The technology employed for the same is integrated waste management (power generation from biomethanation) which originally the PMC lacked. They have also installed portable biogas plants and arrangements for landfill bioreactor have been made in the Special Economic Zones of Hinjewadi and Magarpatta areas for management of food waste. No comprehensive ventures had been initiated yet towards the collection and segregation of organic waste.

However, few patent issues have to be addressed to lubricate the collaboration between the public and the private sector. Siting of a landfill facility is very difficult task and meets with stiff resistance from the community living nearby. In recent years a number of PILs have been filed with the National Environment Engineering and Research Institute (NEERI) regarding the siting of waste treatment and disposal facilities. Such PILs delay project implementation. Thus, the MSW rules for siting must be adhered to in order to minimize adverse impact on environment and quality of life of citizens. If the standards are not duly adhered to, the treatment and disposal facilities can face closure as a penalizing action. Irrespective, such Public Private Partnership models enhance the international bolster which are crucial for implementing effective and targeted capacity-building. The municipal authorities have failed to mobilize the community and educate citizens on the rudiments of handling waste and proper practices of storing it. The public sector is also handicapped in terms of tapping the untapped resource potential owing to the unavailability of scientific know-how. This access to science, technological advancement and innovation and enhancing of knowledge sharing on mutually concurred terms, enhances a global technology facilitation mechanism. Such dexterity can be availed via promoting the development, transfer, dissemination and diffusion of environmentally sound technologies.

PMC's CSR Vision

Adar Poonawalla Clean City (APCC) is an environment sustainable initiative, undertaken by Serum Institute of India (world's largest vaccine manufacturer)

and Mr. Adar Poonawalla, as a contribution towards social responsibility. The APCC will strive to achieve this objective through efficient and scientific management of Organic Food Waste. At current estimates, 52-55% of total municipal waste generated in urban cities is organic in nature. When such waste is segregated and removed separately, at source, it will ensure minimization of land fill and freeing up of urban land for more productive/constructive use by the urban areas¹. This move will also help curb pollution which is on constant rise in the city. The APCC partners with PMC to strive support the infrastructure requirements and management of organic waste which encompasses its segregation at source, and diverting the same for scientific processing. The bio-conversion processing of MSW is applicable to the organic fraction of wastes, to prepare compost or to generate biogas such as methane (waste to energy) and residual sludge (manure). This initiative targets to segregate and process 300-350 tonnes of wet food waste and convert it into biofuel and organic manure, resulting in about 109,500 tonnes of wet waste being processed in a year's time. To achieve the stipulated target, the APCC has pledged Rs. 100 crores under Corporate Social Responsibility. It envisages to take up the following activities under this movement: three mechanical road sweepers to be availed of, 50 machines to pick up street waste, small vehicles to clear waste deposited in bins placed at public places and main roads by residential societies. The PMC will help APCC identify the target areas in the city where there has been certain reluctance and apprehensions posed by the local citizens owing to non-availability of the requisite infrastructure and technology for its treatment.

Similarly, Cummins India has a long standing partnership with PMC for a futuristic zero-garbage ward model and launched a cleanliness campaign – 'Swatchta Mitra'. The zero-garbage project essentially processes all waste at the ward level itself, thereby reducing transportation and labour costs and subsequently eliminating the need for landfills. This model helps decentralize solid waste management and incorporate the waste collectors into the formal system of waste management. This model was successfully implemented in South Pune's Katraj ward, Pune's largest ward in terms of geographic size and number of household; it was the ideal representation of the waste problems plaguing the city; and subsequently in Baner-Balewadi ward. The weakest link gauged in the solid waste management process is the unreliable pushcarts that were provided to the waste collectors. To address this, Cummins launched a Community Impact Six Sigma venture to design a low-cost pushcart with better ergonomics which are designed to improve the conditions of the waste collectors and simplify the process for collection of waste. Citing the success of these new pushcart models, the PMC is looking at replicating it across wards in the city for better waste collection. Once implemented, the project will cater

¹ The conclusion is based on the findings of the case study, 'CSR Initiative in Pune: Adar Poonawalla Clean City (APCC)' conducted by the author.

to over 14,500 households and lead to an increase in the waste segregation at the source by 66 percent. The treatment of wet waste in local composting pits increased by 400 percent to over 2.5 tonnes per day, in addition to 6.5 tonnes per day processed at the local biogas plant. Consequently, the number of roadside garbage bins has been reduced by 33 percent. With the success of the Katraj and Balewadi-Baner models, Cummins is ready with a holistically developed model that can be replicated across different demographics within the city. To guarantee effective monitoring and replication of the new process, Janwani, a social wing of Maratha Chamber of Commerce, Industries and Agriculture (MCCIA) and PMC developed an ISO manual, the first ever for solid waste management in India. It is through such blurring of lines between the public and the private sectors, that the city is able to attain sky-rocketing success in terms of actualizing the goals.

SWaCH: Partnering with the Informal Sector

Solid Waste Collection and Handling (SWaCH) is India's first wholly owned pro-poor cooperative of self employed waste pickers/collectors that provide front-end waste management services to the citizens of Pune. This entrepreneurial workforce of waste pickers boasts of a 9000+ membership comprising 80% women from socially backward castes and marginalized sections. The members of SWaCh are committed towards awarding better sanitation provisions at work, and a promising future for the wards of the members. In 2008 the PMC signed a 5-year agreement with SWaCH and owing to its multi-faceted benefits, renewed it in 2016 to decentralize door-to-door waste collection services. The initiative brought together two interests – the waste pickers' interest in upgrading their livelihood and the Municipality's interest in sustainable SWM, which helped quantify their contribution. The members of the cooperative work in pairs and are in charge of door-to-door waste collection (DTDC) for 200-250 households. They further segregate the recyclables to be sold in re-cycling market; non-recyclable waste is dropped off at feeder points (from where PMC waste sanitation vehicles transport it to the processing units on the outskirts of the city). SWaCH collects more than 600 tonnes of MSW per day and about 130 tonnes are sent for composting and 150 tonnes are recycled. The National Solid Waste Association of India (NSWA) acknowledged this venture of 6600 waste pickers that salvage 144 tonnes of recyclable scrap and save the PMC Rs. 16 crores per annum, in waste handling costs alone. The model is energy efficient and environmentally beneficial, as SWaCH waste pickers re-cycle waste and reduce the quantity of waste sent to landfills. This reduces carbon and other greenhouse gas emissions, responsible for global warming.

The waste collectors, however, are rendered critically vulnerable to pollution-related health hazards from handling the MSW owing to their ignorance and financial frugality. The PMC has, hence, provided the waste

collectors with the necessary training, infrastructure, multiple bins for the segregation of waste, raincoats, gloves, soap, pushcarts and cycle rickshaws. Other benefits including interest-free loans and educational support for their children have also been availed to them to help them confront social stigma. No entity, other than such a grass root one, could have been able to better comprehend and adopt the dynamics of safe waste collection and disposal. Rather, the international partners who rake in the big moolah would've probably failed to assess the ground level scenario; precisely the reason why taking the informal sectors into confidence has become obligatory.

Initiatives in Sanitation: Citizen Engagement towards Capacity Building (Aligns to SDGs 6 and 13)

Access to a clean and hygienic toilet in public spaces in the city is a basic necessity for a citizen. Lack of access to such a facility in public spaces leads to open defecation and unhygienic conditions in the city affecting the health of the citizens. A Gap Analysis Report for public toilets shows that the Pune Municipal Corporation is currently facing a deficit of 92,618 sanitary lavatories according to the PMC latest household survey, based on census 2011. The primary concern for access to public toilets in Pune is the quality of toilets provided and its usable access to the public. People refuse to use unclean facilities and instead prefer to defecate in the open.

Providing adequate sanitation facilities to such a colossal population is a herculean task. Slum Sanitation & Health Welfare Advanced (SHWAAS) is a triad partnership project initiated by Pune Municipal Corporation and CHF India Foundation with support from European Union. This project has been working with an aim of making Pune 100% open defecation free. In order to find solutions to the persistent problems faced by the urban poor with regard to sanitation and waste management, the SHWAAS project has adopted the CLTS – Community Lead Total Sanitation approach. Under this project, the natural leaders are mobilized to take ownership of the community and to resolve various problems related to sanitation and SWM. SHWAAS has been working on day to day maintenance of community toilets, dissemination of awareness and is presently training caretakers in five Ward offices and around 180 community toilet blocks, amongst the city's 300. With a view to increase access and functionality of community toilets in the slums of city, SHWAAS has been endorsed by the European Union with a grant of 9.7 lakh Euros for sustainable solid waste management and sanitation initiatives in 90 slums across Pune.

In its mission to provide toilet facilities in slums, the PMC in 2013 opted for the 'Samagra' model, for construction/redesigning of 50 toilets in 15 slums in the city @ Rs. 1.8 crore supported by the Bill and Melinda Gates

Foundation. This support has been renewed in January 2016, in order to help uplift Pune as a smart city. Samagra has designed a unique self sustainable model for the day to day cleanliness of community toilets at 12 locations under Warje-Karvenagar ward offices. Their Plan of Action entails: providing good design and effective management of community toilet blocks along with various value-added services, effective behaviour change communication (BCC) methods targeted at girls, children and the community, loo-scaping, mobility facilities for senior citizens, provisions for adequate ventilation, motivating and creating 'loo-prenuers' by training local entrepreneurs in cleaning methodology, maintenance and basic business principles. With 92% customer satisfaction and 600% increase in people's willingness to pay for using the toilets, the civic body is seeking to replicate this model in other parts of the city as well.

Digital Literacy (Aligns to SDGs 4, 7 and 9)

Information and Communications Technology (ICT) plays a rudimentary role in not just bridging the knowledge gap for quality education, but also advocate gender quality and battle against climate change. There is an urgent need to build skills for a nation that is aspiring to create a digital identity of its own. The global world is committed to leverage their technology leadership towards the social transformation taking place in the country. Pune City Connect and NASSCOM Foundation (which is the apex industry association for the IT-BPM sector in India) bolstered by Pune Municipal Corporation, have announced the 'Digitize Pune' initiative and launched the 'Each One, Teach Ten' volunteering campaign with the goal of enabling financial literacy for every citizen of Pune. The basic ICT training is ritually being provided by PMC; the domain that had always been omitted was adult and penetrating digital literacy which calls for pooling of enormous funds.

Due to the recent demonetization move, financial literacy in particular, has become a pressing need. This is a call to action for volunteers from across Pune to enable financial literacy for all local population. The volunteers will need to connect with the beneficiaries and help them get on to any one of five cashless transaction platforms including e-Wallets, Unstructured Supplementary Service Data (USSD – Quick Codes), Unified Payment Interface (UPI), Point Of Sale (POS) and Aadhar Enabled Payment System. These five platforms have been identified by the Ministry of Human Resource Development (MHRD), steer the society towards the vision of cashless India. Representatives from over 20 city-based organizations pledged to volunteer for the creation of a 'digi-monetised' society. These companies combined, have a potential volunteer strength of over one lakh and form a formidable task force while more organizations are demonstrating their enthusiasm to become a part of this massive development. The volunteers will be encouraged to train as many people as possible to use online transactions, e-wallets, UPI apps

like BHIM, USSD and Aadhaar enabled transaction systems. NASSCOM Foundation has also come out with a curriculum to aid the volunteers in the training process. Pune City Connect and NASSCOM Foundation as of now have been running 20 digital literacy centres across the city and will soon incorporate the financial literacy course curriculum in the overall digital literacy training programme.

In December 2016, NASSCOM Foundation launched a learning centre in Pune, in collaboration with Hewlett Packard Enterprise (HPE) India. This is in accordance with the Government's National Digital Literacy Mission (NDLM) which aims to have atleast one digitally literate person in each household by 2020. With the launch of the HPE Future Classroom, Pune now has 25 NDLM centres, the highest in any city across India. With strong focus on becoming completely digitally literate city by 2020, Pune has taken an innovative route towards digital literacy, by setting up these centres in NGOs, PMC-run schools, digital mobile literacy buses and now, a portable containerized solution. Pune has become the leading light for this initiative by having crossed a landmark of 25 centres and is attempting to two-fold this number by the end of the year. The HPE hardware and devices deployed will be supported by a suite of software solutions allowing students and teachers to access it at their homes via the internet rendering the learning process as an immersive experience.

Under the aegis of the Pune Municipal Corporation (Urban Community Development department) and Zensar Foundation, first digital literacy bus was launched in Pune. This bus, which functions as a mobile digital literacy centre, is equipped with 16 computers in a classroom-like simulation, with the objective of encouraging the national agenda of achieving digital literacy under the National Digital Literacy Mission (NDLM) by 2020. Likewise, Larsen & Toubro (L&T), a multi-national conglomerate has been chosen as the implementation partner to convert Pune into a smart city. The project intends to enable wi-fi at around 200 strategic locations across the city, and set up a state-of-the-art Smart City Operation Centre (SCOC) to integrate all its services and applications on a single platform. This single-point interface will be a holistic platform with the potential to accommodate all future needs through integration of various citizen-centric applications. The project includes a revenue monetization model, a first in the country for smart cities.

Way Forward: Reimagining Pune

The 2030 vision the city carries is based on the principle 'Make Pune More Liveable'. The Smart City initiative isn't about Union government pumping in extra resources for urban development. The critical element towards attaining numero uno position is about citizens' planning and interpreting smartness. The second and third cycle of competition under the Smart City Challenges are slated for 2016-17 and 2017-18 respectively. To ensure the

holistic development of the citizens of Pune, the Pune Municipal Corporation earnestly strives for the establishment of, and seeks to channelize a 'social license' between the community and other service providers. All this converges to South-South and triangular cooperation encouraging the engaging of diverse development partners in support of common goals thereby rendering the world, genuinely a better and safe place to live in.

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Partnership with the Community through ISR: A Strategy for Transforming India 2030

**Shweta Sinha Deshpande*, Sulakshana Sen,
Sana Vaidya and Ananya Gouthi**

Symbiosis School of Liberal Arts
New Viman Nagar Campus, Pune – 411014

*deputydirector@ssla.edu.in

Introduction

Goal 17 of the Sustainable Development Goals (SDGs) as adopted by the United Nations (UN) in 2016, identifies the need for partnerships at all levels, including governments at the global level and the private sector and civil society at the national, regional and local levels. It outlines the multi-stakeholder strategy in building partnerships to mobilize resources that include and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries¹.

The Honourable Prime Minister of India, Mr. Narendra Modi, in his speech at the UN Summit for the adoption of Post-2015 Development Agenda, spoke of ‘empowerment of the poor for removing poverty through education and skill development... of turning distant dreams into immediate possibilities...of dignity through housing, power, water and sanitation for all’². India has embraced the agenda of the SDGs through the National Institution for Transforming India or NITI Ayog and the Research and Information System for Developing Countries (RIS). These organizations have been made responsible for guiding and bringing in a decentralized system of partnership between the States and the Centre to help execute the 17 goals of the SDGs through a contextualized framework. “NITI Aayog has, for the first time, ensured that all States take the lead in providing policy interventions to the Union Government. A platform for cooperative federalism, NITI Aayog facilitates the working together of the Union and States as equals”³.

¹ <http://www.un.org/sustainabledevelopment/globalpartnerships/retrieved5.01.2017>.

² <http://niti.gov.in/india-s-commitment-to-the-sdgs> retrieved 14.01.2017.

³ <http://niti.gov.in/14.01.2017>.

This paper outlines a further localized framework for community based partnership and proposes a strategy for development to take forward the UN mandate of “Partnership with community to develop strategy for development”. The key idea is to move beyond the global and governing leadership to the local communities, wanting and expecting change, to actually mobilize resources within the local communities through asset and need assessments within the community to enhance growth and capacity building for a long term sustainable growth and development. This ties in well with the key idea of SDGs to reduce poverty, hunger, inequality and promotion of health, sanitation and equality in all sectors for enhancement of human development and capacity building. Human development indices are associated not just with the macro-systems but also with the local or the meso-community level and its socio-cultural environment, and therefore needs to be approached from within the local system and parallel organizational and financial support from the government and other bodies such as the corporate and institutional sectors including education systems.

Firstly the paper outlines the meaning and scope of the terms community and development in context of the SDGs, especially Goal 17. Further it drafts the strategy for community development in context of the Institutional Social Responsibility (ISR) and the scope that it represents in reaching out to the community, through the youth in academic and academia affiliated institutions. This contention that partnership with the community through ISR for transforming India by 2030 will be fortified through some case studies. The suggested strategies cover the urban socio-economic setup of globalized India.

The Need for Social Inclusion, Social Justice and Inclusive Growth

The concept of social inclusion represents a vision for “a society for all”, in which every individual, each with rights and responsibilities, has an active role to play.⁴ Inclusion is a participatory idea at all levels of goal setting, execution of processes and the sustained outcomes for reduction of inequalities, discrimination, social justice and cohesion. The UNDP website states that social exclusion is the reason behind the growing inequalities in the world, as ten percent of the people own eighty five percent of the world’s assets and fifty percent own only one percent. Till this staggering difference is mitigated, true development can never take place. Although issues of inclusive development have been addressed by many a philosopher, scholar and theorist, in the contemporary era, we find the concept of distributive justice, social inclusion

⁴ Social Inclusion, Poverty Eradication and the 2030 Agenda for Sustainable Development: [http://www.unrisd.org/80256B3C005BCCF9/\(httpAuxPages\)/0E9547327B7941D6C1257EDF003E74EB/\\$file/Dugarova.pdf](http://www.unrisd.org/80256B3C005BCCF9/(httpAuxPages)/0E9547327B7941D6C1257EDF003E74EB/$file/Dugarova.pdf)

and inclusive development and growth, being put forward by scholars like John Rawls, Pierre Bourdieu and Amartya Sen.

John Rawls in his book, *A Theory of Justice* (1971), puts forth the theory of Justice as Fairness, using two core arguments. While exploring the way to achieve distributive justice, Rawls argues that each person should have an equal right to the most extensive basic liberty compatible with a similar liberty for all. The second major argument that he puts forth is that social and economic equalities are to be arranged so that they are both to the greatest benefit of the least advantaged and attached to the offices and positions open to all under conditions of fair equality of opportunity. Therefore, these two considerations must be kept in mind when formulating any strategy to implement the SDGs for transforming India by 2030, as true development can never be achieved unless the strategies adopted and implemented ensure distributive justice. It is for this reason that Rawls' concept of distributive justice finds a place of importance in this paper, for unless the benefits of development trickle down to the lowest echelons of the community, the goal of transforming India cannot be truly attained.

In his writing, *Forms of Capital* (1986), Pierre Bourdieu puts forth the thought that "Capital is accumulated labour which enables them to appropriate social energy in the form of reified or living labour. Capital in its objectified form takes time to accumulate and has a potential capacity to produce profits and to reproduce itself in identical or expanded form. Capital can be seen in three main guises as economic capital – money and property rights, cultural capital – which can be converted into economic capital in certain conditions and can be institutionalized in the form of educational qualifications, social capital – made up of social obligations or connections which can also become economic capital under some circumstances and can be institutionalized in the form of a title of nobility." For the purpose of this paper, we will be looking at a combination of Bourdieu's theory of cultural and social capital as the agency to bring about grassroots level community development and realization of the sustainable development goals by 2030.

The role of every modern nation-state, irrespective of its ideology, politics and economics is that of a welfare state. Given that, as well as the fact that the SDGs 2030 are aimed at the welfare of the entire nation and not that of merely the privileged few, it is essential to keep in mind the parameters identified by Nobel Laureate economist Amartya Sen. Sen has emphasized that the focus of development has to be on social infrastructure for inclusive growth to take place. According to him, it is this that will lead to economic growth of the country. Within social infrastructure, Sen has identified primary education and healthcare as the two sectors that require foremost attention in India.

Access to social infrastructure, active informed participation in politics and the process of economic and social growth as well as decision making of the community and all societal activities has been defined as social inclusion. As an outcome, it therefore aims to ensure the reduction of inequalities,

elimination of any forms of exclusion and discrimination and achievement of social justice and cohesion. Therefore, any strategy for achieving SDGs for the country as a whole, must encompass the entire community; but the challenge lies in the implementation of an inclusive programme and an inclusion of the community in the process of defining the trajectory and line of development as well as in defining the notion of ‘community’ itself. The other issue that needs to be addressed is the emphasis on the role of the CSOs and NGOs as the only agencies of contact to reach out to the community to help bring the change that has been visualized in the SDGs and adopted by the national and state governments. A concrete strategy for inclusion of the nation’s demographic dividend to not just participate but actually guide and thrust the process has not been outlined.

SDG’s Social Inclusion, Social Justice and Inclusive Growth

Goal 17 “Partnerships for the Goals” emphasize on *Multi-stakeholder partnerships* that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries (17.16) and encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships (17.17).⁵

A tremendous scope for making the SDGs an attainable and workable agenda, lies with the youth in India. According to the UN Report on population in November 2014, India has the largest youth population – 356 million between the ages 10-24⁶, and it is this potential that we need to tap. Taking account of the potential among the Indian youth and the educational institutions, the National Assessment and Accreditation Council (NAAC) as part of its requirements, gives a lot of importance to Institutional Social Responsibility (ISR) (this will be discussed in detail later in the paper) within academic institutions at the undergraduate level. Higher secondary education including the Indian Certificate of Secondary Education (ICSE), the Central Board of Secondary Education (CBSE) or State Boards, also have a requirement of SUPW or Socially Useful and Productive Work. With an aim towards nation building, SUPW and ISR requires students to reach out to the community not only to help them through stop gap arrangements such as philanthropy, but also for social development and thereby development of human capital. These requirements have been incorporated with the dual perspective of building thoughtful citizens who contribute and understand the need for inclusive and cohesive nation building. The dual benefit stems from

⁵ <https://sustainabledevelopment.un.org/sdg17> retrieved 5.01.2017

⁶ <http://www.thehindu.com/todays-paper/tp-in-school/india-has-worlds-largest-youth-population-un-report/article6612615.ece>

the fact that not only does the community to whom the students reach out to, benefit from this, but the students themselves become better human beings by reaching out to the community, and as Shakespeare puts it:

The quality of mercy is not strain'd,

... it is twice blest;

It blesseth him that gives and him that takes...

(Merchant of Venice, Act IV, Scene 1)

Therefore, by reaching out to the community, not only do the students become more socially conscious and responsible citizens, the people they reach out to, grow as well because as aptly reflected in a Chinese proverb, “you give a poor man a fish and you feed him for a day. You teach him to fish and you give him an occupation that will feed him for a lifetime.”

An autonomous body established by the University Grants Commission (UGC) of India, NAAC assesses and accredits institutions of higher education in the country since its constitution in 1994. The key core value of the organisation is Contributing to National Development along with other competencies and value systems among students. The distribution of criterion-wise differential weightages includes ‘Research, Consultancy and Extension’ as one of the key element for grading the scores of higher education institutions. Inclusion of extension activities within the scheme of higher education points towards the nation’s intent towards inclusive development through community participation (NAAC, 2013). However, what seems to be lacking currently is the strategy and design for propagating this nation building process through community partnerships and possibly the idea of an inclusive community itself. To address the second aspect of the problem identified, the paper will conceptualize the community itself before moving on to discuss the community partnerships and the strategy for community partnered inclusive development in concurrence with the SDGs.

What Does the Term Community Imply?

There are many definitions and parameters for defining the term ‘community’ that has evolved over time since the early 20th century, with debates around the terms *Gemeinschaft* meaning community and *Gesellschaft* meaning society from Weber (1921), Tönnies (1935), and Durkheim (1972) to a more recent understanding as outlined by Patrick and Wickizer (1995), MacQueen et al. (2001) and Phil Brown (2004) in the community service and research sector.

Patrick and Wickizer (1995) identify community with an integrated geographical and spatial concept of: a place or a geographically bounded location; with social interaction, networks and support systems as decisive to the idea with political and social responsibility, involving political and social motives in the formation of communal groups.

MacQueen et al. (2001) in their work “What is Community? An Evidence-based Definition for Participatory Public Health”, focus their

empirical research on the understanding of community and outlines five core elements in their definition: “*community is a group of people with diverse characteristics who are linked by social ties, share common perspectives and engage in joint action in geographical locations or setting*”. Further in their words, “in anthropologic terms, the elements constitute a common cultural domain”.

Phil Brown (2004) in his work “Who Is The Community?/What Is The Community?” further explains the five core elements as outlined by MacQueen et al. (2001).

1. Locus as a sense of place, referred to a geographic entity ranging from neighbourhood to city size, or a particular milieu around which people gathered (such as a church or recreation centre).
2. Sharing, common interests and perspectives, referred to common interests and values that could cross geographic boundaries.
3. Joint action, a sense of coherence and identity, included informal common activities such as sharing tasks and helping neighbours, but these were not necessarily intentionally designed to create community cohesion.
4. Social ties involved relationships that created the ongoing sense of cohesion.
5. Diversity referred not primarily to ethnic groupings, but to the social complexity within communities in which a multiplicity of communities co-existed.

In an integrated understanding, Brown (2004), outlines ever-changing elements of a community as:

1. a variety of geographic (bounded) and trans-geographic (un-bounded) groupings and often a blend of both;
2. that function effectively only through social support through social networks; and
3. ‘generate collective social action, but are also formed as a result of such action’.

This definition is a model for understanding the concept of community in contemporary global and urban context especially since the examples studied and analysed belong to the urban socio-cultural and economic set up. Patrick and Wickizer (1995), MacQueen et al. (2001) and Brown (2004) have worked within the community health sector grappling with the challenges of the ever-changing identity of the community. The authors of this paper feel that in furthering the idea of strategies for achieving the SDGs the concept of community outlined above will come in extremely useful as one of the cases analysed from the Yamunanagar underprivileged tenement further indicates to this diverse idea of community that is constructed on social support and interaction.

Additionally, for the scope of this paper, a geographical or spatial understanding of the term adds to the practical relations that need to be built between community partners that includes the institutions of education, the students and other support groups along with the receiving community and the interventions that will be operative at several levels. This, however, does not restrict us in associating the idea of community to the wider trans-geographical understanding especially keeping in mind the fact that development is a global and transnational aim for all members of the global community. The idea of a fluid community may lack cohesive interactions and commitment to achieve the diverse needs that define a community's expectations of the future, both emotionally and practically.

Community and Community Development

The United Nations since its inception has been crucial in not only constructing the vision of an integrated international community but also in encouraging and facilitating community development at all levels. In 1999, then Secretary General Kofi Annan examined the concept of 'international community' in an address on the fifty-second DPI/NGO conference, exploring the diverse and unique nature of each community and the constant change in how communities are formed and designed, and the fact of a shared vision which binds the community. *"What makes a community? What binds it together? For some it is faith. For others it is the defence of an idea, such as democracy or the fight against poverty. Some communities are homogeneous, others multicultural. Some are as small as schools and villages; others as large as continents. Today, of course, more and more communities are "virtual", discovering and promoting their shared values through the Internet."*⁷ Further emphasizing on community development, he speaks of the partnerships that need to be developed between Non-Governmental Organizations (NGOs), civil society, governments and private sector (UN defines the Civil society as the "third sector" of society comprising civil society organizations and non-governmental organizations, along with government and business. It comprises civil society organizations and non-governmental organizations.⁸

Community development as understood by United Nations is *'a process designed to create conditions of economic and social progress for the whole community with its active participation'*⁹. The key ideas include a holistic progress with an active participation of the community itself and is based on the expressed needs of the people with local government and administration along with voluntary non-governmental organisations (United Nations,

⁷ <http://www.un.org/press/en/1999/19990915.sgsm7133.doc.html>

⁸ <http://www.un.org/en/sections/resources/civil-society/index.html>.

⁹ <https://canadianglobalresponse.ca/cause/community-development-general-fund/> UN, Report 1955.

1957). This fundamental understanding of what makes a community and the responsibility of community development further guides the development of the Sustainable Development Goals. The project of successful Community Development is not only wells, roads, schools, other community facilities, and new crops; it is, more properly, the development of stable, self-reliant communities with an assured sense of social and political responsibility (Miniclier, 1969, p. 9; quoted from Braden and Mayo, 1999).

A community in the practical sense of the contemporary space – urban or rural – include the government, educational institutions, non-profit/non-government organisations, corporate sector organisations and the people within a defined yet a transient geographical space that comes together for development initiative and inclusive growth. A self-reliant community will be realized through partnerships in development that is guided by a vested interest of the diverse groups that form a community within the plans and strategies for their own future. Community participation in the recent past has brought together the government agencies, NGOs, CSOs, and the specific community that seeks support; however what is missing is the role of the academic sector beyond the ideational and advisory support system. There are educational institutions that have already integrated their curriculum with community service through Community Service learning and research and are contributing immensely to inclusive growth through the student dividend that is also the community's youngest partner.

A Sub-committee of the 12th Planning Commission submitted a report on 'Strengthening Community Engagement in Higher Education in India' under the Chairmanship of Shri Harsh Mandar, where they quoted Dr. Montek S. Ahluwalia, Dy. Chairman, Planning Commission, emphasizing the role of institutions of higher education in promoting deeper social responsibility amongst students and teachers by enabling closer interactions with the community (Planning Commission). With increasing enrolment of different students from varied socio-economic backgrounds, education had to cater to a more heterogeneous population than before. It brings about an opportunity for students to take the benefits of this education and give back to the community. There is a need for integration of theory and practice, from the classrooms to society. At a time where India has invested highly in the education sector, the percolation to human resources is expected in a short period of time.

Community engagement activities have been undertaken in higher education institutions; however, the report points out the flaws in this approach. The report pushes for a mutually beneficial partnership between the institutions and the communities. The report highlights the different groups which are involved in community-university engagement across the world and in India which focused on programmes for analysis like the Global University Network for Innovations (GUNI); while some such as Samarth Bharat Abhiyan programme and Tallories Network were projects undertaken to directly reach out to the community. Other projects like Living Knowledge

Network in Europe, work to bridge the gap between the various stakeholders of the community, while Global Alliance for Community Engaged Research (GACER) is a global network between universities and the community.

The examples and initiatives cited, including those within the country, speak of the will amongst the various stakeholders, though a cohesive and integrated and systemic approach within these initiatives is lacking. The strategy suggested brings together these multiple initiatives within the framework of Higher Education Institutions (HEI) through academic research as well as direct engagement with the community that will benefit a larger community.

What is needed is the student's integration within the community to engage with realities of people and through their knowledge both theory and practical, bring in a sustainable change. The idea is not to enforce an outsider's perspective or a rather top down developmental ideology but a participatory understanding and problem solving of issues through community based research, and service learning programmes. What is needed is not sympathy or philanthropy but an empathetic yet positivist understanding through Community Based Research, Participatory Action Research, Asset Based Community Development through a needs and asset mapping. If students are exposed to such ideas of research based community service through a structured curriculum built within courses through the various disciplines that they engage with, change will be speedy and sustainable. Till date community engagement – both teaching and learning – have been through add-ons such as that of the National Service Scheme (NSS). Instead, what is required is an innovative methodology for integrating the students within these developmental agendas without pushing it forth as social work. Therefore, the need of the hour is systemic and scientific mapping, analysis, problem solving and execution as part of the integrated developmental agenda for all sectors – bringing together education and work, theory and practice, university and society (Planning Commission).

Recent Case Studies

Our own research in this area has brought forth some case studies which reflect the need among the community; students, educational institutions, non-profit organizations etc. to work for development of the less privileged.

TEDx Hyderabad

TED is a global foundation devoted to *Ideas Worth Spreading*. Founded in 1984, this non-profit media organisation started as a conference to bring together people from three worlds: Technology, Entertainment and Design. TED is now a platform and a global movement focused on meaningful change through the power of ideas. TEDx was created in the spirit of TED's

mission, but designed to give communities, organisations and individuals the opportunity to stimulate dialogue through TED-like experiences at the local level. TEDx Hyderabad is one such non-profit license holder of the TED global foundation in the city of Hyderabad. It is devoted to building a community of Thinkers, Enablers and Doers within the city of Hyderabad. TEDx Hyderabad believes in the power of community and wants to build it – one idea at a time. Among their numerous projects, three of them look at involving the student community as a means of helping them achieve their goals.

1. Save 10K Bores – This looks at a Do-It-Yourself project of recharging the dry borewells in the residencies and housing societies of Hyderabad city through water harvesting solutions at a minimal cost of 15000/- rupees. This initiative was showcased at HUM - Hyderabad Urban Makeover conference and adopted by HMWSSB (Hyderabad Metropolitan Water Supply and Sewerage Board) as part of a larger campaign for water conservation. This project which targets recharging of ten thousand borewells in the city of Hyderabad, looks at students as volunteers, to create awareness of the possibility of reducing water costs and better management of water and water conservation by meeting management committees of the residencies and housing societies and making them aware of these options.
2. 100K First Responders – The aim of this initiative is to train one lakh people across Hyderabad city in emergency response to help victims of any emergency between the time that the emergency occurs and the ambulance or other emergency service providers arrive. The First Responder training has been imparted to different people across the city including medical college students, Uber cab drivers, and residents at a few residential complexes. The involvement of educational institutes in this initiative would help take this goal forward and help address the apathy that has developed in modern societies.
3. Extension of She Teams to Colleges - SHE teams have been introduced in Telangana state with a motto to provide safety and security to women in Telangana and to make Hyderabad a safe and smart city. 100 SHE TEAMS are working under direct supervision of Smt. Swati Lakra IPS, Addl. Commissioner of Police, Crimes & SIT. This project is in its initial stages where TEDx looks at acting as an agency between the Police and the colleges where students would be trained and there would be centres in colleges which will act as a go to place for any kind of harassment suffered by women.

The rue of TEDx Hyderabad is that they do not find sufficient volunteers to take the project ahead and see a complete fruition as had been visualized by them. If junior colleges and undergraduate colleges could reach out to agencies who are dedicated, then the change in the community would be much more

visible. Ekta Verma, a core team member of TedX Hyderabad opines that once students are sensitized and become socially conscious and responsible young adults, they will not only take this message out to the world at large, but with successive generations, an entire community of citizens will develop who are deeply involved in helping the community that they are a part of as it will become part of their DNA¹⁰.

Design for Change

Design for Change (DFC) is an international movement that encourages school children to take on social issues that bother them and change them through an organized framework of “Feel, Imagine, Do and Share”. Over 200,000 children from across 35 countries register with DFC and take on the one week challenge of feeling about what they would like to change in society, imagining strategies to implement that change, and executing their plan and sharing their story with Design For Change. Several powerful stories of change have emerged from the initiative which rewards the students with awards and provides them assistance and a global platform. Children in all corners of the world from India, Bhutan, Chile, Qatar, USA, Netherlands and so on are doing inspiring work from helping their immigrant peers, stopping child marriages, cleaning up their villages to working towards abolishing untouchability. The Good Project at Harvard did a study on the work done through DFC till 2012 and found 16 key diverse causes that were taken up. Further, DFC has created curriculums that aims to inculcate the values of empathy and working in the community in students. Harvard’s research on the curriculum once again found that it has a substantial impact on the student’s development^{11a, 11b}.

SIU and SCOPE

Symbiosis International University, in 2012, started the Symbiosis Community Outreach Programme and Extension (SCOPE) as per the prescribed guidelines by the UGC with a view to positively impact and help the communities that exist around the various institutes. The main areas of focus were healthcare where the Symbiosis Centre for Health Care put forth the Mobile Medical Unit (MMU) and the Family Doctor Care (FDC). Other areas of interventions came about through the other institutes of the University and were also added to the SCOPE activities.

The healthcare initiatives take place in 14 different villages and some construction sites in the areas around Pune. The facility is a well-equipped

¹⁰ <http://tedxhyderabad.com/team-tedxhyderabad/> as retrieved on 30.01. 2017.

^{11a} http://designforchangeindia.com/public/files/DFC_HARVARD%20GOOD%20WORK%20RESEARCH_2009-2012.pdf

^{11b} <http://www.dfeworld.com/research.html>

one with medical professionals that conduct many preventive, curative and promotive services for the people who need to avail of these facilities and are often unable to do so otherwise. SCOPE has grown to engage with different government and private initiatives to help undertake activities such as monthly immunizations, pre-natal check-ups, treatment camps and other support. Through the course of its engagement with society, SCOPE also aims to undertake research and survey related activities with the different Symbiosis colleges. The University has adopted 14 villages around its main campus to manage it in relation to health, education, sanitation and waste management to keep up the responsibility it has to help the development of society. These endeavours that the University undertakes also enriches the minds of its students in being sensitive and bring in the perspective of social responsibility to all¹².

Symbiosis School for Liberal Arts (SSLA)

Symbiosis School for Liberal Arts, a department of Symbiosis International University has incorporated a Community Outreach Program in their course structure. This provision requires its students to complete 100 hours in community service through the course of their education. These outreach programmes are undertaken predominantly in the fields of education, healthcare, women's empowerment and political awareness in different areas of the city.

Projects like these involve and enhance the interaction between students of more privileged backgrounds with those not as fortunate. In the process, it nurtures sensitivity among the students as well as brings positive change for those seeking upward mobility. The aim of these exercises are to help different communities not through charity but in ways that have a long term effect on building sustainable practices. Another such example of community outreach is collaborations between SSLA and Aman Setu for English as a Second Language (ESL) where students of the college would volunteer to help the children from the school to learn English as it was not the background that they were familiar with. The endeavour aimed to bring about increased communication by the child in English and boost confidence in being able to speak the language with more ease¹³.

In tune with the ISR requirements of the NAAC, as well as the ideals put forth by SSLA for the learning of its students, one of the projects that was undertaken was the study of an urban slum with respect to certain aspects of their lives where the institution could be of help. It used Community Based Research with a focus on Need and Asset Based Community Development (ABCD) as a means of conducting this study. The study was carried out by the students of Applied Anthropology at Symbiosis School for Liberal

¹² <http://siu.edu.in/social-initiatives.php> (siu scope).

¹³ <http://www.ssla.edu.in/explore/community-outreach> (SSLA Community Outreach).

Arts in Viman Nagar, Pune. The community which was being studied was the residents of an urban slum known as the Yamuna Nagar basti also in the Viman Nagar neighbourhood. The students focused on three main issues which were identified through preliminary research of the community which were the areas of Education, Sanitation and Food Systems. Using the different methodologies that was taught during classroom hours, the students were able to collect data and analyse it to form potential solutions that can be undertaken by the University to help build the community further. Asset based community development involves working with a community rather than on them.

The students also learnt how to place views and perspectives against the cultural background and hence thought about interventions based on the same which is an important aspect of bringing about social change. It is also one of the things that a top-down approach to community development cannot achieve. Most communities are heterogenous in their existence and each individual in the community has varied needs. By equipping them to reach the path to finding how to meet these needs is something that comes through community based research at the grassroots level.

Strategy for Change

To ensure an integrated development keeping in mind the needs of the aspiring community, the focus needs to be grass-root connectivity to the state and central agencies through dedicated channels of the higher educational institutions, which have the academic and human resources/capital to partner in national development. NAAC or the National Accreditation Council, which has been referred to before in this paper, is an autonomous body funded by the University Grants Commission that assesses and accredits institutions of higher education in India. The NAAC guideline and manual of the self-study report for affiliated/constituent colleges for assessment and accreditation manual highlights the first *core value* as that of “contributing to the national development”:

“Contributing to National Development has always been an implicit goal of Indian HEIs. The HEIs have a significant role in human resource development and capacity building of individuals, to cater to the needs of the economy, society and the country as a whole, thereby contributing to the development of the Nation. Serving the cause of social justice, ensuring equity, and increasing access to higher education are a few ways by which HEIs can contribute to the National Development. It is therefore appropriate that the Assessment and Accreditation (A&A) process of the NAAC looks into the ways HEIs have been responding to and contributing towards National Development” (NAAC, 2013: 4).

The seven criteria-based assessment of NAAC is the mainstay of the A&A that analyses the “core functions and activities of an institution and broadly focus on the issues which have a direct impact on teaching-learning, research,

community development and the holistic development of the students”. The agenda of Institutional Social Responsibility (ISR) is one of the key criterion (point 3.6) for “Research, Consultancy and Extension” (Criterion III) for securing grades and national certification. ISR is one of the learning elements for developing sensitivities towards community issues, gender disparities, social inequity etc. and in inculcating values and commitment to society (NAAC, 2013: 17). ISR focuses on institution led programme or ideally “built into the curriculum which intends to help, serve, reflect and learn”. According to the publications of UGC and NAAC, ISR and extension activities have been given a major weightage in the assessment of an educational institute. Although numbers vary in different reports, the percentage that ISR and extension activities carry for the gradation of a college or university is high (Institutional Accreditation Manual for Self Study Report, NAAC 2013) (NAAC, 2013).

The current structure outlines community service as an extension activity, that can (may or may not) be embedded within the curriculum of the institutions. However, to create and convey substantial knowledge base with regards to an inclusive growth of the community and strategies for change keeping in mind the needs of the community that is seeking change needs structured action plan. This action plan, we suggest identifies the local, state and central governance bodies, NGOs, CSOs, civil society and the educational institution as key partners with the aspiring community as driving this change through a structured and partnered programme.

At the Local Level

1. Promotion of the idea of a community that is organically bound within parts of cities, towns, *kasbas* and rural area to promote the idea of a singular cohesive inclusive group for propagating integrated development for all. These geographical and organically sketched areas preferably should be based on the existing communities and markers within cities towns etc rather than recreating new distinctive boundaries.
2. Build partnerships to include or build in relations between the citizens, civil society agencies such as retired and senior citizen groups, women’s groups, local political groups with aspirations of change in the area. These groups within the Indian context are often motivated to bring in change but lack the competencies to strategise.
3. HEIs should be able to promote itself as a partner in this endeavour for change with the aspiring community. It is through the resources here that research and community building strategies will be outlined. Higher Educational institutions and students need to be outlined as key inspiring and guiding factors for development as they have access to academic, research and the methodological base for working with the community.
4. The essential component of this strategy is a vibrant role played by the community aspiring change. As discussed above since the community

may have diverse interests and aspirations, it is extremely important to address all agendas from the community's perspective. To ensure the community is not fractured on agendas to be addressed, a plan of action should be discussed outlining the stages (if more than one is required) of action to achieve the set goals. The plan for action should definitely work with the resources identified (if any) within the community itself to enhance the morale and a sense of self-dependency of the agents. The application of needs and asset analysis ensures that the community also has vested interests in the developmental plan.

At the Institutional Level

1. HEI needs to employ or identify individual/s with competencies in the field of community service programme or has experience in research and working with the community. These experts could be from the field of anthropology, development studies, sociology etc to ensure that the social issues are addressed from a 360 degree perspective as a blinkered or tunnel vision in solving issues till date has not really achieved much success. New methodologies for study, concepts within the discipline and the cultural context of the community partners play an important role in the success of any such programme. Tailor made programmes keeping in mind the realities of the community that one is engaged with is in most cases the key to success.
2. To collaborate with the student partners, it is important to build in Community Based Research learnings within the disciplinary/subject curriculums and the larger vision and mission of the HEIs. This strategy is well accepted in many developed nations to resource the student dividend for community development. CBR curriculum allows the student to understand the organic reality of the problems at hand and work with possible solutions integrating disciplines.
3. ISR therefore need not only be carried out as a separate or extension activity but can be embedded and incorporated in the education curriculum. This is something that is yet to be taken up as a practice in most Indian universities. If the learning is incorporated in educational institutes, then once the students graduate, they can carry this forward as part of an imbibed culture, ethics and consciousness and then can branch out and create new associations for community engagement. It is about creating awareness as currently we are all in our own silos.
4. Corporate Social Responsibility Act of the Ministry of Corporate Affairs, Government of India (Section 135 of the Companies Act, 2013) with its mandate of corporate partnership and "corporate citizenship"¹⁴ tries to integrate corporate responsibility for environmental and community welfare and development. As part of the expected 2% CSR mandate,

¹⁴ <http://www.un.org/en/sections/resources/civil-society/index.html>.

funding partnership can be established with the corporate community for a comprehensive growth¹⁵.

5. At the institutional level, facilities can also be offered for building up social capital. Use of the library facilities and computer labs under guidance of senior students can all be looked at to benefit those in the community who do not have access to these facilities.

At the Governance Level, both Central and State

The need for developing the social index of a nation requires not just the local bodies but the institutionalisation of certain frameworks from the government, that will sustain the project long term. NSS was institutionalised nearly five decades ago and though today it still works with the student body to bring change through direct service, the need of the hour is research based, community partnership for inclusive sustainable development in all sectors. To realize the SDGs, the government needs to move beyond ‘think tanks’ and create partnered frameworks that flow naturally/organically between the national agenda of achieving the SDGs and the local needs and aspirations as outlined by the community based research.

What we perhaps need is an organisation that will bridge the gap between the government framework – its vision mission and goals, and the institutes of higher education, so that both work together in a cohesive manner and their partnership is also ensured. This organisation should not be a mere administrative body which functions in a clerical manner, but should also possess a competent research forum that will analyse and assess and take decisions on the needs of the local communities as identified by the institutes.

Conclusion

The authors of this paper feel that when we talk about social capital, the community becomes important and for community to be defined, the consideration is essentially geographic for the purpose of bringing in community participants to engage in a community based development programme. Yet, when we talk about community development, the concept of space and geography becomes transient through the communicative participation of the various partners in development. For example in the case of the community based research at the Yamuna Nagar tenement, we can identify Yamuna Nagar as one geographical space and a community while Viman Nagar needs to be looked as part of the larger space within which Yamuna Nagar seeks partnership for equitable development; therefore, the concept of community is a constantly shifting and reconstituted space. Further, to take an example from the SSLA initiative, social capital from within the SSLA community grow into the key to change in another community space

¹⁵ <http://finance.bih.nic.in/Documents/CSR-Policy.pdf>

but not without participation from within the community partner that seeks development and change. Therefore, when we speak of social capital, we are aiming to build human capacity and bring about social development through an already existing pool of social capital. The social capital needs to move from its defined confines of an institution into the larger community to change the existing socio-cultural and political space. Through this process there is a re-creation of social capital within the larger geographical and community space. Social capital therefore changes habitus through agency. Through ISR, we bring in the government agency, formalize and institutionalize it. There is scope for this because we have the social capital but not the financial capital. The financial capital comes from CSR which is already institutionalized or from the government.

According to the UGC Annual Report of 2009–2010, 1,46,24,990 students are enrolled in universities and colleges across India. Therefore, given the huge number of students that graduate each year from higher education institutions, the figure translates itself to the amount of social capital generated by the country each year. The number is an actual indication of the potential. The challenge of population, not only in terms of numbers, but also diversity, may prevent top down solutions working in India. However, with each region having its own share of institutes of higher education, the potential of the student body to reach out to its immediate neighbourhood and bring about change is enormous.

In fact, the scope actually exists at a dual level. For while UGC is a central body which looks at inclusive qualitative education, state universities along with deemed and other affiliated universities have the opportunity to reach out to the community they exist in as they would be in the best position to understand the local conditions, needs, communicate in the local language and thereby reach out to the people in a non-invasive manner.

One of the major challenges lie in bringing together the various agencies for community building as most of them exist and function in isolation and silos. If we are able to link each of them properly, what we aim to reach in the next 15 years becomes easier. The institutes are multidirectional in their initiatives as of now, but the aim is to get them to be unidirectional, focused on the same goals, but accepting and functioning on multi-pronged ideas. As a result, the institutes and the students can work on and focus on for different fields like health, education, gender etc, depending on their USP and areas of specialization. We believe that the various communities that include international organisations, the government at the local, state and central level, should all be linked through the concept of a community, where they exist not as isolated, hierarchical bodies but as partners invested in local and national development through the agenda that is set forth by the SDGs. Since the issues at hand such as poverty, sanitation, health, education, and employment are interlinked and cannot really be understood in isolation of each other, the strategy required also needs to be multipronged and multi-partnered to resolve them in a sustainable manner.

Therefore, to conclude, the scope of partnering with the community through the mandate of ISR and CSR in institutes of higher education is tremendous and this can best be taken forward if institutions work together as per their strengths with an agency which will bridge the gap between the government and institutes and foster a partnership between the two to resolve the multi-pronged problems of the community and work towards achievement of the SDGs in order to transform India by 2030.

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Is Globalisation Unsustainable? Analysis of the Impact on Trade and Investments Policies on Growth & Unemployment in India

Saswati Banerjee

Symbiosis School of Economics
Symbiosis International University, Pune – 411004
banerjee.saswati94@gmail.com

Introduction

India is currently one of the leading economies in the face of growth and development with an estimated GDP growth rate of 7.6% over the period of 2015-16. India holds records of economic, political, social and environmental milestones, establishing itself as a significant global entity on the world map. In the context of strategies inducing growth and development, sustainability of such strategies and its spillover effects on the economy as a whole, are equally significant for discussion. The United Nations Summit in September 2015, witnessed stalwarts and leaders across nations commit to 17 sustainable development goals with 169 targets in an attempt to help the world develop on an equitable and sustainable path by the year 2030. If India were to achieve these goals over the next 13 years, policies selective to each of the broad goals must constructively eradicate or reduce the intensity of the addressed policy.

India has always been subject to the existence of persistent long run unemployment since independence. Several attempts have been made by the Indian government to assuage these problems, both by direct target programmes such as the '*Mahatma Gandhi National Rural Employment Guarantee Act*' as well as through indirect employment generating and poverty alleviating programs such as '*Make in India*', anticipating positive spillover effects. This paper lays impetus of the indirect means of increased foreign investments and export promotion activities for employment creation. It tries to gauge the impacts of these trade and investment policies on SDG targets such as growth and unemployment, establishing whether the spill overs of such heavily invested government initiatives are in reality sustainable or not.

Objectives

- Analyzing whether trade and investment enhancing policies undertaken by the Indian government help alleviate focus problems such as unemployment.
- Conducting a study on the impact of growth enhancing strategies such as export promotion and increased Foreign Direct Investments on aforementioned target problem.
- Conducting an econometric analysis on the impact of FDIs and net exports on GDP growth rate and unemployment rate in India. Since all analysis is conducted in the Indian framework, lack of data on poverty and inequality over the years constricts our analysis on just unemployment, which then is used to make arguments on poverty and inequality.

Methodology

This paper analyses the impact of trade and investments on SDG targets such as poverty, inequality and unemployment, assessing whether government initiated programmes and policies thriving for increased trade and investments help in alleviating the aforementioned targets or if the negative spill overs of the same have aggravated the already prevailing problems of unemployment.

- Literature review (which would meet the first two objectives of the research) conducted for the research will study the prevailing statistics of unemployment in varying sectors of the Indian economy – Primary, Secondary and Tertiary – so as to understand the most severely affected sector. This further will be mapped to the changing face of FDIs and exports in India in order to theoretically analyse if increasing FDIs and exports have been changing the extent of unemployment in the Indian scenario, thereby reducing the intensities of poverty and inequality.
- A simple econometric model will be developed in order to study the impact of FDI and net exports on growth rate of the economy and unemployment, establishing causal relationships between the growth in trade and investments to the targeting of unemployment. Details of the econometric models are listed under section ‘Econometric Analysis’.

Literature Review

History suggests that developed and developing countries have had extremely distinct growth paths with trade and investment being inevitable contributing factors. However trade and investments needn't necessarily have positive impacts on growth. The distributional impacts of trade have been widely discussed in various literatures, indicating that trade and investment may have significant impacts on unemployment and hence poverty.

Unemployment may be addressed via direct policy decisions such as MGNREGA as introduced by the Indian government to provide guaranteed

employment within a stipulated time in rural areas. However indirect strategies, whose positive spillovers may include employment creation alongside revenue generation may also be adopted. Trade and Investment opportunities are two such means to initiate employment creation in India. In the field of trade and investment all major developed economies have had policies concentrating on the following:

- Export promotion (instead of import substitution) through industrial policies that benefit exporters.
- Investments directed towards manufacturing for longer and productive periods of industrialisation to ensure employment opportunities to the unemployed, 60% of them being low and medium skilled workers.

If India has 17 SDG targets for the year 2030, all policies initiated by the government concerning trade and investments thereby must evaluate the impacts on the listed targets so as to increase the country's efficacy in achieving those goals.

It is to be noted that most developed countries have prospered on economic and social fronts on the basis of their choice of policies. In the book titled "How Asia Works", author Joe Studwell speaks of the different expansionary growth paths adopted by North East and South East Asia and their consequent results. North East Asian countries such as Taiwan, South Korea, Japan and China have grown on the basis of following policy decisions:

- Export promotion: The first step to growth was to promote exports through performance based aids. Performance of institutions based on exports determined their tax breaks and subsidies. The grants provided were still lesser than the revenues earned from these exports thereby putting their government in an advantageous position.
- Culling those firms that didn't meet the specified export requirements on the basis of state industrial policies. They weeded out losers instead of picking winners.
- Providing great deal of bureaucratic support to manufacturers which exported successfully, which included domestic market protection, supply of credit and state assistance in the field of technology.

While all successful economies have been guilty of protectionism in their early years of development, no one has developed economically and socially on the basis of free trade. Trade policy measures must resolve target goals such as unemployment, which further help reduce factors such as poverty and inequality.

Joe Studwell then proceeds to explain the shortcomings of South East Asian countries such as India, in the same endeavour:

- All state support was used to fool politicians than to promote exports. It was quoted as "Selling sand to the Arabs or snow to the Eskimos".

- The nation's development capital was drained away by trying to promote import substitution than monitoring export development.
- Directed funds to excessive real estate development leading to the property bubble associated with the Asian financial crisis.

Desired trade policy varying from each country's target goals, establishes whether trade is growth enhancing or distorting. Standard trade theories have explained the distributional gains from trade to be in favour of few and not all. Trade policies have had significant impacts on wages and unemployment thereby affecting correlated factors such as poverty and inequality.

Investments alongside do leave a significant impact on unemployment. Surging investment opportunities in India have elevated the standards of corporations operating in the country and have also created job opportunities. However, considering that India is yet a developing country, a large proportion of labour in India is unskilled and employed in the manufacturing sector. Despite attempts of policies like Make in India as initiated by Prime Minister of India, Mr. Narendra Modi, most foreign direct investments are targeted towards the service industries. This however diverts the initial goal of these investment policies as tools for creating job opportunities for the masses.

In the paper "Premature De-Industrialization" Dani Rodrik explains that modern world is a product of industrialization. Industrialization has led developing economies such as Korea and Japan to converge to leading west countries. However, from the 1950s to now, labour force in manufacturing has declined from one fourth to one tenth. First coined by economist Dasgupta and Singh in the year 2006, "Premature de-industrialization" is what developing economies experience today. They turn into service economies without going through a channeled industrial phase. Employment De-Industrialization occurs the fastest. With modern day technology, there is growth in labour productivity in the manufacturing sector as a result of which output surges but employment levels fall. Hence what appears to be a "job creating" strategy in India, may actually be selective in nature and just lead to increase in labour productivity. Manufacturing in any developed economy plays an extremely vital role as it helps mitigate the greatest problems of poor countries at the initial stages of development. *A shortfall of productive human skills* as manufacturing is based on the use of machines. Service sectors need investment in human capital, face more practical and political impediments in trade and do not simplistically adhere to the concept of economies of scale. Manufacturing goods, on the other hand, are comparatively easier to trade and have a huge scope of exploiting economies of scale.

India however is victim to premature industrialization. Share of the service sector in her GDP has been consistently high with several government policies in increasing investments in such sectors. Short phases of industrial growth are bound to create an employment glut thereby worsening the problems of poverty and inequality.

Make in India was devised to transform India into a global design and manufacturing hub. It was the response to the bursting of the emerging markets bubble, whereby India's growth rate had fallen to its lowest in a decade. India, along with the other BRICS nations was tagged as the 'Fragile Five'. While India was in the rink of failure, her citizens questioned if the democracy was at risk or opportunity. Post the launch of Make in India, Manufacturing expanded by almost 44% in 2014. Nonetheless the following figures are testimony to the fact that for manufacturing to supersede services, several Big-Ticket reforms need to go through.

- Services, comprising financial, banking, insurance, non-financial/business, outsourcing, R&D, courier, technology testing and analysis continues to attract maximum FDIs despite Make in India.
- The service sector accounted for 17% off the \$ 31 Billion received during the period of April, 2014 to May, 2015.
- According to the Department of Industrial Policy and Promotion, FDI in the service sector surged from \$ 2.22 billion to \$ 3.25 billion from 2013-14 to 2014-15.
- Economists have argued that any policy directed towards the manufacturing would take at least 12-16 months to fructify. Hence despite attempts, Services continue to bag highest FDI shares.
- Considering that the highest level of unemployment as of 2014 continues to prevail in the agricultural sector, policy measures to displace these unskilled workers to the manufacturing sector would be easier compared to services, which has the second highest rate of unemployment.

Table 1: Share of major sectors in total employment (per cent)

	1999-2000	2004-05	2011-12
Agriculture and allied	59.9	58.5	48.9
Industry	16.4	18.2	24.3
Services	23.7	23.3	26.9

Source: Rangarajan et al. (2014).

Chandrajit Banerjee, director general, CII says, "There are encouraging signs that Make in India is positively impacting generation of jobs." "Make in India has the potential to emerge as a force multiplier to provide the emerging workforce with new livelihood opportunities."

The administration's monetary approach is predicated on an ever increasing number of workers moving from farms to industries. Sandip Sarkar, educator at the Institute of Human Development, predicts that this year the quantity of youth between the ages of 15-29 in the workforce would be 153 million. This number would ascend to 156 million in 2020 and to 158 million by 2025. Over 90 per cent of India's workforce still works in

the informal sector, mostly in under-productive farms. India currently needs export promotion policies so as to have longer periods of industrialization as suggested by standard industrial and trade theories. Manufacturing being the largest sector to accommodate for major proportion of unemployment in India must be pushed to meet target goals of unemployment eradication.

Distributional impacts of trade and investments has been a concern addressed by several economists. Trade and Investment policies in line with a country's target goals may lead to positive results; however growth and development may sometime fail to balance each other. While net exports forms a major share of GDP in most leading economies, the benefits reaped off such transactions may differ for different sections of the society. Trade and investments policies alike, may lead to several negative spill overs, aggravating existing problems of unemployment and poverty, if not weighed appropriately.

David Autor, Professor of Economics at Massachusetts Institute of Technology, in his podcast on Econ Talk speaks of the effect of Chinese exports on the American Economy. America holds a trade deficit with China, being one of the largest importers of textiles, shoes, rubber and plastic products. David Autor in his paper 'The China Syndrome' further elucidates that US has witnessed an alarming increasing in unemployment to a mark of 5%. Study reveals that for every 1000\$ of import penetration in America, 58\$ is accounted for transfer payments to reduce the concentrated impacts of poverty and unemployment. Taxes are raised to meet such costs, thereby indicative of the distributional losses of trade to varying sections of society.

Topalova, an economist working for The National Bureau of Economic Research, in her research for the International Monetary Fund, analyzed the changing face of inequality and poverty in several districts of India, concluding that trade needn't always be growth enhancing. The essence of the study was to gauge if tariff reductions brought about by trade liberalization, significantly affected poverty in industrialized districts of India. The study concludes that poverty has escalated in several districts of India subject to reducing tariffs, its intensity depending on how developed the district had been.

The findings of most of aforementioned papers can be validated through standard trade theories. Note that, it is assumed that trade exposes economy to differentiated products and introduces price competition in the market, increasing the access to cheap foreign products. In an article titled 'An Inconvenient Iota of truth' in *The Economist*, the author argues that despite trade reducing the share of workers in the national income, reduced product prices increases real purchasing power of workers, thereby leaving them better off. The same fact was long concluded in 1936 by an Austrian Economist, Gottfried Haberler that "In the long run, the working class as a whole has nothing to fear from international trade". However, borrowing from the father of Economics, Keynes, "In the long run, we are all dead" and hence the short run impacts of trade has been growth distorting to a large extent.

The Stolper-Samuelson theorem of trade states that the abundant factor used in the manufacturing of the exported product is benefitted from free trade, whereas the scarce factor is hurt. Imports made on cost advantage bases, will affect adversely the wages of the factor used abundantly in the manufacturing of that good, domestically. Tariff relieves further lead to plummeting wages as the imported good are now available at cheaper prices, thereby reducing domestic production of that good.

“Globalization is not working” wrote Financial Times columnist, Philip Stephens as a reaction of the Americans to the European Union Referendum for Brexit. Globalization has been both regressive as well as progressive. Sergey Nigai explains the distributional impacts of trade and investment stating that globalization has been benefitting the elite, rather than the poor, considering the basket of imported products usually comprise services and manufactured goods. This theory can be extended to the Indian scenario where prices of mobile phones and televisions have declined significantly, but those of food prices have escalated faster than the average basket of goods and services. It has also been argued that in India, trade liberalization has led to a fall in government revenue because of lower import tariffs which would imply lower spending on anti-poverty programmes.

On a democratic front, it is the government’s responsibility to choose a path of globalization that is sustainable. While trade increased world GDP as a whole, for a given country it becomes essential to choose a path of development on the basis of target goals. “The high level of inequality in the United States today and its enormous increase during the past 30 years, is the cumulative result of an array of policies, programs and laws” wrote Stiglitz. In an article titled “The Backlash against globalization” published in LiveMint, author Roshan Kishore raises arguments against the Trans-Pacific Partnership, who’s supposed trickle down benefits never reached the target group. Also considering that the then US president, Barack Obama himself emphasized that US must hold inequality eradication as its top priority, all policies initiated must weigh its impact on inequality.

This study further elucidates the impact of FDI inflow and Net Exports in India, on growth and unemployment weighing the relative efficacy of Trade related policies in India and to gather Policy implications for the same.

Econometric Analysis

This section formulates six simple econometric models to gauge the impact of FDI inflow, imports and exports on growth and unemployment so as to make simple policy implications on target goals such as unemployment.

A simple OLS Regression analysis is carried out on stationarised data so as to make significant inferences on the impact of FDI, exports and imports on growth and unemployment rates. Details of the same are listed in the Appendix.

Table 2: Variables used for Regression Analysis

<i>Measure</i>	<i>Abbreviation</i>	<i>Description of the measure</i>
Unemployment	UNP	Unemployment, total (% of total labour force) Unemployment refers to the share of the labour force that is without work but available for and seeking employment.
Foreign Direct Investment (as % of GDP)	FDI	Foreign direct investment, net inflows (% of GDP) - Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.
Growth Rate	GRR	Rate of growth of an economy is the relative increase of a country's GDP to the past year in percentage terms.
Imports (as % GDP)	IMP	Imports of goods and services represent the value of all goods and other market services received from the rest of the world.
Exports (as % GDP)	EXP	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world.

Source: Author's compilations

Proposed Econometric Models to Study Unemployment Rates in India

- i. $UNP_t = \alpha_1 + \gamma_1 FDI_t + \epsilon_t$
- ii. $UNP_t = \alpha_2 + \gamma_2 IMP_t + \epsilon_t$
- iii. $UNP_t = \alpha_3 + \gamma_3 EXP_t + \epsilon_t$

Proposed Econometric Models to Study Growth Rates in India

- i. $GRR_t = \alpha_4 + \gamma_4 FDI_{t-1} + \epsilon_t$
- ii. $GRR_t = \alpha_5 + \gamma_5 IMP_{t-1} + \epsilon_t$
- iii. $GRR_t = \alpha_6 + \gamma_6 EXP_{t-1} + \epsilon_t$

(All econometric analysis and findings enclosed in Appendix)

Note that, in the growth models, lagged values of FDI, imports and exports are considered so as to account for the lag period between cause and effect.

Data Source: <http://data.worldbank.org/>

Conclusion and Findings on Unemployment Models

- In the light of the data collected and corrected for non-stationarity, increasing FDIs in the past 35 years has led to increasing rates of unemployment. Though this increase in unemployment is just 0.05 times per one percent increase in FDI, the result is significant. Without loss of generality this may be explained with regard to increasing weightage of investments directed towards the service sector. As explained in the literature previously, though people are found unemployed even in the service sector, the largest proportion of unemployed workers still reside in the agricultural and manufacturing sectors thus demanding scaling in these sectors that can accommodate the largest share of the employable workers.
- Increasing imports lead to increasing rates of unemployment, unemployment increasing 0.07 times per unit increase in imports. Note that imports are economically beneficial for an economy due to uneven factor pricing and cost advantages as explained by standard Ricardian theory. Hence import substitutes lose their market share due to stiff price competition from the cheap imported goods, thereby displacing labour off those industries. American textiles have seen a wipeout from the economy due to their import patterns from China, thereby displacing labour from such industries and spreading mass unemployment.
- Exports, on the other hand, lead to diminishing unemployment rates, a one third fall in unemployment for a unit increase in exports. According to Classical and New Trade Theories, apart from comparative cost advantages and technological differences, economies of scale can also facilitate trade. Countries exploiting such economies of scale, face lower marginal costs, thereby attaining market power for exports. Since labour is one of the most important factors of production, its employment will surge if one needs to expand output. Note that, as mentioned in the literature earlier, exports in manufacturing goods is easier and more promotable than in services, which are faced by several pre-discussed impediments. Hence export promotion strategies can target unemployment problems from the trade point of view.

Conclusion and Findings on Growth Models

- In the light of the data collected, trade and investment are growth enhancing. Export surges increases growth rates whereas import surges have the reverse effect. Thus one may conclude that a Net Trade Surplus is logically growth promoting. Increase in FDIs also lead to higher growth rates.
- Note that while trade and investment are growth inducing factors, their spill over impacts on unemployment is an equally crucial subject for

discussion. Analysis suggests that net trade surplus and increasing inward flow of investments will prove beneficial to India. However consolidating the results from both models we may conclude that export promoting trade strategies, predominantly in the manufacturing sector so as to achieve a net trade surplus and increasing investments directed towards manufacturing will lead to unemployment targeting and increasing growth rates.

Conclusion and Policy Implications

The following policy implications can be made from the available data:

- Considering the economic structure of India, her trade policies must be more export promoting, in line with the strategies utilized by North-East Asian countries. Import substitution will worsen unemployment and hence poverty-inequality conditions in India as suggested by literature.
- Investments, as long as channelized towards services, will continue to stagnate unemployment in India as a majority of the unskilled labour is employed in the manufacturing sector.
- Policies must ensure longer periods of industrialization as suggested by literature.
- Econometric analysis can help conclude that exports surges and promotion reduce levels of unemployment, whereas import has the reverse effect.
- While exports, imports and FDI inflows are growth promoting, the right policies directed towards target goals such as unemployment will only help effective alleviation of the same.
- Employment targeting will have positive spillover effects on poverty, thereby creating what we call the “Double Coincidence”.

Drawbacks

- Limited data points may lead to sampling bias due to lack of data before 1975.
- Variables selected for analysis are time series in nature and often show cyclical or exponential trends. Non-linear regression analysis would render more appropriate and representative results due to the high goodness of fit.
- Models constructed are overly simplistic, analyzing impacts of FDI, exports and imports on unemployment and growth rates, *ceteris paribus*. However in reality the above listed dependent variables may have some degree of collinearity and may cumulatively impact unemployment and growth rates a little less intensively.

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Appendix

Note that since the data is rendered non-stationary and the variables in the model are not a combination of $I(0)$ and $I(1)$ we use VEM modelling with lag 1 of the dependent variable as per AIC, BIC. We avoid the lag values of the exogenous variables to avoid the problem of over parameterization.

(I) Determining the Order of Stationarity

```
> library(forecast)
Loading required package: zoo
Attaching package: 'zoo'

The following objects are masked from
  'package:base': as.Date,
  as.Date.numeric

Loading required package: timeDate This
is forecast 7.2

# For the Unemployment Models the degree of
Stationarity for the given variables are as
follows: FDI: Order 3; Export: Order 3; Import:
Order 2 #

> attach(UNPEXP)
> colnames(UNPEXP)
[1] "Year" "Unp" "Export"
> ndiffs(Export,alpha=0.05,test=c("adf"),max.
d=10) #Difference Stationary of Order 3
[1] 3

> detach(UNPEXP)
> attach(UNPFDI)
> colnames(UNPFDI)
[1] "Year" "Unp" "FDI"
> ndiffs(FDI,alpha=0.05, test=c("adf"), max.
d=10) #Difference Stationary of Order 3
[1] 3

> detach(UNPFDI)
> attach(UNPIMP)
> colnames(UNPIMP)
[1] "Year" "Unp" "Import"
> ndiffs(Import,alpha=0.05,test=c("adf"),max.
```

```

d=10) #Difference Stationary of Order 2
[1] 2

> detach(UNPIMP)

# For the Growth Models the degree of
Stationarity for the given variables are as
follows: FDI: Order 1; Export: Order 2; Import:
Order 3 #**

> attach(GRREXP)
> colnames(GRREXP)

[1] "Year" "GRR" "EXP"
> ndiffs(EXP,alpha=0.05, test=c("adf"), max.
d=10) #Difference Stationary of Order 2
[1] 2

> detach(GRREXP)
> attach(GRRFDI)
> colnames(GRRFDI)

[1] "Year" "GRR" "FDI"
> ndiffs(FDI,alpha=0.05, test=c("adf"), max.
d=10) #Difference Stationary of Order 1
[1] 1

> detach(GRRFDI)
> attach(GRRIMP)
> colnames(GRRIMP)

[1] "Year" "GRR" "IMP"
> ndiffs(IMP,alpha=0.05, test=c("adf"), max.
d=10) #Difference Stationary of Order 3
[1] 3

> detach(GRRIMP)

```

All variables are stationarised before proceeding with OLS estimations.

Note that the notation \mathbf{X}_{Di} implies: A variable X that is differenced 'i' times to make it stationary.

(II) Regression Analysis

Unemployment Models

Model 1: OLS, using observations 1-21 Dependent variable: UNP_D1_

Coefficient Std. error t-ratio p-value

const	-0.0332305	0.0650377	-0.5109	0.6153
FDI_D3_	0.0678019	0.0413404	1.640	0.0174*

Model 2: OLS, using observations 1-22 Dependent variable: UNP_D1_

Coefficient Std. error t-ratio p-value

const	-0.0352548	0.0505146	-0.6979	0.4933
IMP_D2_	0.0701484	0.0185178	-3.788	0.0012***

Model 3: OLS, using observations 1-21 Dependent variable: UNP_D1_

Coefficient Std. error t-ratio p-value

const	-0.0321711	0.0574876	-0.5596	0.5823
EXP_D3_	-0.0386492	0.0130565	2.960	0.0080***

Growth Models

Model 4: OLS, using observations 1-39 Dependent variable: GRR

Coefficient Std. error t-ratio p-value

const	5.89102	0.453352	12.99	2.32e-015 ***
FDI_D1_	0.935413	1.05095	-0.8901	0.03792 *

Model 5: OLS, using observations 1-37 Dependent variable: GRR

Coefficient Std. error t-ratio p-value

const	5.78856	0.470968	12.29	2.96e-014 ***
IMP_D3_	-0.145638	0.132656	-1.098	0.02798*

Model 6: OLS, using observations 1-38 Dependent variable: GRR

Coefficient Std. error t-ratio p-value

const	5.82696	0.440126	13.24	2.11e-015 ***
EXP_D2_	0.500487	0.236755	2.114	0.0415 **