URBANISATION OF INDIA -A GAME CHANGER?

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URBANISATION OF INDIA -A GAME CHANGER?

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PREFACE

Urbanization is a long term process of transformation from traditional rural economies to modern industrial ones. Urbanisation in India is neither unique nor exclusive but is similar to the world-wide phenomenon. Indian urbanisation has proceeded as it has elsewhere in the world, as a part and parcel of economic change. An occupational shift from agriculture to urban-based industry and services is one part of the change. Formed by these shifts are Chennai, Mumbai and other major cities. Agricultural woes have expedited urbanization. Most of the tier 2 cities in the country developed in this particular way. Urban areas are integral to India's growth and development, accounting for around two-thirds of the country's GDP.

There are a whole lot of advantages of urbanization which can improve the degree of development. First and foremost is creating job opportunities which arise directly due to use of technology and modern equipment. A lot of new industries and modern markets emerge which are the direct result of urban transformation. These create millions of jobs and as more and more people are employed, demand for health care facilities, schools and decent housing arises. As these demands are met by the private and the government sectors, we can see improvements in the form of reduction in poverty levels, rising GDP, etc.

At the moment, India is among the countries having a low level of urbanization. The number of urban agglomerations has grown from 1827 in 1901 to 5161 in 2001. The population residing in urban areas has increased from 2.58 crores in 1901 to 28.53 crores in 2001. Only 28% of the population was living in urban areas as per 2001 census. According to a report published by McKinsey in 2010, urban expansion in India will happen at a speed quite unlike anything the country or the world has seen before. It took nearly 40 years (from 1971 to 2008) for India's urban population to rise by nearly 230 million; it will take only half that time to add the next 250 million. This expansion will affect almost every State. For the first time in India's history, five of its largest States will have more of their population living in cities than in villages. According to the Census 2011 data, India still lives in its villages. Only about 31 percent of India's population lives in settlements classified as urban

areas. This reveals that a major part of India is not gaining from urbanization. With a 2.01% urban growth rate, about 377 million people from India's total population of 1.21 billion are urban dwellers.

With more than 10 million people migrating to cities and towns every year, the total urban population is expected to reach about 600 million by 2031. Furthermore, between 2015 and 2031, the pace of urbanisation is likely to increase at a compounded annual growth rate (CAGR) of 2.1 per cent, which is estimated to be almost double that of China's growth rate. In 2014, the Indian government announced the development of '100 smart cities' with an initial investment of Rs.7, 000 Crore. The Ministry of Urban Development (MoUD) expects up to 80 per cent of total investment to come from the private sector. Furthermore, a large portion of the Government's contribution will likely be seen at the State and Municipal levels.

The development of true smart urban areas is most likely to happen in new 'green field' developments. Assuming business as usual, these will mostly take the form of new townships, IT/ITES commercial parks, special economic zones and other industrial estates. Apart from green field developments, the private sector will be looking for joint venture and public private partnerships in urban infrastructure projects around basic water and energy provision, as well as transport projects such as roads, highways, and metro train projects. Although we have made progress, India and other South Asian countries can make better utilization of opportunities that urbanization provides them to transform their economies to join the ranks of richer nations.
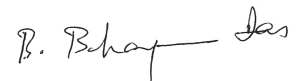
The urban local bodies / municipalities are important for the maintenance and planned development of urban areas. The urban areas are managed by urban local bodies (ULB's) such as the Municipal Corporation, Municipality, Notified Area Committee, Town Area Committee, Cantonment Board, Township and Specified Purpose Agency. These local bodies are mainly constituted to ensure that suitable levels of infrastructure and services are available to the citizens. In many parts of the country, the quality of life in urban areas is miserable due to various factors like migration, increase in slum population, housing shortages etc.

To overcome this problem, a series of reforms and policies have been initiated by the Indian government to strengthen the local level governance. The local government institutions in India are plagued by numerous problems which affect their functions and performance in the discharge of their duties. Public policies for urban governance are very vital for the planned development of urban areas. Public policies may cause distortions in the market and also lead to misallocation of resources. So in order to have a strong relationship between urbanization and economic development, there is a need for balanced urban development policies. Hence it is imperative to understand the working of local governance and the role of fiscal policy in the regulated development of urban bodies.

Suburbanisation is a term which refers to the development of the areas around an urban centre. This means that the existing areas get urbanised to a relatively greater extent. A large extent of suburbanisation occurs on account of people moving out of areas of high population density to the surrounding areas having lower density. Suburbanisation can be said to be the move of people from urban areas to relatively rural areas having a lower degree of development. Suburbs are heavily residential in nature and commercial buildings usually feature to provide for residential needs like groceries, supplies etc. Most residents of suburbs end up commuting to work in the nearby cities. In developed countries, it is seen that those who choose to move from the cities to the suburbs are more financially secure than city dwellers. Suburbanisation is largely seen as a decision to lead a better quality of life with a lower load on public facilities along with more open areas on account of lower density.

Urbanization in India would mean providing a better living environment to people with improvements in the standard of living, infrastructural development, reduction in crime rate, better and improved taxation policies among other things. There are a lot of areas to pay attention to in academic discussions like the local bodies and their finances, the changing pattern of migration in the country and the nebulous reverse migration from cities to rural areas. With major changes taking place in government policies, how urbanisation is helping India and how it can be improved are some of the questions that need to be answered.

Prof. B. Bhagwan Das.

05.01.2017

MESSAGE FROM THE CONVENER

Symposiums are an important channel for the exchange of information. The Department of Economics conducts a symposium every year and, this year,the theme of the symposium is 'Urbanization of India-A Game Changer?'

Urbanization and economic development have a strong positive correlation, which is indicated by the fact that a country with a high per capita income is also likely to have a high degree of urbanization. In this regard, the Department has chosen the subthemes.

I deem it my privilege to thank the executive committee of LEAD consisting of all office bearers for successfully organising this symposium at a national level.

I appreciate the efforts of the members of the Editorial Board who were instrumental in bringing the researchers from all over the country.

I would like to place on record my sincere thanks to the participants who have made this symposium a grand success.

Dr. R. Uma Maheswari.
President, LEAD,
Loyola College, Chennai-600034**.**

GREETINGS

We sincerely appreciate the Department of Economics, Loyola College, under the leadership of Prof. B. Bhagwan Das, for their strenuous efforts and enthusiasm in organizing this National Symposium on14th February, 2017, on the topic **'URBANIZATION OF INDIA- A GAME CHANGER?,'** an appropriate theme for discussion today. The Department has already expressed its concerns on the trend of urbanization on various forums and platforms in the past, with a view to finding solutions that are authentic and sustainable.

We strongly hope and wish that the intellectual outcome of this symposium and its monograph will enlighten all the participants of this symposium and the policy-makers of our country, with some tangible and sustainable solutions to improve the standard and quality of urban life in India.

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CONTENTS

SOCIAL AMENITY AND RESIDENTIAL ASSIMILATION OF INDIAN IT PROFESSIONALS IN KANSAS CITY METROPOLITAN AREA, USA

By Dr. Anirban Mukherjee*

Introduction

The United States of America has often been described as a nation of immigrants (Martin and Widgren 2002; Dunn and Paul 2002). In line with its reputation, Dunn and Paul (2002) note that immigration contributed to about 30% of the total population increase in United States in the last decade. Further, average annual migration resulted in 330,000 immigrants in the 1960s, 450,000 in the 1970s, 600,000 in the 1980s, and 820,000 in the 1990s (Martin and Midgley 1999; Riche 2000; U.S. Census Bureau 2000; Dunn and Paul 2002). According to Zong and Batalova (2015), the population of Indian-born immigrants in the United States in 2013 was 20 lakhs.

Among the Asian nations, Indians constitute a major immigrant group to the U.S. (Dunn and Paul 2002). In fact the Asian Indians are the third largest Asian American ethnic group in the United States, larger than all other groups except the Chinese and Filipinos (Dunn and Paul 2002). From 1990 to 2000, the Asian Indian population in United States grew by 106% (Bhatia 2007). Compared to the 7% growth rate of the general population, Indians constitute the fastest-growing Asian American community (Bhatia 2007). Furthermore, Asian Indians are active participants in the U.S. labor force. In 1997, their labor force participation rate was considerably higher compared to other Asian and non-Asian groups (Lee 1998; Riche 2000; Dunn and Paul 2002). According to Immigration Support Networks (1999) there was 4,00,000 Asian Indian professional workers in United States (Varma and Rogers 2004). Further, the highest recipient of temporary high-skilled worker H-1B visas are the Indian immigrants, constituting 70 percent of 316,000 H-1B petitions in 2014 (Zong and Batalova, 2015).

In terms of education, Asian Indians are ahead of most immigrant groups in the United States. In contrast to 28% of all immigrants and 30% of native-born adults (aged 25 years or more)

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having an undergraduate degree or higher degree, 76% of the Indian immigrants in the same age category in the United States had a similar qualification (Zong and Batalova, 2015). Among all temporary visa holders earning doctorate degrees in the United States, Indian students constituted 14 percent and majority of them (84%) intended to stay in the United States after the completion of their studies (National Science Foundation's Survey of Earned Doctorates, 2014; Zong and Batalova, 2015).

Additionally, in comparison to foreign-born (30%) and native-born (38%) populations, Indian immigrants are more inclined to join science, management, business, and arts occupations (73%). Moreover, 83% of the Indian immigrants are in the working age group (18 to 64 years) in contrast to 60% of the foreign-born (Zong and Batalova, 2015)

Theorists like Portes and Rumbaut (1996) have noted that immigration to the United States is an urban phenomenon and the immigrants mainly concentrate in the bigger cities of United States. Asian-Indians, like other Asian groups (e.g. Chinese, Filipinos, Japanese, and Koreans) have predominantly been in metropolitan cities (Bhardwaj and Rao 1990). Bhardwaj and Rao (1990) note that 70% of Asian-Indians reside in eight major industrial-urban states-New York, California, New Jersey, Texas, Pennsylvania, Michigan, Illinois, and Ohio. Also, as a group, they remain much more concentrated in metropolitan areas compared to the general American population (Bhardwaj and Rao 1990).

Nonetheless, little is presently known about the role of urban amenities in attracting and retaining Asian Indians in general, and Bengali-Indian professionals as residents of U.S. metropolitan areas. This study makes an attempt to address this issue with reference to Bengali-Indian[1] professionals from India residing in the Kansas City Metropolitan Area. Bengalis in India, primarily come from the state of West Bengal. However, some are dispersed in other parts of India as well. From the years 2005-09, U.S. had 188,452 Bengali speakers (Times of India Report 2011).For the purpose of this research, Bengali professionals not only from the state of West Bengal but also from other parts of India are considered. However, Bengalis from Bangladesh are not considered for this research.

The first section of the paper discusses the existing literature on the urban amenity preferences among professional workers. The second section describes the research methods used. The third section presents the research findings. Finally, the conclusions of the study are discussed.

Literature Review

Urban Amenity Preferences among Creative Workers

In his work "The Rise of the Creative Class," Richard Florida (2002: 44) argues, *"Advanced nations have shifted to information-based, knowledge-based economies".* Borrowing from Peter

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[1] The term Bengali is used to refer to people who speak the Bengali language and reside primarily in West Bengal (India), and in Bangladesh. The ethnic group is characterized by distinct cultural traditions, language, and food habits.

Drucker, Florida (2002) defines a "knowledge economy" as *"The basic economic resources-'the means of production,' to use the economist's term is no longer capital, nor natural resources….. nor 'labor.' It is and will be knowledge." (Drucker, 1993)* Florida (2002) calls such a knowledge-based economy a "creative economy" and refers to the key workers employed in such an economy as "creative workers."

Florida (2002) notes that the creative economy is supported by an extensive venture capital system that accelerates the formation of new firms and aids commercial innovation. Florida (2002) contends that this venture capital system has unleashed the talents and energies of creative people. It should be noted, however, that before a venture capital company can give money to entrepreneurs, it has to raise the money (Florida 2002). In this pursuit of raising money, venture capital flows to places that have a well-developed "social structure of innovation" (Florida 2002). In other words, Florida (2002) contends that firms generally cluster in places that enjoy a concentration of creative workers among other elements.

In this context, Florida (2002) points out some characteristics of places that draw creative workers. He posits that "creative settings" draw creative people by providing lifestyle choices and amenities such as a cutting-edge music scene or vibrant artistic community. Furthermore, creative workers (Florida 2002) prefer places that encourage fusion and interchange between different forms of creativity.

Florida's (2002) interviews also revealed that many creative workers had turned down jobs, or decided not to search for them in places that did not offer ready access to a variety of entertainment options like music, art, outdoor sports, etc. Additionally, some of his interviewees moved to a community based on lifestyle considerations and then looked for employment there (Florida 2002). Demand for instant access to recreation on a "just-in-time" basis was a major factor in their decision (Florida 2002). Florida's (2002) research also revealed that communities that offer a vibrant and diverse nightlife are preferred by creative workers.

The bottom line is that cities need a 'people climate' more than they need a 'business climate' in order to attract creative people (Florida 2002). However, Florida (2002) contends that creative places need not be big cities but do need to be cosmopolitan, i.e. where one can find people to socialize with, where there is interplay between diverse cultures and ideas and where outsiders are easily accepted and quickly assimilated.

In their article "Consumers and Cities," Glaeser, Kolko, and Saiz (2004) similarly note that the role of cities as centers of consumption has received little attention in the existing literature. They observe that with an improvement in the standard of living, there is an accompanying increase in the amount of money being spent on an appropriate place to live (Glaeser et al. 2004).

In a similar vein, Clark, Lloyd, Wong, and Jain (2002) note that the proliferation of high-tech jobs associated with the restructuring of the U.S. economy has given rise to greater consumer aspirations among the skilled workforce. With the increase in the citizen's income, education, and political empowerment, there has been a rise in individual agency (Clark et al. 2002). Consequently,

the rise of individualization and volition in tastes and preferences has given rise to numerous and complex niche markets (Clark et al. 2002).

This assigns a new role to government and public officials, who often respond to public concerns like clean air, beautification of towns and pedestrian responsiveness rather than to more private concerns like jobs, contracts and tax breaks to individuals and firms (Clark et al. 2002).

Michael Storper and Allen Scott (2009) question the aforementioned line of thinking that creative individuals move in search of consumer or lifestyle preferences. They posit that existing theories assume the pre-existence of urban centers because it is the basis for subsequent amenity-based changes to occur (Storper and Scott 2009).

While the existing literature focuses on the preferences that supposedly motivate location choices (warmth, diversity, low-density, high-density, cultural amenities, and tolerance), Storper and Scott (2009) question the validity of purported preferences and suspect the preferences may be purely correlational.

Storper and Scott (2009) contend that although human capital and skills are indispensable to urban growth, they do not constitute the primary factors responsible for urban growth. Consequently, we typically do not witness the agglomeration of arbitrarily assorted workers in cities. Instead, we see select types of workers with specific skills, associated with particular industries; locate together in particular cities (Storper and Scott 2009). Thus, Storper and Scott (2009) argue that talented individuals do not move unless they are able to capitalize on their personal talent or unless relevant employment opportunities are in sight.

Based on the literature review, it can be said that the existing literature is devoid of any discussion on the urban and ethnic amenities preferred by the immigrant creative workers in their place of settlement. Therefore, this study explores the "knowledge gap" with reference to Bengali-Indian creative workers in Kansas City Metropolitan Area. The focus of the study is particularly interesting because Bengali professionals account for a substantial portion of the professional immigrant workers in United States. Thus, the study explores:

1. What are the urban amenities preferred by Bengali IT professionals residing in Kansas City Metropolitan Area? Further, what goods, services, and lifestyles that appeal to the Bengali immigrants in the Kansas City Metropolitan Area? What types of these amenities could be considered ethnically oriented versus those preferred by the cultural mainstream?

Furthermore, relying on Storper and Scott's (2009) contention that skilled workers do not move unless they can capitalize on their personal talent, I examine the following questions in this study:

2. What are the factors that made Bengali IT workers choose the Kansas City Metropolitan Area over any other city as their place of settlement?

3. What urban amenities are considered to be indispensable by Bengali creative workers for settling in a particular city?

Residential Preference of Asian Indians in the United States

Massey (1981) argues that residential segregation is an important aspect of the assimilation process because it provides a rough measure of the degree to which immigrant groups are spatially isolated from the mainstream American society. Besides being an important indicator of the assimilation process, residential segregation bears implication for other aspects of sociocultural integration (like interracial marriage) that are closely related to residential proximity (Lieberson, 1963; Gordon, 1964; Massey, 1981). Prior research has found that recent immigrants are only moderately segregated from the White majority in the United States (Alba and Nee, 1999). Additionally, research into metropolitan levels of residential segregation has found that Asian and Hispanic residential segregation from the White majority is considerably less than that of African Americans (Alba and Nee, 1999). In fact, research conducted by Alba and Logan (1993) reported that residential assimilation with the White majority tends to increase with improvement in socioeconomic standing, acculturation (measured in terms of English proficiency), and duration of stay in the United States.

In contrast to the settlement pattern of the European immigrants who migrated to United States in the earlier part of the century, it has been found that 43 percent of the immigrants who arrived during the 1980s were living in parts of metropolitan areas commonly described as "suburbs" (Alba and Nee, 1999). The suburbanization trend was found to be particularly high among the Asian immigrants (Nee and Sanders, 1985; Alba and Nee, 1999). For example, in 1990, it was found that 58 percent of Filipino households were in the suburban areas of the metropolis, increasing from 49 percent in 1980 (Alba, Logan, Stults, Marzan, and Zhang, 1999). Rates of suburbanization were found to be lower among the Latinos, although it was as high as 46 percent for Mexicans and 51 percent for Cubans in 1990 (Alba and Nee, 1999). It was also found that suburban residence became much less selective for Asian immigrants during the 1980s and was not strictly limited to those who were linguistically assimilated (Alba and Logan, 1991; Alba, Logan, Stults, Marzan, and Zhang, 1999). Thus, it can be said that the barrier on settling in suburban areas has fallen for new immigrants, even for those not well- versed in English. New immigrants can now reside in suburban areas without any hindrance to their functioning in their daily lives (for instance shopping or enjoying recreational activities), most likely because they find considerable presence of co-ethnics and ethnic infrastructure in their vicinity (Alba and Nee, 1999).

Residing in suburban areas also implies having a large number of Whites as neighbors. Perhaps this would mean little to the immigrants themselves, who may find enough co-ethnics in their neighborhood to have a similar life to that they would enjoy in an ethnic enclave. However, it is likely to have a major impact on the children of immigrants, who will grow up in frequent contact with Whites (Alba and Nee, 1999).

It has been found that most of the recent immigrants display high levels of geographic concentration in their settlement pattern (Farley, 1996; Portes and Rumbaut, 1996; Waldinger, 1989; Alba and Nee, 1999). Additionally, the degree of geographic concentration among new immigrants exceeds that of older ones at a comparable stage of immigration (Massey, 1994; Alba and Nee, 1999).

Speaking exclusively about settlement pattern of high-skilled Asian Indians in the United States, Khandelwal (1995) notes that new Indian immigrants in New York, initially, settle in neighborhoods like Flushing and Elmhurst, where apartments are in close proximity to public transportation. Since these areas are perceived to be suitable for new immigrants, there is a rise in ethnic chain migration in the Flushing and Elmhurst neighborhoods. However, Khandelwal (1995) observes that after spending their initial years in these neighborhoods, the immigrants move to more desirable residential areas in suburban settings. Khandelwal (1995) believes that this step confirms the process of "settling down" in a new area and then striving for upward economic mobility. The move from city to suburb indicates that families are willing to spend money on automobile transportation in order to live in "better" school districts for their children (Khandelwal, 1995).

However, Khandelwal (1995) notes that this ongoing process of moving in and out of receiving areas and has transformed the receiving areas into centers of ethnic Indian life. The receiving areas contain places of worship, business, and other activities that serve many Indians. Indians residing in suburban areas return to these places to shop for ethnic goods, to practice their religion, and also to meet their friends and relatives who arrived later and have not yet moved to the suburbs (Khandelwal, 1995).

It can be argued that Khandelwal's (1995) case-study of skilled Asian Indian immigrants exemplifies the fact that high-skilled immigrants are not attracted solely by the amenities and facilities offered by the cities. Rather, their settlement preferences are more likely shaped by their desire to assimilate with their counterpart economic class in the White American population, and to provide better educational opportunities for their children. While all the existing research focuses on the settlement preferences of Asian Indians in the larger cities of the United States of America, this study investigates the settlement pattern of Asian Indian in a medium sized city (Kansas City is a tier 4 city) of the United States.

Therefore, my research explores the following question:

4. Do the Bengalis reside in suburban neighborhoods of Kansas City Metropolitan Area? Are the Bengalis residentially dispersed or clustered in close proximity to other Bengalis?

Research Methods

This study employed a non-experimental, cross-sectional research design using qualitative methods. The study population in this research was immigrant Bengali professional workers and their families residing in the Kansas City Metropolitan area. The Kansas City Metropolitan Area was chosen as the area of study primarily because it has the largest concentration of Bengali professional workers within a 150 miles radius from Manhattan, Kansas. This research focused exclusively on Bengali-Indian professionals from India residing in Kansas City Metropolitan Area. Bengalis in India, primarily come from the state of West Bengal, yet some are dispersed in other parts of India as well. This study included Bengali-Indian professionals not only from the state of West Bengal but also from other parts of India. However, Bengalis from Bangladesh were not considered for this research.

The help of ethnic associations of Bengalis in Kansas City (namely the Kansas City Bengali Association (KCBA), Sangam Midwest, and the Pratichi Club of Kansas City) were taken to get a list the names and email addresses of Bengali-Indian professionals in Kansas City. An email entailing the basic information about the study and request for research participation was sent out to the Bengali professionals. On receiving the consents for participation, 75 Bengali-Indian professionals in Kansas City were interviewed. In interviewing the participants, a combination of semi-structured, non-directive, and focused interviews were used. The interviews were informal and open-ended. In reporting the findings the names and job affiliations of the respondents were changed to maintain confidentiality of the research subjects.

Findings

The section will present findings that highlight on the factors that made Bengali-Indian creative workers to choose Kansas City as their place of residence. Additionally, the section focuses on the urban and ethnic amenities that Bengali-Indian creative workers prefer to have in their place of settlement. In other words, the section examines the uniqueness of urban amenity preference, if any, among the Bengali-Indian creative workers.

Urban and Ethnic Indian Amenity Preferences among Bengali-Indian Creative Workers

The findings revealed that the decision of Indian creative workers to locate in the Kansas City was primarily influenced by the availability of job opportunities and had little to do with available urban amenities. All the Bengali creative workers came to Kansas City in search of jobs rather than being lured by the available urban amenities. In the words of Respondent C, an IT sector professional who migrated to Kansas City during 1990s:

"I came to Kansas City not because it is fancy or anything. I came here primarily for my job. In 1996, Sprint opened its global division and many immigrants were hired and I was one of them."

For most Bengali creative workers, their job in Kansas City was not their first employment in United States. Bengali creative workers moved to Kansas City either because they were offered better career opportunities or when they faced with job layoffs. Thus, there were some Bengali professionals who moved to Kansas City from the bigger metropolitan cities of United States on being offered lucrative job offers. Respondent F revealed:

"For most Bengalis, their employment in Kansas City is not their first job. Some of us have moved here from the bigger cities of United States like New York and Chicago where every possible urban amenities were available. We have moved either because our job in Kansas City offered better career prospects or we faced job layoffs. This tells you that none of the amenities are indispensable for us and we will move wherever we will be offered better career chances."

Some respondents observed that Kansas City has its own charm and some of its attractions are very unique to it. For instance, Kansas City offers best schooling opportunities for children, boasts of having one of the finest art museums in the country, organizes the renowned 'Renaissance Festival,' and has a diversity of population. Additionally the city scores high in terms of 'originality'

as well; Kansas City is often credited to be one of the birth places of Jazz music. As Respondent G adored:

"I feel that every city has its own charm. Kansas City has a lot to offer and in terms of urban amenities, Kansas City is at par with any other city in U.S. Indians prioritize the education of their children and Kansas City had the best to offer in terms of schooling opportunities and so our expectation was exceeded on that count. In fact Blue Valley School District in Kansas City is well known throughout the country.

Further, the city is endowed with one of the best amusement parks in the country, "Worlds of Fun." My kids love going there and I have to take them to the park almost every other weekend.

The Nelson-Atkins Arts Museum is simply amazing and it adds to the charm of the city. Some of the earliest works of painters in United States can be found in this museum.

Every year Kansas City celebrates the 'Renaissance Festival,' which is just awesome.

Interestingly, Kansas City is also credited as one of the main cradles of Jazz music in United States. Besides, Kansas City has a long history of sports and the origin of basketball in United States is often linked to Kansas City.

Also, I would say that the diversity of the city adds to its appeal. We have all kinds of people from different racial and ethnic backgrounds in Kansas City and that makes it appealing to the migrants, especially from foreign countries.

There is some event going on in the city throughout the year and that makes it more exciting and interesting for the residents of the city."

Some immigrants appreciated the fact that Kansas City is not an expensive city in which to reside and, they could afford most facilities of an urban life at a reasonable cost. Respondent V, a long-time resident of Kansas City, noted:

"I have resided in Kansas City for 35 years and I don't feel deprived in any way. None can deny that high standards of living can be afforded in Kansas City at a cost lower than the bigger metros of the U.S. Additionally, Kansas City is a peaceful place to stay."

Most immigrants agreed that bigger cities have a lot more to offer. However, they doubted whether they would be in a position to consume a greater amount of urban amenities given their busy schedule. Respondent S offered the following logic:

"I am sure that bigger cities like New York, Chicago, Los Angeles have more to offer except for the fact that they don't offer you more than 24 hours a day. I doubt whether I would have been able to avail more in the bigger cities than what I am availing in Kansas City."

Nonetheless, all interviewees agreed that they can't manage without the basic urban amenities like good schools for children, well-equipped hospitals, grocery stores, shopping malls, movie theatres, music stores, book stores, libraries, cafés, restaurants, spas, car dealers and mechanic shops, etc. They appreciated the fact that Kansas City offers much beyond the primary facilities.

While most immigrants considered the presence of basic urban amenities to be necessary, yet they did not consider the same for the ethnic Indian amenities. Respondent R echoed other immigrants as follows:

"I don't think that I will be able to manage in a city that does not have basic urban amenities but I can definitely manage without ethnic Indian amenities."

While the Bengali-Indian professionals preferred to have ethnic Indian amenities in their city, yet most did not consider such amenities to be indispensable. Among the ethnic Indian amenities like Indian grocery store, restaurant, temple, screening of Bollywood movies in the theatre, the presence of Indian grocery store in the city was prioritized over the availability of any other ethnic Indian amenities.

However, most Bengali-Indian professionals did not consider the presence of Indian grocery store in the city to be indispensable. While they preferred to have the amenity in the city, most of them agreed that they could have made an alternative arrangement if there were no Indian grocery store in town. As Respondent G justified:

"If Kansas City had no Indian grocery store, I still would have moved here for the sake of my job and probably would have availed Indian grocery store in St. Louis or ordered them online via Amazon.com. Now-a-days Amazon has a substantial collection of Indian groceries. In other words, the presence of Indian grocery store will not be a consideration behind choosing a city as the place of settlement."

Since Indian dishes are cooked regularly at home and Bollywood movies can availed at online sites, Bengali immigrants believe that they can do without Indian restaurants and theatres screening Bollywood movies. As respondent H revealed:

"We avoid going to Indian restaurants because we cook Indian dishes regularly at our home. We don't go to the theatre to watch Bollywood movies mainly because the movies become available at online sites like YouTube, Netflix, or Databazaar.com within a month of their release."

Another respondent, Respondent K reasoned in a different way:

"I don't dine at Indian restaurants because I don't think that they are able to get the authentic Indian taste in food."

The Hindu Temple and Cultural Centre of Kansas City provided a platform of conviviality for residentially dispersed Bengali population in the Overland Park area. Respondents narrated that the temple served the important function of imparting Indian cultural traditions among the second-generation children. Many second generation children also availed various training classes in Indian cultural traditions offered by the temple. As Respondent E posited:

"I go to the temple every weekend, because my son gets lesson in 'bhajan' (devotional religious songs). Also this weekly visit serves the latent purpose of familiarizing my son with Hindu religion and its cultural heritage."

The findings revealed that the importance of the temple to the Bengali-Indian professionals increase with their age. The elderly immigrants prefer attending temple on a regular basis in comparison to the younger immigrants. Thus, the temple was perceived to be an urban amenity that becomes increasing important with the age of the immigrant. Respondent X, who came to Kansas City as a young bride 30 years ago, clarified:

"I came to Kansas City at the age of 23 and at that young age one is not very religious and can easily manage without a temple or a place of worship. As you grow older, you get more inclined towards your religion. Now, I feel like going to the temple on a regular basis."

Few immigrants believed that the limited presence of co-ethnics in the city contributes to greater integration and bonding amongst them. They contended that fewer presence of co-ethnics in a foreign city often generates a sense of insecurity, which in turn leads to a greater cooperation and fellow-feeling among the co-ethnics. As Respondent V explained:

"Because the size of Asian-Indian community is smaller in Kansas City compared to the bigger cities of United States, it often contributes to greater unity among the Indians in the city."

The findings revealed that the availability of "social" amenities are crucial to the retention of Indian professional workers rather than amenities offered through the market or aesthetic features of the urban or natural landscape. Participation in ethnic Indian associations and the formation of social networks with other Indian workers residing in the city were critical amenities that influenced the satisfaction of Indian professionals with their lifestyles in the Kansas City metropolitan area. Kansas City has three Bengali associations (Pratichi Club of Kansas City, Sangam, Kansas City Bengali Association) and all Bengali creative workers and their families were found to be attached to at least one of these associations. The main objective of the Bengali associations was to retain the cultural heritage of Bengalis in United States. For instance, the associations celebrate most of the Bengali festivals, organize cultural events like classical music and dance programs with performances from local and renowned artists of India, stage short plays, and arrange for picnics and get-togethers. The associations also publish a yearly periodical with literary contribution in both English and Bengali language from its members.

In explaining the purpose of ethnic associations, Respondent I echoed in a similar vein:

"I am an active member of a Bengali association in Kansas City and I very much appreciate the fact that it celebrates all the religious and cultural events of Bengalis. In a way, Bengali associations minimize our homesickness and sooth our sense of alienation in a foreign country. Bengalis are a small community in Kansas City and so Bengali associations perform the useful function of fostering fellow feelings among the Bengalis."

Furthermore, it was observed that Bengali associations serve the important function of organizing events in a systematic manner and identifying local talent. Respondent J, an activist of a Bengali association, justified the importance of ethnic associations as:

"Bengali associations are important for organizing the Bengali festivals and events in a systematic manner. Though we bring in renowned singers from Bollywood to perform at our cultural events, we always try to incorporate performances by local talent. I feel that this provides an opportunity for the local performers to exhibit their talents in front of a sizeable crowd. Though informal, the events are helpful in promoting the local talent and boost their confidence to perform on a larger stage."

Most Bengali professionals preferred having a Bengali ethnic association in their city, even if the city does have the presence of an Indian association. Majority of the respondents considered that Bengali associations cater to the unique cultural needs and preferences of the Bengalis, which cannot be met by an Indian association because it serves all Indians irrespective of their ethnicities. Respondent M aptly described the uniqueness of Bengali association as follows:

"Apart from religious occasions, Bengali associations organize many cultural activities like enacting plays, poetry recitations, musical concerts, etc. These events satisfy our 'intellectual' thirst and form an indispensable part of our 'Bengali-ness'. Such events cannot be organized by an Indian association because it caters to all ethnicities from India and not just to Bengalis. The ethnic and linguistic diversity of India often contributes to the formation of associations based on ethnic origins. Each ethnicity is unique and ethnic associations try to celebrate such differences and cater to the cultural needs of the people of a particular ethnicity. Indian associations are umbrella organizations that attract Indians irrespective of their ethnicities and they celebrate our unity in diversity."

The presence of co-ethnics in the city was a consideration for some Bengali professionals to migrate to a city. Respondent N, an elderly professional narrated his desperation to find an Indian family when he arrived in Topeka in 1970s and the situation was such that he had to move back to his previous employment in Texas. To put it in the words of respondent N:

"When we moved to Topeka, there were very few Indians. The situation was such that my wife suffered from depression and we had to move back to Texas."

It was found that the aged Bengali professionals, those who were 55 years and older, were reluctant to move from Kansas City. They considered themselves to be well-adjusted in Kansas City and emphasized upon their 'familiarity with the city' and 'the presence of co-ethnics' in influencing their reluctance to migrate from Kansas City.

An elderly respondent, V, highlighted:

"At this age, I prefer not to move from Kansas City. However in my younger days, I would have moved to any place that offered me a higher salary. Nevertheless, the reason behind my decision to stay in Kansas City is not influenced by the presence of ethnic Indian amenities in the city but because of my familiarity with the city. I have become familiar with the city's physical environment (e.g., knowledge of how to get about the city, which route to take when visiting a place, where the offices, shops, hospitals are located, etc.) and it will be difficult for me to learn all anew if I shift to another city."

Bengali families in Kansas City regularly arrange for weekend parties and get-togethers for their Bengali friends. The parties are helpful in fostering networks among the Bengalis in the city and provide much-needed relaxation after the week's hectic schedule. Generally, the host would invite their close friends (10-15 families) home for dinner and they would chat about various issues ranging from Bollywood movies to politics in India and United States. Such informal get-togethers provide the Bengali families a platform to realize and practice their culture, which is otherwise not feasible in a foreign country.

Similarly, Respondent D elaborated:

"Time is something that you invest in order to build social relationships. Parties are thus platforms for building and renewing social relationships. So, we attend Bengali parties whenever we are invited. Also it gives us a chance to engage in Bengali 'adda' (Bengali word for interaction and gossip) and feel refreshed after the week's hard work."

The importance of the get-togethers was emphasized more by the elderly immigrants whose children have migrated to different cities of United States owing to their employment. They believe that parties provide the opportunity of maintaining and renewing ties with the co-ethnics in the city, whom they can rely on in times of emergency.

Most of the gatherings do not mark or celebrate any specific occasion other than providing the opportunity for catching up with old friends. Respondent F, a frequent party organizer, summarized the situation:

"Most of the time, there is no specific occasion behind arranging a party. Often we miss the much-cherished ambience of a Bengali get-together in the United States and so parties aim to recreate such an atmosphere."

Bengalis reciprocate the invitations of their friends and hence one party often leads to another. Thus, there is a party almost every weekend of the year and sometimes people are forced to be selective about attending parties. However, the chance of being selective about attending parties is limited because of the apprehension that it won't be well received by the host and would create strained relationships within the small community.

As Respondent P posited:

"A party always leads to another. It is a courtesy that when you attend dinner in someone's house, you are to reciprocate the gesture and invite them to your house as well. So, one party leads to another.....When you attend a party at Mr. X's place, you enter into an obligation to attend when Mr. Y invites you. You cannot be selective about attending parties because it creates ill-will among friends. So, it is difficult to avoid invitations."

However, some immigrants believed that the presence of co-ethnics in the city reduces the chance of interaction and assimilation with the mainstream American society. Bengali get-togethers and events organized by Bengali associations engage the professionals during their leisure hours and thus inhibit their chances of assimilation with the mainstream American society outside of work. As Respondent G observed:

"The level of assimilation with the American society depends on the city in which you reside. For instance in Kansas City, there are quite a few Bengali families and I prefer to mingle with them. Conversely, when I was in Boise, Idaho, there was only one Bengali family and so my initiative of assimilating with the Americans increased. And, I had a very good experience about it and was well-received by the Americans. Sometimes I feel that the fault lies with us and we don't take adequate measures to know and mingle with the mainstream society when we have a substantial presence of co-ethnics in town."

Residential Preference among Bengali-Indian Professionals

Most of the Bengali-Indian professionals resided in the Overland Park area of Kansas City, an upscale suburban neighbourhood equipped with all the urban amenities. It is one of most highly regarded suburbs in the country. For example, Money magazine ranked Overland Park as the 7th best city to live in United States in 2010. Additionally, Businessweek magazine rated it as one of the best places to raise kids in 2009 and, U.S. News ranked it 3rd among the America's ten best places to grow up.

Overland Park serves as the headquarters location of many companies including the Fortune 500 Company YRC Worldwide, Black and Veatch, Waddell and Reed, Ash Grove Cement Company, Examinetics, Compass Minerals, and Ferrellgas. According to the Overland Park Chamber of Commerce, Sprint Nextel is the largest employer in Overland Park.

However, on top of offering numerous professional employment opportunities, Bengali professionals prefer settling in suburban areas because they strongly emphasize the educational achievement of their children and better schooling opportunities tend to be available in the suburban areas. As Respondent O expressed:

"I have always chosen residence in United States based on the presence of good schools in the neighbourhood. It does not matter if my residence is in a metropolitan or suburban area, provided my child has access to quality education. I have seen from my experience that good school districts generally fall in the suburban areas and hence I have always resided in suburban neighbourhoods."

Respondent T resonated this point:

"In the United States, cities are organized such that the business and entertainment facilities are concentrated in the metropolitan areas of the city and good schools in the suburban areas of the city. So, when you have a child of school-going age, you are forced, in a way, to reside in suburban areas. This is completely different from the situation in India where the good schools and best urban amenities are available in the metropolitan areas and people migrate from the suburbs to avail the facilities."

Interestingly, for the Indian professionals without children, 'distance from work' and 'safety of neighborhood' were the main considerations behind their choice of residence. As Respondent U, a young IT professional emphasized:

"I reside in a suburban area of Kansas City because my office is not far away from my residence. However, if I move to any other U.S. city, I will make my residential choice based on commuting time from my place of work and safety of the neighbourhood in question."

Additionally, immigrants preferred settling in suburban areas with urban amenities and facilities. As Respondent H, a long-term resident of Overland Park narrated:

"I prefer residing in a suburban neighborhood which offers a reasonable amount of amenities and facilities like Overland Park.....Suburban neighborhoods in the United States are not like suburbs in India, where there are few urban amenities. Overland Park is one of the bestsuburban areas in the United States and it offers all the comforts of urban life. It has all the modern amenities and yet it does not have a large share of the hassles of the city like traffic congestion, high crime rates, air pollution, and noise. In terms of facilities, Overland Park has great shopping malls, movie theatres, good schools, great hospitals, and beautiful parks."

Respondent C spoke in a similar vein:

"I reside in Overland Park and I like residing here because it is a suburb with facilities. The Indian grocery store, Wal-Mart, Price Chopper, Best Buy, etc. is conveniently located within a walkable distance from my house."

However, it was found that elderly Indian professionals preferred suburban areas mainly because such neighborhoods are quieter and have little traffic congestion. As Respondent V, an elderly professional, pointed out:

"Generally aged people, like us, prefer living in suburban neighborhoods. The preference for suburban areas is primarily shaped by the fact that suburbs are generally quieter and peaceful places with lower crime rates. We try to avoid traffic congestion and the din and bustle of city life. I consider the quality of life to be much better in suburban areas."

Interestingly, it was found that most Bengali professionals did not prefer staying in a residential enclave dominated by Bengali neighbors. Contextually, some respondents posited that proximity with co-ethnics increases the chance of misunderstanding and conflict. The study revealed that none of the Bengali-Indian professionals interviewed searched for a Bengali-dominated neighborhood when they came to Kansas City. Thus, most Bengali professionals selected residential neighborhoods dominated by professional workers, irrespective of the race and ethnic backgrounds of their neighbors. As Respondent Q observed:

"I reside in a suburban neighborhood inhabited by professional workers like me and I experience a bonding with my neighbors."

Some immigrants believed that settling in neighborhoods dominated by co-ethnics hampers the assimilation chances of the second generations as well. They emphasized the importance of the assimilation of second generation Bengalis to the mainstream culture and considered that staying in a neighbourhood dominated by co-ethnics will serve no purpose towards that end. As Respondent L explained:

"I don't want to stay in a Bengali neighbourhood primarily because I want my children to assimilate in the United States. They can't survive in the United States only by knowing Bengali cultural traditions.....We are outside India and assimilating with the mainstream culture is therefore of utmost importance to the second generation. It is our duty as parents to facilitate that process and not keep our children within the cocoon of Bengali culture and friends....Otherwise, what is the purpose of moving outside India?"

Interestingly, a few Bengali immigrants believed that residing in a Bengali-dominated neighbourhood would put an extra burden of academic achievements on their children. Indian professionals typically overemphasize and celebrate the academic accomplishments of their children. Academic underperformance and mediocrity are looked down upon. Thus many parents believed that their children would face stiff academic competition from the children of neighbours in an ethnic neighbourhood and that would make their life stressful. Respondent J, a parent of two school-going children, elaborated:

"I don't feel like residing in a Bengali neighbourhood because it puts too much pressure on your child. Most Bengalis in the United States are professional workers and they often overemphasize the academic achievement of their children. I am apprehensive that if we stayed in a Bengali neighbourhood, my son would always have to compete with high-achieving Bengali children of the locality. Bengalis have the tendency to inquire about the grades, progress, and achievements of the children of their neighbours and compare it with their son's or daughter's."

Finally, Bengali professionals also contended that the presence of co-ethnics in the neighbourhood also undermines privacy and increases the chance of misunderstanding and conflict. Respondent F explained:

"If you have a co-ethnic presence in your neighbourhood, chances are high that they will get too much involved in your private life. The chances of conflict and misunderstanding increase when you stay too close to your own people. Additionally, though we (Bengalis) are not neighbours, we can reach each other within thirty minutes. Further, we meet every weekend at the Bengali parties and so I feel there is little reason for us to select a residential neighbourhood based on the concentration of the Bengali population."

Conclusion

In addressing the debate of whether creative workers follow jobs or jobs follow creative workers; the findings support Storper and Scott's (1999) contention that workers choose specific locations because of the availability of employment opportunities. The findings indicated that the decision of Bengali-Indian creative workers in the sample to locate in the Kansas City metropolitan area was primarily influenced by the availability of job opportunities and had little to do with available amenities. The Bengali creative workers who were interviewed placed greater priority on job security, job satisfaction, and higher income over the availability of urban amenities in influencing their decision to locate in Kansas City.

Another key finding from this study is that the presence of local amenities central to the lifestyles of American professional workers was more important to Bengali creative workers than the availability of ethnic Indian amenities such as Indian grocery stores, restaurants, temples, and the screening of Bollywood movies in local theatres. It was found that the interviewed Bengali-Indian creative workers prioritized the presence of an Indian grocery store in town over other ethnic Indian amenities, yet the amenity was not considered indispensable because Indian- specific grocery products could be accessed via online sites.

While ethnic amenities were not found to be critical to the migration decisions of Bengali creative workers in the sample, social amenities were found to be important in influencing the quality of life enjoyed by these workers once they had already migrated to the city. This suggests that social amenities are important in influencing the retention of these creative workers. It may be argued that unlike the larger cities of the United States where there is existence of sub-networks within a particular ethnic community, the situation in Kansas City is different. The ethnic Bengali community in Kansas City has developed as a result of migration of skilled professionals, who have moved to the city for the sake of their jobs. Thus, their common ethnic and professional backgrounds coupled with their relatively limited presence (in comparison to the larger cities of the United States) contribute to the formation of a homogenous and tightly knit community.

Participation in ethnic associations and social get-togethers provided an important means for the establishment of social networks with other Bengalis residing in the Kansas City metropolitan area. This study therefore extends Florida's (2002) proposition about the importance of urban amenities in attracting creative workers by highlighting the role of "social" amenities.

Unlike Alba and Logan (1993) and Khandelwal's (1995) proposition that immigrants do not initially settle in the suburban areas of a city, this study found that most Bengali creative workers in the sample did, in fact, settle in suburban residences when they first migrated to Kansas City. Further, Bengali professionals preferred residing in suburbs over inner city neighbourhoods because of the presence of better schooling opportunities for their children. While "distance from work" and "safety of the neighbourhood" were other amenity considerations shaping the settlement decisions of Bengali creative workers in the sample, the presence of co-ethnics in the neighbourhood was not an influential factor. Thus, this finding replicates the findings of Nee and Sanders (1985) and Alba and Nee's (1999) that Asian Indians typically settle in the suburban neighbourhoods dominated by the White majority and, residential clustering is not observed among Asian Indians. In turn, this would suggest that social class considerations outweigh ethnic considerations in choosing a residential location. However, as noted above, the formation of social networks (bonding social capital) with other Bengalis was a key amenity preference among Bengali professionals in the sample. Their lack of residential clustering implies that the formation and maintenance of such networks does not require close propinquity and it is sufficient that such networks are spatially dispersed across the metropolitan area.

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DIMENSIONS OF STUDENT MIGRATION TO CHENNAI

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Introduction

Student migration is the movement of students who study outside their country of birth or citizenship for a period of 12 months or more. There are a number of reasons for this phenomenon, among which globalization take lead role. During the period of globalization, the internationalization of higher education increased dramatically and it has become a market driven activity. With the rapid rise of international education, more and more students are seeking higher education in foreign countries and many international students now consider overseas study as a stepping-stone to permanent residency within a country. The contributions that foreign students make to host nation economies, both culturally and financially has encouraged major players to implement further initiatives to facilitate the arrival and integration of overseas students, including substantial amendments to immigration and visa policies and procedures.

In addition, many developing countries have an under supply of higher educational institutions and as a result students have to study abroad. Generally, students seeking cross-border education migrate to countries with more developed educational institutions than their own. For example, students from Arab countries migrate to Egypt and Jordan to pursue their studies, and many students from Bangladesh and Nepal travel to India. The flow of students from developing countries to developed countries is often due to the belief that the quality and standards of education offered in OECD (Organization for Economic Cooperation & Development) countries is superior to what is offered in the country of origin. It is common expectation that studying across borders can enhance English communication and professional business opportunities. The loss of students from sending countries can have a rather detrimental impact on the economy by depleting already scarce resources, popularly known as 'Brain drain'.

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Objectives

This study looks on the various factors influencing student Immigration to India, to analyze the increase of student migration to Chennai, to find out the most preferred courses in Chennai.

Data and Methodology

Since secondary data are scarcely available this study has been done with primary data. The primary data are supplemented with views obtained from respondents in support of questionnaires. The questionnaires were distributed among 125 respondents from different colleges across Chennai including all streams of study.

There were 2 hypotheses made for the study, which are:

1. There is no significant relationship between the students who have migrated from various places and the courses preferred by them in Chennai.

2. There is no significant difference between the expenditure incurred on education and the courses pursued by the respondents.

Discussion: Student Migration to Chennai

Chennai is the capital city of Tamil Nadu. It is one of the biggest cultural, economic and educational centres in South India. According to the 2011 Indian census, it is the fourth-largest city and fourth-most populous urban agglomeration in India. The Chennai Metropolitan Area is the 36th-largest urban area by population in the world. Further, according to Cushman & Wakefield report (2013) Chennai ranks second among Indian metropolitan city centres with a 90.33 percent literacy rate.

Student migration to India can be traced back to the age of Nalanda & Takshashila Universities. However being the Gateway of South India and the second oldest corporation in the world after London (1687), Chennai is also home to many educational and research institutions from olden days itself. This has induced student migration to Chennai since 17th century till today. The Census 2011 data on migration shows that Andhra Pradesh, Maharashtra, Tamil Nadu, Karnataka and Uttar Pradesh account for 57.33% of the total migrants who moved out for educational purposes. Among these 5 states, Tamil Nadu ranked 3rd with a total number of 7.8 lakhs student migrants. More number of men than women migrated to these states to join professional or arts and science colleges in the last decade. In terms of medical and engineering colleges, the five states account for 50% of the total government as well as private medical colleges in the county. At the same time, Kerala which has the best literacy rate in the country, of the total interstate migrants, only 1.2% has migrated for the sake of education (S Chandrasekar IGIDR).

This achievement of attracting student across the country and the globe is backed by renowned institutions in the city and state. IIT Madras (1959) is ranked among the top centres of engineering education in India. Anna University (1978) is the only state owned university to be ranked in the top 10 engineering colleges in India, along with the IITs and NITs. Madras Medical

College (1835) is the third oldest medical college in India. University of Madras is the 2nd University to setup in India during 1857 and first in south India which caters the need of thousands of students along with a number of autonomous institutions under the university. The University of Madras (1857), which has six campuses in the city, offers a range of programs in liberal arts, science and commerce. A majority of city colleges are affiliated to the university and offer programs in law, science, Arts and commerce. Some such older institutions are the Madras Christian College (1837), Presidency College (1840), Pachaiyappa's College (1842), the Vivekananda College (1946), The New College (1951), DG Vaishnav College (1964) all of which affiliated themselves to the University of Madras on its formation. National Institute of Fashion Technology (1995), Madras School of Social Work (1952), Madras Institute of Development Studies (1971), Madras School of Economics (1993), etc., are other major nationally important institutions in the city. There are a plenty of private universities and institutions in various fields in Chennai which accelerate the student immigration further.

Chennai is also home to many research institutions and libraries. There are also many book banks. The working of a book bank is similar to a library, where books are lent out for a specified period. However, unlike a library, book banks cater only to students as customers and lend those books for their entire semesters (usually six months). The book banks charge a fee and provide the students with the text books they need for their course. Students benefit by not having to spend a lot for their course books. That's how Chennai is one among the most popular destinations in India for students looking to   pursue higher education. It provides good infrastructure, environment, etc. to cater the needs of thousands of students coming into the city every year. It is due to this very reason that Chennai is now becoming a global hub of opportunities and in turn creating revenue for the country and sustaining its development globally.

Data Analysis

- 59 per cent of the respondents belong to the age group 20 – 25.

- 65 per cent of the respondents are male.

- 34 per cent of the total respondent's annual income is less than Rs. 3,00,000.

- 54 per cent of the respondents live in the hostel.

- 66 per cent of them migrated into Chennai for under graduation.

- The majority of 32 per cent of respondents have migrated into Chennai from other parts of Tamil Nadu followed by Kerala with 22 per cent and International respondents with 18 per cent.

- Arts & science is the most pursued course by the college immigrants in Chennai with 44 per cent of the respondents pursuing this course.

- 60 per cent of the respondents prefer engineering in Chennai to be the best compared to the other courses.

- 64 per cent of the respondents prefer education in Chennai for the high scope for better job opportunities.

- 33 per cent of the respondents spend above Rs. 1,00,000 on their education.

- 66 per cent of the respondents feel the quality of education in Chennai is comparatively more than that of other states.

- 65 per cent of the respondents feel Chennai's living conditions are good.

- 61 per cent of the respondents feel climate as a negative while living in Chennai.

- 77 per cent of the respondents given an opportunity would prefer continuing their education in Chennai.

- 81 per cent of the respondents would recommend Chennai as a preferred place for education to others from their native.

- 91 per cent of the respondents are satisfied with the amenities provided to them while pursuing their education in Chennai.

- The result of Chi-Square 30.225 shows that there exists a significant relationship between the students who have migrated to Chennai and their preferred course arts & science. Since the p value is less than 0.01, the hypothesis is rejected at 1 per cent level of significance. So, the migration to Chennai depends on the course arts & science.

- The result of Chi-Square 34.586 shows that there exists a significant relationship between the students who have migrated to Chennai and their preferred course engineering. Since the p value is less than 0.01, the hypothesis is rejected at 1 per cent level of significance. So, the migration to Chennai depends on the course engineering.

- The result of the T-Test explains that there is a difference between education expenditure and course pursued (i.e.) the course pursued by the respondents does not depend on the education expenditure and it is also statistically proved as the p value is less than 0.01 and therefore the hypothesis is rejected at 1 per cent level of significance. It is thus concluded that the education expenditure and course pursued are not dependent on each other.

Conclusion

The Chennai city has got historical advantage in attracting student community across the globe as it is hosting a large number of world renowned institutions in different streams. Further the study reveals that the preference for Chennai by students as their study destination has not declined (77 % of the respondents wish to continue their further studies in Chennai itself and 81 % of respondents would recommend Chennai for others to pursue higher studies), rather it has improved over time and Arts, Basic Science and Engineering subjects are most attractive in Chennai.

It is interesting to see that disappointments and negatives are least with regard to student migration to Chennai and Climate is the only most voted (61%) negativity by the migrant student community in the city. There is an interesting contradictory finding in this study that Kerala is the top contributor of Students (22%) to Chennai which go in line with the study discussion above which noted Kerala is one of the least preferred states for higher studies though it possesses first rank among Indian states in literacy. The International migrant students follows Keralites with 18 a percentage contribution of students.

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HOUSEHOLD DEFECATION BEHAVIOUR&HEALTH OUTCOMES: AN EMPIRICAL STUDY IN NORTH-EAST DELHI

Namita Goel,Vaishvi Goel & DeepankarSingh Rao*

Income, religion, gender, distance to the defecation ground are the major factors which explain the household defecation behaviour in an urban slum setting. People are largely aware of the hazards of open defecation and prefer community toilets over open defecation. In the slums close to the defecation grounds, high cases of child mortality and morbidity are observed. A reversal of these adverse health outcomes calls for public investment in community toilets which are affordable and accessible in a metropolitan slum area.

JEL Classification: I1, O1

Keywords: Open Defecation, Sanitation, Urban Slums, Child Mortality

Introduction

India's population as per the census of 2011 is 1.2 billion. According to the joint UNICEF and WHO estimates of 2015, 44% of India's population defecates in the open, and of this 44%, 61% in rural India and 10% in urban India respectively defecates in the open. These figures also correspond to estimates of census of 2011 which shows 50.2% Indian households defecating in the open. 67.3% and 12.6% of this 50.2% defecates in the open for rural and urban population, respectively.

Open defecation is a public bad and therefore has significant negative health externalities. Open defecation spreads germs in the environment which therefore, has a major impact on children under the age of 5.

In the urban areas, due to higher population density and absence of open fields - the negative externality is much higher than what it is in rural India[2]. Not much research has been

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[2] Coffey et al. 2014

done in regard to open defecation in the urban slums. Thus, it becomes important to research open defecation in urban slums and this pressing problem is what brings us to our area of study of research.

In this study, which was carried from December 2015 to January 2016, we collected data from eighty households in the slums of Seelampur and Mansarovar Park in North-East Delhi, and analysed the household defecation behaviour and the corresponding health outcomes.

Section 2 of this paper talks about the existing literature regarding factors of defecation habits and associated negative health externalities. Section 3 mentions the theoretical background which is the descriptive analysis of factors affecting defecation behaviour of individuals. In section 4, we try to analyse our sample and discuss the methodology of the study. In section 5, an in-depth analysis of the household defecation behaviour is done by discussing various factors. Section 6 attempts to explain the health outcomes followed by the defecation behaviour of the sample. In section 7, we provide a few measures, based on the information gathered in the survey, which can be implemented through the policies to improve sanitation in the urban slums. Lastly, section 8 conclusively discusses the issues that have been featured in the study.

Literature Review

A research article by Assa Doron and Robin Jeffrey (2014) identifies the possibility of other determinants of open defection, besides lack of toilets. It mentions the pleasure and convenience people have by defecating in the fields which also leads to the usage of latrines, in some of the rural households, as storage areas. In urban area context, the paper talks about the long queues and dysfunctional toilet blockage as the reasons for people going in open, even if this makes women more vulnerable to harassment. The effect of this absence of secure toilets puts the women at great disadvantage which the men do not face. This reinforces gender inequality. Along with these factors, paper also talks about the role education and religion play in the defecation habits by drawing comparison between states of India which show very low levels of open defection because of these two major factors. Kerala, having high levels of toilet construction and the lowest levels of infant mortality, has been exposed to primary education for almost three generations and has high literacy rate from the second half of the 20th century meaning that knowledge of basic sanitary science has been widespread for 60 years. Along with this Kerala's population is close to one-quarter Muslim which believes that women should be shielded from outsiders' view and hence own toilet is desirable whereas Hindu families believe in not having their own toilets as they consider it as impure.

Jeffrey Hammer and Dean Spears in their research paper on village sanitation externalities and children's human capital (2013) looked at one of the negative health externalities of open defection namely stunted growth in children in rural Maharashtra with respect to Total sanitation campaign, a policy introduced by Government of India to reduce open defecation in India. The program caused a plausible average increase in child height, an important marker of human capital.

Another research paper we went through was sanitation, quality, use, access, trends (SQUAT) survey (2014)[3]. 3235 data points were collected from five North India regions namely- Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, and Haryana. The aim of the paper was to look at the determinants of demand side of latrines. The major factor observed for this was the misconception regarding the cost of making latrines. Many households were not aware of the true cost and estimated it to be above Rs 20,000 hence considering it to be a luxurious item. Some households who had their own toilets were not using them because of the convenience they had by defecating in the fields which also reveals that people were not aware of the hazards of open defecation. The paper also talks about the problems faced by women, but since they do not have much influence over the household's decision to build latrines or not- their problems are not addressed. Also, in rural India water is not a reason for not having a latrine.

Theoretical Background of Defecation Behaviour

The existing theory[4] on defecation habits of individuals observes many factors as the determinants of the defecation pattern. Income is one of the major reasons which prevent people from having their own toilets because of the misconception regarding the cost of building and maintaining toilets. Considering it as a luxurious item, they prefer not to spend a major part of their low income on the toilets when alternatives to it like open defecation exists.

In rural areas, open fields act as defecation grounds for households. Since these grounds are very far from the houses, going to these grounds has become a leisurely activity for the rural people as they get to interact with other people too during this time. Also, going in the open is much more convenient for them than going to their own toilets which would require maintenance every day on their part.Many individuals, especially women, prefer community toilets or own toilets over open defecation as they want to choose a safe and secure place for defecation to protect themselves from any kind of physical abuse.

Also, religion plays a very important role in determining defecation habits. In Hinduism, there exists a notion that one cannot eat and defecate under the same roof. It is considered impure to have pit latrines in or around the house. Accumulation of faecal matter within the boundary of the house in a pit is a major concern for Hindus. On the other hand, Muslims appear more open to the idea of having a pit within their houses as it does not go against their cultural disposition.

One of the obstacles to individual latrine use and construction is that individuals generally find them repulsive. They are perceived as smelly, dark, small, enclosed spaces that need to be emptied. Family members, peers, neighbours and other community members defecating in the open makes it a common and widely accepted behaviour that is deeply rooted in the local culture. It is perceived as a traditional practice and part of one's daily routine.

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[3] Coffey et al. 2014
[4] Tarraf 2016

The negative externalities which the existing literature highlights are stunting amongst children practising or exposed to open defecation[5]. Along with this, children in India, due to open defecation suffer from malnutrition which affects school-age children and hinders their learning abilities.

Survey Design and Sample Area

1. Methodology

The survey was conducted by the method of individual interview. Primary data[6] was collected by conducting personal interviews of an adult member of a household in the slums of North-East Delhi. The questionnaire was organized to get information on five broad perspectives; socio-economic, health, education, cultural factors and the defecation pattern of the family. The field survey was divided in two parts- a pilot survey[7] followed by the main survey. The pilot survey was conducted on a smaller sample which was analysed to form the final questionnaire. Main primary survey was conducted from December 2015 to January 2016.

In the primary survey, we collected 80 data points[8], 40 data points from a slum from Seelampur while rest of the 40 data points from a slum colony in Mansarovar Park.

2. The Field Area

The sample areas chosen under this study are the slums of Seelampur and Mansarovar Park in the North-East Delhi region. According to the Economic Survey of Delhi 2014-15, the population of North-East Delhi is 22.41 lakhs with a population density of 36,155 persons per square kilometre. It is important to note that North-East district ranks first in terms of population density in Delhi. North-East Delhi has 99.04% urban population[9]. Both the sample areas were unauthorised and represented typical slums in large urban settlements like Delhi, but each had its own unique characteristics.

In Seelampur, the entire slum is lined alongside the GT road. It is an unauthorised colony, but no eviction has been made till now. The other field area of the conducted survey lies very close to the Mansarovar Park metro station. The scatter settlement is an illegally occupied cluster of semi-permanent habitation along the railway tracks and the dwellers live in anticipation of a potential eviction.

Household Defecation Behaviour

1. Defecation Pattern

The research aims to find what causes open defecation and what the cultural, socio-economical or any other set of processes are that lead to it. For that, it is important to analyse

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[5] Spears, Ghosh and Cumming 2013

[6] Data collected directly from first-hand experience.

[7] A preliminary survey, typically on a small sample size, used to gather information prior to conducting a survey on a larger scale.

[8] 1 data point refers to 1 household.

[9] Economic Survey of Delhi 2014-15

the defecation pattern of our sample. Based on the defecation pattern followed by the households, we can divide them into four categories which are as follows:

Category A: All the members of a household go for open defecation

Category B: Male members of the household defecate in the open while female members go in community toilets

Category C: All the members of a household go in community toilets

Category D: Households have their own toilets

The following human defecation index (Table 1) is devised to denote the defecation pattern of the households. A higher human defecation index number corresponds to a 'better'[10] defecation practice by the households.

Table 1: Human Defecation Index

Category	Human Defecation Index
A	0
B	1
C	2
D	3

Source: Authors' Construction

It can be observed that in the sample (Figure 1) 32% of the households defecate in the open, 18% of the households go in community toilets and 25% of the households have their own toilets. It is important to note that 25% households are such where males defecate in the open while females use community toilets.

Figure 1: Defecation Pattern of the Households

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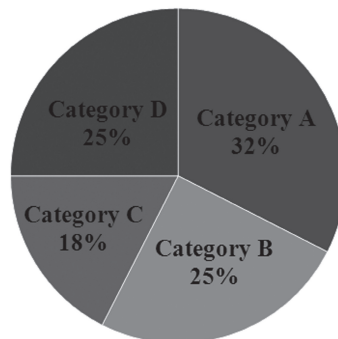
[10] Assuming category D defecation practice as the best while that of category A as worst. Category D> Category C> Category B> Category A

Source: Authors' calculation based on the survey data

Region wise (Figure 2), inhabitants of both the areas showed vast differences in defecation habits. The graph below clearly shows that defecation behaviour in Mansarovar Park is in sharp contrast to that of Seelampur. It is important to note that in our sample; all the households of 'Category A' are in Mansarovar Park while all the households in 'Category D' are in Seelampur. Thus, it can be said that the defecation index of Seelampur is higher as compared to Mansarovar Park.

Figure 2: Region-Wise Defecation Pattern
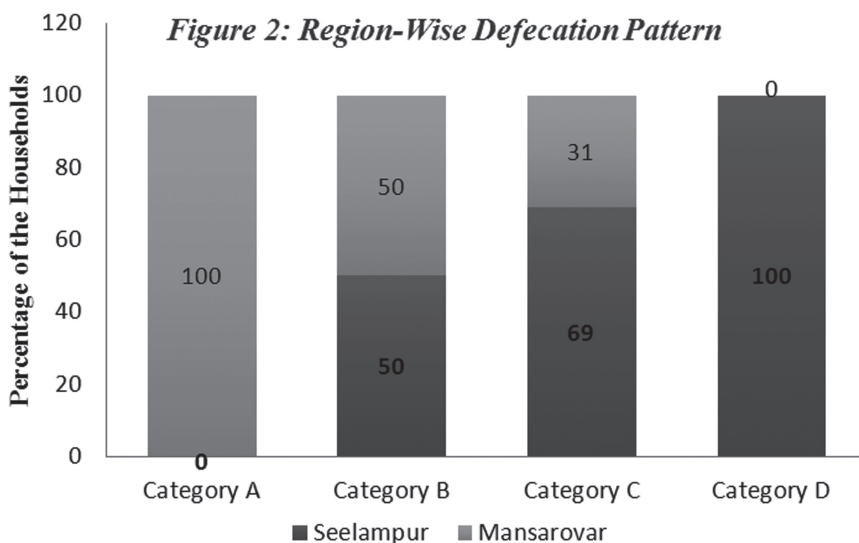
Source: Authors' calculation based on the survey data

2. Income

To understand the variation in income of the sample, understanding their occupational structure is important.

2.1 Occupational structure

The households can be divided into two categories based on their source of income, namely- the households having irregular source of income[11] (comprising, 64% of the total households) and the households having regular source of income[12]. Figure 3 shows that the households having irregular source of income would garner low income as compared to households having regular source of income. Thus, it accounts for the lower per capita income of the households in our sample given the number of dependents and number of earners in the family.

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[11] In our sample it includes work like seasonal labour, selling lemon-chilly, rag picking, etc.
[12] In our sample it includes work like manual labour, rickshaw pulling, private job, skilled worker, etc.

Figure 3: Occupational Structure of the Households
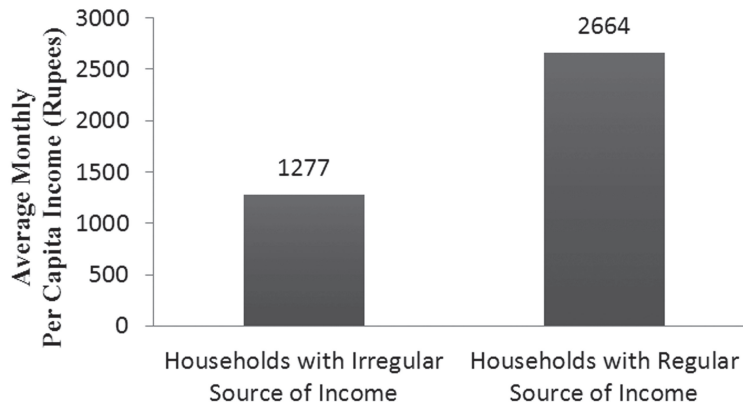
Source: Authors' calculation based on the survey data

2.2 Income and Defecation Pattern

The income level of the household is explained by the nature of the source of income of the household. This way the variation in income levels of the households with their defecation pattern can be analysed. A positive relationship (Figure 4) has been observed between a household's economic status like per capita income and its defecation pattern, i.e. when the household's income is high, they prefer defecation in community toilets and own toilets over open defecation. If not for all the members, at least the female members of the household stop practising open defecation and instead use the community toilets. So, it can be said that as income increases the human defecation index improves.

Figure 4: Income and Household Defecation Behaviour
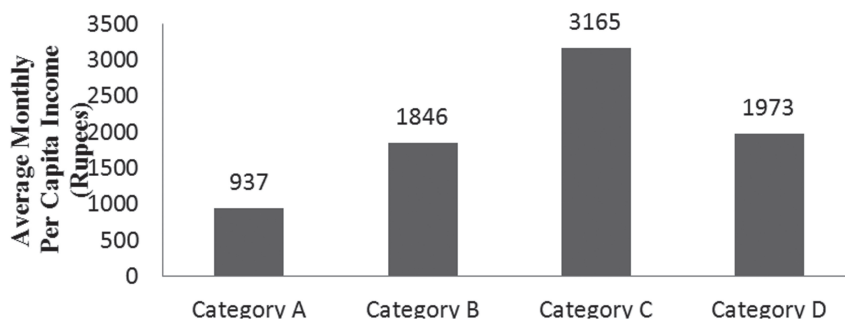
Source: Authors' calculation based on the survey data

A huge variation was observed in the average monthly per capita incomes of different categories of the sample. The average monthly per capita income of the households going for open defecation is Rs 937. It rises to Rs 1846 for the families where at least the female members of the household use community toilets. And it further rises to Rs 3165 for the set of households who go in community toilets whereas it declines to Rs 1973 for households having their own toilets.

It is observed that the average per capita income of households going for community toilet is significantly higher than that of those households that have their own toilets. Thus, it can be said that to a certain extent income does explain the behaviour of the defecation pattern of the households but for a clear idea a few more aspects are discussed below in detail.

3. Distance

The households which do not have their own toilets either go for open defecation or community toilets. Therefore, commutation distance to the defecation ground/community toilet is one of the factors which plays an important role in their decision making.

The 'category A' households which practice open defecation take on an average 3.76 minutes[13] (Table 2) to reach to the defecation ground whereas the nearest community toilet is on an average 11.08 minutes away. A significant difference can be observed between the time taken to reach the defecation ground and the community toilet. The proximity of defecation ground and their low per capita income forces them to practise open defecation.

The 'category C' households which defecate in the community toilets takes on an average 7.50 minutes to reach the nearest community toilet whereas the nearest defecation ground is on an average 7.15 minutes away. The monthly average per capita income of the 'Category C' households is Rs 3165 which is sufficiently higher.

For 'category C' households, distance to defecation ground and community toilet is approximately equal and open defecation is affordable, yet they choose community toilets to defecate. Thus, it can be said that defecation in community toilets is directly revealed preferred to open defecation.

Table 2: Distance and Defecation Pattern

Particular	'Category A' Households	'Category C' Households
Time to Reach Defecation Grounds (Minutes)	3.76	7.15
Time to Reach Community Toilets (Minutes)	11.08	7.5
Average Monthly Per Capita Income	Rs 937	Rs 3165

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[13] Since most of the respondents were uneducated, time taken to reach their place of defecation is used as a proxy variable for distance.

Source: Authors' calculation based on the survey data

Thus, it can be concluded that people are aware that defecation in community toilets is a better alternative than defecation in the open. Also if the income levels of the household are enough and using the community toilets becomes affordable then it can be said that defecation in the community toilets is the preferred option over open defecation.

4. Gender

In the income section, above, it was observed that as income increases the defecation pattern of the people gets better. 25% of the households are such that the male members of the family defecate in the open whereas female members go in the community toilets. The per capita income of these households is Rs 1846 which is sufficiently higher than those where all the household members defecate in the open (Rs 937) but lower than those where all the members go in the community toilets (Rs 3165). Thus, when household income increases, if not all, at least the females of the household go to community toilet.

The major reason for such a pattern is the long queues at the community toilet. The average waiting time at the community toilet in the morning hours, as told by the respondents, is 15 minutes. 75% of the households in the category B have jobs where it is important for the people to report at a given time. Of these 75% households, 80% households are such where male members defecate in the open because they get late for work. Whereas, in case of females this problem doesn't exist as only 30% of them are working and that too in casual labour with no commitment to any working hours. Another reason for females opting for community toilets is the fear of molestation and physical abuse and shyness in defecating in the open. 42% of them reasoned for molestation, 46% of them reasoned for shyness and rest of the 12% reasoned other difficulties.

Hence, apart from income, working nature of males and females, and the molestation fear and shyness of defecating in open explains such a behaviour.

5. Religion

The 80 households surveyed were either Hindu or Muslim. Presence of other religious groups was not significant. 67% Hindu households and 33% Muslim households were surveyed in all. Surprisingly, the composition remained the same in both the sample areas, Seelampur and Mansarovar Park. Though distribution based on religion, in both the areas is same yet significant differences can be observed in the way their religious beliefs affected their defecation habits.

Religion plays a role only in determining whether to build toilets at home or not. And this choice existed only in Seelampur. In Mansarovar Park this option was not available due to temporary settlement issues and constant fear of being evicted.

Thus, the figures mentioned below are just from the households in Seelampur. We observed (Figure 5[14]) that 77% of Muslims have built their own toilets whereas only 33% of Hindus have built their own toilets. In Seelampur, the monthly average per capita income of the Hindus is Rs 2826 whereas for Muslims, it is only Rs 1417. This is a huge contrast to the percentage of households having the own toilets on the basis of religion. Thus, it shows religion plays a significant role in determining the decision about construction of own toilets.

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[14] Please note that there is no 'Category A' household in Seelampur.

Figure 5: Defecation Behaviour based on Religion (Seelampur)
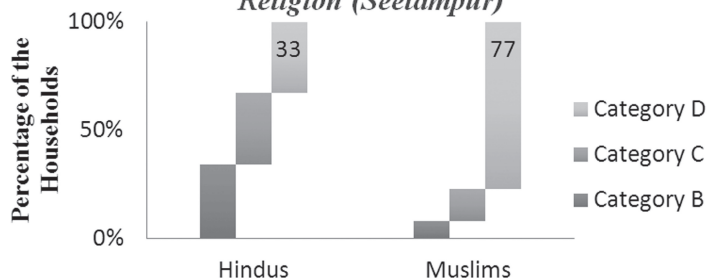
Source: Authors' calculation based on the survey data

The reasons given by households for building their own toilets explained this behaviour. 70% of the Muslim households had their own toilets because of the prevalence of purdah system[15] under their religion. While rest 30% of them built their own toilets because they faced several inconveniences in defecating in the open or going to community toilets. Dirty community toilets, specific timings for community toilets and open defecation not being a safe option were some of the struggles faced by them.

While for Hindu households, 20% of them said that they got toilets built in their house because of women safety while 80% of them gave the reason of facing inconveniences (same as above) while defecating in the open or in community toilets. So, a clear demarcation between the reasons among both the religious groups can be seen.

Rest of the 23% Muslim households who did not have their own toilets wanted one because of the prevalent 'veil system', but they could not build one because of space constraint and having an accommodation on rent. Likewise, 67% Hindu households, who did not have their own toilets cited income or space as the main reason for not building a toilet. Since the space constraint applies to all the households irrespective of their religion, it reveals that even though the average per capita income of the Muslims is half that of the Hindus, Muslims and Hindus have entirely different outlooks regarding building an own toilet in their houses because of their respective religious beliefs.

6. People's Perspective on Open Defecation

Awareness about hazards of open defecation is an important aspect. Households surveyed were aware about the hazards of open defecation. 93% of the households were aware that the practice of open defecation was socially looked down upon and made the surroundings dirty. Out of this 93% households- 80% of them were aware that open defecation was a major cause which led to a rise in diseases.

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[15] A social and religious practise of female seclusion prevalent in Muslims in which females cover their skin   and conceal their form.

This data is consistent with the revealed preference argument in section 5.3 stating that 'Category C' people are aware about the hazards of open defecation and hence they prefer community toilets over open defecation.

However, when asked if they had any knowledge about any of the government policies and schemes to improve the sanitation facilities, surprisingly, only 3% of the households had any knowledge about the same.

Health Outcomes

Open defecation is associated with significant negative externalities. It makes babies prone to grave diseases, impedes the physical and cognitive development of the surviving children and reduces the human capital of India's workforce[16]. It also exposes people to a squalid environment which puts them at a risk of encountering grave diseases like diarrhoea, trachoma, typhoid and other intestinal worm diseases[17].

Major reasons for this high susceptibility to diseases are dirty surroundings and the carrier of germs i.e. flies (Figure 6).Closer the defecation ground, carriers of diseases- flies would carry the germs from defecation ground to their food which results in bacterial infections and diseases[18].

Figure 6: Faecal-Oral Contamination- Transmission Route for Pathogens
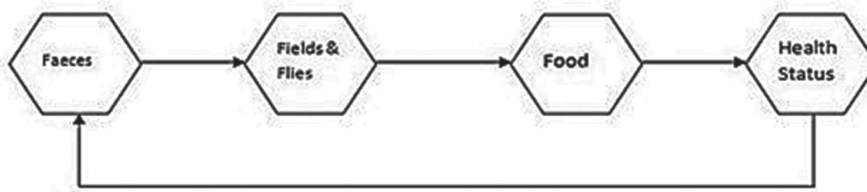
Source: Waddington et al (2009)

Distance of the defecation ground from the residence is a major factor in determining these harmful effects[19]. An area situated close to the defecation ground, its residents would get sick more often as compared to an area situated far. And this impact accrues more in urban areas since they are so densely populated[20].

Both, Seelampur and Mansarovar Park get supply of water from the same source i.e. Jal Board Tankers. Medical facilities are same in both the areas. Hospitals are located within the range of 15 minutes in both the slum areas. Government dispensaries are set up in both the areas once in a week. Therefore, the comparison of the child mortality and the illness from diseases between the two areas will highlight the emerging negative health externalities from open defecation.

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[16] Deaton and Drèze 2009
[17] Doron and Jeffrey 2014
[18] Waddington, Snilstveit and Fewtrell 2009
[19] Waddington et al. 2009
[20] Coffey et al. 2014

1. Child Mortality

Open defecation has negative externalities and hence it affects all the households in a locality equally irrespective of their own defecation choice. The analysis of the negative externalities is therefore not based on household's defecation pattern but on the region i.e. Seelampur and Mansarovar Park.

A very large number of cases of 'Under 5 Child Mortality' were observed in Mansarovar Park (Figure 7). Many children under the age of 5 had died in the households surveyed mainly because of fever, diarrhoea and other unknown reasons. In Seelampur none of the households had any cases of child mortality, whereas, in Mansarovar Park 15 out of the 40 households had at least one case of child mortality with 33 cases in all. It is important to note that the average distance of defecation ground from the Seelampur slum is 500m whereas the average distance of defecation ground from Mansarovar Park slum is only 50m.

The graph below shows the number of cases of child mortality in both areas i.e. Seelampur and Mansarovar Park. The y-axis represents the number of cases of child mortality and x-axis represents the households, 1 to 40 represents Seelampur and 41 to 80 represents Mansarovar Park. Thus, each dot represents child mortality case(s) in that respective household.

Figure 7: Cases of Child Mortality
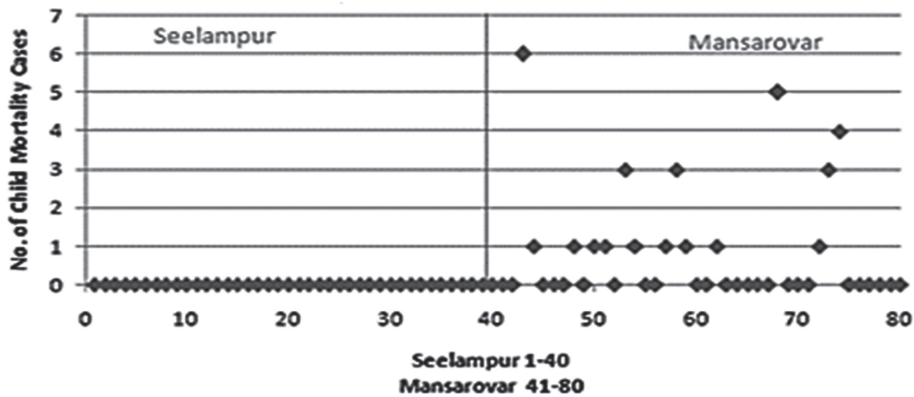
Source: Authors' calculation based on the survey data

Morbidity

The disease or illness experienced by any of the children[21] of the households between the two slums differs largely. Respondents were asked for the medical record of the children of the household of last one year. The average frequency of children falling ill in the households of Mansarovar Park is 1.72/month whereas the average falling ill frequency of children in the households of Seelampur is 0.64/month. Thus, there is significant difference in the average frequency of children falling ill between the two areas.

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[16] Up to 15 years of age

The major diseases observed in both the slums are typhoid, tuberculosis, pneumonia, diarrhoea and normal cold/cough/fever. All these diseases are bacterial diseases. Typhoid spreads due to contaminated food and water especially through stool, TB and pneumonia gets worsened because of low immune system of the patient and spreads considerably due to crowded and dirty conditions[22]. Diarrhoea is caused by not only contaminated food or water but also food that was not refrigerated well enough or went bad before consumption[23].

In Mansarovar Park, 29% of the cases are of diarrhoea whereas in Seelampur, there have been no cases of diarrhoea. The combined cases of Typhoid, Pneumonia and TB in Mansarovar Park are 22% while in Seelampur it is 13%. It is important to note that in Seelampur, 26% of the households reported no cases of any disease. This reflects the fact that a major proportion of people in Seelampur are not experiencing any illness as their surroundings are clean and defecation ground is quite far. This shows that there is a clear negative impact of open defecation on the health of the human beings.

Figure 8: Comparison of Diseases [Source: Authors' calculation based on the survey data]
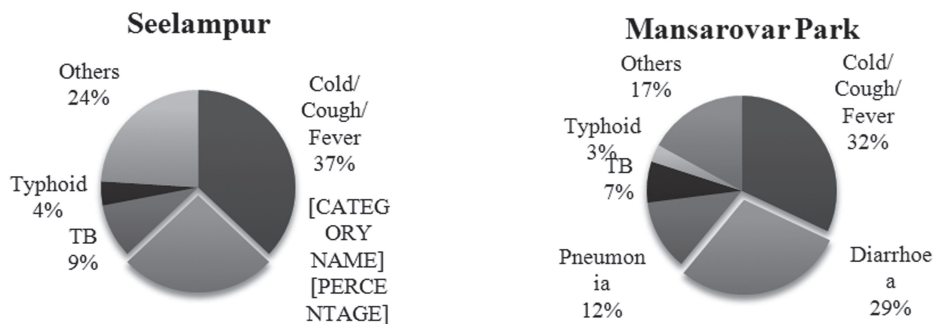
The survey was conducted during winters therefore cold/cough/fever is not accounted as a major illness suffered by the people as it could be due to weather change rather than only dirty surroundings.

3. Vicious Circle

A very interesting fact is highlighted in Mansarovar Park. It reveals how the effects of the negative externalities of open defecation force them to go for open defecation. The slum dwellers are caught in a vicious circle.

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[22] Based on the following articles: Last accessed on March 15, 2016 from
http://www.webmd.com/a-to-z-guides/typhoid-fever
http://chealth.canoe.com/Condition/GetCondition/Consumption
http://www.webmd.com/lung/understanding-pneumonia-basics
[23] Based on the article: Last accessed on March 15, 2016 from
http://www.webmd.com/digestive-disorders/diarrhea-10/causes-diarrhea

Figure 9: Vicious Circle of Open Defecation
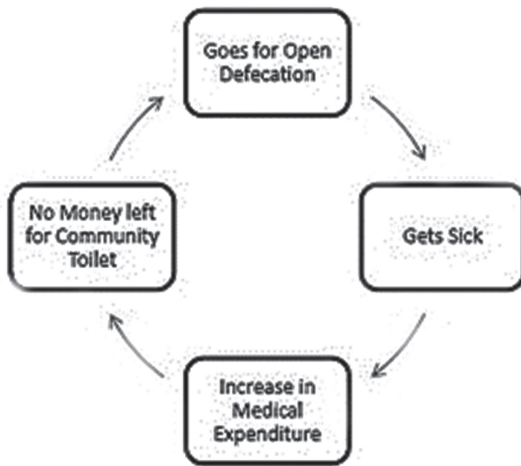
Source: Authors' Construction

As the defecation ground is very close to the slum, the negative externalities of it come into play and it makes them sick and unable to work. They lose their day's income which is monumental for them. Their medical expenditure increases and they are left with a very small fraction of their income for other purposes. In Mansarovar Park, the household's average medical expenditure to income ratio is 22%. More than 1/5th of the already very low income is spent in their medical expenditure. Thus, their standard of living is at a very low level.

As they have less income left for other purposes, they can't afford going for defecation in community toilets and with no other choice left, they go for open defecation in the defecation ground. This further increase the negative externalities of open defecation and in this way, they get caught up in this vicious circle.

Policy Implication

The existing policies of the government are not giving the desired outcome. As discussed in the previous section that the lower income people get caught up in the vicious circle of open defecation and it is very important for the government to take some constructive steps to put an end to open defecation. Based on the analysis of the survey, the following measures can be implemented to curb the problem of open defecation in the model of a 'typical' slum in an urban area.

Monetary Incentives are Ineffective

The government policy of providing monetary incentive for construction of own toilets in rural areas cannot work in this kind of a setting. As slums are mostly unauthorized, therefore the temporary settlement problem makes no sense for this kind of policy. Adding to it, there are space constraints in these slums which lead to further difficulties in construction of private toilets. This

suggests that government should focus on these aspects before designing a policy for constructing private toilets in urban areas. Hence, government policies should focus more in the provisioning of the community toilets in this model.

2. Efficient Implementation of the Policies

It is argued that in rural areas, there is a requirement of large scale campaign of latrine use because despite construction of private toilets- sanitation preferences remain unchanged and people would defecate in the open. This argument is applicable in the rural setting but not in the urban setting. As mentioned above, in the urban slums most of the people are aware about the hazards of open defection and that it is a major cause of various diseases. On the other hand, people are completely unaware of the government policies in this regard. Hence, government should emphasize more on implementation of policies.

3. Provisioning of Community Toilets

It is established that people prefer defection in community toilets over open defecation but despite that people are defecating in the open. Broadly, there are five reasons for not defecating in community toilets i.e. high usage charge, long distance, long queues, female safety and dirty condition. This clearly suggests that there is high demand for community toilets but not enough supply of the same.

For the 'Category A' households, the average distance to community toilet is 11.08 minutes whereas it takes on average only 3.76 minutes to the defecation grounds. The average waiting time in the community toilets in the morning hours is 15 minutes. So, if any person is arbitrarily chosen in the 'Category A' opts for community toilet, it takes on an average 40-45 minutes for him/her to reach back home whereas it only takes on an average 10-15 minutes to reach back home if he/she opts for open defecation.

For the community toilet, on an average, females and males are charged Rs 2 and Rs 3 respectively every time they use it. The average family size in the slums is 6 which is approximately Rs 450-500 per month for a household. Thus, it is a huge incentive for them to go for open defecation which saves them both time and money, especially when their income levels are already very low.

This highlights the need for more community toilets with better facilities and maintenance which are close to the slum area in comparison to the defecation grounds. Community toilets should be provided free of cost as sanitation is a basic amenity which the government should provide free of cost to the public. If it is charged, the lower income households will always have an incentive to defecate in the open. Therefore, to target zero open defecation, the government must undertake some major steps to make the community toilets affordable and accessible for the people residing in urban slums.

Conclusion

Initially, the study was undertaken to find all the possible factors determining a household's defecation behaviour lying in an urban slum settlement. A strong correlation between literacy levels and lack of awareness of the hazards of open defecation with the household's defecation behaviour was believed to be observed but after conducting the survey, we realised that most of the households had full knowledge of the ill effects of open defecation through TV or newspaper or other audio/visual mediums.

One of the factors which play a major role in determining a household's defecation behaviour is income as the households with better economic status saw an improvement in their defecation behaviour. Households lying in category A had very low income and the households which had higher income stopped going for open defecation and went to community toilets. But here there were 2 cases observed - all members going to community toilets (category C) and only females going for the same (category B). Though there is a huge income difference between them, but one more factor to be considered is gender. As income increased they would start sending at least the females as there were many incidents of molestation and harassment around the settlement and a shift could be seen from A to B. But many households who had higher income still didn't shift from B to C because the males could not go to community toilet because of the long queues there in the morning and had to report to work on time. This discrepancy in the income factor is explained by gender.

A factor which could counter the positive relation of income and improved household defecation behaviour was religion. Even though the income of the households lying in category C was higher as compared to those in category D but still they went to community toilets and did not build toilets in their homes. Muslims, who had lower income than Hindus still built toilets at home because of the prevalence of 'veil system' under their religion. Hindus had no such beliefs and could do with community toilets. Space constraint was faced by both religious groups, but the Muslims still managed to build a toilet at home.

Apart from the factors determining a household's decision to defecate in the open, these households also had to bear the consequences of this practice. As it is observed that open defecation results in several grievous diseases among children and adults both, the intensity of these diseases increases with an increase in the proximity of the defecation ground from the house. Child mortality and morbidity increases when the distance between the defecation ground and the house reduces. And this higher child mortality and morbidity was observed in Mansarovar Park rather than Seelampur as defecation ground was closer in Mansarovar Park than Seelampur.

To stall this practice of open defecation the government should take some solid measures to make the community toilets more affordable and accessible. Increasing awareness about the hazards of open defecation is not sufficient and steps should be taken to raise awareness about the government policies to stop open defecation for their better implementation.

There are a few limitations to the study that we conducted. The caste aspect of the demographics was not observed. There were people of different caste in both the areas and it could have been an important factor in explaining household's defecation behaviour. Also, when people migrate from one place to the other they carry the culture of their hometown along with them. Migration details were asked in the survey but the respondents could not answer it properly leading to missing values and problems in data, hence it was not analysed.

To conclude, this paper strongly urges us to recommend that public investments in community toilets by the governments should be undertaken and policies should be especially designed for urban slum settlements keeping in mind their unique requirements. Awareness to follow healthy sanitation practices should be raised among all communities. Steps in these directions will go a long way in improving socio-economic and health outcomes for all residents of urban slum areas.

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RESIDENTIAL SEGREGATION IN URBAN SPACES: PATTERNS AND CORRELATES IN SOUTH INDIAN CITIES

Neeha Susan Jacob*

1. Introduction

Residential segregation can be defined as the extent to which individuals of different groups occupy or experience different social environments (Reardon and O'Sullivan 2004) – the physical (or spatial) separation of two or more population groups into different neighbourhoods (Massey and Denton 1988, Kawachi and Berkman 2003, Maloutas 2012). Segregation and spatial distance were considered as a direct and adequate measure for determining social distance and inequality (Park 1925, 1936 and the Chicago school). This general definition masks the underlying complexities of residential segregation (Massey and Denton 1988) and makes this concept appear 'decontextualized or sufficiently abstract', viewing residential segregation as an outcome alone, and not as a process (Maloutas 2012). However, the paper considers residential segregation in terms of the simple definition as the spatial separation of groups of people into different social environments, but it does not shy away from the fact that residential segregation is an outcome as well as process (or at least a part of the process) that reproduces inequality and discrimination (ibid.). Thus we look into the degrees of residential segregation (viewing it as an outcome), but also we look at the formative process of residential segregation and its effective impact (viewing it as a process).

Unlike most studies on residential segregation in India in the context of rural areas, the paper looks at segregation in urban spaces. A city can be regarded as "a geographic plexus, an economic organization, an institutional process, a theatre of social action and an aesthetic symbol of collective unity" (Mumford 1937). The scale of operation and intensity of activities are quite large in cities than in other spaces and hence, the number of possible interactions and associations

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in the city will be larger (Massey, Allen and Pile 1999). But the forms of social relations and associations in the cities change depending on how near and how far people or communities are. Therefore, questions remain as to how exactly spatial relationships within and beyond the city work (or not) (ibid.). Hence a study of the residential segregation patterns in cities – which are basically the manifestations of social relations between people or groups of people based on proximity and distance - becomes important.

The study of residential segregation in Indian cities is particularly interesting because of other reasons. Caste dimension in studying inequality is quite prominent in India and this has been important in segregation literature as well. Urban sociological theories used to claim that as society and people acclimate with developing city life, earlier forms of social organization fades away (Park 1937, Wirth1938). In this line, the existing social structures in Indian cities were supposed to erode as urbanization began increasing in the country (Rao 1974). In a recent study, Desai and Dubey (2011) identify that caste inequalities by education, income, and social networks are of least inequality in India's metro cities – though the same holds true for less developed villages – while greatest inequality is shown in developed villages and smaller cities. However, there is also literature on caste in urban India suggesting that caste still continues to have an impact upon schooling decisions and educational outcomes and the likelihood of securing jobs (Munshi and Rosenzeveig 2006, Thorat and Newman 2010). Vithayathil and Singh (2012) also argues by studying the seven largest metro cities in India that caste based residential segregation is still prominent in India's urban spaces.

In this context, it becomes important to look at how the patterns of residential segregation are in the cities of India. Such a study might also help in providing insights on how urbanization and differing scales of urbanization in various Indian cities affect residential segregation. The paper is an addition to literature on residential segregation in urban areas, studying 102 class-1 towns of south India. The objective of the paper can be stated as:

- to study the nature and patterns of residential segregation by caste in 102 class one towns of south India

- to study the impacts of residential segregation by caste in the class-one cities of south India.

2. Review of Literature

The literature reviewed are of three types: 1. Theoretical and Empirical Works on Residential Segregation from the West, 2 Literature on Residential Segregation in India, and 3. Literature on measures of segregation.

Theoretical Literature on Residential Segregation

Ernest Burgess's (1928) classic work pioneered the studies on residential segregation in Social Science Research. Burgess looked at residential segregation in American cities and regarded

residential segregation as the result of 'economic competition for scarce urban land'. Burgess in an earlier paper (1925) depicts the growth of the city through the process of 'succession'[24], with various zones in the city. The workers lived closer to the city center while the affluent, who could afford to bear transportation costs, lived in the commuter's zone, farther away from the central business district. This was the first theoretical model of residential segregation. In the theory of Burgess, the process of segregation was through sorting and shifting of different elements in the population as the city expanded.

The studies that followed basically focused on mapping, measuring and looking at the causes and effects of residential segregation. All these studies could be classified under four conceptual frameworks which were 'dominant, yet problematic' (Holloway 2000) – the ecological perspective, the neoclassical perspective, the institutional perspective and the structuralist perspective.

The ecological theory views urban social geography as 'natural' or 'organic' outcome of social competition (Park, Burgess and Mckenzie 1967, as cited in Holloway 2000). The theory considers residential segregation as the spatial manifestation of the aspiration for social distance, often enforced by the majority or overriding group, but it can also be self-selected by the segregated. The neoclassical perspective considers segregation as an incidental byproduct of a few market forces whereby economic actors can make rational choices about housing production and consumption (Clark 1986, as cited in Holloway 2000). People choose to attach themselves to areas where they identify themselves – having similar socio-economic and cultural traits.

Institutional perspective (neo-Weberian perspective, as Van Kemper and Ozueken 1998 calls it) argues that segregation is due to restrictions on the housing choices of minorities, imposed by the majority group through formal and informal activities, often endorsed by the state (Galster 1988, Yinger 1998 as cited in Holloway 2000). Formal activities can be governmental housing laws or policies while informal activities can be higher rent or exclusionary prejudice, to name a few. Structuralist perspective agrees with institutional perspective that segregation is imposed from above, but it focuses on deeper economic, social and political structures that enable institutional agency (Fusfeld and Bates 1984, Marcuse 1997a, 1997b)

Thus, the ecological and neoclassical perspectives consider segregation as a result of individual action, but they do not agree on whether economic or social competition drives the system These perspectives depicts segregation as natural, and hence restricts the recognition of the problematic nature of segregation. The institutional and structural perspectives, on the other hand, highlight the involuntary nature of the minority segregation, thus limiting the recognition of potential benefits that can be a result of self-imposed segregation.

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[24] *Succession is the main process of expansion of the city, the tendency of each inner zone to extend its area by the invasion of the outer zone. There are 4 ways of the process of succession – invasion, reaction, influx and climax. The general process of expansion in urban growth includes the antagonistic yet complementary process of concentration and decentralization*

One of the major works in the neo-classical perspective, but whose theoretical framework is important by itself, is Schelling's (1971) spatial proximity models and bounded neighbourhood models of segregation. The model shows how an individual's preference to stay in a neighbourhood of the same ethnic origin, or the preference for a mixed neighbourhood up to a certain limit can end up in total segregation of the society (Manoj 2012).

These four models have been extensively used in the spatial segregation literature, however, they are not without criticisms, the major one being the fact that all of them overgeneralizing the experiences of specific geographical and historical context. Hence, there have been newer other frameworks developed as well. Holloway (2000) suggests that the causes, meanings, and consequences of segregation vary substantially, depending upon the identity of the people segregated and the geographic and historical contexts in which segregation occurs. He puts forth the need for looking at residential segregation from a social constructivist and contingency perspective. There should be attention given to the identity and the context in which residential segregation is analyzed, especially because we do not consider segregation as an outcome alone, but also as a process, looking at its causes and consequences. Maloutas (2012) also put forth a similar framework to study spatial segregation in his criticism against the social polarization thesis[25] (Sassen 1991). Urban segregation is not just confined to the way global forces act and react; it is context[26] dependent.

Empirical Works of Residential Segregation

Most of the literature on residential segregation and spatial inequalities in the West has been on segregation based on ethnicity or colour, especially the segregation in African American ghettos and its consequences on the socio-economic lives of the people living in these areas (Massey and Denton 1988, Woo 2012). Duncan and Duncan (1957) studied the segregation of Negro population in Chicago and identified that areas inhabited by more population of Negroes, were likely to increase in the Negro population over time. They also add that an area where a kind of social problem is localized tends to retain that problem for a period of years later on. Taeuber and Taeuber (1965) studied the Negro housing and segregation in cities throughout the United States. They also reveal that there are noteworthy changes other than residential segregation since 1950 that are also reasons behind the Negro "revolution". Clark (1986) studied residential segregation in American cities where private housing discrimination had little weight in explaining the patterns of racial segregation in the cities. Galster (1984) also studies segregation in the American cities criticizing the suggestions of Clark (1986) considering them to be a myopic approach to the reality of racial phenomenon in metropolitan areas. Frey and Farley (1996) studies the residential segregation of Latinos, Asians and Black in the metropolitan areas of US from 1980-1990, noting that there can be a convergence in the segregation of blacks, Latinos, and

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[25] *The social polarization thesis is perhaps the most direct claim about the relation between social and spatial trends. Cities are increasingly socio-spatially divided worlds, the changes are brought about by global forces and leaves no margin for state intervention*

[26] *context can be economic, state, social, specific and durable space of local socio-spatial realities (Maloutas 2012)*

Asians over time. Logan, Alba and Zhang (2002) talks about the immigrant enclave model and ethnic enclave model and discusses spatial inequality in neighbourhoods in cities and concerns arising out of in-migration to cities.

Residential Segregation in India

Many empirical studies in the Indian context have also pointed out the spatial nature of segregation in cities, especially that faced by the Scheduled Castes. Dupont (2004) and Mehta (1968, 1969) discusses the residential segregation in Delhi and Pune, with Mehta presenting a U-shaped pattern for the residential segregation index. The studies on people working in Faisalabad Stone Quarries in the outskirts of Delhi (Mendelsohn and Vicziany 1998) and the manual scavengers in Uttar Pradesh (Singh and Ziyauddin 2009) are two case studies indicating spatial segregation. Gupta et. al. (2009) says that historically disadvantaged castes live disproportionately in the slums. Sapovadia (2007) talks about the ghettoization in Ahmedabad of the Harijan population. Clarke and Landes (2010) identified that Brahmins clustered around the same postal address in Kolkata, while Vanneman, Noon, Sen, Desai and Sheriff (2006) indicate the clustering of residences based on caste and naming of streets based on the occupations attached to each caste. Vithayathil and Singh (2012) analyzed the spatial nature of exclusion by analyzing residential patterns in seven major cities in India and found that caste-based segregation is quite severe. Manoj (2012) studies residential segregation by caste in Chennai, studying in detail a few wards in the city. She identifies that there is a persistence of castebased segregation in the city for a long time and expects it to continue. She also notes that one comprehensive theoretical model that could answer the complex nature of residential segregation in Indian cities is non-existent.

Studies on residential segregation in India based on dimensions other than caste have also been gaining attention in India recently. Bhan and Jana (2015), Sidhwani (2015), Mariganti and Mukhopadhyay (2015), and (Balakrishnan and Anand 2015) looks at segregation on the basis of socioeconomic status, housing qualities across cities and in detail in some cities. Most of the literature will be discussed in detail in the other chapters that follow.

Measures of Residential Segregation

One of the earliest attempts to study the comparative urban residential segregation pattern was undertaken by Woofter (1928) in a study on the Afro-Americans in the United States. In the years that followed, there have been varying indices adopted for such measurement. Massey and Denton (1988) after an extensive survey of methodological literature and cluster analysis, identified 20 different indices, classified into five key distinct dimensions of residential segregation, namely, Evenness, Exposure, Concentration, Centralization, and Clustering. Finally, they adopted a single indicator representing each dimension which could be used as a standard measure for future studies on segregation

Evenness measures the differential (spatial) distribution of certain social groups (minority and majority population) among the areal units in a city (Massy and Denton 1988). It studies the extent to which the minority and majority population are evenly distributed within an urban area.

A minority group is said to be segregated if it is unevenly distributed over areal units (Blau 1977). Exposure measures the prospective contact or probability of interaction between the minority and majority group members within geographic areas of a city. Measures of Concentration determine the relative amount of physical space occupied, or residentially located, by a minority group in an urban environment or city. Measures of centralization focus on the degree to which a group is spatially located in the center of an urban area (CBD), while the measures of Clustering analyse whether the areal units inhabited by minority members cluster together in space as a racial enclave in a city under study.

Though there are many suggestions that using one or two indices alone does not encapsulate the patterns of residential segregation of an urban area, the limitations of the census data used in the current study restricts the computation of many measures (as cited in Sidhwani 2015). The study uses only two dimensions – evenness and exposure - to study the residential segregation in the cities, even though they had been criticized for being "aspatial" (although they are implicitly spatial as they depend on census tract boundaries) and are suffering from checkerboard problems and modifiable areal unit problems (Grannis 2002, Morrill 1991, Reardon and Firebaugh 2002b, Wong 1993, Wong 2002; as cited in Reardon and O' Sullivan 2004). Clustering, Concentration, and Centralization are explicitly spatial dimensions of segregation. Calculations based on these measures require information on the location and size of the concerned census tracts (wards, as in this case). In the recent years, researchers are engaged in developing spatial measures of segregation (Wong 2002, Reardon and O' Sullivan 2004). Reardon and O' Sullivan (2004) make an attempt at providing an alternative to Massey and Denton 1988, by providing a two primary conceptual dimensions being: (1) spatial exposure (or spatial isolation) and (2) spatial evenness (or spatial clustering).

3. Data and Methodology

Residential Segregation in South Indian cities is studied by taking into account the urban areas in the five states of South India – Kerala, Tamil Nadu, Karnataka, Andhra Pradesh and Telangana. The towns having a population size of more than one lakh – called "the class-one towns" (otherwise called cities[27]) are used for the study and are 102 in number (Census of India 2011). The scales of urbanisation in these cities vary with some being metropolitan and megacities as well, based on their larger population size. Each city under study is Municipal Corporation, Municipality, Cantonment Board, City Municipal Council or Township. In the case of many cities, the wards that are outgrowths in each city are also taken into account in the current study.

Secondary data from Census of India 2011 is used for the study, and the analysis is limited to quantitative treatment of data. Primary Census Abstracts (PCA) gives information regarding the number of scheduled castes in each ward in each of the city under study. Dissimilarity Index and

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[27] *Towns with population of 1,00,000 and above are called cities, according to Census of India 2011-12*

Interaction Index are calculated to study the levels of residential segregation among the 102 class1 towns and across five states[28].

In order to study the impact of segregation by caste on other variables, two indices – Housing

Quality Index (HQI) and Asset Availability Index (AAI) – are calculated (refer footnote 5 and 6). The two indices are calculated by finding the total scores from the sub-indices under each of them. The ranks of cities based on total index scores are combined with the ranks on DI values of caste in order to study the impact of residential segregation of the latter on the former.

4. Unevenness in residential locations of SCs – Dissimilarity Index by caste

For most of the cities under study, the dissimilarity index (Refer table A1, in the appendix) ranges from 0.2 to 0.5, indicating that in order to attain an even distribution among the minority and the majority population – SC and Non-SC, respectively – there should be a redistribution of residential location of the minority population from 20% to 50%. The higher the levels of DI, greater are the levels of segregation (or, unevenness) in the city. There are 14 cities6 (13.7%) where the Dissimilarity Index is more than 50%, demonstrating a higher level of segregation in these cities between the minority SC population and the majority non-SC population (Table 2.4). For instance, in the case of Rajapalayam in Tamil Nadu (which has the highest DI value among the 102 cities under study), 71% of the SC population in each ward will have to be redistributed in order to attain an even distribution between SC and non-SC population in the city. The least segregation was found in Secunderabad and Neyveli (TS).

Comparing evenness in the distribution of the SC residences in class-1 towns across the five south Indian states, we find that the state of Tamil Nadu has larger number of cities with ward of the city and U is the total population of the majority group in the city.

The interaction index for a city indicates the minority weighted average of the majority proportion of the total population in the ward under study; which basically implies the exposure of minority group members to the majority population. The larger the levels of interaction index, the greater are the exposure between the minority and majority population (SCs and non-SCs in this case), which implies a lesser level of residential segregation in the cities. The Interaction Index (the exposure index, here) in a city can be calculated using the formula:

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[28] *The Dissimilarity Index measures the unevenness of minority population in a city, by taking the weighted mean of absolute deviation of the minority proportion of every unit in the city of the total minority population in the city, and expressing this quantity as a proportion of its theoretical maximum value (James and Taeuber 1985). The index ranges between 0 and 1. When multiplied by 100, the index gives the percentage of the minority population –SC, in this case- that should be shifting their area of residential location from one unit (or, ward) to another, in order to make them attain an even spatial distribution with that of the majority population, to which they are compared ((Jakub 1977, 1981; as cited in Massey and Denton 1988, Duncan and Duncan 1955). DI for each city is calculated from the ward level data from Primary Census Abstract, Census of India, 2011. The index of dissimilarity, as proposed by Duncan and Duncan (1955) is calculated as: where, Si is the population of the minority group – the Scheduled Caste - in the ith ward of a city; S is the total population of the minority group in the city; Ui is the population of the majority population (non-SC group) in the ith*

$$\sum_{i=1}^{n}\left[\left(\frac{x_i}{X}\right)\left(\frac{y_i}{t_i}\right)\right]$$

where **xi** refers to the minority population (here, SCs) in ith ward, **X** is the total minority population in the city, **yi** is the majority population in ith ward, **ti** is the total population in ith ward [(yi/ti) implies the proportion of the majority population in ith ward and (xi/X) is the minority weight in the city that is considered. The cities of large DI values and greater segregation are: Rajapalayam, Tiruvannamalai, Kumbakonam, Vellore, Erode, Bhimavaram, Prodattur, Dharmavaram, Pudukkottai, Kancheepuram, Ambur, Kolar, Dindigul and Gulbarga.

greater levels of unevenness and residential segregation of the SC population as indicated by DI. 54.8% of the cities in Tamil Nadu (17 out of total 31 cities), has more than average levels of unevenness in the distribution of its SC population, followed by Karnataka (having about 46% of its cities, or 14 out of 30 cities, having high levels of segregation). Most states have cities with 3040% levels of DI with Andhra Pradesh, Tamil Nadu and Karnataka having more number of cities in this range. Also, more than 50% level of DI is found only in cities of these three states which denotes greater unevenness. Telangana and Kerala have larger number of cities of a 20-30% level of DI. Fig. 1 shows the way the levels of DI changes across the south Indian states.

Fig 1: Interstate patterns of unevenness as measured by DI
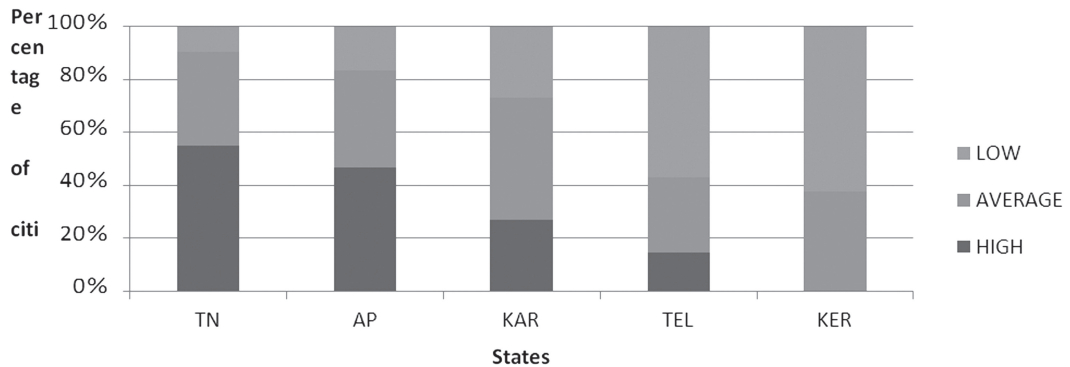
Source: Created based on Primary Census Data, Census of India 2011

Contrasting the categorization of cities on the basis of dissimilarity index against the categorization of cities based on population sizes (Table 1), it can be observed that most of the cities (12 out of 14) having high levels of unevenness and segregation in the distribution of SC residences in terms of DI are having a population size of only 1 to 2 Lakhs, in spite of having a significant share of SC population among the total population in the city (similar to that in other cities). As the population size of cities increase, the levels of DI in the city decreases, with most of the cities of higher population size having lower levels of unevenness, as indicated by lower levels of DI.

Table 1: Combining the levels of Dissimilarity Index levels and the population size of the cities under study

DI LEVELS	Number of cities under each Population Size					
	Less than 2 lakhs	*2 - 4 lakhs*	*4 - 6 lakhs*	*6- 8 lakhs*	*8 - 10 lakhs*	*Million plus*
More than 50%	12	1	1	0	0	0
More than 40%	15	6	2	1	0	1
More than 30%	14	13	4	1	3	4
More than 20%	6	6	4	3	1	2
Less than 20%	1*	1	0	0	0	0
Total number of cities under each population size levels	48	27	11	5	4	7

Source: Based on calculation and data from Primary Census Abstract, Census of India 2011, 1 - Neyveli TS*

5. Exposure between SCs and non-SCs: Interaction Index by Caste

The measures of interaction index in the South Indian class-1 cities show that the exposure or interaction of SC population to non-SC population (majority) varies from 32% to 95% (Table A1 in the appendix). The least interaction (less than 50%) is found in Robertsonpet in Karnataka (32.4%) and Narasaraopet in Andhra Pradesh (45.2%). The largest interaction of above 90% is found in 8 cities, with 5 of them belonging to Kerala; with the largest in Alappuzha (95.21%).

Table 2: Distribution of cities in each state under various classes of Interaction Index

INTERACTION INDEX	Tamil Nadu	Andhra Pradesh	Karnataka	Kerala	Telangana	Total number of cities
less than 50%	0	1	1	0	0	2
50-60%	3	0	0	0	0	3
60-70%)	5	4	3	0	0	12
70- 80%	13	14	12	0	2	41
80- 90%	9	11	9	3	4	36
more than 90%	1	0	1	5	1	8
Total number of cities in each state	31	30	26	8	7	102

Source: Calculated based on data from Primary Census Abstract, Census of India 2011

The patterns of interaction index in the states under study (Table 2) indicate that most of the cities in each state have an exposure of 70-90% between SCs and Non-SCs, which is commendable; with all the class-1 towns/ cities in Kerala being in a superior position of exposure between the two groups (more than 80%), followed by Telangana. Karnataka, Andhra Pradesh, and Tamil Nadu have more cities with a lesser than 70-80% levels of exposure index. 85 class-1 towns among the total 102 cities, which amount to 83% of the total cities under study, have an interaction index of more than 70%. The inter-state pattern in Fig 2 shows similar characteristics - Kerala having a higher interaction level between SCs and non-SCs (for all class-1 towns) and Tamil Nadu having the largest number of cities with lowest levels of interaction index.

Fig 2. Inter-state patterns of interaction between majority and minority population
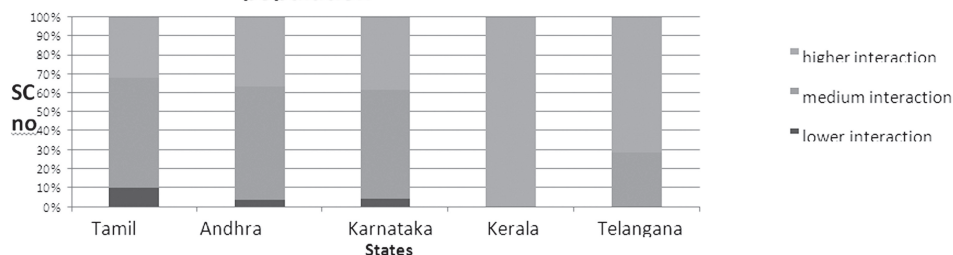
Source: Created based on Primary Census Data, Census of India 2011

With varying levels of population sizes, the levels of Interaction Index (E_i) among the cities also varies as shown in Table 3; which tries to understand the association between population sizes and the magnitude of the interaction index.

Table 3: The Rank levels of Interaction Index and Population size among the cities under study

Ei - ranks	Population						
	Less than 2 lakhs	2 - 4 lakhs	4 - 6 lakhs	6 - 8 lakhs	8 - 10 lakhs	Million plus	Number of cities under each rank levels
1 TO 20(least)	8	5	3	2	0	2	20
21 – 40(less)	7	7	1	1	2	2	20
41 – 60(average)	5	5	5	2	1	2	20
61 – 80(more than average)	13	6	0	0	0	1	20
81 – 102(high)	15	4	2	0	1	0	22
Number of cities in each population level	48	27	11	5	4	7	102

Source: Calculated from Primary Census Abstract, Census of India 2011

The table shows that most of the cities at lower levels of Interaction Index Ranks[29] are those having a population size fewer than two lakhs. Similarly, the cities of higher population sizes are those having better ranks in terms of Interaction Index. Thus, similar to the previous observation, most of the class-1 towns or cities of lesser population size have lower levels of exposure index (interaction index, in this case), which basically implies larger levels of residential segregation in such cities.

6. Combining the Patterns of Residential Segregation among the class-1 towns of South India

Bringing together the two dimensions - evenness and exposure indices - we can observe how the patterns of residential segregation of the scheduled castes from the non- scheduled castes are brought about in the various class-1 towns under study. The combinations of evenness dimensions, measured by the dissimilarity index and exposure dimension, measured by the interaction index, for the 102 cities under study are shown below

The table depicting the distribution of cities in terms of the two indices (Table 2.10) indicates that, there are a greater number of cities that have a combination of least interaction index and the highest dissimilarity index, which implies that there are a large number of cities having least levels of exposure and greater levels of unevenness. Thus, in the current study, there are 10 cities where there is higher residential segregation between SCs and non-SCs, namely: Ambur (Tamil Nadu), Erode (TN), Gulbarga (Karnataka), Kolar (Karnataka), Madavaram (TN), Prodattur (Andhra Pradesh), Pudukkottai (TN), Rajapalayam (TN), Tiruvannamalai (TN), Vellore (TN).

Similarly, if we look at the number of cities that are having least segregation of residential locations, we observe that there are 8 cities in the current study that have higher levels exposure and least levels of unevenness, and therefore having least residential segregation between SCs and non-SCs within them. These 8 cities are: Hosur (Tamil Nadu), Kollam (Kerala), Kozhikode (Kerala), Malappuram (Kerala), Mangalore (Karnataka), Thiruvananthapuram (Kerala), Thrissur (Kerala), and Vishakhapatnam (Andhra Pradesh).

Table 4: Distribution of Dissimilarity Index and Interaction Index among the cities

		Dissimilarity Index					Total number of cities under inter-action levels
		highest	*high*	*med*	*low*	*least*	
Inter-action Index	*High interaction*	0	1	4	7	8	20
	More than average levels	5	3	1	5	6	20
	Medium	1	3	8	4	4	20
	Less	4	4	5	4	3	20
	Least	10	9	2	0	1	22
	Total number of cities under evenness levels	20	20	20	20	22	102

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[29] *By lower levels of interaction index ranks, we mean the cities having interaction index ranks below 60th position – i.e., those cities which have lower interaction of their SC population with non-SC population*

Thus, it can be observed from the study that most of the cities with the highest level of unevenness between SCs and non-SCs are those with the least levels of exposure between the two groups; and most of the cities with greater level of evenness are those with the highest level of exposure between the SCs and non-SCs in the city. Thus, a greater level of residential segregation in a city does imply a greater level of unevenness along with least levels of exposure between SCs and non-SCs in the city (and vice versa).

Looking at the population size of the cities under study along with their DI and Ei results, there seems to be a strict connect between population size and these measures. Since 48 of the 102 class-1 towns under study are below 2 lakhs population, the number of cities with larger DI levels (larger DI ranks) and lower Ei levels (ranks) are mostly belonging to the least populated cities with less than 2 lakhs population. Out of 10 cities that were found to be having greater unevenness and lesser exposure, and therefore larger residential segregation between the SCs and non-SCs, 9 were cities with less than 2 lakhs population. On the other hand, out of those 8 cities that did not have much residential segregation between SCs and non-SCs (due to greater evenness and more exposure between the two groups), 6 cities had a population of more than 2 lakhs, with one even being a metropolitan city. Thus, we observe that there is a greater level of residential segregation in those cities where the population size is low, and cities with higher population sizes have fewer levels of segregation by caste.

7. Impact of residential segregation by caste

The two indices created for studying the implication of segregation by caste on a few outcomes are:

A. Housing Quality Index (HQI)8, for which the following variables are used:

B. Measurement of the Housing Quality Index:

To study the impact of segregation on housing quality, the 102 cities under study are ranked based on the total score obtained from the index calculation for housing quality. The indices for each of the subcategory under housing quality are as given below:

   a)   *Condition of Households The data on the condition of houses enlisted in the Census survey are classified into good, liveable and dilapidated based on the living condition. The index used is as follows:*

The index score = (3*good + 2* liveable + 1*dilapidated)/6

Even though, the condition of households is given in three categories - Total, Residence, Residence cum other use, we use the data under the category 'Total', which is the sum of the condition of households used just for residence and for residence and other use.

   b)   *Material used for construction – for floor, wall and roof*

The materials used for construction includes the materials used in the construction of floor, wall and roof. Grass/thatched/ bamboo/wood/ mud roof, plastic/polythene roof and roof made

of other materials are classified under the 'unsafe' category and roof made of handmade tiles, machine made tiles, burnt brick, stone/slate are grouped under 'safer' category and roofs made of G.I./ metal/ asbestos sheet and concrete are grouped together under the category –safest'.

The index score for material of roof = (1*unsafe + 2*safer + 3*safest)/6

1. Quality of Households
2. Material of Roof, Wall, and Floor
3. Basic Amenities –

a) Main Source of Drinking water, b) Main source of lighting, c) Latrine facility, d) Bathroom facility, e) Type of fuel used for cooking f) Kitchen facility g) Banking services, and 4. Household by type of structure of census houses B. Asset availability Index (AAI)9, for which three variables are used:

In the case of the material of wall, Grass/Thatch/Bamboo etc., Plastic/Polythene, Mud/ Unburnt brick, Wood, Stone not packed with mortar, and any other material are considered bad. The materials for the wall are considered good if they are Stone packed with mortar, G.I./Metal/ Asbestos sheets, Burnt brick, and Concrete. The index score for material of wall = (2*good + 1* bad)/3

Similarly, if mud, wood/bamboo, burnt brick or any other materials are used for the construction of floor, they are considered to be bad; while Stone, Cement or Mosaic/Floor tiles are regarded as good materials for the construction of floor. The index score for the material of floor = (2*good + 1*bad)/3

Basic facilities The basic facilities comprises of different subcategories like drinking water, lighting, latrine facility, bathroom facility, cooking fuel and kitchen facility. In the case of drinking water facility, tap water from treated source, water from covered well, hand pump and tube well or bore well is regarded as good; and tap water from untreated source, uncovered well, spring, river or canal, tank or pond and other sources are regarded as bad.

The index for drinking water facility = (2*good + 1* bad)/3

For lighting, electricity and solar energy are considered as good sources of lighting and lighting from kerosene oil, other oils, other sources and no lighting are classified as bad and similar indexing as above is adopted. Regarding the latrine facility, flush or pour flush latrine with piped sewer system, septic tank, other system and pit latrine with slab are classified under good and pit latrine removed by animal, night soil disposed into open drain, collected either by human or animal is regarded as bad latrine facility. In the case of bathroom facility, households with bathrooms, even if they are just an enclosure without a roof, are classified as good and households without bathrooms are grouped as bad. In the case of fuel used for cooking, LPG/PNG, electricity and biogas are regarded as good. Other kinds of fuels – firewood, crop residue, cow dung, coal, lignite or charcoal, kerosene and other fuels are regarded as bad. For kitchen facility in households, households having kitchen facility is one group regarded as good and households without kitchen 50 facility, cooking outside the house and households where no cooking is carried out is classified as those with bad kitchen facility. Indices used for studying the state of basic amenities (for all

sub-categories) are similar to the one stated above. The index for drinking water facility/lighting/ bathroom facility/latrine facility/fuel used for cooking/ kitchen facility = (2*good + 1* bad)/3

Households by Type of Structure of Census Houses The households by type of structure in which they are built are classified into permanent, semi-permanent, total temporary, serviceable, non-serviceable and unclassifiable (However, in the study the serviceable and non-serviceable are not included). Permanent is considered good, semi-permanent and total temporary sums up as the average and unclassifiable are regarded as bad in the classification. The indexed created as below. The index score for households by type of structure of census houses = (good*3 + average*2 + bad*1)/6

3.5.2 Measurement of Asset Availability Index

The following sub-indices are created and summed up in order to determine the total asset availability index to calculate the availability of assets across the 102 cities and observe the impacts of residential segregation by caste, if any, are in these cities

a)Availability of assets Based on the availability of assets, the households are classified into households with better assets, good assets and poor assets. The assets specified are radio or transistor, television, computer or laptop – with/without internet, telephone services – land phone and mobile phone services, bicycle, scooter,

1. Ownership status
2. Banking facility
3. Assets

To observe the impacts of segregation by caste on the quality of housing and asset availability in the cities under study, we combine the ranks under the two indices – dissimilarity index based on caste and the housing quality index/asset availability index (Tables 5 and 6). For the dissimilarity index, the ranks from 1 to 20 indicates greater unevenness and therefore greater segregation in terms of caste, while the ranks from 1 to 20 of the housing quality index and asset availability index indicates better quality of housing and assets.

Table 5: Distribution of dissimilarity index by caste and Housing quality index across class-1 towns, based on their ranks

	DISSIMILARITY INDEX BY CASTE					
HH	1 -- 20	21 - 40	41-60	61-80	81-102	
1 -- 20	5	1	4	7	3	20
21 - 40	2	3	4	6	5	20
41-60	4	6	4	2	4	20
61-80	6	2	4	3	5	20
81-102	3	8	4	2	5	22
	20	20	20	20	22	102

motorcycle or moped, car, jeep or van. Households with none of the assets specified are classified into the poor category; households with at least a radio/transistor and 51 bicycle are classified under the good category and if the households have the remaining assets – sometimes all of them – are classified as households with better assets.

Index for availability of assets = [(good*2) + (bad*1) + {100– (good + bad)}*3] ÷ 6

b)   *Ownership status of the houses The ownership status of the household can be divided into three – owned, rented or other and the index can be calculated as:*

Index for ownership of household = (owned * 3 +rented * 2 +other *1)/6.

c)   *Banking facility Percentage of banking facility available in households in a city (also that in each ward of the city) is provided by the Household and House listing data, Census of India, 2011. The percentage is divided by 100 to obtain a unitary range between 0 and 1. Based on all these characteristics and the indices generated by combining them, the cities are ranked from 1 to 102, with 1 being the best household with greater quality or greater asset availability. The total rank is calculated by taking the sum of total scores of each of the individual characteristic. The total scores and ranks of both of these variables are in the Appendix (Table A4)*

Table 5 shows the distribution of cities based on the dissimilarity index by caste and the quality of housing in the 102 class-1 towns. It can be seen that most cities in the 1-20 ranks of dissimilarity index by caste have housing quality in the rank groups of 61-80 and 81-102. This implies that the greater the residential segregation by caste, the lower is the quality of housing facility in the city. Similarly, most of the cities having low DI_CASTE (of 61-80 or 81-102 ranks), have their quality of housing in the 1-20 0r 21-40 rank groups, implying that cities with less segregation or unevenness on the basis of caste, have their households with better quality of housing.

Table 6: Distribution of dissimilarity index by caste & asset availability index across class-1 towns, based on their ranks

	DISSIMILARITY INDEX					
ASSETS	1 -- 20	21 - 40	41-60	61-80	81-102	
1 -- 20	1	1	4	6	8	20
21 - 40	3	1	6	5	5	20
41-60	3	7	3	5	2	20
61-80	7	3	5	1	4	20
81-102	6	8	2	3	3	22
	20	20	20	20	22	102

Similarly, Table 6 which shows a distribution of dissimilarity index by caste and asset availability index in the class-1 towns of south India. Similar patterns as in the above case are observed here, with most cities belonging to dissimilarity index rank groups (1-20) or (21-40) having asset availability ranks of 61- 80 or 81-102; and most cities belonging to DI ranks of 61-80 or 81-102. Thus, cities of higher residential segregation have most of their households with lower availability of assets, similar to that in the case of housing quality; while cities of lower segregation based on DI_CASTE ranks have households with greater availability of assets.

It was observed that those cities having greater levels of residential segregation by caste (being in rank groups of 1-20 or 21-40 for DI_CASTE) were found to have a lower quality of housing and lesser availability of assets (being in ranks of 61-80 or 81-102 for the two indices). Similarly, cities of lower residential segregation by caste seem to have more evenness as regard to be having a better quality of housing and availability of assets. Thus, even if residential segregation by caste and residential segregation by class do not go hand 59 in hand, residential segregation by caste does result in the outcomes of those cities with more segregation to be of poor quality. This implies that there can be an impact of residential segregation by caste on socio-economic outcomes or class, in general; however, such a hypothesis needs further validation

8. Conclusion

The paper tries to understand residential segregation in 102 class-1 towns of south India on the basis of caste. It is observed that unevenness in the location of residences and isolation of the SC households from the non-SC households result in the residential segregation in the cities. With increasing scale of urbanisation (measured by the population size of the city), the levels of segregation decreases. Greater segregation is found in those cities of lesser levels of urbanisation. Studying the impact of segregation in terms of caste, it is also observed that the segregated spaces have poor housing quality and asset availability. Thus, spatial inequality in terms of caste remains quite high in urban spaces.

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THE SPIRAL: A STUDY ON THE MISMANAGED MODERN METROPOLIS

Anuja Ray & Steffi Haldar*

Introduction

Urbanisation primarily means the increase in the proportion of people living in towns and cities. The first question that crosses our mind is what causes urbanisation? Urbanisation occurs when people living in rural areas migrate to urban areas, a common case in most developing countries. Economic Development of a country majorly depends on the rate of urbanisation. As far as many writers are to be believed, the acid test of urbanisation is dependent on the shift of rural population to the urban areas.

The first half of the 20th century saw a period of economic stagnation, thus causing a limited level of urbanisation. The urban population accounted for about 11% of the urban population in 1901 which crept lazily to 14% by 1941. Thus indicating that urbanisation faced a standstill. However with a more liberal definition of urbanisation, the level of urbanisation increased to 17.6%.

- For any area to be a termed as an urban area, it has to satisfy three pre requisites
- All placed with a municipality, corporation, cantonment board or a notified town area committee.
- A minimum population of 5000. The population density should be of 400 per square kilometre. At least 75% of the male workforce engaged in non-agricultural pursuits.

The quality of population can be judged from the life expectancy, the level of literacy and the level of technical training attained by the people of the country.

Urbanisation however has various benefits which help in bringing about a pattern of growth and economic development.

Increased food production: The pattern of food consumption and demand may change due to the shift of people from the rural to urban area. When people move to the urban areas in

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search for a job, the food production automatically increases to feed the new mouths. However, this may affect the environment which can then have a domino effect on food production.

Access to Resources: Many new organisations have been established that will tap the resources and lead to the efficient utilization of the available natural as well as manmade resources. The organisations work as mediator group to help transform the resources into finished products.

Efficiency and convenience

Contrary to common belief, urbanisation does lead to efficiency and convenience. If 50 families were to live in 50 separate plots of land, then it would be difficult to reach out to all, as opposed to them staying in one housing complex. In such cases water and other civic amnesties are looked after directly. Moreover one has access to everything in a city like health, social services, educational facilities, connectivity, etc.

Investigative Study

Urbanisation has brought major changes to the Indian population. As said by S.M. Pandey, "the rate of urbanization in Asia has been much higher than the pace of industrialization in the countries of this region."[30] India's rate of change in urbanisation in the past 5 years is an estimated 2.38% [31].

Although there are benefits attached to urbanisation, the real question that arises is that, is it truly a game changer?

There are however, several aspects to it, which hampers the growth and development of a country. Taking into consideration, poverty health and sanitation, it has been found out that urbanisation has a negative domino effect on the level of poverty, thus affecting health and sanitation.

Another aspect that must be considered in this respect is Urban Agglomeration. It is the Census of India which provides statistical information about the different characteristics of the people. Urban agglomeration takes into account the spread of urban areas in adjoining towns. Two or more towns join together to form bigger outgrowths. There are various possible situations in which urban agglomeration would be possible i.e. when two cities or towns have a contiguous outgrowth or when two or more towns with their rapid outgrowth form a continuous spread. The basic condition of a continuous spread is known as urban agglomeration.

Components of Urban Growth in India

The urban area faces an outburst of population due to three reasons: the natural growth of the population, the rural to urban migration and the reclassification of rural areas as urban areas over a course of time. However, this may at times lead to over urbanisation causing

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[30] *Pandey, S. (1977). Nature and Determinants of Urbanization in a Developing Economy: The Case of India. Economic Development and Cultural Change, 25(2), 265-278.*
[31] *https://www.cia.gov/Library/publications/the-world-factbook/geos/in.html*

misallocation of labour between rural and urban areas and it also increase the expenditure that the country needs to bear socially because of the population growth.

Advanced states like Maharashtra and Gujarat along with backward states like Orissa and Madhya Pradesh show high levels of Urban Migration. Taking into consideration four major cities of India or the four metropolitan cities, urbanisation has led to several consequences which has a domino effect on poverty leading to poor quality of health and sanitation.

Whilst the overall Indian population is undergoing the process of urbanisation, New Delhi, Kolkata, Mumbai and Chennai have been experiencing a rapid changes and growth in the urban population since 2001 onwards. However, it is important to note that a "high rate of growth in urban population…does not necessarily mean a higher rate of urbanization".[32] Advanced states like Maharashtra and Gujarat along with backward states like Orissa and Madhya Pradesh show high levels of Urban Migration. Taking into consideration four major cities of India or the four metropolitan cities, urbanisation leads has several consequences which has a domino effect on poverty leading to poor quality of health and sanitation.

The Urban Poverty Report 2009 brings into light the problems that are faced by the poor due to urban poverty. Despite 62% of the GDP of the country is spent on towns and cities, there are still several problems that are faced due to urban slums and urban poverty. Urban poverty has become a pressing issue and is over 25%. "81 million"[4] in the urban areas live below the poverty line. Although the gap is closing, the rural poverty is higher than the urban poverty. In small and medium sized towns economic reforms have not been implemented efficiently and have failed to create adequate jobs thus resulting in further migration towards the urban areas. As more and more people start moving to the cities, the boundaries of the cities keep getting increased and so land around the cities constantly get urbanised. India has a very high slum population. Mumbai having the highest with "11.2 million"[33] living in the Dharavi Slums which is also known as the biggest slum of Asia. The residents of these slums do not get access to clean drinking water, proper health and sanitation. They also face constant threats of eviction and no social security cover. 54% of the urban slums do not have proper toilets.

These developments have been evident in the four metropolitan cities:

New Delhi:

Being the capital city of India, Delhi has experienced a "massive transfer"[34] of the urban population. The urban population in Delhi during Nehru's legacy stood at 1.4 million[35] and has increased to approximately 11 million. Correlatively, the population density of New Delhi has also

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[32] *Pandey, S. (1977). Nature and Determinants of Urbanization in a Developing Economy: The Case of India. Economic Development and Cultural Change, 25(2), 265-278.*

[4] *http://www.citiesalliance.org/node/408*

[33] *http://www.citiesalliance.org/node/408*

[34] *http://shodhganga.inflibnet.ac.in/bitstream/10603/74277/13/13_chapter%203.pdf*

[35] *http://shodhganga.inflibnet.ac.in/bitstream/10603/74277/13/13_chapter%203.pdf*

changed drastically. In 2001, the population density was an average of 9340 people per sq. km[36], whereas according to Census 2011 the population density in Delhi was 11,297 people per sq. km[37], suggesting a rate of change in urbanisation of 20.95%. Whilst the urban population continues to grow, so does the population of people living in slums. As per the Census 2011, the slum population in Delhi is currently at 1,785,390[38] and is growing every day. About 50% of the capital city's population lives in slum – dwellers and suffers through drastic living conditions. The increase in the rate of urbanization is seemed to be causing several problems for the immigrants, as the over-urbanized population is forced to settle in slums. One of the saddening consequences of urbanisation in Delhi is the high infant mortality rate of "30 per live 1,000 births"[39][40] and a maternal mortality of 24 per 1,000 women.

Mumbai:

The financial capital of India consists of a population of approximately 17,700,012, and has witnessed a rapid growth in population of 63%[41]. Thousands of immigrants migrate to Mumbai in search of better employment opportunities and higher facilities of living. As a result of this, Mumbai's population density now stands at "20,680 people"[42] per sq. km. Yet, urbanisation in Mumbai has only increased the slum population. Dharavi is one the largest slums in the world, that is located in Mumbai with a "population density of 10 times the rest of the city"[43]. The population of the slum alone is around 750,000 or more. The standards of living in the slums and outskirts lack sanitation, hygiene and there are many infrastructural bottlenecks. In addition, the growth in population led to excessive overcrowding. Poor health and sanitation conditions have resulted in an IMR of 26 per 1,000 live births.

Kolkata:

Surrounded by neighbouring countries such as Nepal, Bhutan and Bangladesh, Kolkata's population density lies at "24,603 people"[44] per sq. km. According to the 2011 Census, Kolkata's population is an estimated 4 million. While the population continues growing, many immigrants are forced to adapt to horrible living conditions, as there residents do not have basic amenities. Furthermore, only "52 percent of the households are connected to sewerage services"[45] and the

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[36] *http://ccs.in/sites/default/files/files/Ch02_City%20Demographic%20Profile.pdf*

[37] *https://knoema.com/atlas/India/NCT-of-Delhi/Population-Density*

[38] *http://www.delhi.gov.in/wps/wcm/connect/f508bc8046667b0e9cf6bcf5a4ed47e7/Stattistical+Abstract+of+Delhi+2014.pdf?MOD=AJPERES&lmod=-1346796026&CACHEID=f508bc8046667b0e9cf6bcf5a4ed47e7*

[39] *http://www.thehindu.com/news/national/delhi-records-highest-infant-mortality-rate-among-metros-chennailowest/article5726780.ece*

[40] *Census*

[41] *http://shodhganga.inflibnet.ac.in/bitstream/10603/74277/13/13_chapter%203.pdf*

[42] *http://www.dnaindia.com/delhi/report-mumbai-new-delhi-more-densely-populated-than-new-york-tokyosurvey-2035133*

[43] *https://www.theguardian.com/cities/2014/apr/01/urbanist-guide-to-dharavi-mumbai*

[44] *http://www.census2011.co.in/census/district/16-kolkata.html*

[45] *https://www.researchgate.net/publication/290474920_DRINKING_WATER_SANITATION_AND_HEALTH_IN_KOLKATA_METROPOLITAN_CITY_CONTRIBUTION_TOWARDS_URBAN_SUSTAINABILITY*

infant mortality rate continues to worsen as about "1.87 lakh children below the age of one"[46] have died in 2013 alone.

Chennai:

The capital of Tamil Nadu is the "fourth largest metropolis"[47] of India. "It extends over 1189 sq. km. and has a population of 7.04 million as per 2011 census"[48]. The population density is "26,553 persons per square kilometres"[49]. It has an average decadal population growth of 35%. In Addition to this, the work participation rate in urban Chennai is "40.2% higher"[50] than all of India. Ironically at the same time, the slum population in Chennai has also increased by 50% in the past decade. The conditions of the slums are poor, and there are high risks of health towards families living in the hazardous lifestyle. There is also a higher vulnerability to common epidemics of cholera, malaria and dengue in such areas, threatening the young population. However, according to data published on The Hindu, Chennai has the lowest infant mortality rate of "15 per 1,000 live births"[51]. Either good or bad, urbanisation has managed to transform the standard of living of immigrants in the metropolitan cities. According to several recorded data, urban population has been increasing over the past decade, and with this so has been the slum population. While there are several benefits to urbanization, as it helps in the economic development of the city, however without the correct resources and amenities it can only cause harm. Due to urbanisation, the quality of public transport in the capital cities has been improved and is ensured to be more efficient. The public transport is affordable for the common public. Yet, with this change comes a major problem. The increase in the use of transport has caused overcrowding and also become a threat to the environment due to tonnes of pollutants emitted daily. Furthermore, employment has increased in the industrial sector, which has also caused an increase in research and development however again is a threat to sustainability. While, many people from rural areas migrate to the respective cities for better opportunities and also because of personal and social factors, many fail to meet the higher cost of living and are forced to reside in slums or low-service apartments. As a result, this leads to psychological stress and has the possibility of increasing crime rates.

Government Policies

Government expenditure on health and sanitation is the lowest in India, yet ironically India's health issues have been increasing constantly over the past decade. Slums in India face major health and sanitation issues such as malnutrition, inadequate safe drinking water, endemics such

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[46] http://timesofindia.indiatimes.com/city/kolkata/Bengal-among-two-worst-states-in-infantmortality/article-show/49614367.cms

[47] http://shodhganga.inflibnet.ac.in/bitstream/10603/74277/13/13_chapter%203.pdf

[48] http://shodhganga.inflibnet.ac.in/bitstream/10603/74277/13/13_chapter%203.pdf

[49] http://www.thehindu.com/todays-paper/tp-national/tp-tamilnadu/chennai-is-the-most-densely-populated-city-in-tamil-nadu-according-to-census-2011/article4774624.ece

[50] http://www.tn.gov.in/dear/Urban%20development.pdf

[51] http://www.thehindu.com/news/national/delhi-records-highest-infant-mortality-rate-among-metros-chennailowest/article5726780.ece

as cholera, small pox, malaria and dengue. Furthermore, "India has an estimated 1.5 million to 2 million cases of cancer"[52].The Planning Commission of India comes up with central policies for all states, and hence the government does not form policies that are state-specific. Over, the past few years after the urbanisation rate has increased, the Indian government has taken some steps to combat the challenges.

The government launched the National Urban Health Mission (NUHM) with the aim of meeting the "needs of the urban poor and also of the slum dwellers"[53]. Furthermore, a State Level Urban Health Programme was established to focus on slums at a more narrow level. The NUHM intends to provide specific attention to states rather than the country as a whole. It would recognize the needs for state-wise to meet the "vulnerable sections"[54]. Also, the NUHM aims at recognizing efficient resources that will be required to address serious health issues such as dengue and jaundice. In addition, it also aimed to provide form partnership NGOs and "charitable hospitals"[55] to increase the amount of health services in the urban poor areas. The Government of India allocated "`1,128 crore"[56] in the financial year 2015-2016 for 20 major states, which is a 1% decrease than the previous financial year. Not only have this, but allocations of other health schemes also been reduced by the government. In addition, there has been a drop of 1% health-care staff each year in PHCs and CHCs. According to critics, the Government of India allocated very low funds for this scheme and additionally, only "48 percent"[57] of the proposed funds got accepted. Regardless of the scheme having sustainable and positive goals towards battling health issues in slums and urban poor areas, it received little help from the government's side to achieve success.

a. Under the Ministry of Urban Development, the Jawaharlal Nehru Urban Renewal Mission was established in 2013. This programme was implemented to improve the quality of life and provide for the infrastructure for the growing urbanisation. It encourages the cities to take step by step action to increase level of civic facilities. This aims at providing efficient, responsive and equitable cities that can reach out to the needs of the growing population.

b. Focussed attention to integrated development of infrastructure services in cities covered under the Mission;

c. Establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability;

d. Ensuring adequate funds to meet the deficiencies in urban infrastructural services;. (d) Planned development of identified cities including peri-urban areas, outgrowths and urban corridors leading to dispersed urbanisation;

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[52] http://countrystudies.us/india/35.htm
[53] http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v2/11v2_ch3.pdf
[54] http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v2/11v2_ch3.pdf
[55] http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v2/11v2_ch3.pdf
[56] http://accountabilityindia.in/sites/default/files/nhm_2015.pdf
[57] http://accountabilityindia.in/sites/default/files/nhm_2015.pdf

e.   Scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to the urban poor;

f.   Special focus on urban renewal programme for the old city areas to reduce congestion;

g.   Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security."[58]

Provided that cities have an elected governing body, 63 cities are entitles to this programme. They include decentralised urban planning, water supply and sanitation. Along with this it is ensured that the funds are channelized through state level agencies. The mission ensures transparency and accountability.

Conclusion

Through the investigation, it is evident that India is revolving in the spiral of urbanisation. Every year, India's urbanisation rate continues to grow as people migrate in hope to find better employment opportunities and living facilities. However, the sad reality is that the Government of India has been unable to maintain the population growth and has also failed in dividing or enhancing the opportunities equally. Due to this, there is a huge disparity between the rich and the poor. Furthermore, focusing on health and sanitation conditions in the urban areas of 4 metropolitan cities, the Government of India allocates the least amount of funds in comparison to other sectors such as housing and transport. To improve these conditions, an essential need for better Government initiative is required, or else it is not long till the spiral moves faster than we can reach out.

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[58] *http://jnnurm.nic.in/wp-content/uploads/2011/01/PMSpeechOverviewE.pdf*

INCOME-RELATED HEALTH INEQUALITIES AMONG CHILDREN IN INDIA

Nivedita R*

INTRODUCTION

Human resource development is an important ingredient of economic development. The extent to which the economy develops depends mainly upon the level of productivity of its human resource. Higher the productivity of human resource, greater is the development. Thus, when development is the key objective in today's world, it is extremely important to focus on developing human resource of a country. Human resource essentially consists of two major components-health and education. For the human resource of a country to be productive, it is extremely essential to focus on these two components. Only an educated human resource can contribute to the per capita income of a country. The productivity level of an individual is determined based on the education and skills that he acquires. Similarly, health of an individual is also an important factor in determining the productivity of human resource. Only when an individual is healthy can he put into use the skills that he has acquired through education. Thus, the role of health is very important in improving the productivity levels of the human resource of a country.

The World Health Organisation (WHO) defines health as a state of complete physical, social and psychological wellbeing and not merely absence of disease or infirmity. Health has been an integral concern among policy makers as it is one of the key areas of human resource development. The focus on health is very vital, more so, in the case of developing economies like India. This is mainly because health has direct effects on the economic development and growth of a country, as healthy populations live longer, are more productive, and save more. Human resource of a country cannot be regarded productive if it lacks healthy population. Healthy population in a country contributes to the upward spiral movement of the economy and thereby causing economic growth and development. Similarly, a backward link between economic development and better health in the nation can also be traced. As economic development takes place, the more is the ability of the nation to provide better quality of health care services and hence lead to the better

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status of health among the population of the country. For example: investments in roads can improve access to health services; inflation targets can constrain health spending; and civil service reform can create opportunities - or limits - to hiring more health workers. Thus, it is observed that there is a two way relationship between health status of a population and the economic development of a country. These reasons have increased the interests of researchers and policy makers to research on the health aspect of human resources, particularly in the case of developing countries.

India is one of the fastest developing economies in the world. Human capital plays a pivotal role in determining a steady-state development in the economy. Thus, health and education must be the two key areas of focus. Health in India has been the responsibility of the state government rather than the central government. Achieving adequate levels of nutrition, raising the standard of living of the people and improvement of public health has been the primary objectives of the economy. Though the government finds improvement of public health as a primary duty, it is the private sector that has been responsible for most of the healthcare in India. With government expenditure on health as a percentage of Gross Domestic Product falling over the years and the rise of private health care sector, the poor are left with fewer options than before to access health care services. Most of the expenses on medical issues has been undertaken by out-of-pocket expenses rather than through insurance. There a number of other problems faced by the healthcare system in India. The first and foremost problem is that the supply of health services does not meet the demand for health services in India. The population of the country is so huge that the health care demands of the people need to be met with greater supply of healthcare services. But, since India is a developing country, it does not have adequate resources to supply health services which will equal the demand for health services. Therefore most of the people, especially below poverty do not get quality treatment at affordable prices. This is the major problem that is facing the health sector today. Secondly, as mentioned before, most of the health care in India has been privatized. Their motive is not to service for the poor but to make profits. Here again, it means that the people who have adequate capacity to buy the health care are benefitted and the rest fall a prey to the illness or they adjust with the not-so-good quality health care. This will bring down the productivity levels of those people who cannot afford good quality of health care and this will worsen their living standards. Thirdly, India does not have ample funds allocated for research and development in the field of medicine. We are still dependent on foreign countries for advanced medical technologies. We don't get access to those technologies as immediately as in the case of foreign countries. The cost of importing such equipment and medicines are too high for a common man to afford. Lastly, and most importantly, the efficiency of the healthcare system in India is a million dollar question, especially in the public sector. People feel that the healthcare services provided by the government are of substandard quality and therefore refrain from availing such facilities. The private healthcare seems to be relatively better in the quality of healthcare that they provide but are too commercial for the people to afford. All these issues culminate into the problem of equitable distribution of healthcare services in the country. With the private sector commercializing healthcare, the public sector not being able to meet up with the quality standards

and increasing costs along with the increasing demand for healthcare services, how far has equitable distribution in healthcare been achieved?

Several researchers have researched on the distributional aspects of healthcare. Most of the researchers have concentrated on the finding out the crucial determinants of health outcomes. It is observed that the burden of ill health is disproportionately amongst the different socio-economic strata of the society. People with lower income levels seem to bear most of the burden of increasing healthcare costs and also experience poor health outcomes (Macinko et al. 2003). Empirical studies have also validated this fact and have shown that there is a relationship between income and health inequality. (Kakwani et al 1997, Van Doorsaler et al, 1997, Humphiers and Doorsaler, 2000). Research has also been undertaken on how the impact of health inequalities has been amongst different subgroups. Impact of health inequality on children has been studied by William Joe et al. (2008) using NFHS 3 data. The research finds that the poor are beleaguered with ill health whether in quest of ill health or due to anxiety pertaining to child nutrition. There has also been a lot of literature pertaining to the measurement of health inequality. Leclyuse (2006) examined the degree of income related health inequality in self-assessed health in Belgium. The paper also tries to measure how the long-run inequality differs from short-run inequality. The effect of increased income plays a significant role in determining self-assessed health. Thus, the main solution to the problem of health inequalities is to reduce the income inequality in the country or by reducing the effect of income on health. (Gravelle and Sutton, 2002). Similarly, there has been a significant research undertaken on the effects of employment on health inequality. Employment also has a significant effect on health inequalities. Lower long term employment communities have poorer health outcomes. (Jalil Safei, 2008).

Most of the literature pertaining to health inequalities have focused on the income-related health inequalities and on developing ways to measure inequality. Particularly, with reference to India, William Joe et al, have tried to model the impact of health inequality on children using NFHS 3 data. The research has used state wise data to compare the effect of health inequality on children. With the release of the NFHS 4 data, it is has been important to find out how the situation has changed over the years. The NFHS data was released in 2016, which means that the analysis that will be presented will be relevant to the current scenario and will also be able to judge how the effect of health inequality on children has changed over the years- i.e., if there has been any improvement in the health outcomes, especially with children's health.

The relationship between health inequality and income inequality has been widely studied by various researchers. Income plays a very important role in determining the health outcomes of an individual. Most of the researchers have, therefore, emphasized on this aspect. In this paper too, the definition of health inequality is the income-related health inequality that is discussed and not any other form of health inequality. The main reason for this is its easiness in measurement and the availability of data. Most of the data for other forms of inequality is very qualitative to be measured or it is not available. Moreover, as the literature points out, the income of an individual plays a crucial role in determining the health outcomes. Thus, in this research too, importance of

income related health inequalities has been stressed and therefore health inequality here means the inequality in health that is related to income and not any other factor. Children, being the most important part of human resource, the impact of health inequality on children has been assessed. The objective of the paper is twofold. Firstly, it seeks to find out the impact of income related health inequality on children's health outcomes through NFHS 4 data. Secondly it seeks to test the cause and effect relationship between income and health inequality in India. The structure of the paper is as follows.

Section 2 discusses the measurement techniques employed to measure the magnitude of disparities in child health status and discusses about the various data sources and variables that were implemented in the analysis. Section 3 describes the model Section 4 gives the results and section 5 concludes.

I   METHODOLOGY AND DATA

Inequality is generally measured in terms of Lorenz curve and Gini coefficient. These two methods are the standard methods of measuring inequality. This method is based on a simple definition of equity. Equity is the situation where the cumulative proportion of ill health must be equal to the cumulative population shares. When this is not achieved, then there is a situation of inequality. This method is used to quantify the extent of income related health inequality on the health variables taken into consideration. The concentration curve or the Lorenz curve plots the cumulative percent of the population on the X axis and the Y axis measures the cumulative proportion of ill health. If the burden of health was equally distributed amongst the population, then the concentration curve (CC) will be equal to the line of equity or the diagonal. If it lies above the line of equity, then it would mean that the burden of health is among the poor sections of the society. The farther the CC lies from the line of equity, the more the inequality.

Another method of measuring inequality is Concentration index (CI) is defined as twice the area between the CC and the diagonal. Mathematically, it can be represented as CI = 2 cov (Hi, Ri)/ μ, where Hi is the health variable whose inequality is being measured, and μ is the mean Ri is the ith individual's fractional rank in socio-economic situation. The value of CI ranges between +1 and -1.

The collection of data is as important as the measurement technique used. All the literature on health inequality with reference to India is based on the data on NFHS 3 which was released in 2005. The National Family Health Survey, has been published again in 2015. Thus, the main aim of this paper is to find out if there has been any improvement in the inequality levels. This data is very new and not touched upon with reference to health inequalities. This paper bridges this gap by attempting to find out the effect of income related health inequalities on children's health as they are the most potential human resource of the country using the NFHS 4 data. The analysis is an inter-state analysis child health outcome variables are taken across different states of the nation.

The child health outcomes are measured using four variables, stunting, which is the number of children whose height is below minus two standard deviation (-2 SD) from the median of the reference population; underweight, which is measured by the number of children whose weight is below minus two standard deviation (-2 SD) from the median reference population; prevalence of anemia (children are classified to be anemic if their hemoglobin level is less than 11.0 g/dl.; Not fully immunized (children who haven't received BCG, measles vaccination and 3 polio vaccinations). Among these four variables, the first two, that is, Stunting and underweight together capture the level of inequality in nutrition since these two variables are highly associated with the nutrition of children. The variables taken into consideration have been based on the literature obtained on child health outcomes. The analysis has been done for 12 states in India, namely, Assam, Karnataka, Andhra Pradesh, Maharashtra, Manipur, Meghalaya, Uttarakhand, Bihar, Haryana, Madhya Pradesh, Tamil Nadu and West Bengal. All information pertaining to this has been derived from the NFHS 4 data.

The data obtained under these headings have been used to test the objectives of the study, by means of plotting Lorenz curve and concentration indices. In addition to these variables, since the research discusses about income related health inequalities, data on the gini coefficient which shows the income inequality in among these 12 states for the year 2015-2016 have been obtained from the Planning commission. This is used to find out if there is any relationship between the inequality in health in the given indicators and income inequality.

II   THE MODEL

In order to find out of there is any cause and effect relationship between income inequality and health inequality among children, this paper uses a simple linear regression model to test for a significant relationship between the two. As mention in the previous sections, inequality in health is measured by the concentration curves and concentration indices. In order to facilitate a regression analysis, we need to take into account a mathematical measure for calculating the inequality among the four variables. For this purpose, we use the concentration index. The CIs measure the inequality in health has been calculated using $CI = 2 \, cov \, (H_i, R_i)/ \, \mu$, where H_i is the health variable whose inequality is being measured, and μ is the mean R_i is the ith individual's fractional rank in socio-economic situation. The value of CI ranges between +1 and -1. The second variable is the gini ratio of the states obtained from the planning commission. With these two variables, the estimated regression function is based on the assumption that there exists a linear relationship between the two variables in question. Four regression equations have been estimated for the four variables for which health inequality is measured. The general model is given by

$$CI_i = \beta_1 + \beta_2 \, Gini + \varepsilon_i$$

Where, CI_i is the dependent variable and measures the inequality in health indicator 'i' in the model; Gini refers to the gini coefficient, which measures the income inequality among the 12 states; ε_i is the stochastic disturbance term and β_1 and β_2 are the parameters in which β_2 measures the degree of relationship between the two variables and shows in what direction and

how significantly the income inequality has an impact on the health inequality among the different states.

III   RESULTS

This section provides findings of income related health inequalities for the four variables that have been defined in the previous section. As mentioned in the previous section, the inequality of health has been measured by concentration curves and concentration indices for the 12 Indian states from the NFHS 4 data.

Before empirically analyzing the relationship between income inequality and health inequality there is a need to find out how the two variables are related through a descriptive analysis. For this purpose, the Lorenz curve or the concentration curve is used which measures the cumulative % of the health variable taken into consideration on the Y axis and the cumulative percentage of births ranked by the socio economic status on the X axis. The analysis has been carried out for seven states out of the 12 states that has been taken for analysis. Following this, the concentration index has been calculated by using the formula CI = 2 cov (Hi, Ri)/ μ, where Hi is the health variable whose inequality is being measured, and μ is the mean Ri is the ith individual's fractional rank in socio-economic situation. The latter part of this section deals with the regression analysis for the four health outcomes that have been taken into consideration.
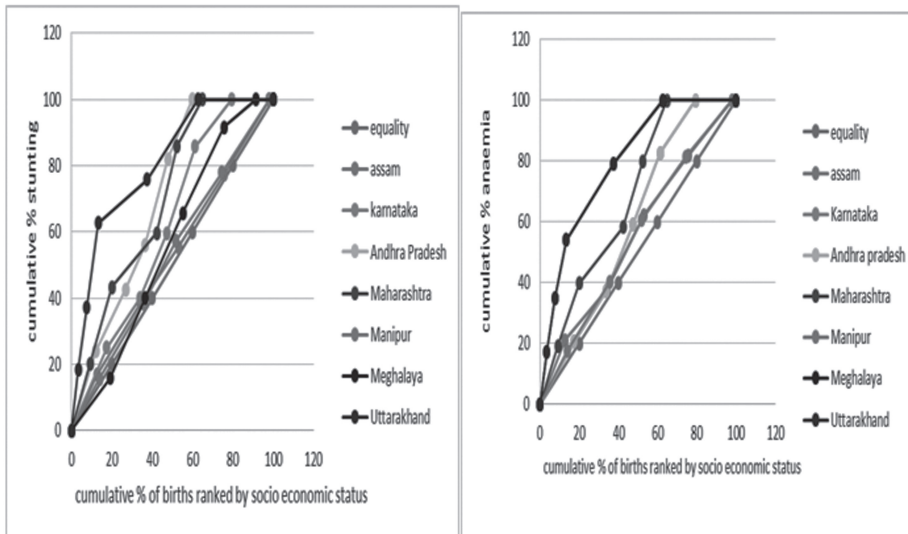
Chart 1: Income related health inequality: Stunting & **Chart 2:** Income related health inequality: Anaemia
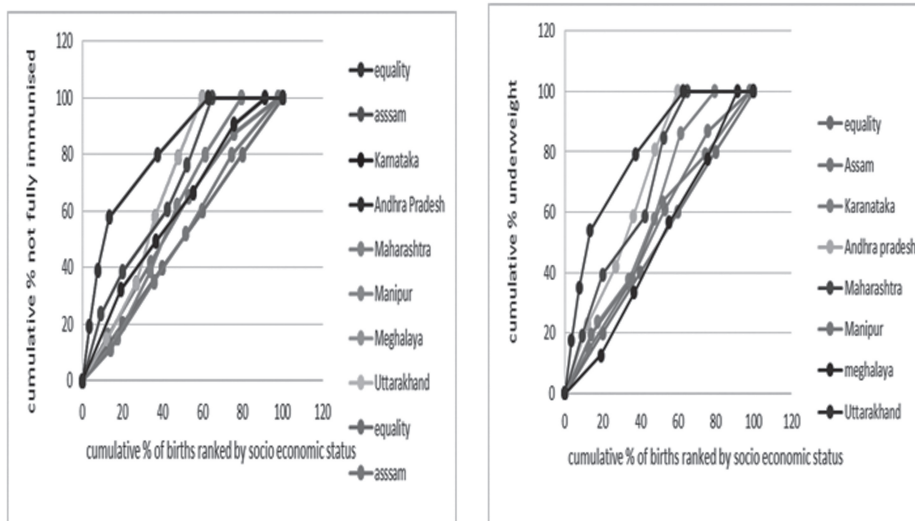
Chart 3: Income related health inequality: NFI, **Chart 4:** Income related health inequality Underweight

Source[all]: Computed by the author based on NFHS 4 data

Table 1: Table showing the concentration indices for the four health outcomes

State	Stunting	Underweight	Anemia	NFI
Assam	-0.32542	-0.70673	-0.40154	-0.52553
Karnataka	-0.12365	-0.02173	-0.08275	-0.103639
Andhra Pradesh	-0.17619	-0.109802	-0.31042	-0.273736
Maharashtra	-0.40194	-0.21963	-0.0611	-0.099457
Manipur	-0.29256	-0.135977	-0.05844	-0.58337
Meghalaya	-0.52663	-0.216438	-0.23452	-0.89678
Uttarakhand	-0.15224	-0.237467	-0.29183	-0.07992
Bihar	-0.10334	-0.10709	-0.0488	-0.1391
West Bengal	-0.1351	-0.20713	-0.0527	-0.4862
Haryana	-0.20693	-0.10722	-0.0494	-0.1757
Tamil Nadu	-0.10649	-0.1111	-0.0675	-0.2617
Madhya pradesh	-0.10697	-0.1565	-0.0987	-0.3135

Source: Computed by the author based on NFHS 4 data

The Lorenz curves show that the inequality for the four indicators is highly correlated with the income levels as the Lorenz curve lies above the line of equity. The Lorenz curve of the states show that the lorenz curve of assam almost coincides with the line of equity.

On comparison of these concentration indices across varied indicators of child health, the inequalities are more prominent in the case of the receipt of basic vaccinations for immunization and the least in the case of prevalence of anemia. The stunting and underweight measures the inequality in child nutrition. The concentration indices for both these measures are relatively low for all the 12 states when compared to the other three indicators. Bihar has the lowest inequality for stunting and underweight (-0.10709 and -0.10334) among the 12 states. Meghalaya has the highest inequality with respect to the stunting and Assam has the highest inequality. For the indicator anemia, all the 12 states have shown relatively less inequality when compared with the other indicators. Among these 12 states, Assam has the highest inequality (-0.40154). Bihar has the least inequality in this indicator (-0.0488). Maharashtra also shows a similar picture as that of Bihar (-0.0611). In addition to this, the health inequality has also been measured by the not-fully immunized children in the 12 states. This is a key indicator as it shows the number of people who are vaccinated against crucial diseases. The higher the level, indicates poor health outcomes. And this indicator is seen to have the maximum inequality among all the 12 states. Meghalaya has the highest inequality in this indicator (-0.89678). Bihar and Uttarakhand has relatively lower levels of health inequality (-0.1391 and -0.07992 respectively).

In addition to this, to facilitate the discussion on the relationship between income and health inequality, regression analysis has been done to find out the cause and effect relationship between the inequalities among the four indicators. The results are displayed below:

Table 2: Table showing the regression results for the four indicators

	Gini coefficient	Significance	R squared value
Variable			
Stunting	1.22	0.116528	0.22
Anaemia	-0.67391	0.510995	0.44
Underweight	-1.00109	0.437456	0.24
NFI	3.589069	0.022413	0.64

Source: Computed by author

The results show that there is no significant impact of income inequality measured by the gini coefficient on all the four indicators of child health. This result validates the findings of William Joe et al, using NFHS 3 data. Income inequality has a positive but insignificant impact on stunting and immunization while it has a negative insignificant impact on anemia and underweight.

IV.   CONCLUSION

Health plays an important role in human resource development of a country. The distribution of health is very important in determining the economic development of a country. This paper

seeks to find out if there is any inequality of health among children using the NFHS 4 data for 12 states in India- Assam, Karnataka, Andhra Pradesh, Maharashtra, Manipur, Meghalaya, Uttarakhand, Bihar, Madhya Pradesh, Tamil Nadu, Haryana and West Bengal. Also, it seeks to find out the level of inequality in child health based on the income level of these 12 states. The results show that the inequality level is the highest with respect to immunization of children. Meghalaya has highest inequality level for immunization. The inequality level for stunting is also relatively high when compared to the other states. In the concentration curve analysis, inequality is the highest with respect to all indicators in the case of Uttarakhand. The regression analysis shows that there has been no significant impact of the inequality of income on health inequality among children, even though the Lorenz curve show that the economic status of a state is positively related to the health inequality among children in these four indicators. So what is important is to note is that, why is there a difference in the results obtained from the descriptive analysis and the regression analysis? Another point that is worth noting here is that the Lorenz curve coinciding with the line of equity, does not really imply anything about the health outcomes. It could also mean that poor health might be equally distributed. Thus, this could be one of the reason why there is no impact of the income inequality on the health inequality.

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A TALE OF CHARTER CITIES: A MODEL FOR ECONOMIC GROWTH IN INDIA

Gauri Sharma, Saswati Banerjee & Sneha Roy*

Introduction

Cities are responsible for the generation of almost 70 percent of the world's GDP. Therefore it becomes essential to make cities self-sufficient in terms of finance so that they can take care of their ever growing needs.

Local Governing Bodies are directly related to the welfare of their communities. They are the providers of basic amenities to the citizens and if they face a financial road block, it could impact the discharge of these imperative functions. Renowned Economist, Paul Romer suggests creating charter cities- the success of which he believes will inspire other cities and the nation as a whole to imitate the same model, leading to inclusive growth. He suggests establishing new cities in special zones which will eventually contribute to the overall growth of the nation.

Popularly defined "a charter city is a city in which the governing system is defined by the city's own charter document rather than by state, provincial, regional or national laws". Such cities facilitate independent administrative and financial governance via means of say, a 'mayor' or a 'city manager'. The paper further elucidates upon the feasibility of incorporating the idea of charter cities within the Indian framework of Legislative and Judicial systems.

Objectives

- To understand the importance of De- Centralization and Importance of Local governance against that of the State governance.
- To analyse the efficacy of Charter Cities and the pros and cons of establishing the same.
- Extending the concept of charter cities to India and analyzing how its definition can be altered to suit the Indian Governance system. .

Research Question/Hypothesis

- Can the concept of Charter Cities be adapted and implemented in India?

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- Will transforming existing cities into that of Charter cities/ Special Administrative Regions by means of de-centralization aid in the process of economic growth, inching her close to a developed nation.

Research Methodology

- Cross country analysis of Economic growth of countries with and without charter cities.

- Case study analysis of the structural form and efficacies of Paul Romer's design of Charter cities.

- Analogical study of application of charter cities in India with regards to its success in other countries

Literature Review

In a time where international aid has failed considerably, there is a need to look for non-traditional development facilitators. Freiman (2013) makes the argument that in a global situation that is non-ideal, charter cities could provide a better framework for development than the currently existing ideas. The paper points out that in an ideal world, institutions would be better reformed, the poverty stricken could supply labour to countries where they could be more productive and the labour mobility would be greater. But with the situation as it is, is far from ideal. This is relatable to the Indian context as well. Brain drain in India happens because of the same reasons - relatively better pay (implying better productivity) and the ability to migrate.

Another valid argument that the paper makes is that "... the efficiency advantages of directing reform efforts toward the establishment of charter cities rather than immigration liberalization or conventional foreign aid [are more]." There are several reasons for this - first, development of charter cities will receive more support than liberalization of immigration in most developed countries that can act as hosts. Second, these cities will work better at relieving poverty than foreign aid. This is because they will foster an environment with stable and good rules, without which aid is inefficiently spent anyway. This is also very apparent in India. Bad rules have repeatedly ensured squandering away of funds.

Moreover, it is an idea that has some serious takers. Honduras is an example. The Honduran government decided to create "special development regions" by a constitutional amendment. In an article in The Economist , a point was made as to how in a country like Honduras, which is one of Central America's most crime-ridden and the poorest countries, it could be a solution to its problems and maybe even a replication of Hong Kong in the West as a model of development. Rhodes (2012) goes on to point the same - just like how Hong Kong and Singapore raced ahead of other South Asian cities, Honduras could do the same in Central America.

Mentioning examples, one cannot ignore the case of Hong Kong itself - Romer's primary example that he himself states. Our paper too, goes on to explore the case of Hong Kong to see what makes it a good (or bad) example and how applicable the idea could be to the Indian context.

Literature is abundant on Hong Kong's rapid success but in this review we stick to literature that tells us more about if Hong Kong is a charter city, what makes it so and if its growth can be attributed solely to its being a charter city.

Cheong and Goh (2013) in their paper examine this theme. The paper counters Romer's argument that cities or the successful SEZs that came around Hong Kong did not replicate it's model and so to solely accredit the Hong Kong model (and in implication, the Charter city idea) with the success of these SEZs would be wrong. The paper also goes on to make a few points about what could then lead to a successful charter city, based on Hong Kong. It says the role that the developing host country plays is an important aspect that cannot be ignored. In case of Hong Kong, the authors argue, it is the early years of isolation of China under the Communist regime that led to Hong Kong being it's gateway to the world in the first place. If these arguments by Cheong and Goh are valid, then establishing a charter city in India need not play by the exact rules outlined by Romer.

What all this points to is that Romer's idea of charter cities as a development alternative is unconventional to say the least and this in turn has triggered some very mixed reactions. For example, an opinion article in the Guardian outright calls it bad and points out 2 that the idea is a reminiscent of the justifications provided for colonialism. The article, although biased by sentiments, presents the argument that China had cities other than Hong Kong, like Shanghai, that were foreign administered and occupied but didn't boom like Hong Kong did. It further goes on to say that the idea suggests "Poor countries give up their sovereignty in return for the promise of greater prosperity." This is especially relevant to the research question being asked by our paper. India, with its very long history of colonialism and it's still existent damages, has to be wary of anything that could have a possibility of turning into something similar. This of course, has to be evaluated from a practical point of view as opposed to the more sentimental narrative of this article. From that standpoint, another article, from the Atlantic calls it "… is not merely neo-medieval, in other words. It is 3 also neo-colonial." The article though is not in general against Romer's idea, it actually roots for it. To this end, the article from the Economist also defends this notion with the same argument Romer makes - "…when people vote with their feet to come and live in a charter city, they opt in to its rules, in a way that makes possible a new form of governance: neither authoritarian nor (at least initially) fully democratic."

While the above is not an academic opinion per se, it definitely is not alone. There has been skepticism from economists too. The same article in the Atlantic quotes the development economist William Easterly from New York University "Paul is very creative, and sometimes creativity can cross the line into craziness." Easterly is of the opinion that Romer's idea of a charter city does not take into account the complexities of existing cultures and customs, and deep-rooted politics. With the diversity of not just cultures and traditions but also the diversity of deep political attitudes and reactions in India, the question whether a charter city would work beyond just theory has to take in to consideration the points that Easterly makes. Other academicians like Elliott Sclar, a professor of urban planning at Columbia University, also are critical about the idea - stating that Romer's idea oversimplifies the process of building a city.

The article goes on to elaborate on Romer's paper presented at the World Bank conference in 1992. Romer explains that ideas consist of not just innovative technology and manufacturing processes, but also customs and laws of an institution. This forms a central idea in Romer's model, as stated before, the idea that for a charter city to work, "good rules" need to operate. The ironic example of the African child studying under the street lamp is just that - absence of good rules. This is easily comparable to Indian scenario where bad rules and governance plagues the system to the extent that it would not be very hard to find our own example of an Indian child who owns a cellphone, studying by the street light. To this end, our paper looks into the local governments and the existing "rules".

'A Brief History of Charter Cities'

The world has transcended through phases and eras of anarchy and monarchy, few have been witness to harsh dictatorship, while the rest have been established colonies. History has also seen countries transition into democratic republicans with centralized and subsequently de-centralized forms of governance.

In today's scenario, with increasing importance granted to local forms of governance such as municipalities, it becomes necessary to question if de-centralization is the need of the hour. Empowering local governments would administer growth from its roots thereby giving a bottom up approach to development, strengthening a country from its very base.

There are two popular notions in the discussion of state pre-eminence over local governments.

In the year 1868, Dillon's Rule argues that

"Municipal corporations owe their origin to, and derive their powers and rights wholly from, the legislature. It breathes into them the breath of life, without which they cannot exist. As it creates, so may it destroy? If it may destroy, it may abridge and control"

Contradictory to the above, theories put forward by the Cooley Doctrine suggest that there exists an inherent right to local self-determination. He argues that

"Local government is a matter of absolute right; and the state cannot take it away"

In this debate of the merits of de-centralization, steering the process of economic growth, Paul Michael Romer, an American economist and entrepreneur by profession, in the year 2009, introduced the concept of '*Chartered Cities' through his famous TED talk on 'Why the World needs Charter Cities'

As defined by the Paul Romer, a charter city is a self-designed city, where in the governing structure is defined by its own Charter document rather than the state/national laws. Under this set up, the city is allowed to exercise its administrative, judicial and financial powers without any intervention from the state authorities. These cities are usually governed by residents/ 3rd party management structures (usually a 'city manager' or 'mayor'), with the charter granting them the flexibility to choose their devised form of novel governance.

Charter Cities are designated when the charter initiates development and an establishment of a successful social structure for the course of living. They promote large scale urban development laying the trajectory for socio-economic growth in developing countries. Hong-Kong has been the widely quoted example for the success of Charter cities, followed by Honduras, California, etc.

Structure of Charter Cities

Paul Romer in his widely popular TED talk of 2009 on 'Why the world needs characteristics' lays emphasis on the sanctity of Rules and the prerequisite to change established Rules in the process of governance.

The main premises of Charter Cities are Rules. A good charter city has a solid foundation of rules that not only provides security to its citizens but also to its potential investor. Any investor would prefer investing in a city that will provide her or him with a guarantee regarding return on their investment, even in the wake of a change in Government. Romer categorizes rules into 2 broad categories, 'good' and 'bad'. He explains that ideas and innovations needn't always pertain to the field of technology. Ideas may also be relevant with reference to enhancing rules so that we are not trapped in an endless loop of bad rules.

Charter cities intend to adapt to the market economy promoting economic growth by decentralized means. Villages are miniature structures and hence undersized for its application and a nation is too large to incorporate massive structural changes such as charter cities. We may adapt to market economy by the following means:

- Preserve choices for people

- Operate on the right choice

Cities enhance opportunities of formulating rules that are in sync with the utility of its citizens and empower them to opt into it. To structure charter cities we need to abide by the following rules:

o   Define a 'Charter' or a set of grants given by the legislative power of a country defining the rights and privileges of the recipients.

o   Make the country pass a law that allows the acquisition of uninhabited land for the construction of charter cities. E.g.: Utilizing land near the sources of water are extremely desirable, attracting larger number of Investors and Industries.

o   Providing choices for Leaders. Charter cities initiate partnerships between countries promoting other source country to invest in the host countries by setting up industries and building infrastructure. It also becomes the hub of rural and inter country migration, whereby people can now move a newly established city with sound amenities and services. This, as Romer quotes, 'Helps augment the bottom 30% of the society off the poverty boundaries by facilitating job opportunities and newer and better living standards.' Usually a developed country acts as a guarantor country to administer the region.

Charter cities were to be established in fast urbanizing countries where entirely new cities would come up to set trajectory to the path of development as well as help in the expansion of current cities, steering overall growth in the economy.

Correlated Pros and Cons of Charter Cities

To become a charter city, the city must adopt a charter. A charter in this context serves as a region centric constitution, specifying the administrative, financial and judicial rights of the city. A charter could be formed either by,

- Allowing the city's voters to vote for a commission liable to formulate the charter

- Allowing the local governing body to make the draft.

There have been several associated benefits of charter cities as visible from the prototypes of Hong Kong and about 112 cities of California. They are as follows:

- Charter cities have led to an increase standard of living. Employment levels have drastically increased, along with provisions of good health and education facilities aided with basic amenities.

- They have been successful in battling poverty as it aims at providing habitat and quality living standards to citizens of both the host and investor countries.

- Charter cities have also paved way for international collaborations and partnerships to ensure a dense network of investments.

- Since charter cities are host to both foreign and native citizens, it promotes rapid emigration and cross cultural ties.

- The host country is benefited through an improvement in infrastructure, rise in growth rate and Human development Indexes, while the investors get newer opportunities and landmarks to invest in.

- Limited resources in the upcoming cities also ensures sustainable development with optimal utilization of resources. This increases efficiency with minimum conflict between the government and citizens.

- Since taxation powers reside with the state, administrative processes are reduced in the process of facilitating trade and investments.

  However, Paul Romer's concept of charter cities have also been criticized on several fronts:

- The concept of charter cities has often been considered analogous to the colonial setup. However there exists no coercion or   in charter cities.

- While drafting the 'charter', defining what exactly are 'municipal affairs' becomes a tedious task. The drafting and devising of the charter for the purpose of an election is not only time consuming and expensive, but considering the two year waiting

periods in between elections can lead to pessimistic consequences with regards to generating revenue.

•   The cultural amalgamation facilitated by the process of emigration might lead to a conflict of interest. Also the problem of 'brain-drain' is not regarded and definitely not eradicated or diminished.

•   The standard of living of the first generation of citizens arriving in the city are not bettered immediately, but the subsequent generations reap benefits with regards to better education and job opportunities. Hence the process induces an inevitable time lag.

•   Foreign investors in the process of earning increasing profits might not be keen on investing or in the growth of public goods/ nation development. Let us take the example of Dubai, it is an invented marketing emergence. A charter city would follow suit, even with respect to infrastructure. Dubai has little provision for pedestrians outside the downtown area. A number of cities that experience a rapid inflow of foreign capital neglect public transport, favoring highways and airports.

•   Batan, a small city in Singapore has witnessed several incomplete construction of hotels and other infrastructures. This occurs as a consequence of assured high rates of growth to investors leading to the phenomenon of 'abandoning failed idea'

•   Charter city supporters promote the illusion of increased savings and local control, whereas in actuality the lobbyists' are attempting to overhaul most of the existing aspects of local governance for limited special interests.

Proposed Structure of Charter Cities in India

India, till today, stands to be an extremely diverse country in terms of its culture, ethnicity and topology. Politically, post-independence, India adapted herself to a democratic form of governance which has been suiting her for more than 60 years now. As our population grows and expands and as our technology develops and becomes more sophisticated, it becomes imperative for our infrastructure, which accommodates the two, to grow and attempt to match paces with population and technology.

The XIVth Finance Commission supported the stance of allowing greater powers to local Governments to collect varied sources of revenues and also advocated providing autonomy to local Governments to frame their own rules and regulations. Taking this idea further, we come to the theme of 'Charter Cities', conceptualized by Paul Romer. He cited the example of Hong Kong which has been granted the status of Special Administrative Region by the Government of China. Hong Kong has taken advantage of this autonomy granted to it and has made itself into a major global trade hub and financial center.

In order to make India a prototype to Paul Romer Model we first understand few of the shortcomings of the Indian setup with regards to his specified model:

- Availability of vast stretches of barren uninhabited land is extremely low in India, unless one looks into hilly terrains or encroaches forest spreads.

- Rural India, due to the inadequacy in the approach of 'following rules' as Romer points, becomes too naïve a center to implement his idea.

- The alternative available to us now, is to help transform existing cities into charter cities by means of devising an effective structure.

Since several cities of India are fairly developed, for instance Delhi, Bangalore, Chennai, Mumbai, etc., we aim at uplifting the social, financial and political status of those cities that within the state need to be empowered considerably higher.

We look into states, whose:

- Development with regards to HDI's and GDP per capita is the lowest or amongst the bottom 5 in the state.

- Population is sparse.

It is to be noted that charter cities in India is not structured to increase population of a city with improving infrastructure and investment, but to distribute existing population into potential cities, pushing as many people as possible above the poverty line.

The associated 'Charter' is to be formulated by an efficient set of leaders or existing government officials specifying administrative, financial and judicial powers and rights of cities.

A basic, skeleton of the proposed structure has been mentioned below (to be administered by local citizens)

Proposed Structure of Chartered Cities

Characteristic	Charter City
1. Ability to Govern Municipal Affairs	• Has supreme authority over municipal affairs; • State can have the authority to look into certain factors such as inter-city connectivity and devolution of a proportion of grants and taxes depending on the yearly performance of cities
2. Form of Government	Democratic
3. Election Generally	• Multiparty elections can be carried out; • Candidates may contest independently or can be affiliated to a political party ;

	• If the candidate is an Independent Candidate, his/her name must be proposed by a member of the city and the nomination must be seconded by at least 10 other residents of the same city ; • Candidate must be a representative figure of the city.
4. Methods of Election	• Election of the Mayor happens analogous to the General assembly election of India. The MLA of a registered political/ independent party is allowed to contest for election from within the city and is brought to power by the citizens of the city ; • The Deputy Mayor is elected by the mayor upon prior consultation with his counselors; • It is to be noted that elections in such a charter city needn't be in queue with that state elections. The political party in power may differ in the city with regards to its state.
4. City Council Member Qualifications	• Standard 12th graduate/Undergraduate; • Citizen of India ; • Registered voter ; • Resident of the city for more than half of his /her age in years ; • Good legal records ; • 25 years and above ; • (Reservations do not play a role in qualifications)
5. Public Funds for Candidates in Municipal Elections	• Public Funds cannot be acquired to contest elections. Candidates affiliated to a political party can be aided by them and Independent Candidates must organize self-funds to contest for elections.
6. Term Limits	• 4 working years (subject to death or termination)

7. Vacancies and Termination of Office	• May be in the form of death, or termination of tenure due to accusations or other criminal charges ; • In case of the untimely death of the Mayor, the Deputy Mayor presides over the office and appropriately elects the new Deputy Mayor. However, in the case of an untimely death of the Deputy Mayor, the Mayor may exercise power in re-electing the Deputy Mayor ; • The same process is followed for mid-tenure termination.
8. Council Member Compensation and Expense Reimbursement	• All basic military amenities/employment and retirement benefits/health and education facilities + monthly salaries (adjusted to inflation) will be provided.
9. Voting Requirements	• To be an eligible voter, one must produce a valid Voter ID card ; • He/She must be a resident of the city and at or above the age of 18.
10. Rules Governing Procedure/Decorum/Personal Matters/Judicial System of Cities	• Subject to prevailing judicial system; • The system of mobile courts can also be implemented to provide speedy and inexpensive justice, in the absence of which citizens will be allowed to seek justice at higher courts.
11. Payment of Prevailing Wages	• Minimum fixed wage applies to Charter Cities, establishing a more corporate framework, in sync with the Macroeconomic theory of Efficiency Wages. Incentives and grants to be provided to both private and public employees as per productivity. • (Work schedule: 5 days a week, Saturdays optional)

12. Finance and Taxing Power	• All taxes which are currently collected by Local Governments in India are to be followed without change ; • Tax devolution to be made more effective to villages, providing them incentives to perform better and urbanize faster ; • Allowing municipal bonds to be traded on the Security Exchange Board of India. It is to be noted that acquiring these bonds does not mean ownership of city, but simply a position of a potential investor ; • Charter City centric banks registered under RBI in competition with all other existing banks providing a fertile financial front for foreign investors to initiate international collaborations.
13. Public Utilities/Goods	• Sanitation/healthcare/electricity/education to be taken care of by the municipality and it's heads ; • Increasing investments in the field of healthcare and education by joint foreign partnerships in such fields ; • Establishing a symbiotic relationship between Private and Public education centres enabling inter-department job opportunities ; • Hiring private companies along with Government support to build roads, parks and other public goods and infrastructure.

Success of Charter Cities in the entrepôt of Hong Kong

The concept of Charter Cities, special zones within developing countries which have adopted better rules and institutions, is an offspring of revolutionization of rules- where an opposition of choices between leaders and his people is demarcated clearly to avoid friction. Having started off with an identical set of rules, South Korea prospered inarguably whereas North Korea stills lingers in the dark owing to simply one reason- a change of rules which led to very divergent choices.

China is an exemplary instance of the potential as well as challenges of a country performing with rules. Back in the 1400's, China was the world's leader in the field of technology with booming industries of steel, gunpowder, printing et cetera. However, the Chinese did not employ efficacious rules for the propagation of these ideas and instead, adopted rules which decelerated innovation leading to a stagnation of the economy's income. Recent data however, shows that China, in the

1950's and '60s experienced a GDP per capita of a hovering 3 per cent which rose to a tremendous high of 7 per cent in the late '70s. The reason that led to this dramatic change of rules in China resulting in its growth was, Hong Kong.

Hong Kong, an erstwhile British colony and a city located in southeastern China, ran on a set of rules very different from the rest of China. These rules were borrowed from working market economies at that time and administered by the British. China's paramount leader at that point of time, Deng Xiaoping, decided to bring in a change of rules and convert all of the mainland to the market model. However, instead of forcing everyone in China to shift immediately to the market model, he offered choices to his people. Certain special economic zones (SEZ) were created to overcome shortcomings faced in the fields of unstable fiscal regimes, infrastructure, controls and clearances.

Four SEZs were created around Hong Kong to attract foreign investment. One of the zones next to Hong Kong has a city called Shenzhen. In 1979, Deng Xiaoping designated Shenzhen as the country's first SEZ. In less than 30 years, the fishing villages across the border from Hong Kong has converted to a capitalist enclave which is arguably much larger and populous than New York City.

Shenzhen, kicked off China's transformation from a rural backwater to an export-driven powerhouse. The set of unique rules followed by Hong Kong helped eliminate poverty in China than all the foreign aid put together. Almost 660 million of Chinese citizens were lifted out of absolute poverty between 1981 to 2008, thereby demonstrating the sterling success of the market model and the need for its application in the entire economy. Colonial Hong Kong was sculpted from China at gunpoint following the first Opium War. The city's modern shape and form was later defined by being an island and as a refuge for millions fleeing Mao Zedong. Shenzhen, formerly known as Baoan County, was simply a small fishing village. After being named as a SEZ, Shenzhen grew so fast that it absorbed hundreds of villages, along with illegal populations of rural migrants who manned the most dangerous factories.

Paul Romer, who is trying to replicate the success of charter cities and transforming it into an engine of economic growth in developing countries, is of the argument that a country can benefit a lot if a city is designed from the bottom up. He refers to Shenzhen as a startup, and these startups are new enclaves with their own laws, investors and immigrants. They are referred to as laboratories which have been established to test competency of new forms of governance. Romer has repeatedly invoked Hong Kong as a sunny inspiration for the remaking of Honduras, the most recent charter city.

The success of Hong Kong is a key inspiration for the formation of other charter cities also suggesting both direct and indirect benefits. Directly, each charter city allows millions of people to improve their lives and conditions by integrating with the world economy. Indirectly, each charter city is a beacon of enlightenment. Hong Kong shone bright enough to convince the dogmatic Chinese Communist elites that foreign investments, economic integration and private property

is the gateway to success. Successful models like Hong Kong pave the way to other cities into embracing pro-growth policies leading to a more prosperous and co-operative world economy.

Hong Kong v/s Shanghai: Are charter cities better and more efficient engines of growth?

Hong Kong has enjoyed its status of a Special Administrative Region post the British colonization period, thereby allowing it to maintain its own market and economic structures

GROSS DOMESTIC PRODUCT (GDP)   351.119$ billion

INCOME INEQUALITIES   0.434

The Gini coefficient is a measure of dispersion, in this case used to show the variation in income. A Gini coefficient of zero expresses perfect equality. A Gini coefficient of one expresses maximal inequality. Lower income inequalities indicate a more equal distribution of wealth and better opportunities for the average citizen. Source: Wikipedia, 2016.

0.44

BIG MAC INDEX   1.94$

The Big Mac Index is published by The Economist as an informal way of measuring the purchasing power parity (PPP) between two currencies. The Big Mac PPP exchange rate between two countries is obtained by dividing the price of a Big Mac in one country (in its currency) by the price of a Big Mac in another country (in its currency). Source: Economist, 2016.

2.27$

NUMBER OF BILLIONAIRES   38

Number of billionaires can indicate if the city has significant agglomerations of personal wealth. Source: Forbes, 2016.

8

ANNUAL POPULATION GROWTH   0.76%

Population growth is the change in a population over time. The higher the growth the more dynamic society feels. Growth of population can be connected with economic, cultural and social development of the city, which attracts more and more people who want to live in it. Source: Wikipedia, 2016.

22.15%

instead of abiding by those laid down by China. Following Hong Kong's success, several other cities, along the cost of China were declared to be Special Economic Zones, to promote globalization and industrial development. The paper examines the growth patterns in Hong Kong against a randomly chosen city in China, Shanghai, evaluating how a unique charter driven city promotes faster economic growth and development. It is to be noted that Hong Kong is not a charter city, however poses as an inspiration to Paul Romer's concept of charter cities in its British colonial setup. Under this setup Hong Kong operated and hence flourished with regards to a detailed charter laid down by British colonists. Brief statistics presented below showcases the performance of Hong Kong, a SAR, when compared to another Mainland China city, Shanghai:

Hong Kong

Shanghai

The above data collected from "Versus" is testimony to the fact that charter driven growth has served, on several grounds, beneficial to Hong Kong as compared to a preexistent Chinese city like Shanghai.

Paul Romer recently commented on the presently reigning Modi Government elucidating upon the necessities and importance of Charter Cities in the prevalent Industrial setup in India. In a Live Mint article, Romer also stresses on the rapid need of urbanization and economic dynamism in modern day India.

Limitations and Future research scope: The political and financial structure of the country is intricately interwoven and establishing a new structural set up will be subject to several other constraints not taken of.

- Establishing a charter centric bank involves heavy investments which need to be accounted for.

- The model is very naïve and just the foundation of certain basic facets of a charter city if to be modeled in India.

- Charter cities can be claimed and declared as India's future. In the current scenario, people have been progressing in enabling increased investments in India by suitable adjustments of macroeconomic tools and creating the right investment environment.

POPULATION DENSITY

Population density shows how cramped or spread out inhabitants are. Cities with high population densities can be considered overpopulated, but the extent to which this is the case depends on factors like quality of housing and infrastructure and access to resources. Source: Wikipedia, 2016.

6480 people/km²

3600 people/km²

UNEMPLOYMENT RATE

Low unemployment rate indicates better career opportunities and economic growth. Source: Wikipedia, 2016; city's official stats, 2016.

3.2%

4.5%

POPULATION

Cities with bigger population usually offer better employment and entertainment opportunities. Big cities attract business, are trade and cultural centres and research hubs. Source: Wikipedia, 2016.

7.078 million

23 million

Thus in the era of 'Make in India' charter cities would now provide an autonomously functioning body where investments can be carried about with least administrative processes.

- • Future analysis and study can be carried out to define a more specific model for charter cities that can be adapted by the existing cities of India.

Conclusion

In this paper, we attempt to analyse application of the concept of Charter City to a country like India, after considering the attributes and challenges posed by India. Currently, the population of India makes up for 1/ 5th of the global population. We therefore suggest through our research, utilizing a sizeable piece of land where the population is sparse and the opportunities for investment in infrastructure are many. Coming to the legal, political and judicial systems- It is suggested that the Charter City follows the same judicial system as applicable to the rest of the country however certain changes are recommended in terms of political scenario of the Charter City. The Host Country is granted with the discretion to make sure that rules are applied appropriately and divergences if any are reviewed and penalized. This would provide investors with a sense of security and help in building a positive environment for the same. While each country possesses its own challenges and hurdles, Charter City still remains a desirable alternative facing many Governments. It presents a new way of working towards growth - where we approach growth in a bottom down tactic. Charter Cities is the new burning topic in Growth theory and one that is promises to improve the authoritative and financial independence of cities all over.

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COMPREHENDING THE REPERCUSSIONS OF URBANIZATION ON INDIAN AGRICULTURE AND MITIGATING THEM THROUGH CONSTRUCTION OF A SUSTAINABLE VILLAGE MODEL

Divyankur Tiwari

Introduction & Motivation

The trajectory to sustainable economic growth becomes a difficult task to be mapped out when the economy is witnessing a demographic transition. Where in developed western world, economies are facing crises of ageing population; India owns its own unique surplus of demographic dividend in terms of consistently increasing younger population. According to recent studies carried out, India will experience peerless urbanization with 350 million people migrating to cities by 2030 and 700 million by 2050. India's urban population has witnessed an increment by 32 percent in the previous decade. Although it is plain from the data that India is going through an unprecedented urbanization, it's annual per capita expenditure on urban infrastructure is insufficient, a meager $17 as compared to China's $116 and United Kingdom's $391. There exists unsympathetic and perilous lack of urban infrastructure. Allocation of per capita income to urban citizens is one sixth of the rural spending. Also, the spending on urban poor is one-tenth of the rural poor. A lot needs to be done to fill in the shoes. This urbanization is taking place in a concerning way, the rate of urbanization is out-spacing our population growth and its happening haphazardly without pondering upon the principles of urban planning, water resource management, waste management, distribution of electrical power, transportation infrastructure, services and without proper heed to environmental protection. However as the time has advanced, the systematic urban planning has also taken its charge. Like western-style sprawl Indian urban dispersion has its own economic repercussions. The issue that needs to be understood is that a possibility of a continuous erroneous urban planning and flawed urban growth model with piecemeal reforms may prove very costly for the economy in long run. This paper focuses on specific issues related to urbanization as mentioned in the objectives.

Research Objectives

To understand the relationship between the agriculture and urbanization, here we study the effects of urbanization on agriculture.

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To understand how the disguised unemployed population in agriculture can be utilized through the process of urbanization.

To study the social costs incurred by rural areas as a consequence of rapid urbanization. This objective is complementary to the first objective.

Methodology

The methodology followed for all three objectives are different. For the first objective the data has been collected from National Institute for Urban Affairs and Agricultural Research & Office of Registrar General and Census Commissioner. The data has been taken for 6 Census years and has been analyzed by employing Karl Pearson's method of Correlation Analysis. The second objective has been explored by employing choice based game theory. The third objective has been explored by conducting a descriptive research. At last a model of sustainable village has been developed using equations.

The Case of Agriculture & Urbanization

Agriculture in India is undeniably the largest corner of our economy that acts as a means of support, source of income, living, subsistence and employment to the major part our population. In other words it is the largest provider of livelihood in our country. At 157.35 million hectares, India has the second largest agricultural land in the world, which becomes a challenge as well as a great opportunity to our emerging economy. The unique trait of Indian agriculture is that with 20 agri-climatic regions, India experiences all 15 major climates that exist in the world. India is also endowed with 46 of the 60 soil types existing in the world. In recent years, India has witnessed record production of food grains. India also makes to the largest producer of major agricultural and horticulture crops. Over the years mechanization of farming has increased in India. India manufactures one-third of the tractors in the world; the number of tractors in the economy is estimated to touch 16 million in 2030 from 6 million in 2014. Agriculture is the primary source of livelihood to 58 percent of India's population and this sector recorded a growth of 8.3 percent during the year 2015-16. It contributed 15.35 percent to the Gross Value Added during 2015-16 at 2011-12 prices. This sector contributes around 10 percent to the total exports which generates considerable revenue to our economy. Thus agriculture becomes the chief support system of Indian economy and is an industry in itself which provides substantial support to the manufacturing sector.

The idea here is to understand the relationship between agriculture and urbanization. Although the general notion suggests that there exists a strong positive correlation between urbanization and economic growth but with the merits of urbanization arrives its consequences too. One major consequence of this rapid urbanization is the loss of farmland. The abovementioned consequence is not just a possibility or probability but a reality being witnessed by Indian states. This loss of farmland will further have ripple effects and will decrease the agricultural production and further productivity. Loss of farmland can be attributed to multiple factors but is majorly understood as a cause of urbanization. This happens when there is diversion of cultivable land

for non-agricultural purposes, construction activities, and industrial activities and for other developmental programs. This trend of loss of agricultural land will leave farmers in a worried lot and will lead to depression in the agricultural sector, which may further impact and hurt the self-sufficiency of the economy in the long-run. Thus it becomes important to study this case and analyse it. This paper puts its focus on the effects of urbanization on agriculture as its first objective. This objective has been explored in this paper with statistical tool of correlation analysis.

One important limitation of this study is the paucity and availability of homogeneous data regarding the concerned variables. However an attempt has been made to study the objective statistically with the available data. Here we have built two models. The cause and effect relationship between the urbanization and agriculture has been studied using correlation as using granger causality test was not possible with limited sample size.

First Model

In the first model we took two variables namely, percentage of urban population to total population and percentage agricultural land area to total land area. It important to note that an assumption has been made that urban population to total population is an apt indicator of urbanization.

Trend of Urbanization in India-1[59]

Census Year	% of Urban Population to Total Population	% of Agricultural Land Total Land
1961	17.97	58.84
1971	19.91	59.80
1981	23.34	60.67
1991	25.71	61.07
2001	27.82	60.70
2011	31.15	60.63

The table above shows decadal data of Urbanization-percentage to urban population to total population and Agriculture-percentage of agricultural land to total land area. Population Census is carried out in every ten years in India so decadal data is used. Data is taken from census year 1961 to the recent census year 2011. Karl Pearson's method of correlation analysis has been employed. It is observed that up to 1981 there was a strong positive correlation of 0.93 between Urbanization and Agriculture but however after 1991 a strong negative correlation of 0.87 has been observed between agriculture and Urbanization.

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[59] Source: National Institute for Urban Affairs and Agricultural Research and Office of Registrar General and Census Commissioner.

Second Model

Correlation matrix (Pearson): (1961-1981)		
Variables	% of Urban Population/Total Population	% of Agricultural Land/Total Land
% of Urban Population/Total Population	1	0.983
% of Agricultural Land/Total Land	0.983	1
Values in bold are different from 0 with a significance level alpha=0.05		
Correlation matrix (Pearson): (1991-2011)		
Variables	% Urban Population/Total Population	% of Agricultural Land/Total Land
% of Urban Population/Total Population	1	-0.876
% of Agricultural Land/Total Land	-0.876	1
Values in bold are different from 0 with a significance level alpha=0.05		

In this model we have taken two variables namely, urban population (in numbers) and operational landholding[60] (in hectares). Like the previous model again we have taken into consideration the census data from 1961 to 2011. It has been assumed that the urban population is an apt indicator of Urbanization and operational landholding of Agriculture. Karl Pearson's correlation technique has been used to study the validity of the objective.

Trend of Urbanization & Agriculture in India-2 [61]

Census Year	Urban Population (In Numbers)	Operational Landholding (In Hectares)
1961	78936603	1314
1971	109113977	162124
1981	159462547	163797
1991	**217611012**	**165507**
2001	**286119689**	**159903**
2011	**377106125**	**159592**

Like the pervious table of model 1, this table also shows the trend of Urbanization and Agriculture with different variables of urban population and operational landholding respectively. Here it is witnessed that there exists strong positive correlation of 0.79 between the urban population and operation land holding up to 1981 and strong negative correlation of 0.84 since 1991.

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[60] *Operational Landholding is the land which is used partly or wholly for agricultural production and is operated as one technical unit by one person alone or with others without regard to little, legal form, size or location is taken as statistical unit for data collection in Agriculture Census.*

[61] *Source: National Institute for Urban Affairs and Agricultural Research and Office of Registrar General and Census Commissioner.*

Correlation matrix (Pearson): (1961-1981)		
Variables	Urban Population	Operational Landholding
Urban Population	1	0.791
Operational Landholding	0.791	1
Values in bold are different from 0 with a significance level alpha=0.05		
Correlation matrix (Pearson): (1991-2011)		
Variables	Urban Population	Operational Landholding
Urban Population	1	-0.848
Operational Landholding	-0.848	1
Values in bold are different from 0 with a significance level alpha=0.05		

Contemplation

This makes us reflect upon the changing structure of agriculture after 1991, as 1991 was a crucial year for India where India was facing internal economic crises and adoption of liberalization policy was the only choice. The prime focus as we here put, is on agriculture, it is clear from the trends of the two models that after 1991 the agricultural land is decreasing and urban population is increasing. It explains that there exists a strong possibility that New Economic Policy of 1991 has made a way for rapid increase in urbanization in India and as urbanization has advanced in recent decades it has had a negative impact on agriculture as it is clear from the picture that after 1991 the agricultural land area to total land area and operational landholding have decreased.

The Case of Disguised Unemployment and Urbanization

The key challenge to India's growth is to create jobs for its people, particularly the young population. India has always been suffering from employment crises, reasons are several, and however uneven and rapid growth in population and lack of human resource infrastructure has been attributed as important factors in this regard. India is usually referred to as a developing economy and still large parts of the country remain underdeveloped. This characteristic of the economy features the prevalence of disguised unemployment. Large proportion of population subsists on agriculture, superficially giving an impression that they are employed but they are not wholly productive, signifying that the so called employed, if withdrawn will not cause any loss or disturbance to the production. Disguised unemployment suggests that the ratio of labour to land is so high that the marginal productivity of labour reduces to zero which makes this workforce physically employed but economically unemployed. The sagacious idea to be understood behind this is that if agricultural income has to increase, people need to move from agricultural sector to non-agricultural sector. Urbanization in particular here is a window, exploration of which can be effectual in extricating disguised unemployed population from agriculture. The onus lies on the manufacturing sector. For every 1 percent increase in the Gross Domestic Product (GDP), the

non-agricultural employment[62] went up by 0.52 percent during the period between 1999-2000 and 2004-05. This figure has fallen to 0.38 percent between 2004-05 and 2011-12 (D. Joshi and V. Mahambare, 2014). This explains that the growth in employment in non-agricultural sector does increases GDP but this growth in GDP has slowed over the period of time. So this task of shifting the disguisedly employed population in agriculture to manufacturing becomes even difficult, however efforts cannot be put to halt. This challenge is to be taken even more efficiently since India is going through early phase of urbanization; it presents an opening for sustainable future trajectory.

One point that needs to be addressed is that India faces a challenge of not just providing employment to its people but also increasing the employability of labour force which has positive correlation with knowledge and skills developed through quality education and effective training along with providing good quality of health.

We are giving our attention to manufacturing sector here as urbanization is characterized by massive arrivals of manufacturing units; this sector employs nearly 1.4 million people and is estimated to employ 2.8 million by 2017. In recent times India has become a major hub for investments. It is today one of the most attractive destinations for investments. NITI Ayog (National Institute for Transforming India) aims to persuade the government for support to the manufacturing sectors with huge employment generation opportunities, such as electrical and electronics engineering, footwear and light manufacturing segments which also tends to have export potential. This is a corner which needs to be explored. Further we also focus on the service sector which is expected to contribute 62 percent to the country's GDP by 2020. Also this sector provides employment to around 25 percent of the country's population. The potential of this sector to absorb disguised unemployment has also been taken into consideration.

Also there is no reliable data available regarding disguised unemployment in India. If we are to make an assumption we can just assume that the 25 percent of people engaged in agriculture are disguisedly unemployed or say 30 percent or even 40 percent. This is just an assumption from author's economic point of view. Let's make an assumption that today the population of India is 121 crore and 50 percent (under-estimate) of the total population is engaged in agriculture and out of this population which is engaged in agriculture 25 percent (author's assumption) of the population is disguisedly unemployed so it brings us to an estimate that 15 crore people in the country are disguised unemployed, which is a great challenge to our budding economy.

The question that we are facing now is that in which sector the disguised unemployed population has to be transferred. So as to solve this puzzle a matrix has been created with combination of sectors namely manufacturing sector, agricultural sector and service sector. The matrix is presented below:

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[62] *Non Agricultural employment includes both manufacturing as well as service sector.*

Choice Based Game Theory[63]

Disguised Unemployment Transfer Matrix - Short-run & Long-run			
	Maufactring Sector	Agriculture Sector	Service Sector
Maufactring Sector	1, 0, 0	1, 2, 0	1, 3, 0
Agricultural Sector	2 ,1, 0	2, 0, 0	2, 3, 0
Service Sector	3, 1, 0	3, 2, 0	3, 0, 0

The matrix shown above presents a picture where manufacturing sector is shown by "1", agriculture by "2" and service sector by "3". The matrix presents an idea where- (1, 0, 0) says that the whole disguised unemployed population must be transferred to manufacturing sector, in this case agriculture and service sector have zero points each. This is similar to the cases- (2, 0, 0) and (3, 0, 0) where agriculture and service sector scores full points and other sectors scores zero. Both the cases signify that the disguised unemployed population must be transferred either to agricultural sector or service sector.

Note: When we say that the disguised unemployed population must be transferred to agricultural sector, we basically mean that the disguised unemployed population must remain in the agricultural sector. Also a combination of all three sectors is not possible in the above matrix.

So the transfer in other cases, the red colour ones- (1, 2, 0) show a combination of agriculture and manufacturing, (2, 1, 0) again show a combination of agriculture and manufacturing, (2, 3, 0) and (3, 2, 0) both showcase a combination of agriculture and service sector.

Now so as to choose the right combination we need to understand the social and economic structure of disguisedly unemployed population. It seems plausible that this population is characterized by lack of education, skills and is economically backward being engaged in agriculture. So already they are unproductive in their own sector of agriculture, so the choice of remaining in the agriculture sector is eliminated. So we eliminate the cases of- (1, 2, 0), (2, 1, 1), (2, 0, 0), (2, 3, 0) and (3, 2, 0) in which agricultural sector is present which is significant by digit "2". The next case that is eliminated is of (3, 0, 0) where only the transfer is made to service sector which is quite absurd as it is almost impossible to transfer whole of the disguised unemployed population from agriculture to service sector because of their socio-economic background.

The case that can be accepted for short-run is the case of (1, 0, 0) where the disguised unemployed population is fully transferred to the manufacturing sector. This is possible through proper training and skill development programmes in various subsectors of manufacturing sector. A Public-Private Partnership model can be further developed for exploring this area.

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[63] Author's Construction (two matrices).

However in long-run the remaining two cases-(1, 3, 0) and (3, 1, 0) in green can be accepted which shows the combination of manufacturing and service sector signifying that the disguised unemployed population can be transferred to manufacturing as well as service sector. Now to understand this, in long-run educational infrastructure can be improved and the growing disguised unemployed population can be made educated and well skilled. On the other hand the already existing population that is disguisedly unemployed can be given better skills and training for working in manufacturing sector. So moving on from employing this disguisedly unemployed population to manufacturing sector the area of service sector can also be explored in long-run.

Unemployment Transfer Matrix - Very Long Period		
	Manufacturing & Service Sector	Remarks
Manufacturing Sector	1, 3, 0	Loser
Agricultural Sector	2, 1, 3	Winner
Service Sector	3, 1, 0	Loser

Another matrix shown above for very long period explains that in the very long period the unemployed population can be absorbed in agricultural sector also. An overlapping of any sector in the above matrix is shown by "0", meaning it scores no additional point. As when the earlier winners of short run, the manufacturing sector (1, 0, 0) and in long run, the combination of manufacturing sector and service sector (1, 3, 0) or (3, 1, 0) matures there would be a possibility of prosperity in agricultural sector as agricultural income would take an upward swing. In such case if at times manufacturing and service sector suffers loss there can again be a transfer of unemployed population from manufacturing and service sector to agricultural sector. A possibility of tradeoff of unemployed population is also understood between manufacturing and service sector in long-run, however in very long period a tradeoff between all three sectors is accepted which is significant by the case (2, 1, 3).

The Case of Social Costs

Every challenge has its own cost and its way forward. The need is to convert these challenges into opportunities. The progress of urbanization presents social costs to rural areas. These include cost borne by every rural individual and as well as rural society as a whole. One of these costs has been already discussed in the first objective where urbanization has a negative impact on agriculture. It also creates imbalance in rural-urban population. The expeditious urbanization will lower the population in villages and will in turn shift the productive workforce from rural to urban areas and will lower the growth as well as productivity in the rural side of the country. As mentioned earlier with urbanization arrive its consequences too. It has positive impacts on its surrounding like dispersion of better living facilities, job opportunities, income, wealth etc. (Spread effect). On the contrary there occurs backwash effect (Gunnar Myrdal) which when advances leads to decline in the level of economic activity in the backwoods declines. This happens when economic activity, power and wealth accumulates in one particular part leaving other surrounding areas under-

developed. Along with this, urbanization is characterized by approaching industrialization which further brings issue of environmental degradation. This creates new problems in rural areas of pollution (air, water, soil, noise etc.) which increases social cost. Social cost to rural community will take way for long-term social cost for the entire economy if the concerned issue gets neglected or unresolved.

Sustainable Village Model

The way here is to be achieved through trivializing the consequences of Urbanization. If urbanization has to advance, its progress has to be prosperous instead of being destructive. Destructive urbanization here we describe as the destruction of the agrarian nature of the rural economy, population imbalance (robust migration of rural people to urban areas), destruction of natural environment, loss of jobs in rural areas, increasing gulf between the rich and poor accompanied by widening income divergences. So an overall harm may be caused to the rural economy which is to be pondered upon and avoided by effective policy intervention.

The model is built carrying an idea that it should be constructed in such a way the village doesn't loses its inherent rural character and also gains advantage from the urbanization. The model includes qualitative as well as quantitative variables.

$$vd = f(p) \ldots(1)$$

A village's development depends upon its prosperity and engineering prosperity (equation 1) isn't an easy task. Here we have defined "vd" as village's development which is a function of "p" prosperity.

$$p=f(bn+agp+sb+en+if+w+d+ur)\ldots(2)$$

Another equation (equation 2) of the model explains that the prosperity of the village "p" is a function of fulfillment of the basic necessities "bn", agricultural production "agp" which needs to be above the ratio of 1.2:1(Output:Input), "sb" signifies revenue from the small businesses in which village community is engaged, the revenue here should be in excess of the cost incurred and the ratio between revenue and cost should be more than 1.1:1 (Revenue:Cost). "en" refers to the quality of natural environment in the village which is to be tested through scientific techniques and surveys at regular intervals, more specifically annually. "if" refers to presence of adequate and required infrastructure (in terms of educational, health related, transportation, connectivity, electricity etc.). "w" and "d" signify satisfaction of wants and desires respectively which is to be accounted by conducting social survey in the village. "ur" is an important factor signifying the positive impact of urbanization on rural economy or the village economy. This "ur" will help in creating more jobs in rural side, will make the infrastructure more viable, bring investment, modern facilities, and will not destruct the agricultural activity and the inherent character of the village or rural economy, in other words it will also not cause loss of farmland. Policy control has to play an important role in this area.

$$bn \rightarrow food+clothing+shelter$$

Basic necessities as widely considered, food clothing and shelter are the fundamental needs to be fulfilled as the first priority in any economy. It's ironical that we compare our country often with China but we tend to ignore the very fact that China has already over these obstacles and has fulfilled its basic necessities. But to India if it my take half a decade, so be it, what is more necessary at this point is understanding and accepting the prevalence of the problem and making a map to tackle it. Of course the policy implementation and intention has to be in same line.

$$bn=f(Y+S(e+c)+W)…(2.1)$$

How can basic necessities be fulfilled?

A question which is very common to our policy makers also becomes a challenge to our emerging economy. Basic necessities can be fulfilled if the people have sufficient income "Y", stock of saving "S(e+c)" , earlier savings as well as current savings and some stock of wealth "W". In the absence of these concerned variables the fulfilment of basic necessities would become a major problem and would require government intervention.

Also the idea behind this model is that the achievement of sustainable village model is not possible without government intervention and effective policy control. This is not just necessary for one single variable mentioned above in the equations but for every variable. This intervention by the government is imperative otherwise there will a risk of destructive urbanization. Also it needs to be seen that the urbanization does not enters robustly and paves it way into rural economy without paying any heed to development of the village society. When urbanization has to advance, its arrival has to slowdown so as the village economy can absorb the shock of its arrival. This where the government has to play an important role, it has to see that the village economy doesn't see destruction by urbanization, infrastructure needs to be planned. Any new license for any industrial setup must be granted with proper study of it pros and cons, its environmental consequences, its effect on the rural jobs, rural business (agriculture and non-agricultural) and even the culture of the rural society. Also if the setup of any industrial unit is of great importance and has the possibility of affecting the rural economy negatively then such setup must be accompanied by compensation to the village in the form of employment and better infrastructure (governmental intervention has its role here). The third equation of the model becomes as follows:

$$p=f(bn+agp+sb+en+if+w+d+ur)Gi…(3)$$

Here "Gi" as discussed before refers to governmental intervention where government through policy control will trivialize the consequences of urbanization on rural economy. With trivializing the consequences this factor will also see that the agenda of sustainable development will continuously take place. This government's intervention would be substantial in fulfillment of basic necessities, checking the optimum agricultural production, promotion of small businesses of rural people, ensuring safe natural environment, infrastructure and in the wake of urbanization factor and the same governmental intervention would be minimal in satisfying the wants and desires. This governmental intervention would have to decline with advancement of time as the

village is able to sustain itself in the wake of urbanization. The final equation can also be written as:

vd=f(bn+agp+sb+en+if+w+d+ur)Gi…(4)

or

vd=f(bnGi+agpGi+sbGi+enGi+ifGi+wGi+dGi+urGi)…(5)

This explains prosperity is also a function of village's development. This model if worked will prevent the rapid migration from rural to urban areas and may even cause counter[64] urbanization. Counter Urbanization may be good as well as bad. Good counter urbanization may occur when the returning population proves to be productive to the rural homeland and vice versa. This model doesn't claim to be a perfect econometric model but it is a model which is an attempt to help in the understanding of village's development in the further policy making. This model has not been tested and needs to be tested. A proper experiment is required for it verifiability.

Major Findings

After 1991 there prevails a strong negative correlation between agriculture and urbanization.

The New Economic Policy of 1991 has pushed the rate of urbanization in the upward direction.

In short-run the disguised unemployed population can be transferred to manufacturing sector and in long run even service sector can be explored in this regard.

Conclusion & Policy Recommendations

Economists have very little to say on the subject of repercussions of urbanization on agriculture. Here in this paper this compelling issue has been taken up and has been explored. It is plain that since 1991 urbanization is causing loss of farmland. This will lead to rural distress if not looked upon. This area needs to be pondered upon by the authorities and a planned urbanization is needed. Further, land monetization is also another issue which needs effective policy. Development of agriculture is indeed a necessity for large population's livelihood in our country. Loss of farmland cannot be treated lightly and will invite farmer's suicide if not eyed early. India holds the second largest farmland in the world and it is an opportunity of which we can reap maximum benefits. It's time to ponder on this issue and intervene with effective and efficient policies.

Given that the economic development requires manpower, India is rich in it. But so as to make effective use of it we need to tackle the problem of disguised unemployment in our country. Although there no data available regarding the percentage of population disguisedly unemployed, the paper makes rough estimate (assumption) of 25 percent of the people engaged in agriculture

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[64] Counter Urbanization means counter to urbanization migration taking place from urban areas back to rural areas.

are disguised unemployed, the way to extricate this population from agricultural sector is to transfer them to manufacturing sector in the short run and in the long run the disguised unemployed population can be transferred to service sector even, simultaneously with manufacturing sector through improvements in human resource infrastructure. A case of tradeoff of unemployed population between manufacturing, service and agricultural sector is also studied in very long period. Also it is understood that there are certain social costs incurred by rural areas at the cost of urbanization. Understanding the above scenario, a new sustainable village model is developed which claims to take advantage of urbanization and still doesn't loses its inherent rural character. It explains that prosperity can be engineered through village's development. It is a model to be experimented. This paper is also a move towards financial inclusion of the poor in the mainstream economy. The paper explains that inexorable urbanization can be taken up as an opportunity and it will pave way for further development. However no policies can act as magic bullets that can tackle the consequences of urbanization unless the gap between well-intentioned policies and implementation is bridged.

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THE ROLE OF SMALL SCALE INDUSTRIES IN AVERTING NEEDLESS URBANIZATION IN INDIA

Dr. D. Uma & R. Selvamani*

Introduction

Urbanization is a process whereby populations move from rural to urban area, enabling cities and towns to grow. It can also be termed as the progressive increase of the number of people living in towns and cities. It is highly influenced by the notion that cities and towns have achieved better economic, political, and social mileages compared to the rural areas. Accordingly, urbanization is very common in developing and developed worlds as more and more people have the tendency of moving closer to towns and cities to acquire "privileged" social and economic services as well as benefits. These include social and economic advantages such as better education, health care, sanitation, housing, business opportunities, and transportation.Urbanisation is an increase in the number of people living in towns and cities. Urbanisation occurs mainly because people move from rural areas to urban areas and it results in growth in the size of the urban population and the extent of urban areas. These changes in population lead to other changes in land use, economic activity and culture. Historically, urbanisation has been associated with significant economic and social transformations. For example, urban living is linked with higher levels of literacy and education, better health, lower fertility and a longer life expectancy, greater access to social services and enhanced opportunities for cultural and political participation (UNDESA, 2014). However, urbanisation also has disadvantages caused by rapid and unplanned urban growth resulting in poor infrastructures such as inadequate housing, water and sanitation, transport and health care services.

Reviews on urbanization

According to Philip M. Hauser & Leo F. Schnore (1967, p. 1) the reasons to emergence of cities are the size of total population, the control of natural environment, technological development and developments in social organization. The major triggering factor of developing

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cities is technology. Technology should be used correctly. Even if cannot be used correctly or without caring future, it cause some problems such as urbanization. Urbanization has lots of negative sides. In case, urbanization control by policy of sustainable development.

Gilbert and Gugler 1982]. A growth centre serves as an agent in an agropolitan district. The growth centre notion conceives of an urban complex containing a series of industrial enterprises. The centre provides a focus for the development of the centre's hinterland. Industries that consume agricultural products will create a market for the region's farmers, as will the growing concentration of urban inhabitants.

Bendavid-Val (1991)has argued that rural towns, given a welcoming environment, are logical business locations for many types of entrepreneurs.

Leidholm et al (1994) have also argued that rural towns help grow small enterprises. They serve as centres for marketing farm produce forobtaining wage employment, for engaging in non-farm enterprises, and for investing.

Datey (1999) in his study titled practice manual to smallscale Industries discusses the importance of small-scale industries, clubbing of clearances of SSI and an overview of income tax, central sales tax, Finance to SSI and management of SSI units.

Global trends in urbanisation

In 1960, the global urban population was 34% of the total; however, by 2014 the urban population accounted for 54% of the total and continues to grow. By 2050 the proportion living in urban areas is expected to reach 66% (UNDESA, 2014). Figure shows the change in the rural and urban populations of the world from 1950 through to projected figures up to the year 2050.
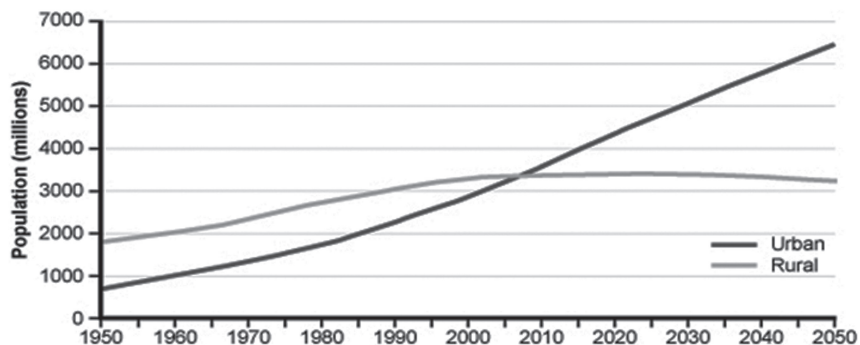
Urban and rural population of the world, 1950–2050. (UNDESA, 2014)

The two lines cross at about 2007 or 2008. This is when urban first exceeded rural population.

The process of urbanisation affects all sizes of settlements, so villages gradually grow to become small towns, smaller towns become larger towns, and large towns become cities. This trend has led to the growth of mega-cities. A mega-city is an urban area of greater than ten million

people. Rapid expansion of city borders, driven by increases in population and infrastructure development, leads to the expansion of city borders that spread out and swallow up neighbouring urban areas to form mega-cities. In 1970, there were only three mega-cities across the globe, but by the year 2000, the number had risen to 17 and by 2030, 24 more mega-cities will be added

The top mega-cities in the world in 1970, 2000 and 2030. (UNDESA, 2014)

From Figure in Africa how many mega-cities are predicted to exist by 2030

Six mega-cities are predicted to exist in Africa by the year 2030 – Luanda (Angola), Lagos (Nigeria), Johannesburg (South Africa), Kinshasa (Democratic Republic of Congo), Dar es Salaam (Tanzania) and Cairo (Egypt). There is one mega-city, Cairo, which has had a population of more than 10 million since 2000.

The global trend in urbanisation is not the same in all parts of the world. Asia and Africa currently have the highest rates of urbanisation. Figure shows a comparison of trends in more or less developed regions of the world.
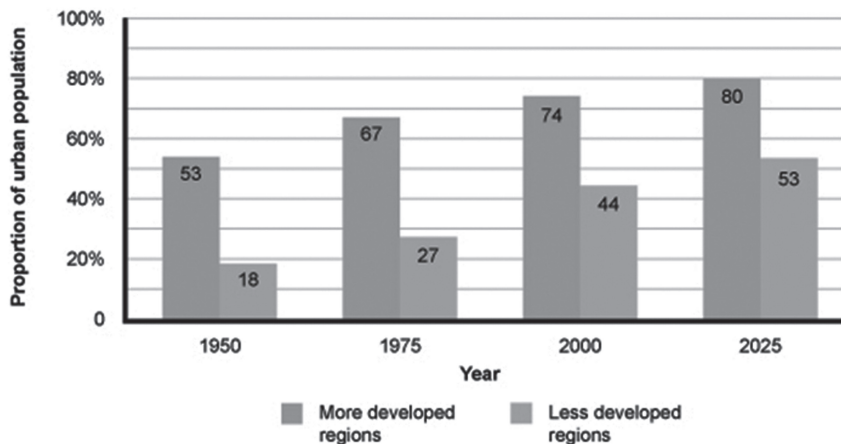
Trends in urban population growth, comparing more and less developed regions. The graph shows the proportion of the total population living in urban areas.

The growth of urban populations in less developed regions is increasing at a faster rate than developed regions. In 2000, in more developed parts of the world 76% of the population lived in urban areas and a small increase to 83% is forecast by 2030. In less developed regions, there was a much smaller proportion living in urban areas in 2000 (only 40%) but this is expected to increase significantly to 56% by 2030.The agricultural and industrial revolutions first sparked urban growth in the late 18th century and throughout the 19th century. The increasing number of factories in urban areas created a need for labour. In the United States and Europe, rural workers moved to the cities to satisfy this need. This initial movement was succeeded by the movement of others to provide various services for these workers. Each increase in the concentration of population further increased the social and economic opportunities for new migrants. **Industrialization, modernization and economic opportunity cause urbanization, or an increase in the number of people moving from rural to urban areas.** Urban areas offer better opportunities for employment, housing and education, and city living allows people to benefit from diversity and marketplace competition..

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Causes of Urbanization

Industrialization

Industrialization is a trend representing a shift from the old agricultural economics to novel non-agricultural economy, which creates a modernized society. Through industrial revolution, more people have been attracted to move from rural to urban areas on the account of improved employment opportunities.Industrialization has increased employment opportunities by giving people the chance to work in modern sectors in job categories that aids to stir economic developments.

Commercialization

Commerce and trade play a major role in urbanization. The distribution of goods and services and commercial transactions in the modern era has developed modern marketing institutions and exchange methods that have tremendously given rise to the growth of towns and cities. Commercialization and trade comes with the general perception that the towns and cities offer better commercial opportunities and returns compared to the rural areas.

Social benefits and services

There are numerous social benefits attributed to life in the cities and towns.Examples include better educational facilities, better living standards, better sanitation and housing, better

health care, better recreation facilities, and better social life in general. On this account, more and more people are prompted to migrate into cities and towns to obtain the wide variety of social benefits and services which are unavailable in the rural areas.

Employment opportunities

In cities and towns, there are ample job opportunities that continually draw people from the rural areas to seek better livelihood. Therefore, the majority of people frequently migrate into urban areas to access well paying jobs as urban areas have countless employment opportunities in all developmental sectors such as public health, education, transport, sports and recreation, industries, and business enterprises. Services and industries generate and increase higher value-added jobs, and this leads to more employment opportunities.

Modernization and changes in the mode of living

Modernization plays a very important role in the process of urbanization. As urban areas become more technology savvy together with highly sophisticated communication, infrastructure, medical facilities, dressing code, enlightenment, liberalization, and other social amenities availability, people believe they can lead a happy life in cities. In urban areas, people also embrace changes in the modes of living namely residential habits, attitudes, dressing, food, and beliefs.As a result, people migrate to cities and the cities grow by absorbing the growing number of people day after day.

Rural urban transformation

As localities become more fruitful and prosperous due to the discovery of minerals, resource exploitation, or agricultural activities, cities start emerging as the rural areas transform to urbanism. The increase in productivity leads to economic growth and higher value-added employment opportunities.

This brings about the need to develop better infrastructure, better education institutions, better health facilities, better transportation networks, establishment of banking institutions, better governance, and better housing. As this takes place, rural communities start to adopt the urban culture and ultimately become urban centers that continue to grow as more people move to such locations in search of a better life.

Effects Of Urbanization

Positive effects of urbanization

Urbanization yields several positive effects if it happens within the appropriate limits. Some of the positive implications of urbanization therefore include creation of employment opportunities, technological and infrastructural advancements, improved transportation and communication, quality educational and medical facilities, and improved standards of living. However, extensive urbanization mostly results in adverse effects. Below listed points are few of them.

Housing problems

Urbanization attracts people to cities and towns which lead to high population increase. With the increase in the number of people living in urban centers, there is continued scarcity of houses. This is due to insufficient expansion space for housing and public utilities, poverty, unemployment, and costly building materials which can only be afforded by few individuals.

Overcrowding

Overcrowding is a situation whereby a huge number of people live in a small space. This form of congestion in urban areas is consistent because of overpopulation and it is an aspect that increases day by day as more people and immigrants move into cities and towns in search of better life. Most people from rural or undeveloped areas always have the urge of migrating into the city that normally leads to congestion of people within a small area.

Unemployment

The problem of joblessness is highest in urban areas and it is even higher among the educated people. It is estimated that more than half of unemployed youths around the globe live in metropolitan cities. And, as much as income in urban areas is high, the costs of living make the incomes to seem horribly low.The increasing relocation of people from rural or developing areas to urban areas is the leading cause of urban unemployment.

Development of slums

The cost of living in urban areas is very high. When this is combined with random and unexpected growth as well as unemployment, there is the spread of unlawful resident settlements represented by slums and squatters. The growth of slums and squatters in urban areas is even further exacerbated by fast-paced industrialization, lack of developed land for housing, large influx of rural immigrants to the cities in search of better life, and the elevated prices of land beyond the reach of the urban poor.

Water and sanitation problems

Because of overpopulation and rapid population increase in most urban centres, it is common to find there are inadequate sewage facilities. Municipalities and local governments are faced with serious resource crisis in the management of sewage facilities. As a result, sanitation becomes poor and sewages flow chaotically, and they are drained into neighboring streams, rivers, lakes, or seas.Eventually, communicable diseases such as typhoid, dysentery, plague, and diarrhea spread very fast leading to suffering and even deaths. Overcrowding also highly contributes to water scarcity as supply falls short of demand.

Role of Small Scale Industries in Economic Growth

Small scale industries to a degree avert needless urbanization.

Small-scale rural industries cannot grow in backward villages where basic infrastructure facilities are not available. The promotion of dispersed growth-centres or small towns is essential

for the growth and development of rural small enterprises. Towns act as market centres for the surrounding villages

Small scale industry is playing a very important role in the industrial development of our country. The growth in employment in this sector over years has been remarkable. The total value of production of small scale units comes to nearly 40 percent of the total value of industrial output of the country. Over the years a heartening trend in exports has been observed in the shape of increase in exports of non-traditional items from this sector.

Small Scale Industries: An Important Catalyst for the Growth of India's Economy

A topic on business scenario in India is incomplete without mentioning of contributions of Tatas, Ambanis or Birlas... but uniformly important in stabilizing the economic growth of a country are its Small Scale Industries (SSI). Since independence, the small scale industries have rendered a major contribution to the gross domestic product of the country.They play a vital role in changing the industrial scenario and strengthening the industrial sector tremendously. They assist the utilization of assets for productive purposes with minimal initial resources. SSIs have contributed greatly in nurturing private enterprise and in hastening the economic development by generating employment, exports, and reducing local unevenness. This sector estimated to possess a huge potential in the growth of trade with the array of products it offers

With 40 percent share in total industrial output and 35 percent share in exports, small scale industries significantly contribute to the fiscal intensification of the country .The adored possession of India, the khadi handloom is a favourite product of these industries. Household products to raw materials for large scale industries mark the range of produce by these industries. They are instrumental in transfiguring the areas of horticulture, sericulture, fishery, and garments with the products they supply. The fine handicrafts for example the stunning artworks of sandalwood or metal idols are all the works of craftsmen from these industries. The traditional small scale industries that have been at hand for a long time form the crafty portion and tap the above fields. The progression of traditional small scale industries have made the modern industries which produce the day to day goods like hosiery products, leather products etc to more refined items like television and radio sets, electronics managing system. Pickles, papads, Bread, oils, wooden furniture, Exercise books, Wax candles etc also form the products on demand. In a nation like India small scale industries come as boons. They persuade entrepreneurship and help in employment of local populace. As per a report about 273 lakh people are working in small scale industries with a turnover of about 348,059 crores currently. The domestic talents are put to good use to produce commodities that have found market worldwide.

Advantages of small scale industries

(1) Employment: The cottage and small scale industries have a high employment potential. With less capital they can provide employment to a large number of people. It has been estimated that these industries have the potentiality to provide 8 to 10 times more employment than the large-scale industries.

In the period of 1994-95 to 2003-04 the employment in small-scale sector has increased from 191.40 lakhs. Has created that in the period of 10 years the small-scale sector has created 82.57 lakh employment opportunities. In 2014-15, 312.5 lakh people were engaged in this sector.

(2) More Output with less Investment: These industries, being labour intensive, require less capital investment. Thus, more production can be obtained with less investment. Besides, as the capital intensity of these 'industries is low, they can easily adapt themselves with changing trends in market demand and changes in technology.

The output produced by small-scale sector was worth Rs. 1,09,116 crore in the year 1994-95. It increased to Rs. 471663 crore by the end of year 2006-2007. The average growth rate of output has been greater than 12 percent in 2015-16. The share of small scale industries in the country's manufacturing output is around 39 percent.

(3) Export Earnings: Small scale and cottage industries have a high export potential. The products of these industries like handicrafts, embroidery, handloom, ivory products etc are in great demand in the foreign countries. It has been estimated that these industries account for about 30 per cent in over export earnings. This share can further be increased by appropriate policy measures. The exports from small-scale sector have increased from Rs. 29068 crores in the year 1994-95 to Rs. 150242 crores in the year 2005-2006.

(4) Labour Intensive: Small scale industries are labour intensive; they require less capital and more labour to produce a given output. Therefore, such industries are most suitable for countries like India which is characterized by shortage of capital on the one hand and abundance of labour on the other.

(5) Low Gestation Period: the small units can be set up within a short period of time. Likewise, the time-lag between investment and production is less in small-scale industries. They can increase the flow of consumer goods immediately because their method of production is simple and less time-consuming. Hence these industries can help in meeting the shortage of essential goods and commodities.

(6) Decentralized Economy and More Even Distribution of Income : The small units require less capital, which mains a large number of people can set up such units. Thus, the ownership of these industries is distributed in a broad-based way which helps to achieve a decentralized economy. Moreover, as these industries are labour intensive and proved employment to a large number of people, there is more even distribution of income.

(7) Balanced Regional Growth: Small scale and cottage industries can be more easily set up in the different parts of the country as they use locally available raw materials, labour, skill and capital. Thus, these small units are means to achieve a decentralized economy and bring about balanced regional development.

(8) Saving in Social Cost: The development of these industries help in saving social cost as they discourage large scale migration from rural areas to urban areas. As the workers get

employment in their areas, the social cost in terms of creating infrastructure like roads, power supply, housing, provision for drinking water, sanitation, health care, educational facilities etc. in the urban areas is reduced. This results in saving of social cost of development theseindustries. .

(9) Use of Locally Available inputs: These industries use locally available man power and physic resources which lead to more intensive use of land, forest, mineral resources and also products of agriculture and animal waste. This helps in developing other sector of the rural economy.

(10) Ancillary Industries: The small scale and cottage industries act as complementary to large scale units. Many of the products required by large scale industries can easily be produced by small units. For example, bolts and nuts, carriers for bicycles, cotton bobbins, starch etc. In short, small units can serve as ancillary units for-large scale industries.

Investment on Small scale Industries

Classification	Manufacturing Enterprises*. (Investment limit in Plant & Machinery)	Service Enterprises** (Investment limit in equipment)
Micro	Rs. 2.5 million / Rs. 25 lakh	Rs. 1 million / Rs. 10 lakh
Small	Rs. 20 million / Rs 2 crore	Rs. 50 million / Rs 5 crore
Medium	Rs.50 million / Rs. 5 crore	lakh Rs 100 million / Rs 10 crore

Growth Performance of Small scale Industries
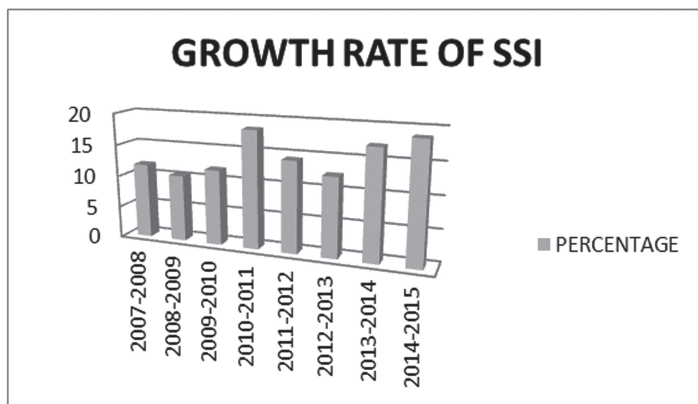
SOURCE: National small scale industries data

Small scale industries have shown constant growth rate around 11% every year till 2010-11. The highest growth in recent time was recorded during 2011-12 (18.45%) whereas during year 2012-13 and 2013-14 growth rate was around 14% and 12%, respectively. But it jumped to 17%

in 2014-15. However, recent data for 2015 i.e., from April-September, 2015 have shown impressive growth of 18.74% (year-on-year growth).

Policies formulated by the Government for the development of small scale industries

Mahatma Gandhi Institute for Rural Industrialisation (MGIRI)

The national level institute namely 'Mahatma Gandhi Institute for Rural Industrialization (MGIRI)" (erstwhile Jamnalal Bajaj Central Research Institute) has been established as a society under Societies (Registration) Act, 1860 at Wardha ,Maharashtra , to strengthen the R&D activities in KVI sector. The main functions of the Institute are to improve the R&D activities under rural industrial sector through encouraging research, extension of R&D, quality control, training and dissemination of technology related information.

Khadi & Village Industries Commission (KVIC)

The Khadi & Village Industries Commission (KVIC), established under the Khadi and Village Industries Commission Act, 1956, is a statutory organisation engaged in promoting and developing khadi and village industries for providing employment opportunities in rural areas, thereby strengthening the rural economy. The KVIC has been identified as one of the major organisations in the decentralized sector for generating sustainable rural non-farm employment opportunities at low per capita investment. This also helps in checking migration of rural population to urban areas in search of the employment opportunities.

The Coir Board

It is a statutory body established under the Coir Industry Act, 1953 for promoting overall sustainable development of the coir industry and improving the living conditions of the workers engaged in this traditional industry. The activities of the Board for development of coir industries, inter-alia, include undertaking scientific, technological and economic research and development activities; developing new products & designs; and marketing of coir and coir products in India and abroad. It also promotes co-operative organisations among producers of husks, coir fibre, coir yarn and manufacturers of coir products; ensuring remunerative returns to producers and manufacturers, etc. The Board has promoted two research institutes namely; Central Coir Research Institute (CCRI), Kalavoor, Alleppey, and Central Institute of Coir Technology (CICT), Bengaluru for undertaking research and development activities on different aspects of coir industry, which is one of the major agro based rural industries in the country.

The National Small Industries Corporation (NSIC) Ltd

It was established in 1955 by the Government of India with a view to promote, aid and foster the growth of small scale industries in the country. NSIC continues to remain at the forefront of industrial development throughout the country with its various programmes and projects to assist the MSMEs in the country. The main functions of the Corporation are to promote aid and foster the growth of micro and small enterprises in the country, generally on a commercial basis. It provides a variety of support services to micro and small enterprises by catering to their different

requirements in the areas of raw material procurement; product marketing; credit rating; acquisition of technologies; adoption of modern management practices, etc. The NSIC is directly operating different programmes by a dedicated team of professionals at all levels and operates through 142 offices located all over India and one office located at Johannesburg (South Africa)

National Institute for Micro, Small and Medium Enterprises

Entrepreneurship development and training is one of the key elements for the promotion of micro, small and medium enterprises (MSMEs), especially for creation of new enterprises by the first generation entrepreneurs. In order to inculcate the entrepreneurial culture amongst the first generation of entrepreneurs on a regular basis, the Ministry has set up three national level Entrepreneurship Development Institutes viz; National Institute for Micro, Small and Medium Enterprises (ni-msme) (1960) at Hyderabad ,The National Institute for Entrepreneurship and Small Business Development (NIESBUD) (1983) at Noida (Uttar Pradesh), , and Indian Institute of Entrepreneurship (IIE) (1993) at Guwahati, as autonomous societies.(NIESBUD and IIE have been transfered to MoSDE May 2015) National Institute for Micro, Small and Medium Enterprises (ni-msme) is engaged in developing training modules; undertaking research & training; and providing consultancy services for entrepreneurship development & promotion of MSMEs, including enhancement of their competitiveness. ni-msme proudly mentions to mention that during the last three years it has offered 4,931 training programmes benefiting 1,63,823 participants consisting of prospective/existing entrepreneurs and executives besides undertaking 31 National Institute for Micro, Small and Medium Enterprises MSME research and consultancy projects, attaining a cumulative growth of 12,040 training programmes, 4,00,505 participants and 885 projects.

 Over the years, ni-msme has expanded its reach to embrace the entire developing world. In the last three years, it has offered 64 programmes benefiting 1,221 executives of the developing countries. So far, 8,776 executives from 140 developing countries have profited from its expertise, knowledge and resources. The Institute's collaborative efforts with various international organizations and institutions make its endeavours more meaningful and its reach more extensive. The range of development work in MSMEs involves several department/ Ministries and different organisations of Central/ State Governments. To facilitate coordination and inter-institutional linkages and in pursuance of the MSME Development Act, 2006, a National Board for Micro, Small & Medium Enterprises consisting of a total of 47 members has been constituted with 20 non-official members. It is an apex advisory body constituted to render advice to the Government on all issues pertaining to the MSME sector. The Minister Incharge of MSME of the Government of India is the Chairman and the Board comprises among others, State Industry Ministers, some Members of Parliament, Secretaries of various Departments of Government of India, financial institutions, public sector undertakings, industry associations and eminent experts in the field.

The industries are characterized by the wise utilization of labour for the commodity production and the advantage lies in the fact that is consumption of ample labourers who are not qualified to work for the large scale industries and thus reducing unemployment and poverty in the country as well. Small Scale Industries help the financial system in promoting even-handed

development of industries across all the regions of the economy and also in the efficient distribution of money. Thanks to the measures of the government which have always supported the small scale industries. Government has reserved certain products for manufacture in the small scale sector in areas where there is an economic justification for such an approach to encourage these industries, there are about 675 items reserved for the small industries presently.. There are about 115.2 lakh small scale industries in the country which have influenced the economy of the country by a great deal. Victory stories of countless women who held on to small scale industries are widespread in recent times. Physically handicapped, abandoned and even illiterate inhabitants have found new lives by means of the small scale business.

Commodities form foreign countries like china and Singapore have hit the small domestic industries with cheaper price and superior quality goods. With the rise in the costs of raw materials it is intricate to maintain the unwavering manufacture and sustain domestic industries complain many small industry holders; nonetheless they are doing an enormous trade in promoting export and international relations with their "Desi" caliber and talents.

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Conclusion

Since the mega cities have reached saturation level for employment generation and to avoid over-crowding into the over-congested slums of megacities i.e Bombay, Calcutta, Delhi and Chennai. it is required to build strong economic sector in the rural (small scale industrial) economy. Growth efforts and investments should be directed towards small villages which have been neglected so far so that functional base of rural economy is strengthened. Policy should also be related to proper small scale industrial planning where village planning will consist of operational, developmental and restorative planning. Operational planning should take care of improvement of rural infrastructure, e.g. roads, traffic, transport etc. Small scale industries to a degree avert needless urbanization. The number of people migrating to cities in search of jobs shrinks by the employment options domestic industries create thereby reducing pollution and over population in cities and also helps in decentralized industrial expansion.

The main reason of a small scale industry is to achieve self-reliance by utilizing the resources available and harnessing the skills of local people to lay a platform that yields a steady income.

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URBAN DEVELOPMENT INDEX

Sivapriya, Sri Ranjani & Vasanthi S Pillai*

Introduction

Since Independence, the Indian cities have been developing at a rapid rate. Experts estimate that about 25-30 people migrate every minute to major Indian cities in search of better livelihood and better lifestyles. This has led to an upsurge of lot of problems in the cities, especially in terms of congestion and shortage of resources. Urban infrastructure is crucial for the development of any country worldwide and in this regard, many of the Indian cities have been lagging behind in terms of infrastructure and investment. Moreover, the concern is also about sustaining these cities over a period of time.[65] It is predicted that by 2050, Indian cities will house nearly 843 million people. This massive increase in population will put incredible pressure on India's cities, requiring new infrastructure for transportation, energy, housing, social security and safety.The development of socially inclusive urban cities is of extreme importance.

On the other hand, we can see that there are numerous policies like the Smart City Mission that aims to develop sustainable cities andthis mission is expected to support 100 cities eventually. However, 20 cities have been selected to participate in the first year of the program from which we have selected Chennai and Coimbatore for further analysis throughout this paper.

Need for an Urban Development Index:

When we look at the existing definition of an urban area, we see that it is very narrow in nature. According to Census of India, 2011, urban area may be defined as

1. All places with a municipality, corporation, cantonment board or notified town area committee etc.,
2. All other places which satisfy the following criteria

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[65] *Institute for Transportation and Development Policy [https://www.itdp.org/category/location/ india/coimbatore]*

a. A minimum population of 5,000

b. At least 75% of male main working population engaged in non-agri pursuits

c. A density of population of at least 400 per sq. km

We see that the above definition limits the scope and essence of urbanisation and also is quite lopsided. Going by this definition, would probably help us determine urban areas geographically but will not reflect various other qualitative factors that contribute to the process and state of urbanisation. Hence, there arises a need to comprehensively look at development of the urban areas. Merely classifying it on the basis the population i.e over 5000 people according to the definition does not reflect urbanisation in its true sense. Thus this study aims to construct a holistic index that includes all essential aspects of urbanisation, simultaneously widening the scope and flexibility of the meaning of urbanisation.

Mahmod Othman, Ku Ruhana KU-Mahamud,AzuralizaAbu Bakar: This particular paper utilizes the function of a fuzzy test for evaluating performance of various qualitative factors. The paper initially focuses on studying the quality of education by listing our various factors such as content, teaching art, attitude of teachers towards students, etc. The foundation on which this works is coding qualitative variables and enabling quantification to enable qualitative aspects for studies.

This paper facilitates the conceptualization of our study of constructing an urban development index, by giving enough emphasis to subjective factors and quantifying it through questionnaires and surveys from a diverse group of people. The Fuzzy method of evaluation helps us analyzing the responses we receive and impart it into this process of construction

Urban Development: The Logic Of Making Plans [By Lewis D. Hopkins]: This is an interesting book that deals with the planning of urban cities and hence involves a lot of methodologies and processes that are involved in the planning of urban infrastructure. The study proceeds to begin from the foundational aspect of urban development from land appropriation to setting up o municipalities. It further studies the logic behind these place through several statistical games to reason out every action that is taken. This book helps the process of constructing an urban development index by substantiating every factor that goes into study development. This is important as a validating factor as well as a mechanism to trace the evolution of urban development.

The Malaysian Urban Development: The Malaysian government's efforts to understand development of urban spaces is commendable. The study involves the quantification and comparison of 72 variables. This is an extensive study and supports the process of constructing an urban development index by providing a list of the most elements to be considered. However our study of constructing an urban development index will involve taking into consideration qualitative factors as well as narrowing down the factors to the most important and impactful ones.

Methodology

The data collected belongs to the range of period between years 2010 and 2015. The values of every variable under study is the latest available, hence the index constructed will measure the level of urbanization during the above mentioned period. The indicators are segregated into two sections, the first one being those indicators where a high value reflects efficiency and the second one where a low value reflects efficiency. The Urban Development Index is calculated by the following formula for both these sections:

Index values =   [Actual Value – Minimum Value]/[Maximum value – Minimum value]

The urban development index will be a combination of both these sections and comparisons are made in order to study the level of urbanization between different cities. The areas of study taken here for reference purposes are Chennai and Coimbatore.

Situated in the northeastern region of the State of Tamil Nadu, the city of Chennai is one among the four metropolitan cities in the country. The city is bordered by the bay of Bengal in the east and the districts of Thiruvallur and Kanchipuram. Despite being the smallest district in the state covering an area of only 175 sq. km, it is the most populous city. Apart from being the capital city, it is also called the "Detroit of India" as it attracts automobile makers with its port, educated labour force and hassle free business environment. The city portrays high degree of urbanization with zero rural population.[66]

Often referred to as the Manchester of South India, the district of Coimbatore is located in the southwestern region of Tamil Nadu, bordered by the state of Kerala and the districts of Thiruppur, Erode and Nilgiris. It is the third largest city in the state covering an area of 4732 sq. km. Having been the hub for cotton textile industries, Coimbatore district is administered by the Municipal Corporation of Coimbatore.

The reasons behind choosing these two cities for the study are as follows:

1. Primary reason being that these cities are a part of the Smart City Mission launched by the government of India.

2. Since the study calls for comparisons between different cities, choosing 2 cities from the same state would facilitate easier analysis. However the same could be extended to make intra-city and inter-city comparisons.

Choice of Indicators

There are numerous studies that either take a lot of indicators into consideration or take very few of them. The problem with the above situations is that taking a lot of indicators might become very complex and having too few indicators might not be holistic. Hence we have taken comprehensive indicators that are extremely crucial in reflecting the degree of urbanization.

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[66] *District Handbook – Census 2011 and World Statistic Journal*

The process of urbanization can be measured through various indicators and the construction of an urban development index involves the choice of specific indicators that reflect the level of urbanization. The following indicators have been taken into consideration.

Voter Participation Rate: This is measured as the percentage of people who have voted in a particular period to the total number of eligible voters in that particular period. This is an indicator that reflects the political participation of the society, which in turn signifies the social progress of an urban area.

Public Latrines: One of the major issues in rural areas is lack of sanitation infrastructure, on the contrary, the problem with urban areas is unsafe sanitationand hence this indicator has been taken into consideration. Public latrines is measured as number of latrines per sq. km.

Road Works: Mobility of population plays an important role in urbanisation and therefore the expenditure towards construction and maintenance of roadways is extremely significant. This is measured as percentage of expenditure on roads to total city level budget amount.

Density of Population: This indicator reflects the efficiency of land planning and is measured as no of people per square km.

ATM Density: Urban areas necessitate financial inclusion which implies the degree of mobility and liquidity of funds. This indicator is measured as no of ATMs per 100,000.

Education

"Education is the premise of progress, in every society, in every family." –Kofi Annan

The following indicatorsreflect the educationallevel in an urban area

Pupil Teacher ratio: This indicator is measured as the number of students per teacher and is a combined indicator which includes both primary and upper primary. Developed countries have set standards of low student pupil ratio which every society aims to achieve, as this indicates the efficiency of teaching-learning process.

Net enrollment ratio: According to UNICEF, The number of children enrolled in primary school who belong to the age group that officially corresponds to primary schooling, divided by the total population of the same age group. The purpose of choosing NER over GER is to show the extent of participation in a given level of education of children and youths belonging to the official age group corresponding to the given level of education

Adult literacy: As per UNICEF it is the Percentage of persons aged 15 and over who can read and write.

Number of Schools: This is measured as the number of primary and secondary schools per 10,000 population.This indicates the level of accessibility to education in an urban society

Expenditure on Education: Expenditure on education shows how much the government is inclined towards improving the educational infrastructure in terms of just not building new

institutions, but also upgrading them with latest technologies (like Smart class, computer labs etc) . This is measured as the percentage of expenditure on education to total expenditure in the city budget.

Health and Sanitation:Health indicators portray abundant information not merely about the level of urbanization but also about the impacts of urbanization. The following definitions are provided by the United Nation's Population Division

Birth Rate: This is measured as the annual number of births per 1,000 population.

Death rate: This is measured as the annual number of deaths per 1,000 population

Life expectancy: The number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth

Public health expenditure: Percentage of public expenditure on health to total city expenditure. Considering the fact that provision of health care is one of the most important duty of the government, this particular indicator will show the government's role in improving the social inclusiveness of the society.

Accessto Tap Water, Toilet facilities and connection to drainage

This indicates the percentage of households with access to tap water (from treated source) within Premises.

This indicates the percentage of households having toilet facilities within premises

This measures the percentage of household Waste water outlet connected to drainage

The above indicators are extremely important as they portray the quality of sanitation facilities in the locality

Housing

"Housing is essential to meet basic needs, such as shelter, but it is not just a question of four walls and a roof. Housing should offer a place to sleep and rest where people feel safe and have privacy and personal space; somewhere they can raise a family. All of these elements help make a house a home. And of course there is the question whether people can afford adequate housing." – OECD Better life Index

Dwelling type: General surveys show that maintenance and rebuilding of houses accommodate a significant proportion of the housing expenditure and hence the existence of permanent houses indicates the standard of living of the society and their affordability towards residing in permanenthouses and thus the level of urban development. This is measured as the percentage of permanent house to total houses

Ownership of houses: Although urban areas witness extensive migrant inflow, ownership of houses signify the real estate performance, the level of income and social standards of living in an urban area. This is measured as the percentage of people living in own houses to total houses

Electric power consumption: Power consumption indicates the degree of demand for goods and services, the consumption pattern and quality of life of people in an urban area, hence this indicator has been chosen. This is measured in KwH per capital.

Transport and Communication

Transport and communication delves into the networking and accessibility aspect of an urban space and hence is chosen to be a part of the index.

Mobile Subscriptions. The number of mobile subscriptions state degree of development in terms of communication and how it has turned into a necessity. This is measured as the number of mobile subscriptions per 100 of the population.

Public transportation: Public transportation not merely covers the number vehicles but also the quality of the services rendered in terms of building mobility in the city. This is the percentage of people using public transportation.

Automobile ownership: This covers private ownership of vehicles and indicates affordability of the urban population and can also reflect the inefficiency of the public transportation system. This is measured as the number of private ownership of automobiles per 1000 population.

Petrol and Diesel consumption: This is measured as the number of liters of petrol and diesel consumed by a person per month.

Sustainability

In recent times the crux of developmental agenda has been sustainability. For developing nations, the problem at hand is far more complex, as they have to tackle the issues of poverty and growth whilst promoting sustainable development.

Solid waste management: Solid waste generation and treatment has beenhindering the process of sustainability by inducing pollution and thereby have detrimental impacts. This indicator analyses how holistic the process of urbanization is.

Percentage of solid waste treated: This is measured as the as the percentage of waste treated to total waste generated

Solid Waste generation: This is measured as the per capita generation per day. This units it is measured inTonnes

Sewer connectivity: This is measured as the percentage of households with waste water line connected to the main sewerage system of the city.

Groundwater table level: Ground water table level reflects the level of exploitation of water resources and in turn marks the level sustainability attained in the urban areas. This is measured as the current level of ground water table and is quantified in metres.

Pollution Level (PM2.5):

Green/Alternate Energy: This is measured as the percentage of households that use alternate sources of energy, either partially or fully.

Safety and Security:

Safety and security reflects the level of peace in the society, simultaneously portraying the performance of government services towards betterment of social needs. Maintenance of law and order is an important essence of government's role and this can be reflected through the following:

Crime rates: This is measured as no of incidents per lakh population in a particular year

Road accidents: This is measured as the number of accidents per lakh population in a particular year

General Indicators:

These are some of the basic indicators that reflect the subsistence level of living, which covers the basic necessities in an urban area

Unemployment Rate: This may be defined as the percentage of unemployed population in the city

Per Capita Income(PCI): This may be defined as the income per person (in Rupees)

Construction of the Index:

Indicator	Minimum value	Maximum value	Actual Values		Index values		High/Low[67]
			Coimbatore	Chennai	Chennai	Coimbatore	
Voter participation ratio	0	100	68.1	60.5	0.605	0.681	H
Public Latrines	0	15	0.06	4.08	0.272	0.004	H
Road works (2011)	0	100	19.85	26.59	0.266	0.199	H
Density of population	5	19000	9950	26553	1.398	0.524	L
ATM Density	1	225	51	49	0.214	0.223	H
Pupil Teacher ratio	0	100	46.5	43	0.43	0.465	L

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[67] *H denotes the indicator where higher value denotes efficiency and L denotes the indicator where lower value denotes efficiency*

Net enrollment ratio (Primary and secondary combined)	0	100	**98.935**	**98.065**	0.981	0.989	H
Adult literacy (2011)	0	100	**91.3**	**90.18**	0.902	0.913	H
Public Expenditure on Education	0	100	**19.36**	**21.63**	0.216	0.194	H
Schools	0	100	**25**	**71**	0.71	0.25	H
Birth rate (2012)	5	50	**16**	**18.1**	0.291	0.244	L
Death rate (2012)	1	15	**11.3**	**8.8**	0.557	0.736	L
Life expectancy (2012)	25	85	**68**	**69**	0.733	0.717	H
Public Health expenditure	0	100	**9.8**	**11.6**	0.116	0.098	H
Dwelling type	0	100	**73.43**	**87.08**	0.871	0.734	H
Ownership (of houses)	0	100	**43.93**	**47.2**	0.472	0.439	H
Electric power consumption	35	55000	**4771.16**	**5416.15**	0.098	0.086	H
Mobile Subscriptions	4	325	**132**	**140**	0.424	0.399	H
Public transportation	0	100	**44.3**	**42**	0.42	0.443	H
Automobile ownership	2	1300	**96.64**	**324**	0.248	0.073	H
Petrol and Diesel consumption	0	100	**18**	**21**	0.21	0.18	H
% Waste treated	0	100	**46.01**	**46.15**	0.462	0.46	H
Solid Waste generation	0.1	5	**0.6**	**0.7**	0.122	0.102	L
Groundwater table level	0	50	**9.6**	**10.5**	0.21	0.192	L

Pollution Level (PM2.5)	6	100.8	**34**	**44**	0.401	0.295	L
Green/Alternative energy	0	100	**12.3**	**15.7**	0.157	0.123	H
Crimes	0	100000	**264**	**562**	0.006	0.003	L
Road accidents (2013)	0	100000	**1300**	**9705**	0.097	0.013	L
Unemployment rate	0	100	**3.21**	**2.32**	0.023	0.032	L
PCI	0	3740000[68]	**65781**	**57706**	0.724	0.733	H
Female Workforce par-ticipation	0	100	**25**	**19.40**	0.002	0.25	H
Urban Poverty rate (as a % of urban popula-tion)	0	100	**3.66**	**2.34**	0.023	0.037	L
Sex ratio	0	1000	**1000**	989	0.989	1	H
% of households with access to tap water (from treated source) within Premises	0	100	**98.21**	**84.08**	0.841	0.982	H
% of households having toilet facilities within premises	0	100	**82.5**	**94.57**	0.946	0.825	H
% of household Waste water outlet connectedto drainage	0	100	**89.58**	**97.27**	0.973	0.896	H
No. of Hospitals per 1,00,000 people *	0	100	**0.48**	**1**	0.01	0.005	H

[68] *The maximum value is based on the data of world's highest PCI converted in rupee terms as per the present exchange rates*

Analysis:

The calculated value of the index is as follows

	Chennai	Coimbatore
Less:	0.361	0.24
High:	0.614	0.406

The indicator where a low value reflects efficiency for Chennai is 0.361 and for Coimbatore it is 0.240, the indicator where a high value reflects efficiency is 0.614 for Chennai and 0.406 for Coimbatore. The index values for the cities are calculated by merging these two categories through range reversal. The optimum ranges will be:

	Range	**Degree of Development**
(a)	(0 - 0.499, 1- 0.8)	High degree of development
(b)	(0.499 - 0.799, 0.799 - 0.499)	Mediocre degree of development
(c)	(0.8 - 1, 0.499 - 0)	Low degree of development

From these ranges the Urban development index is calculated by the following formula

Urban Development Index = [(1-x) + y)]/2

Where, x is the index that represents efficiency when the values are less and y is the index that represents efficiency when the values are high This can be calculated for Chennai and Coimbatore as follows

Chennai-(0.361, 0.614)

The Urban development Index = $\dfrac{[(1-0.361) + 0.614)]}{2}=0.649$

Coimbatore: - (0.240, 0.406)

The urban development index = $\dfrac{[1-0.240 + 0.406)]}{2}=0.583$

Thus the above values of the Urban development Index indicate that the level of urbanisation in Chennai is higher than that in Coimbatore, since UDI for Chennai is 0.649 and Coimbatore is 0.58. This value not merely reflects the mainstream indicators, rather delves into widening the understanding of the process of urban development. Moreover, this indicator also reflects the sustainability in the process of development, wherein Chennai ranks better than Coimbatore, reinstating the fact that the value comprises a diverse set of variables that

Suggestions

- The questionnaire of the census has to be updated in terms of relevance since at presence the data collected is extremely basic and may not be able to facilitate an in-depth study. The nature of the questions should be conducive to conduct various developmental studies, considering the fact that the census is a major data bank for the researchers. Moreover, taking into consideration the fact that this is a grass root level index which in turn helps the concerned authorities to take initiatives in the areas that is required to be improved, such a modification in Census data collection will prove to be useful.

- This research proposes an inter-city comparison that is Chennai and Coimbatore, however this index can be extended towards intra-city comparison which has not been calculated in this paper primarily because of unavailability of intra-city data. If this index is calculated by specific committees that has the capacity to acquire intra-city data, this index will be helpful to understand the areas that have to be focused on as well as help in effective diversion of resources amidst areas in a city that requires the resource- attention, thereby facilitating an overall growth of the city and achieving efficiency in allocation and utilization of resources

- Gender discrimination being on the rise, the availability of gender disaggregated will help in improving the current index to also understand the inequalities in opportunities that urbanisation has created.

- This index, if adopted, may be revised once in five years in order to incorporate the changing times of society.

Conclusion

The planning of the urban development process is indeed not an easy task. It involves looking at the multitude of problems that has to be addressed in the light of 21st century modernism and developmental agenda. This means that sustainability and infrastructural development becomes a huge question mark. Historically speaking, there has always been devolution of cash from the state and central governments to make the cities competitive. However, misallocations of these funds have always been a hindrance to any such development. This, we feel, can be addressed only when we do an impact assessment study. Most of such studies become ineffective due to the inherent defects in the classical methods of assessment. Therefore, development of an Urban Development Index, as suggested in the study, would go a long way in addressing the issue, primarily because of the reason that this index shows where the cities are lagging behind and where they are doing well. This will thus help in proper diversion of resources, and thereby help in policy making of the local governments.

We need to address and reflect upon the fact that these days, economists and policy makers' main issue of concern is to sustain any form of developmental process. And, urban areas, being

the main hub of businesses, seem to have caused considerable amount of damage to the environment. Looking back at the index, one might find that the sustainability indices show that the cities development plans aren't sustainable enough. Hence, the local bodies can take actions accordingly to initiate the sustainable development, keeping in mind the Sustainable developmental Goals. This now paves way to implement the SDGs at a grass-root level, thereby creating a better impact.

The urban cities, in spite of being the center of attraction to most of the investments, there seem to be a lot of untapped potential, in terms of beautification, skilling the labour force, better social and physical infrastructure, bettering which will go a long way in improving the overall standard of living of the people. Thus, in conclusion, the paper has stressed upon the need of a single holistic index that will guide the process of development in any city.

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POVERTY: A TOLL ON URBANIZATION

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INTRODUCTION

As defined by the JOINT URBAN STUDIES CENTER (2006), "in terms of a geographical place urbanization means increased spatial scale /density of settlement/business and other activities in the other area during a specific period of time." Through this research paper, we try to figure out how a prevalent cause of societal progress hindrance, poverty, affects this societal trend.

The sample we have selected for our analysis is from the Indian Human Development Survey (IHDS). It is a nationally representative, multi-topic survey of 41,554 households in 1503 villages and 971 urban neighbourhoods across India. The second round of IHDS interviewed most of these households in 2011-12 (N=42, 152) and data for same is available publicly through ICPSR.

This paper focuses on the effects of poverty on urbanization in India as a whole. The data includes samples from both rural and urban areas. While this sources provides rich micro level information through a representative sample, there have been a limited number of studies that attempted a rigorous analysis of this data set.

REVIEW OF LITERATURE

Poverty is a deprivation of basic capabilities rather than merely lowness of income. Further, enhancement of substantive freedoms, which provide people with capabilities to choose a life they have reason to value should be the main objective and primary means of development. (Sen, 2001). [Development as Freedom]

Three broad concepts of poverty can be identified. Poverty can be defined as subsistence, inequality and externality. Subsistence is concerned with the minimum provision needed to maintain health and working capacity. Inequality is concerned with the relative position of the income groups to each other. Externality is concerned with the social consequences of poverty

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for the rest of society rather than in terms of the needs of the poor (Martin Rein, 1970). [Poverty in India: Global and Regional Dimensions]

Needs which are unmet, can be defined satisfactorily only in terms relative to the society in which they are found. However, the distinction between 'absolute' and 'relative' poverty or between 'basic' and 'cultural' needs is not acceptable, because the needs which are believed to be basic or absolute can be shown to be relative. Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the types of diet, participate in the activities, and have the living conditions and amenities which are customary, or at least widely encouraged or approved, in the societies to which they belong. Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary patterns, customs and activities. Therefore, poverty must be regarded as a general form of relative deprivation which is the effect of misdistribution of resources and that section of the population whose resources are so depressing from the mean as to be deprived of enjoying the benefits and participating in the activities which are customary in that society can be said to be in poverty (Townsend, 1979). [Poverty in the United Kingdom]

Now, coming closer to home, we find that compared to the all-India poverty level, rural poverty in India is lower, and the poverty gap is also considerably lower. By contrast, urban poverty– both headcount rate and poverty gap – is about the same as the all- India level. Urban poverty is much higher than rural poverty, a somewhat anomalous finding given differentials across urban and rural areas in other living standards indicators. (M. H. Suryanarayana, 2003) [Economics Weekly]

The finding that urban poverty is higher than rural poverty is difficult to reconcile with other evidence such as superior educational attainments, access to services etc. in urban areas. Higher urban poverty rates come from the fact that the urban poverty line, at Rs 511.44 is around 65 per cent higher than the rural poverty line of Rs 309.59. The large gap between the Planning Commission's urban and rural poverty lines stem from the choice of price indices used for adjusting the poverty lines over time [Deaton 2001].

OBJECTIVE

To deduce the causes and effects of poverty on urbanization in India and suggest methods to eradicate the same

India is one of the fastest growing economies in the world clocked at a growth rate of 7.6% in 2015, but poverty still remains a persistent issue. The World Bank international poverty lines definition is based on purchasing power parity basis at $1.25 per day .A realistic definition and comparison of poverty must consider the differences in the cost of living as well because then currency fluctuation and nominal number becomes less important. In India the poverty line per day is Rs.50.

METHODOLOGY OF THE STUDY:

The present study is based on Secondary data; secondary data has been collected from Books, journals, Annual reports, and internet sources.

Our study deals with deducing the set of factors that cause poverty and the measures that can be implemented to break this "cycle of poverty".

Tablet.1: Trends in Incidence of Poverty: All-India

Year	Rural Sector		Urban Sector		Combined	
	%of poor	No of poor (million)	poor	No of poor (million)	%of poor	No of poor (million)
All India						
1973-74	56.44	261.29	49.23	60.31	54.93	321 .60
1993-94	37.27 (50.10)	244.03	32.36 (31.80)	76.34	35.97 (45.30)	320.37
2004-05	28.30 (41.80)	220.90	25.70 (25.70)	80.79	27.50 (37.20)	301.72
2009-10	22.42 (36.50)	184.95	19.27 (19.80)	67.33	21.57 (31.99)	253.28

Sources; Karnataka economic survey.

The above statistics gives an understanding of the percentage of poverty prevalent in India which leads to problems in urbanization in this state. We intend to take the above survey at hand, study the findings, analyse and interpret the factors that are hindering the urbanization in the state. We urge the Indian government to work closely with UNITED NATION working for SUSTAINABLE DEVELOPMENT GOAL and eradicating poverty.

DESCRIPTIVE STATISTICS

1. The data below is a cross tabulation between the credit acess available to individuals from the urban and rural areas.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
URBAN2011 = 1 (FILTER) * BankAccountandPOAccount	81302423a	100.0%	0	0.0%	81302422.763	100.0%

a. Number of valid cases is different from the total count in the crosstabulation table because the cell counts have been rounded.

2. The data below is a cross tabulation between the individuals living below poverty line (BPL) from the urban and rural areas.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
URBAN2011 = 1 (FILTER) * BPL	81302423a	100.0%	0	0.0%	81302422.763	100.0%

a. Number of valid cases is different from the total count in the crosstabulation table because the cell counts have been rounded.

3. The data below is a cross tabulation between the individuals who have availed education up to or beyond higher secondary from the urban and rural areas.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
URBAN2011 = 1 (FILTER) * Education	81273337a	100.0%	29085.763	0.0%	81302422.763	100.0%

a. Number of valid cases is different from the total count in the crosstabulation table because the cell counts have been rounded.

Now, considering only the urban sample, we do a cross tabulation based on metro and non-metro areas.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
METRO = 1 (FILTER) * Education	27528539a	100.0%	0	0.0%	27528538.686	100.0%
METRO = 1 (FILTER) * BankAccountandPOAccount	27528538a	100.0%	.686	0.0%	27528538.686	100.0%
METRO = 1 (FILTER) * BPL	27528538a	100.0%	.686	0.0%	27528538.686	100.0%

a. Number of valid cases is different from the total count in the crosstabulation table because the cell counts have been rounded.

1.1   VARIABLES USED

1) DEPENDENT VARIABLE – Median of per capita income

The per capita income of an area affects the poverty positively. The increase in per capita income leads to the decrease in poverty, which in turn leads to the increase in the economic activities of the region and thereby urbanization.

2) INDEPENDENT VARIABLES: -

• **Percentage of people having higher secondary education or greater than higher secondary education-** Higher education directly translates to higher pay in the future, which ensures that the per capita income of a household increases due to the presence of more skilled labour, which in turn leads to urbanization.

• **Percentage of people with credit access-** The greater the number of people with Bank Accounts and P. O. Accounts, the greater is the possibility that they can avail loans and other banking facilities, which in turn lead to the reduction in the number of households living under poverty.

• **Average of no. of loans availed in the past 5 years-** If the loans availed is high, it means they have more resources available to increase business, thereby increasing the per capita income.

• **Average of the largest loan availed by the people in the last 5 years-** If the loan availed is high, it translates to the fact that the individual is susceptible to higher income and thereby a stable, if not higher, per capita income. This would also ensure that the economic activities in the area would be sustainable and thereby ensure the urbanization process to run smoothly.

• **Percentage of people living below the Poverty Line-**The number of people living below poverty line has much less per capita income, which does not allow the growth of economic activities in the region, thereby posing a threat to urbanization.

• **Metropolitan cities present-** The greater the number of metropolitan cities, the greater are the economic opportunities for an individual to earn from. This in turn allows the prevalent growth of per capita income, thereby attracting more households to migrate to these areas.

The total agricultural and non-agricultural incomes of the people- High non-agricultural income indicates that apart from agriculture, there are other economic activities which allow the residents of that area to earn revenues from; thereby increasing per capita income and supporting the process of urbanization.

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1.0 ECONOMETRICS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708a	.502	.498	16019.43017

a. Predictors: (Constant), POOR_mean, DB2_mean, DB2B_mean, INCBUS_mean, Largest 6 metro areas 0/1, BankAccountandPOAccount_mean, Education_mean

ANOVAa

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	250336793262.950	7	35762399037.564	139.358	.000b
Residual	248666856602.174	969	256622143.036		
Total	499003649865.124	976			

a. Dependent Variable: INCOMEPC_median

b. Predictors: (Constant), POOR_mean, DB2_mean, DB2B_mean, INCBUS_mean, Largest 6 metro areas 0/1, BankAccountandPOAccount_mean, Education_mean

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	9590.336	1875.701		5.113	.000
Education_mean	43301.247	2534.645	.454	17.084	.000
BankAccountandPOAccount_mean	6739.805	2081.487	.079	3.238	.001
DB2_mean	-1321.066	448.112	-.069	-2.948	.003
DB2B_mean	.005	.003	.042	1.829	.068
Largest 6 metro areas 0/1	6142.890	1294.706	.112	4.745	.000
INCBUS_mean	.031	.003	.236	10.006	.000
POOR_mean	-22651.481	4299.024	-.135	-5.269	.000

a. Dependent Variable: INCOMEPC_median

Histogram
Dependent Variable: INCOMEPC_median

Mean = -8.59E-17
Std. Dev. = 0.996
N = 977

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: INCOMEPC_median
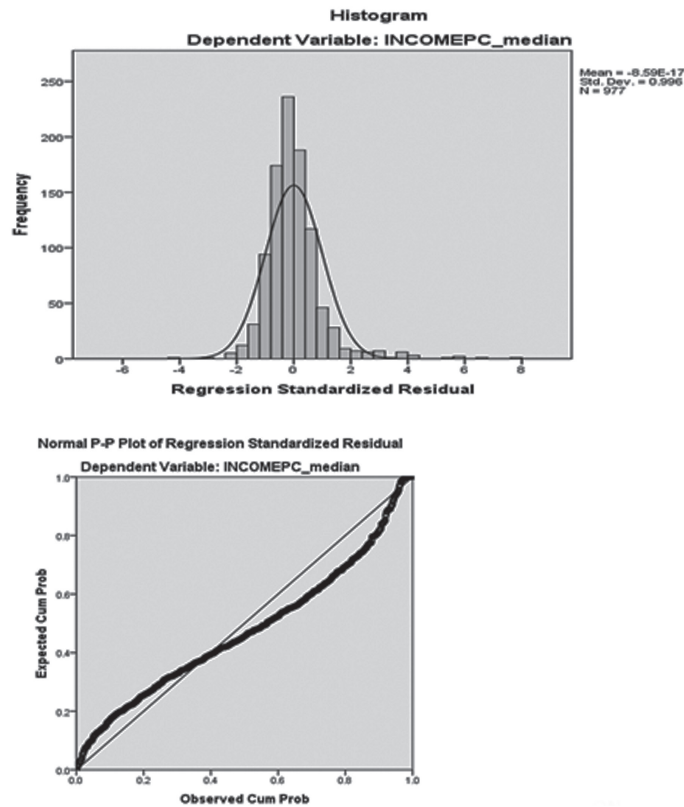
CONCLUSION

The objective of this analysis is to explain how poverty affects urbanization in rural as well as urban areas in India. As mentioned earlier, regression analysis was carried out for rural and urban, metro and non-metro cities. The results for the regression indicate that the model explains the variability of the response data around its mean very well.

In the current data model, the null hypothesis selected is that the value of beta is equal to 0, where beta refers to the amount of change in the Y on one unit of change in X. Here, all the chosen independent variables are significant, as all their values are less than 0.10.

The F-ratio in the **ANOVA** table tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predict the dependent variable, $F(7, 969) = 139.358$, $p < .0005$ (i.e., the regression model is a good fit of the data).

Unstandardized coefficients indicate how much the dependent variable varies with an independent variable when all other independent variables are held constant.

So, considering each of the unstandardized co-efficients :

- Education – For a unit increase in the percentage of population with higher secondary or greater level of education, per capita income increases by 43301.247, thereby reducing the poverty of the region and promoting urbanization due to the presence of more skilled labour.

- Access to Credit - For an unit increase in the percentage of population having access to credit, per capita income increases by 6739.805. This ensures that the economic processes of the are remain sustained, thereby allowing urbanization to occur and poverty to reduce.

- No. of loans availed in the last 5 years - For an unit increase in the average number of loans availed by the individuals or households in the past 5 years, per capita income decreases by -1321.066. This comes from the fact that, even though loans are available, the per capita income of the individuals decreases while paying back the loans along with a high interest rate. This can cause several individuals to live below poverty line and thus dis-allow urbanization.

- Average of the largest loans availed in the last 5 years - For an unit increase in the percentage of population earning revenues from non-agricultural activities, per capita income increases by 0.5%. This is a direct implication from the concept that availability of loan allows the sustainment of several economic activities, providing several avenues for income for an individual or household, thereby increasing the per capita income, which in turn assures the curbing of poverty and the promotion of urbanization.

- Total non-agricultural business of the region - For an unit increase in the percentage of population earning revenues from non-agricultural activities, per capita income increases by 3.1%. This is directly linked to the fact that presence of several types of economic activities in the region allow individuals to earn revenues from various aspects and not only depend on agriculture, which implies that the per capita income of the individuals can go up, thereby curbing poverty and promoting urbanization.

- No. of people living below the poverty line (low per capita income) - For an unit increase in the percentage of population living below the poverty line (BPL), per capita income decreases by -22651.481. This directly translates to the fact that poverty becomes prevalent in these regions, which essentially hampers the urbanization by causing a hindrance to several economic activities.

NEED FOR SUSTAINABLE URBANISATION IN INDIA

Aaqib Javed & Nisha Nujumudeen*

In urbanisation, you think big because you are thinking decades ahead. Kushal Pal Singh

INTRODUCTION

Urbanisation refers to as a shift from a predominantly rural to a predominantly urban society and it is seen as the way to modernize by the transfer of population from the rural to urban centres. Urban growth in India is in the transition or acceleration stage and we may witness massive increase in urbanization and significant restructuring of the economy in next two to three decades.

Kingsley Davis, an eminent sociologist and demographer had explained the process of urbanisation through its three stages. In the first stage, called the initial stage the society is primarily rural, settlements are dispersed, workforce is mainly occupied in agriculture and the growth rate of urban population is low. Urbanization level in the initial stage is below 10 per cent. In the second stage, as the urbanization level crosses 30 per cent mark, and structural transformation happens in the economy with rising contribution of industrial and service sectors in the Gross Domestic Product (GDP) and increasing spending on social overheads, rural urban migration picks up and urbanization accelerates; thus this stage is referred to as the acceleration or the transition stage. In the third stage, when the urbanization level crosses 70 – 75 per cent, it is said to reach the terminal stage, and it stabilizes around this level.

In India, the level of urbanisation is in acceleration or transition stage, according to 2011 census, more than 377 million people comprising of 31.16 per cent of total Indian population were living in urban areas, which is having a relatively slower pace as compared to 45 per cent in China, 54 per cent in Indonesia, and 87 per cent in Brazil. However, the absolute level of urban challenge is very large because even at mere 31 per cent, India has more than 377 million people living in Indian cities and towns.

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The trend in urbanization in India indicates that not only is the urban population growing at an alarmingly high rate but also that this population is concentrating in large cities and existing urban agglomerations. As per Census 2011, about 43 percent of urban population live in 53 cities with population of over a million. Class-I cities with population over 0.3 million account for about 56 percent of the urban population and class-II cities with a population of 0.1 million to 0.3 million account for another 14 percent. In addition to high concentration of urban population in large cities, there is some evidence that other urban growth nodes are emerging. In 2011, India has 53 cities with population of more than a million which is projected to increase to 87 cities by 2031.

The Census of India recognizes all those settlements as urban which either have a statutory status like municipal committee/corporation/notified area committee/cantonment board, estate office, etc. this is called as statutory town.

Other settlements which fulfil all the following three conditions simultaneously; (i) A population of more than 5000; (ii) More than 75 percent of the male working population is engaged in non-agricultural activities; and (iii) Density of population is more than 400 persons per square kilometre, these are called as census town.

According to census 2011, the number of towns in India increased from 5,161 in 2001 to 7,935 in 2011. Almost all of this increase was due to the growth of 'Census towns' (which increased by 2,532) rather than 'statutory towns' (which increased by only 242). The trend indicates that there is a significant spillover of existing cities into 'peri-urban' areas. Given the spillover of existing cities into 'peri-urban' areas, the deficit in infrastructure and better public services in India's urban areas is not only large but growing.

Therefore, India's economic growth momentum cannot be sustained if urbanisation is not actively facilitated.

OBJECTIVE OF THE STUDY

- To examine the trends and pattern of urbanisation in India and various government initiatives taken for sustainable urbanisation in India.

- To elucidate various problems that have emerged due to the existing pattern of urbanisation and to forecast future challenges that will inflate in India.

- To provide suggestions and recommendations for achieving sustainable urbanisation in India.

METHDOLOGY

The study is descriptive in nature and tries to bring out the problems in the ongoing pattern of urbanisation and need for an alternative pattern which is under sustainable level or a level of urbanisation which is easily manageable given the public resources available in one area. The methodology adopted for this study is based on secondary data which are obtained from various books, journals, articles, websites related to the topic under study.

TRENDS AND PATTERN OF URBANISATION IN INDIA

The release of urbanisation figures from the 2011 Census has evoked several reactions. For the first time the absolute growth in urban population (91 million) is more than its rural counterpart (90.5) and slightly higher than expected. Urbanization follows economic growth. People concentrate in urban areas because this is where new investment and new jobs are created. So in many ways, urbanization is a reflection of economic success. It reflects the increasing proportion of GDP generated by industry and services – and the increasing proportion of the labour force working in industry and services.

TABLE 1: TRENDS OF URBANISATION IN INDIA FROM 1951-2011\

Census Year	Total Population (in crores)	Urban Population (in crores)	% Urban
1951	36.11	6.24	17.3
1961	43.92	7.89	18.0
1971	54.81	10.91	19.9
1981	68.33	15.95	23.3
1991	84.63	21.76	25.7
2001	102.86	28.6	27.8
2011	121.02	37.71	31.16

Sources: Various Census reports

As per the UN Habitat's World Cities Report 2016, urban India will be a home to 600 million (40 per cent) people by 2031 and the urban sector share to gross domestic product will increase from 66 per cent in 2011 to 75 per cent in 2031, and urban population is further estimated to reach about 800 million by 2050, when one out of every two Indian is expected to be living in urban areas.

According to the World Bank report 2015, Leveraging Urbanization in South Asia Managing Spatial Transformation for Prosperity and Liveability, highlights these spiralling urban pressures and calls India's urbanisation "messy and hidden". Messy urbanisation refers to more congested cities, poor housing facilities and urban slums etc on the whole this hampers the quality of living in cities. Messy urbanization is reflected in the almost 65.5 million Indians who, according to the country's 2011 Census, live in urban slums, as well as the 13.7 per cent of the urban population that lived below the national poverty line in 2011.

On the other hand, hidden urbanisation refers to the phenomena whereby the available urban statistics understates the population living in areas that have urban characteristics but falls outside the municipal boundaries. According to the Agglomeration Index, a globally applicable alternative measure of urban concentration, the share of India's population living in areas with

urban-like features in 2010 was 55.3 per cent. This compares to an official urban share of the population of just over 31.16 per cent, indicating the existence of considerable hidden urbanization. The main reason for "messy and hidden urbanisation" in India is unchecked unplanned urbanisation which puts tremendous pressure on infrastructure, basic public services, land, housing, environment etc.

Table 2: Population of India in towns 2001-2011

Census Year	Total number of towns	Statutory Towns	Census Towns
2001	5161	3799	1362
2011	7935	4041	3894

Sources: 2011 Census reports

Now that if we dig deeper into the problem of "hidden urbanisation" in India, the major surprise came with the number of census towns (CTs) rising from 1,362 in census 2001 to 3,894 as per census 2011, while the number of statutory towns (STs) increased marginally from 3,799 in census 2001 to 4,041 by census 2011. Up to 2001, the focus on Census Towns was limited; as their share in the total urban population was low (7.4% in 2001) and their numbers were growing gradually. However, the sudden increase in the number of Census Towns has highlighted the need for more attention to this class of settlements. Moreover, during the decade period 2001-2011 the lion's share of increase in total towns came from census towns with 2,532 and alongside meagre increase in statutory towns of just 242 during the same period.

Actually, state governments have the flexibility to declare a particular area as an urban territory for administrative purposes. Given the fact that traditionally, the central government has invested more in rural areas than in urban areas, many areas shy away from declaring themselves as "urban" despite meeting all the defined conditions. This is evident from the fact that the number of census towns in India have increased from 1,362 in 2001 to 3,894 in 2011. But the number of statutory towns has not increased dramatically during this same period. As a result there are many areas with urban like features have large population but don't have statutory status of a town. Therefore, doesn't have adequate level of urban infrastructure, basic public services delivery, lack in better housing facilities, etc.

At the central level, nodal agencies which look after program and policies for urban development are **Ministry of Housing and Urban Poverty Alleviation (MoHUPA) and Ministry of Urban Development.** Urban development is a state subject. At state level there are respective ministries, but according to 74th Constitutional Amendment act, 1992, it is mandatory for every state to form Urban Local Bodies (ULBs) and devolve power, conduct regular election, etc. Under 12 schedule of Indian constitution, 18 such functions have been defined which are to be performed by ULBs and for that states should support the ULBs through finances and decentralization of

power, for more autonomy. But this is not uniform throughout all the states and still more is need to be done to empower ULBs in India. Urban areas are managed by urban local bodies (ULBs), who look after the service delivery and grievance redressal of citizens. There are eight type of urban local government in India- Municipal Corporation, Municipality, Notified area committee, Town area committee, Cantonment board, Township, Port trust and Special purpose agencies.

However, despite significant growth in urbanisation, there is significant growth in the slum and squatter settlements also in urban India. Within the urban population, there is a rapidly growing informal sector whose ability is limited and gives way to mushrooming slums in the urban areas; the major policy concern for India is the widening gap between demand and supply of housing units and inadequate housing finance solutions. This is posing a new challenge to the Policymakers and urban planners.

MAJOR GOVERNMENT INITIATIVES TAKEN FOR SUSTAINABLE URBANISATION IN INDIA

The role of government in planning and funding for a better sustainable cities cannot be overlooked as various initiatives were launched by government of India from time to time for a better city life for its urban dwellers, In this direction major initiative launched by central government was **JNNURM (Jawaharlal Nehru National Urban Renewal Mission)** in 2005for focused and integrated development of the urban infrastructure and services, initially for 63 cities. This program was to be continued till 2012, but it has been extended, covering more number of cities. Focus of JNNURM was on provisions for urban poor, including housing, water supply and sanitation, urban transport, road network, and the development of inner/old city areas, etc. The scheme had the following four components:

- **Urban Infrastructure and Governance (UIG):** To provide for urban infrastructure projects relating to water supply, sewerage, SWM, roads etc in 65 mission cities

- **Basic services to the Urban Poor (BSUP):** To provide social housing and slum development projects in 65 mission cities

- **Urban Infrastructure and Development Scheme for Small and Medium Towns (UIDSSMT):** To provi de urban infrastructure projects in small and medium towns

- **Integrated Housing and Slum Development Programme (IHSDP):** To provide social housing and slum development in non-mission cities & towns

Rajiv Awas Yojana was launched in 2011 for creating "slum free India" as a pilot project for two years. But now it has been extended till 2022. It is applicable to all slums in the city whether notified or non-notified. It is also applicable to urban homeless and pavement dwellers. The 2011 Census was the first one that collected data on people living in slums that have become commonplace in a rapidly urbanizing India. It found that around one out of every six households in urban India (17.4%) is in a slum, and that well over one-third of all slum households in the country (38%) are in cities with a population in excess of a million.

Apart from these initiatives, Government of India has also launched the Urban Rejuvenation Mission in June, 2015 to efficiently manage the rapid urbanization and transform the cities into vibrant economic units and better living spaces for the people. The Urban Rejuvenation Mission comprises of three flagship programmes *viz., Smart Cities Mission, Atal Mission for Urban Rejuvenation and Transformation (AMRUT) and Housing for* All in urban areas. The Smart Cities Mission will develop 100 cities of excellence; this will include creative, cyber, digital, e-governed, entrepreneurial, intelligent, knowledge, harnessing the power of Information and communication technology (ICT). Smartness has to be there with respect to governance and service delivery. AMRUT aims to upgrade key infrastructure including piped water supply and sewerage to all households, storm water drainage, walking and cycling infrastructure and green open spaces in 500 class-I cities. Government of India would be spending about Rs.1 lakh crores on Smart Cities Mission and AMRUT over the five year period from 2015 to 2020. Similar amount would be invested by State Governments and Urban Local Bodies. "Housing for All (HFA) in urban areas" aims to provide a house to every family residing in urban areas, by 2022. Housing shortage in urban India is estimated at about 20 million. Another important urban sector programme launched by the Government is "Swachh Bharat Mission" which aims to make India open defecation free (ODF) by 2 October, 2019. The programme includes elimination of open defecation (ODF), conversion of insanitary toilets to pour flush toilets, eradication of manual scavenging, Municipal Solid Waste Management and bringing about a behavioural change in people regarding healthy sanitation practices and increasing awareness among citizens about sanitation and its linkages with public health. Policies to incentivize Waste to Energy, Waste to Compost, and construction & demolition waste management projects have been put in place to incentivize municipal waste management. In addition, in order to preserve and revitalize the soul and unique characteristics of 12 heritage cities Government launched the National Heritage City Development and Augmentation Yojana (HRIDAY) in 2014. Funding of Rs 500 crores is being provided by the Central Government for HRIDAY projects. The High Powered Expert Committee 2011 (HPEC 2011) has estimated the investment requirements for urban infrastructure over the 20 year period (2010–2030) at Rs 39.2 lakh crores at 2009-10 prices, of this, Rs 17.3 lakh crores (or 44 per cent) is accounted for urban roads. The backlog for this sector is very large, ranging from 50 per cent to 80 per cent across the cities of India. Sectors delivering urban services such as water supply, sewerage, solid waste management, and storm water drains will need Rs 8 lakh crores (or 20 per cent). The Committee has made explicit provision of Rs 4 lakh crores towards investment in renewal and redevelopment including slums.

ISSUES AND CHALLENGES DUE TO EXISTING PATTERN OF URBANISATION

There are many issues and challenges due to the unplanned, unorganised, unchecked pattern of urbanisation which is prevailing in urban cities and adjoining towns. Some of the major issues which need to be brought under limelight are as follows:

1. **Messy Urbanisation:** The number of statutory towns reported as slums according to census 2011 are 2,613 towns which accounts for around 64.6 per cent of the total

statutory towns which was 4041 that time. The total slum population was estimated to be over 65 million of total urban population. Therefore, this fact indicates that urbanisation has led to congestion of urban areas which has in turn made urban towns more like urban slums.

2. **Hidden Urbanisation:** The number of census towns have shown tremendous increase between the last two census period of 2001-2011, the reason being that mostly state governments are reluctant to recognise urbanisation because then as per law urban local bodies should be formed and revenue and autonomy should be decentralised from the hands of state to local government.

3. **Poor urban governance:** Indian municipalities are amongst the weakest in the world in terms of access to resources, revenue raising capacity, and fiscal autonomy. The ratio of municipal revenues to gross domestic product (GDP) at factor cost in India is estimated at 1.03 per cent for 2012-13, compared to South Africa (6.0 percent) and Brazil (7.4 percent). The municipal sector is not only weak but have been subjected to significant erosion of fiscal autonomy over the years as municipal tax-GDP ratio stood at 0.33 as against combined tax-GDP ratio of central and states at 17 per cent for the year 2012-13.

4. **Lack in delivery of basic services:** The Twelfth Five Year Plan (FYP) points outthat as per Census 2011 only 70.6 per cent of urban population is covered by individual water connections; duration of water supply ranges from 1 hour to 6 hours and per capita supply of water ranges from 37 litres per capita per day, Almost 50 percent of households in cities like Bangalore and Hyderabad do not have sewerage connections, about 13 percent of urban households do not have access to any form of latrine facility and defecate in the open, less than 20 percent of the road network is covered by storm water drains. Such problems are likely to worsen in the near future given the unchecked growth of urban centres and agglomerates.

5. **Poor urban health conditions:** As per Mercer's Quality of Living Ranking 2016,Hyderabad is the highest-ranked Indian city at 139 out of 230 cities. At 162, New Delhi comes in last among the seven Indian cities. But such poor ranking figures are not new, the 2015 Economist Intelligence Unit's Liveability Ranking of 140 cities put New Delhi and Mumbai towards the bottom quarter of the list, New Delhi is ranked 110, while Mumbai was ranked 115 out of 140 cities. Thus, the above figures are sufficient to highlight the poor quality of living standards in Indian cities and the reason behind this is urban congestion, pollution, slums, sanitation various other poor health related indicators.

SUGGESTIONS AND RECOMMENDATIONS FOR SUSTAINABLE URBANISATION IN INDIA

Sustainable urbanisation can be referred to as urban development which strives to meet the essential needs of all, without overstepping the limitations of the natural environment. A sustainable city has to achieve a dynamic balance among economic, environmental and socio-cultural development goals, framed within a local governance system characterized by deep citizen involvement and inclusiveness. (McCarney, 2006)

The newly adopted 2030 Agenda for Sustainable Development presents 17 Sustainable Development Goals that replace the previous Millennium Development Goals. As per the sustainable development agenda goal 11 seeks to: "Make cities and human settlements inclusive, safe, resilient and sustainable." This stands-alone goal on cities recognizes the transformative role of urban areas towards building sustainability in the post-2015 Development Agenda.

As recommended by the World Cities Report, (2016) the followings are essential for sustainable urbanisation, especially in developing countries like India were improvement in basic socioeconomic conditions have been long overdue.

SUSTAINABLE INFRASTRUCTURE

A core component of a sustainable cities agenda is sustainable infrastructure— the interconnected physical and organizational structure, set of services and system that supports the daily functioning of a society and its economy. Sustainable infrastructure is that which is designed, developed, maintained, reused, and operated in a way that ensures minimal strain on resources, the environment and the economy. It contributes to enhanced public health and welfare, social equity, and diversity. Investment in sustainable infrastructure is pivotal in planning for the sustainable development of cities. Despite the importance of urban infrastructure, there is a clear under-investment as characterized by the backlog and state of deficient infrastructure.

SUSTAINABLE URBAN MOBILITY

To provide access to safe, affordable, accessible and sustainable transport systems for all, is a factor of inclusion and integration, urban mobility has a specific transformative role. Urban mobility is a multidimensional concept, encapsulating the multitude of physical components pertaining to urban transport (air, road, and rail systems, waterways, light and heavy rail, cable cars) including the economic, environmental and social dimensions of mobility. Sustainable urban mobility provides efficient access to goods, services, job markets, social connections and activities while limiting both short- and long-term adverse consequences on social, economic, and environmental services and systems. A sustainable mobility strategy serves to protect the health of users and the environment, while fostering and promoting the city's economic prosperity. An evolving trend is the cultural shift away from auto-dependency. Singapore, Hong Kong and Tokyo are examples of cities where the costs of car ownership and use have been set high and planning strategies have emphasized development patterns oriented to transit, walking and cycling. Moreover, use of low-carbon emission vehicles, electric vehicles, or use of bio-fuel or solar energy for transport vehicles will be sustainable for future urban mobility. Transportation in urban centres is a major constraint. Currently, public transport accounts for less than a quarter of urban transport in India. Therefore, urban mass transit including metro, rail, electric buses and trams as well as other forms of public transport must be greatly strengthened especially in under-served urban centres.

SUSTAINABLE USE OF ENERGY

For ensuring a healthy and liveable environment, global efforts in the transition to sustainable energy are pivotal. As cities represent more than 70 per cent of global energy demand,

while many renewable energy technologies remain more costly than conventional sources and are often overlooked, it is important to note that investment in renewable cleaner energy can reduce health impacts from air pollutants, which can severely impact quality of life and place strains on health care systems. Increasing renewable energy sources, maximizing conservation and lessening dependence on non-renewable sources of energy, particularly those most damaging and contributing to global warming, are critical steps to sustainable urbanisation. For instance, use of solar energy for street lighting, bus stand, railway station etc. and use of other renewable sources of energies for power generation for public utilities.

RESILIENCE TO RISKS

A growing international focus on resilience is a core agenda item for cities today. The increase in severe weather events and natural disasters has highlighted the need for cities to augment their ability to withstand the disaster risks they may face, and to mitigate and respond to such risks in ways that minimize the impact of severe weather events and natural disasters on the social, environmental, and economic infrastructure of the city. Consequently, city leaders have been making significant transformative changes and investments in the resilience of their cities.

Some other major suggestions for achieving sustainable urban development are as follows:

Harnessing the rural-urban continuum

As India's labour force witnesses a rural to ur¬ban shift, it is of critical importance that the rural and urban areas develop in a symbiotic manner by adopting a "regional planning approach." The new initiative of RURBAN Mission is a step in this direction. The focus would be to have appropriate synergy and convergence of various schemes of different ministries for sustainable and inclusive rural-urban continuum.

Promoting inclusive ur¬ban development

A mix of strategies has been planned for pro¬motion of inclusive urban development. It would consist of (a) universalization of basic services, including education and health; (b) governabili¬ty of cities focussed on social cohesion, especially among classes that stand excluded from the de-velopment mainstream and civic engagement; (c) access to housing as a tool for alleviating poverty and as a growth escalator; and (d) putting in place a strategy for reducing "working poverty."

Empowering urban local bodies and Good urban governance:

Empowerment of local government i.e., Urban Local Bodies (ULBs), are the foundation of a forward-looking urban strategy. A cooperative federalism framework is warranted to promote cities as locomotives of growth and structural transformation. Urban Local Bodies should be given more powers in terms of access to resources, revenue-raising capacity building and fiscal autonomy. Local government can embrace "golden rules" and adopt 'users pay', 'beneficiaries pay', 'polluter pay',exacerbaters pay','congesters pay', and 'growth pay' instruments this kind of public policy will be revenue generating of urban local bodies.

Strengthening housing finance system:

The focus would be on strengthening the housing finance system in the country for accessible housing finance for the urban poor by addressing demand-side and supply-side constraints. The strategy would include: (a) providing affordable housing for all the people by a target date; (b) ensuring better living conditions for the slum population; (c) promoting cost-effective innovative building material and technologies, and use of local resources that are environmental-friendly; (d) increasing the range of types and opportunities of housing to maintain city diversity and inclusiveness; (e) bringing vacant houses to use through fiscal incentives and regulatory changes; (f) preventing the phenomenon of homelessness via national policies linked to regional and local policies of housing rehabilitation, involving NGOs and local authorities including law and order authorities ; (g) linking housing sector with strong economic growth and job creation; (h) Adequate housing finances should be provided to urban dwellers by Public-Private Partnership (PPP).

Well –planned urbanisation

Indian cities must be better managed by proper planning through sustainable means and resources with the help of urban planners, to improve the overall quality of living of people in cities and towns. Moreover, by proper monitoring of urbanization which is a vital role of planners, governmental and non-governmental organizations for implementing policies to optimize the use of natural resources and accommodate development at the same time minimizing the impact on the environment.

CONCLUSION

All the evidences points towards the fact that it is high-time; if necessary steps and actions are not being taken in order to manage the inevitable rise in urban population, majority of Indian cities will turn out to be" Urban Slums" with high rate of pollution, poor quality of life, inefficient delivery of public services, lack of adequate urban infrastructure etc. Thus, there is need for sustainable urbanisation in India.

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DEVELOPMENT OF INFRASTRUCTURE: A MACROECONOMIC ANALYSIS.

Ankan Ghosh, Bandhuli Ray & Debapriya Das*

INTRODUCTION

Capital accumulation results when certain proportion of income is saved and invested in order to augment the future output and income. The investment in physical capital or the directly productive capital is complemented but what is called the "social and economic infrastructure". This includes construction of roads, railways, sanitation, and innovation in irrigation etc. This type of investment in infrastructural capital "facilitates and integrates economic activities".

There have been many studies carried out in this field which argue that, presence of adequate investment in infrastructure is crucial for the modernization and commercialization of the different sector and achievement of income surplus for capital accumulation. As the Human Development Report of India, 2011 states there is a positive relationship between the level of economic development and quality of housing and access to basic amenities like electricity, safe drinking water, toilets etc. Hence an important way to raise per capita income of individuals and improve economy's productive potential is the spend on infrastructure.

Often, inadequate infrastructure and services becomes binding constraint on production and growth for infrastructure suppliers and leads to low efficiency in the production of output. In this context we must have a look at the World Development Report, 1994 published under World Bank states. It says, "...the adequacy of infrastructure helps determine one country's success and another's failure in diversifying production, expanding trade, coping with population growth, reducing poverty or improve environmental condition

Investment in infrastructure is mainly in two forms- private investment in infrastructure and public (govt.) investment in infrastructure. Private investments include all the investment carried out by private enterprises, for example building of factories, offices etc. And public investment in infrastructure includes investment in the construction of roads, railway, sanitation etc.

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Our main motivation to set up the model of this paper is based on the works by Lance Taylor,

Variety of Stabilization Experiences. In mid 1980s the World Institute of Development Economics Research ran a development program which produced 18 country case studies. This was done under the supervision of the World Bank and the IMF. Taylor has used these studies as the basis for a summary volume. The work is divided into four main categories namely, external strangulation and external bonanza, orthodox stabilization with regressive income re-distribution and heterodox stabilization. Within these framework synopses of the country studies are deployed. The rest of the paper is organized as follows:

In Section 2 we build up a Neo-classical full employment model. We use standard optimization framework. In section3 we carry out a comparative static exercise. In section 4 we sum up the major findings of the paper.

Infrastructure Linkage and Challenges

Linkage effects of infrastructure development may provide a road map to the policy makers in directing scarce resources. Some of the aspects of the forward and backward linkages are as follows: Infrastructure includes both economic (water, power, telecom etc.) and social infrastructure which includes the development of social sector (health and education). To assess the impact of physical infrastructure, we may use the Herschman's theory of unbalanced growth. If infrastructure of overhead sectors develops then the unit cost of production falls. This in turn increases profitability of other sectors producing consumer goods (directly productive activities). This is true for different sectors namely agriculture, industry and service sectors as well. On the other hand, development of social infrastructure has an immediate bearing on educational attainment and gender empowerment as well. This in turn helps in reducing poverty.

Infrastructure development has always been a concern of policy makers. This can be achieved through the domestic ways by resource mobilization or inflow of capital from abroad or a suitable combination of both. In this context, the recent policy initiatives of the Government of India are worth mentioning:

1. The Government of India has relaxed rules for FDI in construction sector by reducing minimum built-up area as well as capital requirement. It has also liberalized the exit norms.

2. The Government of India has announced highway projects worth USD 93 billion which include government flagship National Highways Building projects (NHBP) with total investment of USD 45 billion over the next three years.

3. In the Budget-2015-16, the capital outlay for roads and railways have been increased by Rs. 140.3 billion (USD 2.11 billion) and Rs. 100.5 billion (USD 1.51 billion) respectively.

4. The Government of India has earmarked Rs. 50000 crore (USD 7.53 billion) to develop 100 smart cities across the country. The GOI released the list of 98 cities for the smart cities project in August 2015.

India is now the fourth largest economy in the world. However, a factor which continues to remain a drag on our development is the lack of infrastructure. Casual empiricism shows that the lack of proper infrastructure pulls down the GDP of our country by 1-2% every year. The goal of inclusive growth and a 9% GDP growth can be achieved only if we overcome the deficit of infrastructural. There are several challenges that this sector faces. Financing remains a perpetual challenge in infrastructure which is underdeveloped in our country. The public sector have been the main investors in the infrastructural projects however post reform the investment in infrastructure is more through the public private partnership. Next land acquisition is looked upon as one of the largest roadblock for infrastructure development as land is one of the main pre-requisite for the development of infrastructure, acquiring land turned out to be a curse for many potential projects. Inadequate regulatory framework has proved to be another stumbling block in the road to infrastructural development. This feature is primarily responsible for delays in completion that most of the infrastructural projects in our country face along with inefficiency in approval process. A rigorous process that ensures the transparency and quality is important, however, bureaucratic complexities and protracted procedures for securing approval often act as serious disincentives for potential investors. Also, the rural urban divide that exists in our country in terms of infrastructure services make the general budgetary support in the form of tax-incentives or direct allocations to infrastructure services more widely available necessary over long term.

THE MODEL

Let us suppose we have two sectors that are the Firm sector and the Household sector. In this model we make a simple macro-economic analysis of the introduction of infrastructural capital in an economy and show the long run dynamics later in the model. We start our model by the optimizing behavior of firms and the household sector. Labor demand, labor supply and employment are obtained from the optimization exercises. We assume there are two time period1 and 2. Assume that the period1 is the current period and period2 will be reached in the long run i.e. it is the future period.

FIRM'S OPTIMIZATION

The firms produce its optimum output by choosing labor and capital. The firm uses two kinds of capitals, which we denote as private infrastructural capital and private infrastructural capital and labor (L) to produce output (Y). Suppose that the firm has a production technology of C.R.S type given as follows:

$$Y = Kp\alpha. Kg\beta. L1-\alpha-\beta \quad 0 < \alpha, \beta < 1 \ldots\ldots\ldots\ldots(1)$$

Where Kp: private infrastructural capital

Kg: Public infrastructural capital   L: labor

We differentiate Y partially w.r.t. L to get the i.e. the marginal product of labor. In period1:

$MPl = \partial Y \, \partial L = (1 - \alpha - \beta).Kp\alpha.Kg\beta.L - \alpha - \beta > 0$ ....$(0 < \alpha, \beta < 1)$.............(2)

$\partial M \, \partial LPl = (1 - \alpha - \beta)(-\alpha - \beta).Kp\alpha.Kg\beta.L - \alpha - \beta - 1 < 0$ ... . $(0 < \alpha, \beta < 1)$........(3)

From the above two equations we have a downward sloping MPl curve. The demand for labor is dependent on the marginal product it produces and therefore MPl curve is nothing but the labor demand curve. At the optimum the value of the marginal product of labor must be equal to the money wage the firms pays to the workers. This is the optimality condition which must be fulfilled and is represented by the following:

$VMPl = P.MPl = W$ ....(4)

Where, W is the nominal wage rate, P is price and $VMPl$ is the value of marginal labor productivity. From equation 4 we have, in period1:

$MPl = w1 \, where, \, w1 = WP1$

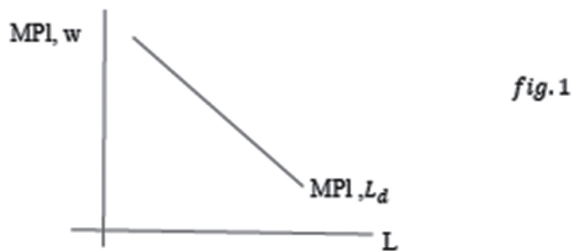Marginal product of labor is equal to the real wage in each period1 and period2.

In period 1we have, therefore:

$(1 - \alpha - \beta).Kp\alpha.Kg\beta.L - \alpha - \beta = w1$.............(5.1)

Similarly in period 2 we have

$(1 - \alpha - \beta).Kp\alpha.Kg\beta.L - \alpha - \beta = w2$ (5.2)

Equation 5 gives us the downward sloping labor demand curve. Shown in figure below:

2.2. THE HOUSEHOLD OPTIMIZATION

2.2.1. Let us suppose that the consumers derive utility from consumption and leisure in both the period. The utility in the second period, however has been discounted. The consumer tries to maximize their utility subject to an inter-temporal budget set. Let the utility functions be of the following form.

$U = U1(c1, l1) + \rho U2(c2, l2)$ ....(6)

We maximize U w.r.t $c1$, 1, $c2$, $l2$ and subject to

$w1(T - l1) + rw2(T - l2) = c1 + \quad rc2$............(7)

Here, Ui: utility in the ith period ci: Consumption in ith period. li: leisure in the ith period.

Where i=1,2 and is the discounting factors

$$1 + \rho$$

We set up a Lagrange function Z to maximize utility.

$$Z = U_1(c_1, l_1) + \frac{1}{1+\rho}U_2(c_2, l_2) + \lambda\left[w_1(T - l_1) + \frac{1}{1+r}w_2(c_2, l_2) - c_1 - \frac{1}{1+r}c_2\right]$$.........(7.1)

[The first order conditions for maximization are:

$$\frac{\partial Z}{\partial c_1} = U_{1c_1} - \lambda = 0 \dots\dots\dots\dots. (8)$$

$$\frac{\partial z}{\partial c_2} = \frac{1}{1+\rho}U_{2c_2} - \frac{\lambda}{1+r} = 0 \dots\dots\dots. (9) \qquad \text{Here, } U_{ic_i} = \frac{\partial U_i}{\partial c_i}$$

$$\frac{\partial z}{\partial l_1} = U_{1l_1} - \lambda w_1 = 0 \dots\dots. (10) \qquad \text{and } U_{il_i} = \frac{\partial U_i}{\partial li}, i=1,2$$

$$\frac{\partial z}{\partial l_2} = \frac{1}{1+\rho}U_{2l_2} - \lambda w_2 = 0$$.........(11)

$$\frac{\partial z}{\partial \lambda} = w_1(T - l_1) + \frac{1}{1+r}w_2(c_2, l_2) - c_1 - \frac{1}{1+r}c_2 = 0$$.....(12)

We have $L = (T - l)$ ....(13)

Where , T: total time

L: labor supply

From the optimality conditions given above we obtain consumption profile and labor supply over time i.e. . Given quasi-concave utility function, that is second order conditions of utility maximization is fulfilled and assuming the substitution effect dominates the income effect we have the following properties:

i. Rise in r reduces current consumption and increases savings. Moreover, rise in r increases current labor supply.

ii. Rise in w (say in period 1) will increase savings and current consumption and also labor supply.

Therefore we get an upward sloping labor supply curve in period 1.
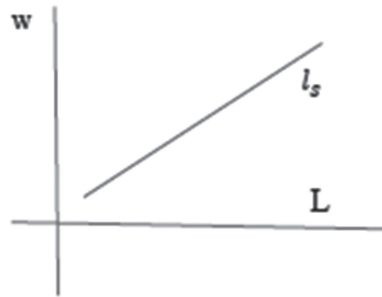
*fig.*2

Results in the next period will follow similarly as in case of period one.

2.2.2. THE LABOUR MARKET EQUILIBRIUM
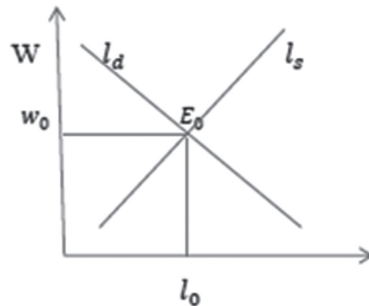
*fig.*3

The labour market equilibrium occurs where labour demand and labour supply equals. That is at $E0$. The labour market has flexible wages and the labour market clears with $w0$ as equilibrium wage and $l0$ as the equilibrium level of employment.

2.1. COMMODITY MARKET EQUILIBRIUM

2.3.1The commodity market equilibrium will determine the real interest rate. The commodity market equilibrium is shown as:

$(w1, w2, r) + T = G + Ip + Ig$ ....(14)

Where, Savings is a function of real wage and real interest rate, as shown earlier.

Ip: Infrastructural investment in private sector.

Ig: Infrastructural investment made by the Govt.

 G: Govt. consumption expenditure T: Tax revenue.

This approach could have another view, which is the loanable fund approach. This $(w1, w2, r)$ may be seen as the demand for loanable funds and $(G - T) + Ip + Ig$ is the demand for loanable funds on a flow basis. The rate of interest is obtained at the equilibrium of the supply and demand of loanable funds. We can therefore say that financing of investment on infrastructure is brought in by the generation of savings.

2.3.2. Determination of equilibrium interest rate.
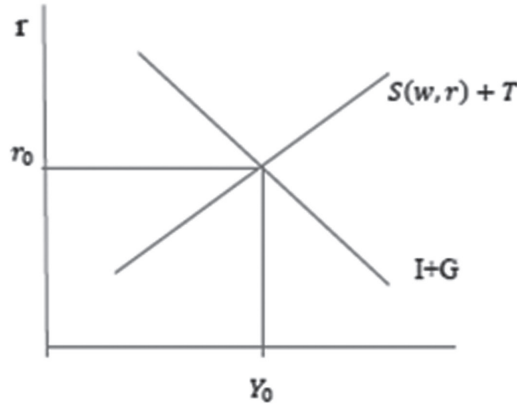
fig.4

Therefore the equilibrium interest rate is determined by the commodity market equilibrium.

2.3.3. We assume Simple Quantity Theory of Money holds.

$$MV = PY$$

$$M = kPY \ldots \ldots \ldots (15)$$

Where $M : Money$

$k : inverse\ of\ velocity\ of\ money.$

$P : price\ level$

$Y : output$

From the labor market equilibrium we have the wage rate. The commodity market equilibrium gives the interest rate which affects the labor supply positively. The working of the model simply starts with the dynamics which shows the change in the infrastructural capital accumulation in the long run and its effects on various economic variables.

2.2. DYNAMICS

2.4.1. Overtime it is noticed that both the private infrastructural capital and public infrastructural capital changes. The change in either form of infrastructural capital is the investment

in the capital over the depreciation of the capital. For simplicity we assume that the rate of depreciation is same for both kinds of capital. From the Neoclassical theory of investment we borrow the idea that $(MPk- r)$. Investment depends on the marginal product of capital and the real interest and some policy parameters(which have been dealt later in the paper).

Now, we have, $\dot{Kp} = (MPkp- r, \psi) - \delta Kp$.................(16)

$\dot{Kg} = (MPkg- r, \phi) - \delta Kg$..................(17)

Where, $\dot{Kp}$: $change\, in\, private\, infrastructural\, capital$ $\dot{Kg}$: $change\, in\, government\, infrastructural\, capital$.

δ: $rate\, of\, depriciation$.

The two policy parameters are $\psi\, and\, \phi$.

Where ψ: $Investment\, tax\, credit$. ϕ: $Government\, policy\, regarding\, infrastructure$.

The marginal product of capital is derived from the production technology used by the firms and denotes the demand for capital.

$MPkp = \alpha. Kp\alpha-1. Kg\beta. L1-\alpha-\beta$..................... (18)

$MPkg = \beta. Kp\alpha. Kg\beta-1. L1-\alpha-\beta$......................... (19)

Steady state level of capital formation occurs when the change in the capital stock is zero. No further capital is added or removed. This is shown mathematically as follows:

$\dot{Kp} = 0\, and\, \dot{Kg} = 0$

I.e. when $(MPkp- r, \psi) = \delta Kp$

And $(MPkg- r, \phi) = \delta Kg$

2.4.2 Change of $Kg\, and\, Kp$ on $Kg=0$ and $Kp=0$

When Kg increases, from equation (19) we have that $MPkg$ falls. The fall in the marginal product of public capital is guaranteed by the law of diminishing returns to factors and thereby leading to the fall in Ig. We also note that δKg goes up invariably.

Therefore from equation (17) we have

$\dot{Kg} = Ig(MPk- r, \phi) - \delta Kg\, falls$

Therefore, we see that when Kg rises, $falls$. The change in the capital formation falls invariably.

Now we see when Kp rises, from equation (19) we have that   rises which in turn increases Ig.

Again from equation (17) we have

$\dot{Kg} = Ig(MPkg- r, \phi) - \delta Kg\, rises$

Therefore we see that when Kp increases, $\dot{}rises$ invariably.

From the above discussion we can write change in the public infrastructural capital depends on both levels of infrastructural capital i.e. public and private infrastructure capital. This is mainly because the private investment in infrastructure is crowded in by the public investments. $K\dot{g}$ as a function of $Kp\,and\,Kg$.Where Kg is positively related to the former and negatively related to the later.

$K\dot{g}$ $= f(Kp, Kg)$............. (20)

And $fp{>}0$ and $fg{<}0$

Where $fp = \partial\ \partial fKp$ and $fg = \partial\ \partial fKg$

Next we take total differential of equation (20) we have,

$fpdKp+ fgdKg$= 0 Next we take total differential of equation (20) we have,

$fpdKp+ fgdKg$= 0

Or $= - ffpg{>} 0$ .... $[{>} 0\ and\,fg{<} 0]$

From the discussion, we have an upward sloping $Kg\dot{=}$ 0 line in the $KpKg$space.

Similarly, we have for $Kp{=}$ 0,

When Kp increases $K\dot{p}$ ${<}0$

And   when Kgincreases $K\dot{p}\ rises$ and hence we have an upward sloping $Kp{=}0$ line in the $KpKg$ space.

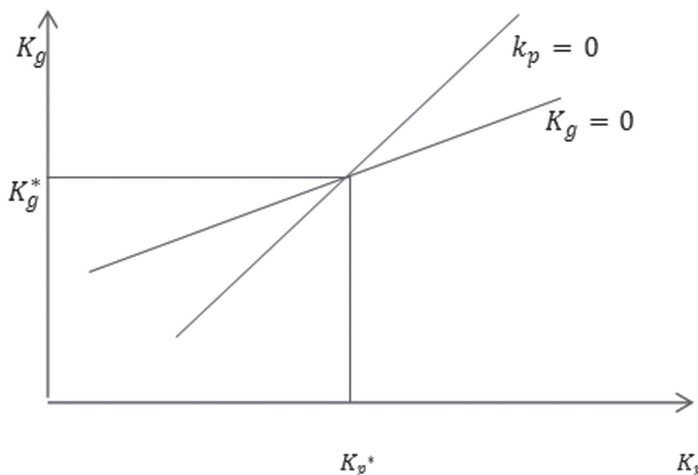.4.3. The optimum amount of $Kp\,and\,Kg$ is obtained as follows.

*fig.*5

The steady state optimum levels of infrastructural capital could be obtained by the above equilibrium giving, $Kg*$ and $Kp*$ as the optimum levels of public and private infrastructural capital respectively.

Note: For the stability of equilibrium we must have slope of $\dot{p}=0$ to be greater than the slope of $K\dot{g}=0$. This is because in this case if $K\dot{p}=0$ moves rightwards then then the equilibrium level of both capitals increase. But for the other case if $K\dot{p}=0$ moves right then the equilibrium level of both capitals fall.

PARAMETRIC CHANGE: COMPARATIVE STATIC EXERCISES.

In the previous section of the analysis we had introduced two policy parameters, which influences the level of investment of infrastructural capital, denoted as $\psi and \phi$.Here we will analyze the effect of the change of these parameters on the level of $Kp and Kg$.

3.1. Rise in ψ.

3.1.1. ψ: $Investment tax credit.$

The investment tax credit is a type of tax provision that reduces a firm's taxes for every amount of money spent of capital goods. The expenditure on the new capital is recouped through lower taxes; this type of credit lowers cost of capital and increases investment.

Now suppose that ψrises by govt policy. Private investment will rise as explained above. From equation (16) we have Ip rises and Kp rises as a result $Kp= 0$ shift right. The change is shown in the following figure.

fig.6
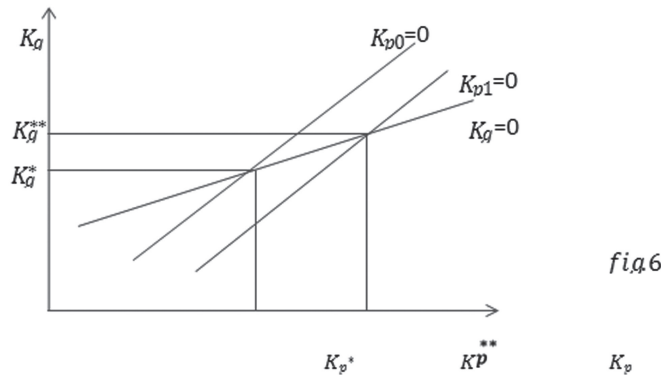
Here we see that the increase in this government policy of investment tax credit increases the amount of both capitals from initial level of $Kp^{*} Kg^{*}$to $Kp^{**} Kg^{**}$.

3.1.2 Effect on Labor market, Commodity market and price level.

3.1.2. (a) Labor market:

From the optimization of the firm we have that as both the capitals K_p and K_g increases the demand for labor shifts to the right. That is with introduction and augmentation of capital demand for labor may drive in. The result is shown below:

fig.7
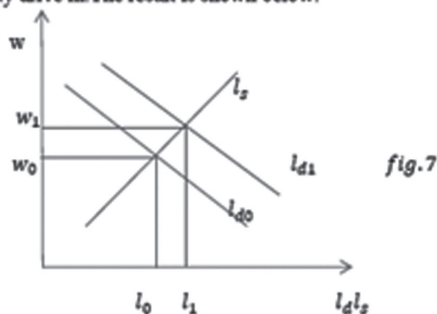
Here, we see that the employment of labor increases from l_0 to l_1. The wages of the economy rises from w_0 to w_1.

3.1.2 (b) Effects on commodity market.

From the commodity market equilibrium, from equation (14) we get: as the policy increases I_p, $I_g + I_p + G$ increases. Also we have shown that savings is negatively related to wage. From the above done discussion we have seen that wages increases therefore $S(w,r) + T$ moves right. The results are shown in the figure:

fig.8
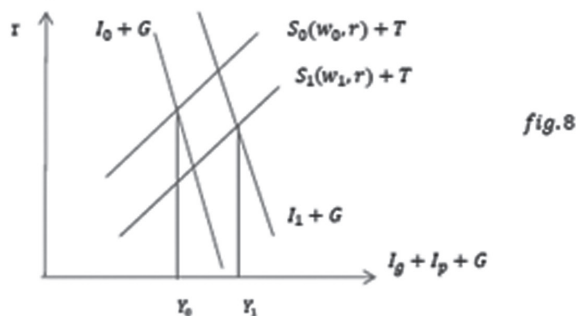
The output of the economy unambiguously increases from $Y0 to Y1$ because of this. But the effect on the real interest rate is ambiguous. It may increase, decrease or remain constant depending on the degree of shifts.

3.1.2. (c) From the simple QTM we have,

$M = kPY.$

For an increase in Y from $Y0$ to $Y1$ and constant k and M the prices P must fall \ to maintain the equilibrium. Therefore inflation is moderated.

Proposition 1: Government incentives for private investment in infrastructure is inducive for economic growth.

3.2. ϕ Increases.

3.2.1. ϕ: Goverment policy regarding infrastructure.

The government policies regarding infrastructure includes all the fiscal policies that the government can take to augment the infrastructural base of the economy. Now we suppose that the government takes an expansionary fiscal policy regarding infrastructure. I_g is raised which means $\dot{K}_g$ rises which means $\dot{K}_g = 0$ shifts upward.
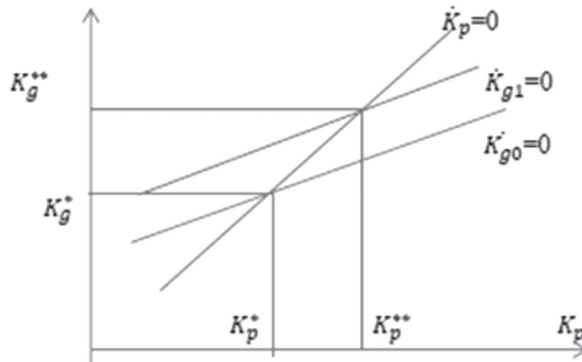
fig.9

This increases the level of both capitals from $K_p^* K_g^*$ to $K_p^{**} K_g^{**}$.

3.2.2. Effect of increase of ϕ on Labor market, commodity market, Money maket.

3.2.2. (a) Labor market:

Similar to the previous case, from the optimization of the firm we have that as both the capitals K_p and K_g increases, the demand for labor shifts to the right. The result is shown below:

fig. 10
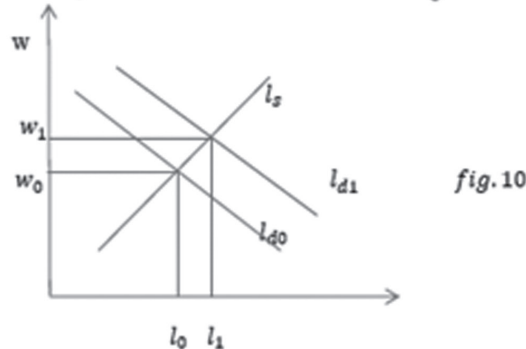
Here, we notice that the employment of labor increases from l_0 to l_1. The wages of the economy rises from w_0 to w_1.

3.2.2 (b) Effects on commodity market.

Similar to the previous case, from the commodity market equilibrium, from equation (14) we get: as the policy increases I_p and $I_g + I_p + G$ shifts to the right. Also we have shown that savings is positively related to wage. From the above done discussion we have seen that wages increases therefore $S(w, r) + T$ moves right. The results are shown in the figure:

fig. 11
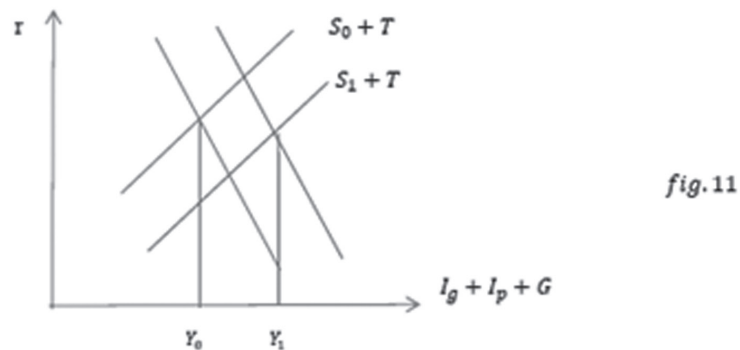
GRISES.

3.3.1.G: $Government consumption expenditure$.

The Government has to spend on buying the services of their employees, for maintaining the National defense, production of arms and ammunitions etc. All these expenditure falls under Government Consumption Expenditure.

Now suppose the Government carries out an expansionary fiscal policy such that G rises.

We have from the commodity market equilibrium, in the short run the level of income rises and the interest rate goes up
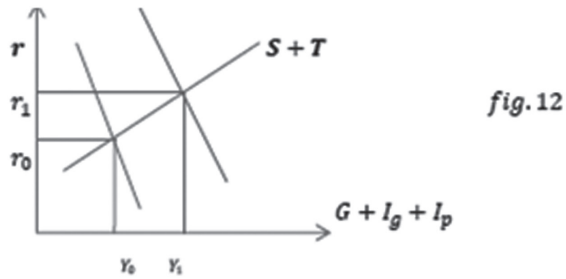
fig. 12

As interest rises L_s increases.
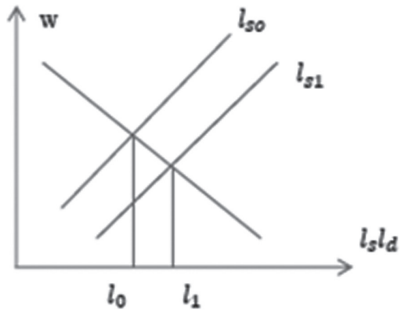
fig.13

We observe as G rises, r rises from $r0$ to $r1$. With the rise in r the labor supply increases. Employment increases from L0 to L1 while wages fall.

Now, As r rises Ip and Ig both falls. Therefore, we have, from equation (16) and (17), $\dot{p}=0$ shifts left and $Kg=0$ shifts downward. This has been illustrated diagrammatically as follows.
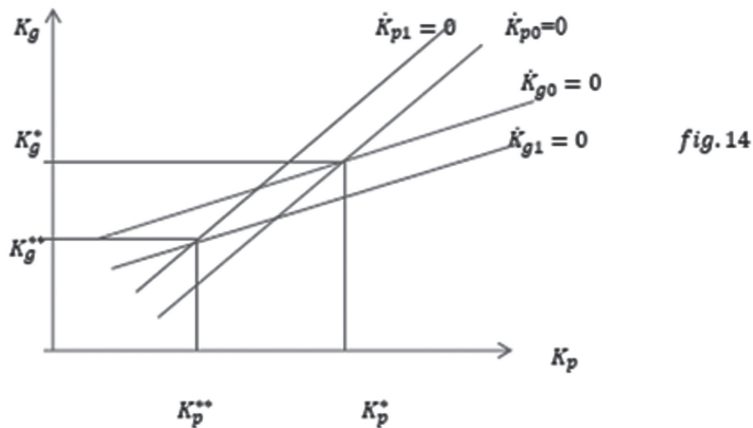
fig. 14

It is observed that equilibrium amount of both capitals falls from initial $Kp*Kg**toKp**Kg**$.

This fall in capital may completely reverse the effect of short run boom.

The level of income may fall and from the money market inflationary tendencies may set in.

3.3.3. Proposition 3: Such an expansionary fiscal policy has a deleterious effect on the economy in the long run.

4.Conclusion

The model in our analysis elaborates how infrastructural investment affects the economy and its three main macroeconomic variables- employment, output and prices. It is observed that when both, private incentive for infrastructural investment is provided and the government increases the investment in infrastructure, these variables go through favorable changes. That is the level of employment increases, output increases, and inflation is moderated. But it was observed in our model that with a rise in the Govt. consumption expenditure the variables change to give unfavorable results in the long run although we see an economic boom in the short run. This type of deleterious effect in the long run is purely model specific result.

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URBANIZATION IN INDIA: BUILDING MORE, LESS DENSER CITIES

Akalank Prakash Jayakumar*

INTRODUCTION

India, a nation with a population of 1.2 billion has about 377 million people living in urban areas. Of these 377 million urban residents, a huge 92 million live in the ten largest metropolitan areas: Mumbai, Delhi, Kolkata, Chennai, Bangalore, Hyderabad, Ahmedabad, Pune, Surat and Jaipur. In other words, close to 1/4th of the urban population in India live in just ten metropolitan areas.[6]

Indian Metropolitan Areas by Population

Mumbai 18; Delhi 16.3; Kolkata 14.1; Chennai 8.6; Bangalore 8.4; Hyderabad 7.7; Ahmedabad 6.3; Pune 5; Surat 4.6; Jaipur 3
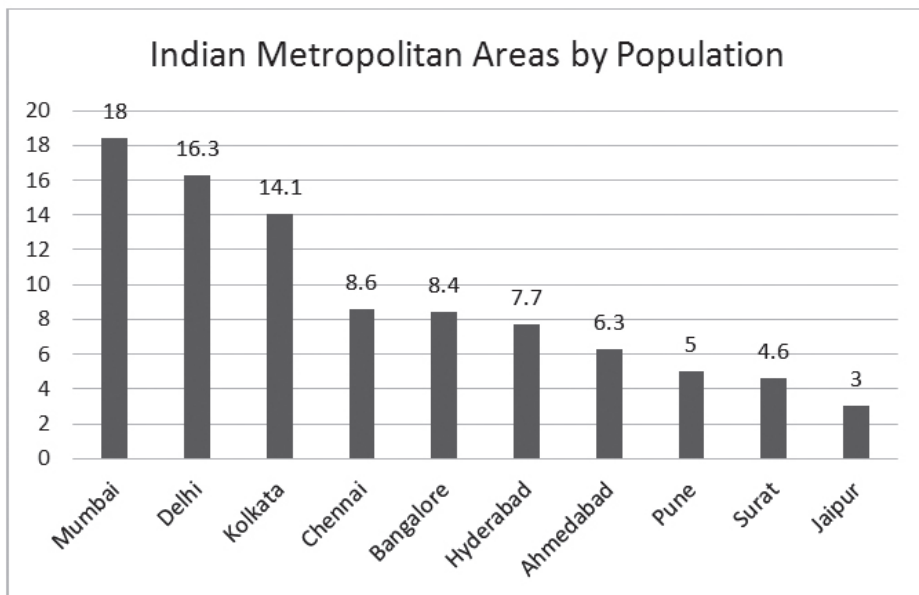
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However, by many indicators, we would note that much of these "urban" residents lead lives in cities that have inadequate infrastructure and resources. 41.3% of the population of Greater Mumbai, 29.6% of the population of Kolkata, 28.5% of Chennai, 14.6% of Delhi and 8.5% of the population of Bengaluru live in slums.[1] Furthermore, the ones who don't live in slums do not enjoy the fullest capabilities of urban infrastructure. In other words, cities now hold more population than what they can sustainably hold.

Objectives

This paper deals with increasing the capacity of cities, and lays a special emphasis on lessening the load on existing cities by building additional urban spaces, a measure that receives little to no attention from governments.

CAPACITY OF A CITY

Cities shouldn't hold more than what they can hold. By this, we mean the ability of a city to meet the full transportation necessities of its population, the ability of a city to provide parks and other natural, green spaces and the ability of a city to provide for the use of vehicles and industries without them leading to grave pollution.

In much of Indian urban agglomerations, public transportation is in a sorry state. There is a huge demand-supply gap, and public transport is largely characterized by over-crowdedness. For example, a 9-rake Mumbai local train carry about 4500 people during peak hours.[2] The rated carrying capacity? Just 1,700.49.01% deaths in Mumbai's suburban network are either a direct or an indirect result of over-crowding.[3] These include falling off from a running train, electric shock due to overhead wire, hit by a pole etc., all of which can be avoided if trains were less crowded. The Delhi metro faces similar challenges of over-crowdedness. India's bus penetration is a paltry 0.4 per 1,000 people.[4]

A poor public transportation system brings with two other problems: air pollution and traffic snarls, thanks to the increased adoption of private vehicles. A study called the INSTANT project (Infosys-Stanford Traffic Project) discovered that commuting during peak hours leads to a loss of 70-90 minutes every single day.[7] An undue stress is placed on natural

resources such as water, fresh air, beaches, lakes and rivers.

The essence of "what a city can hold" lies in how many people it can afford to house without them getting squeezed while travelling on the metro, or while taking a bus. It deals with whether or not it has adequate green spaces to provide fresh air for its population.

Of course, this is not to discount the fact that it is only higher urban density that allows for an effective public transportation system. 4For without a proper density, transportation systems become financially unviable. By the same logic, higher urban density allows people to satisfy their needs locally –be it buying daily necessities at a retail store or other niche goods such as music equipment. However, at higher levels of densities, sometimes, the infrastructural capabilities of a city is too low to provide for the population and thus, it becomes important to: (a) reduce the

burden of the city by preventing incoming population and (b) increasing the infrastructural capabilities of the city in question.

The crux of the debate lies not in making cities arbitrarily less denser, but in taking the effort to analyse what amount of population a specific city can hold, and if found that migration to that city is getting unmanageable, taking measures not only to increase the capacity of the city (by building more rail networks, highways, etc.), but also by building additional urban areas than can take away a part of the burden from the city we're concerned with.

Delays and Cost Overruns

The most common way of allowing a city to hold more incoming population is to increase its infrastructural capabilities. However, two very important issues persist with this regard: cost overruns and delays.

Improper planning and implementation strips away the bloodlines of a city's progress. When this happens, the years ago needs of a city are met today and we can all understand the implications of such delays. Delays place a barrier on the growth of a city, while cost overruns take away economic resources that could have been planned for some other project.

The Maduravoyal-Chennai port project is a stellar example. The project, the construction of which was planned to start about 6 years ago, is yet to begin construction due to political differences.

A 2009 study[8] conducted by Ram Singh of Delhi School of Economics throws some striking statistics. The study revealed that 41.67% Urban development projects faced a cost overrun and not a single one of them were completed on time. The cost and time overruns for road transport and highways is 54.4% and 85.35% respectively. Indeed, these issues of delays and cost overruns are not peculiar to urban development and transport sectors of India. Out of 894 projects across different sectors in the study, less than 60% were completed in the given budget and just 17.67% were completed in time.

We can see how such a vast difference between planned and actual time taken to complete a project is detrimental. A project that was designed to handle to necessities and demands of the population in 2015 should ideally be operational by that time. That is definitely not the case with Indian urban development projects. Of course, this only holds when we can safely assume that planners and policy makers have predicted accurately what the demands of a city would be like in the future. The lack of concrete planning based on statistical prediction causes further trouble to the growth of Indian cities. It is of extreme importance to address these issues.

The same study[8] outlines that merely passing a part of the onus of building infrastructure from governments to the private sector by way of Public-Private Partnerships (PPPs) don't work because the fundamental problems causing time and cost overruns of projects exist both in the private and the public sector.

For example, the problems of land acquisition, the legal issues related to the same and sometimes, court cases various projects have to go through is present both in the private and public sector. Furthermore, in many urban development projects, different activities of the same project are performed by different departments. For example, work related to power lines, sewage lines, construction of a road are usually done by different departments. The mere privatization of public infrastructure projects will not wash away these problems.

Solutions Suggested

It is necessary to, statistically; predict what the needs of an urban area will be in the upcoming areas and to start working on providing for those needs well ahead. It is also important to remove the bottlenecks associated with the implementation of projects.

For the construction of huge urban development projections like metro rail projects etc., a single organization can be given the power to plan and execute all activities on its own whenever possible, without assigning different activities to different departments to prevent organizational delays and to reduce the need for clearances from multiple agencies for mundane tasks.

Taking the burden off of existing densely populated urban areas

Something that has received little government attention across the nation is the necessity to build more cities. Urban planning has concentrated quite a lot on improving rail, metro, road, power and other facilities in existing cities across the nation but little effort is placed to dissipate the income barrage of people year after year into the same top ten metropolitan cities across the country.

While a high density of population is a desirable characteristic for public transportation, industry and general quality of goods and services, planners and policy makers should when a city cannot take more than what it holds.

Without an efficient public transportation system, the public move to using private vehicles, further increasing traffic snarls and thus the need for more roads and also increasing air pollution to dire levels. Of the 20 most polluted cities in the world, 13 are in India.9 Four Indian cities are among the 5 most polluted cities in the world, with Delhi topping the list. The country has the highest rate of death due to respiratory diseases.

How do we build more rail roads, more flyovers and road networks in the already congested national capital?

How do we provide for schools, parks, hospitals, spaces for sports and other entertainment activities to the arriving population when much of the city's land has already been used up and worse, when such facilities are not available in an adequate quantity to the population that already exists?

Satellite Towns

The answer, then, moves from further improving the urban infrastructure in an already congested city, to try and decongest the city or making efforts to reduce migration into the city.
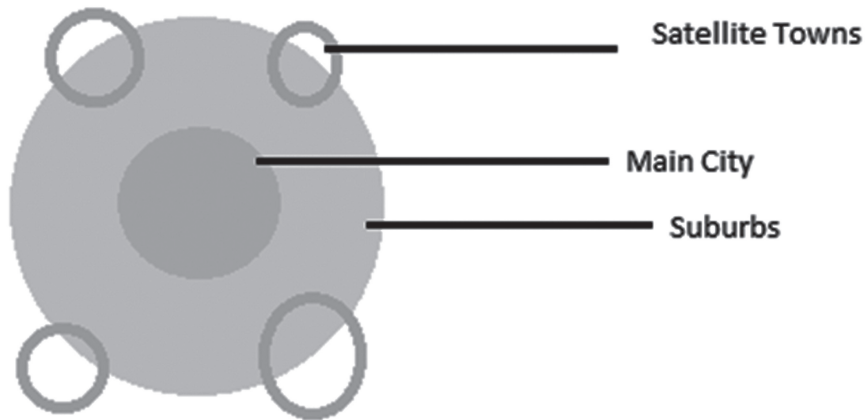
One way to do this, is, as we've seen in the past, to build satellite towns, a measure the Indian government has taken many times in the past. Gurgaon, for example, which was once a small village, started out as a satellite town of Delhi and is now almost a city by itself. Other satellite towns of Delhi include Faridabad, Noida, Ghaziabad and Dwarka.

These satellite towns of Delhi, many of which are now cities in their own right, house a combined population of 5.6 million (Gurgaon - 876,969; Faridabad - 1,414,050; Noida - 637,272; Ghaziabad - 1,648,643; Dwaraka – 1,100,000). Much of which would have gone to New Delhi or one of the older districts of Delhi had it not been for the satellite cities, which moved some part of the industries and population away from the main city.

The satellite cities of Mumbai –Navi Mumbai, Thane, Dombivili and Uran similarly do theirpart in decongesting Mumbai. A new satellite city called Tirumazhisai was proposed earlier this year by the then Chief Minister of Tamil Nadu J. Jayalalitha at the cost of ₹2600 crores.

Satellite towns are usually far enough from the parent city so as to form an identity of their own, but close enough to the parent city so that they can draw upon it's economic prowess. Building satellite cities is a proven way to decongest existing densely populated urban areas. Forest and tree cover in Delhi, for instance, has greatly increased after the establishment, from 5.93% in 1999 to 20.2% in 2009.[13]

However, Planners should be careful as to not make Satellite Towns that serve as giant dormitories. In the sense, satellite towns shouldn't be just residential locations, from where a huge population goes back to the main city for work. That would defeat the entire purpose of satellite towns.

A similar problem occurred with, the satellite town of Delhi. Thousands of commuters travel from Delhi to Gurgaon to work, or vice-versa.

Unless satellite-towns are entirely self-sufficient, the purpose of creating them in the first place is partially lost. Further, all too often, governments forget about other, completely independent cities in their states.

Data from the National Sample Survey Organization's 64th round reveals that 70% of migrants to Mumbai are from Maharashtra itself (2012).[10] Mumbai's population growth is twice as that of the rest of Maharashtra (2014).[11]

By a similar comparison, more than 3/4th of the Chennai's migrants were from within Tamil Nadu. 12(Census 2001) 4/5th of Hyderabad's migrants were from within the then Andhra Pradesh. (Census 2001)

The question pertaining here is: Why is adequate effort not taken to develop urban infrastructure in other cities within their states? Why are state capitals teeming with activity and infrastructure projects year after year but there is not yet a dedicated local train network in say, Coimbatore, Madurai, Trichy, Nagpur, Vizhakapatnam, Nagpur or Vijaywada?

The common logic of "there isn't adequate demand" leads to a self-fulfilling prophesy. (There isn't adequate demand because not a lot of people are moving there. People aren't moving there because of (a) lack of proper urban infrastructure and (b) the lack of job opportunities, which, again, arises from (a).

Conclusions

Cities can only hold a definite amount of people. What they can hold is not a perfect number that applies to every city, but rather a function of the infrastructure available in the city. To make sure that people live happy, healthy and leisure filled lives, which is the core of economic rationale (the oft repeated terms "satisfaction" and "utility" in economic theory provide evidence for this statement),

We should go with a two-thronged approach:

(1) Increase the capacity of existing cities by improving urban infrastructure, by developing ways to maintain air pollution levels under critical levels, by making sure that there are adequate green spaces etc.

(2) Decrease the burden on existing metropolises by:

(a) Building satellite towns that initially draw their charm from parent cities, but goes on to serve their purpose by forming into fully-fledged independent cities on their own and

(b) Developing other existing, smaller cities than take in some part of migration from rural to urban areas

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DELHI'S SUSCEPTIBILITY TO WATER SUPPLY SHOCKS: A RISK ANALYSIS & VULNERABILITY ASSESSMENT

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PART I

Background & Definitions

The present study evaluates the risk associated with water extraction, transportation and treatment on quantum of water supply. This study does not taken into account the distributional aspect and the quality of water supplied.

Risk assessment in water supply refers to evaluation of the potential risks that may be involved in the process. It is, here, calculated as the cross product of the likelihood of occurrence of a Hazard and the severity of its consequence.

The distinction between hazard and risk needs to be understood so that attention and resources can be directed to actions based primarily on the level of risk, rather than just the existence of a hazard.

- A hazard is defined as a biological, chemical, physical or radiological agent that has the potential to cause water supply cut;
- A hazardous event as an incident or situation that can lead to the presence of a hazard;
- A risk as the likelihood of identified hazards causing water supply cut in the exposed region, including the magnitude of its consequences.

Vulnerability is again a distinct concept from risk. Risk assessment examines the ability of different groups to resist the impact of hazard, once it has already taken place. In this context, it would imply how different groups respond and resist to water supply shock.

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Methodology

Hazard Identification

For the purposes of Hazard Identification, a comprehensive list of all the plausible hazards is made through reading case studies of water supply shocks across the world and brainstorming. After a careful study, relevant hazards are identified.

Risk Assessment

Risk is assessed qualitatively by gauging the likelihood of the occurrence of identified Hazards and attached severity of their consequences.

Likelihood Description

Assumptions and Caveats in Likelihood Calculation

Likelihood in the context of the present research means the probability of occurrence of the hazard. The paper utilizes a qualitative assessment of grading likelihood under the five heads given below. In a qualitative assessment, likelihood may be calculated with the following parameters:-

a. Historical Data

In this method historical data is utilized to calculate likelihood from the precedence of hazards happening in the past, and hence calculating the aggregate frequency occurrence of the hazard

b. Trend Analysis and Forecast

Trend analysis takes into account the trend of historical occurrence of hazards and forecasts the trend by extrapolation.

c. Anecdotal evidence

Opinion based likelihood calculation is based on establishing arguments on the tendencies of occurrences, which does not take into account numeric empirical evidences of occurrences but rather anecdotal evidence.

In the given case, the identified hazards do not conform to a uniform pattern of occurrence, where a single method may be employed to calculate likelihood. Further, all the three methodologies have individual limitations. In the case of historical data, the analysis may not reflect present likelihood of occurrence, may have sampling and reporting errors due to change in technology, and may not reflect changes in the conditions under which the hazards occur. In the case of calculation through anecdotal evidence, we encounter the problem of arbitrary judgment. Further, the robustness of the anecdotal evidence may also be a limitation.

We finally come to the likelihood calculation made through trend analysis. The difference between historical data analysis and trend analysis is that we take a moving average trend of previous year's data and extrapolate the trend line to get a forecast of an approximate frequency

of occurrence. In the present case we use a logarithmic trend line to calculate the moving average and extrapolate.

In this case we may see an increasing trend of occurrence of the hazard. However this does not mean a higher prediction of future frequency. The reasons are:-

I. The logarithmic function is a monotonically increasing function. Since it may be used to calculate the trend of maximum values of a functions, in this case it gives us the approximate maximum likelihood of occurrence.

II. Due to improvement in the instruments of measurement, we may see a rise in the frequency of observed hazardous events. Hence in this case, in no manner whatsoever, that reflects a prospective rise in the frequency of the hazard.

Point Risk

A point risk reflects the risk posed by abrupt and unpredictable events that last for a short duration but may endure larger and long term damage.

Level	Description
Highly Unlikely	Probability or Past frequency below 2% in a given time period
Unlikely	Probability or Past frequency between 2-10% in a given time period
Somewhat Likely	Probability or Past frequency between 10-25% in a given time period
Likely	Probability or Past frequency between 30%-50% in a given time period
Highly Likely	Probability or Past frequency above 50% in a given time period

Non-point or continuous risk

There also exist persistent risks that persevere through time. These include risks posed by Climate Change, Mining, and Excessive Groundwater Extraction. In this case we may take into account the rate of damage caused by the given hazards.

Rate of Damage/ Damage	Likelihood of Risk
Persistent, Irreversible and Increasing Rate of Damage	Highly Likely
Persistent, Reversible and Increasing Rate of Damage/Irreversible and Constant Rate of Damage	Likely
Persistent, Reversible and Constant Rate of Damage/ Irreversible but Decreasing Rate of Damage	Somewhat Likely
Persistent and Reversible but Decreasing rate of Damage	Unlikely
Reversible and Decreasing Rate of Damage	Highly Unlikely

Severity Index

Extent of shortage in water supply	Severity of Risk
Major part of water cut for 30 days or more	Extreme
Minor part of water cut for 30 days or more; Major part of water cut for five days or more	Very High
Minor part of water cut for 15 days or more; Major part of water cut for 1 days or more	High
Minor part of water cut for 7 days or more; Major of water cut for or more	Average
1-5% of water cut	Low

Risk Matrix Score

RISK SCORE	Low	Average	High	Very High	Extreme
Highly likely	11	16	20	23	25
Likely	7	12	17	21	24
Somewhat Likely	4	8	13	18	22
Unlikely	2	5	9	14	19
Highly Unlikely	1	3	6	10	15

Risk Prioritization

	Low	Average	High	Very High	Extreme
HighlyLikely	15	10	6	3	1
Likely	19	14	9	5	2
Somewhat Likely	22	18	13	8	4
Unlikely	24	21	17	12	7
Highly Unlikely	25	23	20	16	11

Hazard Identification and Risk Assessment

The following Hazards have been identified:

A.   Natural Hazards

       1.   Earthquakes
       2.   Floods
       3.   Climatic Change

B. Hazards related to water pollution and human activity

       1.   Heavy metals
       2.   Ammonia
       3.   Eutrophication
       4.   Biological Contamination
       5.   Mining & Quarrying in and along the riverbed and floodplains

C. Hazards Related to Accidents and Technical faults

       1.   Power Failure
       2.   Drowning accident
       3.   Chlorine leakage
       4.   Fire exposure to chlorine gas and PAC

D. Hazard Caused due to political and social conflicts

       1.   Non-water related acts of sabotage
       2.   Water development related conflicts
       3.   Change in inter-state water sharing patterns

A.   Natural Hazards

1.   Earthquakes

Earthquakes form one of the most rudimentary hazards to the water supply infrastructure of urban water supply systems.

Hazard that the earthquake can inflict on the water supply and transmission systems

The main effects of an earthquake, depending on its magnitude, are:

- ❖   Total or partial damage to:-
- ❖   Intake system
- ❖   Transmission system and transport infrastructure (canals and barrages)
- ❖   Treatment plants and infrastructure
- ❖   Storage (reservoirs and tanks)
- ❖   Distribution system (Pipelines and tanks)
- ❖   Rupture of transmission and distribution pipes and damage to joints between

pipes or tanks with consequent loss of water;

❖   Interruption of electric power, communications, and access routes

❖   Deterioration of the water quality at the source due to landslides and other phenomena;

❖   Reduction in yields from groundwater sources and flow in surface water sources;

❖   Changes in the exit point of groundwater or in the phreatic level;
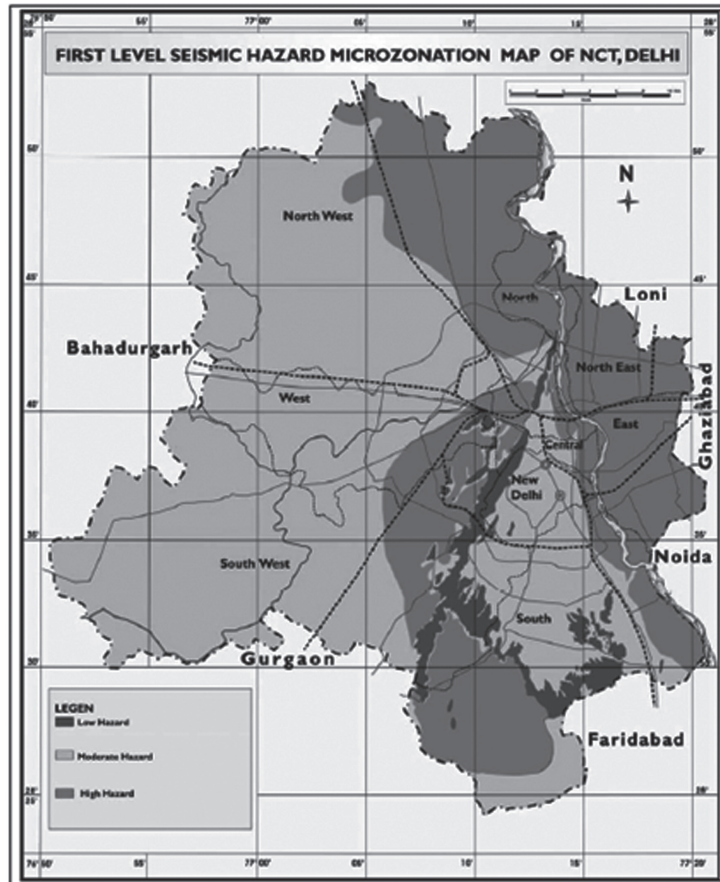
Spatial Variability of Seismic Hazard in the City of Delhi(Iyengar and Ghosh 2004)

In the past, five earthquakes of Richter Magnitude 5.5 to 6.7 are known to have occurred in the UT of Delhi or close to it since 1720 AD. Two major lineaments namely Delhi-Haridwar ridge and Delhi-Moradabad faults pass through the territory, both having potential of generating earthquakes of magnitude up to MSK VIII will be quite probable in the Delhi territory. Normal depth of 30 km may be assumed for these earthquakes. It will be prudent to consider the effects of such a potential earthquake for developing a prevention-cum-preparedness plan. (Delhi Disaster Management Authority 2016)

How an earthquake can sever an aqueduct

Aqueducts: Tunnels can carry water into the city through a mountain range.

Slip: An earthquake causes one block of earth to move from the other, slicing the tunnel in half.

Dip: The movement can also occur vertically. The tunnel is dammed up and can suffer a collapse.

Fault line

Water tunnel
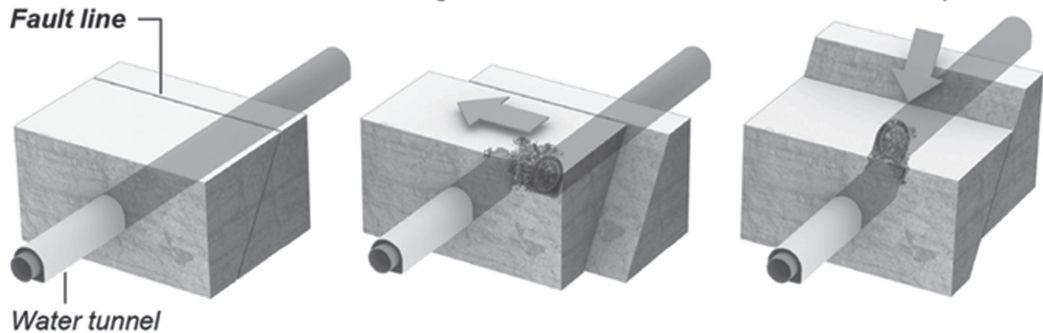
Source: Times reporting, U.S. Geological Survey

Doug Stevens / @latimesgraphics

Damage to transport infrastructure

Damage & Severity matrix for Earthquake

Magnitude in Richter Scale	Severity
Below 3.5	Negligible (not taken into consideration
3.5-4.5	Low
4.5-5.5	Moderate

5.5-6.5	High
6.5-7.5	Very High
7.5 & Above	Extreme

Decadal frequency of earthquakes of various magnitudes[69]:-

Data Source: (Earthquaketrack.com 2016)

From the above data we may decipher the likelihood of future occurrence of earthquakes and their magnitudes. The method used here is logarithmic extrapolation.

From the data above the magnitude we can come to the following conclusions regarding earthquakes

A.   Low intensity (Richter scale magnitude - 3.5) earthquakes are converging to a frequency of 8 times every decade. Hence the likelihood of yearly occurrence is about 0.8. This means that the likelihood of occurrence of low intensity earthquakes is 'highly likely '

B.   Medium intensity earthquakes (4.5 & above) are converging to a frequency of 5 times in a decade. Hence the yearly likelihood of occurrence is 'likely'

C.   High intensity earthquakes (5.5 & above) are converging to a frequency of 3 times in a decade. Hence the yearly likelihood of occurrence is 'somewhat likely'

2. Floods

Floods constitute the second paradigm of natural hazards. The hazards posed by floods are as follows. The Yamuna and the Najafgarh Drain are the flood prone water bodies of the city. (Irrigation & Flood Control Dept 2015) The:-

❖   Turbidity in water disrupts treatment process. This in turn disrupts the water supply in the command area that receives water from the water treatment plant.

❖   Flooding may also cause displacement of temporary households in the low lying areas. This affects the livelihoods of households living in proximity to the water body affected by the floods

❖ Flooding also increases the dissolution of saturated contaminants. This leads to an increased concentration of pollutants in the raw water source.

❖ Flooding may also lead to sewage overflow. This has further repercussions on health and adds to the cost of constrained water supply.

❖ The most damaging floods had occurred in 1978, where the Old Yamuna bridge read a water level of nearly 206m. The damage is largely caused due to inundation of agricultural fields and colonies in the proximity of the floodplains. Nearly 12000 were rendered homeless. Explicit damages worth Rs. 176 million (nearly Rs 8.14 billion in today's value) were reported. (KHAN n.d.)

❖ However only major floods have the potential to cause such excessive damage. Though floods of similar magnitude have occurred after 1978, the impact on livelihood and water supply has diminished.

❖ Therefore we consider only major floods in our calculation of likelihood of occurrence. The severity level of major floods (water levels 205m and above) may be accorded a severity rating of 'High"

Occurrence of Major Floods

$y = 0.6684\ln(x) + 0.3826$

— Occurrence of Major Floods

— Log. (Occurrence of Major Floods)

Occurrence of Major Floods in Delhi
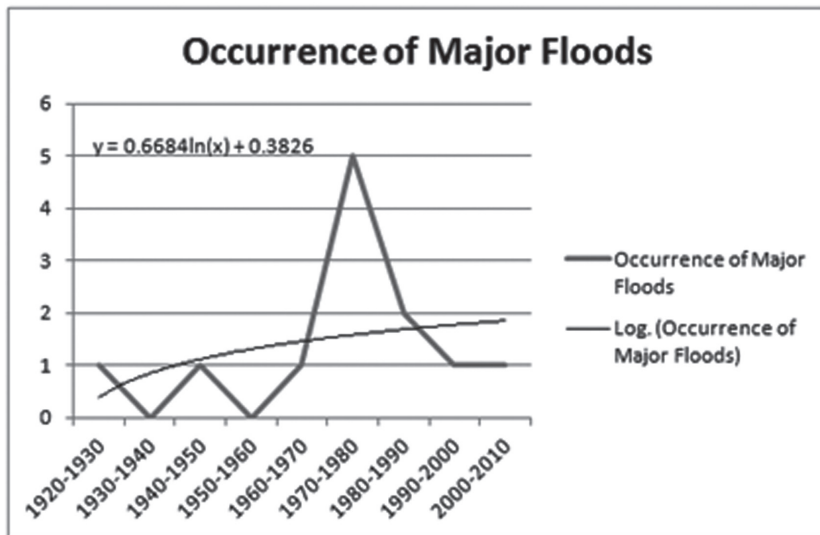
Data Source: (Delhi Disaster Management Authority 2014-15)

From the graph and the extrapolation of frequency decadal occurrence of major floods in the city are 2. This results in a yearly likelihood of occurrence rating as **"Unlikely"**

3. Climate Change & Resource Depletion

We define climate change from the perspective of change induced due to human activities as well as the natural fluctuations of rainfall and temperature. Climate change might be induced by global climatic changes due to phenomenon such as La Nina, which impacts the onset of the South West monsoon or Western disturbances impacting winter precipitation.
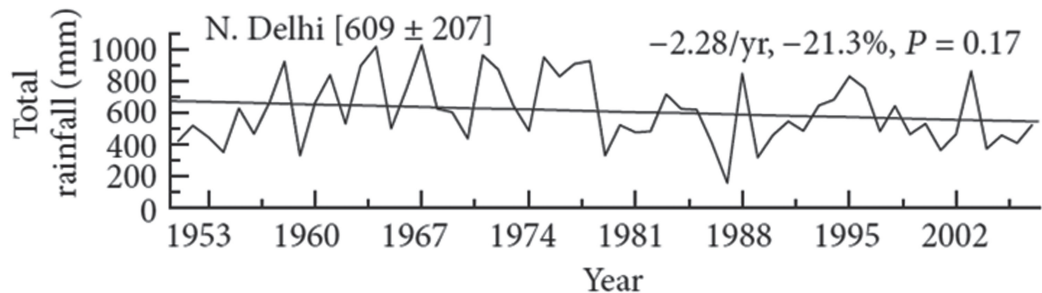
A negative trend of seasonal rainfall in New Delhi

Source: (Shailesh Kumar Kharol 2013)

The visible impact of climate change is identified in the average total rainfall in the city. The trend of average precipitation in the city shows decline of nearly 2.28mm per year. According to the aforementioned estimate, seasonal rainfall has reduced by a factor of nearly 21.6%.

Climate Change poses the following hazards to the water supply of the city

        A.   Alteration of Yamuna River's Stream flow

        B.   Decline in Groundwater Recharge

        C.   Drying up of the city's internal water bodies

A. Alteration of Yamuna River's Stream flow.

Water depth level in the major river has been declining over the years. Given below is the declining trend of aggregate water levels in the river. The repercussions of such a decline are scalable as the change in total water resource availability. With a depth reduction of this trend is alarming as it reflects a persistent increasing rate of decline in Yamuna's water level reflecting a higher likelihood that the city's water scarcity would get aggravated.

Since the rate of decline is persistent and at an increasing rate, the likelihood of greater risks is **"likely"** and the associated severity of the hazard to Delhi's water supply, as **high.**

Aggregate Level of Yamuna at Delhi

$y = -135.2\ln(x) + 1231.2$

Legend: Level (in metres) ; Log. (Level (in metres))
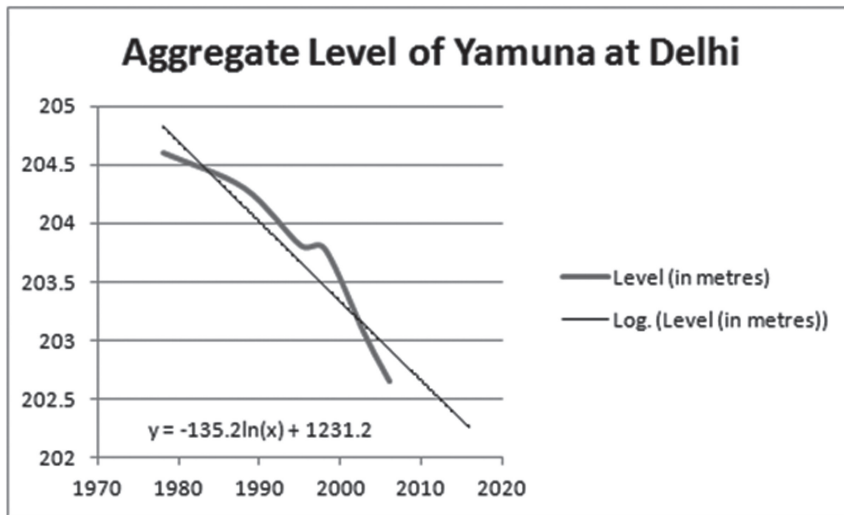
Data Source: (Agrawal, Kharya and Gupta 2006)

B. Insufficient Groundwater recharge

As mentioned above the rate of extraction of groundwater in the city is estimated to be 145% higher than the rate of replenishment. In the case of Delhi groundwater is the contingency measure of the water supply system, which is crucial not only to domestic consumers but also industries in the city. In such a situation a falling groundwater table may spell disaster to the city's livelihood and economy. The severity of this hazard is accorded as **"high"**

Central Ground Water Board's long-term groundwater level trend analysis in the district over the last 10 years period shows the following statistics in 4 districts of Delhi (Shekhar, Purohit and Kaushik 2013)

District-wise Aggregate Depth Level	Pre-Monsoon Depth Level (in meters below ground level)		Post-Monsoon Depth Level (in meters below ground level)	
District	2002	2012	2002	2012
South West	0.30	6.90	0.07	6.08
New Delhi	0.04	2.58	0.03	3.11
West	0.18	2.20	0.53	2.12
North East	0.51	1.68	0.96	2.34

Risks due to excessive groundwater abstraction

- Pumping lifts/costs increase
- Borehole yield reduction
- Spring flow/river base flow reduction
- Phreatophytic vegetation stress (both natural and agricultural)
- Aquifer compaction/transmissivity reduction
- Saline water intrusion Ingress of polluted water (from perched aquifer or river)
- Land subsidence and related impacts
- Aquifer diffusivity characteristic
- Drawdown below productive horizon Aquifer storage characteristic
- Depth to groundwater table
- Aquifer compressibility
- Proximity of saline/polluted water
- Vertical compressibility of overlying/inter bedded aquitards

Fig. 2 Annual Net Groundwater Availability and Annual Gross Groundwater draft (ha m)
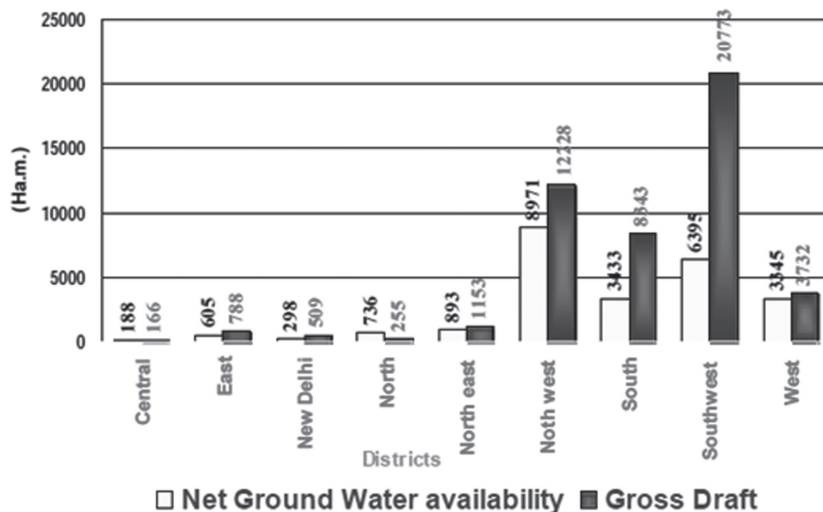
Data Source: (Shekhar, Purohit and Kaushik 2013)

With the rate of decline of water table ranging between 0.17 - 0.66 m per year, the rate of harm to the water resource is persistent and at an increasing rate, which gives a likelihood of risk as **"likely"**

C. Disappearing water bodies

Estimates of the number of water bodies in the city vary from 674 to 1012. However, according to MCD data, nearly 190 to 274 of these water bodies have dried up due to scanty rainfall, encroachment and construction in the catchment area. This shows a persistent, irreversible and increasing rate of decline and damage to the water resource. (Roychowdhury 2014)

Although these water bodies were not present sources of the city's water supply, they do have the potential to hold surface water for contingency, and their decline means a lost opportunity in watershed management. Water bodies form an important ecosystem in the city's hydrology, and their decline signifies a worrying trend. The severity of the risk is hence accorded as **"Average"**

D. Hazard caused due to political and social conflicts

Socio-political risks are referred to those hazards that originate from socio-political realities of a region. Therefore, the risks are context specific. A state with ongoing civil war is more prone to instances of sabotage as compared to a region of peace. Political risks are also to a high degree, uncertain.

Socio-political hazards are categorized as follows for the purposes of analysis:

1.   Non-water related acts of sabotage
2.   Water development related social and political conflict
3.   Change in inter-state water sharing patterns

1. Non-water related acts of sabotage

Non- water related violence manifests as acts of deliberate sabotage of water infrastructure and cause disruption in water supply.

Past data trends on a global level (Gleick and Herberger 2013)
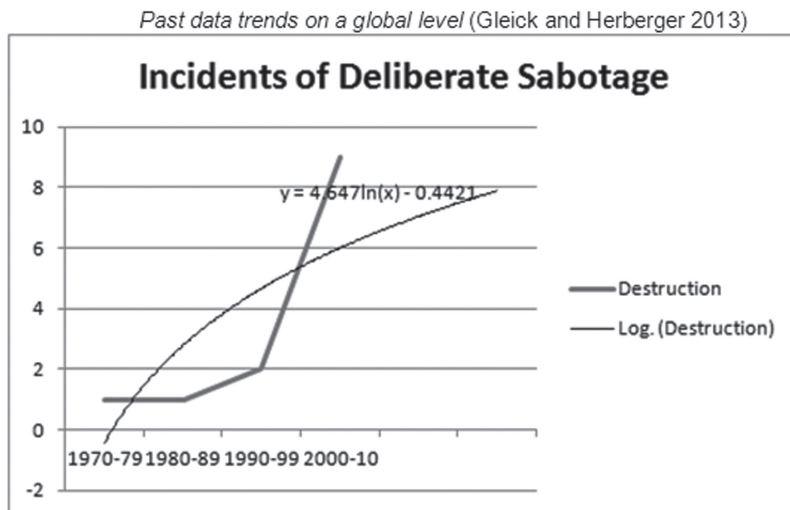
Figure Number

The above graph shows the past data trend of incidents of deliberate sabotage across the world. The trend is shown to be converging at 8 incidents per decade. Accordingly, the probability of instances of sabotage per year can be attributed as 0.8. On a global scale, such a probability indicates that instances of sabotage   leading to water supply shock are highly likely to occur.

Risk Appraisal

To estimate the risk associated with Delhi's water supply, an analysis of causes behind the incidents are conducted.
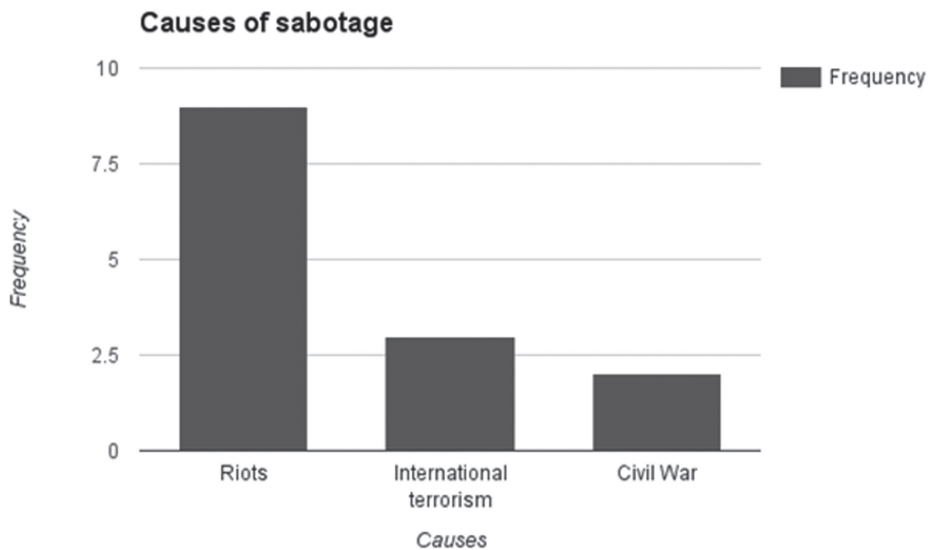
- Most of the incidents of sabotage of water supply infrastructure have happened as manifestations of riots closely followed by as activities of international terrorist organizations.

- **International Terror:** International terrorist organizations, as the past data trends show, have led to three instances in a history of 110 years. This shows that cutting water supply is not the preferred target areas of terrorist outfits so far. However, in 2003 bombs were put to main water pipeline in the Indian state of Jammu and Kashmir by terrorist outfits. (Network(TNN) 2004)

- **Civil War:** It is not considered to be an important factor for Delhi since the general political climate is not assessed as one of civil unrest.

- **Riots:** In recent past, there have been two cases of Delhi's water cut due to acts of deliberate sabotage. In year 2010, Jat agitation demanding their inclusion in OBC category led to sabotage of upper Ganga canal and corresponding water cut in East, South and Central Delhi. (Gupta 2014) In year 2016, the same issue led to sabotage

of Munak canal in Haryana. (Service 2016). The issue has still not died, but is being re-ignited in Uttar Pradesh. (Nath 2016)

Infrastructure contributing to Delhi water supply is situated in Haryana, Uttar Pradesh and Punjab, apart from Delhi itself. (Division 2013) Therefore, political situations in these states pose a risk to Delhi's water supply.

• Uttar Pradesh had the highest toll of communal conflicts (703 incidents) in the country in 2010-2014. (A. Sethi 2015) The following graph shows the number of incidences of communal conflicts in the state.
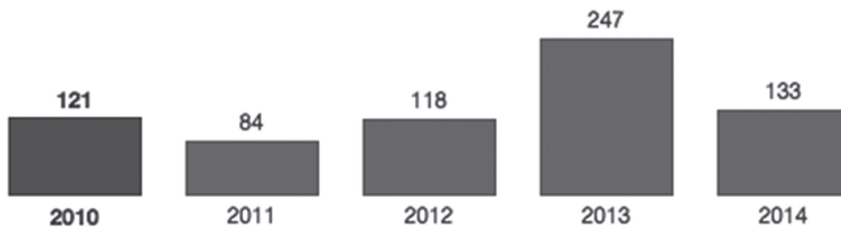
Source: Business Standard

• Haryana saw the recent Jat quota stir leading to massive public and private property damage, multiple rape cases and up to 30 deaths. Haryana, in past decade, has been witnessing high incidences of caste clashes due to rapid upward caste mobility (Ghildiyal 2015).Haryana has also seen a considerable number of communal violence in the past. Three incidents of communal violence were reported in 2014 (Engineer 2015). 2015 was marred with the infamous Balabhgarh riots. (Ghosal 2015) Considering the situation of political unrest in Delhi and adjoining states, the likelihood, through the method of elimination is assessed to be Unlikely-Somewhat likely.

The severity of the consequences is dependent on the infrastructure which is damaged and government's response time. Since it is possible to rebuild the infrastructure, water is cut only for some days. On an aggregate, destruction of essential infrastructure in water supply system leads to 5 days of water cut.

Inference

Likelihood: **Unlikely-Somewhat Likely;** Severity: **High-Very High**

B. Water Development Disputes:

In the process of economic and social development, often conflicts and dispute arises. Water use and allocation is an important source of contention in international as well as intra-national systems.

Figure shows the frequency of the instances of water development related conflicts around the world (Gleick and Herberger 2013). The frequency converges at 4 instances per decade. With 0.4 probability, a development related dispute is likely to occur in a global context.

Frequency of Water Development Related Conflicts Around the World

$y = 1.9723\ln(x) - 1.0472$

Nature of development disputes: International or Intranational

Decades
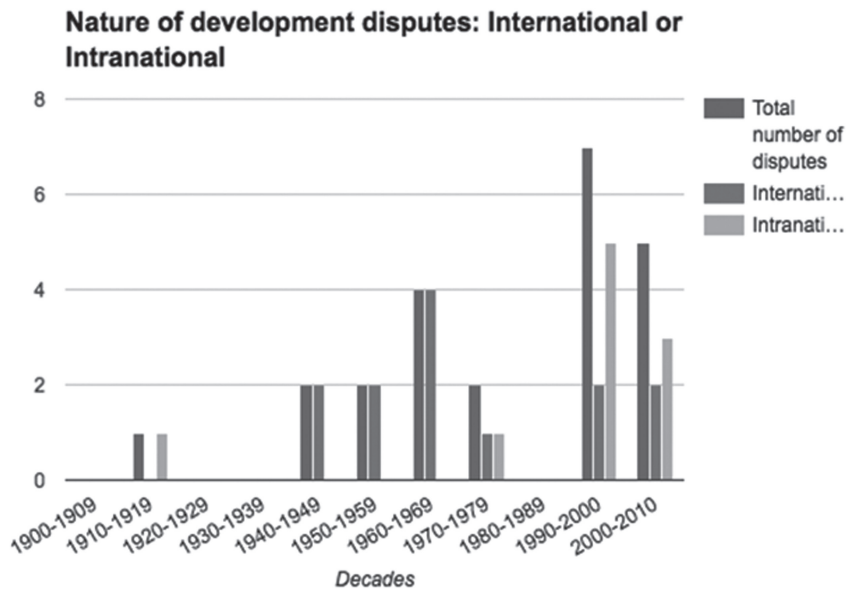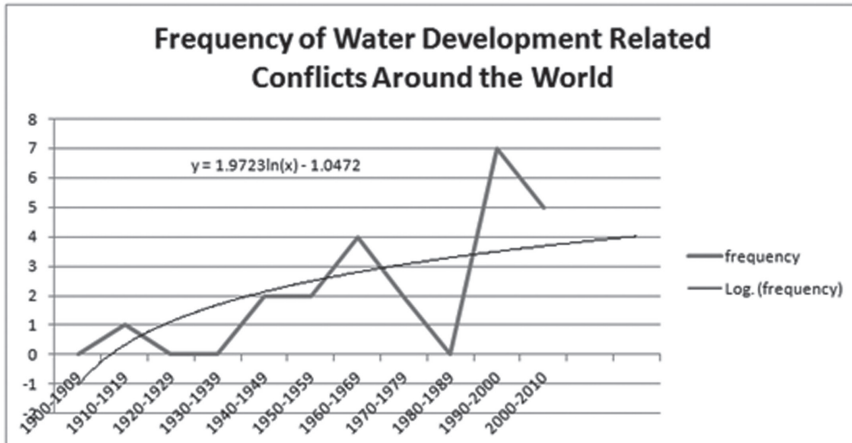
In recent times, development disputes of intra-national origin are steadily rising, while disputes among countries are falling (Gleick and Herberger 2013).

B.1 International water development disputes and Delhi

Risk Appraisal

Delhi gets water from two international river basins- Indus river basin and Ganga river basin (Wolf and Joshua 2008). Since, India is the upper riparian state, public agitations cannot block the

river flow. (Piesse 2015) However, the agitations can pressurize the national governments to re-negotiate water allocations.

- Sutlej and Beas form the part of Indus River System. Governed by the Indus River Water Sharing Treaty, India possesses absolute control over the two rivers. Indus river water treaty signed in 1960 has been respected by both India and Pakistan (Piesse 2015).

- Ganga water is shared between India and Bangladesh. Post a conflict of 35 years, the countries signed a bilateral treaty in 1996 for 30 years. Though the treaty will annul in 2026, India being an upper riparian state is relatively safe. (Sharma 2005)

The two treaties are explained in greater in the next section.

Inference

Likelihood: *Highly Unlikely*
Severity: *Extreme*

B.2 Intra-national water development disputes and Delhi

Risk Appraisal

Intra-national disputes refer to disputes arising due to water development issues inside a country. Inter-state water sharing disagreements are assessed separately below. Delhi, though has seen many protests against low water availability, the water supply has never been affected. (Gleick and Herberger 2013)

In general, the incidents of this nature have led to reversible damage causing water cut for 10-15 days.

Inference

Likelihood: *Unlikely-Somewhat likely;*
Severity: *High-very High*

3. Inter-state disputes of water allocation

An undesirable change to existing patterns of water sharing is another major risk to water supply.

Appendix A.2 shows that all the major inter-state disagreements in India find their origin in the very creation of state or action plan.

Delhi shares three river bodies- Yamuna, Ganga and Sutlej-Beas with adjoining states. (Board 2014-15) A change in Delhi's water allocation has highly severe consequences as the water cut becomes irreversible in short to medium run and is perennial.

a) Yamuna River Water [70]

Yamuna river water sharing agreement ensures Delhi 0.724 BCM of water annually. In case of low level of water availability in the river, the treaty ensures Delhi's demand to be met first and the balance be distributed amongst Haryana, U.P., Rajasthan and H.P., in proportion to their allocations. This agreement could be reviewed after 2025, if any of the basin States so demand (Hasan 1995). A further Supreme Court judgment of 1996 obligates Haryana to keep Wazirabad and Haiderpur reservoir full to their capacity. The court judgment is open to modification through the act of Tribunal (1996) . However, nothing has been done in this regard in past twenty years despite Haryana considering the judgment as unfair.

Appraisal of the risk

In the wake of demand pressures in adjoining states, the respective governments may want to re-negotiate the current allocations. However, given that Delhi's water demand is majorly for drinking purposes following factors are responsible for wide demand-supply gaps:

- Rising water consumption demand in states. For example, the overall demand[71] of Haryana is 2,111.37 million litres per day (MLD), but the state authorities have been able to ensure the availability of only 1,913.22 MLD (Bhaduri, et al. 2010) .

- Rise in demand for irrigation: With the onset of green revolution, wheat and paddy is the major crop with rampant water mismanagement and wastage. (Bhaduri, et al. 2010)

- Environmental clearances related hurdles in the construction of Renuka Dam on River Giri, a tributary of Yamuna in Sirmaur District of Himachal Pradesh, Kishau Dam on river Tons, also a tributary of Yamuna river in Uttarakhand and Lakhwar-Vyasi Dam on river Yamuna near Lakhwar village in District Dehradun of Uttarakhand (Express News Agency 2011).

- Halt in the construction of Sutlej-Yamuna link causing huge implications for Haryana's water supply (Express News Agency 2016).

Inference

Likelihood: *Highly unlikely-somewhat likely*

Severity: *Extreme*

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[70] *River Yamuna, with a total length of 1376 km, rises from Yamunotri glacier in the Bandarpunch range of Himalayas in the state of Uttarakhand. Its basin, spread over some 366,220 sq km, lies in the states of Uttarakhand, Himachal Pradesh (HP), Uttar Pradesh (UP), Haryana, NCT of Delhi, Rajasthan and Madhya Pradesh (MP).*

[71] *Of the overall 2,111.37 MLD water demand, 1,081.66 MLD is from the urban side, while water supply to urban areas equal 968.86 MLD.*

b) SATLUJ-BEAS WATER

The water from Sutlej-Beas is governed by two treaties:

- Indus water treaty: Sutlej-Ravi-Beas form a part of Indus river basin. The Indus Water Treaty[72] (IWT) regulates the water use between India and Pakistan (The Indus Waters Treaty 1960).

Risk Appraisal

- India, being the upper riparian state, is set at an advantage position.

- India and Pakistan have fought four wars until now. In spite of the wars, the agreement has continually been respected and upheld by both the signatories. The extent of commission can be seen by the fact that The Indus water commission continued to meet even during the wars of 1965 and 1971. (Piesse 2015)

- In year 1999, India began construction of Baglihar Hydroelectric project, a run-of-the-river power project on the Chenab River. Pakistan protested against the construction, claiming that India has violated the treaty. The two countries resolved the dispute through third-party arbitration. Though bilateral negotiations was not used as the method of resolution hinting at the existence of mistrust between the two countries, the agreement was respected (Gargi Parsai 2010). The instance further shows that the two countries have chosen to work in the framework of the treaty to settle disputes.

- Experts have called for review of IWT considering the change in realities in consumption and demand levels to further efficiently use the water. However, with present fragility of the relationship between India and Pakistan, such a review seems farfetched (Piesse 2015).

Inference

Likelihood: *Highly Unlikely*
Severity: *Extreme*

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[72] *IWT was negotiated between India and Pakistan under the auspices of the World Bank in 1960. It was designed to allocate the waters of the Indus River Basin after the partition of the two countries in 1947. Prior to independence, the British constructed an intricate canal system to irrigate the region that is modern-day Pakistan. Partition left a large part of this infrastructure that Pakistan relies upon to support its agriculture-based economy in what it sees as a hostile foreign country. The tributaries of the Indus River either originate in India or, like the Indus itself, begin in Tibet. Under the treaty, the waters that flow into the Indus Basin are shared between the two countries.Prior to the signing of the treaty, water sharing arrangements were made on an ad hoc basis. Under the agreement, exclusive usage rights to the three eastern tributaries – the Sutlej, Beas and Ravi – were granted to India and usage of the three western rivers – the Chenab, Jhelum and the Indus proper – were given to Pakistan. Indian rivers represent one-fifth of the total flow of the Indus system while the remainder was granted to Pakistan. As part of the agreement, India is permitted to limited development on the three western rivers within its own territory. The treaty does not exclude India from utilizing the western rivers that were allocated to Pakistan. As they pass through Indian Territory, India is permitted limited use of these waters for drinking water, existing agricultural use with some limited expansion, and storage of no more than 3.6 million acre-feet and generation of hydroelectric power through run-of-the-river projects.*

2. Sutlej-Beas River Water

A long standing dispute exists between Haryana and Punjab over sharing of Sutlej-Beas Water[73] (Express News Agency 2016).

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[73] While negotiations on Indus water sharing between Pakistan and India were being conducted under the mediation of WB, India had directed states of Rajasthan, undivided Punjab and Jammu and Kashmir to form plans regarding river water utilization.

In year 1995, an executive order was passed, water allocations to each of the state based on then existing water consumption. The allocations were as mentioned below:

State	Water allocated per year
Rajasthan	8 MAF
Undivided Punjab	7.20 MAF
Jammu and Kashmir	O.65 MAF
Total	15.85

In year 1966, Punjab was reorganized and separate state of Punjab and Haryana was formed. After re-organization, each state laid claim to a major portion of the water and several Centrally-appointed committees failed to find a solution. Then the Central Government issued a statutory order on March 24, 1976, in the midst of the Emergency, dividing the water 50:50 between the two states. Each state got 3.5 MFA and the remaining 0.2 MAF was allocated to Delhi.

The allocations are mentioned below:

State	Water Allocated (In MAF)
Rajasthan	8.6
Haryana	3.5
Punjab	3.5
Delhi	0.2
Jammu and Kashmir	0.65

Punjab felt that allocation was unjust as the state was based on agriculture and argued for riparian rights. The state filed a suit in SC in 1979 to strike down the arrangement while Haryana filed counter-suit, demanding implementation of the agreement. With the change in government in Punjab, a tripartite agreement was signed between Punjab, Haryana and Rajasthan. Upon re-investigation the total usable water in Ravi-Beas basin was found to be 17.17 MAF. The allocations were revised; however Delhi's share remained same. This agreement required both Haryana and Punjab to withdraw their Supreme Court suits.

In July 1985, came the Punjab accord with Clause 9 referring to the sharing of river waters. It said: "The farmers of Punjab, Haryana and Rajasthan will continue to get water not less than what they were using from the Ravi-Beas system as on July 1, 1985 The claim of Punjab and Haryana regarding their share in the remaining waters will be referred for adjudication to a

Appraisal of the risk

- Increased Water Demand: In the initial years, Punjab's political class was unable to foresee future water scarcity in the region. With higher irrigation demands due to green revolution and higher consumption demand due to rising population, both Punjab and Haryana are struggling with current water access.

- Punjab claims ownership of Ravi-Beas water through Riparian rights. The state has shown discomfort over sharing water with non-riparian states Rajasthan and Haryana, who have other sources of water at their disposal. Haryana claims it's right on Ravi-Beas water since the state has been carved out from Punjab itself.

- If Punjab is allowed to get away with the filling up of canals with mud in order to block the flow of water, it could set a dangerous precedent for other parts of the country and threaten federal unity with inter-state battles for waters that ignore the law.

- None of the stakeholders have so far raised objection to Delhi's as well as Jammu and Kashmir's allocation. The share of these two states is very less when compared with share of the other three states.

- However, given that issue has still not been resolved, Delhi must stay alert and cautious. Though the tribunal had rejected Punjab's riparian rights on Ravi-Beas water, Punjab may extend the argument to decrease Delhi's supply as well. Being the capital of the country, Delhi gets an advantage against such issues.

Likelihood: Unlikely

Severity: Extreme

3. Ganga Water

Inter-state sharing of water is not based on a treaty between the respective state governments, but on a real time analysis of water flow in the river. Delhi get's it water through Upper Ganga Canal (UGC) (Board 2014-15).

Risk Appraisal

- The sharing of water from river Ganga is done as per standing orders issued by C.E. in charge & it lays down the principles for inter-circle and inter-divisional distribution of water in U.G.C. Command. On the U.G.C. Command, Chief Engineer Meerut,

convenes a meeting of all the superintending engineers before the start of Rabi season to assess & decide probable availability of water for utilization in UGC & makes weekly allocations to each circle in charge who in turn decides the plan of operation of branches / distributaries & minors under his charge (UYRB).

• The supply of water is a major political issue in west UP, especially after farmers' body Bharatiya Kisan Union asserted the state government should provide water to farmers for irrigation rather than supplying it to Delhi. Opposition parties in UP (such as the BJP, RLD, Congress and the BSP) have supported the farmer's agitation (Singh 2014).

Inference

Likelihood: *Unlikely-Somewhat Likely*

Severity: *Extreme*

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tribunal to be presided over by a Supreme Court judge....The decision of this tribunal will be binding on both parties." The Eradi tribunal increased, both Punjab's and Haryana's allocation to 5 MAF and 3.83 MAF respectively while keeping Rajasthan's constant. However, clarifications have been demanded by both centre and states and final report is awaited. The militancy and subsequent Emergency in Punjab had kept Sutlej-Yamuna link project on halt. Opposition continued against the construction of the SYL long after emergency, a few times manifesting itself as violence. In 2004, Punjab's Vidhan sabha passed Punjab Termination of Agreements Act that cancelled all the water sharing agreements, of which Punjab was a party. Supreme Court is currently investigating the legality of such an act.

Hazards Due to Human Activities

Mining

A boom in real estate and construction activities has led to an increase in the demand for sand. This has led to rampant mining along the Yamuna riverbed. Rampant mining has led to vast erosion of the rich alluvial soil, which is highly detrimental for the floodplain and the river flow. The impact of mining is not only limited to the river flow but also to the water supply infrastructure on Yamuna. The impact of mining near Saharanpur is clearly visible in the pictures given below

Source: (SANDRP 2016)

Region	Blocks	Quarrying	Mining Area	Sand price	Duration
Yamunanagar	13	48	2949.56 ha	Rs. 66.61/ton	8-10 years
Kurukshetra	1	11	257.94 ha	Rs. 0.3	10yrs
Karnal	9	26	2954.57 ha	Rs. 21/ton	8-10 yrs

The high and consistent negative externalities inflicted due to mining on the Yamuna riverbed and floodplains, is closely related to the economic viability of the sector. Due to a continuous boom in construction activities, this sector has grown out of proportions, In the aforementioned table we see that the duration of mining along the riverbed has been a viable for nearly 8-10 years and demands good prices, we also see the large area of land under mining and quarrying. The figure shows the damage done to the Tajewala barrage in Haryana, due to excessive floodplain and River bed mining along the Yamuna. This shows a **persistent, irreversible and increasing rate of damage** inflicted on not only the water resource but also to the transmission infrastructure. Though the effect has been visible, its direct impact on Delhi's water supply is not yet identified. However since, continual damage may cause large collateral damages and such damages are difficult to reverse in a short time period, the severity of this hazard is **"high".**

Power cuts

Most incidents of power cut in Delhi are related to problems in distributional networks at local level and that too for shorter duration. Such power cut is unlikely to affect the treatment process at WTPs because power supply in WTPs is prioritized. But the major power failures can hamper the treatment process since the heavy equipment that makes up the treatment facility cannot be run on backup supply like diesel generator sets. There are five instances of power cuts leading to disruption in water supply since 2000[74]. The past frequency is 0.30 per year.

- May, 2014 - thunder squall;

- January, 2013 - coal shortage at NTPC Dadri power plant, followed by fall in supply from DVC and Chandrapura power plant;

- July, 2012 - North India grid failure;

- May, 2012 - power cut in East Delhi

- January, 2001 - transmission fault in UP leading to northern grid failure.

Even 10 minutes supply cut lead to at least 2 hours of disruption in treatment process. This can lead to 30-35% fall in water supply from WTPs as has happened earlier (Times of India). Also the severity caused due to this particular hazard is multiplied since households cannot even store

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[74] *The set of events are not exhaustive.*

in tanks using motor. Even the water supply in households dependent on bore wells is affected in the event of long electricity cut. **Likelihood – likely; severity - high.**
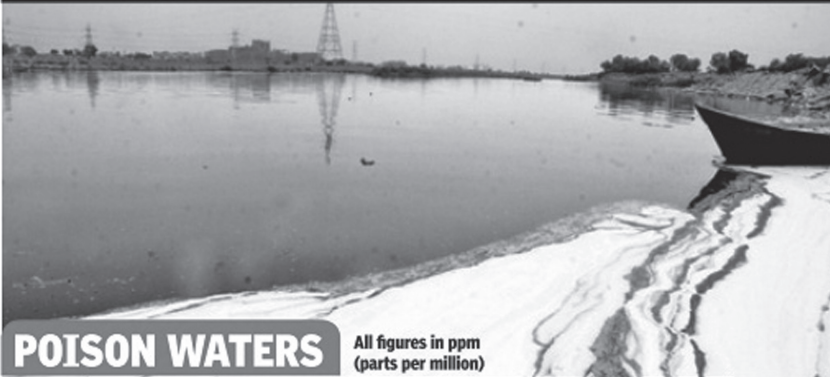
Contamination

• Heavy metals

1. Risk appraisal

Heavy metals are chemicals having high density and which become toxic after certain level of concentration. Their toxicity can be justified by a phenomenon known as bioaccumulation and lead to major ailments. Some of these are required by human body like Iron, Copper, Manganese, Magnesium, Molybdenum, and Zinc while others like Mercury and Lead aren't. Research conducted by TERI (Yamuna, the poisoned river, 2012) and Sehgal, 2012 have pointed out to accumulation of heavy metals in Yamuna at various location in Delhi and Haryana. (Water quality status of river Yamuna in Delhi with reference to heavy metals: Review Divya Christopher, Simarpreet Kaur and Rachana Singh Res). At present the, the treatment process at WTPs does not consider heavy metals as parameters. In the coming years, when these heavy metals will begin crossing the tolerable level, if the treatment technology is not upgraded, the supply of water will be affected greatly. Thus, heavy metals pose **persistent damage with their concentration increasing with time.**

Likelihood - likely; severity - high

POISON WATERS — All figures in ppm (parts per million)

	Lead	Chromium	Cadmium	Mercury	Arsenic	
Pre-monsoon	7.1-23.9 16.2 (avg)	7.2-90.2 40.3	0.2-0.4 0.3	0.8-1 0.9	1.2-4.9 3.3	*Detected only at two places
Post monsoon	15.4-55.7 23.9 (avg)	28.9-796.7 207.3	Below detectable levels	3.2* & 4.7* 3.9	5.3-11.4 7.7	Source: Toxics Link
Standard	0.1	0.5	0.01	0.001	0.2	

Heavy metals in Yamuna

Source: indpedia.com (data- Toxic link)

2. Ammonia

The level of ammonia which is desirable for drinking water as per CPCB standards for 0.5. However in past years the level of ammonia has gone beyond this level at Wazirabad pond due discharge of industrial and sewage flow combined with the natural ammonification process. A high level of ammonia is not usable for human consumption. "If the quantum of ammonia in raw water increases to 0.5 ppm or mg/l and beyond, the operation of raw water has to be suspended as ammonia when mixed with the treating agent chlorine gives rise to Trihalomethane which is carcinogenic in nature" DJB chairperson Kapil Mishra said. Thus in absence of technology to treat high concentration of ammonia, WTPs mainly Wazirabad and Chandrawal are shut down. Together, these WTPs supply 340 MGD water. Apart from WTPs, the production Ranney wells situated in Yamuna floodplains is affected due rising ammonia level. But the damage caused due to ammonia contamination is essentially lasts temporarily. Thus the **severity** of high ammonia level is **very high.**

The **likelihood** of occurrence of this hazard is **high**. In 2016 only, Chandrawal and Wazirabad WTPs had to be shut down thrice owing to hike in concentration of ammonia at Wazirabad pond (19, 20 Jan; 16 Feb; 29 Feb). In last 5-6 years, it has happened 7-8 times[75]. Due to frequent incidents, it has also been considered as inter-state river water disputes by CBCP.

3. Eutrophication

Eutrophication the increase of nutrient levels in water, which can lead to the formation of large masses of algae or blooms. The growth of these algae blooms leads to reduced oxygen and release some toxic chemicals. The factors responsible for Eutrophication are phosphate and nitrate level, which are again contributed by detergents, agricultural runoff, and industrial waste and domestic sewage.

Risk appraisal

'Accelerated phosphate and nitrate level: factors to blame for Eutrophication in Yamuna River', shows the level of nitrate and phosphate in Delhi's Yamuna to be high and increasing over time. (Simerjit Kaur and Indu Singh, International Journal of Plant, Animal and Environmental Sciences)

The figure reveals that level of Dissolved Oxygen for Delhi's stretch of Yamuna is lower than the standard level for 1999 -2005. The dissolved Oxygen now is almost zero in Delhi's Yamuna. Thus there is **persistent, reversible, increasing rate of damage** due to Eutrophication.

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[75] *From informal meeting with govt official. The official figure was not provided as the issue involves Haryana as well. But based on news report and visits to DJB officials, we know that it is rather frequent phenomenon.*
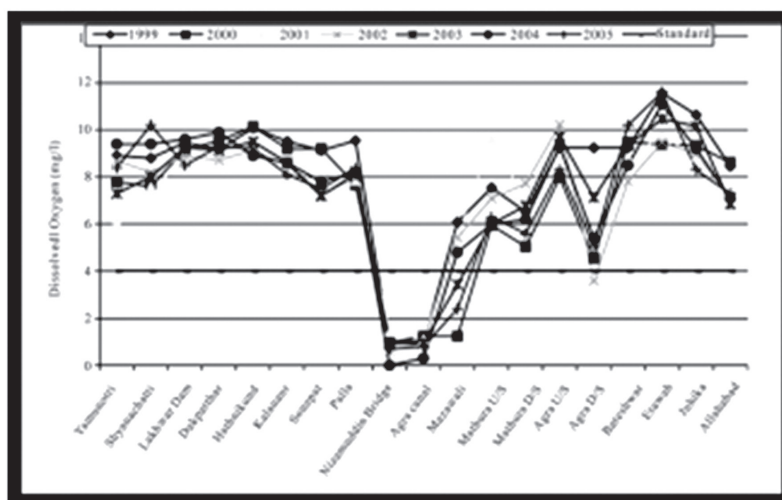
Dissolved Oxygen

Source: A River About To Die, Yamuna (Anil Kumar Mishra, Journal of Water Resource and Protection

Vol.2 No.5 (2010), Article ID: 1806, 12 pages)

It is surely a major threat for aquatic life but it can also be a potential problem for Delhi's water supply. DJB plans to increase the use of recycled wastewater for non potable and potable purpose too. Also it plans expand the production at its wastewater treatment plants. High levels of Eutrophication in future can go against this plan since in order to achieve recyclable water quality it is essential that many of the current STPs discharge cleaner water quality at lower energy/chemical costs. (Draft water policy, DJB). However, as the use of recycled wastewater at present is already low and is limited to non potable use like irrigation and horticulture, and the plans to expand this is yet to be achieved, the quantity of water supply affected will be small.

Likelihood - somewhat likely; Severity - average.

4. Organic contamination

Risk appraisal

The large quantity of sewage being disposed into Yamuna through various drains has constantly deteriorated the organic quality of river water. It can inferred from BOD[76] graph indicates the same. Even the level of Total coliform and faecal coliform for river Yamuna conform to same pattern. Thus it is a **persistent, reversible and constant rate** of contamination.

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[76] *Biochemical oxygen demand is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period.*
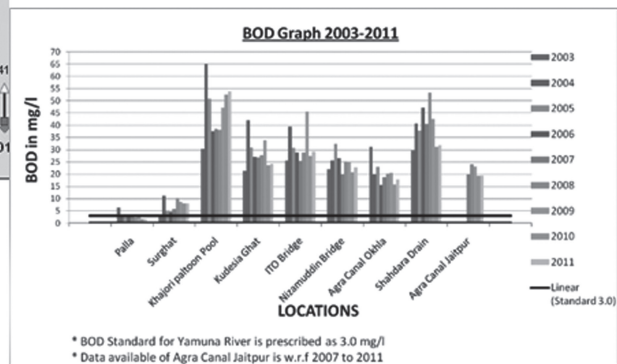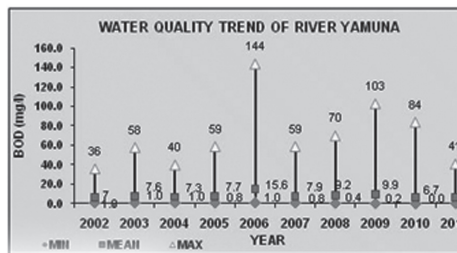
Source: CPCB

However as the next graph shows, the high level of biological waste increase only after the water is extracted for treatment purpose since various drains Source: DPCC

Join the Yamuna after the Wazirabad barrage. The raw water intake at treatment plants doesn't contain such high level of contamination. Even the biological contamination is again treated at WTPs through chlorination of water and does not lead to any cut in water supply. However, groundwater supply will become unusable due to increasing organic contamination.

Likelihood - somewhat likely;Severity- low

Accidents

1. Drowning accident before raw water intake at WTPs

Risk appraisal

In past 20 years, there have been 3 incidents[77] of drowning accident when water supply was cut to WTPs. past frequency - 0.15 per year...

Although it urgent to stop the flow of water supply in the water body in order to save life, the cut is not continued for long duration.

Likelihood - somewhat likely; Severity - average

2. Chlorine leakage

Risk appraisal

In the past 20 years, there have been 4-5 incidents[78] of chlorine leakage at old WTPs and at DJB tube wells in Palla. Past frequency - 0.225 per year.

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[77] *Based on visit to Disaster and Safety Management team, DJB*
[78] *Based on visit to Disaster and Safety Management team, DJB*

Chlorine is highly poisonous and inflammatory gas and poses a huge threat to the workers at plant and thus treatment process will be disrupted. However, there hazard is manageable by the Disaster Management team and thus severity is brought down.

Likelihood - somewhat likely; Severity - average

3. Chlorine gas or PAC catches fire

Risk appraisal

Till now, there has been no serious incident[79] of fire accident at WTPs in Delhi. But there always exists probability of occurrence of such hazards.

Exposure of either of gases to fire is extremely disastrous and might take hours to control. In face of such incident, water supply from the treatment plant will be affected for that very period. Also there might be long term effect on machinery facilitating the treatment process.

Likelihood - highly unlikely; Severity - very high

RISK TABLE

Hazard	Type	Likelihood	Severity	Risk Quotient
Earthquake				
	Low Intensity <3.5	Highly Likely	Low	11
	Medium Intensity 3.5-4.5	Likely	Average	12
	High Intensity 5.5<	Somewhat Likely	High - Very High	13-18
Flood	Major- Water levels above 205m	Unlikely	High	9
Climate Change				
	Reduced river flow	Persistent and constant rate of decline - somewhat likely	High	13

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[79] Based on visit to Disaster and Safety Management team, DJB

	Reduced Groundwater recharge -likely	Persistent and Increasing rate	Very High	21
	Disappearing water bodies	Persistent, Irreversible and Increasing rate - Highly Likely	Average	16
Contamination	Ammonia	Highly likely	Very high	23
	Heavy metals	likely	High	17
	Eutrophication	Somewhat likely	Average	8
	Organic contamination	Somewhat likely	Average	8
Mining	Floodplain and riverbed	Persistent and Constant rate	High	17
Accidents				
	Drawing water tragedy	Somewhat likely	average	8
	Chlorine leakage	Somewhat likely	average	8
	fire	Highly unlikely	Very high	10
Power cut	WTPs, Tube wells	Likely	High	17
Non-water related acts of violence	Deliberate Sabotage	Somewhat Likely	High-Very High	13-18
Water Development Disputes				
	International water development disputes	Highly Unlikely	Extreme	15
	Intra-national water development disputes	Unlikely	High-Very High	9-14
Adverse change in inter-state water sharing agreements				

	Inter-state Yamuna-water sharing	Highly Unlikely	Extreme	15
	International sharing of Indus river basin	Highly Unlikely	Extreme	15
	Inter-state sharing of Ravi-Beas river	Highly Unlikely	Extreme	15
	Inter-state Ganga water sharing	Highly Unlikely	Extreme	15

Part III

Vulnerability Assessment

Any risk assessment is incomplete without taking into account the tolerability from the impact of the particular hazard. This calls for a comprehensive vulnerability analysis at different levels. Hence we have designed our vulnerability assessment in a fourfold design, taking into account the vulnerabilities present at the four stages of water supply system in the city:- At the city level, in the command areas of water treatment plants, the colony level and finally at the households level.

Cascades of Vulnerability
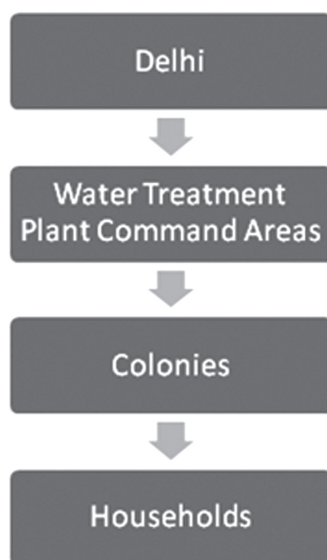
Spatial Vulnerability Assessment

Spatial vulnerability assessment takes into account the vulnerability of water treatment plants and their corresponding command area due to the virtue of their location. Here we analyze the risks posed to the water treatment plants based on the hazards it faces due to geographical and physical proximity to the sites of hazards. We derive it from the gradation given under the risk matrix

WTP	Source of raw water	Production proportion of total supply	Vulnerabilities	Risk Points	Total risk exposure[80]	Total impact[81]
Chandrawal	Wazirabad Pond	10.43%	High Earthquake vulnerability zone[82], Flood prone zone Effect of climate change on Yamuna, ammonia, power cut, accident (all), heavy metals, mining, Change in inter-state water sharing patterns	13-18+ 9+ 13+ 23+ 17+ 8+ 8+ 10+ 17+ 15	135.5	14.13265
Wazirabad	Wazirabad Pond	14.98%	High earthquake vulnerability zone, Flood prone zone, Effect of climate	13+ 18+ 9+ 13+ 23	135.5	20.2979
	Pond		change on Yamuna, Ammonia, power cut, heavy met-als, accident (all), mining, Change in inter-state water sharing patterns	17+ 8+ 8+ 10+ 17+ 15		

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[80] *Taking average risk in case of range*
[81] *Total impact is defined to be risk points*production proportion of severity*
[82] *With reference to the zonal seismic hazard map*

Haiderpur	WYC	25.08%	Moderate earthquake vulnerability zone, Power cut, accidents (all), heavy metal, non water related act of sabotage, water development conflicts, Change in inter-state water sharing patterns	12+ 17+ 8+ 8+ 10+ 17+ 13- 18+ 9- 14+ 15	114	28.5912
Sonia Vihar	Ganga upper canal	15.64%	High earthquake vulnerability zone, Power cut, accident (all), non water related act of sabotage, water development conflicts, Change in inter-state water sharing patterns	13- 18+ 8+ 8+ 10+ 17+ 13- 18 + 9- 14+ 15	100.5	15.7182
Nangloi	WYC	4.43%	Moderate earthquake vulnerability zone, Power cut, accident (all), heavyMetals, non water related act of sabotage, water development conflicts, Change in inter-state water sharing patterns	12+ 17+ 8+ 8+ 10+ 17+ 13- 18+ 9- 14+ 15	114	4.902
Bhagirathi	Upper ganga canal	11.87%	High earthquake vulnerability zone, Power cut, accident (all), non water related act of sabotage, water development conflicts, Change in inter-state water sharing patterns	13- 18+ 8+ 8+ 10+ 17+ 13- 18+ 9- 14+ 15	89	10.5643

Dwarka	WYC	4.77%	Moderate earthquake vulnerability zone, Power cut, accident (all), non water related act of sabotage, water development conflicts, heavy metals, Change in inter-state water sharing patterns	12+ 17+ 8+ 8+ 10+ 17+ 13- 18+ 9- 14+ 17+ 15	131	6.2487
Bawana	WYC	1.66%	Moderate earthquake vulnerability zone, Power cut, accident (all), non water related act of sabotage, water development conflicts, heavy metals, Change in inter-state water sharing patterns	12+ 8+ 8+ 10+ 17+ 13- 18+ 9- 14+ 17+ 15	114	1.8924
Okhla	Recycled water from Chandrawal	2.21%	Low earthquake vulnerability zone, Power cut, accident (all), Eutrophication	11+ 8+ 8+ 10+ 17	54	1.1934

Caveat:

- Ranney wells (12 in number) and Tube wells (4400 in number) are used in DJB water supply and form nearly 11 % of the total water supply. However due their presence across the city, a location specific vulnerability assessment is difficult. However the paper as mentioned the zones of overexploitation, the increasing rate of extraction and the issues associated with groundwater recharge, making a lucid assessment.

- The difference in functioning of WTPs is ignored.

Assessment of vulnerability at household level

The aim of this section is to identify the parameters that make households in NCT highly vulnerable to water supply shocks.

For the purposes of assessing the vulnerability, a case study of 'Impact of water cut in Delhi due to sabotage of Munak canal during Jat agitation' was conducted. Case study of such a nature was considered suitable due to the following reasons:

1. Almost 100% water cut for multiple days: Following the sabotage of Munak canal, parts of Delhi faced almost, if not complete, 100% water cut for 4-10 days. First, such an incidence allows for a magnified picture of how households react when there is a water cut. This paper does not make the assumption that individuals shall be equally vulnerable in water cuts of minor degree. However, an exaggerated picture does allow for the appreciation of the general response pattern and hence a vulnerability assessment can be concluded. Second, because of the acuteness of the problem, people remembered the problems endured and their responses through the incident.

2. Short time lag between the incident and the survey: The survey was conducted after 3 months of the occurrence of the incident. Given the acuteness of water shortage during the accident, the time lag was short enough for respondents to submit answers with high degree of conviction.

3. Universal Impact: The impact of the accident was not isolated to one place. Rather, major parts of Delhi being served by affected WTPs faced the problems in varying degrees of acuteness. This factor allowed for variability in the sample, hence ensuring greater credibility of the results.

Methodology

To gauge vulnerability to water supply shocks via a viz water procurement method of the households, two assessments were conducted. In the first assessment, telephonic interviews of RWA's presidents were conducted and the general response mechanism of the colony was recorded. In the second assessment, household level data was conducted through in-person interviews.

Assessment I:

Residence Welfare Association (RWA) is a civil body which represents the interest of the citizens of a specific urban or suburban locality. RWAs are not official organs of government, and even slums and illegal housing localities in India can form RWAs to represent citizen interests.

DJB interacts and associates with RWAs on Rain Water Harvesting; Distribution of Water through tankers; Replacement of old/ leaking service pipes; Water bill payment and collection; Curbing wastage of water and encouraging water conservation. (DJB website).

For the survey, a random sample of 50 RWA's from Central and South West districts of Delhi was taken.

Both these districts were affected because of the sabotage (DJB press release). RWA's of both planned and unplanned colonies were chosen through methods of random sampling from telephone directory. All the RWAs interviewed had been registered with the government.

Broad areas on which open ended questions were asked:

● Modes of water supply and problems with each mode.

- Jat agitation effect - how many days affected, how water was managed during that period and associated problems and costs with them.

- Functioning as rwa- meetings happen how often, problems in raising questions to authority and their response, changes felt due to closure of bhagidari.

- Number of household and the economic class of majority of household.

Observations

Colony Profile	Total Number	Number of colonies dependent on external water sources during water cut	Percentage of colonies dependent on external water sources during water cut
Number of colonies with provision of DJB water pipeline for households	41	27	65%
Number of colonies with only individual borings for at least of the households	23	17	N/A
Number of colonies with only community borings for households	3	1	N/A
Number of colonies with both individual and community borings for households	6	4	N/A
Number of colonies without any access to groundwater	8	5	N/A
Number of colonies without provision of DJB water pipeline for households	9	2	22%
Number of colonies with only individual borings for at least some of the households	4	1	N/A
Number of colonies with only community borings for households	2	1	N/A
Number of colonies with both individual and community borings for households	2	0	N/A

Number of colonies with no access to groundwater	0	N/A	N/A
Total number of colonies surveyed	50	29	58%

Additional Observations:

- Out of the 41 localities that get piped water supply from DJB, 15 had reported either some serious concern about quality or regularity.

- Out of the 9 colonies that did not get piped water supply from DJB, 6 were either UACs or JJ. Of the same 9 localities, 6 got water through DJB tankers.

- Of the total colonies interviewed, 41 colonies had access to groundwater. At least some houses of 38 localities had provision of individual borings. 12 localities had community boring provision either in the form of DJB boring connected to households through pipeline, boring at parks or boring at other community areas.

Impact of Jat Agitation

- All the colonies of the sample with access to DJB's piped water supply have reported to be affected by the water supply cut.

- Localities without access to DJB's piped water supply or those who are not dependent on them, have also reported to be affected during Jat agitation. However, they reported lower intensity of impact.

- The intensity of affect has been varied for different colonies. For 42 localities, the supply cut lasted for maximum one week. While for 4 localities it lasted for more than one week.

Response

- The recorded response pattern for most of the localities was the use of borings. 36 or 72% of the total localities interviewed claimed to depend on borings during the water shortage. Localities without any access to groundwater were worst hit. Out of the 8 localities having no access to groundwater, 5 had to incur additional cost on the part of cans and private tankers which in the range Rs 780 to Rs 280. Only 17 reported to have procured water from tankers and only 7 localities had to call private tankers specially and thus incur cost above Rs 500.

- For the non-potable purposes, water was either available at free or low cost from boring or tankers for most houses.

- But the cost was incurred on the part of procuring drinking water for most localities. The purchase of cans, bottles was, however, dependent on the economic status of households.

Summary

Following factors have proven to determine the vulnerability of localities in face of water cut:

Availability of boring in locality: Though 25 of the 40 localities that had access to borings depended on external water supply during water cut, average out of pocket payments of households were reported to be lower than of colonies without any access to groundwater.

This happened because demand of water for nonpotable purposes was fetched by borings. Those who did not own one, shared from the neighbour's.

The ease of getting water from DJB tankers

As noted earlier, the level of dependency on tankers vis-a-vis borings has been low. One reason has been the shortage of water while the relative ease of getting water from boring rather than tanker is also a factor. Few localities complained that they didn't get DJB tanker during the period even after repeatedly calling at the DJB emergency service number. They either had to call incur cost of calling private tanker or had to limit their water consumption. There were also examples where RWA president/secretary pointed out the help of sources like Zonal engineer and MLA who helped them ease the process of procuring DJB water and also prioritize their locality when water supply was rationed. Furthermore, an RWA President based his case against not calling on tanker on an incident of murder in procuring water from tankers*. There was an interesting case where price paid to DJB tanker was more than that charged by private tankers* The plying of both these DJB and private tankers is subject to a lot of transparency issue and has been under scrutiny. Since, tankers form an important contingency measure, the lack of transparency and susceptibility to political interests further increases the vulnerability of localities, especially for those lacking political power.

Unsustainability of contingency measure

From this analysis, it comes out very evidently that groundwater connection can prove to be a lot helpful even when there is a pipeline supply of water. But going beyond the immediate results, it is realized that such incentive is self-destructive. Once the access to groundwater is lost, no contingency measure will be left in case of any shock to supply system. Even in the present hazard, since the groundwater has depleted in many regions and is not fit for drinking, households were forced to buy drinking water even if they were not buying in normal scenario. And families who couldn't afford the cans had to suffer. The accelerated rate of depletion as identified earlier in risk assessment section means that the primary contingency measure is unsustainable.

Caveats

- Political interest of RWAs
- False information on borings
- Not well aware

Assessment II: Data collection at household level

Three different kinds of localities were visited and a sample of people were interviewed in each.

Locality 1: Kautilya Apartments, Dwarka, Sector 14

- General Description: Kautilya Apartments of Dwarka is a posh residential complex that has MIG as well as LIG apartments. These apartments are organized under respective strong RWAs. There are roughly two expenditure groups. A crude estimate on the basis of some households is 40-50k for low expenditure group and 25-30k for middle expenditure group.

- Water procurement system: The RWAs are largely dependent on government pipe water supply water with intermittent supply since a few years. Individuals and RWAs now do not have any issues with the either quantity or quality of water supply.

- Response pattern during the water cut: At the time of Jat agitation, the water supply in this locality was affected. The supply was disrupted for 15 to 30 days, as reported by different people. Households during this time procured water from community bore well, DJB and private tankers and bottled water. For buying water from tankers, 5-6 households together ordered the tanker. DJB tankers were available at free but it was not sufficient to meet the demand. Private tankers cost per household around Rs 200-300. However, access to community bore well ameliorated the impact of water supply cut on the RWA's.

Locality 2: Malkaganj

- General Description: Malkaganj in north Delhi has single storey as well as double storey houses. While the former houses most people with expenditure group in upwards of 80 thousand, the latter comprises of people expending in the range of 30-60 thousand.

- Water procurement system: Quality of DJB supply water is below the desired levels. The supply is also erratic. Therefore, most houses in both settlements have personal borings. Those who do not own one, take water from the neighbors in case of water supply cut. Most people opt to not drink water of the boring and instead buy cans from the market. One cannot help but notice water cans put up in shops, big and small. At Least 10-15 water-can shops operate in the area with per day sale of around 40 cans a day. Even local grocery stores sell these water cans. The rates range from Rs. 30 - 70. The water purifier business also working well given the TDS of 3000 for supply water and a TDS range of 500-1500 for ground water depending on the depth and place.

- Response pattern during the water cut: During the water cut, most houses relied on borings. The few that neither own one and nor could ask for water from neighbors, had to call for water tankers as well as buy additional water cans.

Locality 3: Bharat Vihar, Dwarka

- General Description: Bharat Vihar is a Jhuggi Jhopdis cluster in Dwarka. It has many blocks. We visited block C ad block E.

- Water procurement system: In block E, households procured water from DJB water tankers, while in the block C, people relied on DJB pipe supply water along with borings.

- Response pattern during the water cut: For the people entirely dependent on tanker, the cost of disruption in water supply due to Jat agitation was mixed. Some people reported that they were not affected at all while for others the impact was small. The DJB tankers supplied water in lesser frequency than usual, and this continued for around one-two weeks. Most families are accustomed to using low levels of water. They, therefore, didn't go for alternative arrangement of water. For people living in Block C, the ownership of borings cushioned them against any altered water.

Observations

- If water is being provided by tankers which is done once or twice a week, people become habitual of consuming less amount of water. In case of Jat agitation, the provision of water tankers in Bharat Vihar to delayed by a day or two at maximum. Though some had to buy drinking water cans from outside, there was not much of problem faced by the community.

- In case water is solely provided by water supply, people face a lot of problem when water supply is cut off.

- However, living in a society reduces the vulnerability as collective action helps. In most societies, there also exist society level borings which though used to water gardens are used when water supply is cut off.

- Living around neighbors with boring also reduces vulnerability as non drinking water is obtained free of monetary cost.

- In case boring is used additionally, people prefer to use DJB's water to drink. In case of water supply cut, the only cost involved is related to procuring drinking water, that too when RO is not put and ground water cannot be used at all.

Conclusion

Vulnerability Assessment	Out of pocket Payments →			
Scarcity of water ↓		**Low (0-2)**	**Moderate (2-4)**	**High (4-6)**
	Low (0-2)	Houses with borings	(-)	(-)
	Moderate (2-4)	(-)	Houses with borings in neighbourhood	Society
	High	Jhuggi	(-)	Colonies
	(4-6)	Jhopdis		without borings

Caveats

- Limited sample size

- Respondent's bias

- Not remembering past details

Assessment II: Vulnerabilities to manufacturing units in the city

In our survey of the various consumers and stakeholders of water supply, industries formed an important aspect of adjudging vulnerabilities of the city's economy and livelihoods as a whole. To study the impact of water supply disruption on Delhi's manufacturing industries, we collected primary data from Industries present in the Bawana and the Okhla Industrial areas. These industrial areas were chosen in order to put to light the effect of water supply disruptions due to piped water supply cut and bore well water exhaustion.

- ❑ The industries that utilize water in a major manner are food and beverage, textile, paper, waterworks and sanitation services

- ❑ Delhi has in total 4,150 such manufacturing units which employ 198353 workers

Context

- The industries that we interviewed comprised of food & beverage manufacturing units, textiles, paper and rubber and plastic industries.

- The scale of industries ranged from Grih Udyogs, small and medium scale units and finally large manufacturing units.

- Questions related to the type and quantity of water use, affect on production due to supply disruption and contingency measures for crisis management were asked. Water is largely used as raw material in the product, coolant, cleaning agent, heating agent, solvent and transport mechanism.

The vulnerability assessment is based on the following parameters:-

1. Water use in production process

A. Water as raw material

Indicates high vulnerability of production process to water supply cut, as it would cause complete disrupt the production process. As potable or processed raw water might be used as an ingredient in the product, water reuse or inventory may not conform to the quality standards.

B. Water as solvent

Water use is not as sensitive as a raw material. Hence the scale of processing and quality are not relatively important. Water may be sourced from substitute sources. Medium vulnerability from supply shocks.

C.   Water used as coolant and heating agent

Quality of water is not a priority. Water may also be reused in repeated cycles. Indicates lower vulnerability

D.   Water used as cleaning agent and transport mechanism

Substitutes other than water available, less emphasis on quality and easy reuse. Low vulnerability.

2.   Water supply source

A.   Piped water supply - Higher dependence on intermittent supply water. No other substitute available. High Vulnerability

B.   Common Bore well

No dependence on piped water supply, water supplied from local source. However the supply is not exclusive. Further the possibility of overexploitation is higher. This reflects medium vulnerability

C.   Personal Bore well

Local and exclusive source of water. Overexploitation is the only source of vulnerability. Medium vulnerability.

D.   Multiple Personal Bore wells

Multiple exclusive local sources of water Indicates substitute sources if one source fails, higher volume usage which in turn means higher abstraction, is the only source of vulnerability

3.   Ability to arrange for contingency water supply

a.   Dependent on Industries scale and capital - grih<small< medium< large<very large

b.   Available means: Tankers and Water can

c.   Inventory Capacity

Observations

1.   Food and beverage industries are large users of water, where water is used as raw material. The industries we surveyed produces soya products, semolina, juices and drinking water. Since water supply is essential to production, exclusive and uninterruptible supply is the prerequisite. Hence personal bore wells were a common feature in these industries. While small & medium scale industries utilized single bore wells, larger industries have installed multiple, given the higher volume of output.

2.   However small scale Grih udyogs are still reliant on piped water supply and have installed tanks in order to maintain continuous supply of water in the production process. This indicated a higher vulnerability relative to other small scale industries

3. The impact of a supply cut or scarcity on market supply is tackled by inventories. Inventory capacity varies positively with the scale of industries

4. The larger impact of supply shocks is largely absorbed due to higher levels of bore well installation

Conclusion

The ranking in the matrix is done according to the given score. The parameter coordinates reflect the least pos state of vulnerability

Vulnerability Assessment		Level of Tolerability		
Duration & Scale of Scarcity/Water Supply		Low	Medium	High
	Low	Grih udyogs and khadi udyogs (1A,2A) 3A- Small 3B-Cans 3C- Low	Small Scale Industries (1B,2B)(1D,2A) (1C,2B) 3A- Small 3B-Both 3C- Medium	Medium (1D,2C) 3A- Medium 3B-Cans 3C- High
	Medium	Small Scale Industries, Medium Scale (1A,2B)(1B,2A) 3A- Small, medium 3B-Both 3C- Low	Medium (1A, 2C) (1A, 2D) 3A- Medium 3B-Both 3C- Medium	Medium & Large (1C,2D) 3A- M,L 3B-Both 3C- High
	High	Medium (1C,2A) 3A- Medium 3B-Both 3C- Low	Large(1D, 2B) (1C,2C)(1B,2D) 3A- Large 3B-Cans 3C- Medium	Manufacturing units of MNC/Industries (1C.2D),(1D,2D) 3A- Very Large 3B-Both 3C- High

Policy Recommendations

The prime objective of the study was to conceptualize a framework of risk assessment of Delhi's water supply. We explored and studied hazards associated with the city's water supply and consequently inferred the vulnerabilities present at different levels of the city. Our formal conclusions establish the priority of intervention in the list, also aligning them to disaggregated vulnerabilities. However the given conceptual framework may have limitations in terms of available

data and the choice of qualitative analysis over quantitative analysis, which highlights the scope for further study in the area. Nevertheless, the paper identifies the need for a comprehensive and detailed survey of minute and out-of-the box hazards, which have been neglected on the grounds of no past precedence. However by highlighting the fact, that Delhi's vulnerabilities stand exposed to numerous and an inexhaustive list of hazards, the approach of neglecting such problems is dubious. This is needed to bridge the gap between perception and a broader perspective of risks that have been given a miss in the disaster management plans for Delhi's water supply

1. Dynamic & Periodic Risk Assessment of Delhi's Water supply

In a situation where we stand exposed to multiple hazards, many of which were either undiscovered or neglected, the city needs to have a periodic and real time risk analysis of its water supply and resources. Such an analysis will utilize real time data; to not only assess the dynamics of the said hazards but also to collate policy correspondingly.

2. Creation of Water Inventories and Contingency Storages

The concept of creation of inventories is to fix the system of a static water allocation and external dependency on water supply governance. The city's water supply mechanism receives a flow supply of water, which intrinsically bears the aforementioned vulnerabilities.

The rationale of creating stock water inventories is to address the dynamic variability in water demand of the city, when the supply may be in a dearth or the risk of supply disruption is high.

These inventories may be constructed in the following manner

I. At or Near the water treatment plants, where water, on increasing demand may be treated immediately and supplied through the existing network

II. Rejuvenating internal water bodies for surface storage. This policy measure would require a larger mobilization of government machinery to prevent construction on or near the catchment areas of these existing water bodies, investment in watershed development to rejuvenate dried-up water bodies, and take into account of formalizing and mandating the maintenance of the existing water bodies

III. Community level storages, this is a further decentralized method of creating inventories at the colony level or as a pool resource in order to increase the tolerability to water supply crises. However this would again require investment in acquiring the site, construction and regular maintenance of such inventories. Further institutionalizing their governance,

Hence in this respect, water storage is a quintessential issue in the development of contingency arrangements in the city. Often storage itself is vulnerable to structural damage caused by hazards like earthquake, and hence they need to be sufficiently robust, in order to provide water in any kind of emergency. Given below is a model of flexible storage, a method followed in New Zealand.

Water storage which is resilient from any structural damage inflicted by earthquakes a

Emergency water supply: Flexible Reservoirs   **Flexible water tank carried by an army truck**

ods Water Companies & KIWA   Water Companies & KIWA

3. Caveats for Renegotiating Terms of River Water Sharing Agreements and Governance: Building a case for Integrated River Basin Risk Management Policy

As Delhi receives water from three different rivers and two different basins, a disaggregated water allocation has led to contentions in water sharing. However since the basins and river waters are shared by nearly the same states, an integrated policy approach may resolve the problem of sharing from a separate source with different mandates.

- Dynamics allocation rather than static allocation

- Regulating the arbitrary powers of upstream states over downstream states

- Security of transmission and allocation control infrastructure

- Addressing and mitigating hazards such as mining, contamination and

4. Utilizing storm water drains for Groundwater recharge rather than sewage treatment
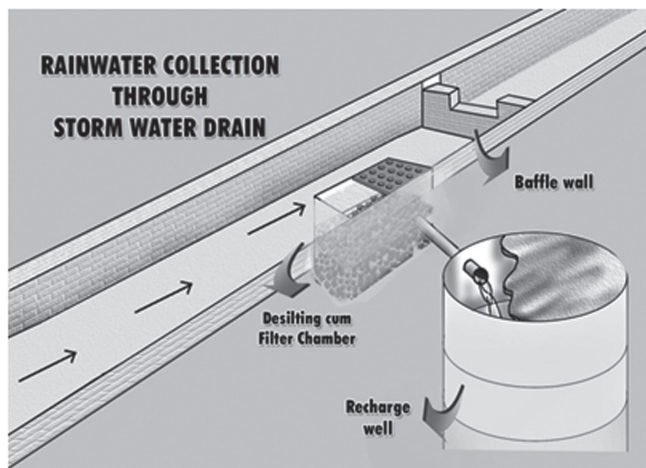
A model of storm water drains used for recharging

Rainwater harvesting is often restricted solely to rooftop harvesting. However a large quantity of the rainwater is retained in the drainage system which is however drawn into the sewerage network, completely wasting the retained water and diluting the sewage treatment.

5. Empowering RWAs

Problems related to water is raised to the local representative (MLA) and also to DJB official. 62% of RWAs interviewed faced problems in reaching out to them to discuss the problem in water supply. Also 50% of the RWAs either reported that they don't have any meeting with the officials or the meetings are formality, with another 50% arguing against the closure of Bhagidari and weakening of RWA. Indeed, the closure of Bhagidari took away the relevance of RWAs and thus rendered them ineffective. When it comes to mitigating risk, as we found in our analysis, an effort at the society level rather than individual can yield better results. Conducting meetings of RWAs regularly and strengthening them enable citizens to solve the problems related to water at much decentralized level.

APPENDIX

A-1

Development Related Conflicts		
Decades	No. of instances	Description
1900-1909	0	N/A
1910-1919	1	Los Angeles: pipeline destroyed to stop diversions of water to Owens valley
1920-1929	0	N/A
1930-1939	0	N/A
1940-1949	2	1)India-Bangladesh partition leads to tensions in water sharing 2) India-Pakistan partition leads to dispute over Indus water
1950-1959	2	1. Jordan-Israel-Syria: competition between river water use leading to border skirmishes 2) Jordan-Israel-Syria: competition between river water use leading to border skirmishes

1960-1969	4	1)Israel-Syria: Destruction of irrigation ditches 2)Brazil-Paraguay negotiation talks over river water sharing is interrupted due to military invasion by Brazil 3)Somalia-Ethiopia border skirmishes over deputed area cutting access to water and oil resources 4) Israel Syria competes over water sharing
1970-1979	2	1) Iraq-Syria: water sharing of Euphrates 2) Protest against dam construction
1980-1989	0	N/A
1990-2000	7	1) South Africa: Pro apartheid council cuts water of black settlement; 2)Iraq, Syria and Turkey compete over river water sharing; 3) In china, two villages fight over water sharing, cutting water supply; 4) Indian states: Karnataka, Tamil Nadu water sharing row; 5)Hungary, erstwhile Czechoslovakia, Slovakia water sharing row; 6) China inter allocation water row; 7)Farmers in Chinese province Hubei and Henan fight over limited water
2000-2010	5	1) Kyrgyzstan cuts Kazakhstan water until coal is delivered and Uzbekistan cuts Kazakhstan water's supply for nonpayment of debt; 2) Unrest in China blowing up water canals; 3) Botswana empties water sources of indigenous khoisan people to forcibly shift them; 4)Bolivia water use unrest destroys pipelines to Tarata town; 5)Two WTP projects hated at Gaza by US due as a tool of put political pressure

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Relativity in infrastructural development of Smart cities causing exclusion and environmental degradation

Sruthi Sankaran*

OBJECTIVE

The main objective of this research paper is to analyse the positive and negative aspects of smart cities which seems to be advantageous only for few sections of the society, and to look forward on how to solve the growing health problems caused by air pollution in our country.

INTRODUCTION

India is one of the fastest growing economies in the world ranking ninth position in terms of GDP growth with its current growth rate being 7.56 % out of which urbanization contributes two third of the percentage. The word 'Urbanization" in accordance with Wikipedia, refers to "the gradual increase in the proportion of people living in urban areas", and the ways in which each society adapts to the change. Indian urbanization is very momentous because of its occupational transition from agricultural sector to the industrial sector. One of the dominant contribution to urbanization is through Infrastructural development, which plays a key role to improvise the techno-based development that is quite essential to match its stature with other nations. It is defined to provide goods and services in an advanced way, aided with modern equipment to uplift the living standards of people.

It comprises development of transportation , telecommunication, buildings, and various other facilities to ensure economic development. It emphasis on increasing productivity by providing more employment opportunities and reducing poverty across the country. This ensures both positive as well as negative impact on our environment and the society. It might be very beneficial for some but at the same time it proves to be exclusive for the others.

As we all know, urbanization promotes the migration levels from rural to urban with more employment opportunities to increase the living standards, because of which there is a widespread

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threat to our environment. Too much burden on the limited resources will ultimately lead to income segregation and have inimical effect on the economy. This calls for the need of sustainable development and investment on equipment to reduce pollution. Although it a rises the question of, "why urbanization?" as it leads to instigate complications and dilemma, but also justifies solutions for development that leads to a more stable economy if surpassed with efficiency and maintained with responsibility.

The aim of the paper is to identify the existence of duality in terms of exclusivity and inclusivity of select societal groups in infrastructural setups like the smart city program in our country, and also examine the reasons as well as solutions to reduce social exclusion. Moreover, the consequences like environmental deterioration affecting everyone's health is a red signal to adopt policies in favour of sustainable development, and also by introducing new strategies to eliminate air pollution by investing on smog free tower.

ANALYTICAL MODEL: How infrastructural set up in Smart cities cause exclusion and environmental degradation
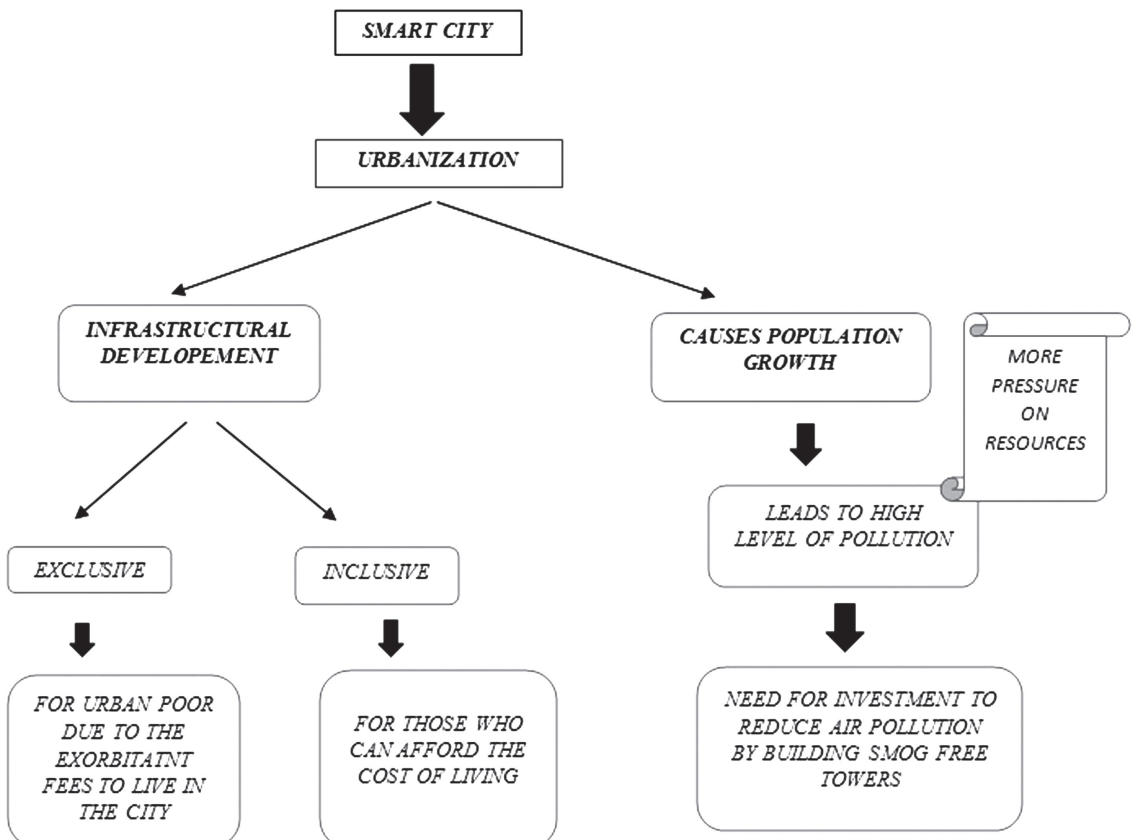
ECONOMETRIC MODEL

I would like to present a simple estimated multiple regression model:

$Y = \beta 0 + \beta 1$ (technology used)$+\beta 2$ (income of the consumers)$+ \beta 3$ (Knowledge and skill of citizens)$+\beta 4$ (population of the city) $+\beta 5$ (Cost to set up)$+\beta 6$ (Budget)$+\beta 7$ (Management)$+\beta 8$ (Urban or rural area)$+\beta 9$ (Facilities that are existing)$+\beta 10$ (Location)$+\beta 11$ (NGO's and associations)$+\beta 12$ (Design and engineering)$+\beta 13$ (Local governance)$+\beta 14$ (Environmental conditions)$+\beta 15$(Available resources)$+ \ \varepsilon$

Y :(Infrastructural development in smart cities): Endogenous variable/Dependent Variables

X: Exogenous variable/Independent variables ε: Error term

LIMITATION

The major drawback for the empirical analysis is the unavailability of data.

MODI'S SMART CITY

The infrastructural ideas in India developed from the western economy plays a crucial role in accelerating the economic stature. The motto remains sustained due to the prevalence of global competition. There are various globalizing ideas that are being promoted in order to modernize the urban system like the smart city program by Shri Narendra Modi, whose rational policies seemed attractive and achievable.

"Smart city" the term itself highlights development in an advanced way with techno-based infrastructure providing high-class facilities. The scheme was introduced by our honorable prime minister Shri Narendra modi who aimed at developing 100 smart cities (which has been upgraded to 109 cities) across the country, out of which the government of India shortlisted 20 cities to begin with. It comprises the following attributes : Smart governance(e-government to facilitate and increase the efficiency) , Smart technology(accessing broadband, GPS attached devices and use of more modern resources to operate the city) , Smart buildings (setup of automatic operations to control and regulate the activities using technology), Smart mobility(transportation with low emission) , Smart healthcare (e-health with elevated and diligent devices) , Smart management(Digital source of management), Smart securities(cctv surveillance) and smart citizens(tech-skilled people).To establish all these constructive activities we need a strong foundation and planning for high-tech infrastructure.

MEANING OF INFRASTRUCTURE AND EXCLUSION

Infrastructure refers to the world of paradise which acts as a necessity to make the society functional and its definition varies with different sections of the society depending on the needs and expectations of an individual. For the elite classes, development might refer to a luxurious world with world-class facilities but at the same time for the urban poor it might mean access to basic amenities like toilets to uplift their lifestyles and ensure safety. In smart cities planning is made to issue identity cards for their residents and to keep a watch through the system of

surveillance for the maintenance of the cities. The characteristics for Smart cities hold prevalent for opulent consumers and producers, richer people invest most of their spending in luxurious flats which are unaffordable by the urban poor. Despite knowing this palpable situation many luxurious flats are being constructed instead of edifying affordable housing. This exemplifies that development for one section may not lead to progress for the other section of the society, thereby causing exclusion.

We have heard about the term "exclusion" in our day to day lives. Here we are going to discuss about social exclusion instigating inequality and segregation. The smart governance, smart living, smart transport, smart economy and smart environment are exclusively for highly- skilled people as it is not accessible by the unskilled people. The main drawback for such advancements is the idea that is, exclusion itself. I believe that, exclusion is ultimately the segregation of people. GIFT city and Dholera are India's first two smart cities established in Gujarat respectively. These cities have been entitled as "investment zones" due to the usage of technology driven amenities which have brought in the IT sector employing highly skilled people. This leads to evasion of the poor as they are termed unskilled and are restricted by imposing financial burden on them. Therefore, these attractive projects are successful inclusionary project only if they reduce the monetary burden, thereby permitting them to enjoy such facilities.

In any kind of settlements, the facilities are essentially dependent on the transport infrastructure. To enable the working of a Smart city, Smart transportation facilities are indispensable. In order to establish a hundred high-tech Smart cities, an efficient transport infrastructure is a must. The attempt regarding metropolitan cities in India was to create transportation catering to a larger crowd through a metro rail system inspired by the global economy and e-rickshaws. From this, an implication can be drawn that the present metro fares are unaffordable for some people. This entails the propagation of Non-Motorized Transport like providing walking and cycling infrastructure.

Keeping in mind the exorbitantly costly facilities required, the strategies in favour to Smart cities are expected to solve the essential problems in such countries. These are one of the prominent characteristics for being smart. "Smart governance" displays the efficacy of jurisdiction which includes maintenance and safeguard for their members living within that space. "Smart living" refers to an affluent home equipped with sensors and providing the members all kinds of facilities. Surprisingly, the policies which are expected to solve the plight of poverty stricken people, increases segregation from the society instead. As recommended by many economists and policymakers, in order to make this into a more inclusive policy I believe that the centre needs to start improvising the existing infrastructure and invest more on basic facilities for the people like the need for toilets , access to water and clean surroundings.

INCLUSIONARY IDEA

The infrastructural development process can be enhanced by strengthening the basic roots of automation that can also act as a mean to eradicate poverty. The ideas to better the existing

infrastructure like waste management, transportation, etc., are still ineffective due to the lack of basic operational networks. It is assumed that by focusing on alternative policies to uplift the living standards of the people will mitigate the advent of urban development leading to disempowerment and injustice. Thus, the accomplishment of strong basic services ensure evolution of advancement in the long run and it is essential to check the operation and accessibility of basic resources like water supply to all.

ENVIRONMENTAL DEGRADATION

All these projects that involves infrastructure entails urbanization. This leads to rise in population in urban due to employment opportunities and for better living standards, thereby putting more pressure on the limited resources causing exploitation of nature. This accounts for destruction of natural resources causing pollution that deteriorates the health. One of the biggest and recent topic that encircles Delhi is "air pollution". According to researchers, the main cause of pollution is due to expansion of technology, industrialization, waste disposal and use of fossil fuels. This has put serious ill effect on the public that provokes heart diseases, lung cancer, stroke, asthma and other respiratory problems.

Premature Mortality Due to Air Pollution (deaths per year per 1,000 km²)

-1,000   -100   -10   -1   -0.1   0.1   1   10   100   1,000
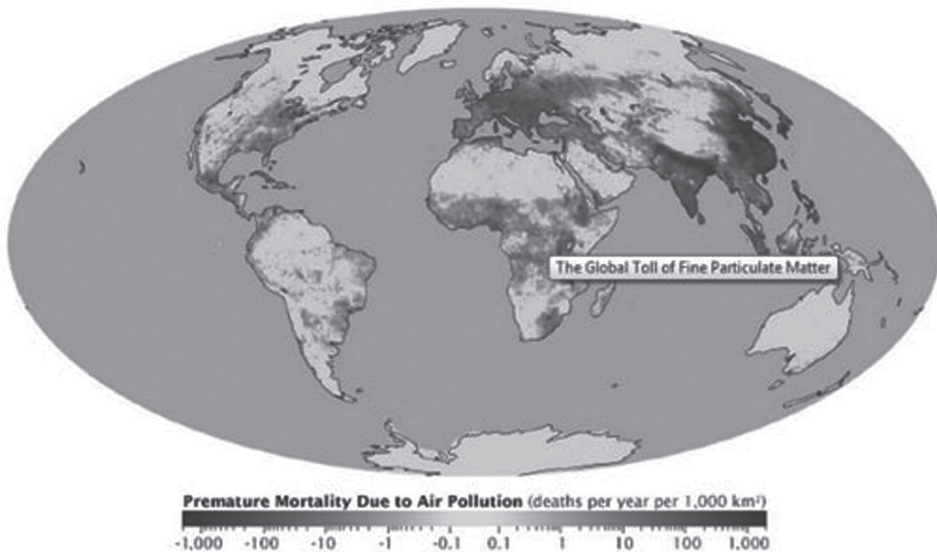
Source: WHO

The above map is published by NASA, to show the level of air pollution across the globe, where brown shade indicates the level of pollution .This clearly shows how India is adversely affected. As announced by World Health Organization, India has the world's highest death rate caused due to respiratory problems like asthma.

SOLUTION TO SOLVE AIR POLLUTION

Delhi has developed an increased amount of air pollutants reducing the visibility and making it difficult to breathe. It has been labelled as one of the most polluted cities in Asia after Beijing in China. China has taken several effective steps to reduce the air pollution. Apart from closing schools, factories and construction sites, it planned to invest on smog free towers. It is a 23 feet tall air purifying tower designed by a Dutch architect Daan Rossegaarde, which can puify 30,000 cubic metre air in an hour. It works through ionization technology that collects the dust particles and releases clean air through the vents. The pollutants are majorly made up of carbon which can be converted into artificial diamond if put under high pressure for weeks. These diamonds can be marketed to raise money that can be used for investing more such towers across the city. The smog free tower seems to be quite advantageous and safe.

I believe that ,if we include the construction of smog free towers into our smart city programme creating a clean environment in order to improvise the hygienic conditions and develop the existing infrastructure with efficient planning and management. This shall make it affordable and advantageous to all sections of society fulfilling their perspective of development, thereby reducing exclusion of the poor.

CONCLUSION/IMPLICATION

In order to lubricate th2e Indian economy in a more integrated manner, adopting western idea of smart cities ultimately leads to evolution of fragmented societal groups. Our existing infrastructure gives us only one façade view rather like an integrated procedure, like the implantable monitoring system, which plays a crucial in enhancing the management processes by saving time and energy. The idea of smart cities plays a completely contradictory role to the inclusionary idea, as it emphasizes on building a world class facility. This makes the scheme confusing, as it serves only a part of society due to costly investment and heavy maintenance charges. If we initiate the focus by developing basic needs to the urban poor we can reduce exclusion to some extent.

Further, all these developmental activities put a huge amount of pressure on the natural resources which becomes the primary reason for the rising health problems. So, if we include infrastructural set ups that help in reducing the pollution levels we can create a clean environment across the country.

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THE TANGIBLE SIDE OF INDIAN URBAN POVERTY

Vaishnavi[83]

Introduction

"Overcoming poverty is not a gesture of charity. It is the protection of a fundamental human right, the right to dignity and a decent life."

- Nelson Mandela

Poverty is about denial of opportunities and unexploited human potential. Poverty and inequality are closely related. Poverty is a social-economic phenomenon in which a section of society is unable to fulfill even its basic necessities of life and inequality appears have been on the rise worldwide in recent decades at both national and international levels. The basic minimum needs are food, clothing, housing, education. Humanity faces pains and miseries if it does not attain a subsistence level of such needs. It is generally agreed in this country that only they who fail to reach a certain minimum consumption standard, should be regarded as poor

India has experienced an unprecedented rate of urbanization in the last few decades, which has led to increased urban poverty, chaotic growth, violence, pollution, disease and extreme destitution. Still with all these consequences, people continue to move away from rural to urban areas. The urban population in India is expected to increase from 27.8 percent in 2011 to 38 percent by 2025. Along with the ongoing migration from rural to urban areas, the rise of the unskilled labor force is contributing to the widening gap in urban income levels. Successful urban planning has been especially difficult to achieve in fast-growing Indian cities. For a while, some Indian cities were growing by one million residents a year. In addition to dealing with housing and crowding issues, India has faced financial difficulty in developing and urbanizing new areas. To offset the costs of urbanization, India decreased its public services and investments in infrastructure. India houses one third of the world's poor. According to World Bank and McKinsey report, India has only lifted 38 million people out of extreme poverty. Even though the poverty is still more prevalent in rural areas than urban areas, the gap between the two is gradually getting closer.

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Many Indian states report a higher poverty figure in urban areas with 32.7 percent of the population living on $1.25 per day and below the international extreme poverty line. In addition to negatively affecting health, education, sanitation and general livelihoods, urban poverty creates serious difficulties for groups like women, children and the elderly. More than 80 percent of the world's population lives in countries where income differentials are widening. Slums have long been hotspots of urban poverty in India. The 2011census indicates that the number of slums has decreased while the population of slum dwellers has increased. Tamil Nadu, Gujarat, Punjab, Maharashtra and Karnataka account for over half of the slum population in India. At an annual growth rate of 5 percent, the slum population has become more concentrated, making slum dwellers increasingly vulnerable to eviction, confiscation of belongings and poor sanitation. Over 50 percent of urban slums lack access to toilets, proper healthcare, social security, hygienic public facilities and clean water.

Objectives of the study

- To study the prevalence of urban poverty in India
- To identify the levels of urban poverty suggested by the anti-poverty committees

Methodology

The relevant secondary data are collected through various sources such as websites, Economic survey, books and journals.

Urban poverty - Definition

There is no stringent or definite means on definition of urban poverty but two broad complementary approaches are prevalent: economic and anthropological interpretations. Conventional economic definitions use income or consumption complemented by a range of other social indicators such as life expectancy, infant mortality, nutrition, the proportion of the house hold budget spent on food, literacy, school enrolment rates, access to health clinics or drinking water, to classify poor groups against a common index of material welfare.

 Alternative interpretations developed largely by rural anthropologists and social planners working with rural communities in the third world allow for local variation in the meaning of poverty, and expand the definition to encompass perceptions of non-material deprivation and social differentiation (Wratten 1995; Satterthwaite 1995a). Anthropological studies of poverty have shown that people's own conceptions of disadvantage often differ from those of professional experts. Great value is attached to qualitative dimensions such as independence, security, self-respect, identity, close and non-exploitative social relationships, decision-making freedom and legal and political rights. More generally, there has been a widening of the debates on poverty to include more subjective definitions such as vulnerability, entitlement and social exclusion. These concepts have been useful for analysing what increases the risk of poverty and the underlying reasons why people remain in poverty. Vulnerability is not synonymous with poverty, but refers to defencelessness, insecurity and exposure to risk, shocks and stress. Vulnerability is reduced by assets, such as: human investment in health and education; productive assets

including houses and domestic equipment; access to community infrastructure; stores of money, jewellery and gold; and claims on other households, patrons, the government and international community for resources at times of need (Chambers 1995, cited by Wratten 1995). Entitlement refers to the complex ways in which individuals or households command resources which vary between people over time in response to shocks and long-term trends. Social exclusion is seen as a state of ill-being and disablement or disempowerment, inability which individuals and groups experience. It is manifest in 'patterns of social relationships in which individuals and groups are denied access to goods, services, activities and resources which are associated with citizenship' (ILO 1996)

Reviews on Urban Poverty

The study of urban poverty had its roots in Europe and the United States in the late 19th and the early 20th centuries, when industrialization reshaped the urban landscape. A seminal work in the field was The Condition of the Working Class in England in 1844 (1845) by Friedrich Engels (1820-1895), which linked industrialization, the labor process, and the worsening living conditions in slums. A focus of the early studies was to publicise the problem of urban poverty and this was   influenced by investigative journalists like Henry Mayhew (1812-1887) along with the socially aware works of fiction in the novels of Charles Dickens (1812-1870). In England, social reformer Charles Booth (1840-1916), for example, made use of the earlier work of journalists for his classification of the laboring classes, Life and Labour of the People of London (1902).

In the 1920s and the 1930s the field was largely influenced by the Chicago school of sociology, which linked the problems of urban poverty to ecological factors, such as family structures. The Chicago School also pioneered studies on topics like juvenile delinquency and slums, thus laying the social scientific basis for the interpretation of urban poverty.In the 1960s and the 1970s urban poverty was most often treated as cultural pathology, with anthropologist Oscar Lewis (1914-1970) arguing in favor of the "culture of poverty," thesis, which attributed persistent poverty to certain behavior.

In the 1980s and the 1990s studying of urban poverty was focused on the urban underclass - the poorest of the poor inhabitants of cities, and the way these people live in post-industrial environment, often without a job or even the prospect of steady work. Modern methods of studying urban poverty are largely quantitative. Sophisticated money-metric measures use income or consumption to gauge whether a household can afford to buy a basic basket of goods at a certain point in time. But the quantitative measures can also be based on basic need satisfaction, assets of a household, and even on vulnerability. Descriptive studies are still present, in the form of the participatory methods, such as interviews of the poor or case studies. Many of the present methods of exploring urban poverty are focused on the drawing of the so-called city poverty profile - a spatial tool, defining the extent and nature of poverty within a given urban area.

Characteristics of Urban Poverty

According to the World Bank, urban poverty is characterised by limited access to education and employment, insufficient finances, as well as poor social protection mechanisms. Insufficient

access to health care services, lack of secure housing and utility services, as well as high exposure to environmental risks are other features of the poverty in urban communities. Urban poverty exists everywhere, although on different levels, from poor to rich countries. You recognise it in substandard living conditions and incomes along with deficient provision of basic needs like water and electricity. For centuries and centuries the world has been urbanizing, building and extending cities and that makes this problem a central one as more and more people become concerned by this problem. It makes urban planning, city building and resources management some of the most central components of the fight against urban poverty.

In the 1980s and the 1990s studying of urban poverty was focused on the urban underclass - the poorest of the poor inhabitants of cities, and the way these people live in post-industrial environment, often without a job or even the prospect of steady work. Modern methods of studying urban poverty are largely quantitative. Sophisticated money-metric measures use income or consumption to gauge whether a household can afford to buy a basic basket of goods at a certain point in time. But the quantitative measures can also be based on basic need satisfaction, assets of a household, and even on vulnerability (the probability that a household will suffer some problem in the future).

Urban property studies highlight its different characteristics across the globe. By 2010, South Asia was the region with the highest number of urban poor in the world. It is the host of five mega cities - Mumbai, New Delhi, Calcutta, Dhaka, and Karachi, which have giant slums.Sub-Saharan Africa is the region characterized with the most rapid rate of urbanization in the world. Along with this, poverty rates are growing and in 2007 between 40 percent and 70 percent of urban residents were found to be poor or extremely poor. The region is also estimated to have the highest prevalence of slums and the lowest access to safe drinking water in the world. It also has the worst sanitary conditions and access to healthcare, factors which explain the spread of HIV/Aids and malaria.

The case of urban poverty in India has been exemplary in terms of mismanaging (or not managing at all) urban growth. Cities have become the best place to foster poverty and destitution at a scale and extent unseen before. Rural poverty is one thing, but urban poverty in India added a whole new breed of revolting aspects to it: diseases, violence (more than at the countryside), disintegration of communities and the social fabric. But building and increasing the size of cities obviously costs billions and India was somewhat short of cash at the time. Consequently, it has decided to radically reduce the public services it offers as well as its investment in infrastructure. You might think "Okay, but they were broke", but this is where strong political will makes a difference, considering that other countries in the same situation managed very well their transition despite a few controversies. Challenges of urban poverty in India are intimately tied with challenges of the country's fast development. Indian cities have come to dominate the charts as the world's biggest cities for the first time in modern history. Such high-speed, colossal growth, as impressive as it may be, poses several problems if not threats: pollution (air, soil, water), and a disproportionate concentration of poverty, among others. Those two issues stem directly from the fact that by growing that fast it makes it hard to plan for everything all at once: housing (for a while some

cities grew by a million inhabitant per year) and the gigantic urban planning mish-mash that it presupposes.

Measuring urban poverty

Poverty line:

Poverty line is a cutoff point on the income distribution, which divides the population as poor and non-poor. People below poverty line, are poor and above the line are average or rich. Poverty line is therefore a derivation from inequality of income distribution. However ,cut-off level of income or expenditure is determined differently in different countries and regions. According to Planning Commission of India, "Poverty line is drawn on the basis of barest minimum desirable nutritional standards of 2400 calories per person per day in rural areas and 2100 calories for urban areas".

Estimation of poverty in India:

The Planning Commission estimates levels of poverty in the country on the basis of consumer expenditure surveys conducted by the National Sample Survey Office (NSSO) of the Ministry of Statistics and Programme Implementation. In India poverty is estimated on the basis of 'Head Count Ratio' or on the basis of minimum consumption expenditure. In 1973-74 estimation of poverty was made on the basis of consumption expenditure through sample method. Planning commission has prepared several estimates through several bases.

The current methodology for poverty estimation is based on the recommendations of an Expert Group to Review the Methodology for Estimation of Poverty (Tendulkar Committee) established in 2005. The Committee calculated poverty levels for the year 2004- 05. Poverty levels for subsequent years were calculated on the basis of the same methodology, after adjusting for the difference in prices due to inflation.

Table 1: Estimated population % below poverty line (1993 – 2012)

Year	Rural	Urban	Total
1993 – 94	0.1	31.8	45.3
2004 – 05	1.8	25.7	37.2
2009 – 10	3.8	20.9	29.8
2011 – 12	5.7	13.7	21.9

Graph 1: Estimated population % below poverty line (1993 – 2012)
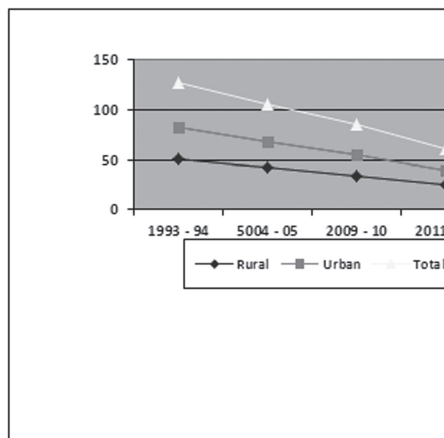
Source: Planning Commission; PRS.

The above table shows national poverty levels for the last twenty years, using methodology suggested by the Tendulkar Committee. According to these estimates, poverty declined at an average rate of 0.74 percentage points per year between 1993-94 and 2004-05, and at 2.18 percentage points per year between 2004-05 and 2011-12.

The tricky mark - poverty line
Pre independence poverty estimates:

One of the earliest estimations of poverty done Dadabhai Naoroji in his book, 'Poverty and the Un-British Rule in India' formulated a poverty line ranging from Rs.16 to Rs.35 per capita per year, based on 1867-68 prices. The poverty line proposed by him was based on the cost of a subsistence diet consisting of 'rice or flour, dhal, mutton, vegetables, ghee, vegetable oil and salt'. Following, in 1938, the National Planning Committee (NPC) estimated a poverty line ranging from Rs.15 to Rs.20 per capita per month. Like the earlier method, the NPC also formulated its poverty line based on 'a minimum standard of living perspective in which nutritional requirements are implicit'. In 1944, the authors of the 'Bombay Plan' (Thakurdas et al 1944) suggested a poverty line of Rs.75 per capita per year.

Post-independence poverty estimates:

In 1962, the Planning Commission constituted a working group to estimate poverty nationally, and it formulated separate poverty lines for rural and urban areas. VM Dandekar and N Rath made the first systematic assessment of poverty in India in 1971, based on National Sample Survey (NSS) data from 1960-61. They argued that the poverty line must be derived from the expenditure that was adequate to provide 2250 calories per day in both rural and urban areas. This generated debate on minimum calorie consumption norms while estimating poverty and variations in these norms based on age and sex.

Alagh Committee (1979):

In 1979, a task force constituted by the Planning Commission for the purpose of poverty estimation, chaired by YK Alagh, constructed a poverty line for rural and urban areas on the basis of nutritional requirements.

Table 2: Minimum calorie consumption and per capita consumption expenditure as per the 1979 Planning Commission task force on poverty estimation

Table 2: Minimum calorie consumption and per capita consumption expenditure as per the 1979 Planning Commission task force on poverty estimation

Area	Calories	Min consumption expenditure (Rs per capita per month)
Rural	2400	49.1
Urban	2100	56.7

Source: Planning Commission; PRS
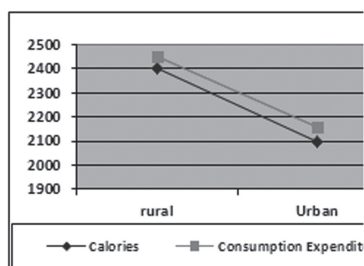
The above table shows the nutritional requirements and related consumption expenditure based on 1973-74 price levels recommended by the task force. Poverty estimates for subsequent years were to be calculated by adjusting the price level for inflation.

Lakdawala Committee (1993):

In 1993, an expert group constituted to review methodology for poverty estimation, chaired by DT Lakdawala, made the following suggestions:

(i)   Consumption expenditure should be calculated based on calorie consumption as earlier;

(ii) State specific poverty lines should be constructed and these should be updated using the Consumer Price Index of Industrial Workers (CPI-IW) in urban areas and Consumer Price Index of Agricultural Labour (CPI-AL) in rural areas; and

(iii) Discontinuation of 'scaling' of poverty estimates based on National Accounts Statistics. This assumes that the basket of goods and services used to calculate CPI-IW and CPI-AL reflect the consumption patterns of the poor.

Tendulkar Committee (2009):

In 2005, another expert group to review methodology for poverty estimation, chaired by Suresh Tendulkar, was constituted by the Planning Commission to address the following three shortcomings of the previous methods: (i) consumption patterns were linked to the 1973-74 poverty line baskets (PLBs) of goods and services, whereas there were significant changes in the consumption patterns of the poor since that time, which were not reflected in the poverty estimates; (ii) there were issues with the adjustment of prices for inflation, both spatially (across regions) and temporally (across time); and (iii) earlier poverty lines assumed that health and education would be provided by the State and formulated poverty lines accordingly. It recommended four major changes:

(i)   A shift away from calorie consumption based poverty estimation;

(ii) A uniform poverty line basket (PLB) across rural and urban India

(iii) A change in the price adjustment procedure to correct spatial and temporal issues with price adjustment; and

(iv) Incorporation of private expenditure on health and education while estimating poverty. The Committee recommended using Mixed Reference Period (MRP) based estimates, as opposed to Uniform Reference Period (URP) based estimates that were used in earlier methods for estimating poverty.

It based its calculations on the consumption of the following items: cereal, pulses, milk, edible oil, non-vegetarian items, vegetables, fresh fruits, dry fruits, sugar, salt & spices, other food, intoxicants, fuel, clothing, footwear, education, medical (non-institutional and institutional),

entertainment, personal & toilet goods, other goods, other services and durables. The Committee computed new poverty lines for rural and urban areas of each state. To do this, it used data on value and quantity consumed of the items mentioned above by the population that was classified as poor by the previous urban poverty line. It concluded that the all India poverty line was Rs 446.68 per capita per month in rural areas and Rs 578.80 per capita per month in urban areas in 2004-05. The following table outlines the manner in which the percentage of population below the poverty line changed after the application of the Tendulkar Committee's methodology.

Table 3: Percentage of population below poverty line calculated by the Lakdawala Committee and the Tendulkar Committee for the year 2004-05

Graph 3: Percentage of population below poverty line calculated by the Lakdawala Committee and the Tendulkar Committee for the year 2004-05

Committee	Rural	Urban	Total
Lakdawala's	28.3	25.7	27.5
Tendulkar's	41.8	27.5	37.2

Source: Planning Commission; PRS
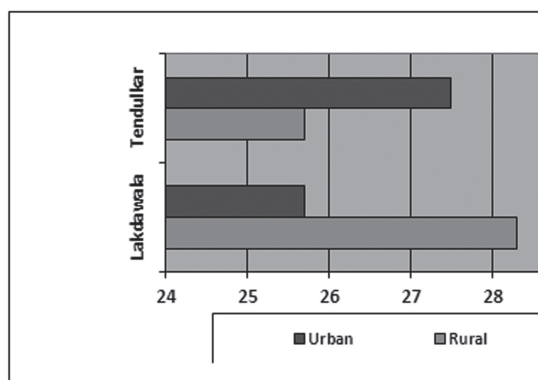
Table 4: National poverty lines (in Rs per capita per month) for the years 2004-05, 2009-10 and 2011-12

Graph 4: National poverty lines (in Rs per capita per month) for the years 2004-05, 2009-10 and 2011-12

Year	Rural	Urban
2004-05	446.7	578.8
2009-10	672.8	859.6
2011-12	816.0	1000.0

Source: Planning Commission; PRS
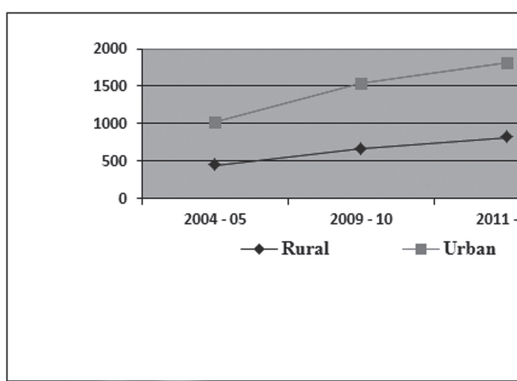
Rangarajan Committee:

In 2012, the Planning Commission constituted a new expert panel on poverty estimation, chaired by C Rangarajan with the following key objectives:

(i) To provide an alternate method to estimate poverty levels and examine whether poverty lines should be fixed solely in terms of a consumption basket or if other criteria are also relevant.

(ii) To examine divergence between the consumption estimates based on the NSSO methodology and those emerging from the National Accounts aggregates.

(iii) To review international poverty estimation methods and indicate whether based on these, a particular method for empirical poverty estimation can be developed in India,

(iv) To recommend how these estimates of poverty can be linked to eligibility and entitlements under the various schemes of the Government of India. The Committee is expected to submit its report by 2014.

Table 5: Rangarajan Committee's estimation

Urban Poverty Line (Rs) Per Month per Person	1407
Rural poverty line (Rs) per Month Per Person	972
Calories In Rural Areas	2155
Calories In Urban areas	2090

The Rangarajan report has rejected the arbitrary method that Tendulkar report suggested, which was to take the all-India urban poverty line as a benchmark to determine all other poverty lines in the states. The report recommends that the government revert to the method of using separate rural and urban poverty basket lines. The report also rejects the recommendation of the Tendulkar report to delink poverty lines from calorie norms, though Tendulkar himself had ended up using it for estimating the all-India urban poverty line. The report adds proteins and fats to the nutrient-norm, in addition to calories. The new protein norm is 48 gm. (rural) and 50 gm. (urban) per capita per day. The new fat norm is 28 gm. (rural) and 26 gm. (urban) per capita per day.

However, the Rangarajan report has reduced the calorie requirement in rural areas to 2155 calories (from 2400 calories) and in urban areas to 2090 calories (from 2100 calories). When the normative calorie norms were fixed in 1979, it was assumed that a worker in rural India required at least 300 calories per day more than his/her urban counterpart. This was due to the lower levels of mechanisation in rural areas, as well as the relatively poor facilities of transport and infrastructure.

In the Rangarajan report, there is little difference between normative calorie norms in the rural and urban areas. If the difference between the rural and urban calorie norms was 300 calories earlier, it is now just 65 calories. While the calorie requirement in urban areas has fallen by just 10 calories (from 2100 to 2090), the calorie requirement in rural areas has fallen by 245 calories (from 2400 to 2155). And in addition to nutrients, the Rangarajan report claims to have added two more items of expenditure in estimating the poverty line: (a) clothing expenses, rent, conveyance and education expenses; and (b) all non-food expenses that meet nutrition requirements. Thus, for 2011-12, the Committee estimates the following: (a) a per capita monthly expenditure of Rs.554 in rural areas and Rs.656 in urban areas to meet calorie, protein and fat requirements; (b) a per capita monthly expenditure of Rs.141 in rural areas and Rs.407 in urban areas for clothing expenses, rent, conveyance and education expenses; and (c) a per capita monthly expenditure of Rs.277 in rural areas and Rs.344 in urban areas for non-food items that meet nutrition requirements. Together, they add up to the new poverty line: a per capita per month expenditure of Rs.972 in rural areas and Rs.1 407 in urban areas. In other words, Rs.32 per capita per day in rural areas and Rs.47 per capita per month in urban areas.

Conclusion:

Still in spite of all these adverse conditions, there are signs of economic development both in urban and rural India. According to research reports, the economic growth in India, China and South Asian countries will enable them to reduce poverty. India and China which account for 38 per cent of the world's population, have largely avoided the financial crisis that shook their South East Asian neighbours. It is in the construction of these expenditure requirements that the problem lies. For instance, both Tendulkar and Rangarajan use the expenditure of the median fractile in the NSS sample to estimate the expenditure on clothing expenses, rent, and conveyance and education requirements. In both reports, the observed median is considered as the normative requirement. Despite setting the poverty line at destitution levels, the report shows that 30.9 per cent of the rural population and 26.4 per cent of the urban population were poor in 2011-12. In absolute terms, there were 26.1 crores poor persons in rural India and 10.3 crore poor persons in urban areas. In all, India had 36.3 crores poor persons in 2011-12. If the use of a destitution line can show that 36.3 crore persons were poor, what would be the real extent and depth of poverty in India. This is, thus, the total poverty scene in rural and urban India. What are indeed necessary and needed is that there be a political, economic, strategical, military stability and free time for the government to plan the eradication of poverty and India is capable of combating, controlling and winning this war against poverty. The government and local organizations have yet to help lift India's poorest out of poverty

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NON-INCLUSIVE URBANIZATION: GROWTH OF SLUM POPULATION IN INDIAN STATES

Salma Merin John and Erica Wilson*

1.Introduction

Urbanization is an unavoidable process in the phenomena of economic growth. Well planned, regulated cities with well-built amenities has always been an indicator of high economic growth and industrialization. Urban planning is an important component in urban development because it ensures inclusiveness. Non-planning or wrong planning of urbanization results in certain sections of the urban population being excluded from the fruits of urban development. In other word the progress achieved with certain sections being excluded cannot be termed as development as a wide range of economic literature points out.

OECD defines inclusive growth as "economic growth that creates opportunity for all segments of the population and distributes the dividends of increased prosperity, both in monetary and non-monetary terms, fairly across society".

The concept of inclusiveness involves four attributes:

Opportunity: Is the economy generating more and varied ways for people to earn a living and increase their incomes over time?

Capability: Is the economy providing the means for people to create or enhance their capabilities in order to exploit available opportunities?

Access: Is the economy providing the means to bring opportunities and capabilities together?

Security: Is the economy providing the means for people to protect themselves against a temporary or permanent loss of livelihood? (Singh)

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But there are several factors that hinders inclusivity in urban development like poor governance, unemployment, pollution etc.

Development of slums is an important indicator of non-inclusive urbanisation. UN-HABITAT defines a slum household as "a group of individuals living under the same roof in an urban area who lack one or more of the following:

1. Durable housing of a permanent nature that protects against extreme climate conditions.
2. Sufficient living space which means not more than three people sharing the same room.
3. Easy access to safe water in sufficient amounts at an affordable price.
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
5. Security of tenure that prevents forced evictions.

Each of these aspects indicates non-inclusivity.

Under Section 3 of the Slum Area Improvement and Clearance Act, 1956, slums have been defined as **mainly those residential areas where dwellings 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.**

Objectives

The following study analyses the concept of inclusive development with regard to Indian cities by taking into account the growth of slums. It has the following objectives:

1. To analyse whether urbanisation in Indian states is inclusive.
2. To analyse the range of non-inclusivity due to growth of slums in India.

Methodology

The analysis is one with the help of secondary data mainly from primary census abstract for slums (2011). Comparisons are made using tools like graphs, percentages etc. Regression method has been applied to study certain changes in the indicators.

The indicators taken for analysing the trends and patterns of slum development are the number of slums in each state, slum population and its various characteristics like literacy, presence of SC/ST population and work participation rate.

1.1 Slums in Indian States

In India around 64% of the total statutory towns in Indian states are slum reported towns. A striking feature is that all the statutory towns in Andhra Pradesh have the presence of slums in

them. Out of the total states, nineteen of them have slums in more than half of their statutory towns. Haryana, Karnataka and Tripura have ninety percent of statutory towns reporting slums. Manipur is the only state where slums are not reported in any of its statutory towns. Also in Census 2001, while six states and three union territories were reported slum free, the 2011 census reports only one state (Manipur) and three union territories as slum free. The number of towns reporting slums were 1743 in Census 2001 which has rose to 2613 in the 2011 census.

More than half of total statutory towns having slum reported towns is not a healthy trend for inclusive urban development. Also more states have reported the presence of slums in their statutory towns over the past decade increasing the range and intensity of non-inclusive urbanisation. This shows that the urbanisation in India tends to be non-inclusive in nature as most states have the presence of slums in their statutory towns.

A. Features of Slum Population

1.2 a Population

The slum population as a percentage of total population in states is low (highest being for Andhra Pradesh-20.63%), but if we consider the absolute numbers, Andhra Pradesh and Maharashtra have more than one crore of their urban population living in slums. In Tamil Nadu, West Bengal and Madhya Pradesh, more than 50 lakh people are slum dwellers which is a matter of serious concern. This means in these states half crore or more people are deprived of the benefits of development or they are side-lined without being made stakeholders in the process of urban development.

Andhra Pradesh which have the largest number of slums have the largest number of its urban population living in slums too, followed by Madhya Pradesh. Other states in top five are Maharashtra, West Bengal and Tamil Nadu. The share of slum population in urban population has increased over the last decade in all the above states except Maharashtra which shows a slight decline. In Andhra Pradesh 36% of its urban population are slum dwellers.

1.2 b Literacy Rate

In the top five most slum populated states, literacy rate is more than 70%,that is near to the national average according to the 2011 census. The reason for this trend has to be analysed in detail. But this is a positive indicator as literacy can be a big step in the upliftment of the down trodden and excluded sections.

1.2 c SC/ST Population

31% of slum population in Tamil Nadu belong to the SC category, while it is more than 20% for Madhya Pradesh and Uttar Pradesh. This shows further marginalisation of the marginalised. Compared to the share of SC population, the share of ST population is low among slum dwellers highest being 6% in Madhya Pradesh.

1.2 d Work Participation Rate

The work participation rate among the slum population is very low, the highest being 40% in Karnataka. All other states also have a work participation rate between 30% to 40% which is not a healthy indicator. Also this indicator has not shown any significant improvement compared to the previous census.

Thus the above indicators makes clear the range of non-inclusivity created by urbanisation in Indian states.

Key Findings

1. The presence of slums make urbanisation in India non-inclusive.
2. The towns reporting slums has increased in the 2011 census compared to the 2001 census.
3. Not only the number of slum reporting towns, the absolute number of slum population has also increased over the last decade.
4. Literacy rate of slum population is an indicator which has shown a better performance compared to other indicators.
5. The composition of SC population is high in slums while ST population consists of only a marginal proportion.
6. The work participation rate among slum population is very low and has not shown any improvement compared to the previous census.
7. Analysis shows that 1% increase in GSDP results in 12% increase in slum population showing uneven distribution of growth.

Conclusion

The study found out that the urbanisation trends in India happens to exclude some sections of the population, slum dwellers being one among them. This is a matter of serious concern as exclusion will result in lopsided development which will not help in the nation's overall progress. Since the development literature now focus on the importance of inclusiveness, no economy or planners can exclude themselves from focussing on inclusive urban development. Erasing slums from the map of urban areas and providing the slum population with a better life is an important step in the direction of ensuring the marginalised slum population opportunity, access, capability and security.

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Participatory Budgeting : Lessons from Pune Municipal Corporation

Sebin B Nidhiri&Athreya Mukunthan*

Introduction

If the 20th Century was the century of science, the 21st century would be the century of cities. Cities have now become the centres of growth. People identify with cities more than with their own states. A person from Mumbai would never answer Maharashtra when asked where he/she is from. He/she would proudly say, "Mi Mumbaikar". Such big cities have grown beyond the identity of the state and have formed their own unique identities, cosmopolitan yet regional.

According to Census 2011, there are 7935 cities (including Census towns[84], and statutory towns[85]) and 981 outgrowths[86] which is home to 37,72,61,131 Indians. This is around 31% of the Indian populace. Greater Mumbai UA (Urban agglomeration[87]), the most populous UA in India has a population of 1,83,94,912 (a little less than the whole population of Sri Lanka of 20 million). Yet, urbanisation is comparatively much lower than in many other large developing countries like Brazil (87% of population live in urban areas), Mexico (78%), Indonesia (54%) and China (45%). In India, the rate of growth of urbanisation has dipped, but urbanisation has increased and is bound to increase even more in India.

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[84] As per Census 2011, any area which has a population of above 5000, density more than 400 persons per sq. km. and more than 75% of the male workforce engaged in non-agricultural pursuits is called a Census town.

[85] Any urban area governed by a body established by law or statute. All places with a city corporation, municipality, cantonment board or notified town area committee are examples.

[86] An out growth is a viable unit such as a village or a hamlet or an enumeration block made up of such village or hamlet and clearly identifiable in terms of its boundaries and location. Some of the examples are railway colony, university campus, port area, military camps, etc. which has come up near a statutory town outside its statutory limits but within the revenue limits of a village or villages contiguous to the town. While determining the outgrowth of a town, it has been ensured that it possesses the urban features in terms of infrastructure and amenities such as pucca roads, electricity, taps, and drainage system for disposal of waste water etc. educational institutions, post offices, medical facilities, banks etc. and physically contiguous with the core town of the UA.

[87] Urban Agglomeration is a continuous urban spread constituting a town and its adjoining urban out growths, or two or more physically contiguous towns together and any adjoining urban out growths of such towns. An UA must consist of at least a statutory town and its total population should not be less than 20,000.

Cities have become pockets of development driving India's growth story and attracting people from all walks of life with the promise of better opportunities. The urban share of the Gross Domestic Product of the Indian economy was 37.7% in 1970-71, 52% in 2004-05 and 62-63% in 2009-10. This is also low compared to China (78%), Latin America (76%) and USA (84%). A study by Barclays suggests that urban India will contribute three-fourths of the country's GDP by 2020[88].

With this rising significance of cities.urban governance has become ever more important. It can lead to the rise and fall of cities. People vote with their feet by moving to cities that provide better employment, better public utilities, lower cost of living, more opportunities and in short a better life. "Managing urban areas has become one of the most important development challenges of the 21st century. Our success or failure in building sustainable cities will be a major factor in the success of the post-2015 UN development agenda," said Mr John Wilmoth, Director of UN DESA's Population Division. A quick look at our environment shows that most of our immediate needs are influenced by the local government. From the water connection to the bus service to waste collection to providing street lights are all under the mandate of the Urban Local Government/bodies (ULBs). ULBs have to make sure they identify the people's needs and fulfil them. Misgovernance and mismanagement can lead to the fall of cities. Detroit, Cleveland and Philadelphia are few modern examples of cities in decay. Kolkata and Varanasi are examples of Indian cities in decay which have lost their former glory.

Participatory Budgeting is an innovative, democratic governance technique by which the citizens of the society come forward and collectively with the Government decide the intricacies of allocation in the budget. Although there are differences in regions on how it is implemented, it is essentially a democratic process in which community members directly decide how to spend part of a public budget. Participatory Budgeting is a measure which ensures that people's needs are addressed and their participation in governance increased. With the role of the Government in today's global economy becoming more important day by day, it is critical for people participation in the decision making to ensure transparency and accountability. Public participation has taken many forms and dimensions over the years across the globe, the participatory budget examples may be few in number, but the positive impact it has created in those places implemented is commanding.

History of Participatory Budgeting

The concept of Participatory Budgeting was first initiated in the city of Porto Alegre, Brazil in 1989. It is to be noted that the city was marred with inequality with a lot of slums, which lacked even basic facilities such as water. Participatory budgeting was one of the creative and experimental ideas to be introduced in the city to improve the situation. World Bank acknowledges that this reform has had a direct impact in the improvement of service delivery mechanisms in the city.

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[88] http://www.livemint.com/Money/n0LnGYOlGmstg0fpbFrCRK/Urban-India-to-contribute-threefourths-of-GDP-by-2020.html

Since 1989, Participatory Budgeting concept has spread to over 1,500 cities in, North America, Asia, Africa, Latin America and Europe. In the US and Canada, the major cities covered under Participatory Budgeting are Toronto, Montreal, Guelph, Chicago, New York City, and California[89]. Another interesting and encouraging fact is that in the city of Baara Mansa in Brazil, there is a separate children's council for the city, which is also involved in the participative budgeting process[90]. This ensures that the children's needs in the society are also heard and fulfilled.

The Indian Experience

The idea of PB that has become widely used in local bodies in the west is yet to evolve similarly in India. In India, very few cities have had some form of participation in budgeting and Pune is one shining example where participatory budgeting in its true sense has been happening consistently for some years now. The paper looks very briefly at the history of PB in Bangalore, which is the first city to have experimented with the idea and then gives a detailed picture of PB in Pune.

Bangalore

Bangalore has witnessed high levels of civil society activism right from the 1990's. NGOs like PAC[91] and Janaagraha[92] have worked tirelessly in the area of Urban Public Participation and has successfully created few hallmark public participation projects in Bangalore. Public Affairs Centre in the nineties had created a report card concept, where they would develop a perception based report card on the delivery of services by the state government in the city. The results from the report card had a lot of media attention and the whole society demanded better service delivery from the Government. The Ward Works initiative by Janaagraha in 2001 was an innovative community participation technique, by which people could have a say in the budget. Under this strategy Janaagraha went to the people of each ward and helped them assess their public facilities, and submit the list of their suggestions to the community leader in Janaagraha. The corporators were made a part of all this, thereby ensuring that representatives were in the loop. Later prioritization meetings were held with the ward officers and the people to shortlist and finalise their immediate needs. That year, the Bangalore Municipal Corporation came out with a budget accounting for these demands. PROOF - Public Record of Operations and Finance ,was one more accountability initiative of Janaagraha in 2002, for financial disclosure of Corporations every

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[89] http://www.participatorybudgeting.org/

[90] Citizenship knows no age: children's participation in the governance and municipal budget of Barra Mansa, Brazil, Elliana Guerra

[91] Public Affairs Centre (PAC) is not-for-profit organisation started in 1994. It is one of the first of its kind to focus on improving governance. It was formed in following with the idea of a report card generation for cities initiated in 1992 by Dr. Samuel Paul, an eminent economist, teacher and management professional. Located in Bangalore, it conducts research, raises awareness and provides advisory services to various stat and non-state organisations.

[92] Started by Ramesh Ramanathan and his wife Swati Ramanathan, Janaagraha, based in Bangalore is a non-profit which aims to improve the quality of life in Indian cities and towns. Quitting their high paying jobs in the USA to start Janaagraha, their dream has now come true as Janaagraha is today one of the leading organisations in urban space.

quarter to its citizens. It is worth mentioning that it was PROOF which was the idea behind JnNURM's public disclosure law. PROOF has been recognised as a best practise by World Bank and by UNDP as a successful accountability idea. Along with this Janaagaraha also designed Standardised Service Level Benchmarks (SSLB's), which would be a benchmark to judge the quality of public services by the Government. The 13th Finance Commission has included this in the criteria for judging the state's performance and this played an important role in fund allocation.

Participatory Budgeting in Pune

The Pune Municipal Corporation Setup

The population of Pune city is around 3.2 Million[93] and spreads over 700 Km square. The city is governed by the Pune Municipal Corporation (PMC). PMC was established on 15th February 1950 and functions according to The Bombay Provincial Municipal Corporation Act; 1949. The corporation has three important Authorities:

1. General Body

The 152 councillors elected through democratic direct election form the General Body of the Corporation who are elected for a period of 5 years. There are 5 nominated councillors. They together elect the Mayor of the Corporation, who in turn leads the city corporation for a Two and a Half Year Term. The Mayor presides over the general body meeting which is held once every month.

2. Standing Committee

The Standing Committee is the most important body of the corporation. It governs the functions of the Corporation on behalf of the elected councillors. The councillors elect the Standing Committee in their first meeting. The chairman of the standing committee is also elected in that meeting. In simple words we can term this committee as a policy making body of the corporation, which decides the policies with regard to the finances and establishment of the Corporation.

3. Municipal Commissioner

Municipal Commissioner is the highest executive officer of the city Corporation, who is an Indian Administrative Service officer, appointed by the State Government. If the Mayor is the legislative authority for the city, the Commissioner is the executive head.

The city is divided into 76 Prabhags, which have an average population of 42,000. Each Prabhag has 2 elected representatives, who together form the city council. The council is headed by the mayor, usually from the party which has a majority in the council. Around 5 prabhag are grouped together to form an administrative ward. There are 15 such administrative wards in Pune. These administrative wards are the lowest level of budget preparation. The ward level budgets are sent to the Municipal Commissioner and PMC Accounts Department who incorporate it into the city budget.

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[93] As per Census 2011

The Pune Story

In 2005, with the initiative of local citizen groups, Nagrik Chetna Manch and the National Society for Clean Cities[94] (NSCC) organised a meeting with the Municipal Commissioner and various other officials of Pune Municipal Corporation (PMC). The officials explained the process of making the municipal budget and invited suggestions from the people. The meeting was attended by various Mohalla Committees, NGOs and other citizens. They submitted suggestions for new infrastructure projects and improvements in infrastructure and management. This was the first ever exercise in citizen engagement

The concept of Participatory Budgeting (PB) as brought by Janaagraha in Bangalore in 2004-05, garnered the attention of civil society in Pune. Vishal Jain, one of the founders of Janwani[95] took the then Municipal Commissioner Dr. Nitin Kareer IAS to Bangalore to better understand the mobilising of citizen's suggestion though programmes like PROOF , Ward Works etc. When Dr. Kareer introduced the idea of PB to the standing committee members of PMC in 2006, it was faced with stiff opposition, with one of the members even calling it "the death of democracy". So the commissioner along with the PMC Accounts officer, the head of PMC Urban Community Development Dept. (UCD), Janwani and CEE[96] charted out a process to implement PB in Pune. A sum of Rs.20 lakhs was allotted to each of the 144[97] electoral wards in Pune making the total outlay Rs.28.8 crores. (Menon, 2013). Four public meetings were held in the four zonal offices of Pune where the Commissioner Dr. Kareer spoke urging people to participate in the process.

Two separate processes were followed for slum areas and the remaining areas. PB was initiated through self-help groups and neighbourhood groups. Trained volunteers went to these meetings and conducted two-hour orientation sessions explaining PB and suggestions were collected. These were conducted through December 2006 to January 2007. Student volunteers were trained. Huge call lists were created by NGOs to contact various Mohalla Committees[98], Lions Club, Rotary Club, laughter clubs etc. Electronic messages were sent to software professionals, those interested in environment, urban transportation, development planning etc. In 2009, Janwani

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[94] NSCC is a citizens group in Pune which encourages the formation of mohalla committees. It is in itself an association of several mohalla committees.

[95] Janwani is the social initiative of Mahratta Chamber of Commerce, Industries & Agriculture (MCCIA), Pune. It is an NGO which aims at making Pune "the best place to live and work". They address the issues of growth and work towards the comprehensive development of the city and provide practical and well researched solutions. They have achieved considerable success in areas like participatory budgeting, waste management, traffic management and organising heritage walks in the city.

[96] Centre for Environment Education (CEE) is a nationwide organisation established in 1984 as a Centre of Excellence by the Ministry of Environment and Forests. It aims to promote environmental awareness nationwide. It has regional offices across the country. CEE Maharashtra works on education for children, experiencing nature, sustainable urban development and waste management.

[97] In 2007, there were 144 electoral wards. Later they increased to 152 and then were clubbed to form 76 prabhags.

[98] Mohalla means neighbourhood in Hindi. Mohalla committees are organisations (not necessarily legally registered) who are vigilant about civic issues in their localities. Participation in these committees is generally from middle class and upper middle class communities.

along with KPIT Cummins created an online portal for citizens to submit their suggestions without having to actually visit the ward office to submit their suggestion. KPIT Cummins did this as part of their Corporate Social Responsibility.

Though it started off with a huge response in 2006, it was seen that the participation rate slowly fell as the years passed. In 2012 only 3300 suggestions were received from a population of more than 3 million people. However, the determined efforts of the civil society especially the two NGO's Janwani and CEE helped the response in 2013 to pick up. Janwani has been organising workshops on PB around the city. It also publicises PB online though social media. In 2013, 6000 responses were received

Participatory Budgeting: A Look into the Procedure

The following flow chart depicts the six stage process of Participatory Budgeting in Pune:

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┌─────────────────────────────────────────┐
│      Inviting Citizens to Participate    │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│  Processing of Forms Received from Citizens │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│        Compilation and Data Entry        │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│          Costing of Project Ideas        │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│  Holding of Prioritization Meetings at Ward Level │
└─────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────┐
│   Incorporation of Citizens Suggestions in │
│            Municipal Budget              │
└─────────────────────────────────────────┘
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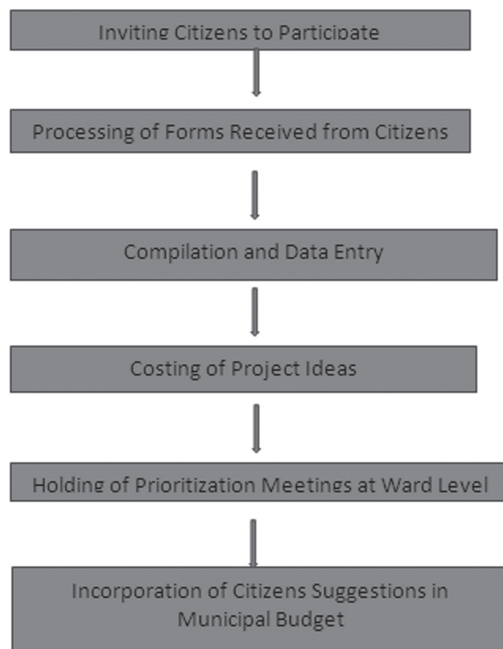
Inviting Citizens to Participate:

The name itself suggests the importance of participation of the public. Therefore the success of the process depends significantly on how much the people come forward and participate in the process. The role of the 2 NGO's in this stage cannot be overseen. Both CEE and Janwani have worked strategically in spreading awareness among the people for participatory budgeting in Pune. Advertisements were given in the media and phone was also used as a main tool of spreading awareness, clarifying doubts etc. Target groups such as housing associations, laughter clubs and senior citizens club were identified and phone calls were made to the leaders in those associations

to disseminate information. A help line number was setup in these 2 NGO's to assist the public in any need.

Also, mohalla committees, persons who are familiar with PMC take initiative and collecting suggestions from people. The employees also spread the word to people who visit the ward offices.

1. Processing of Forms Received from Citizens:

The next stage of the process involved screening and classification of the suggestions received. The suggestions were put into either budgetable or non-budgetable based on the nature of the suggestion. It was also checked if this suggestion was already budgeted in the previous year. However if there was less clarity on the nature of suggestion or the type of work to be included in the budget, a phone clarification was sought from the citizens.

2. Data Compilation:

After receiving the suggestion forms from the citizens the data was compiled and fed into an excel database. Various heads were Budgeted, Suggestions, Duplicate, Incomplete, Complete and Original. This gave a professional and organised database to work with. PMC sought help from NGOs for this part of the project.

3. Costing of Project Ideas:

After the data was ready in hand, each ward office was asked to prepare a rough cost estimate of each suggestion and an overall cost estimate for the ward's suggestions. The engineers go to the location and assess the physical feasibility, the costs of construction and prepare estimates.

4. Holding of Prioritization Meetings at Ward Level:

After the cost estimates were done, representatives from every ward were called for meetings to the ward offices to discuss the priorities of the ward. Given that only 2o lakh ruppees were allotted to every ward, it was important to prioritize the needs of the society. An overall consensus is sought on the needs of the ward, and a draft is prepared.

5. Incorporation of Citizens Suggestions in Municipal Budget:

After all this completed, the newly elected council agreed to adopt all the suggestions that came through the Participatory Budgeting Process. Though initially the suggestions from slums were not incorporated in the budget, after an appeal from a few women SHG's to a senior NCP leader, whose party was in power the slum suggestions were also incorporated in the budget for the year 2007.

After the first year of PB, when the electoral body was elected and opposed the idea of PB, it was the pressure from civil society which ensured that PB was not stopped. The then Municipal Commissioner Mr. Praveensinh Pardeshi tweaked the process a bit to include the political representatives. He directed that the suggestions should go to the ward committees who would

deliberate on it and if included will redirect those suggestions to the city budget, as opposed to the suggestions going to the municipal commissioner in the first year of PB.

Annexure I shows a PB form for the year 2014-15.

Bouquets and Brickbats

Participatory Budgeting in Pune has had its share of praises and criticisms. The major successes of PB in Pune are:

Increased allocation of budget: In the first year of PB, each electoral ward had Rs.20lakhs. From the second year on the allocation was raised to Rs.25lakhs. After formation of Prabhags in 2012-13, each prabhag had an allocation of Rs.50lakhs. A single project under PB has an outlay limit of Rs.5lakhs. This is because that is the maximum limit of works that can be approved at the ward level. The amount set aside for PB is adequate to fund the suggestions which come in. The low percentage of PB budget in the Municipal budget should not be a concern. A chunk of these funds go to maintenance of the corporation's activities, paying the employees and construction on infrastructure. Major infrastructure work is in the construction of roads which is not approved at the ward level. The funds are sufficient for works at the ward level.

Budget year	PB Budgeted expenditure (in crores)
2007-08	17.62
2008-09	27.27
2009-10	35
2010-11	30.16
2011-12	34.73
2012-13	26.24
2013-14	36.9
2014-15	37.52
2015-16	37.4

Source: PMC budget books

Consistency: Although there have been oppositions, PB has not stopped since its inception. There have been ups and downs in the number of suggestions received and suggestions accepted, PB has continued its operations in Pune.

Political Acceptance: Although PB was initially opposed by the corporators, it has now come to be accepted by the political class. PB was seen as brought to make good the ineffectiveness of the representatives. But today, the corporators have accepted the process as a means for better reach. They themselves organise meetings and collect suggestions.

Acceptance by PMC employees: In interviews with the staff of PMC, it has been seen that the employees have come to see PB as part of their routine and not an extra burden. Also employees spread awareness about PB by word of mouth. They educate visitors to the PMC about this facility. A ward officer named PB a win-win situation. If PB was not there, the ward office had to identify the projects to allocate funds. Now, the needs of people are met and the work of identifying projects is also done.

Completion of Projects: Menon (2013) claims that the rate of completion of projects under PB is satisfactory. Many projects have already been completed and steady progress is made on the other works.

Low Cost: In interviews with ward officers it was revealed that the administrative cost of PB is negligible. It is done by the same staff and does not overburden them. The only cost is printing the forms and printing advertisements in the media. Also there are no delays to the process of budgeting. PB goes parallel along with the ward level budgeting process.

Criticisms

Lack of transparency and follow up: Once suggestions are invited and accepted, there is no role of the public. Not all suggestions are selected, but why those that are not selected are not selected is not revealed. Also details regarding status of completion of projects under PB, funds allocated etc. are not made easily available to the public. This lack of feedback reduces interest in PB among citizens. When someone's suggestion is not implemented and no explanation is provided, people lose confidence in the process. Deliberation processes have not been conducted consistently across wards over the years.

In New York City Council, USA, after suggestions are collected and sorted, meetings are conducted in neighbourhood groups to explain the suggestions to the citizens. After this, the citizens are asked to vote on which projects they want implemented. This is much more participative. Some critics have said that Pune just collects suggestions for budget, but does not have participatory budgeting.

Gap between budgeted and actual expenditure: Although the PB budget has been rising over the years, many of it does not translate into actual work on the ground and the money remains unspent. The gap has seen a rise over the years. (see Figure 1)

Table 2: Percentage of actual spending on the PB budget

Budget year	PB Budgeted expenditure (in crores)	Actual expenditure (in crores)	Percentage spent
2007-08	17.62	11.32	64.24518
2008-09	27.27	20.75	76.09094
2009-10	35	21.62	61.77143
2010-11	30.16	16.55	54.87401
2011-12	34.73	23.28	67.03138
2012-13	26.24	16.67	63.52896
2013-14	36.9	27.03	73.25203
2014-15	37.52	NA	NA
2015-16	37.4	NA	NA

Source: PMC budget books, Janwani[99]

Fig 1: Gap in budgeted and actual PB spending (in Rs. Crores)

Source: PMC budget books, Janwani

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[99] Actual expenditure on budgeted works in PB was collected via RTIs filed by Janwani.

Participation from marginal groups: Participatory Budgeting has not been very participative in Pune. More than 40% of Pune's population live in slums with 564 slums in the city. Given the large percentage of slums, the number of suggestions received from these areas is not as high (see Table 3). Except in the first two years, no special initiative has been taken to collect suggestions from slum dwellers. In 2013-14, of the 854 projects included, only 120 are in the slum areas. This does not service the 40% of the population well.

Year of Suggestion	Year Budgeted	No. of suggestions included	No. of suggestions for projects in slums	Percentage of no. of projects in slums
2006-07	2007-08	575	55	9.57
2007	2008-09	831	144	17.33
2008	2009-10	699	105	15.02
2009	2010-11	917	160	17.45
2010	2011-12	927	141	15.21
2011	2012-13	704	102	14.49
2012	2013-14	854	120	14.05

Source: (Menon, 2013)

Table 4: Percentage of total spending on various areas

Year	% Electrical	% Building	% Slum Improvement	% Water Supply	% Drainage	% Footpath	% Road
2007-08	13.15	6.33	6.41	3.82	14.02	6.05	50.27
2008-09	10.38	3.72	20.54	8.01	13.06	2.55	41.74
2009-10	10.93	7.66	12.76	7.71	16.1	-	44.85
2010-11	15.09	10.32	18.37	6.51	8.8	-	40.91
2011-12	12.3	6.13	14.65	0.88	14.73	-	51.5
2012-13	14.06	7.23	16.02	5.85	16.91	-	39.93
2013-14	17.01	12.33	13.85	4.74	14.92	-	37.15
2014-15	20.20	14.39	13.06	4.21	14.13		34.01

Source : Janwani, (Menon, 2013)

Reach of PB: Even after all the activism for PB, the awareness regarding the same among the citizens is very low. Receiving 6000 suggestions from a population of 32lakhs is a very low number. Further study of this criticism in done in the next section.

Use of funds: Although considerable amounts have been allocated to PB, never have the funds been fully utilised. This shows some amount of delay and the scope for improvement in PB. The graph shows that actual expenditure has always been lower than budgeted expenditure.

Participation and Awareness of Participatory Budgeting among the residents of Pune

A primary survey was conducted among the residents of Pune[100]. Data was collected by physically going to the residences or offices and surveying them. A total of 100 responses were collected. 20 were female respondents and 80 were male. The sample consisted of students, housewives, employees, businessmen and senior citizens. The broad age and income distribution of the sample is shown in the following graph and pie-chart.
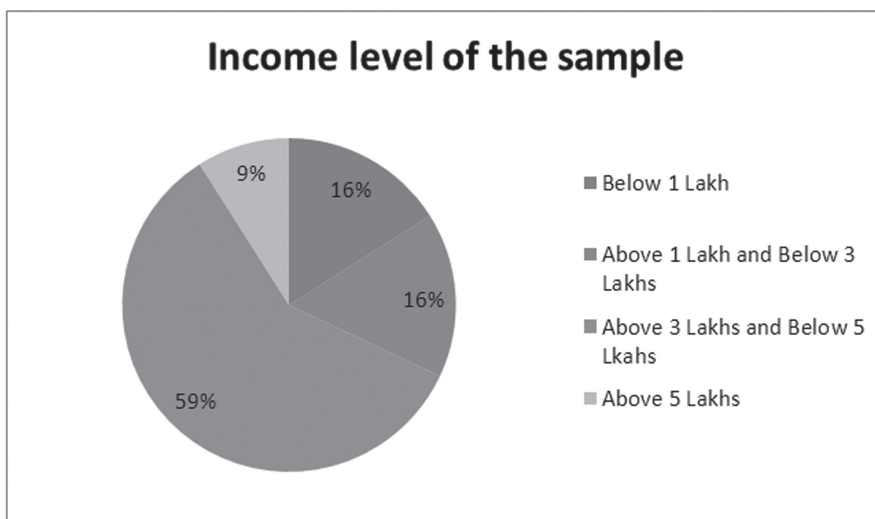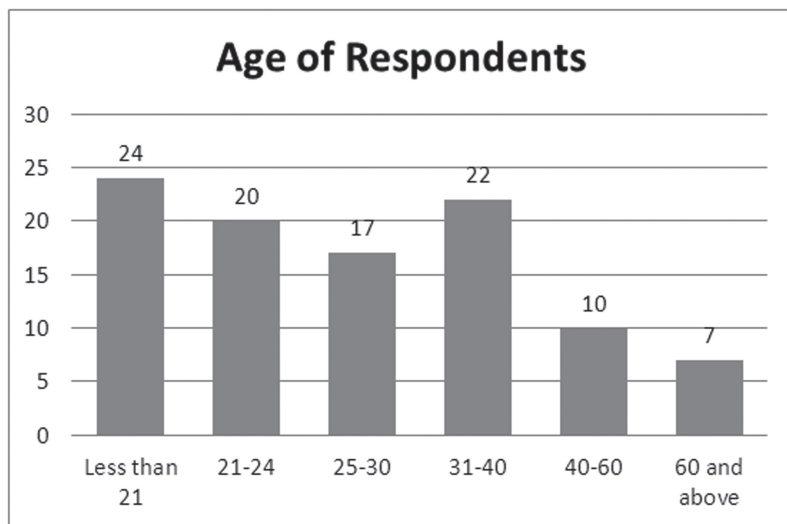
Source: Primary Survey

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[100] The authors are grateful to Sakshi Saxena, Research Assistant, Symbiosis Inernational university for her help in conducting the survey

Of the 100 people, only 7 of them knew of a facility called participatory budgeting. This is a very low number and points to the fact that although a revolutionary initiative, its reach has been limited. Of the 7 who were aware of PB, nobody had ever filled and submitted a PB form.

There were questions on whether they knew who their prabhag representative or municipal commissioner was. 22 % knew their prabhag representative and 12% knew the municipal commissioner. The dismal numbers here also showed a general lack of awareness. But interestingly 75% of the sample said they were willing to take the time and effort to fill up a PB form if they feel the need and not leave it to the elected representatives. So, there is demand for such initiatives. There is need for better awareness and farther reach.

Aware of PB

■ Yes ■ No

0%

7%

93%

Awarness about Representatives (in percent)

Know prabhag representative

Know Municipal Commissioner

0   5   10   15   20   25

Yes No

0%

25%

75%
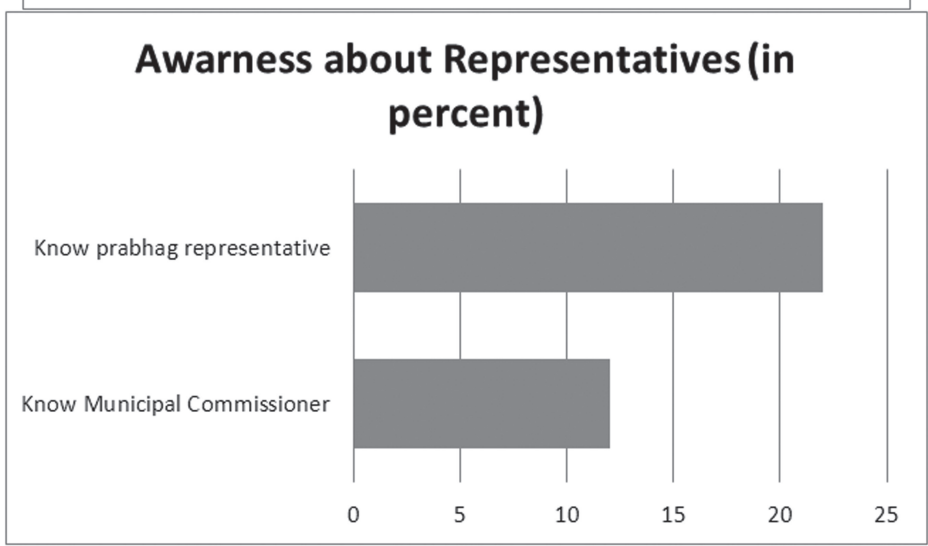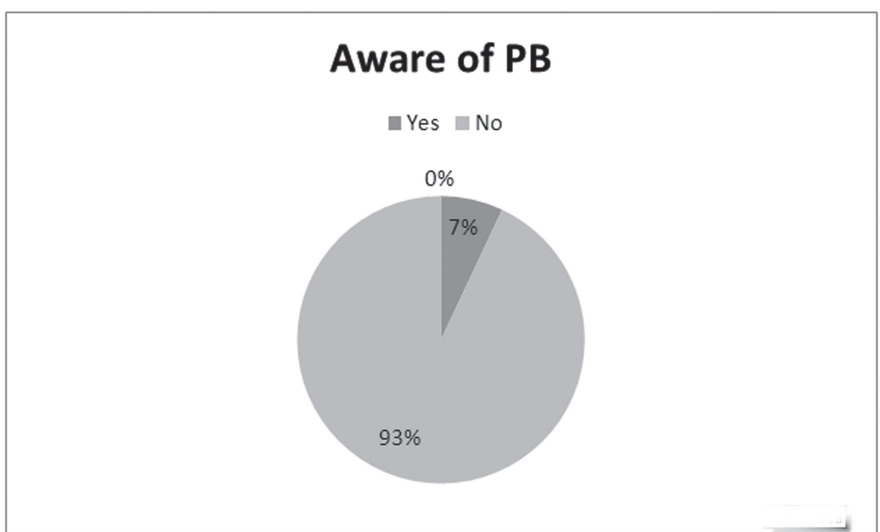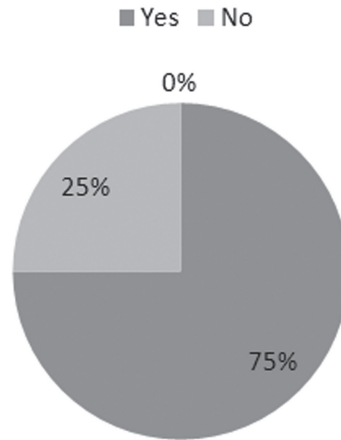
Source: Primary Survey

Way Forward

PB has set its roots in Pune. PB in Pune has received considerable attention. World Bank has appreciated the process. There have been studies commissioned from abroad on PB in Pune. Now it has to increase its scope and reach. The way ahead is indeed bright, but it has its own set of hurdles to clear. The potential of PB is tremendous and effort should be taken to fine tune the process.

Every process has a gestation period. PB is a relatively recent concept. It will take time for it to spread and reach all sections of a large municipal corporation like Pune. Special effort should be taken to increase participation among the marginalised groups. They are the ones worst affected and first affected by any lack on the side of the ULBs or government in general.

Some measure might be created to give feedback to citizens, ensure transparency and accountability and track our suggestions. For this an overhaul of the process with increased use of technology may be necessary. Corporates don't see PB as an avenue for Corporate Social Responsibility (CSR) activities. Corporates can dedicate time and money for publicising PB or support organisations which work on PB. Better participation and governance in the long run will provide benefits to the companies itself and so can be seen as a ripe area for CSR activities.

In one of the interviews, a ward officer said the current level of participation was manageable with the current staff at the ward office. With an increased number of participation, the current staff would be inadequate to manage the no. of suggestions, estimate the costs of the project etc. Thus with an increase in PB, an increased scale of cost should be expected.

Conclusion

Participatory Budgeting is an efficient and effective tool to increase people's participation in governance. People can directly impact decisions. Due to India's vast size and population, direct participation is possible only at the local government level. Even at the local level, the participation is low and is not completely inclusive. But there should be no question about the benefits reaped off it.

Although PB may face initial resistance from the political class, it should take the politicians also in its fold. In the long run, it benefits them too. Every city should try and incorporate PB in budget formulation. The costs of implementing it are very low and the benefits manifold. But it can never be seen as an alternative to representative democracy.

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Annexure –I

पुणे महानगरपालिका   **PUNE MUNICIPAL CORPORATION**
सहभागी अंदाजपत्रक सन २०१५– २०१६   **Participatory Budget 2015-16**
नागरिक सूचना अर्ज   **Citizen Suggestion Form**

प्रभागाचे नाव* Name of the Ward* :	अर्ज आवक क्रमांक (सेवक कार्यालयीन वापरासाठी)	स्थानदर्शक क्रमांक		तारीख			अनुक्रमांक	

नागरिकाचे नाव * / Name of Citizen * :

संपर्कासाठी पत्ता / Address :

सूचना क्रमांक / Tel.No. :   ई-मेल* / e-mail *:

अ.क्र. Sr.No	कामाचे स्वरूप व स्थान Work Description and Location	कामाचा संकेतिक क्रमांक* Work Code*	प्रस्तावित कामामुळे साध्य होणारा सार्वजनिक हेतू Public purpose served by the proposed work
1	2	3	4

इतर सूचना / Other Suggestions :

दिनांक / Date :   स्वाक्षरी / Signature :

------------------×--×------------------

पुणे महानगरपालिका, सहभागी अंदाजपत्रक सन २०१५–२०१६, नागरिक सूचना अर्ज पोच
PUNE MUNICIPAL CORPORATION Participatory Budget 2015-16 Receipt for Citizen Suggestion Form

नागरिकाचे नाव : Citizen Name :	स्थानदर्शक क्रमांक Location ID		तारीख Date		अनुक्रमांक Sr No	

वळे पृ / P.T.O.

नागरिक सूचना अर्ज कसा भरावा यांसाठी मार्गदर्शनपर माहिती

(१) नागरिक सूचना अर्जातील रकाना क्र. २ मध्ये कामाचे स्वरूप व संक्षप अचूकपणे लिहावे.

उदा. घरेली सर्वे क्र.२८, प.क्र.४/१, १/१ शिवसाई सोसायटी डिलेरिंग, ताळीम व हंसनगर पासून पाटील रस्त्यापर्यंत पथदीप खांब उभारणे व दिवे लावणे.

(२) नागरिक सूचना अर्जातील रकाना क्र. ३ मध्ये खालील कोष्टकानुसार कामाचा सांकेतिक क्रमांक नमूद करावा.

कामाचे स्वरूप	सांकेतिक क्रमांक	कामाचे स्वरूप	सांकेतिक क्रमांक	कामाचे स्वरूप	सांकेतिक क्रमांक
रस्तप / पायवाट	A	सार्वजनिक वाहनतळ	F	उद्याने	K
गटारे	B	सार्वजनिक शौचालये	G	बाग	L
पथदीप	C	कचरा पटवण्याची	H	भवरे	M
वाहतूक संकेतस्थळे	D	पाणी	I	निरिक्षक	N
बस स्थानके	E	गटारे	J	इतर	O

(३) नागरिक सूचना अर्जातील रकाना क्र. ४ मध्ये प्रस्तावित काम केल्यामुळे साध्य होणारा सार्वजनिक हेतू नमूद करावा. उदा. पथदीप व दिवे लावल्यामुळे अपघात कमी होऊन सुरक्षितता वाढेल. उदा. नमुना अर्जात पुढील उदाहरणानुसार माहिती भरावयाची आहे.

अ. क्र.	कामाचे स्वरूप व स्थान	सांकेतिक क्रमांक	प्रस्तावित कामामुळे साध्य होणारा सार्वजनिक हेतू
१.	घरेली सर्वे क्र.२८, प.क्र.४/१, १/१ शिवसाई सोसायटी डिलेरिंग, ताळीम व हंसनगर पासून पाटील रस्त्यापर्यंत पथदीप खांब उभारणे व दिवे लावणे : रस्त्याच्या दोन्ही बाजूला प्रत्येक पाठवणी प्रत्येक १० दिवे असलेले ५ खांब उभारणे.	C	पथदीप व दिवे लावल्यामुळे अपघात कमी होऊन सुरक्षितता वाढेल.

(४) अनुषंगिक सूचना :

१. सर्व रकाने भरणे (निदोंश*) तसेच सर्व कामांना सांकेतिक क्रमांक देणे अनिवार्य आहे.

२. केवळ कामाची मागणी घेतल्याने कामाचा अंदाजपत्रकाशी समावेश होईल असे दृष्टित धरू नये. कामाचा अंदाजपत्रकातील समावेश हा त्याासंदर्भातील आर्थिक व कायदेशीर बाबींच्या उपलब्धतेवर अवलंबून आहे, तसेच नागरिक-नगरी एजन्सीकडून चर्चा करून त्याचवेळी बाराण्यात कामाचा प्राधान्यक्रम ठरवण्यात येईल.

३. मागणी केलेल्या सर्व कामांची जागेवर मांडणी केली जावी. (उदा. स्थान, कामाचे जर्जन व स्वरूप), आवश्यक असल्यास फोटो, रेखाटने जोडावीत.

४. केवळ प्रभागातील आवश्यक अशीच कामांची मागणी करावी, संपूर्ण शहराच्या गरजांशी मागणी करू नये. शहर असे प्रभाग कार्यालयास पाठवत घेण्याजोगी असावीत.

५. एका कामाकरिता जास्तीत पूर्व मर्यादा रक्कम रु.५ लाख एवढी असावी.

६. खालील प्रकारच्या कामांचा समावेश करण्यात येईल, रस्तप, पाणी पुरवठा, गटारे, बस थांबे (पीएमटीच्या सल्ल्याने), बाग व उद्याने (फक्त दुरूस्ती) सार्वजनिक शौचालये, पथदीप(रस्ते व वाहतूक संकलन), तळे (फक्त पुनःडांबरीकरण)

७. खालील प्रकारच्या कामांचा समावेश करण्यात येणार नाही, फ्लायओव्हर पूल,(भूमिगत कोंटरी अंडर उभारणे) गरीटेपक, (नवीन निर्मिती) पुढे महानगरपालिकेच्या मागणी करावयाच्या धोरणांबाबत धोरणक्रम.

८. अंदाजपत्रकातील चौकशासंदर्भात असलेल्या सूचना माहितीसाठी अंदाजपत्रकाच्या पेटीची जनद उघडणे आवश्यक आहे असे सूचना ठरवण्यात. उदा. कर्मचाऱ्यांची निवडणी, किरकोळ दुरूस्ती, स्वच्छता, इ.

९. सदर अर्ज सादर करण्याची अंतिम तारीख १५/१०/२०१४ आहे. अंतिम तारखेनंतर सादर केलेले अर्ज विचारात घेतले जाणार नाही.

१०. कृपया आपल्या अर्जाची एक छायाप्रत आपल्या जवळ ठेवावी व मूळ अर्ज कार्यालयात दाखल करून अर्जाचा अनुक्रमांक व पोहोच घ्यावी.

११. सदरचा नागरिक सूचना अर्ज हा आपल्या नजीकच्या क्षेत्रीय कार्यालयात सादर करता येईल. नागरिक सूचना अर्ज नमुना मनपा संकेत स्थळावर उपलब्ध असून अर्ज इंटरनेटद्वारे www.puneccorporation.org या संकेत स्थळावरून प्रत (Download) करता येईल.

कुपाटमु. (११०६) १६,०००-८-१४   उत्तेखप्रत (अॅ.)

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क्षेत्रिय कार्यालयांचे संपर्क क्रमांक

| औष	...	कोमवर (वर्षे पेठ)	...	घोले रोड	...	आडके-कॅम्प	...	कोडधवा रोड	...
औंध (बाणेर रोड)	...	येवला (संभाजी)	...	भवानी	...	बाल-निधान	...	शिवाजी	...
नगरकर	...	रुकवार	...	तिकोणी	...	भवानी	...	येरा-वाडी	...

CLIMATE REFUGEES AND URBANIZATION: WHAT DID DICAPRIO MISS?

Archana M V& Bhavani Kumara Masillamani*

1. Introduction

1.1 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's 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 climatic changes 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.
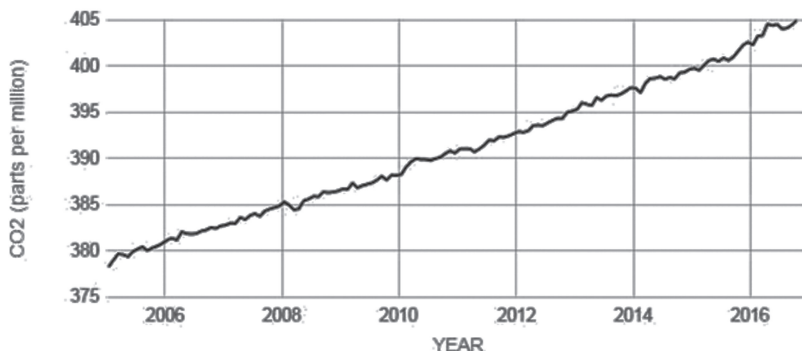
Source: climate.nasa.gov

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The above graph 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, 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.

A significant portion of the awareness spread is directly accountable to the celebrities addressing climate change at public forums. Mark Ruffalo, Leonardo DiCapio, 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) program. The Paris Agreement and UNFCCC3 Article 6 follow from these programs that supports and guides countries to address climate change. 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.
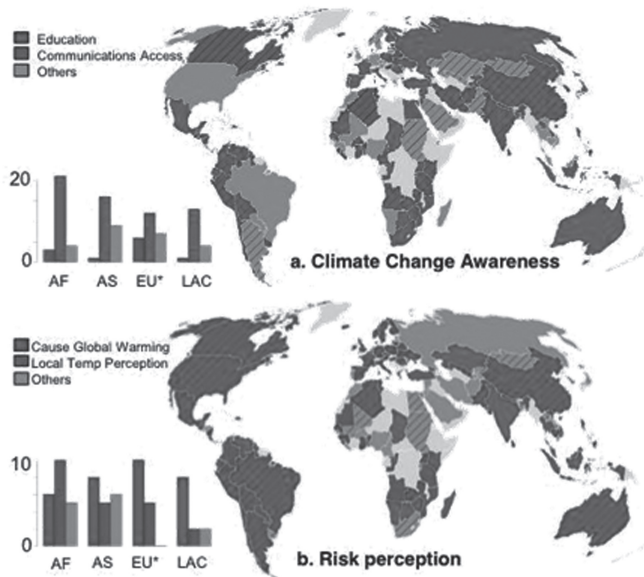
Source: Predictors of public climate change awareness and risk perception in the world

3 United Nations Framework Convention for Climate Change

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 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 climatic changes 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 climatic changes are happening pretty much in every part of our nation and a large part of our society have failed to identify the issue.

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, increase in pollution levels, are a sign that a country like India needs to take up climate change as one of the persistent issues of the country.

1.2 Climate change and Migration:

Climate induced migration, which is a closely related issue resulting from climate change is considered to be a form of forced migration. This process, which could take a form of exodus migration leads to movement of people to the less vulnerable areas of climate change in search of employment or to sustain a livelihood. The displacement of people due to increasing environmental problems is being taken notice of at the international platform in the recent years. IPCC report published in 1990, had warned that the impact of climate change would adversely affect the migration pattern. Two and a half decades since then, the countries are still finding their way to adapt to the aspect of climate migration. The migration induced by climate change will have impact on the developmental plans which are undertaken by the countries. Asian Development Bank (ADB) in 2009 conducted a study in Asia Pacific to understand the pace of climate migration in these areas. The results suggest, displacement caused due to floods, droughts and cyclones, among other natural calamities are also accompanied by large number of deaths due to lack of aid. Therefore, migration associated with the environmental aspects accentuate the need to mitigate the climate change at source. 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. This data takes into account the number of people who are displaced due to natural disasters for a year through 26 years.

The category of migration that brought about the highest displacement due to climate change were floods and storms. For the year 2015, the floods in India and the earthquake in Nepal caused large scale displacement of people.
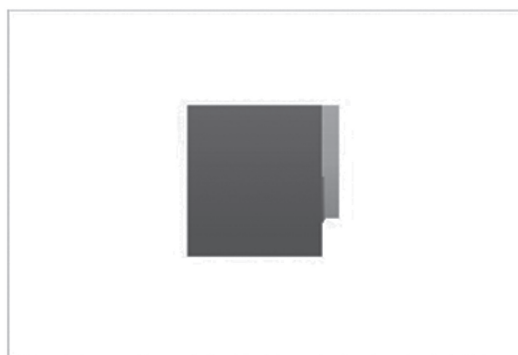
■ Storm   ■ Wet Mass Movement
■ Wildfire   ■ Extreme temperature
■ Floods

The displacement caused due to climate change in the high income group countries is an average of 1.8 million people, while in lower income countries, 9.8 million people are displaced due to climate change/weather hazards. This large difference in numbers show that the low income level countries have lower capacity to mitigate displacement caused due to climate change and also, do not possess adequate aid and assistance needed to meet the demand arising out of displacement. With reference to the above chart, between the years 2008-2015, 64 per cent (110 million people) have been displaced due to floods alone, being the factor responsible for largest displacement, followed by storm. This large scale displacement necessitates the basic civic infrastructure and adequate facilities for rehabilitation.

Exodus migration to the cities arising out of any reason along with the increasing rates of urbanization often creates an imbalance in the urban centres. The data specific to Asia Pacific shows that millions of people are displaced already due to climate change and this process would be aggravated with the increasing population levels in these countries. Hence, emergence of an urban centre that promises a better livelihood along with the existence of forced migration is making cities the next destination for these migrants. However, the cities which are vulnerable to climate change would also suffer a setback, if the cities are not capable of mitigating the effects of climate change. Therefore, the climate induced migrants could originally belong to rural or urban area, however, the implications of displacement will be the same if the adaptability to climate change is poor.

Millions of people from an urban setup in low and middle income countries are vulnerable to climate change and this can be largely underestimated. The scale of devastation in urban cities caused by climate change highlights the vulnerability of urban cities and its underlying implications. With the increasing rates of urbanization in the low and middle income countries, there is a growing dependency on the limited infrastructure available in the cities. The urban centres play a major role in generating greenhouse gases, while also taking some substantial efforts in reducing them. From the recent developments with regard to climate change, it is understood that there needs to considerable adaptation to reduce the risk of climate change, yet, there is no consensus reached in this regard. The urban cities are the centre of economic growth of a country, hence, any mishaps from a natural disaster is capable of creating a havoc in the soundness of an economy.

The migrants often settle in parts of the cities which are at risk from landslides, floods, and vulnerable to the effects of climate change. The loss of life and property in urban cities caused by climate changes emphasise the failure of urban management. The urban poor, who do not have access to the infrastructure that promises them a better standard of living, are often the victims of the poor management of urban cities. The categorization of urban poor in terms of calorie intake does not offer a thorough explanation because, an account of the non-food necessities are ignored. The case of Dhaka, the capital of Bangladesh, is fighting climate change and climate refugees. The city has grown 20-folds in the last 50 years with a large number of inhabitants living in the parts of the cities that do not offer a conducive living environment. Although the population of Dhaka have been trying to adapt to climate change, the efforts have not resulted in positive results. (Alam, Rabbani, 2007).

The urban local self-governments should play a key role in adapting to climate migrants and also, to mitigate the climate change in the cities. Since majority of the infrastructural services such as water, electricity, sanitation and waste management are offered by the city and municipal governments, their policies could reduce vulnerabilities and offer a sustainable living.

1.3 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 are 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 focused on the involvement of the citizen groups and the 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 Local Self Government (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 a long 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 toproviding 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, D.P, Rana, A.K, 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, S, 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 effevtive 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, Siddharth, 2007).

1.4 Literature Gap:

The existing literatures in regard to climate change and migration have studied in isolation the effect of climate change without emphasizing on the gravity of the issue and the urgency to adopt better policies as climate changes and migration cause a ripple effect. The challenges caused by migration initiates 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 which follow, we discuss in detail the reasons for migration from the rural economy and develop the challenges in urban areas caused by the exodus migration and finally, review the policy recommendations to address the urbanization challenges due to climate change.

1.5 Objective:

To look at the potential reasons for the migration from rural to urban area and further connect it with the ongoing urbanization process and suggest policy recommendations to tackle climate change and climate induced migration.

1.6 Methodology:

The findings arrived at in this paper, follow both qualitative and quantitative research methodology, letting them complement each other. The data collected for the stated purpose has been collected from relevant government publications such as NSSO, Census data and other international publications, among others. A descriptive analysis technique has been adopted to verify the data and arrive at the results. In addition to this, the data has been used to acknowledge the existing policy shortcomings and put forward our recommendations for the same. The various methodologies put together, have helped us in establishing our findings and probable courses of action needed to develop a near perfect sustainable city model.

2. Impacts of Climate Change: Agriculture, Migration and

Urbanization

Displacements caused due to climate change in India because of drought and storms are increasing every year. Reports published by IPCC and the others have suggested that the melting glaciers in the Himalayan region will eventually affect the water resources and also the availability of land for cultivation in the region. Additionally, the areas near the Sundarbans and the Gulf of Kutch are considered vulnerable for climate change. The lack of adequate rainfall in the major parts of the country results in drought which translates itself to lower productivity of crops. Agriculture sector is both directly and indirectly impacted because of climate change. While direct impact is seen in the changes of the crop and livestock production, the indirect impact is observed through increased pressure from pests and pathogens. Climate change poses as a major challenge to the Indian agriculture sector because of the critical dependence of agricultural sector on climate and also, because agriculture is an important source of living for the rural population. The failure of crops owing to change in climate leaves people who are reliant on agriculture for their livelihood, jobless. According to IPCC report 2014, even at 1 degree Celsius increase in temperature, the negative impact for major crops like wheat, rice, corn are high and they are expected to worsen every period. Therefore, with the increasing levels of climate change, growing food could become difficult and would cause food crisis in India. The joblessness caused owing to climate change is forcing people to migrate to urban set up for achievement of better livelihood and in seek of employment.

The migration data collected by the Census does not categorize the climate induced migration as one of the reasons for internal migration. In our study, we have considered the migration taking place seeking employment. The underlying assumption for this being, the exodus migration occurring because of climate change would be in search of employment. Although wilful migration seeking employment has been a trend, we believe that forced migration because of change in climate is a possibility. The Fifth Assessment report by IPCC, 2014, suggests that the employment loss generating through climate change which is direct and obvious, the migration resulting from this is also apparent since moving in search of a better livelihood is the best way to adapt to climate change.

2.1 Climate change and agriculture:

Agriculture sector is driven by various factors which hold importance for its yield and area under cultivation. As per the World Bank estimates of 2013, of the total employment, 50 percent of the employment is in agricultural sector for India. This employment ratio, however, has reduced from 60 per cent in 1994. Agriculture continues to be a source of living for the rural population despite the growth of the small scale industries in villages. However, the declining levels of employment in agriculture suggests that people are seeking employment in other sectors.

The sector is fairly 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 SAPCC4, 65 per cent of the Indian terrain is drought prone, 12 per cent area is flood prone and the rest 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.

Year	Area	Production	Yield	Area Under Irrigation (%)	Annual Rainfall
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 area under cultivation has not increased significantly over the last 4 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 the low productivity is that the land dedicated to growing pulses is mostly un-irrigated and hence, there is a 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 shows that 53 per cent of the land was being rain-fed, good monsoons increases reduction and offers incentives for the farmers to continue with their cultivation and vice versa.

2.2 Climate Change and Migration:

The analysis shows that the Indian agriculture is vulnerable to climate change resulting in lower productivity and less incentive for the farmers to cultivate. The lack of mechanism to adapt to climate change, brings about forced migration of labourers from rural to urban areas seeking employment. 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.

Year	Male	Female
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 intention of education, post marriage but, only focusing on the migration taking place for 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 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 relocating 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 section of population to migrate to the cities in search of employment increases the burden on the already existing population in cities 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 seems 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 have 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 a 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 induced migration challenges which are majorly prevalent in the cities and the adaptation mechanism in place to fight climate changes and the urban challenges.

2.3 Climate Change and Urban Challenges:

Climate change are 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. 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.

All-India/State/Union Territory	Total (%)	Rural-2011 (%)	Urban-2011 (%)	Difference (%)
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 are 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 *The carbon emissions level in India has shown an increasing trend with increase in urbanization. The carbon emissions here are 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 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 falls 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.

3. Policy Recommendations

The urbanization challenges faced by India have to be overcome effectively ensuring that the policies recommended address the environmental concerns as well. United Nations held a Framework Convention on Climate Change (UNFCCC) where 197 countries attended the convention and discussed the raising concerns about climatic changes across the globe and ways to address the same from a nation's perspective. The Paris Agreement, so termed, was aimed at improving the global response to the threat of climate change, in terms of sustainable development and efforts to eradicate poverty. India is one of the 117 countries who have ratified the agreement declaring that keeping in mind its development agenda, it will move towards being a nation that focuses on low carbon emissions and concentrate on cleaner sources of energy, thereby contributing its share to the redressal of climate change.

- Reduction in carbon emission and shift towards clean energy: India is the 4th largest carbon emitter in the world and being a developing nation, India has its own restrictions in terms of issues addressed to. This, however, does not imply that climate

change can take the backstage while looking at its development plans. The development of the nation has to go hand in hand with looking into the development concerns. Urbanization being one of the primary focus of the country, has a higher risk of enlarging the climate change issue in hand if not designed properly. In order to control the levels of carbon emissions and other related issues, India has to pay attention to the forestry and increase the area coverage under forests. To create an additional dip in the carbon emissions level of 2.5 billion-3 billion tonnes, 5 million hectares of land has to be brought under the forest coverage, apart from improving the quality of green cover. Even though climate resilient urban centres maybe slightly out of reach right now, we would still have to thrive towards the same. One of the biggest challenges that we face currently is the concentration of power generation using non-renewable sources of energy and India aims to produce 40 per cent of the total electricity from renewable sources of energy by 2050.

Renewable energy is considered as one of the best mechanisms to adapt to climate change, whereas, the knowledge and the adaptation of renewable energy in India is limited to certain section of people in the urban cities. 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. Renewable energy sources help in displacing the emissions from fossil fuel. The penetration of wind and solar energy has seen a remarkable growth in the recent years. 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. 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.

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 equipment's. Hence, the need for investment in the renewable energy sector is driven by the

need to minimize the carbon emissions into the atmosphere and slow down the onset of climate change.

- Adaptation mechanism by the Local Self Government (LSG): 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 integrateclimate change and other hazard mitigation concerns into the primary land use 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 has 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.

The need of the hour is to reduce the ongoing risk whilst targeting to adapt to the climate change. The programmes initiated for the mitigation of floods and drought are more short term in nature and doesnot consider the risk in long term perspective. Before relocation is thought of as a policy option, mitigation programmes should consider spatial adaptation wherein the vulnerable areas within the rural set up or the village is moved to a different part of the same set up. This spatial adaptation is considered better than relocation since with this the economic structure of the rural or urban area is revisited and there would be involvement of people in economic activities generating lesser risk to the climate and hence adapt to the risk effectively.

- SMART cities: This program 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 program 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.

- Awareness and perception of climate change: 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.

Effective data management: As the IMO suggests, the available information on climate migrants is very limited and there is no full-fledged information available on the set of people who constitute climate migrants. While undertaking this study, we were faced with the challenge of limited data from the Census report of 2011 and the NSSO reports of 2007-08. The categorization of the migration data collected by these reports should address the climate change induced migrants who could have relocated themselves to different parts of the country exclusively because of the changes in the climatic conditions and hence need to be treated differently from the other migrants. This effective categorization will further help the rehabilitation process and would offer scope to undertake studies which would focus on the risk adaptation and designing the economic activities to adapt to climate change.

4. 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, we look at how it impactsIndia. 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 urbanization cannot be taken up by ignoring the climate change prevalent across different sections of the country. Urbanization process, in itself, causes detrimental effects to the environment and hence, it is important to not let it convert into a vicious cycle. The programs 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 programs 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. Development of a developing country need not isolate climate change, but rather imbibe into their urban development agenda, thereby, covering what DiCaprio had missed in his climate change propaganda.

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A STUDY ON URBAN CAPACITIES AND RISKS OF EXCLUSION

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INTRODUCTION

Rural-urban migration is an indicator of developmental change, especially in a country like India. According to an IGIDR report, it is expected that half of Asia's and Africa's population will be living in urban areas by 2020 and 2050 respectively. However, with 31.6 percent of its population living in cities and towns in 2011, India is the least urbanized country among the top 10 economies of the world. An overview of the contemporary literature on population mobility in Asian countries suggests that despite widely different trends and patterns, alternate policy frameworks and varying ideological dispositions of the policy makers and researchers, the dominant perspective is that the region is currently experiencing rapid urbanization and migration and that this would continue in future years.

"Urbanization is defined by demographers as the increasing share of population living in urban areas" by Poston and Bouvier (2010). The term urbanization is defined differently in different countries. Generally, they are considered to be settled areas that are more populous and dense than rural settlements, and more suitable for locating administrative facilities and functions.

This paper studies the urban capacities and the risks of exclusion faced by the migrants, particularly the male migrant construction workers in Chennai. The scope of the paper defines the urban capacities with respect to the financial and social securities of the individual workers.

The main objectives of the study are-

i) To check for the relevance of the Harris-Todaro model to Chennai city construction workers

ii) To study the socio-economic status of male migrant construction workers in Chennai

iii) To examine the wage differences between male migrant and non-migrant workers in the construction sector in Chennai

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HYPOTHESIS:

H0: There is no statistically significant difference in the wages of migrant and non-migrant workers.

H1: There is a statistically significant difference in the wages of migrant and non-migrant workers.

The study has used a primary survey using direct questionnaire method with random convenience sampling technique. The sample size is 25 which is 5% of the representative population of construction workers in the area of study. Consequently, the workers from 2-3 construction sites in Anna Nagar were chosen for the same. Further, the data collected is analyzed using a dummy variable regression model and results are drawn.

THEORETICAL BACKGROUND

HARRIS TODARO MODEL

The burden of this model is to explain why masses of workers moved from the countryside to the city in the face of sizeable urban pools of unemployed and underemployed. To accomplish this, the model focused attention on the present value of expected earnings rather than current wage rates.[101] The rate of rural-urban migration was held to be a function of the difference between present values of expected urban earnings and expected rural earnings, with the size of the flow of expected urban earnings significantly affected by the probability of obtaining employment in the urban modern sector.

So the individual's decision to migrate from the rural to the urban modern sector depends on two principal variables: the real income differences between the urban and the rural areas, and the probability of obtaining an urban job.

In cases where the probability is positive, the economically rational potential migrant will decide to move. Harris Todaro model assume that open rural unemployment is nonexistent. A probability of unity is therefore used when calculating expected rural earnings.

Even though there might exist an urban pool of underemployed and unemployed labor, a potential migrant would decide to make the city ward trek if the expected urban modern earnings, properly discounted by the probability factor, exceeded the expected stream of rural earnings. Todaro defines the probability of being selected for a job during period t as being equal to the ratio of new modern sector employment openings in period t relative to the number of accumulated job seekers in the urban traditional sector in time t.

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[101] The reason workers compare expected wages is that the urban wage is set institutionally above the market clearing level and urban unemployment results. It is always assumed that there is always full employment in agriculture. Rural- urban migration is thus the equilibrating force which equates rural and urban expected incomes and as such is a disequilibrium phenomenon.

Those migrants not obtaining urban modern employment in the immediate period are said to accept temporary employment in the urban surplus labor pool (urban informal sector). Although sometimes referring to the surplus labor pool as the traditional sector, the Todaro model clearly assumes that all members of the pool, as well as all migrants, are intent upon eventual urban modern sector employment (this assumption is imbedded in Todaro's treatment of the probability of employment in the urban modern sector). The Todaro model thus explains why there may be more migrants than modern sector job openings and accounts for the growth of the urban pool of surplus labor.

The HT model predict that, in response to the creation of extra urban jobs, additional rural laborers attracted by the increased employment probability will swell the urban labor force until the new ratio of jobs to urban labor force is restored to the earlier ratio. However, for this as well as for similar paradoxical results to hold, it must be assumed that the urban wage rate is fixed or that it changes only by a negligible amount. But this requires explicit assumptions about the elasticity of migration.

REVIEW OF LITERATURE

S.Chandresekhar, Ajay Sharma in their paper "Urbanization and spatial patterns of Internal migration in India" argues that India presents itself as an interesting case for understanding the process of urbanization and migration. The study focuses on migration streams and emerging patterns in migration and also provides some evidence on outcomes related to migrants and households with migrants. The paper uses data from two different sources: Census of India 2001 and 2011, and the all-India household Survey of Employment and Unemployment and Migration Particulars periodically conducted by the National Sample Survey Organization (NSSO), India. Although economic theories are primarily about worker mobility, census data typically reflect mobility of the population and not necessarily of workers. Consequently, based on this data set, it is not feasible to disentangle temporary, seasonal and circular migration.

Amitabh Kundu in his paper titled, "Urbanization and Migration: An Analysis of Trends, Patterns and Policies in Asia" overviews urbanization and migration process in Asian countries at macro level since 1950s, including the projections made till 2030. An attempt is made here to examine the thesis of southward movement of urbanization and urban explosion in Asia. An analysis of the trends and pattern of urbanization across different regions and countries in the continent has been attempted, with reference to international migration. It also overviews the changing structure of urban population across different size categories, shift of growth dynamics from large to second order cities and stagnation of small towns in different regions of Asia. Difficulties in decomposing incremental urban population into natural growth, new towns, expansion of urban boundaries and RU migration has been considered in the context of non-availability of data on internal migration from standard international sources. It also speculates on the change in the share of each of these components based on fragmented evidence from different countries and proposed government policies. The paper further attempts to understand the dynamics of migration and urbanization in a historical and socio-cultural context and explores

if that can justify the urban projection of the UN. The pattern of interdependencies of migration and urbanization with a select set of indicators articulating aspects of economic and social development for all the Asian countries has been carried out in the paper. It also overviews the programmes and interventions at national, regional and city levels to determine the major thrusts of urban policy and their implications in the context of slum evictions in high income areas, city segmentation etc.

In his paper titled," An overview of migration in India, its impacts and key issues", Ravi Srivastava talks about internal and international migration, both of which are large-scale with impacts on economic growth and poverty. It analyses the patterns, trend and nature of labour migration, reviews existing government and non-governmental policies and programmes and briefly examines key policy issues and options. The paper relies mainly on existing data, but also draws on some new analysis of secondary data. Inspite of the empirical and conceptual difficulties, the two main secondary sources of data on population mobility used are the Census and the National Sample Survey (NSS). The paper further identifies the causes of migration as the pattern of development and the social structure. The study emphasizes that a major policy focus has to be on a vigorous pro-poor development strategy in the backward areas.

In the paper, "Migration and Urbanization in India in the context of poverty alleviation",

Amitabh Kundu points out that migration and urbanization are direct manifestations of the process of economic development in space, particularly in the contemporary phase of globalization. A large part of migration and urbanization in the less developed countries have historically been linked to stagnation and volatility of agriculture and lack of sectoral diversification within agrarian economy, India being no exception to this. He further says that rural urban migration has often been considered the major factor for growth of slums in urban areas. It would be important to look at migration not always as a negative phenomenon - reflecting misery and lack of livelihood opportunities in the out-migrating regions and absence of basic amenities and health hazards in in-migrating regions. It needs to be seen also as an opportunity being taken up by people to improve their socio-economic conditions.

Rakesh Kumar Bhati in his paper, "A study of Rural to Urban Migration in India" says that urban population growth in the developing countries is far more rapid than the population growth generally, about half the urban growth is accounted for by migrants from rural areas. The paper covers the rural to urban migration which shows us the demographic structure of migration within India. Further, it studies about the patter on migration between intra-states that shows the migration flow. This also covers the male and female ratio of migration between states; this also tells us about the development structure and their migrated population of that particular city/ area. The main focus of the paper is on employment oriented migration which identifies why migration takes place to that particular state or city. The paper finally throws light to the silent feature of the Indian society of how urbanization is leading us to westernization.

ANALYSIS:

Via convenience random sampling technique, the researcher has surveyed 25 male construction workers in Chennai, of which there are 15 migrants and 10 non-migrants these were the representative 5% sample of the total construction workers in the Anna Nagar area of Chennai city. The 15 migrants are a mixed group from the states of Odisha and West Bengal. The major reasons for them to migrate are the push factors and pull factors in their native places and Chennai respectively. The main push factors include seasonal unemployment, lack of overtime work benefits and low wages, while the pull factors are attractive wages and extra payments for working over-time.

The non-migrants are of the age group of 40-55 and have been working for a daily wage of Rs.600-Rs.650, for the past 7-8 years. In spite of their wages being on a daily basis, they sustain stable standard of living with all the basic civic amenities. They are all also given provisions for overtime and additional bonus for festive seasons. They have their own house, they exercise voting rights and hence are not politically excluded either. Most of them also own a two wheeler which smoothens their commutation to their work places.

Meanwhile, the migrants are of the age group 20-35 and their primary motive for migrating is in search of employment. They have completed their schooling, but there are no better prospects in their states. "There is a Rs.50 increase in wages, provision for over-time and more availability of work in Chennai. In the beginning, language was a problem but now I manage" says a migrant worker from Calcutta. They have been given an accommodation by the company by which they are hired and out of the Rs.400-Rs.450 they earn on a daily basis, the group of them stay together and cook for themselves. "We have been working here for years, we don't feel we are discriminated. We get over-time also. Here there is work all the time not like my village. I go home twice a year. As far as my family's ends meet, I'm happy" says a migrant worker from Odisha. The migrants do not get any provisions from the government, neither do they hold a ration card or any form of documentation here. They also do not own a bank account. These are the basic amenities for an individual living in an economy, which these groups of people clearly lack. These exclude them financially, socially and politically from the different arenas of economic life.

MODEL

The researcher has used categorical variable and hence employed a dummy variable regression model to study the significant difference in the wages with respect to male migrant and non-migrant construction workers in Chennai. The attributes are quantified by constructing artificial variables that take on values of 1 or 0, 1 indicate that the worker is a migrant and 0 indicate that the worker is a non-migrant. Variables that assume such 0 and 1 values are called dummy variables. Dummy variable regression model can be specified as:

$$Y_i = \hat{\beta}_1 + \hat{\beta}_2 D_2$$

In the above model Yi represents the wages earned by the male migrant and non-migrant construction workers. D2 represents whether the worker is a migrant or a non-migrant.

D2=1, if a migrant and D2=0, if a non-migrant.

Regression Statistics

R Square   0.882846
Standard Error 34.42067
Observations   25

ANOVA   Significance

	df	SS	MS	F	F
Regression	1	205350	205350	173.3229	3.4E-12
Residual	23	27250	1184.783		
Total	24	232600			

	Coefficients	Standard Error	t Stat	P-value
Intercept	625	10.88477	57.41967	2.42E-26
D2	-185	14.05218	-13.1652	3.4E-12

Interpretation:

$\hat{Y}i = 625-185D2$

Here the coefficient of D2 is -185 and its t stat value is 13.1652. Higher the t value and lower the p-value greater is the level of significance. Hence we reject the null hypothesis and accept the alternative hypothesis. Therefore there is a statistically significant difference in the wages with respect to migrant and non-migrant workers.

The researcher tries to find out the extent to which there is discrimination in the wages of migrant construction workers.

$E(Yi/D2=1) = \hat{\beta}1+\hat{\beta}2(1)$ → it is the expected or the average wage of the migrant worker

$E(Yi/D2=0) = \hat{\beta}1+\hat{\beta}2(0) = \hat{\beta}1$ →it is the expected or the average wage of the non-migrant worker

The average wage of the male migrant worker is Rs.440 while the average wage of the male non-migrant worker is Rs.625. Hence the study shows that there is a difference of Rs.185 in distribution of wages between male migrant and non-migrant construction workers.

KEY FINDINGS:

This paper hence proves the relevance of Harris-Todaro Model that the migrant construction workers move from their rural settlements to urban areas in search of better prospects especially because of higher wages. Yet another key finding of this study is that there exists statistically

significant difference in the wages of the male migrant and non-migrant construction workers. The major reason for this significant difference in the wages is that they are willing to work for a lower wage rate as compared to the non-migrant workers. Even though the migrant workers believe that they are not being excluded from the growth of the economy but the model clearly shows that they are being excluded in terms of financial, political and social securities.

CONCLUSION

The study shows that the representative sample contains a significant amount of migrant workers especially from the states of West Bengal and Odisha. This inter-state migration in India undergoes discrimination to a great extent. The migrant workers are well off than their states of origin but they are not economically in par with the non-migrant workers in the area of study. This is an inequitable distribution of wages and other opportunities to both these categories of workers. This arena needs focus and this bias must be attended to.

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A COMPARATIVE STUDY BETWEEN INDIA AND CHINA ON URBANIZATION

VENKATA LOKESH & PHILOMEN JOEL A.M*

INTRODUCTION:

In today's world, a city is not merely a place of dwelling; it's catalyst In the process of economic and social growth and innovation. However, it is the sustainable urban development and its effects on social and environmental development that one needs to start looking at. Despite the looming challenges regarding the management of mass migration that lay ahead, the benefits that urbanization brings with it are numerous, paving a way for a new cultural and economic boom.

One half of all urban growth is taking place in China and India, which are emerging centers of economic growth. The overall urban scenario leads to unprecedented challenges, most important of which are: dealing with population growth, providing access to resources such as clean water and electricity, as well as housing, social infrastructure and sanitation, enforcing stricter urban pollution control.

This paper contrasts the urbanization in what are considered in two of the fastest growing nation India and China, along with being the two most populous countries, also are geographically close to each other. Both countries have been involved in a mass migration of people into urban areas. With a brief review of literature, the paper contains two parts, First part discuss about the comparison between two countries about various elements which are basis for urbanization. The second part tries to find out the problems and tries to provide possible reforms that could improve urbanization process both in India and China.

REVIEW OF LITERATURE:

Mohan and Dasgupta (2004) authored an article and they analyze the past urbanization of India as well as future projections of urban growth. They also explain that India, urbanization is seen as a negative aspect of development. They also provide policy suggestions that would make India's urbanization a lot better.

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Henderson (2007) is one of the many publications that focus on china's urbanization. The author speaks about China's hukou system and advices china to decentralize from larger cities to medium or small cities. The article also provides remedial measures for the urban development and efficient use of natural resources.

Porter Zachary(2015)'s article analyses the difference and similarities in urbanization between India and China. The article states that China is investing more than India in the urbanization process. And the article also compares the two nations in terms of their move to a more urban environment.

OBJECTIVES OF THE STUDY:

To study the trend of urbanization in India and China.
To compare the elements of urbanization in two countries.
To provide possible remedies for the better urbanization process.

METHODOLOGY:

The study is exploratory in nature, information building up the paper has been collected from various research articles and reports collected on the topic. The information so collected has been analyzed to arrive at a meaningful conclusion

ELEMENTS OF URBANISATION:

Urban Population:

Urban population is one of the major element in the urbanization process. A huge number of people migrate from rural area to urban area. Indian city New Delhi ranks 4th in global ranking in population density where as china's city shanghai ranked 6th

The urban population in India has increased from 8,05,97,390 to 42,93,30,000 during 1960 to 2015 whereas the urban population has grown in china from 10,80,85,400 to 76,23,79,000 during the same period of time.

FIGURE: 1

Urban population in India and China 1960-2015
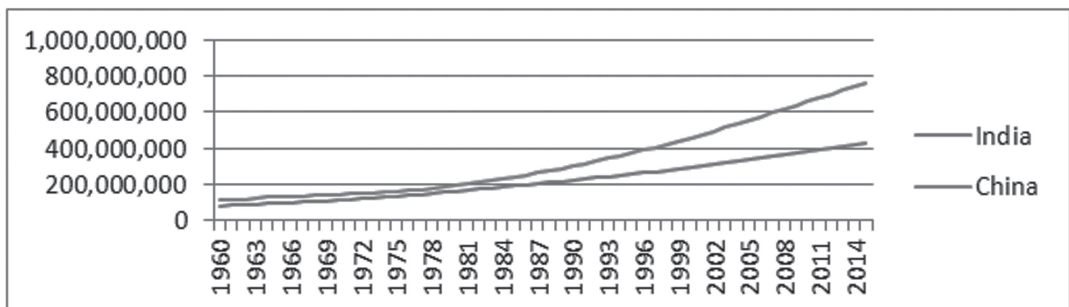
SOURCE: Indexmundi.com/country facts/urban population/

Water supply:

Water supply is one of the major aspect in the urbanization process, In India 94.1 % of people living in urban area have access to proper water supply whereas in China 94.8% of people have access to proper water supply. There is no much difference in providing water to the urban population in both the countries.

Sanitation:

Sanitation is another major element in the urbanization, in this particular element china is way ahead than India because from 1990 to 2015 urban population provided with proper sanitation in china has increased from 67.8% to 86.6% but in India the urban population with proper sanitation facility has increased from 49.3% to 62.6% only. The below chart shows a clear growth in availability of proper sanitation facility in both the countries and it also shows us china is well ahead than India in providing sanitation facilities to urban population. A huge amount of Indian population especially urban areas has affected by many health issues because of improper sanitation facilities available to them India has to work a lot on providing better sanitation facilities to all the people.

FIGURE:2
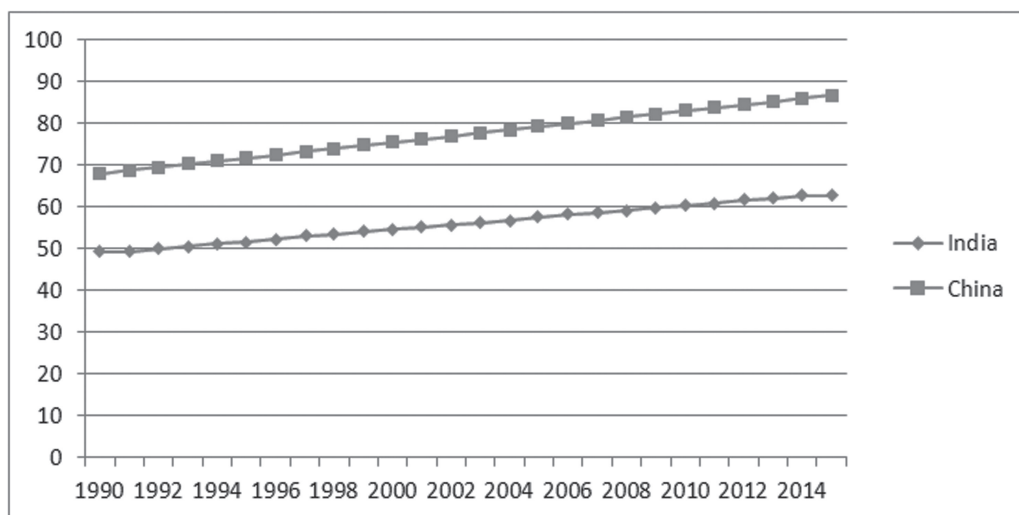
SOURCE: Indexmundi.com/country facts/sanitation/

:Electricity

Electricity is one of the important companent of urbanization process, China has achieved 100% access to electricity to its urban population but India yet to achieve 100% mark. The below given table and graph clearly shows us that China has consistently achieved full access to eletricity in urban areas in past two decads but India is not consistent in providing access to electricity, in 1990 86.45 % of indian urban population had access to electricity and in 2000 it raised to 98.64,

then decreased to 93.09 in 2010 So inconsistent growth in providing electricity is one of the major problem of India's downfall in urbanization process

TABLE:1

YEAR	INDIA	CHINA
1990	86.46	100
2000	98.64	100
2010	93.09	100
2012	98.23	100

FIGURE:3
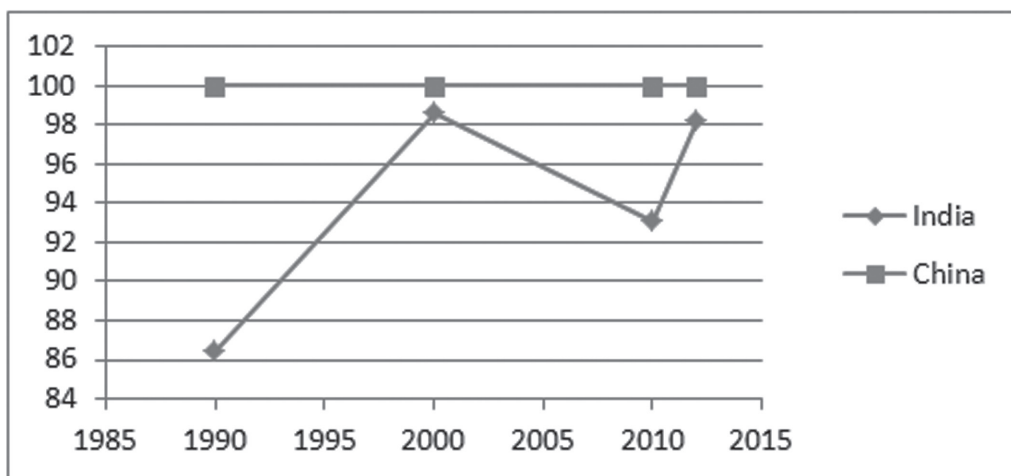
Transportation:

Urbanization poses major challenge to transport system. With traffic blockage, almost all cities and towns of India are suffering from severe form of transportation problem. Transportation problem increases and becomes more complex as the crowd grows in dimension. With its growth, the town performs varied and complex functions add more people move to work or shop.

REMEDIAL MEASURES:

India has rapidly increasing population especially in urban areas. According to the estimates of new Mckinsey global institute research, cities of India could produce 70 percent of net new jobs by 2030, may generate around 70 percent of Indian GDP, and drive a near fourfold increase in per capita incomes across the country. If India upgrades its urban operating model, it has the capacity to reap a demographic dividend from the increase of around 250 million expected in the next decade in the working age inhabitants.

When it comes to solving or at least lessening the urbanization issues in both countries, First of all, there needs to be more done in the area of combating the slums. China has to increase its infrastructure. India has had a history of trying to improve the slums. India has tried to fix the problem of slums since the 1950s. In the 1970s, it had undertaken a variety of environmental improvements of urban slums, including sanitation, other urban services, and the provision of infrastructure. A concern is that India develops these "Master Plans" that try to curb overall urban growth.

China does not want to fall into a trap of slums as they exist in Latin America and other regions.

They could implement a policy to reform the existing Hukou system in order to lessen the severity of the urban-rural income that they have been experiencing. Some reforms options to the

Hukou System include getting rid of the obstacles that make it hard for some people to access certain public services or allow free and migration throughout all province. All of these options would help combine the rural and urban segments of the country and possibly help people get out of the poorer urban villages. To help the environmental issues, India has started to provide public transportation that runs on cleaner fuel. Subsidized public transportation also causes less people to use cars. That, in turn releases less pollution into the air. In the mid-1990s, India added to the list in their constitution that describes the tasks of Urban Local Bodies (ULB) with the most prominent tasks calling them to help with solid waste management. China also has to deal with the environmental factors. China could to raise the prices of gas. These policies would incentivize taking public transportation and as a result, help lessen the pollution of the air and free up the traffic in the city centers.

CONCLUSION:

To conclude, Urbanization is the substantial expansion of urban areas due to rural migration and it is strongly related to modernization, industrialization and the sociological process of rationalization. Urbanization commonly occurred in developing countries because government has keenness to attain the state of developed city status. As a result, almost all area also turned into industrial or business area. It shows us that rapid urbanization has many unconstructive implications especially towards social and environmental aspects.

China and India have urbanized at different rates but still developed similar problems as well as similar ways to combat the issues at hand. For the last three decades, china is going through a mass relocation of people from the rural to the urban areas. India's urbanization has not been as fast as people thought it would be but India's great surge of people moving to the cities is expected to come in the next few years.

Both countries are dealing with major negative impacts of urbanization. China and India are trying to deal with poor areas and slums. These areas lack sufficient services and infrastructure. It is typically the poorest people who inhibit them. In china, the urban villages are slum-like and

also lack services. Another major challenge is to deal with the environment impact of urbanization. Air pollution, a lack of access to clean water, insufficient sanitation, and huge amounts of solid waste are major issues that plague the urban centers of both countries.

The two countries need new policies in order to fix or lesson the negative effects of urbanization. Policies that deal with slums include an increase in infrastructure or at last for china, reform the dated Hukou system.

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CAUSES AND CONSEQUENCES OF URBAN MIGRATION IN INDIA:
AN OVERVIEW

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<u>Key Words:</u> Urban Population, Internal Mobility, Urban Migration

Introduction:

India's urban population which was 17 per cent in 1951 is expected to jump over to 42 per cent in 2025. The increase will be on account of migration of people from rural areas, who will shift location in search of greener pastures. In the last 50 years the rural population has decreased from 82.0 to 68.9 per cent. Migration is the barometer of changing socio-economic and political conditions at the national level and speaks of the levels of economic inequalities existing in the economy. With the share of Gross Domestic Product (GDP) of agriculture falling sharply from around 40 per cent in the 1990's to around 15 per cent, large number of people along with their families are shifting to urban areas in search of better opportunities. Some say they are being squeezed out because of "Push Factors", while other academicians say they are getting attracted to urban life because of" Pull Factors".

Recent economic growth and faster industrial development along with the growth of urbanization is the major magnetic effect at work that draws people from rural to urban areas. The scope of better employment opportunities, better standard of living and provisions of improved amenities of these cities also add to the cause. Besides, migration is the natural outcome of deprivation, inequality, poverty and unemployment especially in the rural areas. Various socio-economic dynamics and a range of causes unlock the way for rural to urban migration. This is in fact, a special kind of class struggle and inequality in terms of provisions made. Such an influx of population from rural to urban areas has resulted in various socio-economic problems at the source of origin as well as at the source of destination.

Migration of people within national borders is far greater in magnitude than migration across international borders and has enormous potential to contribute to economic prosperity,

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social cohesion and urban diversity. Internal migration is an essential and inevitable component of the economic and social life of the country, given regional imbalances and labour shortages and safe migration should be promoted to maximize its benefits. However, in the absence of a coherent policy framework and strategy, migration imposes heavy costs on human development through poor labour arrangements and working conditions of migrants and obstacles in their access to shelter, education, health care and food. Migrants constitute a floating and invisible population, alternating between source and destination areas and remaining on the periphery of society. In India, internal migration has been accorded very low priority by the government & policies of the Indian State have largely failed in providing any form of legal or social protection to this vulnerable group.

India's total population as recorded in census 2011 stands at 1.21 billion. Internal migrants in India constitute a large population – 309 million internal migrants or 30 per cent of the population (census of India 2001) and by more recent estimates 326 million or 28.5 per cent of the population (NSSO 2007-2008). Migration is the barometer of changing socio-economic and political conditions at the national and international levels. It is also a sign of wide disparities in economic and social conditions between the origin and destination. It is a natural outcome of inequality in the distribution of resources. Migration and development is a growing area of interest. There has been much debate on the negative impact of migration on development and vice versa. On the one hand, it is argued that underdevelopment is a cause of migration, and on the other hand, prosperity also leads to migration. The history of migration is the history of people's struggle to survive and to prosper, to escape insecurity and poverty, and to move in response to opportunity.

With this basic understanding this article focuses on the following objectives:

1.   To understand the demographic structure and urban migration.

2.   To highlight the possible causes and consequences of urban migration in India

3.   To recommend the concrete strategies to check urban migration.

Based on the first objectives the following two tables exhibit the percentage of villages and population by class of villages in the two consecutive censuses 2001 and 2011 and migration rates from different NSSO.

Table 1: Percentage of Villages and Population by Class of Villages in 2001 and 2011

		2001	2011
Less than 500	Village	36.9	32.95
	Population	7.16	5.74
501-999	Village	24.5	23.73
	Population	14.18	12.39
1000-1999	Village	21.9	23.39
	Population	24.69	23.7

2000-4999	Village	13.54	16.13
	Population	32.21	34.63
5000-9999	Village	2.49	3.12
	Population	13.21	14.81
10000 and above	Village	0.67	0.78
	Population	8.55	8.68
Total	Village	100	100
	Population	100	100

Source: http://www.censusindia.gov.in/2011census/A-3_Vill/Statements%2012.pdf

Note: India's rural population in 2001 and 2011 stood at 743 million and 833 million respectively.

The above table reveals that the percentage of Villages and Population from the group of 1000 to 10000 and above group highlights gradual enhancement of number of villages and population. But there is no sign of negative decline in the urban migration during this period. The following table reveals the migration rates from different NSSO rounds.

Table:2, Migration rates from different NSSO rounds

Round (Year)	Category of Persons		
Rural			
	Male	Female	Percentage
64th (2007-08)	5.4	47.7	26.1
55th (1999-2000)	6.9	42.6	24.4
49th (1993)	6.5	40.1	22.8
43rd (1987-88)	7.4	39.8	23.2
38th (1983)	7.2	35.1	20.9
Urban			
64th (2007-08)	25.9	45.6	35.4
55th (1999-2000)	25.7	41.8	33.4
49th (1993)	23.9	38.2	30.7
43rd (1987-88)	26.8	39.6	32.9
38th (1983)	27.0	36.6	31.6

Source: NSSO (2010) Report on Migration in India

The above table highlights the comparison from 38th to 64th round of NSSO assessment of migration rates in India shows the gradual improvement from 20.9 percent to 26.1percent for the rural areas. At the same time period urban area shows 31.6 percent to 35.4 percent.

In India, migration mostly takes place not due to the so called pull forces of the destination place as usually happens in case of developed countries, but because of poverty, unemployment, natural calamities and underdevelopment at the origin place. Migration in developing countries like India is still viewed as a survival strategy. In India internal mobility is critical to the livelihoods of many people, especially for people from rural areas. In the last 50 years the rural population has decreased from 82.0 to 68.9 per cent. All this will happen because large numbers of people will leave rural areas for urban areas in search of better opportunities.

CAUSES OF MIGRATION

The second objective of this article highlights here the possible causes and consequences of urban migration in India. Given the diversity in the nature of migration in India, the causes are also bound to vary. Migration is influenced both by the pattern of development (NCRL, 1991). The National Commission on Rural Labour, focusing on seasonal migration concluded that uneven development was the main cause of seasonal migration. Along with inter regional disparity, disparity between different socio- economic classes and the development policy adopted since independence has accelerated the process of seasonal migration. Most migration literature makes a distinction between 'pull' and 'push' factors, which, however, do not operate in isolation of one another. Mobility occurs when workers in source areas lack suitable options for employment/ livelihood, and there is some expectation of improvement in circumstances through migration. The improvement sought may be better employment or higher wages/incomes, but also maximization of family employment or smoothing of employment/income/consumption.

There are numerous causes of migration from rural to urban centers and vice versa or from one region to another. Notable among these are:

1. Social conflicts and social tension

2. Gap in civilization / culture

3. Law and Order situation

4 . Inequalities in the available social and economic opportunities and other amenities of life between groups of people and or sectors.

5. Income maximization.

6. Inequitable distribution of benefits of economic development.

7. Social mobility and social status aspirations.

8. Residential satisfaction.

9. Friend and family influences

10. Desire for attaining lifestyle, performance and enjoyment.

11. Development of some sort of complex.

CONSEQUENCES OF MIGRATION:

Urbanization:

Migration aids in Urbanization. Thomson also viewed urbanization in the form of

migration. Preston considers rural urban migration as an indicator of regional and sectoral distortions in the pattern of development. The UN also estimated that about 60 per cent of the urban growth in developing countries is due to the rate of natural increase of urban areas and the remaining 40 per cent is due to migration. Migration is the chief mechanism by which all the world's greatest urbanization trends have been accomplished.

Rural depopulation:

Migration to urban areas results in rural depopulation. As most of the productive work force leaves rural areas in search of better opportunities the rural areas are left behind with the old and the unable.

Social status:

Migration is helpful in equalizing social status, income of rural urban settlements, checking fragmentation of land holdings and promotes concept of division of labour and specialization. Migration also helps in cultural diffusion and cultural assimilation as peoples from diverse cultures settle and in due course of time they share and exchange their cultural values and ethos thus helping in cultural diffusion.

Remittances:

Income sent home in the form of monetary assistance can help in paying the debts, increasing food security, help diversify livelihoods and to reduce vulnerability associated with shocks. The NSSO 64 report also states that nearly 10per cent of the households in the rural areas had used remittances for 'debt repayment' and nearly 13 per cent of the households in the urban areas had used remittances for 'saving/investment'. The Reserve Bank of India (RBI) has reported that Indians living abroad transferred $24.6 billion to India in the fiscal year 2005-2006. India, thus, continues to retain its position as the leading recipient of remittances in the world. A study by a UN organization (2000) found that Bangladeshi women migrants sent 72 percent of their earnings home. These remittances have a great role in poverty reduction and development (UNFPA, 2006).

Problem of management:

Cities have become unmanageable because of uncontrolled migration of rural population to urban areas. Large cities of India have now ceased to be congenial places for living. Rural populations coming to urban areas earn their livelihoods by rickshaw pulling, vendors, road side mobile shops. Such activities lead to problem of traffic, congestion and sometimes add to the crime rates. Ultimately, the third objective of this article to recommend the concrete strategies to check urban migration is dealt here.

STRATEGIES CAN BE EMPLOYED EFFECTIVELY TO CHECK MIGRATION:

Checking Rural Migration:

Rural migration is still largely a survival or a subsistence strategy. Survival strategy indicates that the prevalent economic and social conditions force the rural peoples to migrate for a longer time in order to stay alive. The second reason for migration is a short term measure and it is mainly due to need to supplement income in order to fill the gaps of seasonal employment.

Providing Urban Facilities in Rural Areas (PURA):

The concept of PURA was the brainchild of our former president Sh. A. P. J Abdul Kalam. The objectives of PURA are proposed to be achieved under the framework of Public Private Partnerships involving Gram Panchayat. The state government actively supports the activities under PURA Amenities to be provided for rural infrastructure includes drinking water facilities, sanitation, sewerage, village streets, drainage, solid waste management, skill development etc.

Providing suitable wage employment opportunities:

Rural population, if provided with suitable livelihood opportunities will not go for migration. This has been authenticated by various research studies involving Mahatma Gandhi National Rural Employment Guarantee Act which provides for 100 men days of work to each family on the rural areas. A study done by P. Anandharaja Kumar in Dindigul district of Tamilnadu revealed that after the implementation of MGNREGA migration stopped in 5 Panchayats.

Making agriculture remunerative:

Agriculture as a major mainstream livelihood activity is now being perceived as a failure due to the rising costs of cultivation and a declining returns thus making it non remunerative. As such it is necessary that agriculture be made more profitable by suitable interventions. A report of the World Population Council says that productive population of India, i.e., people belonging to the age group 15-60, will stop increasing in the coming years and it will stabilize at 64 percent of the total population from 2025 to 2050. It will then decrease thereafter to 62 percent of the total population in 2050 (Jain, 2008). If the present rate of migration from the country increases, we may face shortage of skilled labour in India due to that brain drain for the home country and brain gain for the receiving country. As the pattern of emigration shows that mostly migrants are those who are scientists, IT engineers, doctors, academicians and others who are already in short supply, it may lead to decline in productivity besides affecting our education system seriously. The process of migration needs to be dealt with multi level planning and not individual efforts. Migration should not be seen as a merely survival strategy or an escape route, but a social process that contributes to the well being of the society, that promotes cultural diversity, specialization and division of labour and spirit of unity among diversity.

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TO FIND THE EFFICACY OF PRADHAN MANTRI JAN DHAN YOJNA PROGRAM AMONG WOMEN LIVING IN URBAN SLUMS OF DELHI

CHETNA BAKHSHI & SHRADHA RUNGTA*

Introduction

Strong and vigorous financial institutions are the pillars of growth, progress and success of modern economies. Lack of accessible, affordable and appropriate financial services has always been a global problem. Therefore, the significance of an inclusive financial system is widely accepted not only in India, but also has become a policy priority in many countries. Financial access can really boost the financial conditions and living standards of lower segmented societies.

Financial inclusion means providing services at a affordable cost to the disadvantaged section of the society. It could also be defined as the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost.

Financial inclusion has been broadly recognized as a critical phenomenon in reducing poverty and achieving inclusive economic growth. It is not an end in itself, but a means to an end—there is growing evidence that it has substantial benefits for individuals. Studies show that when people participate in the financial system, they are better able to start and expand businesses, invest in education, manage risk, and absorb financial shocks.[102]

Access to accounts and to savings and payment mechanisms increases savings, empowers women, and boosts productive investment and consumption. Access to credit also has positive effects on consumption, employment status, income, and mental health and outlooK.[103]

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[102] See, for example, Aportela (1999); Ashraf, Karlan, and Yin (2010); Beck, Demirguc-Kunt, and Martinez Peria (2007); Bruhn and Love (2014); Burgess and Pande (2005); Dupas and Robinson (2013a, 2013b); Prina (2012); and Ruiz (2013). See also World Bank (2014a) and Cull, Ehrbeck, and Holle (2014) for an overview of the literature on financial inclusion.
[103] Karlan and Zinman 2010.
3 RBI Data 2015

Financial inclusion, at its most basic level, starts with having a bank account. But it doesn't stop there rather it is only with the regular use that people get complete benefits of having a bank account. Both these outcomes can be difficult to achieve. Though it is focused on use, but lack of use does not always mean lack of access. Many people lack access to financial services in the sense that these services have prohibitive costs or that there are barriers to their use, such as regulations requiring onerous paperwork, travel distance, legal hurdles, or other market failures. Others may choose not to use financial services despite having access at affordable prices. Nevertheless, there is growing recognition that most of the barriers that limit access to services can be overcome by better policies.

India saw a growth in individual's savings bank accounts from 329 million accounts in 2006 to 1070 million accounts in 2015. Number of savings bank accounts of women showed an increase as well from about 143 bank accounts per thousand of female population in 2006 to 536 bank accounts per thousand of female population in 2015. All India's individual savings bank deposits' amount outstanding rise from 5170 billion in 2006 to 19088 billion in 2015, with 962 billion in year 2006 to 3061 in 2015 for rural areas and 1246 billion in 2006 to 4541 in year 2015 for urban areas. The total of Indian female population saw a slight positive change in amount outstanding per female's saving banks between 2006 and 2015: from 14 thousand in 2006 that increased to 17 thousand in 2010 which decreased to 15 thousand in 2015, whereas the rural Indian female population's amount outstanding remain same in all the years. But the number of dormant bank accounts still remains high.3

1.2 Financial inclusion background

It is a known fact that in India, while one segment of population is deluged with assortments of banking services encompassing regular banking facilities and portfolio counselling, the other segment is totally deprived of even basic financial services.

The efforts to include the financially excluded segments of the society into formal financial system in India are not new. The concept was first mooted by the Reserve Bank of India in 2005. In addition, Branchless Banking through Banking Agents called Bank Mitr (Business Correspondent) was started in the year 2006. In the year 2011, the Government of India gave a serious push to the program by undertaking the "Swabhimaan campaign" to cover over 74,000 villages, with population of more than 2,000 (as per 2001 census), with banking facilities.

However, one of the learnings of the campaign was that efforts need to be converged so as to cover various aspects to ensure comprehensive Financial Inclusion. The campaign had focused only on supply side by providing banking outlets, the entire geography could not be covered. The deposit accounts opened had very limited number of transactions and the task of credit counselling and financial literacy did not go hand in hand. Hence, the desired benefits were not visible. [9]

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[9] PMJDY Brochure

India saw strong growth in account ownership between 2011 and 2014— in India from 35 percent to 53 percent. Translated into absolute numbers, this growth means that 175 million in India became account holders. However, with a dormancy rate of 43 percent, India accounts for about 195 million of the 460 million adults with a dormant account around the world.[10]

1.3 Pradhan Mantri Jan Dhan Yojana

In August 2014, the Indian government launched the Pradhan Mantri Jan Dhan Yojana scheme for comprehensive financial inclusion with the goal of opening bank accounts for every household. Inclusive Growth – "Sab Ka Sath Sab Ka Vikas" is central to the development philosophy. The main objective of this scheme is to ensure access to various financial services like availability of basic savings bank

9PMJDY Brochure

10 World Bank – The Global Findex Database -2014

account, access to need based credit, remittances facility, insurance and pension to the excluded sections i.e. weaker sections & low income groups. Under this program, people will be able to open zero-balance accounts in both, either public or private banks. The scheme offers a couple of freebies too but they depend on satisfactory transaction in the bank account. Accident insurance of up to Rs.1 lakh comes free with each account and life cover of Rs. 30,000. Once operative for at least six months, holders may also be offered an overdraft facility, first for Rs.2,500 and then for Rs.5, 000. Each account holder will get a RuPay debit card and will be able to access a basic form of mobile banking. The Government believes that this scheme will be able to financially include the people from the bottom of the pyramid 11

1.4 Choice of sample and design of survey
1.4.1 Aim of the survey

Our objective is to study the relevance of PMJDY to the poor women in urban slums in Delhi and the specific questions that we were looking answers for are as follows:

1. Whether just opening a bank account will lead to financial inclusion, especially for the poor women in urban slums, and impact their saving behavior;

2. Whether easy access to the banking system can get them freedom from moneylenders and loan sharks and therefore, materially lift economic prosperity for this particular section of the society;

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[10] World Bank – The Global Findex Database -2014
account, access to need based credit, remittances facility, insurance and pension to the excluded sections i.e. weaker sections & low income groups. Under this program, people will be able to open zero-balance accounts in both, either public or private banks. The scheme offers a couple of freebies too but they depend on satisfactory transaction in the bank account. Accident insurance of up to Rs.1 lakh comes free with each account and life cover of Rs. 30,000. Once operative for at least six months, holders may also be offered an overdraft facility, first for Rs.2,500 and then for Rs.5, 000. Each account holder will get a RuPay debit card and will be able to access a basic form of mobile banking. The Government believes that this scheme will be able to financially include the people from the bottom of the pyramid 11

3.   Also this scheme is hugely dependent on successful deployment in the field. So, what are the potential issues that could be faced in the urban slums for this prestigious scheme to be successful, especially for the women?

1.4.2 Methodology

This was a 5 phased research:

Phase 1: Reviewed the existing literature around the PM Jan Dhan Yojna and the financial needs of the poor women from urban slums.

Phase 2: Created a questionnaire for the primary research and tested the questionnaire on a small sample of 25 respondents selected from North Delhi region. Made changes in the questionnaire to make it more suitable to get the answers we wanted.

Phase 3: Conducted Interviews of 90 poor women in and around urban slums in Delhi.

Phase 4: Collected and analyzed results from the questionnaire.

Phase 5: Presented the results to the research committee.

1.4.3 Limitation of the survey

The scope of the research was to make use of the primary data collected and draw inferences from income, expenditure, saving behavior, investment and sources of credit etc. which have been obtained from the first hand responses of women living in Slums.

Being a qualitative research, it was necessary that every aspect of the question raised was to be analyzed properly. The major limitation was that the respondents being slightly conscious and resisted while disclosing their incomes and expenditures. There was a misconception as they thought that disclosing the figures might create a problem for them in terms of status or reputation among the milieu and some also thought that we were government officials from income tax department and hence were not ready to even talk to us.

1.4.5 Selection of Sample

Stratified random sampling was used which is a method of sampling that involves the division of the population into smaller groups known as strata. The strata are formed based on members' shared attributes or characteristics. This was done so as to differentiate between areas where at least some women had opened a bank account under PMJDY and those who hadn't.

1.4.6 Field Survey

The pilot survey was conducted on 25 samples from the North Delhi region. The main survey, which comprised of a sample of 90 respondents, was conducted in JJ colony (both in North and South Delhi region), Bharat Nagar, Okhla, Ali Gaon, Malkaganj, slums near Preet Vihar, slums near Rajouri Garden,Wazirpur and slums near Sarita Vihar after some modifications in the questionnaire to be able to get the required answers.

2. Findings of the survey

2.1 SOCIAL PROFILE OF THE WOMEN INTERVIEWED

The age distribution of the 90 women interviewed, who were living in the slums of Delhi is spread widely with the youngest being 15 years of age while the oldest being 65 years of age. Majority of the respondents were in the age bracket of 30 – 50 years of age, were married and were living with their husband's family.

In every household, at least two people were working with one being the respondent herself and a male member of the family, either her husband or her son. The number of family members also varied from three being minimum to eight being maximum. But majority of the families had five members which included the husband and wife, their two children and one elder member who was completely dependent on them.

Family Incomes of the respondent's families also showed a wide variation with the least being under Rs.5000 a month to the highest being well above Rs.20000 a month. 33% of the families had a family income between Rs.10000 to Rs.15000 a month and 31% had income between Rs.5000 to Rs.10000
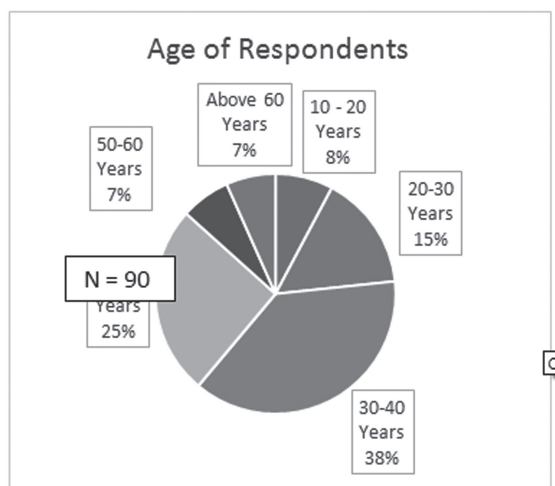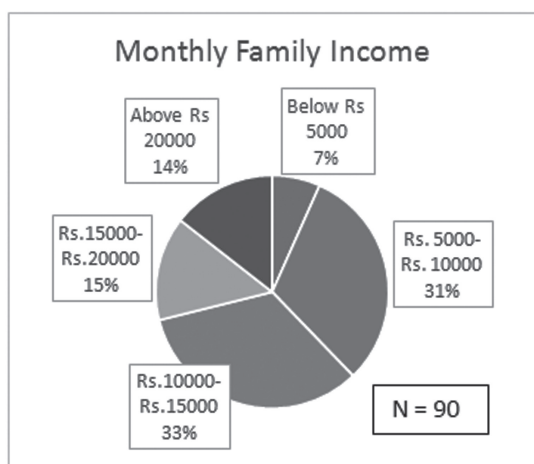
Majority of the respondents (49%) were not educated, i.e. never had any formal education in their lives and couldn't read and write at all in any language and majority of them could not even sign their names and instead used thumbprints in place of signatures. They could not fill forms and applications on their own and hence, required help for the same.

2.2 The Broad Picture

Out of the 90 women interviewed who were living in the urban slums in Delhi, 33% of them had not opened a bank account under PMJDY citing various reasons like not having the knowledge of the benefits of a bank, not having sufficient ID proof, Lack of awareness, guidance and support
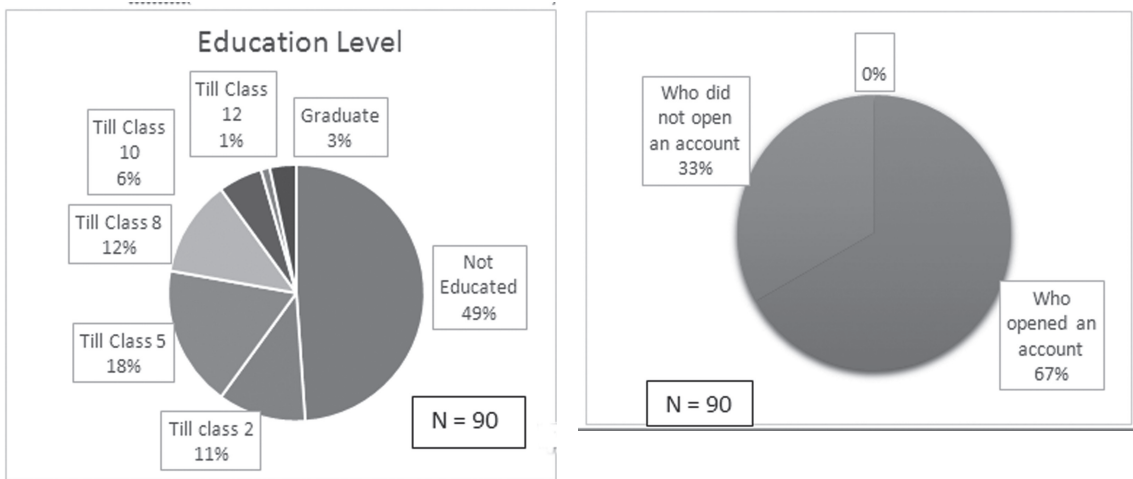
to help open a bank account, embarrassment, etc. A number of them also complained of not coming in touch with any Bank Mitr which could have reduced the above statistic a bit as they could have helped people in filling forms and also explaining the about the benefits of a bank account and the PMJDY scheme. These will be looked upon in detail in the coming section. All the respondents were either only using a bank account under PMJDY or not using one at all.

Only 67% of the respondents had opened a bank account under the scheme. However, the frequency of usage of the same varied greatly even amongst them, with some saving at least once in two months to some never saving in their bank account at all. Surprisingly only 38% of the respondents saved money in their bank accounts at all. Whereas 62% of them either had never deposited any amount in their account or even if they did deposit some amount upon opening of the bank account, shortly went back to withdraw that sum as well and then never returned to deposit any money or they had not even opened an account under PMJDY.

This mere fact that the bank accounts were not really being used to save and transact money defeats the purpose of having a bank account at all which were made to include the excluded people into the formal banking sector of the country.

What was even more surprising was the fact that only 1% of the respondents took loans from the bank, 39% took loans from relatives and friends , as they were not required to pay back any interest on the sum borrowed if the borrower had borrowed money for less than two months. Second popular option was moneylenders (16%) but only those people approached them who had something to put on mortgage or thought that they didn't have any other option apart from approaching the moneylenders in time of need. 14% of the respondents took salaries in advance from their employers as they didn't have to pay any interest on it. The borrowers promised to work to repay the employers and if the employers trusted them they gave the salaries in advance. It was based on trust. 10% took loans from shops. They went and got all goods they required from the shops and asked the shopkeeper to keep a record of it and promised to pay him back as soon as they get money which was usually the starting of each month.

With an account under PMJDY, a number of add-on services can be availed like the overdraft facility, life insurance and accident insurance. To be eligible for accident and life insurance, a transaction is required to take place at least once in every two months. Majority of the respondents either were not aware of this fact. They thought that just opening a bank account under PMJDY was enough to be eligible the add-on services but that was not the case.
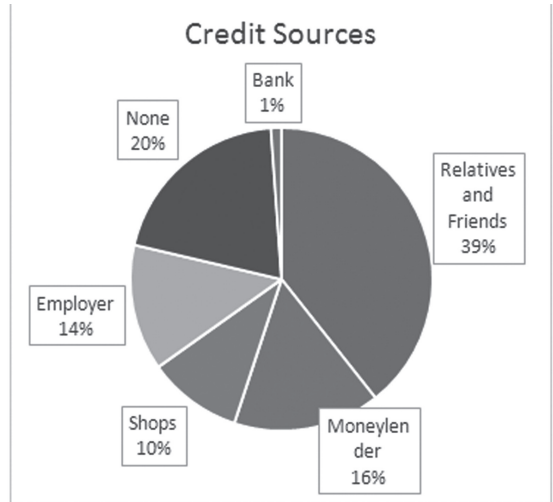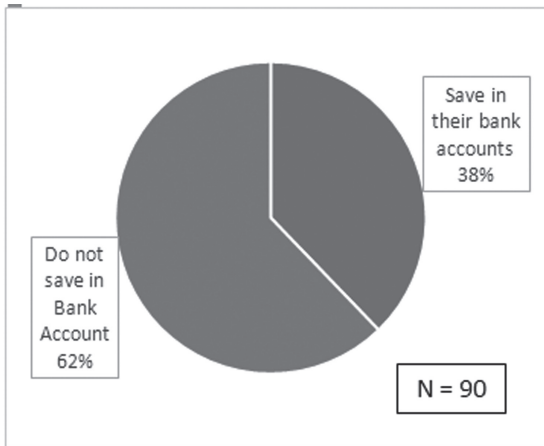
Hence, most of the respondents who had opened a bank account under PMJDY did not transact as frequently aswas required and they weren't eligible. Only 22% of respondents were eligible for added them.
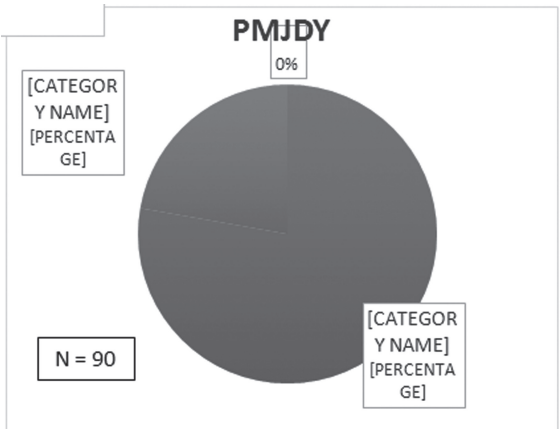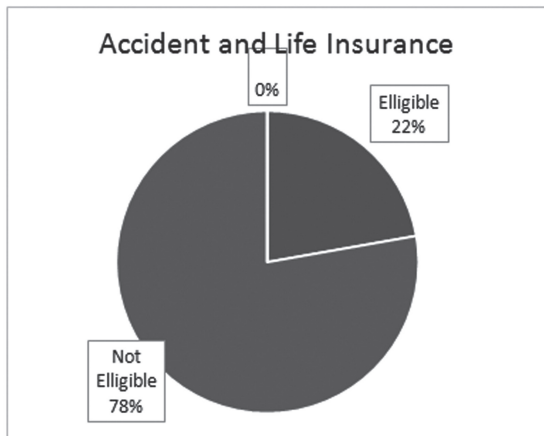
So over all, 78% of the respondents were not being benefitted by PMJDY. This includes those who had not even opened an account under PMJDY or if they had, they weren't using it or those who were using the account but still were not eligible for add-on services.

Only 22% of the respondents were benefited by the scheme overall. That is, only 22% of the respondents were saving in their bank account and transacting and were also eligible for the Life insurance, accident insurance and the overdraft facility that are provided with the bank account under PMJDY.

4. Detailed Analysis

3.1 Those women who did not open a Bank Account under PMJDY

Even though PMJDY scheme addresses most of the problems related to financial services that are faced by the women from the financially weaker section of the society, still 33% of the respondents had not opened a bank account under the scheme due to various reasons. Majority of the women had more than one reason for the same which are broadly stated as follows.

1. Not aware of the benefits of a bank

It was observed that 50% of the respondents who did not open an account under PMJDY, did not know how the banks could be beneficial for them. They were not even aware of the interest paid by the banks when money is kept in the savings account. They were very new and also apprehensive of the idea of keeping their money saved anywhere else as they were used to saving it at the convenience of their homes only and using it when needed.

2. Lack of awareness, guidance and support for PMJDY

57% of the respondents did not open a bank account due to the lack of awareness, guidance and support to open a bank account under PMJDY. These women heard about the scheme and wanted to open the account under the same but they did not know how to go about it. Their family also did not provide them the support they needed when they expressed their wish to open an account and in fact in 10% of the cases where women did not open a account, they were asked to use their husband's account to deposit their earnings too instead of opening an account under their own name.

3. Lack of ID proof

40% of the respondents did not open a bank account under PMJDY scheme as they did not have sufficient ID proof. These women, even on repeated tries, were not able to get any ID proofs under their name whether they were ration cards or aadhar cards. These ladies had migrated from other states in search of work, to make a living and were residing in kaccha houses made up of cloth or plastic sheets. They reported that the authorities they went to for getting the ID proofs kept on refusing every time and just asked them to leave.

4. Due to embarrassment

60% of the respondents who had not opened an account, had had no formal education, they had never been to a school. These women were hesitant to go to the banks and found the bank officials intimidating. As they could not read and write, these women faced problems when it came to filling their details in the forms which were required to be filled to open the accounts

under the scheme and since they could not do it themselves, they were embarrassed to go to the bank.

5. Never came in touch with a Bank Mitr

65% of the respondents who didn't open an account under PMJDY, never came in touch with a bank mitr. Bank Mitrs play a major role in helping women open their accounts as not only do they help them in filling up the forms but also tell them the benefits of a bank and the scheme and do this in the comfort of their homes and they do not need to go to a brick and mortar bank branch to open the accounts. Hence, bank mitrs help in making the process of opening a bank account much easier than before. They also help to a great extent when the women are not educated.

3.2 Women who opened a Bank Account under PMJDY scheme

67% of the women surveyed had open a bank account under the scheme. But when asked about their saving behavior 44% of 67% reported to have never used it after depositing the initial amount which was deposited when the said bank account was opened. All women stated that they were asked to deposit Rs. 500 after filling the form to open a bank account and once the account was active, they could deposit and withdraw money from it as they needed. It was surprising
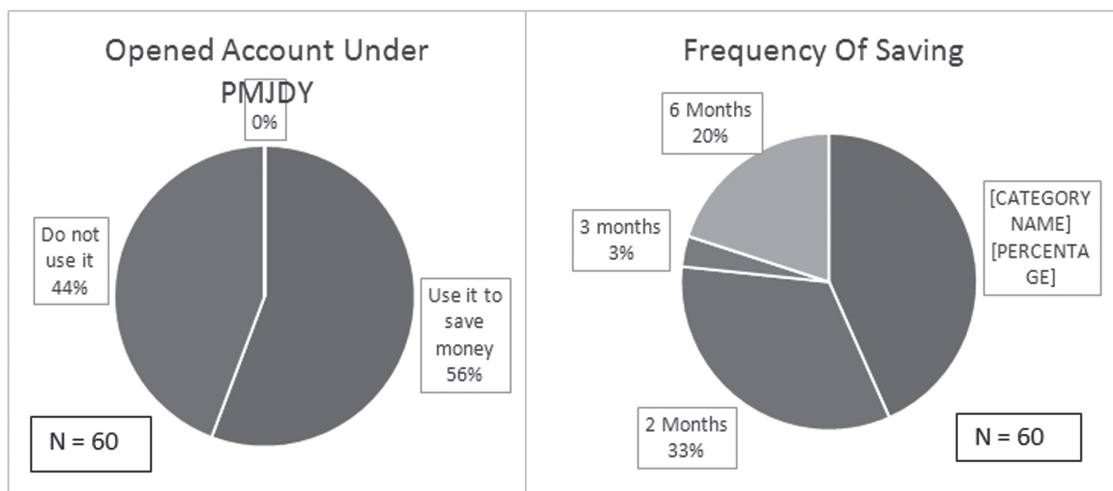
to find that only 56% of the women who opened an account actually went to the bank to deposit money again. Whereas 44% never went to the bank again to deposit any money, their only trip to the bank location was to withdraw the initial sum that they had deposited while opening the account.

Among the women who used their accounts to save money, the frequency at which they transacted varied from at least once in 2 months to at least once in 6 months.
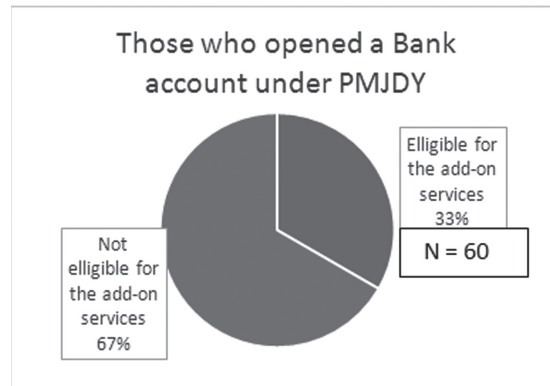
Though majority of the women who were saving in their bank accounts, deposited some amount at least once in 2 months. 22% of them only went once in 6 Months to deposit or withdraw money and there was small group of women who deposited once in 3 months.

Of all the respondents who opened a bank account under PMJDY, only 33% of them were eligible for the other benefits which were provided with the scheme. We observed the factors that lead to differences in the women's saving behavior. They'll be looked upon in detail in the next section in detail.

3.2.1 Women who did not save even after opening a bank account

Technical Jargon is difficult to be understood by the women who have had low or no formal education at all. As can be seen by the pie chart, 50% of the women who did not save in their accounts had no formal education at all whereas 15% had studied up till Class 2, 19% up till Class 5, 8% had studied till Class 8 and only 4% had studied till Class 10 and Class 12.
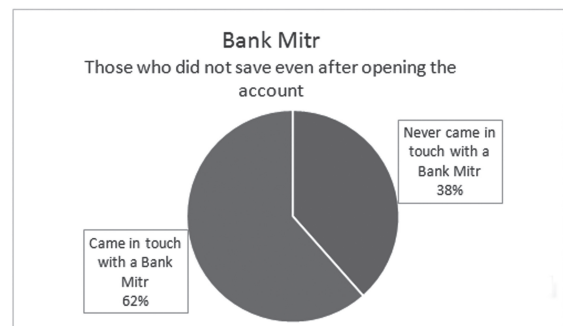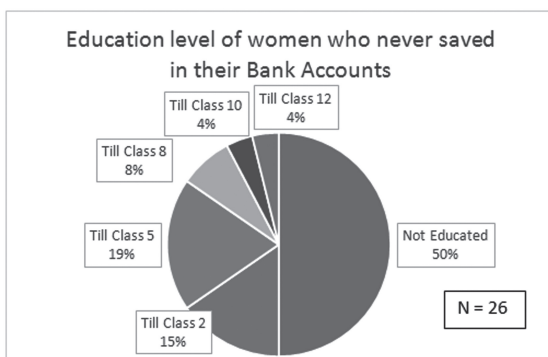
Hence the term 'Zero Balance Account' is open to interpretation to these women and in the simplest terms these women understood that the meaning of this term is that the balance of the account should always be ZERO. It was surprising to find that 81% of the respondents out of the 44% who never saved in the account believed that the balance has to be kept zero at all times. What was even more surprising was that these women thought that when the balance in the

account was zero, the government will put in money in it for them and hence they even tried at times to keep the balance zero.

Another thing which was observed was that out of all the women who did not save even after opening an account under the scheme, 62% of the women did come in touch with the Bank Mitr. Most of them didn't know about the services that can be availed with their accounts under PMJDY.

It shows that the Bank Mitrs, though are doing decent at helping women open their accounts under the scheme but they are not providing them with the necessary information about the financial services which are provided and can be availed satisfactorily or are not covering all the areas.

As 73% of the respondents who did not save even after opening the Bank accounts did not have any knowledge about what loan is whereas 72% of them had no knowledge of what insurance is and the fact that it is available with their Bank accounts under PMJDY scheme without the requirement to pay any premium.
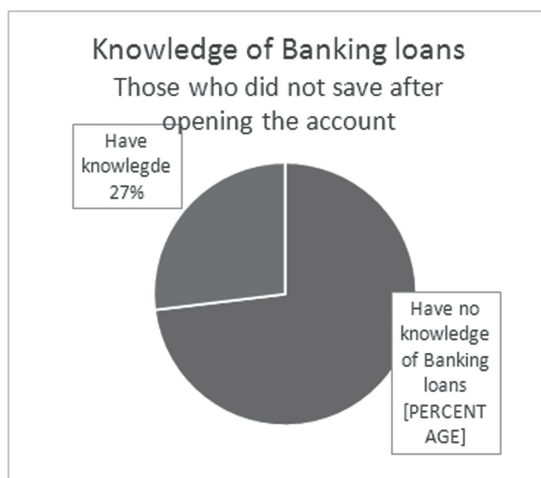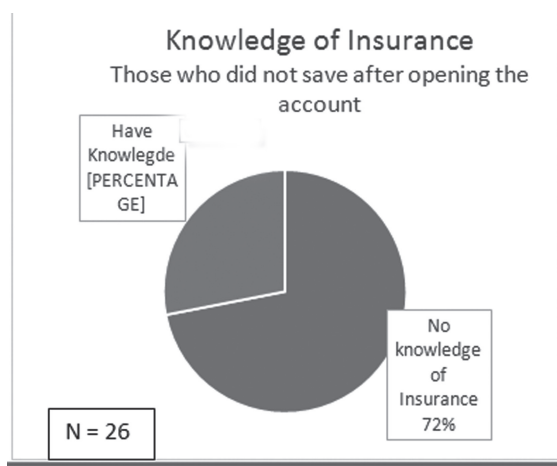
The lapse is evident when the above charts are observed closely. But the fact that they did not save in their bank accounts does not mean they did not save at all. These women saved at their homes itself as they were in the habit of doing that and did not trust and understand the idea of a bank. They thought that their money will be accessible to them whenever they need it if they kept it at home. Some even mentioned that depositing money in the banks makes it inaccessible at times like at night as the banks are not open at that time. 23% of the women out of those who did not save at all had problems because the banks were situated at long distances from their houses.

As the savings of most people in this category were not usually enough to meet any unexpected expenditures, hence they were the ones who required credit from various sources.
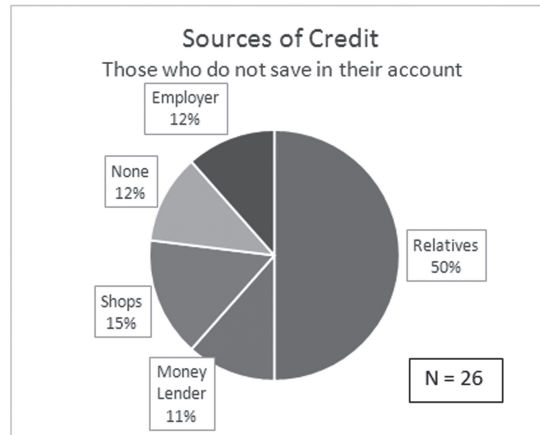
50% of the respondents in this category were taking banking loans from their relatives as they required no interest payment when repaying the amount. Same was the case with women taking advances from their employers, which was reported by 12% of the respondents in this category. Whereas 11% took from moneylenders at a high interest rate and 15% took from shops and when asked why they did, they told that they do not know of any other accessible source. Whereas 12% did not take banking loans in any forms as they had enough savings to meet any unexpected expenditure.

Itwas surprising to find that 86% of the women who saved once in at least 6 months
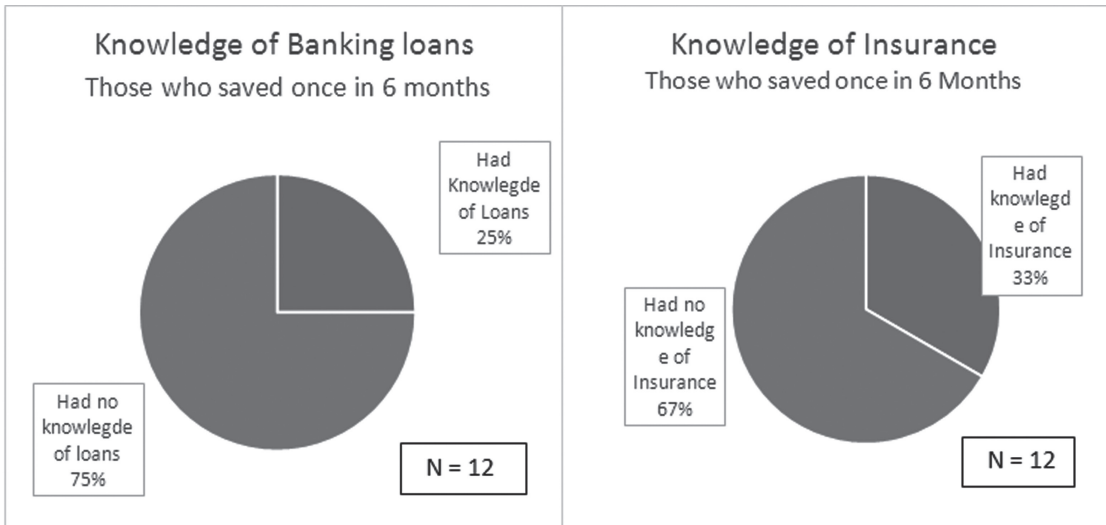
had no knowledge of banking loans and 84% of these respondents had no knowledge of Insurance and they didn't even know that it was provided with their accounts under PMJDY. Hence they weren't even aware about the eligibility criteria to be able to avail the financial services which they could have been benefitted by otherwise. It might have been the reason for them not

transacting more frequently. As if they are saving, it shows they do want to save and if they knew about the other services provided with their accounts and the fact that they could avail them without paying any premium for the Life and Accident Insurance and just increase the frequency, they would have done the needed changes in their saving behavior, maybe by saving a lesser amount more frequently than saving a comparatively larger amount less frequently. 67% of these women said that saving in a bank account was better than saving at home or anywhere else as it was more reliable and safe.

Also it was found that among who were saving just once in 6 months, 67% of them had never come in contact with a bank mitr. Coming in touch with a bank mitr can help women as the Bank Mitr's can provide them with the necessary information about their accounts under the scheme.

But it can be concluded again that all households were not covered and out of those which were covered, they still did not know about the added benefits. Hence it was a problem of reach of the bank mitrs and also of information not being provided to the women satisfactorily.

Most of these women could not have gotten to know about the other benefits being provided with the account as a significant percentage of them were not educated and hence could not read. To gain full information it was necessary to read the full brochure to get to know about the facilities and since in this case it wasn't possible bank mitrs were really needed to read out and explain to them about the benefits of opening a bank account under PMJDY scheme.
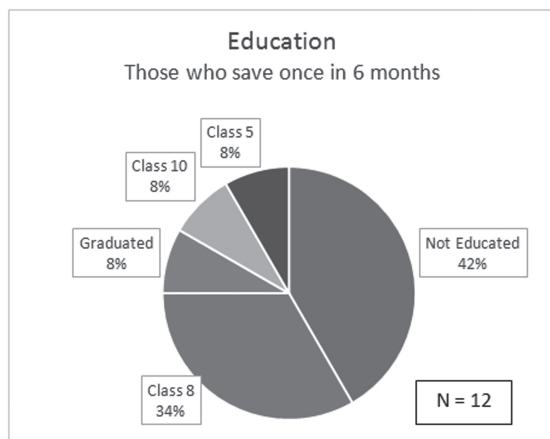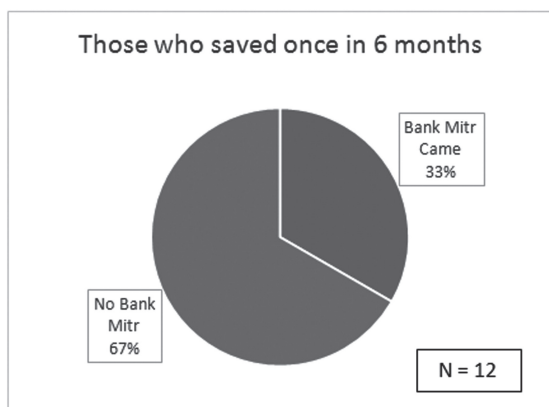
42% of the respondents who saved once in 6 months in their bank account had not had any formal education and had never been to a school. 34% of these respondents had studied up till Class 8, 8% till Class 10 and 8% up till Class 5 and only 8% were graduates. Looking at the credit taking behavior of these women we find that 42% of them did not take credit from anywhere. This shows that even though the frequency of saving is not as required by the bank to be eligible for the Life and Accident Insurance provided with their accounts still they save enough to be able to cover the unexpected expenditures that might crop up and hence they do not require banking loans as frequently as compared to those who do not save in their bank accounts.

Sources of Credit

Those who save once in 6 Months

Bank 8%

Employer 9%

Friend 8%
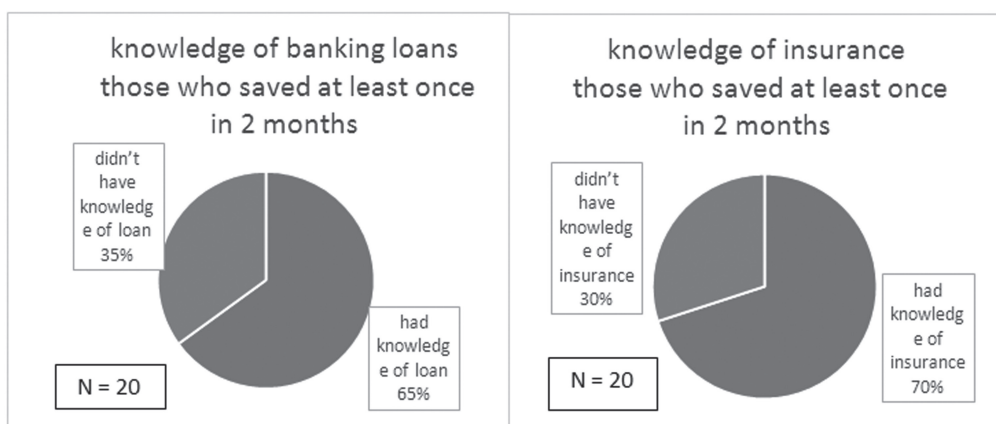
Moneylenders 8%

None 42%

Relatives 25%

N = 12
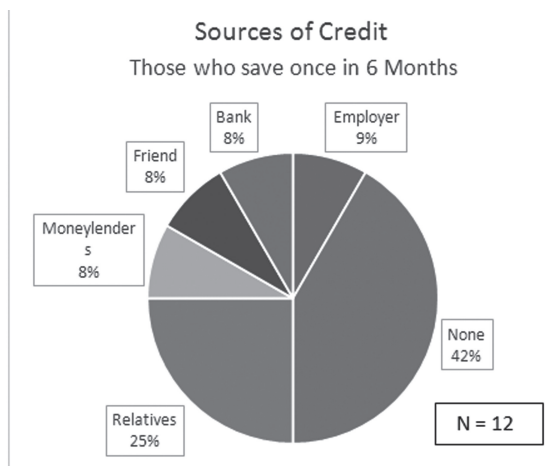
8% of these women take advance payments from their employers as they do not require to pay an interest on the principle and is paid off by manual work. Also 25% take banking loans from their relatives and 8% from friends, again due to no interest payments are needed during the repayment of the principle. Respondents were largely dependent only on the informal sources for credit needs.

3.2.3 Women who saved at least once in two months in their bank account

65% of the respondents out of those who save at least once in 2 months have knowledge about the banking loans and the credit facilities and about 70% of the respondents have knowledge about the accident cover and life insurance that could be availed with their bank account under this scheme. These are the women who are well aware of the benefits of these scheme as compared to the women in the rest of the categories.

These women not only save their money in their accounts but also look forward towards the other facilities they could be of their help in future. Here maximum percentage of women actually had the knowledge about the benefits provided with their accounts and about the eligibility criteria which helped them change their saving behaviour accordingly.

knowledge of banking loans those who saved at least once in 2 months

didn't have knowledge of loan 35%

had knowledge of loan 65%

N = 20

knowledge of insurance those who saved at least once in 2 months

didn't have knowledge of insurance 30%

had knowledge of insurance 70%

N = 20

Also it is important to note that in this category, the women who save at least once in 2 months, 63% of the respondents came in touch with a bank mitr. These business correspondents were of great help in opening up of their accounts and providing them the necessary information about the services that they could avail.

But this was not the only reason as to why these women had better knowledge of the services provided with the bank account. It was seen that a major chunk of women were educated with some even being graduates. So it could also be due to the fact that they were more aware as they could read the about these benefits too that in detail.
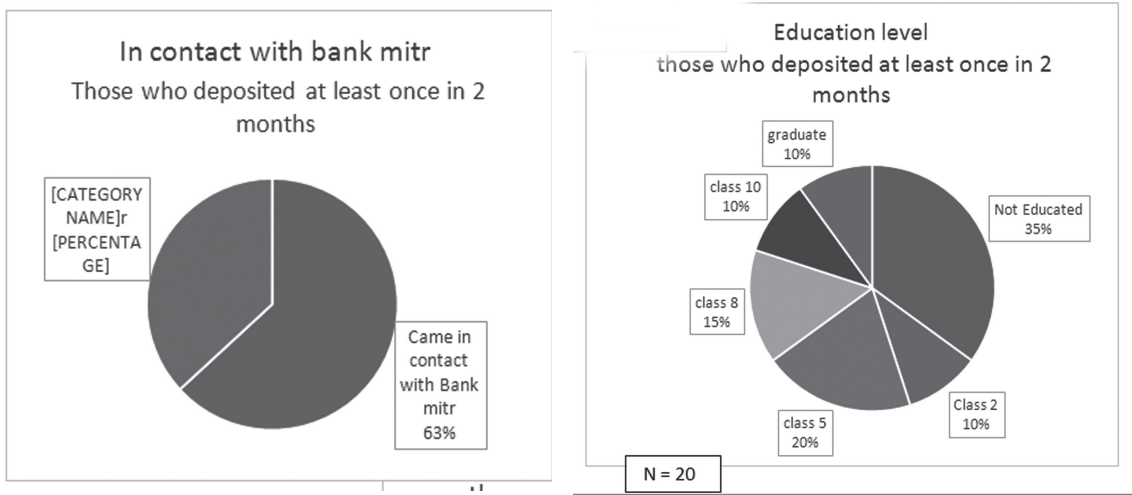
Out of the 59% of the women who deposited at least once in 2 months, 10% of them were graduates whereas 10% had completed class 10 who could very well read and write. 15% of the respondents had completed class 8, 20% had studied up till class 5, whereas 10% had studied up till class 2.
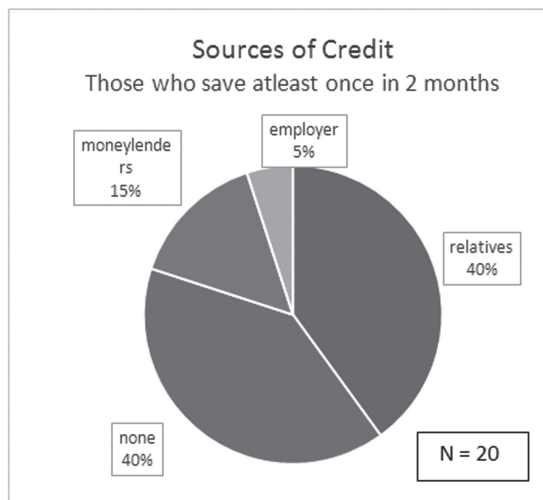
Still there were 35% of the women who had not had any formal education, but coming in touch with the bank mitr helped them in opening the accounts and were also informed about the facilities. This proportion of women not having any education is much less as compared to the other categories.

Looking at the credit taking behaviour of these women, it can be seen that 39% of the respondents who save in the account at least once in 2 months take loan from the relatives whereas 6% of them take advances from their employer who charge no interest rate on these advance payments and have to be paid only by manual labour. 15% of the women took loan from the moneylenders, despite the fact that they charge a very high interest rate of about 4-5% per month as they were very new to the idea of taking banking loans from banks and feared what would happen if they are not able to repay.

40% of the women who save account at least once in 2 months have never approached anyone for the advances. They are capable enough to use their savings in the adverse unforeseen conditions in till date. They also thought that keeping money in their bank accounts is a safe and reliable mode of saving money. They felt that when they keep money at home they end up using it even when the expenditure is not really necessary and felt the need to save money from themselves. Also because of the long distance of the bank branch from their homes, they are lazy to travel to the bank for withdrawing money for small purposes and end up saving not only that amount but also the cost on the transportation they would incur otherwise.

Observations

The respondents' saving behavior was affected by a few factors, which are given below.
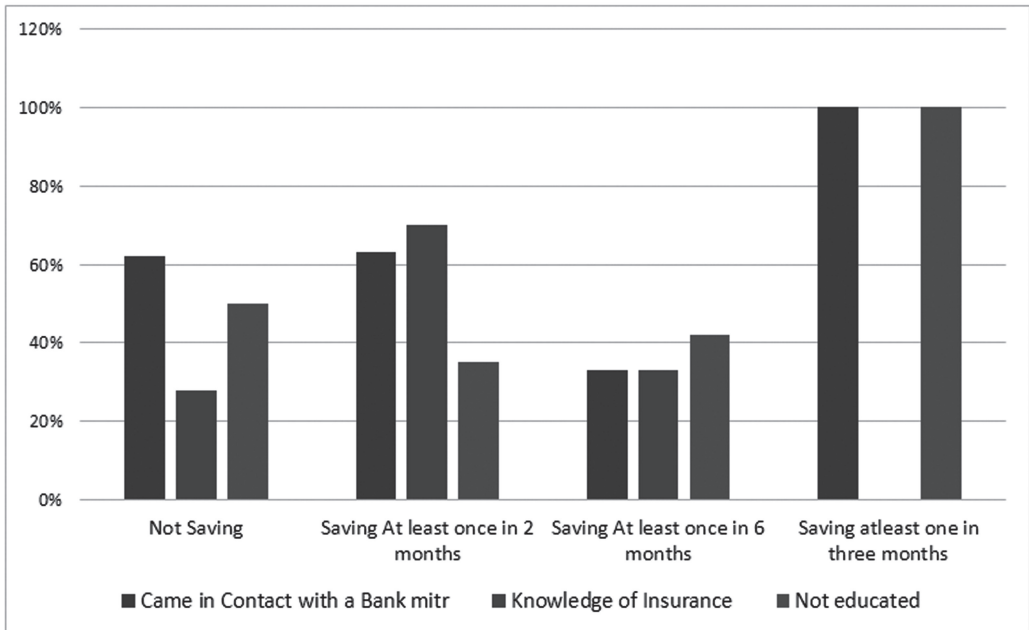
Of the 60 respondents who opened a bank account under PMJDY, their saving behavior varied as can be seen above. The above chart shows the percentage of respondents from their respective categories. Hence, the size of respondents in each category is different. The biggest size is of the category where women did not save even after opening a bank account under PMJDY, which is 26, followed by women who save at least once in 2 months with a size of 20, women who save at least once in 6 months which has a size of 12 and the least size being of the category where women save once in 3 months which is just 2.

Another observation was that even in the households the bank mitrs went to, the knowledge of insurance wasn't imparted satisfactorily. As can be seen in the category where respondents didn't save at all, 62% of them came in contact with a bank mitr yet only 28% of them had the knowledge about the insurance facility available. Same was the case with those who saved at least once in 3 months. Even amongst those who saved at least once in 6 months, 33% came in touch with a bank mitr and not all of them knew about the added benefits that can be availed.

Only in the category where respondents saved once in 2 months did the percentage of women having knowledge of the insurance was higher than the percentage of those women who came in touch with bank mitrs. This was due to the fact that almost 20% of them had studied till class 10 or more and the percentage of uneducated women was the least as compared to other categories.

So we observed that two things – the education of the women and coming in contact with a bank mitr- could help these women know more about the benefits of having a bank account and the added benefits which can be availed under this scheme. All the respondents knew that saving was good for them and some of them were even saving in the bank account. But when the information about the added benefits could have been imparted to them satisfactorily, they could have changed their saving pattern a bit to be able to avail the added benefits, if they weren't already.

It was observed that there were two problems with the working of bank mitrs. Firstly, not all households were being covered by them. Secondly, of the households covered, the information that was important to be imparted wasn't done so in a satisfactory way and they were just getting bank accounts opened by helping the women to fill the forms. Yes, helping these women fill the forms is also very important but so is helping these women understand the scheme better so that they can be actually benefitted by it.

Also, for the women who had not gone and opened a bank account – due to embarrassment as they couldn't read or write, or due to no support or guidance from their families to help them open an account under PMJDY, or because they were not aware of the benefits of a bank- all these problems can be solved by a bank mitr.

5. Discussion

The PMJDY scheme addresses most of the needs of these women whether it is about a place to save money in a Zero balance account, access to accident and life insurance facilities or

the overdraft facility. Also the fact that it is a Zero balance account, helps these women as they don't have to stress about maintaining a minimum balance in the account or be scared that it will be forcibly shit down due to low or no balance. On top of it all, this account also pays them interest on their savings.

Usually these women only save at their home or when they have more money than needed to make the necessary expenditures, they informally lend to their neighbours, friends or relatives and seek no interest on the sum lent. Also there are times when their lent money is not returned back. But they do so to be able to have access to money when they are in need. They have to manage immediate expenses and also repay loans which were borrowed in the past.

It was also observed that there is a gap between intent and action. They have the intention to save but they are still not saving in the bank. Due to uncertain income, sometimes it is insufficient to meet their needs and they have to make the ends meet by compromising on them. Due to this, if there is surplus money, it does not go into saving but seen as an opportunity to meet the compromised need.

These women require a place, which is safe and reliable, where they can keep money in order to save the money from themselves as they know if they keep money at home, they will spend it on things they don't really require or expenditures which are not really necessary. According to them, any money which is easy to access, is easy to spend. They put money in committees or chit funds that uses commitment and social devices to save money. But high psychological distance due to unfamiliarity with the banking system contributes to non-engagement with the banks. Bank mitrs can address these issues with psychological distance and making them more viable and more effective.

These are the women who belong to families where the members are entrepreneurs or daily wage workers and hence the overdraft facility which comes with a bank account under PMJDY can really be helpful for them when there is need to start or sustain a business. But the problem starts when they need to avail the same. Many are not aware of the facility. Some who are aware of it are not aware of the eligibility criteria and even in cases where they are, they still prefer to go to other sources to get credit as they are afraid about what will these large banks do when if they ever default. Existing products that informal channels offer options which work well as it gives them the certainty and flexibility they are looking for as opposed to the banks.

Another problem which some of the respondents faced who actually applied for loan was of proof of running business. Women needed money to buy a shop for their ironing work and provided papers of their house as it was on their name. But they were refused by the bank as they didn't have papers of a shop which could show how they will repay the sum. Also an account can be opened with the help of any ID proof, even an electricity bill. But to avail the add-on facilities that come with the account the women need to have an aadhar card linked with their account.

When it came to life and accident insurance, majority of the women did not know that it was provided with the bank account and about its eligibility criteria.

The biggest obstacle that stands in the way of making this scheme a success is the fact that people of this strata are still not fully aware of the scheme and what are they required to do to benefit from it. There is a information – awareness gap. Once information is rightly spread then comes the next obstacle, which is psychological distance. They will have to learn to trust the bank with their money and not be intimidated by it.

6. What needs to be done?

First, to make people start using the account the psychological distance from the banks has to be reduced. There should be focus on the literacy of the process of opening and using the bank account. People should be told how a savings account in a bank can benefit them and the extra benefits that are provided with a bank account under PMJDY. Then they should be told what the eligibility criteria for the add-on facilities is and then about the process they can use in order to get maximum benefits from the account which could be something like save a given sum of money every month.

These people know they have to save but when they are asked to save a given amount, let's say Rs. 200 a month, they have a fixed way which they can understand and work towards.

Bank mitrs should be empowered by knowledge and training to function as extensions of the bank branches. They should be given enough incentive that motivates them to do their job satisfactorily apart from the monthly remuneration they get. Also it needs to be seen that their payments are on time so they don't lose interest and don't feel the need to do secondary jobs. They should be trained in methods to enhance the literacy of the process and also advice on schemes related to finance fields even outside PMJDY like the pension Yojana. They can also be given training on activities like collection of small loans, credit inspections, etc.

Smart Cities: A solution to Urbanization Fallacy?

Magulsha George*

Introduction

Urbanization across the globe has been viewed as a development favouring phenomena. Urbanization and economic advancement has been considered to have a cause-effect relationship though the direction of cause and effect is not well defined. Urban areas are localities of rigorous economic activities and more developed in terms of socio-economic infrastructure that encouraged movement from rural areas to urban areas or sub-urban areas. Urban areas or cities have become cosmopolitan in nature over the years and haven of better life. Urbanization is a continuous process.

India has also experienced the emergence and expansion of urban areas. With second largest population in the world it has 31.6% of its population living in urban areas. The major cause of migration has been the increased employment opportunities perceived by the people. The geographical expansion of urban centers is often correlated with the economic wellbeing of people. Over the years, the Indian economy has experienced the adverse effects of agglomeration in terms of poor living conditions and growth of slums as part of urban areas that brought about further discrimination based on economic wellbeing.

'Urbanization fallacy'[104] holds a causal relationship with GDP, whereby higher rates of urbanization is associated with economic advancement. Expansions of urban centers have the potential to pull up the real economic activities through forward and backward linkages. However, as far as India is concerned despite all the efforts the urbanization rate is lower than other developing economies, though the rate of rural-urban migration is considerably high.

With the increased pressure of migration to urban areas, the need of the hour is 'inclusive cities'. The NDA government recently have proposed and declared the development of 100 smart cities across the country. This policy has to be viewed with great optimism for a prospective future

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[104] The urbanization fallacy, Pettis, Michael, Carnegie endowment for international peace, 2013

of India. 'Smart cities' are proposed not merely to check the migration to metropolis but could be potential for job creation, diversification and specialization activity.

Objectives

The major objectives of the study are:

1.   To understand the trends and extend of urbanization in India

2.   To analyze the socio-economic development in the light of urbanization

3.   To look into proposed Smart cities as a solution to the urban fallacy

Methodology

This study is based on the census data from 1901 to 2011 and economic survey for certain variables. This paper make use of simple charts and diagrams as an attempt to bring about the rate of urbanization in India and its extend and contribution towards overall socio-economic development.

Findings

Urbanization in India:

An increase in the size and proportion of urban population indicates the extent of urbanization. The population census data shows an upward trend in urbanization though the proportion of urban population is less than that of rural population which has reached 377.1 million as per census 2011 while rural population and total population are 833.75 million and 1210.9 million respectively.
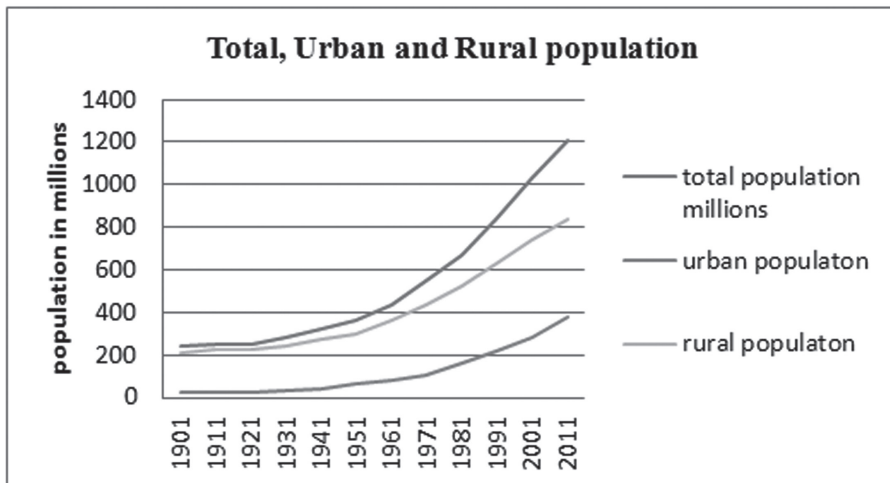
## Figure 1: Trends in total, rural and urban population

Major factor that determines the growth in urban population is that of migration. The rural-urban divide has encouraged the rural-urban migration. The rate of migration was more

gradual in the post independent era. However, the new economic policy and opening up of the economy to the global market has greater impact on the extent of migration. The 21st century has witnessed further increase in the rate of migration which was contributed to a great extent by the technological advancement and the resultant job opportunities in and around urban areas. The rate of migration has increased almost 3 times in the last decade.

	1961	1971	1981	1991	2001	2011
urban population	78.94	109.11	159.46	217.61	285.36	377.11
migrant population	35.37	42.83	60.51	69.44	102.31	307.15
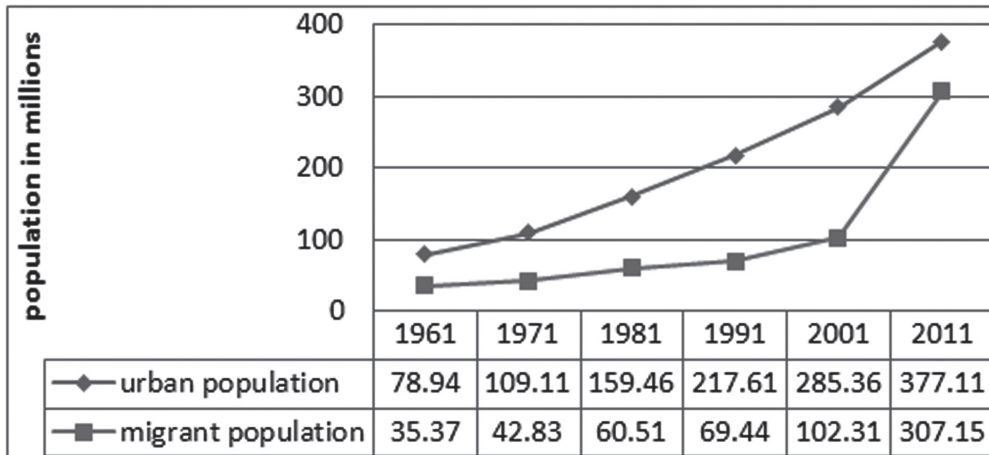
Figure 6: Proportion of migrant population in urban areas

The data indicates that an upward trend in population growth was not followed very much by the trends in sex ratio. There was a decline in sex ratio in the 1990s which improved in the past three decades. The fall in sex ratio for urban areas was much steeper compared to that of rural areas may be because of technological advancement in health sector which brought forth birth control and also sex determination. Overall sex ratio was 972 in 1901 which came down to 924 in 1981 and improved to reach 940 as per census of 2011. The sex ratio for urban and rural areas was 880 and 950 respectively in 1981 which increased to 926 and 947 respectively as per the census of 2011.
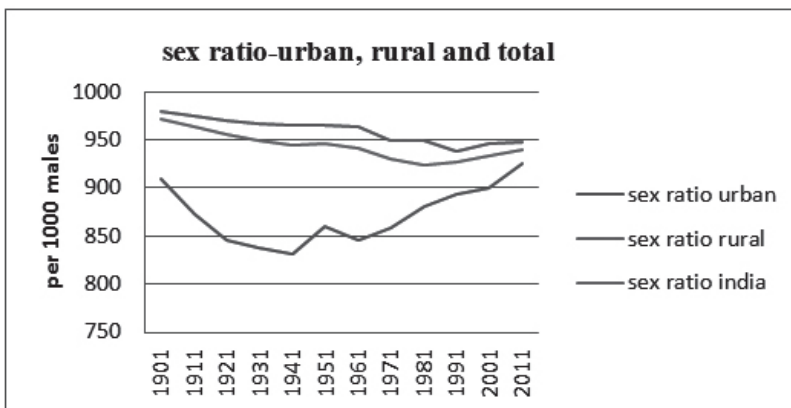
 Figure 2: Trends in sex ratio

Any measure of advanced is inclusive of the literacy rate. It is not merely a measure of human development rather indicates the potential of the economy as a whole. Education was in fact the key to transform a shattered economy at the time of independence to an emerging economy. The overall literacy rate increased from 18.33 % in 1951 to 74.04 % in 2011. There exist a wide disparity in the literacy rate in urban areas and rural areas. The literacy rate in urban areas was 34.59 % in 1951 and increased to 84.98% by 2011 while that of rural areas was 12.1 % in 1951 and 68.91% in 2011. This rural-urban disparity might be due to faster development of social infrastructure in urban areas compared to that of rural areas.
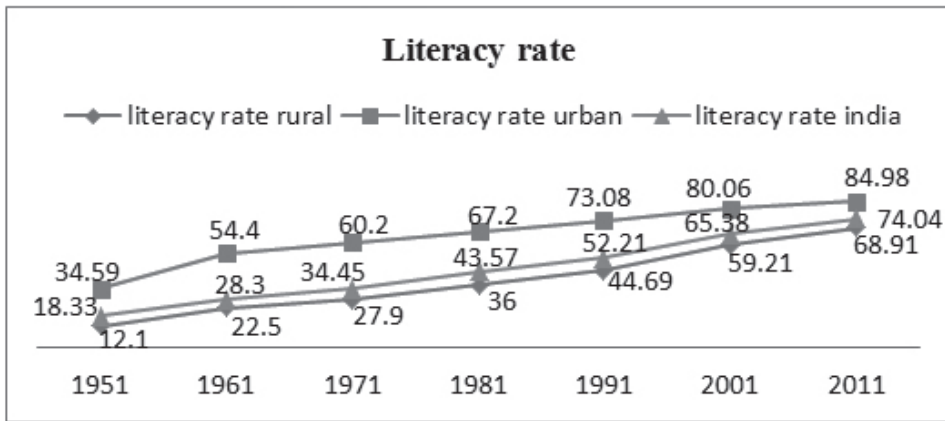
Figure 3: Trends in literacy rate of rural, urban and all-India

While the rate of urbanization is indicated by increase in size of urban centers and expansion in population the standard of living and access to basic facilities decides the real rate of development of urban areas. An increase in number of people does not always lead to better living conditions. In fact, more the population, more the expenditure to be incurred by the public authorities on the living conditions. The diagram below shows the extent of coverage of certain selected basic facilities over the years in urban areas. Despite the efforts and various initiatives adopted that made considerable improvement in the availability of basic amenities (figure 4), there prevails considerable poverty in urban areas (figure 5).
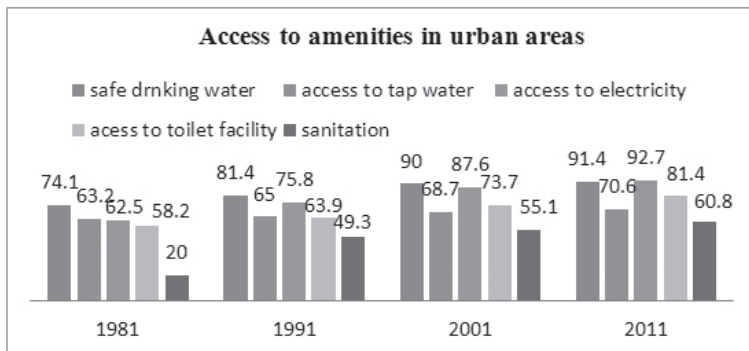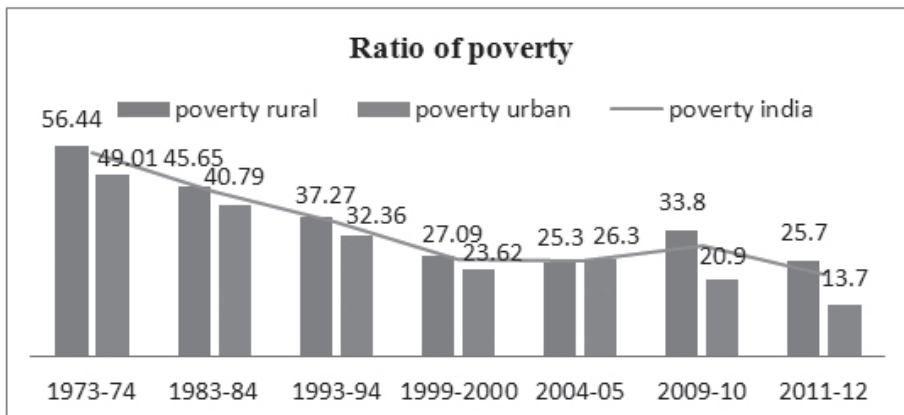

Figure 4: Improvement in basic amenities in urban areas

Figure 5: Poverty in urban areas

As the results of the study has revealed there has been increase in the urbanization and the efforts to create better facilities and opportunities have been fruitful to greater extend. However, whether the urbanization has contributed to the real overall economic development of the economy is subject matter of 'urbanization fallacy'. The fallacy that exists here is that urbanization is an essential driving force of economic development. This aspect of the study is further complex in nature since the development is not merely improving the economic aspect but rather constitutes the social and ecological factors in them. This indicates that to come of this fallacy, the policy makers has to realize the real problems of the economy and bring about smart solutions along with balanced advancement of rural and urban areas.

Smart cities Mission:

Census 2011 estimated about 31% of Indian population lives in urban areas and contributes about 63% of GDP which is projected to be 40% and 75% respectively by 2030. The major challenge before the policy makers is to channelize this growth such that it acts as a catalyst to the economic development, which calls for a comprehensive growth of the urban centers.

'In the approach to the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions.'[105] Smart city mission aims at comprehensive and inclusive development of cities, incorporating within them the area based development so that livability of whole city is improved. The proposed smart solutions in turn will enhance the quality of life and income thereby bringing more inclusive growth.

The question here is "will the smart cities be solution to the urban sprawl and related problems?" Smart cities mission is a new initiative which is still in initial stages of implementation. The proposal has given space for all the major issues like availability of drinking water, affordable housing, sanitation, lighting and the like. 'Creating walkable localities'[106] and preserving and developing open space is a special feature of smart cities.

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[105] Smart cities: mission statement and guidelines, ministry of urban development, Government of India, June 2015
[106] Smart cities: mission statement and guidelines
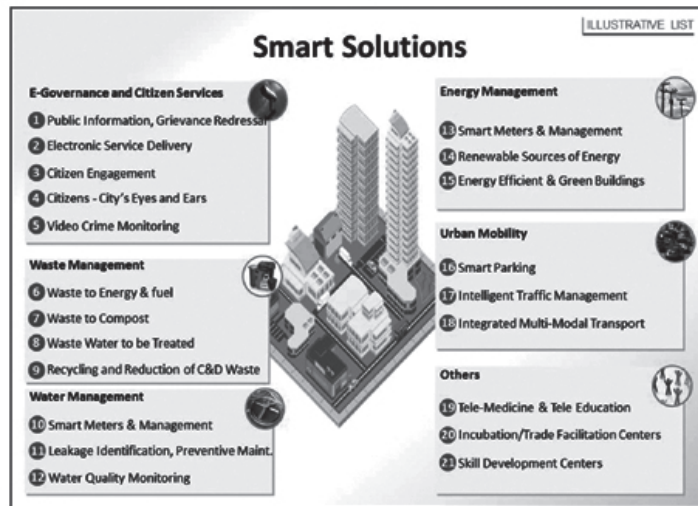
Source: Ministry of urban development, Government of India

The analysis on urban areas has shown that despite all the policy initiatives and programmes implemented so far, our economy is still suffering from certain structural problems which are hurdles to our journey towards development. The need of the hour is not only developing the existing urban areas but there should be efforts to bring about regional balance so that the severity of agglomeration could be reduced by checking the rate of further migration to the over-populated urban settlements.

Conclusions

Urbanization has been thrust areas in the plan document of India for the year 2012-17, that projected at least 300 million to be added to the urban population in the coming years. The structural reform adopted in 1991 has been a game changer for the economy. With the integration of global and local markets and the liberalization; the inflow of foreign capital and investments has increased the prospect for the Indian laborers. This has led to in surge of rural population to urban areas attracted by the job opportunities and improved living conditions. However, the poor economic conditions and the greater disparities have led to uneven growth in the economy. The NDA government realizing the need for more balanced and planned urban development has proposed the Smart Cities Mission so that there will be a wider prospect of urban centers that will in turn bring about overall economic development, better living conditions and large job opportunities via more domestic and foreign investments.

Suggestions

Urbanization is definitely a major driver for economic growth of the economy. The challenge before the policy makers is to channelize it in the desired direction which is to be given utmost care. The first step towards this is to identify the present requirements of the urban economy and ensure inclusive development of urban population. Targeted policy measures have to be adopted

so that the benefits trickle down to the targeted group. Integrated single policy could be more beneficial rather than too many programmes which in effect adversely affect the effectiveness of all programmes.

Urban governance is the central challenge to improve quality of cities, especially that of small cities which is more likely to accommodate rowing urban population. Urban centers are 'population sinks' and has to take up the challenge of job creation. The public spending in general is urban biased which has to be replaced by the balanced development. Growing urban centers accompanied by growing informal sector which calls for greater attention. The attempts to increase level of urbanization should be accompanied by that to improve the living conditions of the dwellers.

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CLIMATE INDUCED MIGRATION: PREDICTION OF ITS IMPLICATIONS

By Akanksha Soni and Nappinnai Dhamodharan

INTRODUCTION:

Climate change has now for long shown that it impacts low lying areas with a potent force and leads to short and long term displacement of people. The Intergovernmental Panel on Climate Change (IPCC) 2012 report [1] sheds light on the countries that were most likely to be affected by a rise in sea level. This vulnerability mapping singled out countries like Bangladesh, Vietnam and India and predicted mass displacement of people living in those countries. This paper attempts to confirm/ascertain the intuitive claim that climate change results in migration, by citing the example of Bangladesh and also provides evidence (using indicators of climate change) that India is one of the countries vulnerable to climate change. At present not much attention is being paid to the issue of climate change. As Kuznet [2] explains the developing countries cannot afford to concentrate on the environmental condition when they are occupied with the growth objectives.

This paper tries to bring out the problems of not paying heed to the climate change over the coming years especially to a developing economy like ours. Our dependence on the agricultural sector will be tested in the coming years especially because food production would be one of the many things that would be drastically affected by change in the climatic conditions vis-à-vis flash floods, droughts etc. Even though the changes occurring because of climate cannot be felt in the market period, ignoring the prospects will lead to alarming and accelerated pressure on the economy and will in the long run take a toll on the economy.

LITERATURE REVIEW

This area of study has captured the interest of scholars all over the world. Some of the pioneering work has been carried out by Professor Roger Zetter [3] the Director of the Refugee Studies Centre(2006-2010) who has been working on the areas of climate change, human migration and human rights. The theory of Environmental Kuznets Curve [2] elucidates how developing countries typically fail to pay attention to environmental factors. The work of Professor Stephen Nickell [4] studies the impact of immigration on inflation.

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OBJECTIVES

The objectives of this paper are:

(1) to show that climate change is real and that it induces migration and

(2) to assess the implications of such migration on the economy.

Discussion

METRIC CHOSEN CO2 emission

Carbon dioxide that is present in ambient air is used as a reference gas and other greenhouse gases are measured against it. The entire process of life revolves around the transformation of carbon from one state to another in various forms. Carbon based fuels when burnt lead to rapid release of atmospheric carbon dioxide. Although the ocean serves as a sink to capture a significant quantity of carbon dioxide the unabsorbed CO2 leads to rise in temperature by trapping infrared component of the electromagnetic radiation. The CO2 emissions also disturb the radiative balance of the earth causing an unnatural rise in the sea leve

The CO2 emissions in India between the years 2000-2010 is presented below. This plot shows an upward slope (positive slope) which is a clear indicator of the persistent rise in the CO2 emissions. This according to our study is a proxy indicator of climate change
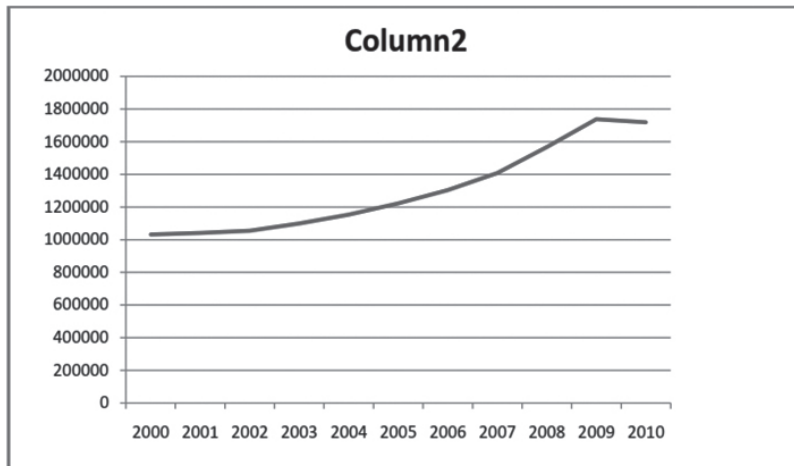
(Note: the data has been obtained from the World Bank database)

At this juncture having established that climate change is indeed a reality we need to delve into answering the next most crucial question. What the scale and scope of the problem is and in doing so we look closely at the example of Bangladesh as changes taking place there are easier to observe and quantitative, especially with the rising of the average sea level and the submerging of considerable portions of land.

THE MIGRATION PREDICAMENT OF BANGLADESH

Bangladesh, a country exposed to climate change by virtue of being a low lying country has already experienced unconventional patterns of urbanization. According to estimates released by the International Organization for Migration [5] 70% of Dhaka's slum dwellers moved there due to an environmental shock of some degree. The Director of the Centre for Climate and Environment Research at BRAC University in 2012 claimed that according to his study nearly 1500 families moved to cities mostly Dhaka. As a result of this heavy migration, Dhaka spread over a 325 km radius and at present is now home to 15 million people thereby exerting undue weight on its carrying capacity. Although one could always argue that the migration could be due to the availability of opportunities in urban versus rural context the exact reason cannot be attributed to this factor alone as the migrations are predominantly from the low lying villages of Bangladesh.

The situation is predicted to worsen and the IPCC report of 2012 [1] estimates that an additional 15 million people would migrate from low lying villages in Bangladesh to Dhaka by 2050. The crop production as a result of that is predicted to fall by 10% and wheat production by 30%.

The example of Bangladesh alone would suffice for a country like India to awaken and take measures to account for the rapid urbanization that would occur in the future. The problem however is not linear as one may expect it to be. There is a strong overlap between migration on account of employment and migration on account of climate change. So much so that it becomes difficult to separate one from the other.

What is most alarming is that the IPCC report paints a gloomy picture for the densely populated cities of Mumbai and Calcutta. These fall under the category of the top three Asian cities that are predicted to crumble under the pressure of this climate induced migration. What complicates matters in a country like India is the already high population density in cities due to a wide gap between employment opportunities in the rural and urban sector.
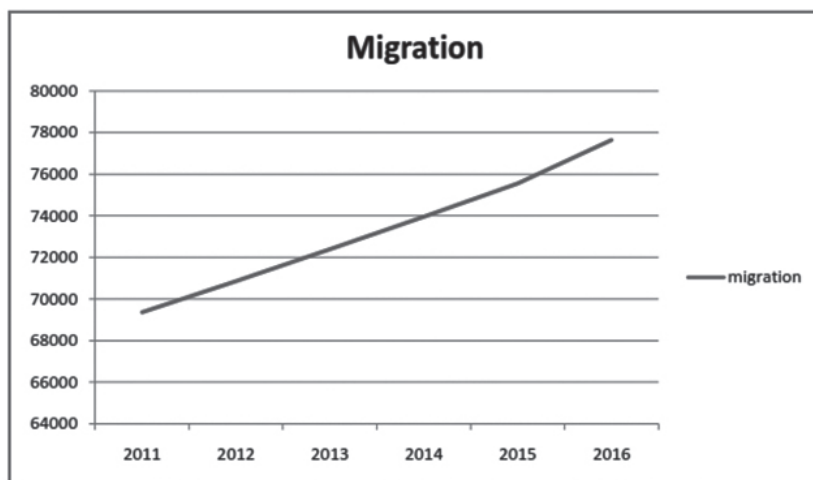
The above graph shows the migration into Delhi for the past six years. The upward slope indicates the constant increase in migration into Delhi.

Note: The data has been obtained through extrapolation given the population over the years by indiaonlinepages.com and the estimated migration rate for a period of 6-10 years given in the Delhi Human Development Report2013.

Our report henceforth aims at establishing the economic impact of such climate induced migration by using the following indicators:

MIGRATION DRIVEN INFLATION:

An increase in the population density intuitively signals towards a rise in inflation. However there is some dispute amongst economists about the impact of migration as it is widely believed by some that an influx of labour makes the wage rate competitive in the market thereby bringing down the cost of production. There are however two problems with such an interpretation:

1) It is assumed in this case that those who migrate due to an environmental mishap automatically integrate into the labour force. However, this may not always be true. Historical evidence proves that migrants either find no work or become part of the unorganized sector.

2) In the long run if the migrants decide to settle it means the resources are now divided amongst more individuals.

In our study we have taken the CPI inflation (index number value) [6] for Delhi and the migration into Delhi and performed correlation analysis on that data as shown below:

Year	Migration (DELHI)	CPI Inflation (y)
2011	69358.39	176
2012	70856.53	191
2013	72387.03	209
2014	73950.59	223
2015	75547.92	234

Hence by performing correlation we have established a strong relationship between migration and inflation, which implies that an influx of migrants into cities would lead to an increase in the prices of commodities in such cities. To what extent this inflation impacts the economy depends on: i) the aggregate expenditure of these migrants; ii) the ability of migrants to be absorbed into the labour force to meet the output requirements. If in the long run b=a, or b>a then inflation will not persist.

REDUCTION IN FOOD PRODUCTION: A MEASURE OF MIGRATION

Food production has been used a proxy to indicate the impact of climate change on migration. Even though food production may not be the only factor that affects the rate of migration

the scope of this paper considers this factor primarily to establish a relation between climate change and migration as it has a considerable impact on the livelihood of the people.

The graph shown above depicts the Rice production in Bihar over a period of four years [7].

NO. OF DISTRICTS AFFECTED IN BIHAR

STATE	2009	2010	2011	2012	2013	2014
BIHAR	26	38	0	0	33	28

The table shows the number of drought affected districts in Bihar over the years [8].
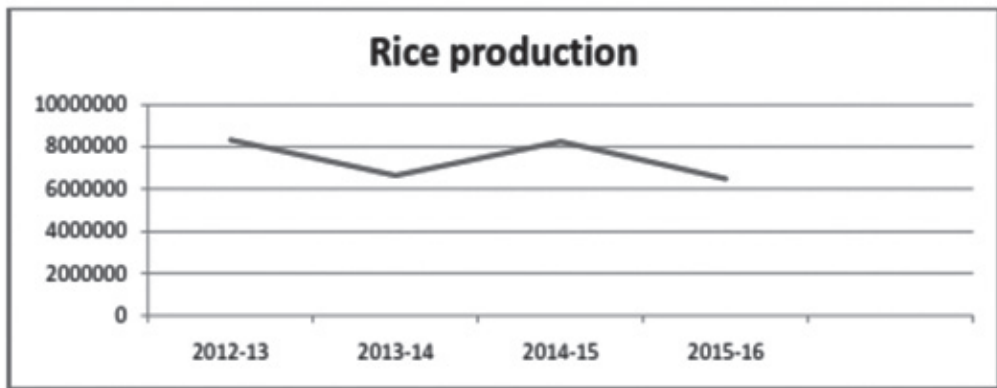
From the diagram we can observe that the rice production has gone down in 2013 the year when 33 districts in Bihar experienced drought conditions.

The graph shown above depicts the Rice production in Bihar over a period of four years [7].

NO. OF DISTRICTS AFFECTED IN BIHAR

YEAR	PRODUCTION OF RICE IN BIHAR	POPULATION MIGRAT-ED INTO
2012	8322013	241699.5
2013	6649589	246920.2
2014	8241624	252253.7
2015	6488945	257702.4

Note: Using the population data of Delhi as provided by indiaonlinepages.com[9], the migration rate for a period of 6-10 years and the estimated percentage of migrants from Bihar as given by the Human Development Report Delhi, 2013 [10] to arrive at the data of the estimated population to have migrated into Delhi from Bihar (column 3). The data for the production of rice in Bihar has been obtained from the source The Directorate of Statistics and Evaluation, Bihar (SASA) [7].

CORRELATION: - 0.508

This negative correlation between these two factors helps assert our claim on the impact of climate change on migration levels.

Around 33 districts of Bihar was affected by drought in the year 2013 and we can see the impact it had on the rice production in Bihar.

The Production of rice in Bihar has been used as a proxy to exhibit the impact of climate change on the economy. The droughts experienced in Bihar have had an impact on the production of rice. The correlation study shows that as the production of rice in Bihar goes down the migration from Bihar into Delhi goes up by 50%. Even though rice production is not the only factor that leads to migration this significant correlation between the factors helps bring about the significant impact of reduced food production on the rapid movement of people from Bihar to Delhi. In this scenario the potency of just one factor helps surmise how other factors could also leave a significant impact.

INFERENCE

Our study indicates that as the climatic conditions become more erratic and unpredictable the economic implications arising out of these changes are not going to be light on the economy. Against popular belief, this study shows that developing countries like ours also have to take up the issue of climate change seriously as it has a major impact on the agricultural sector especially in the rural context.   Over the past few years the marginal growth in the agricultural produce in the Indian economy has gone down because of the increasing droughts and occurrences of unseasonal rainfall that affect the Kharif and the Rabi crops (The food production in India has gone down from 265.04 million tonnes in the year 2013-14 to

252.02 million tonnes in 2014-15 and 252.22 million tonnes in 2015-16 [11]). When livelihood in the rural areas gets affected the trend observed is that of movement into urban areas where there is relatively more job opportunities. The migrants from the rural areas add to the already dense population in the cities and apply more pressure on the land.   The infrastructure in cities will crumble under the pressure of this increased size of population, there will be a strain in the allocation of resources, and the horizontal imbalance will increase. With more people seeking jobs in the industrial and the service sectors in the city, there can be more prospect for growth according to the migration models but this growth without paying attention to the increased damage to the environment/ this growth, which is not sustainable will ultimately accelerate further migration into the urban areas.

SUGGESTIONS

Suggestions include policy makers focusing on sustainable growth and increased focus on effective town planning and all round growth of the country including the improvement of infrastructure in rural areas. Not only the peripheral areas of the major cities should be developed to expand the city but more investment in infrastructure could be made in towns and rural areas.

CONCLUSION

In conclusion what we have arrived at narrows down to the inference that there exists a strong correlation between climate change and migration. This correlation helps contend the conventional belief that developing countries ought to prioritize growth over environmental concerns. In a situation wherein environmental mishaps turn into bottlenecks to economic growth of the country, growth cannot occur without accounting for the same. Given the existence of a symbiotic relationship, tuning the conventional wisdom to suit the current scenario is the need of the hour.

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