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# **Slum rehabilitation in the context of urban sustainability**

## **a case study of Mumbai, India**

Amey Z. Sheth<sup>\*</sup>, Nagendra R. Velega and Andrew D. F. Price

*Civil & Building Engineering Department,*

*Loughborough University,*

*Loughborough, Leicester,*

*LE11 3TU, UK*

Mail: [A.Sheth@lboro.ac.uk](mailto:A.Sheth@lboro.ac.uk), [Sheth\\_Amey@yahoo.com](mailto:Sheth_Amey@yahoo.com)

Phone:

### **Abstract**

In the last two decades, migration from villages and small towns to metropolitan areas has increased tremendously in India. This leads to the degradation of urban environmental quality and sustainable development especially in the metropolitan cities. The problems faced by the people living in the urban areas of India have become major concerns for the government over the last two decades. Slums are considered to be the major issue within many urban areas; particularly problems related to transportation, population, health and safety. India is one of the fastest developing countries with many metropolitan cities (e.g. Mumbai, Pune, Bangalore, Hyderabad, Delhi and Chennai). To explore the effect of rehabilitation of slums on urban sustainability, part of Mumbai was selected as a case study. Compared to the other metropolitan cities in India, Mumbai is one of the biggest metropolitan regions and capital of the state of Maharashtra with many slums varying in sizes. In addition, every year millions of rupees are being spent to resettle and rehabilitate slums to make Mumbai sustainable. It is reported that around 6 percent of the total land holds nearly 60 percent of the total Mumbai population (CBC, 2006). From 1980 onwards, the rate of migration and the sprawling nature of slums into the city has become a major issue, although many organisations are working towards development of Mumbai, the conditions are not conducive to achieving urban sustainable environment as most of the organisations are not working on a united front. Also, various researchers have reported that to maintain the pace of sustainable urbanisation, a holistic approach to sustainable development needs to be considered.

Considering today's poor urban environmental quality in Mumbai, there are many projects under development and execution to improve the poor conditions. Also, the World Bank has funded many projects with the primary aim of improving the city's land transport, health and education which

affect thousands of families. The majority of families affected by urban development projects are located in slum areas which are under consideration for resettlement and/ or rehabilitation. The aim of this research is to examine slum areas and their effects on sustainable urban development. To accomplish the above aim, a case study based approach, engaging a series of face-to-face interviews, was used. As a part of this research, an urban development project funded by the World Bank to achieve urban sustainability in Mumbai Metropolitan Region (MMR) was explored. Also, several visits to other slums and rehabilitated areas were conducted to identify the quality of life in slums and rehabilitated areas. The data collected during the face-to-face interviews, was used for descriptive analysis considering various aspects (i.e. social, educational) of urban sustainability. Through this research, the reasons for slums and problems related to slums were explored. During the research, it is revealed that some people still think that urbanisation is responsible for unsustainable development and they are not in favour of resettlement and rehabilitation. This suggests that to achieve successful urban sustainability, other issues such as employment, education and general awareness are also required along with low-cost mass housing.

**Keywords:** Rehabilitation and resettlement, slums, and sustainable development

# 1 Introduction

Slums are often defined as, “*buildings and areas that are environmentally and structurally deficient. A result of multiple deprivations such as; illegal land tenure, deficient environment and inadequate shelter and are the result of the gap between the demand and the legal and formal supply in the housing market*” (Chauhan, 1996). Mumbai, formerly known as Bombay, India’s financial capital, attracts people from all over the country. The United Nations (UN) reported that Mumbai is the seventh largest city in the world, has the fifth fastest rate of population growth and is the sixth most populous city in the world (O’Hare et al., 1998). But, behind Mumbai’s glitz, glamour and attraction there are different realities; the city landscape is dominated by massive, sprawling slums. In Mumbai some of the slums are the biggest in the world (Jha, 2008) and their origin can be seen from the late 17<sup>th</sup> century (Dalvi, 1997). The outcome of consumer expenditure data survey, conducted by National Sample Survey (NSS) of India, reveals that 15 percent of the total urban population of the country are living in slums (Dhingra et al., 2008). Alex, 2005 reported that, eight million out of the twelve million people in Mumbai are living in slums; and one in every three people in the world could be living in slums by 2030. Mumbai is not alone; slums are global problems, accommodating a billion people (Alex, 2005).

In the Mumbai Metropolitan Region (MMR) various organisations are working towards upgrading slums in order to improve the urban environmental quality of Mumbai. Some examples are: MMR-Development Authority (MMRDA) and City and Industrial Development Corporation (CIDCO), which are regional planning authorities; the Maharashtra Industrial Development Corporation (MIDC) a planning entity for the industrial estate developed under the control of state government. In addition to these, Slum Rehabilitation Authority (SRA), Slum Rehabilitation Society (SRS), Maharashtra Housing and Area Development Authority (MHADA), Brihanmumbai Municipal Corporation (BMC), etc. are also working towards the improvement of slums in Mumbai. In 2006, it was reported that there are more than 60 registered non-governmental organisations (NGO’s) working towards the development of Mumbai slums to make it a good habitable place (Karmayog, 2006). Also, the long-term vision of SRA is, “to make Mumbai slum-free by the year 2015” (Dutt, 2004). Most of these organisations are funded by various sources such as World Bank, central government, state government, and corporations. Recently, World Bank has invested 32000 million in Indian National Rupee (INR) to improve the urban environmental quality of Mumbai. This is the largest urban resettlement project ever undertaken in India (Dutt, 2004). Other than World Bank several organisations have already invested millions and billions (INR 5000 million in 2003 and INR 160 billion in 2008 by local government) of rupees towards the development of Mumbai slums. The local municipal authority reported that every year a billion rupees are spent before monsoon season preparing for the rains (Allen, 2008).

As mentioned in literature, a significant amount of money is already invested and is set aside to be invested in the future (Pandey, 2007); however, Mumbai still seems to be far away from a sustainable urban development. There are many key problems such as slums, population and unregulated growth in the way of sustainable urban development. These problems are discussed in this paper. One of the key reasons for Mumbai being far from sustainable urban development is that most of the above mentioned and presently active organisations (governmental and non-governmental) are working individually with a lack of proper central control and coordination. Inadequate initiatives and improper procedures taken at this stage will augment the future impact of

slums on urbanisation making them impossible to ignore. Through this research, key issues and priority areas which need to be addressed are highlighted and discussed with the help of a literature review and a case study. To conduct the case study, one of the five major link roads under development in the MMR was selected. The details about the case study and project are explained in Section 4.

The paper is divided into six sections: the aim, objectives and methodology of this research are discussed in Section 2. The literature review and case study are discussed in Sections 3 and 4 respectively. In order to support the literature review several interviews were conducted; this is discussed in Section 5. The research work is summarised and concluded in Section 6. This is followed by references and acknowledgments.

## **2 Study aim, objectives and methodology**

The primary aim of this research is to explore slums to understand their impact on sustainable urban development. To achieve the above aim the following objectives were formulated.

1. To explore existing slums and understand how slum rehabilitation and resettlement projects work.
2. To explore one of the major projects at the execution stage involving rehabilitation to achieve sustainability in Mumbai.
3. To understand the attitude of slum dwellers towards urban sustainability.
4. To examine why rehabilitation and resettlement projects are not achieving considerable success.
5. To understand the gap between families shifting from slums to rehabilitated buildings.

To achieve the above objectives, a case study based methodology, which involved face-to-face interviews and literature review were employed. The main purpose of conducting a case study was to know the ground realities related to the project; slums and urban sustainability. Also, to accomplish the aim and objectives of this study, several visits and observation were made to slums located in different pockets of the MMR. As discussed before, Mumbai was selected as it is one of the biggest metropolitan regions in the world, which has many large scale slums (Nijman, 2008).

In Mumbai there are 'Eastern', and 'Western' express highways, which run parallel in a North-South direction along the length of the suburbs. Also, when the existing plan of the city is studied, one can see that there are very few road links connecting the East and West. Hence, several projects in Mumbai are under development and are at the execution stage related to roads connecting the city in the East-West direction. In this research, one of the five proposed major link roads connecting 'Eastern' and 'Western' express highways passing through part of an existing hutment in Mumbai was selected. This is discussed further in Section 5. The research was guided by a set of questions related to origin, history, impact, and future development related to slums. Several observations were made during a number of site visits to various slums. The collected data were used to analyse the slums and their impacts on the sustainable development of Mumbai which are presented at the end of the paper.

### **3 Literature review**

As a part of the literature review, various aspects related to slums and urban sustainability were considered and explored. In this section, existing slums and their impacts in Mumbai and slum rehabilitation in the context of urban sustainability were reviewed. At the end of this section execution of slum rehabilitation projects are discussed.

#### **3.1 Existing slums and their impacts in Mumbai**

On looking at Mumbai from an aerial view, one can see many small and large scale black spots, so called slums and hutments sitting in the different pockets of the city. As mentioned before, while slum pockets cover a mere 6 percent of the land in Mumbai, they hold about 60 percent of the total population (CBC, 2006). All the slums in Mumbai are not merely residential, but have many commercial units such as, shops and small scale industries. However, in Mumbai a high rate of migration to the city from the rest of India resulted in the growth of slums. The development of low-cost housing could not accommodate all the migrants (Dalvi, 1997; Giridharadas, 2008). Slum growth started about a half century back. From the literature, some developments (for example, ports and harbours), which took place in the past are identified as a reason for increasing the slums. During such developments a group of people were displaced from certain locations without provision of alternative housing and other facilities, which resulted into the some of the existing slums today. In some studies it is found that the gap created by the supply of 17,600 housing against the need for 46,000 houses in the 1960s and the supply of 20,600 housing against the need for 60,000 housing in the 1970s also augmented the growth of slums (Shetty, 2007). At the same time, though several organisations are working, lots of efforts are made and investment spent to control the growth of slums; still sustainable urban development is far from a considerable level. It is reported that 55 percent of the total population is living in more than 2,500 slums located in different parts of Mumbai (O'Hare et al., 1998). About 50 percent of these slums are spread on private land, 25 percent on state government land, 20 percent on municipal land and the remaining 5 percent on Central government and housing board land (Dalvi, 1997). It is reported that there are 5 million slum dwellers, 1.2 million slum families eligible for rehabilitation in Mumbai; and "rehabilitating all of them will cost over INR 210,000 million," (Iyer, 2005). The area wise slums population in the MMR is shown in Table 1. As population surveys are conducted every 10 years, the population in the year 2001 is presented.

A review of literature and observations made during visits to some slums reveals that unhygienic conditions and population density (overcrowded) are very common problems with all slums (Husock, 2009). Overcrowding within the slum neighbourhoods has impact on various facilities available in urban areas (such as public transport, water and sanitation) are responsible for an unpredicted extra load on the amenities in the city (Dhingra et al., 2008). Also, literature confirms that, it is difficult to mark exact boundaries of slums, density, and to allocate exact funds to improve their conditions. As growth of slums is uncontrolled, unregulated and unpredicted; it is very difficult to implement and execute any proposed development in and around the slums. The existing slums have considerable impacts on quality of life, development and sustainability of urban areas at micro and macro levels.

**Table 1: Slum Population in Municipal Urban Area of MMR (2001)**

(MMRDA, 2001)

<b>Sr. No</b>	<b>Urban Area (Municipal Corporation /Councils)</b>	<b>Slum Population (in 000's)</b>	<b>Total Population (in 000's)</b>	<b>Percentage of slum population (%)</b>
01	Greater Mumbai	5823.51	11914.40	48.88
02	Thane	420.27	1261.52	33.31
03	Kalyan-Dombivali	34.85	1193.27	2.92
04	Navi Mumbai	138.62	703.93	19.69
05	Bhiwandi	111.30	598.70	18.59
06	Mira Bhayander	37.24	520.30	7.16
07	Ulhasnagar	53.72	472.94	11.36

However, rehabilitations of slums put pressure on middle-class people resulting in paying more taxes to the governments (UN-Habitat, 2003). Moreover, the available and reserved money for the improvement of urban areas is utilized for development of existing slums which results in an overall undeveloped urban area. A study by Davis, in 2004, reported that, populations in the slums are often undercounted. Also, slums which exist on the maps; where a census has been done, exists a variation in population between the census and the actual population. In another study by Nijman, 2008, it is argued that, often, there is a variation in the actual boundary, location and population of the slums. Moreover, some slums in Mumbai do not exist on any maps, thus formal surveys and census have never been done with these slums (Nijman, 2008). Also, it was found that there was a significant difference in slum location and size population count in the actual census recorded by Greater Mumbai and in the field. The outcome of this above mentioned study reported that slums population and size are far more than the actual numbers mentioned in the census records.

### **3.2 Slum Rehabilitation in the context of urban sustainability**

While understanding slum rehabilitation, the key reason for studying this is to understand; why slum rehabilitation is required? What is the relationship between slum rehabilitation and urban sustainability?

Urban sustainability is defined as "*Improving the quality of life in a city, including ecological, cultural, political, institutional, social and economic components without leaving a burden on the future generations*" (Urban21, 2000). Whereas, Sustainable Urban Development Association (SUDA) has define unsustainable urban development as "*often it is urban sprawl. Sprawl is low-density suburban development, usually consisting of subdivisions of detached and semi-detached, single-family houses, and scattered low-density commercial/industrial uses*".

In the long-term, unsustainable urban development can harm the health of urban dwellers (Huang et al., 1998). The first ever systematic effort to improve slums was made in the early 20th century, after

consequences of the plague epidemics in the 1896. However, to rehabilitate crowded living areas and slums 'The City Improvement Trust' was formed on the 9th of December 1898 in Mumbai (Dalvi, 1997). It is said that, presently Maharashtra is the only state in India to propose and carry out a massive slum rehabilitation programme. Also, the state government has come-up with an autonomous and a fully IT-based state-of-the-art "Slum Rehabilitation Authority" (SRA) to implement various schemes related to resettlement, rehabilitation and improvement of the slums in Mumbai. As mentioned earlier, large amounts of money have been invested and set aside by various organisations and governments (central, state and local) to achieve urban sustainability. Several projects initiated, funded or invested by the governments to improve the slums fall under the following categories, slums eradication and relocation, improvement, up-gradation and redevelopment and rehabilitation. From time-to-time the concerned government conduct several amendments in the regulations to improve slum conditions (SPARC, 2003) (Mukherjee, 2008). But, it is reported that though there is incremental change in living conditions the slums are growing continuously.

### **3.3 How the slums rehabilitation projects work?**

Slum Rehabilitation Society (SRS) is one of the oldest and active nongovernmental organisations (NGO) in Mumbai and working with a different approach to slum rehabilitation. Its strategy to improve slums is by promoting the "self-development" approach to prohibit the profiteering by an individual or organisation. The main beneficiaries of self development approach are both the occupants and the city. A slum rehabilitation scheme can be taken up on the plots that are notified, categorised and approved as a slum by the local government. If any of the plots covered by a slum is reserved for non-buildable reservation, then during the resettlement and rehabilitation the plot area should be more than 500 m<sup>2</sup> and minimum ground coverage should not exceed 25 percent by the slum rehabilitation. With self development approach, slum dwellers get an opportunity to appoint a developer for execution of proposal. Slum rehabilitation and self development in Mumbai is financed by 're-housing the slum dwellers' in multi-storeyed buildings on one part of the land and selling the other part at commercial rates in the city. Also, 70 percent of the eligible slum dwellers from hutments can come together to form a society to implement the slum rehabilitation scheme. If the area is too dense and difficult to get a satisfactory sale component (as declared by local government), then the rights for developing the commercial area can be transferred to the northern suburbs under the scheme called TDR (Transferable Development Rights). The Floor Space Index (FSI) permissible for a scheme depends on the number of slum dwellers to be rehabilitated, but should not exceed 2.5. Also, after providing low cost housing, ex-slum dwellers living in an apartment receive help in the form of subsidies; tax reductions over a 20-year period and concession for an apartment maintenance. The tenement assigned to a slum dweller is for a minimum period of 10 years from the date of allotment and cannot be sold during that period.

Every slum structure existing on or before 1st January 1995 are eligible for rehabilitation and cheap housing. All the eligible residential slum structures are provided with an alternative tenement admeasuring 225 square feet preferably at the same side, irrespective of the area of their slum structure. However, tenements can be transferred to a legal beneficiary if approved by the Chief Executive Officer (CEO) of SRA. A onetime sum of INR 20,000 per tenement is recovered from the developer for subsidising the monthly maintenance of the building. Flats are allocated by an open



lottery system and in rare cases family do get a chance to choose flats depending on individual circumstances (handicap, old age, etc).

#### 4 About the case study

A Joegeshwari-Vikhroli Link Road (JVLR) is part of the Mumbai Urban Transport Project (MUTP) to improve traffic and transportation in the MMR (MMRDA, 2001). The Eastern and Western express highways connect the suburbs and Greater Mumbai. The JVLR, with length 10.8 km is one of the five major links proposed to connect the “Eastern” and “Western” express highways (Iyer, 2005). This project is funded by the World Bank. To implement this project it was estimated around 300 slums and 70 commercial units would be rehabilitated from slum areas (MMRDA, 2005). Pratap Nagar and Durga Nagar are situated at Jogeshvari in Mumbai on either sides of the JVLR as shown in Figure 1. However, the slums are situated in the Pratap Nagar; and rehabilitated buildings are situated in the Durga Nagar. During the case study, a plan for the resettlement was developed and was partly finished and partly under execution for the residential and commercial units. Considering the stage of the project, this particular area was selected for the case study. In Figure 1, a brief plan of Mumbai along with major roads and links are shown.

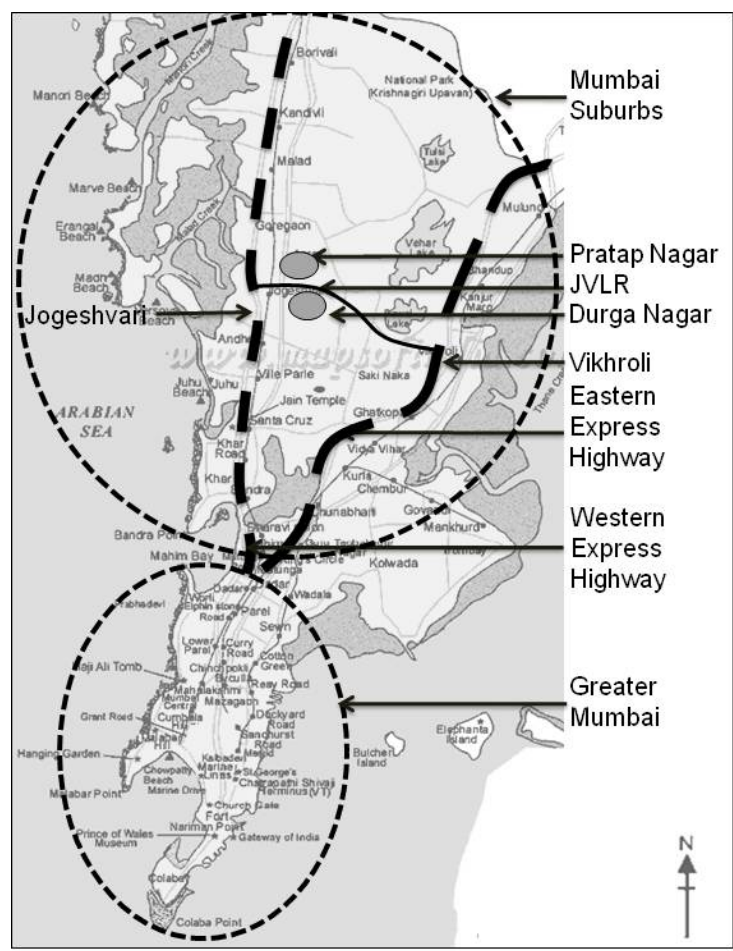


Figure 1: Schematic plan of the JVLR and Mumbai

Around 25 face-to-face interviews were conducted in 2006. Half of the interviews were conducted in the Pratap Nagar and rest in the Durga Nagar. The basic information collected during the interviews

in both the areas was related to family profile including origin, amenities, space occupation, social life, monthly expenses and opinions related to the slums as well as rehabilitated areas. In the slum areas, the information collected during the interviews was only related to slums whereas in the rehabilitated buildings data was collected related to the rehabilitated buildings as well as slums.

The intention behind conducting this case study was to explore part of the ongoing project. The slums and their impact on the sustainable development were considered during the case study. The reason behind this resettlement is not just to relocate the people affected by the Mumbai Urban Transport Project (MUTP). The aim of this project was to rehabilitate an unlooked section of the society; slums, and take a step towards improving the quality of life in the urban environment. There are various issues involved in this process of rehabilitation. Based on our site visits and interviews in the Pratap and Durga Nagar the following issues are discussed, relevant to those particular areas.

#### **4.1 Re-housing and Resettlement**

During the case study it was observed that Pratap Nagar slums are not entirely affected by the project (JVLR). Different parts of Pratap Nagar which were getting affected because of the project were considered for rehabilitation and resettlement. As part of the research, the collected data was used for a descriptive analysis as presented in Sections 4.2 and 4.3. In Section 4.2 social and economical conditions are discussed in the slum and rehabilitated area, followed by environment and maintenance in Section 4.3.

#### **4.2 Social and Economic Conditions**

##### **4.2.1 In slums:**

1. The majority were Hindu families, much less Muslim families and a few catholic families who speak English were found in those particular areas.
2. The population is a mixed, one in terms of financial status.
3. High level of social interaction and social security is achieved due to the dense living conditions.
4. Complex and functional use of the small amount of space allocated for living and working (i.e. residential, commercial) in many cases.

##### **4.2.2 In rehabilitated areas:**

1. As most of the flats are allocated on a lottery system, a mixed culture is observed.
2. Though population is mixed in terms of financial status, facilities and amenities are same for all.
3. High level of privacy, security and places for social interactions because of regulated growth.
4. Some level of segregation of areas (kitchen and living) within the flats and at the society level (commercial, residential and play areas).

### **4.3 Environment and Maintenance**

The people living in the Pratap Nagar slums were very much concerned about the cleanliness. They not only take care of their individual dwellings but also of their neighbourhood up to some extent. It was observed that all the people living in the slums contribute some money monthly for the maintenance of their slum areas. We can see this difference at the border areas where garbage is thrown, which is never cleared. Drainage systems in the hutment areas are comparatively good. Wherever possible the inhabitants have tried to close the drains. We often found the drains on both sides of the streets. However, as the drainage and garbage is collected on the periphery of the hutments, overall quality of the slum areas are below an acceptable limit and unhealthy.

To maintain the hygiene in resettlement areas, SRA took initiative. They are trying to help groups of buildings by forming societies and choosing a concern person who will take care of issues related to buildings (such as cleaning, collecting and throwing away garbage). The SRA helps them to build a common area, where everybody can dump their garbage and it will be sent from there to a dumping ground and/ or for recycling.

### **4.4 Opinion about resettlement area**

During the interviews, when asked about their personal opinion towards the resettlement schemes, the following positive and negative observations were obtained.

#### **4.4.1 Positive feedback**

1. People living in the resettlement area observed a significant increase in the amount of day light, ventilation and privacy; whereas most of these things are least in the slums.
2. Considerable increase in available number of facilities such as toilets, water, parking, school, public transport, roads, etc.
3. Resettlement provides more work opportunity and increase in monthly income.
4. Because of the regulated growth and upgradation in living standards they have good neighbourhood and friends.
5. The availability of the public bus services near the resettlement area reduces their travel time to work.

#### **4.4.2 Negative feedback**

1. Before the opening of the lottery to allocate their flats, they were not allowed to visit the flats.
2. Families, where only one person is earning, were scared to relocate, as this might increase their monthly expenses because of the additional facilities which are not there in the slums.
3. As every family will be getting 225 square feet each, irrespective of their slum areas in Pratap Nagar; those who are getting less than their previous area in slum were disappointed.
4. Many of them were reluctant to shift, because they will be moving to a 7-storey building (high rise) from the low rise slums.

5. Those who were supposed to shift their commercial units (shops) were unhappy as they might observe a drop in their business.

Also, other than the above mentioned reasons, it was found that public opinions regarding relocating themselves differed based on the following reasons.

#### **4.4.3 Traditional v/s unorthodox**

When compared, individuals, especially females, in orthodox families were not eager to move into a building, as one from a liberal family. This is because in orthodox families the women are confined to the houses and have a very limited social life. They feel that moving into a building will add to their isolation from the world. Hence, they were highly reluctant to move into apartments.

#### **4.4.4 Financial security v/s poverty**

From the interviews it was revealed that economically stable families had no problems moving into buildings compared to the economically unstable family. When asked, the economical reasons such as better lifestyle and regulated growth were given by the different part of the society.

#### **4.4.5 Education v/s illiteracy**

Observations made during the interviews revealed that people who are educated and more futuristic were keen to move. Education broadens their perspective and makes them want an apparently better lifestyle and environmental quality. On the other hand, people who are less educated and their life revolves around their small community prefer not to be isolated from their slum by moving. Also, we observed that some of the students, who are at school level, were keen on moving as there is provision of schools in the rehabilitated area, because they expecting good (educated) friends and better neighbourhood.

## **5 Descriptive analysis**

To accomplish the aim and objectives, other than interviews in Pratap Nagar and Durga Nagar, several site visits were made to other slums located in different parts of Greater Mumbai and the suburbs. During the site visits to various slums in the MMR, certain observations were made related to hygiene, public transport, common facilities, etc as discussed in this section.

During this research a descriptive analysis was emphasized. For the success of rehabilitation and resettlement projects and sustainable urban development; individuals' criteria related to families are very important, are described with the help of descriptive analysis. This analysis related to rehabilitation project, general observation, land tenure pattern, hygiene, and transportation and emergency are as discussed in Sections 5.1 to 5.5. In section 5.1 the rehabilitation project is explored and general observation related to the same are given in Section 5.2. Land tenure was analysed to understand how slums are originated in an urban environment in Section 5.3. Whereas, Section 5.4 is about hygienic conditions to understand quality of life in the slums, and following Section 5.6 is about transportation and emergency to understand the importance of location for rehabilitation project.

## **5.1 Rehabilitation project**

The reason behind resettlement and rehabilitation is an attempt to achieve the urban sustainability and efforts to respond to the requirements of the inhabitants. However, resettlement and rehabilitation could not achieve sustainability to a great extent as it is not considering all the aspects of sustainable urban development. As per the observations made during this research, the buildings constructed under the resettlement scheme are functional, well built and practical, but the socio-cultural aspects are not considered up to a great extent. Also, the closely clustered units and their scale generate an environment conducive for an active social life. More interaction is generated by the proximity and the multi functionality of the street and the space just in front of the houses. This further enhances the community/street life. There are provisions of office spaces for organizational committees to encourage people to participate in the process of rehabilitation and to make them more vigilant citizens. In the rehabilitated area there are wide streets provided for social activities to maintain the culture of an active street life but, often observed that they lack vegetations.

The people in the slums are more accustomed to having organized their spaces. They want multifaceted and multi-functional areas rather than having them defined and segregated areas as in apartments. Multifaceted and multi-functionality take an attachment to their homes on a higher level, to the spaces outside their houses and onto the streets. People do not participate personally in maintenance and hence do not have the same attachment to their outside spaces as they had formerly. This further isolates them from their surroundings. Some of the participants suggested that forming a board of members for the society may help to maintain cleanliness and hygienic conditions. However, this is a mundane aspect which is far away in making the project successful in the long run.

## **5.2 General observations related to slums in Mumbai**

Following are the general observation made during the research. Slums do not have:

1. Basic municipal services such as water, sanitation, waste collection, storm drainage, street lighting, paved footpaths and roads for emergency access.
2. Sufficient play areas, schools and medical facilities for children.
3. Sufficient community places to socialise and to celebrate festivals.
4. Healthy, hygienic conditions for families.
5. Visible differences amongst the slums and richer neighbourhoods which could be responsible for social tensions in slums.
6. Sufficient conventional places because of unplanned and unregulated growth of settlements.

Due to the lack of facilities in the hutments, slums do not only impact the slum areas but are responsible for the overall unsustainable urban environment. After conducting the case study, literature review and observations during various site visits, it is concluded that to achieve sustainability in an urban area, segregated projects related to transportations, link roads etc. are not enough in Mumbai. There is a need to; study pre and post project impacts, different employment opportunities, and spread general awareness about urbanisation along with sustainability.

Rehabilitation and resettlement projects will not work if people living in the slums are relocated far away, where there are no employment opportunities. However, in this scenario families will relocate themselves, where work is available resulting in the formation of new slums or promotion of existing slums. For the success of any resettlement, rehabilitation and slum improvement, project location is an important component. In most of the cases people living in the slums do not get a chance to give their opinion about the proposed development. If any of the components of urban area can not satisfy the sustainability criteria and growth is unregulated and not predicated then the urban area cannot achieve sustainability. Moreover, urban sustainability cannot be achieved without the support from the people living in the slums; as they play a major role towards the success of the resettlement and rehabilitation of projects. Often, only one or few of the organisations are working to achieve sustainable development in an urban context and not in collaboration to the rest of the organisations. Because of this, several projects in Mumbai always get delayed and often there are price escalation and obstruction from other organisation or society. For example, if JVLR is considered, there is a difference of more than 50 percent in initial tender cost and the revised cost. The estimated cost as per the tender was INR 660 million and when completed/revised it came to INR 1020 million, and the project is three years behind schedule. Also, the above mentioned costs and time are excluding investment for rehabilitation and resettlement of project affected families (MSRDC, 2007).

### **5.3 Land tenure**

When we studied existing land tenure and how people manage to build their slums, the following interesting facts came into the picture. About ownership of the land, slums and their working is very different (not standard) when compared with the rest of Mumbai. Most of the settlement, so called hutments consists of a number of 'chawls'. Often, a chawl will contend 10-20 small attached units (houses) measuring approximately 100-200 square feet each, which are given on rent by a slumlord (landlord). Also, a number of slumlords own small portions of the land in the settlement. The portion of the land owned by the slumlords is then given on rent with some initial deposit, where the tenant needs to construct their own house and has to pay rent for using the land and not for the house. In the local language this system is known as the "pagadi system" and is widely practiced in many slums in the MMR. Also, this system works very well, as most of the time tenants do not have to vacate their house and keep on paying rent for the small piece of land only, as they are available on long lease.

### **5.4 Hygiene**

After visiting the slums in different parts of Mumbai, a few of them located in Greater Mumbai (Dharavi, Mahalaxmi, etc.) and in the suburbs (Jogeshwari, Vikhroli, etc), the following conclusions are made based on the observations.

Slums which are located in Greater Mumbai are more unhygienic compared to the slums located in the suburbs. It was observed that the slums which are located in the suburbs, collect and throw their garbage on the periphery (if there is an unoccupied land), cleaning internal alleys, gali's (streets) and neighbourhood; ended up surrounding hutment by the piles of garbage. Whereas slums in the city do not have any open spaces on the periphery, resulting in collection of their garbage within their internal streets and neighbourhoods only. However, in both the areas hygiene is below standard.

## 5.5 Transportation and emergency

As resettlement areas are neatly planned, demarcated in the development plan of the city, it is easy to have planned public transport services. In most of the cases bus stops are located near the resettlement areas. Exact known density and details about the people make it easy to provide all possible public services such as schools, public bus services, ambulances, etc. Also, all of the resettlement areas are approachable by the ambulance and fire fighting vehicles during emergencies. Whereas in the case of slums, all above factors such as density, public profile and their requirements are unknown, making them difficult to plan any activities such as public transport services and other facilities to be used during emergencies. Also, slums don't often have any boundaries and are spread to maximum limits, some time even occupy footpaths, this makes it difficult to locate any common facilities, such as bus stops for public transport and access for emergency vehicles.

## 6 Summary and conclusion

The research was guided by certain (key) questions, such as 1. What are the factors keeping slums against sustainable urban development? 2. How do slums originate and develop?

Slum inhabitants go through many problems; such as lack of water, healthy air, sewage, solid waste facilities and public transport, migration, pollutions, and shelter shortages. They also face poor ventilation, due to the lack of windows and electricity. Most of the times they tend to establish slums on unused, uncontrolled or reserved lands. As discussed, there are many reasons for the origin of slums and their characteristics make them one of the key players against sustainable development in an urban area (Husock, 2009).

Another reason which leaves a huge chunk of slums untouched by private builders and developers is because the present slum rehabilitation schemes are not financially attractive to them. It is even unviable in some of the suburbs as the selling rate is less than INR 2,000 per square feet" (Dalvi, 1997). Both the above mentioned reasons are the main reasons for the low number of provisions of low cost houses (Iyer, 2005).

The research attempts to explore the slum rehabilitation project in the context of urban sustainability, which is part of the JVLR project funded by World Bank. During the research, it was revealed that to execute any project and to achieve urban sustainability and rehabilitate slums, opinions of people living in the slums need to be considered. In Mumbai, most of the people are living in the slums and it will be difficult to achieve urban sustainability if the slums and employment opportunities are not considered in Mumbai. To achieve considerable sustainability in an urban environment, concerned organisations (governmental and non-governmental) should come together and work in the same line and not individually.

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