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The Impact of Slum Resettlement on Urban Integration in Mumbai: The Case of the Chandivali Project

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THE SETUP PROGRAMME

(http://www.csh-delhi.com/programs.php?selectedcategory=4&idprog=216#repere)

The SETUP – 'Social Exclusion, Territories and Urban Policies' – is a research programme funded by the French National Research Agency (ANR), and aims to study the social and territorial dynamics in slums, especially as affected and influenced by specific public policies in the four megalopolises of Mumbai, Delhi, São Paulo and Rio de Janeiro. SETUP brings together a unique gathering of 18 international scholars from multi-disciplinary backgrounds (sociology, geography, law, economics), specializing in urban issues affecting Brazil and India.

Nurturing a two-fold focus, the scholars define and study the impact of public policies on slums, and the environmental issues raised by the increasing number of slums in peripheries, particularly in protected natural areas. The comparative approach makes it possible to move from the singular to the universal by using generalizing deductions.

The international pool of researchers was split into two teams, namely 'SLUM' and 'FOREST'. Their objectives are to understand how poor urban areas 'function' in contexts of social exclusion, urban splittering and globalization, but also to identify what are the inter-relationships linking urban and peri-urban environments with poverty.

The SETUP study uses a diversity of approaches and data-processing methods: qualitative field studies, collection of quantitative data, processing of satellite imagery, use and production of maps and analysis of the corpus of laws. Field surveys were conducted by binomials, that is, by small teams consisting of specialists from India and Brazil working simultaneously in the two geographical areas.

The programme ran from November 2006 to November 2009, and the final results will be presented in the course of a three-day international conference *Habitat précaire, exclusion sociale et politiques urbaines et environnementales, dans les mégalopoles de l'Inde et du Brésil. Perspectives Franciliennes* to be held in France in February 2010.

ACKNOWLEDGEMENTS

Working in Mumbai is an excellent opportunity for those having a passion for urban and especially 'slum' economics, as it brings together all the elements that can be found in Third World metropolises, stretching all issues to the 'maximum'.

My first acknowledgment would go to my research supervisor, Dr. Marie-Hélène Zérah, who provided me with this unique opportunity. Her encouragement, especially her confidence in the outcome of this fieldwork, her support and precious advice all along the six months of my internship at the Centre de Sciences Humaines (CSH), was a motivating influence. I cannot but thank her for her support and guidance.

I would also like to express my deep appreciation for the entire SETUP and CSH teams for the prolific discussions and the consideration given to this work. Among the most supportive were Dr. Basudeb Chaudhuri, Director, CSH, and Prof. Frédéric Landy, geographer at Paris X. The daily captivating discussions with my colleagues and friends Marion Pollet and Akshay Tiwari have also been a constant source of inspiration. I am equally grateful to the two anonymous reviewers of the paper for their invaluable suggestions and inputs.

Finally, I would like to express my gratitude to the hundreds of 'Mumbaikars' I met and interviewed for the purpose of this study. They granted us some of their time…such a precious commodity in this city! Their strength, determination and hope are lessons in life, which I shall carry with me far beyond this six-month experience.

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Variable	Definition
Adults	Number of adults in the family
AgeAdult	Adult's age
AgeAdultSq	Square of adult's age
ChandivaliHappy	Dummy equaling '1' if the respondent is satisfied with the resettlement project
ChangeJob	Dummy equaling '1' if the worker has changed job at the time of resettlement
Children	Number of children in the family
Demolition	Dummy equaling '1' if the family faced a demolition
DemolitionNum	Number of demolitions faced by the family
DependencyRatio	Number of non-workers per worker in the family
EduAdult	Adult's education grade
EduAverage	Average education grade
ElectricityCost	Monthly cost of electricity
EnglishLiterate	Dummy equaling '1' if the adult is literate in English
EnglishSpeak	Dummy equaling '1' if the adult speaks English
FamilyWorkers	Number of working ('participating') family members
FamilyNonWorkers	Number of non-working ('non-participating') family members
GenderAdult	Dummy equaling '1' if the adult is a woman
HeadIncome	Family-based income-per-capita
HindiLiterate	Dummy equaling '1' if the adult is literate in Hindi
HindiSpeak	Dummy equaling '1' if the adult speaks Hindi

HouseBuilt	Dummy equaling '1' if the family built its house in the slum
HouseholdSize	Total number of family members
HouseIncome	Monthly household income from adult's work
HousePrice	Cost of the house if it was bought by the family
HouseQuality	House consolidation index: '0' if kachcha, '0.5' if semi-pucca and '1' if pucca
HouseRooms	Number of rooms in the dwelling
Illiterate	Dummy equaling '1' if the respondent is illiterate
InSituRebuilt	Dummy equaling '1' if the family has rebuilt the house in the same place after the last demolition
LandPrice	Cost of the plot of land if and when it was purchased by the family
MarathiLiterate	Dummy equaling '1' if the adult is literate in Marathi
MarathiSpeak	Dummy equaling '1' if the adult speaks Marathi
NativePlace	Family's place of origin if not Mumbai
Participate	Dummy equaling '1' if the adult is participating in the labour market
Principal	Dummy equaling '1' if the worker has a principal (full-time) job
PrivateFee	Monthly fee for private school
ProfEvolution	Professional evolution at time of resettlement as perceived by the worker
Religion	Respondent's religion
Resettled	Dummy equaling '1' if the household has been resettled
GenderAdult	Dummy equaling '1' if the adult is a woman

SlumDemolition	Intensity of demolitions: '0' if no demolition took place, '0.5' if demolition was selective and '1' if demolition was unselective
ToiletCost	Monthly costs for the maintenance of collective toilets
TotalIncome	Household monthly income including revenues from non-work activities (room renting, pension, lending…) and child labour
WaterCost	Monthly cost of water
WhenDemo	Date (year) of the last demolition faced by the family
WhenHouse	Date (year) when the household moved in its house
WhenMumbai	Date (year) of the household's arrival in Mumbai
WhenSlum	Date (year) of the household's arrival in the slum
WorkAreaDummy	Dummy equaling '1' if the job is located at less than 3km from the living area
WorkAreaDummy2	Dummy equaling '1' if the job is located at less than 5km from the living area
WorkDependency	Distance for the resettled workers between its job location and the original slum
WorkDependencyDummy	Dummy equaling '1' if the 'WorkDependency' variable is equal or less than 3km
WorkDistance2	Commuting distance where non-localized jobs are attributed a 3km commuting distance

Damien VAQUIER

INTRODUCTION

With an average of 2.9 m^2 of built-up area per inhabitant (Bertaud, 2004) and 54 per cent of the population living in slums (Census of India, 2001), land, in Mumbai, has become an increasingly scarce resource. In fact, the city's fast demographic growth, within a geographically and administratively constrained environment, has led to more and more pressure on natural spaces and especially on the 103 km^2 of large urban forest enclosed by the suburbs: the Sanjay Gandhi National Park (SGNP).

What we see emerging here is a competition between shelter and livelihood issues, on one hand, and nature conservation, on the other – which is a direct fallout of land and housing shortages. This has resulted in increasing divergences in public policy between what are commonly known as the 'Green' and the 'Brown' agendas[1]. While these two visions of urban development complement each other in many metropolises, the growth of slums touching and spilling into the Sanjay Gandhi National Park has ensured that the twain do not meet in Mumbai.

Massive slum settlements can be observed within the park's unclear boundaries. In 1995, a Public Interest Litigation case was filed by the Bombay Environmental Action Group (BEAG) in an attempt to reclaim the corresponding plots of land. Following a High Court decision ruling in favour of the environmentalists, large-scale demolitions were carried out by the forest department. On the other hand, several NGOs have since committed themselves to protect the so-called 'encroachers' living in the park. One of these NGOs,

[1] 'The Green Agenda concentrates on reducing the impact of urban-based production, consumption and waste generation on natural resources and ecosystems and, ultimately, on the world's life support systems. The Brown Agenda emphasizes the need to reduce the environmental threats to health that arise from poor sanitary conditions, crowding, inadequate water provision, hazardous air and water pollution, and local accumulations of solid waste' (DANIDA Workshop Papers: Improving the Urban Environment and Reducing Poverty, 2000).

the Nivara Hakk Suraksha Samiti (NHSS), is now handling the relocation of 12,000 of these dwellers through what has become Asia's largest slum resettlement[2] project: 'Sangharsh Nagar' (the 'village of struggle') in Chandivali.

In this study, we assess the sociological and economic impact of the shift to the new site of Chandivali, the availability and choice of employment being the key driver towards socio-economic urban integration.

Our methodology, based on a statistical and econometric analysis, offers a new insight into an unconventional resettlement project, sometimes considered as a reference by local politicians and social activists. It relies on a household survey carried out between December 2007 and February 2008, both in the slums of the Sanjay Gandhi National Park and in the resettlement site of Chandivali.

Two quantitative, geographically stratified databases were compiled. The first one, providing 200 household-level observations, is used to assess the overall quality of the project and impact of public policies in terms of access to land and services. The second one is much larger and gathers detailed professional information of over 729 working and non-working adults. Qualitative information has also been retrieved, through meetings with key stakeholders, informal discussions with slum dwellers and, more simply, through basic fieldwork observations.

The notion of urban socio-economic integration / exclusion used throughout this report can be defined as the combination of three fundamental components of citizenship, of which slum dwellers are often deprived. These include, firstly, *access to land ownership* and, more generically to perceived tenure security, as we know that in developing countries 'formal' ownership remains marginal. The second dimension of urban integration is *access to basic*

[2] To avoid any confusion, we use the term 'rehabilitation' only in the case of provision of subsidized tenements *in-situ* (where the slum is originally located), while we prefer the term 'resettlement' when a geographical relocation occurs.

infrastructure and amenities, while the third one, of specific interest to us, is *employment and access to the labour market*.

This research paper is divided into three parts. Given the singularity of Mumbai's urban configuration, the first part provides an essential general overview of the development of the city, its slums and the Sanjay Gandhi National Park. It also introduces the history of the land-related protracted legal battles through the Public Interest Litigation process filed by BEAG as also that of the Chandivali resettlement project.

The rationale and the methodology of the survey are explained in the second part, followed by a presentation of our first general outcomes. These are related to the following issues: the history of the creation of the slums studied here; the impact of the resettlement, in terms of *access to basic infrastructure and amenities* and *access to land ownership*; the interactions between slum dwellers and their ecological environment; the overall awareness level and the identification of factors influencing the satisfaction of slum dwellers regarding the project.

The third and last part of this report presents the core outcomes of the study: an assessment of the disruptive impact of resettlement on the *access to and structure of the labour market*. We especially focus on the alterations in professional patterns, resulting from a modification in the family composition. We also try to assess the effective and perceived changes in professional statuses and identify their causes. Commuting location and distance are, of course, taken into account. We finally resort to least-square and logit regressions in order to understand the dynamics underlying participation in the labour maket, access to full-time jobs and income levels[3].

[3] This report – compiled in order to meet the needs of the SETUP project as well as academic requirements at the University –therefore covers a wide range of issues, including, but not limited to, the impact of slum resettlement on urban integration. The reader is invited to refer directly to relevant sections depending on the information he/she already has on the related issue.

Part One: Mumbai metropolis, 457 km^2 of conflict between the city, its slums and its forest

1. The city of Mumbai

1.1. A historical perspective[4]

When the Portuguese took control of Bombay in 1534, the area was still an archipelago composed of seven islands. The English monarchy, to whom the land was gifted in 1661, considered it quite inhospitable because of the mangrove swamps, and transferred its control to the East India Company in 1668. The Company was already doing business in Surat (Gujarat) but was looking for a new deep-water port and suitable land for growing cotton.

The British gave the initial impetus to the urban and economic development of the area as a trading centre, the raw cotton produced around the city being sent to British mills. In 1687, the Company shifted its headquarters from Surat to Bombay. Major civil works were undertaken in order to connect the isolated islands. The Company developed the port and laid the first Indian railway line from Bombay to Thane in 1852, linking the city to its hinterland. Urbanization remained largely unplanned.

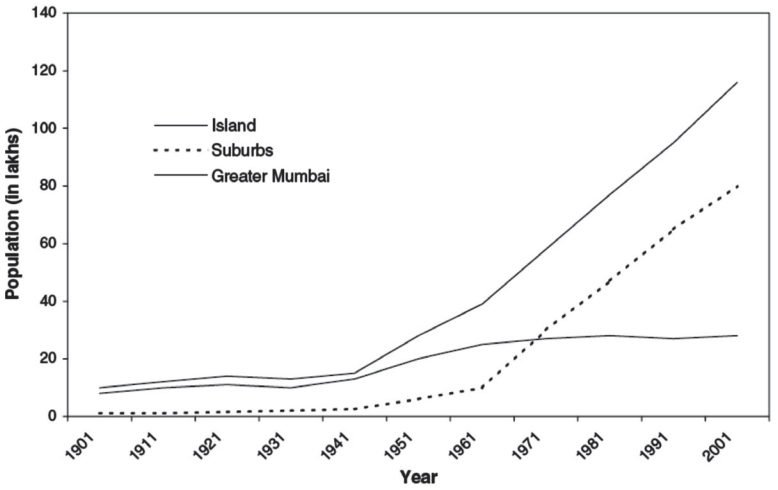
The industrialization of Bombay in the textile sector started in the 1860's, stimulated by the increase in demand due to the American Civil War, the opening of the Suez Canal and the completion of the Bombay-Delhi railway. The textile industry grew from 7,000 to 73,000 workers between 1860 and 1900. Migrants' accomodation was then provided by mill-owners in *chawls* (rented, single room tenements with a cooking place and shared lavatories). By 1888, Bombay became the first Indian city to have a Municipal Corporation. Its population reached a million by 1906, more than 10 per cent of it working for the textile industry.

After independence, the city successively became the capital of the state of Bombay (1947) and of Maharashtra (1960). As the

[4] Section based on the information retrieved from: Risbud, 2003; Gupte, 2003; Pacione, 2005; Chalapati Rao and Murthy, 2006.

migration rate increased exponentially, a restrictive legislative framework was introduced under the Town Planning Act (1954) in a bid to rein in both urban densification and the unequal distribution of land. These legislations, however, had adverse consequences (see **Section 1.3**). With land becoming a scarce resource, dearth of housing space aggravated. As a result, informal housing structures grew at a faster pace.

Figure 1: Population growth in Mumbai Island and its suburbs.



(Source: Pacione, 2005)

In the late 1970s, Bombay overtook Kolkata as the largest Indian city with 9.6 million inhabitants (see **Figure 1**). However, this period also marked the decline of the city's textile sector. Faced with increasing economic difficulties, mill workers went on an 18-month strike in 1982 and as a result, 100,000 of them lost their jobs. The textile industry, which had been indirectly employing up to 50 per cent of the city's population in the 1930s, declined over the years, and with scores of workers being laid off, stopped being the primary employer in the city. Over the two decades to 1990, the textile sector's workforce dropped from 200,000 to 60,000 (Pacione, 2005). This decline slowly brought about the downfall of the overall manufacturing sector in Bombay.

On the contrary, the liberalization process in India benefited from a significant impulse in 1991, when the country opened its market to foreign investment and softened foreign corporate ownership rules. As the main Indian gateway to international markets, Bombay's finance and service sectors profited largely on account of this shift from a national, rather insulated economy, to a globalized one. Still, the increasing wealth of the city did not reach every citizen (see **Section 1.3**) and in the 1990s, the city faced increasing communal tensions. In 1995, the nationalist party Shiv Sena won the state elections and renamed the city 'Mumbai'[5].

1.2. Administrative organization of the city

The city of Mumbai may be referred to through three different administrative conglomerations (see **Figure 2**). The first one is 'Mumbai island', which is a 69 km^2 strip of land south of Mahim Creek. It is the historical and economic heart of the city, where the highest population densities can be found. Thereafter, 'Greater Mumbai' includes, in addition to Mumbai Island, the suburban areas located north of Mahim Creek. Covering an area of 438 km^2, it is administered by the Municipal Corporation of Greater Mumbai (BMC).

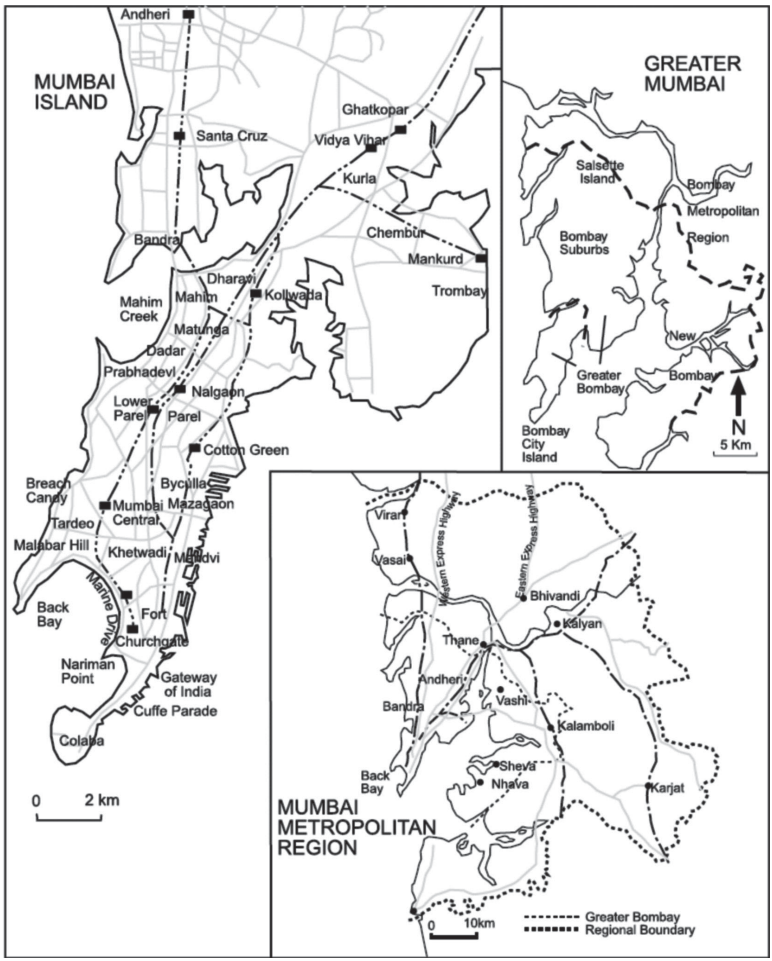
Finally, the Mumbai Metropolitan Region (MMR) is a 4355 km^2 area, including Greater Mumbai as well as seven other Municipal Corporations and thirteen Municipal Councils, the main ones being Thane, Kalyan, and the twin-city of New Bombay. The state agency in charge of the metropolitan region's urban development is the Mumbai Metropolitan Regional Development Authority (MMRDA), and the one in charge of housing is the Maharashtra Housing and Development Authority (MHADA).

The state body in charge of slum rehabilitation and resettlement schemes in Greater Mumbai is the Slum Rehabilitation Authority (SRA), established in 1995 by amendment to the Maharashtra

[5] The city was renamed 'Mumbai' by the Shiv Sena after the Hindu deity Mumbadevi.

Regional and Town Planning Act, 1966, and to the Maharashtra Slum Area Act, 1971. The MMRDA can also implement resettlement projects when large-scale relocations are necessary due to infrastructure development. Conflicts and overlaps are then frequent between the interventions of the SRA and the MMRDA on resettlement issues.

Figure 2: Administrative map of the Metropolitan Region of Mumbai (MMR).



(Source: Pacione, 2005)

1.3. Present demographic, economic and housing situation

In terms of economic activity, Mumbai has become one of the most diversified and vibrant Indian cities, and the leading contributor to national income. It attracts the highest level of direct foreign invetment, generates one third of the country's income taxes and 60 per cent of custom duties, houses the largest share of bank credits and deposit, and has the most active stock exchange. Though the manufacturing sector is slowly losing its leadership in favour of the tertiary one, the basic metals and engineering, as well as the chemical and pharmaceutical industries remain significant contributors to the city's economic output.

The tertiary sector is rapidly expanding, representing more than 81 per cent of the city's employment today (Urban Age, 2007). However, this growth mainly appears to be the consequence of a shift of low-skilled labour into informal, small-scale or self-employed service activities. In fact, 36 per cent of service jobs are linked to 'communication, social and personal services' while 'business and financial activities' remain below 16 per cent. On the whole, it is estimated that 65 per cent of the city's jobs are informal (Urban Age, 2007).

Therefore, the average educational and income statistics hide extreme inequality and poverty levels. At least 30 per cent of the city's population remain below the poverty line. A similar share of citizens quit school before reaching primary levels, 16 per cent of adults are illiterate and life expectancy remains at an average of 68 years (Urban Age, 2007).

Nevertheless, the recent demographic evolution of the city is impressive. While it was only housing 2.9 million inhabitants in 1950, Mumbai's urban agglomeration[6] has followed an annual growth rate of 3.38 per cent, reaching an estimated 18.98 million

[6] According to the UN 'World urbanization prospects', an urban agglomeration refers to the population contained within the contours of a contiguous territory inhabited at urban density levels without regard to administrative boundaries.

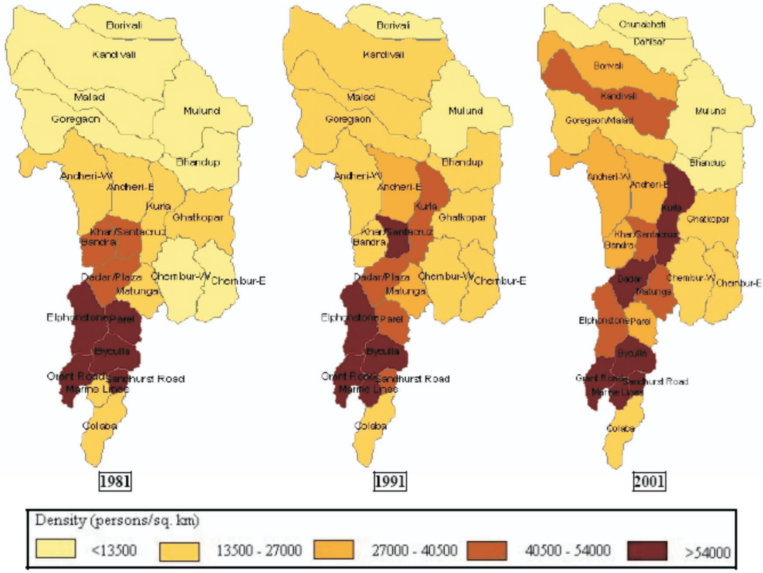
inhabitants in 2007. It has now become the fifth largest agglomeration in the world, according to the UN 'World Urbanization Prospects' report. Figures provided by the MMRDA and the 2001 Census of India are more moderate, with an estimated 11.9 million inhabitants for Greater Mumbai and 17.7 million in the Metropolitan Region in 2001.

Migration, especially from neighbouring districts of Maharashtra, has always been the main factor driving the city's demographic growth. The stock of migrants[7] has been increasing from 4.4 million in 1991 to 7.1 million in 2001 (Bhagat, Guha and Chattopadhyay, 2006). Yet, the contribution of migration to the city's decadal demographic growth is decreasing, from 50 per cent in 1961 to 37 per cent in 2001 (Singh, 2005), with natural growth taking over.

As displayed in **Figures 1, 3 and 9**, most of Greater Mumbai's recent demographic growth is taking place in northern suburban areas, along the two suburban corridors, located on each side of the Sanjay Gandhi National Park. Yet, the demographic and urban expansion of the city faces a highly constrained geographic configuration. Bertaud (2004) estimated that the surface accessible within a 25 km radius from the city centre, historically located south of Mumbai Island, is only 230 km^2, as compared to more than 1,500 km^2 in other cities. This factor, illustrated in **Figure 4**, has logically led to some of the world's highest population densities. An average of 27,348 inhabitants per km^2 are living in Greater Mumbai, 43,447 in Mumbai Island, and an astonishing 114,001 in the ward of Marine line (2001 Census).

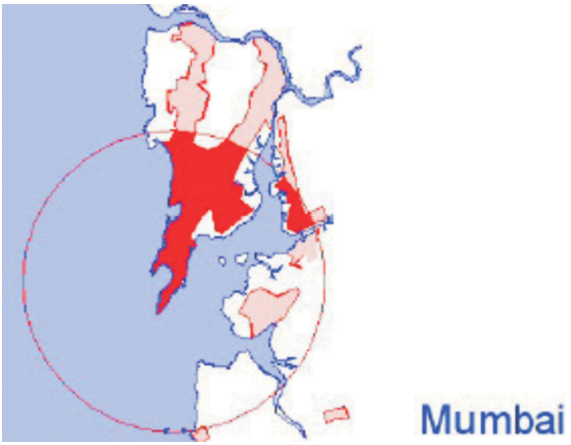
[7] Definition based on the previous place of residence (outside Mumbai).

Figure 3: Sector-wise evolution of population densities in Greater Mumbai, 1981-2001.



(Source: Bhagat, Guha and Chattopadhyay, 2006)

Figure 4: City of Mumbai, map of the built-up area accessible within a 25 km² radius from the city centre.



(Source: Bertaud, 2004)

In any well-planned city, these densities would have led to high real-estate prices and a vertical or horizontal expansion of built-up areas. But in Mumbai, besides the lack of sufficient mass transport infrastructure, restrictive urban policies have aggravated the situation by increasing land value to unprecedented levels and shrinking the built-up area per capita down to 2.9 m^2 (Bertaud, 2004).

The Floor Space Index (FSI), introduced in an attempt to contain the densification of the city, is one of these policies. This ratio of maximum floor space that can be built on a given plot size was uniformly fixed in 1991 at 1.33 for the Island city (Colaba to Mahim) and 1 for the suburbs. According to Bertaud (2004), restrictive regulations keeping FSIs at a surprisingly low level are not only responsible for the reduction in the per capita built-up area, but also for the deterioration of centrally located buildings[8] and for the explosion of real-estate prices in Mumbai. Other regulations, such as the Urban Land Ceiling Regulation Act (1976) and the Rent Control Act (1948), have also frozen urban development, caused the accumulation of vacant land and reduced incentives for owners to maintain their properties.

Likewise, Sharma (2007) and Weinstein (2008) believe that the inflation in Mumbai's housing prices is due to the manipulation of the real-estate market by the "politician-builder nexus" in order to maintain its economic domination and generate income through illegal practices. Such illegal methods have been reinforced through the implementation of slum rehabilitation and resettlement schemes (see **Section 2.4**).

The combination of these factors (unavailability and unaffordability) has caused increasing imbalances in the housing market. The cumulative housing shortage has been increasing by

[8] FSIs having decreased over time, it has become uneconomical to rehabilitate a dilapidated building, as this would automatically have meant a loss of floor space.

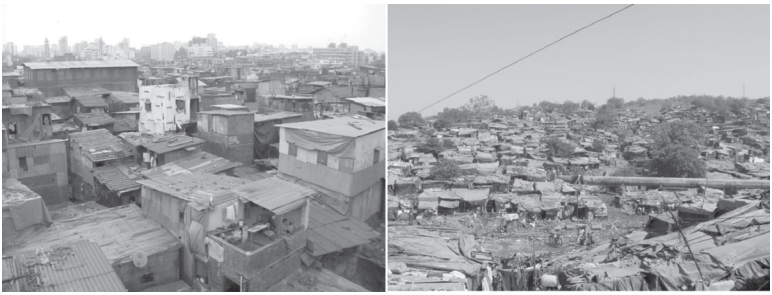
more than 20,000 units annually, affecting a large share of the city's population and explaining the dramatic expansion of informal ways of accommodation.

2. The slums of Mumbai

2.1. Definition and typology

Slums are a widespread type of settlement in Mumbai and can be interpreted as an answer to the city's housing shortage that has been constantly increasing since the 1940s. As defined by the 2001 Census of India, a slum is a 'compact area of at least 300 people or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities'. These are commonly referred to as *jhopadpattis* or squatter settlements in the local terminology. Yet, this generic definition hides a great heterogeneity among slums, based on their size, location, density, consolidation levels and economic structure (see **Figure 5**).

Figure 5: Comparison between a slum of Bandra (left), centrally located and highly consolidated, and a slum of Malad (right), located in a suburban area and unconsolidated.



(Source: Author's survey, 2008)

This restrictive definition also excludes other kinds of substandard housing structures that can be found in Mumbai, namely *chawls* and 'pavement dwellings'. *Chawls* were initially rental tenements provided by factory-owners and by the public sector units to house low-income male workers during the first half of the twentieth

century. Excluded from the Census' definition of slums, these are between one and three-storey buildings with one-room tenements including cooking spaces and shared common lavatories. Through time, densities in *chawls* have grown sharply as a result of family consolidation. These structures have now become more and more dilapidated due to lack of maintenance, partly as a consequence of the Rent Control Act, 1948 (see **Figure 6**).

Figure 6: A typical *chawl* in the suburb of Dadar, Mumbai.

(Source: Urban Age, 2007)

Most 'pavement dwellings' are similarly excluded from the Census' definition of slums, as they are often small, scattered and recent structures (see **Figure 7**). These hutments built on the 'footpaths' (or pavements) of Mumbai's roads, close to centres of economic activity, usually house families headed by male migrants. They are systematically excluded from rehabilitation schemes.

Figure 7: Pavement dwellings in Mumbai.

(Source: www.sparcindia.org).

2.2. The singularity of Mumbai slums

As mentioned earlier, the pressure on the housing market has constantly been increasing since the beginning of the century. While it was estimated in 1911 that 69 per cent of the city's population was living in one-room dwellings, this figure had gone up to 77 per cent by 1971. But it is only since the 1940s that large slum settlements have started growing. The first official Census of slums was carried out by the Government of Maharashtra in 1976: 902,015 dwellings were identified in 2335 pockets (Risbud, 2003). According to the 2001 Census of India, Greater Mumbai encompasses 1959 slum pockets housing 6.25 million citizens, 54 per cent of the city's population. These figures are the highest ones recorded for an Indian city through the census[9] (Risbud, 2003).

[9] By comparison, and in spite of the fact that the criteria used to define slums might have been slightly different, the 2001 Census of India recorded 1.9 million slum dwellers in Delhi's Municipal Corporation (19 per cent of the population).

The estimated average household size in slums is 4.5 and the sex ratio – 842 women for 1000 men – is higher than in other types of settlements (811 women for 1000 men in Greater Mumbai).

In Greater Mumbai, 6 per cent of identified settlements are predominantly temporary structures while 62 per cent are permanent ones, mainly made with bricks and reinforced cement roofs. It then appears clearly that most slums have become long-term answers to housing scarcity. It comes out as well that consolidating investments[10] are the result of a higher level of perceived security: slums facing constant demolitions or credible threats of evictions display the most temporary structures.

Slums lack the most basic services: 49 per cent of slum dwellers have access only to water through shared standpipes and 98 per cent of slums do not have any organized system for waste disposal. Sanitation remains the most worrying problem, with 73 per cent of slum dwellers depending on community toilets, while as much as 28 per cent still defecating in the open (Risbud, 2003).

In terms of localization, while the Census shows that 54 per cent of Greater Mumbai's population lives in slums, such settlements only occupy 8 to 16 per cent of the city's land[11]. These are mostly located on areas not suitable for development, like low-lying marshy lands, hillsides and areas along railway tracks.

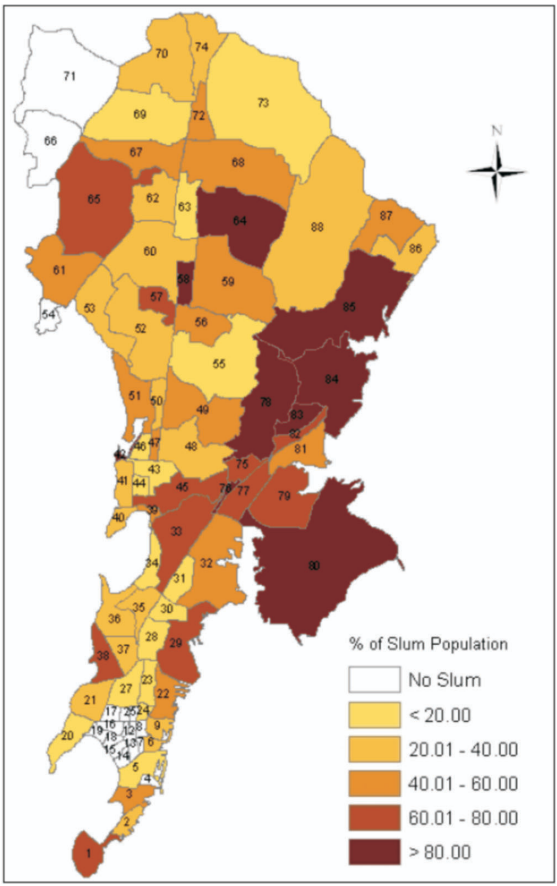
A large movement of slum expansion and densification can be observed in suburban wards, which encompass an increasing share of the city's slums (from 79 per cent in 1976 to 83 per cent in 2001). In contrast, the slums located in Mumbai Island have been facing

[10] Slum housing 'solidify' over a period of time as people invest in their houses. Mumbai is characterized by a high share of 'solid' structures /'consolidated' slums, a widespread form of housing, even sometimes for the middle-class. Such consolidating investment only takes place in areas where the perceived security of tenure is high.

[11] Several estimations are available in the literature, ranging from 8 per cent in Urban Age (2007) to 16 per cent in Mumbai Reader (2006). These variations probably depend on the land considered as a basis (Mumbai Island, Greater Mumbai or Metropolitan Region), and on whether 104 km^2 of the Sanjay Gandhi National Park are included.

constraining overpopulation (see **Figure 8**). In Dharavi, the well-known "largest slum in Asia" located in Mumbai Island, it was estimated in 2002 that the number of dwellers had reached 700,000 and that the density exceeded 100,000 inhabitants per km^2 (Saglio-Yatzimirsky, 2002). This concentration of population has led to a consolidation of settlements structures, together with an increase in the number of tenements per plot of land and even an 'informal verticalization' of slums: 42 per cent of slum dwellings now have an area of 10 m^2 or less, while 45 per cent have two or more floors.

Figure 8: Sector-wise percentage of slum population.



(Source: Bhagat, Guha and Chattopadhyay, 2006)

In case of land ownership, the 2001 Census shows that 48 per cent of slums are located on private land, whereas 52 per cent are on public land, including that owned by the State Government (21 per cent), municipal land (18 per cent) and land belonging to the Indian Railway. All of them differ in terms of occupational status but are characterized by very dynamic informal sales and rent markets.

Most informal settlements have become the field of thriving economic activities through dense and complex networks of small-scale, often informal, production, service and commercial units. Consolidated slums, such as the large settlement of 'Kurar village' on the western fringe of the Sanjay Gandhi National Park, are particularly productive.

In addition, Mumbai's slums are characterized by low unemployment rates. As they tend to develop near centres of economic activity, the local labour demand is often high, especially in the fast-growing informal sector. In Mumbai, the average number of workers per slum household reaches 1.47 and only 3 per cent of families have no working member at all (Risbud, 2003).

Women are largely under-represented in the slum population participating in the labour market, even if they sometimes have subsidiary income-generating activities such as selling vegetables, producing cheap bracelets and necklaces or even illicit liquor. When they work outside the slum, women are often employed as domestic help such as maids and cooks or as unskilled labour in the construction industry.

2.3. Historical perspective on public policies related to slums in Mumbai

The poor in India in general and in particular in cities such as Mumbai, do not dream beyond minimum existence. They are not allowed to dream beyond minimum existence. They fight for minimum inclusions. This time, unlike in the past, this fight is veering towards formulation of a long-term housing policy for the poor in the city. It is hoped that this would lead to formulation of 'inclusive politics' and 'inclusive policies' even in cities such as Mumbai.

- Mahadevia and Narayan, 1999.

While Mumbai's policy-makers adopt recurring and ambitious benchmarks for the development of their city (the latest one being Shanghai), they often tend to deny the minimum 'citizenship right'[12] to the majority of slum-dwellers. Until the 1970s, demolitions and forced evictions have been the main policy answer to the appearance and growth of slums. A widespread exclusive, 'anti-poor' vision was then prevailing among both the wealthy citizens and political elites, but also among the formally housed middle-class.

While 'slum clearance' policies were adopted as early as 1936, the first large-scale evictions were undertaken during the 1950s and '60s. In the very few cases where resettlement options were proposed, they were drafted without any consultation and understanding of slum dwellers' needs and involved relocation in distant areas. This strategy of systematic eviction failed to address the root problem of sub-standard living conditions in the city. As a consequence, evicted families immediately re-appropriated their initial housing area.

In the 1970s, public perception started to change, as slums came to be more and more considered a persistent feature of Mumbai's landscape and as politicians realized that their inhabitants constituted a significant vote bank. Although demolitions were still a frequent answer to the slum issue, the need for resettlement and for on-site tenure security was increasingly acknowledged. The first projects, providing in-situ basic infrastructure and amenities, were started in 1970 through the Slum Improvement Programme (SIP).

In 1976, an exhaustive Census of slums was conducted for the first time. Some were officially registered and their inhabitants provided 'photo-passes' (identity documents). By granting voting rights to 'official' slum dwellers, this Census marked the beginning

[12] The definition of citizenship is here very close to the one of integration we will use in this study.

of a very recurrent and populist political sequence that can still be observed today (Mahadevian and Narayanan, 1999; Burra, 2003): promises of land regularization, then elections followed later by large-scale demolitions.

The 1980s witnessed limited improvement, mainly through the World Bank funded 'Bombay Urban Development Programme' (BUDP), under which two innovative projects were held: the Slum Upgrading Project, where dwellers were for the first time given some right to land, and the Low Income Group Shelter Programme, precursor of the 'cross-subsidy' approach.

Yet, the 'demolition drive' did not stop during the '80s. In 1981, the then Maharashtra Chief Minister, A R Antulay, stated that slum dwellers had to "return to their Native Place […] voluntarily", ignoring the fact that many of them were actually born in Mumbai. In the course of a single year (1983), the slum of Sanjay Gandhi Nagar, located between Cuffe Parade and Nariman Point, was demolished 44 times (Mahadevian and Narayanan, 1999). In 1985, when the Shiv Sena took control of the BMC, its leader Bal Thackeray declared that "there was no question of showing humanity" and that Mumbai was not "the country's orphanage".

In 1985, the Court banned demolitions during rains and without notice. The same year, the Central Government provided a grant of one billion rupees to the State of Maharashtra to improve housing conditions through the 'Prime Minister's Grant Project' (PMGP)[13]. Its principal objective was the rehabilitation of the extremely densely populated slum of Dharavi. Yet, it initially made provision for the in-situ rehabilitation of only 35,000 families out of the

[13] The notification for this project came out in 1985. The grant amount was US$ 20 million. It brought about a major shift towards (in-situ) re-development, as traditional (in-situ) slum upgradation was irrelevant in very dense slums. The principal component of this project was the re-development of Dharavi. Given the extreme densities of Dharavi, quite an ambitious Master Plan was drawn up; housing co-operatives were set up to represent dwellers; 18 m^2 were to be purchased by dwellers; and large transit accommodation was to be provided.

estimated 100,000 living in Dharavi, and lacked the required land, financial resources and administrative capacity to implement such a complex strategy.

During the state electoral campaign of 1990, the Shiv Sena proposed a large free housing programme through a cross-subsidized rehabilitation scheme relying on the private sector. The Sena lost the elections, but the Congress Party found it politically necessary to introduce a similar programme: the Slum Redevelopment Scheme (SRD). Under the SRD, builders were incited to act as developers through an increase in the FSI (see **Section 1.3**) and the possibility of selling additional flats in the open market. The maximum profit allowed was 25 per cent of the initial investment. However, the scheme had a limited success due to the impractical profit cap of 25 per cent and the irrelevance of the financial model used by the SRD Committee to calculate additional FSI. Builders remained skeptical, claiming that the process was too complicated and too slow.

After winning the 1995 state elections, the Shiv Sena decided to implement its own redevelopment strategy. The 'Afzulpurkar Committee' was set up to identify the limits of the SRD and to come out with a workable proposal for a new scheme. This resulted in the development of the Slum Rehabilitation Scheme (SRS).

2.4. The Slum Rehabilitation Scheme: principal actors and processes

Initiated by the Shiv Sena in 1995, the Slum Rehabilitation Scheme (SRS) is the main programme dealing with slum rehabilitation and resettlement in Mumbai[14]. Its objective is to make available free housing to slum dwellers by providing strong financial incentives to the private sector through what is commonly called 'cross-subsidy'. In fact, private profitability is ensured thanks to the slackening of social housing standards, the authorization to directly

[14] The MMRDA can also implement resettlement projects when the construction of infrastructure under the MUTP and MUIP schemes requires the displacement of slum dwellers.

sell part of the built-up area, and the granting of "Transferable Development Rights" (defined later in this section) to the developer. SRS projects are monitored by the Slum Rehabilitation Authority (SRA), created in 1996 by amendment of the Slum Area Act, 1971 (see **Section 1.2**).

There are, in fact, three different rehabilitation schemes under the SRS[15]: an 'in-situ scheme', a 'project-affected people scheme' and a 'transit scheme'. The Chandivali resettlement project we study falls under the second category. Under this model, the resettlement land initially belongs to a developer. Once a resettlement project is finalized, the land is handed to the SRA in lieu of a sale component (share of flats that can be sold directly) and Transferable Development Rights.

SRS eligibility criteria for a given family have been set up as follows. First, the long-term ward residency has to be proved with name of the head of family mentioned in the 1995 (or any previous) election roll. Then, a 'ration card', mentioning the slum to be rehabilitated or resettled as the family's residency area, has to be provided.

Under 'in-situ schemes', at least 70 per cent of the dwellers have to organize themselves into a cooperative housing society in order to appoint a developer for the project. This is not the case with 'project-affected people schemes', where the SRA directly publishes a letter of intent to find available land owned by a developer willing to provide resettlement tenements.

The SRS standard flat size is 225 ft^2 (21 m^2). Once resettled, 'project-affected people' are not allowed to rent or sell their tenement for 10 years. They benefit from an abatement of the municipal property taxes during this period and then progressively pay an increasing amount over the next 10 years. A deposit of Rs

[15] http://www.sra.gov.in/HTMLPages/RehabSchemes.htm

20,000 per flat (13 per cent of the estimated cost of construction) has to be provided by the builder to be used for maintenance.

Several financial incentives are given to attract developers. While in the SRD, profits could not have exceeded 25 per cent of the initial investment, under this scheme, the profit ceiling is deregulated.

Second, while FSI is only 1.33 in Mumbai Island and 1 in the suburbs (see **Section 1.3**), builders are allowed to use a 2.5 FSI on rehabilitation and resettlement sites. This means that the built-up area can reach 2.5 times the area of the plot. In very high density slums such as Dharavi, where the number of tenement per hectare exceeds 500, FSI can be raised up to 3. In areas under Coastal Regulation Zone [16], the FSI for rehabilitation and resettlement can only be raised to 2.

Third, as in the former Slum Redevelopment Scheme, only part of the built-up tenements is handed over to 'project-affected people'. Once all families have been resettled, the remaining area, called the 'sale component', can be directly sold by the developer. However, the maximum ratio of built-up area for sale to built-up area for rehabilitation depends on the location: it is 0.75 in Mumbai Island, 1 in the suburbs[17] and 1.33 in "difficult areas". The idea here is to allow more built-up area to be sold in locations where more financial incentives are needed to attract builders. Given these conditions, it would quite suit a builder to have some slum-dwellers encroaching on a plot that is marked for rehabilitation in a valuable area. The FSI can then be increased significantly (up to 2.5), while only a minimal portion of the built-up area is needed for housing slum dwellers and all the rest can be used as a sale component. The fact that FSI are not strictly proportional to the density of the

[16] This regulation concerns all built-up areas located less than 500 metres from the sea, so quite a significant portion of Greater Mumbai.

[17] A ratio of 1 means that a developer can sell a maximum of 50 per cent of the total built-up area under a SRS project.

slum clearly makes it more lucrative for builders to redevelop plots where low-density slums have encroached, especially where land is expensive.

Fourth, 'Transferable Development Rights' (TDR) maintain the project's profitability even when the initial slums are densely populated. The rationale behind TDR is as follows. In cases of dense population, even if the maximum FSI is consumed, most of the built-up area has to be used for rehabilitation. There is then no apartment left for the sale component, and thus, no profitability for the builder. TDR are, therefore, used to compensate the builder, who acquires it thanks to the SRS project. It is additional housing space to be used somewhere else. It can be used to increase the FSI of another construction instead of the rehabilitation/ resettlement one, or be put up for sale on the open market. In fact, 'loading' TDR on ordinary residential projects allows the builder to increase the maximum FSI which would normally be permitted. The only restriction is that TDR have to be used in suburban areas of Greater Mumbai, on a construction located in the north of the resettlement site. The BMC is the body in charge of issuing TDR progressively, upon delivery of the residential tenements. The calculation of TDR to be allocated to the builder is then based on the built-up area provided to affected families, plus the area consumed for passages, stairs and society units. However, social amenities are excluded from this calculation, providing no incentive to the builder to provide such facilities.

The Slum Rehabilitation Scheme, however, has been facing increasing criticism from the public over the last ten years. While its initial objective was to provide 800,000 tenements, by 2000 only 10 per cent of the nominally eligible slum dwellers of the city had shown interest (Mukhija, 2001) and, by 2003, 19,000 units had been built (Burra, 2003). There are several reasons for this limited achievement, especially when it comes to on-site rehabilitation. The primary ones are the drop in property values during the 1995-1998 period; the fact that most slums are located on areas classified as dangerous (hill slopes, under power-lines)

or not fit for construction (marshy land); and the often complex and protracted process of direct negotiations between slum dwellers and developers. As a result, many SRA buildings under construction were left unfinished.

Similarly, although the scheme can be very profitable, developers have no financial incitement in enhancing the quality of construction above minimal requirements. Very few social facilities are provided and therefore, buildings tend to deteriorate quickly. Yet, the principal critique mounted by researchers and social workers on the SRS is its complete reliance on the private sector and the lack of involvement of the state and municipal authorities, who take a 'back seat' in the process (the SRA's role is limited to a few tasks, such as approving the plans and controlling the conformity of buildings).

Consequently, frequent and significant abuses take place in the process. Numerous cases of developers putting financial, moral and even physical pressure on slum-dwellers to accept their project have been observed. Our field work also reveals that blackmailing and illegal delivery of eligibility papers have also become a very lucrative business in slums under rehabilitation or resettlement schemes (often strengthening the central role played by slumlords), increasing significantly the price most families have to pay to get a 'free' flat. According to representatives of local NGOs, SRA engineers barely visit construction sites under their supervision and tend to close their eyes to major construction defects (allegations of corruption are frequent). The media has covered countless scandals related to SRA-approved projects[18]. In 2007 alone, the Anti-Corruption Bureau was asked to probe 247 complaints against the SRA[19].

[18] See for instance *Times of India*, 09/10/2006, 20/10/2006, 25/11/2006 and 30/11/2006.

[19] See : www.karmayog.org/acbnews/acbnews_5006.htm.

3. The Sanjay Gandhi National Park

3.1. History of the Park[20]

The first evidence of human activity in the park's area goes back to the golden age of Buddhism in the first century AD (Kanheri caves). However, records of the recent history of the forest are only available for the period starting in the seventeenth century, when the forests of Yeur and Nagla were part of state property under the Maratha regime. In 1808, the British took control of the area and the forests of Vihar and Tulsi lakes were acquired by the BMC in 1860 and 1883 on 99-year leases. With the creation of the forest department in 1845, all these properties were surveyed and brought under a management plan.

The Krishnagiri National Park was then created as per the provisions of the Bombay National Park Act, 1950, covering an area of roughly 20 km^2. A state committee was set up in 1968 to manage the development of the park. Several forests under different ownership and management were brought together and added to the Krishnagiri National Park, under what became the 68.27 km^2 'Borivili National Park'.

While in 1976 the legislative powers related to forests were transferred from states to the central government by amendment of the Indian Constitution, 25 km^2 of additional land were acquired by the forest department. The Park was then once again renamed in 1981 to become the 'Sanjay Gandhi National Park' (SGNP). It then acquired legal backing and the higher status of a National Park. Following minor extensions and the setting up of a 10.38 km^2 buffer zone, the park soon reached its current size of 103.09 km^2.

The SGNP can nowadays be divided into several legal zones depending on the level of protection: 81.51 km^2 of reserved forest (core and most protected area), 0.21 km^2 of protected forest and 21.37 km^2 of unclassified forest (primarily the fringes, where the recreational area of 5.75 km^2 can be found today).

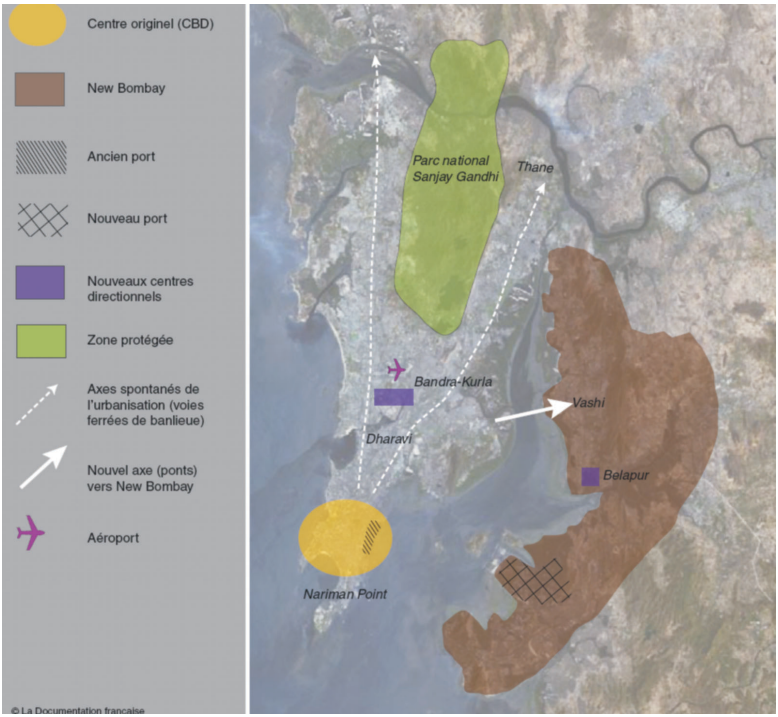
[20] Source: ECONET, 'A comprehensive assessment of the Sanjay Gandhi National Park, Mumbai', 1997.

3.2. The Park today: its importance for the citizen

The park is now a 103 km^2 protected enclave within the densely populated and fast growing northern suburbs of Mumbai. Of this, 44.45 km^2 are lying within Greater Mumbai and houses 12 million inhabitants; while the remaining 58.64 km^2 comes under the district of Thane. On the international level, the SGNP is known as the largest park located within the administrative precincts of a city, except for the one in Rio de Janeiro.

On account of its central location, the SGNP has shaped the urban expansion of the city towards the north by dividing it into two corridors. As no transport infrastructure can traverse the park, both the eastern and the western corridors concentrate all the mass transport infrastructure on a south-north basis, such as the two main freeways and railway lines of the city (**Figure 9**).

Figure 9: Urban expansion and localization of the SGNP



(Source: Landy, 2007)

The debate regarding the justification of maintaining such a large protected area in an already geographically constrained and highly congested environment is permanent. Supporters of the 'Brown Agenda' consider it irrational to have stretched the protected forest until it became the world's largest urban park, while the city was becoming one of the world's most densely populated metropolis. However, environmentalists maintain that the SGNP plays an essential role for the city's inhabitants. Its significance, as described in the Econet report (1997), is primarily indirect and therefore underestimated by the average citizen. Its contribution is ecological, recreational[21], educational, aesthetic, cultural and religious.

An overall contingent evaluation of the economic value of the park was conducted in 1995 by the Indira Gandhi Institute of Development and Research in the metropolitan area. It came out that the monthly willingness to pay (WTP) of the average citizen for the upkeep and protection of the park was as high as Rs 27.78 over five years. The park therefore still holds significant value for the residents of Mumbai.

4. The Park: perfect ground for a 'clash' between the 'green' and the 'brown' agendas

Today the Park is in shambles, with its south-western border encroached by over 40,000 slum dwellers, the north-western and the northern boundaries scoured and pock-marked by 19 stone quarries, its northern block devastated by plundering woodcutters and poachers, the Yeur forests encroached by developers, goondas and other illegal builders from Thane and Mumbai, and the central hill-slopes ravaged by the expanding empires of tricksters and 'dhongeebabas' trying to build concrete structures illegally by fleecing gullible visitors.

- Econet report, 1995.

[21] In terms of its recreational value, the SGNP is a great success, as it is the most visited park in India with 2 million visitors annually.

4.1. Settlements and conflicts in and around the Park

Each of the three entities previously presented – the city, the slums and the forest – follows its own dynamics, which explains the present 'clash' that is taking place along the boundaries of the SGNP. Over the last 50 years, the park expanded from 20 km^2 to 103 km^2, while 8 million additional inhabitants were settling in the neighbouring suburban areas (Risbud, 2003; see **Figures 1 and 3**). A significant share of them was 'informally housed' citizens attracted to the area by growing economic incentives and the availability of land. As a result, the city and its slums started encroaching onto the park's land as early as thirty years ago.

Several types of 'encroachments'[22] have been observed within the park (Econet, 1995). While a number of factories and quarries had long been operating in the area, the rapid rise of residential settlements has raised more concern. An estimated 90,000 hutments and dwellings were present within the protected area in 1995, both in tribal villages and in slums (450,000 inhabitants if we assume an average family size of 5). The following passages present an analysis of the history and localization of the corresponding 58 settlements, largely based on a survey carried out by Krishna Tiwari (2007) for the SETUP programme.

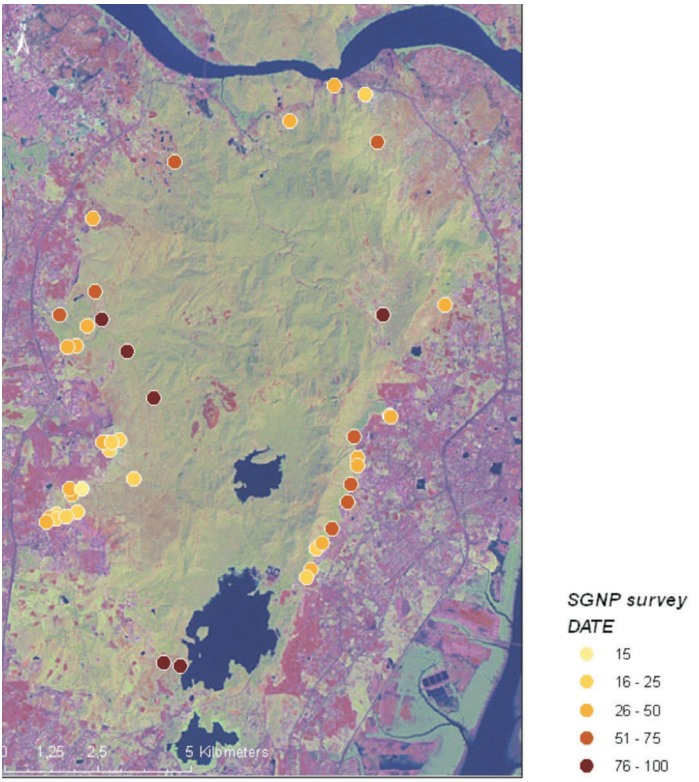
Tribal villages in the park:

Tribal communities (*adivasis*) are mainly located in so-called *padas* (hamlets) within the core area of the park. These benefit from a *de-facto* protection from local authorities as their inhabitants are said to be the heirs of a long tradition of knowledge and a lifestyle that is in harmony with the forest. Yet, tribal communities are now held partly responsible for the deterioration of the local ecosystem.

[22] Not all 'encroachments' were illegal. It is important to remember that (i) the demarcation of the park is not very clear; (ii) many people were here at a time when the park was much smaller and they somehow got engulfed into the park; and (iii) others were provided with all basic public services, and in some cases, the inhabitants were even paying property taxes to the municpality. See E. Bon, P. Chapelet, F. Landy and M-H Zérah, 'Nature in megacities: An impossible challenge? Insights from Mumbai', Contribution to the SETUP symposium on urban policies, territories and social exclusion, University of São Paulo, 27 and 29 August 2008.

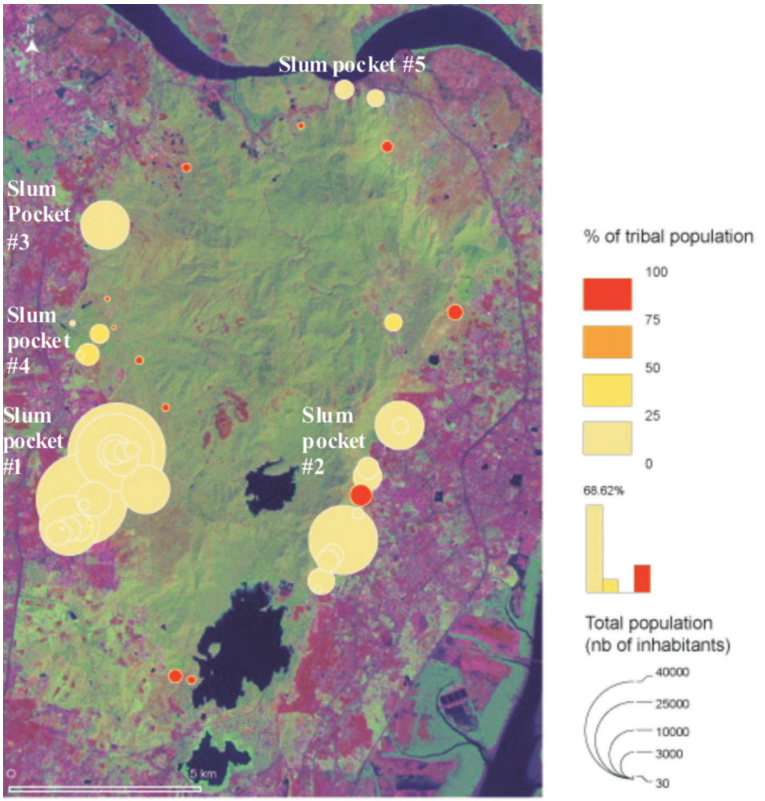
According to Tiwari's survey (2007), tribal villages are much more recent than commonly agreed. The two maps presented in **Figures 10 and 11** show a rough correlation between the percentage of tribal inhabitants within a village and the age of the settlement, but no tribal village appears to be more than a hundred years old. It is also clear that most tribal villages now house a high share of non-tribal population, composed mainly of migrants from other Indian states. In some cases, this is the consequence of *adivasis* renting houses to recent migrants. On the other hand, a number of tribal families can be found in large slums on the fringe of the park (Ketki Pada, Dahisar). There is then an increasing confusion on whether a settlement should be called 'tribal' and thus be allowed inside the SGNP.

Figure 10: Age (number of years) of human settlements within the SGNP.



(Source: Baseline survey, Krishna Tiwari, SETUP, 2007)

Figure 11: Size and composition of human settlements within the SGNP, location of the 5 main slum pockets.



(Source: Baseline survey, Krishna Tiwari, SETUP, 2007)

Slums in the park:

Slums are located on the fringes of the SGNP and are much larger than tribal hamlets. Unlike the tribal *padas*, most slums were initially called *nagars* (villages). There are five principal areas of slum concentration on the edges of the park, displayed in **Figure 11**. The most populated one is located on its south-western border, in the areas of Malad and Kandivali East (#1). It encompasses the slums of Damu (or Bhim) Nagar, Gautam Nagar, Satara Camp, Kranti Nagar, Pimpri Pada, Appapada and Ambedkar Nagar. The second area of concentration is a narrow strip of informal

settlements on the eastern side of the SGNP, expanding from Bandhup to Thane West (#2). It includes, among others, the slums of Hanuman Pada, Rahul Nagar and Shankar Tekdi. The slum of Ketki Pada, in the north-west of the park (suburban area of Dahisar), is the third pocket of population concentration on the park's boundaries (#3). Finally, the last and least populated slum pockets are located around the main entrance of the park in Borivili East (#4) and on its northern fringe (#5).

According to our fieldwork observations, none of these slums are the result of a quick, massive and planned land invasion. Two clear patterns of slum development can be identified.

The small and isolated slum pockets (#2 to #5) were the first ones to be created in the 1950s, either by *adivasis* or by the new migrants. Some of these settlements were initially outside the park and have progressively been included, following the successive acquisition by the forest department. Given their relative isolation and topographic constraints, they have faced limited demographic expansions. Over time, their inhabitants have developed a strong feeling of legal ownership, some of them even paying property taxes until very recently.

The next settlement process started much later (1970s) in the large south-western slum pocket (#1), as a result of the expansion of the 'formalized' slum of Kurar village towards the park (see **Figure 12**) and the proximity of a dynamic economic centre (major factories such as Otis or Mahindra & Mahindra). Informal settlements consolidated and expanded deeper in the park in the 1980s and '90s, when 'legal' infrastructure networks were set up (BMC water network, legal electric connections, MHADA public toilets etc.). Political parties played a significant role in encouraging this process by promising land regularization campaigns and the provision of basic amenities in the slums under their 'patronage' before every election.

Figure 12: Kurar village, a large informal housing and employment area neighbouring the south-west slum pocket of the SGNP. Except the front part (Kranti Nagar), it is outside the park and has not been affected by demolitions.

(Source: Author's survey, 2008)

Formal housing:

Slums and tribal hamlets are not the only forms of human settlements in the SGNP. The scarcity of land, as well as the strong commercial argument of a 'green environment', has led builders of Mumbai to constantly try to grab forest land (see **Figure 13**). We believe these 'formal housing structures' should be taken into account as another type of illegal residential encroachment within the park.

Controversies about large formal residential constructions started in early 2008 when the forest department claimed back large built-up areas located in Bhandup, Mulund and Thane West (*The Times of India*, 25, 26 and 27 March 2008). According to the *Times of India* (26 March 2008), an estimated 100,000 people are formally

housed within the park and an additional 75,000 people have invested in flats currently under construction on forest land. Similarly, many bungalows have flourished in the original tribal area of Yeur, most of them belonging to affluent politicians or bureaucrats and also encroaching onto the SGNP.

Figure 13: Residential buildings located on land apparently claimed back by the forest department. None of them have faced credible threats of demolition.

(Source: Author's survey, 2008)

4.2. The Public Interest Litigation process

Between 1990 and 1995, a total of 66 Court cases were filed by the SGNP authorities, mostly related to specific encroachments. In some cases, the Civil Court of Mumbai ordered eviction. A total number of 82 demolitions were held between 1988 and 1995, mainly by the forest department and by the government of Maharashtra (Econet, 1995).

In 1995, the Bombay Environmental Action Group (BEAG), a local NGO, headed by a controversial environmentalist, filed a Public Interest Litigation (PIL) case in the Bombay High Court. Its objective was to target all kinds of illegal encroachments and unauthorized structures built on land belonging to the SGNP.

Several committees were set up in order to provide in-depth information on issues of encroachment, resettlement and

reforestation. It took two years for the Court to issue its principal interim order, on 7 May 1997. According to Zérah (2007), "the stand of the court clearly rules in favour of environment and considers that resettlement and rehabilitation as well as measures to curb illegal development are required for its protection".

The order stipulated that (i) a map with clear boundaries had to be presented by the forest department; (ii) all types of public infrastructure had to be removed (electricity, water, phone, transportation); (iii) all existing commercial and industrial licences had to be cancelled; (iv) a survey of families living in the park had to be carried out within two months; and (v) inhabitants who settled in the area before 1995 would be provided resettlement, while the others evicted.

This ruling was consistent with the traditional, anti-poor vision of slum dwellers within the city's elite (described in **Section 2.3**). While the order mentioned all types of existing encroachments in the park, it was clear that given the current resettlement mechanism and restrictive criteria, slum dwellers would have to bear most of its – largely underestimated – social cost. Interestingly, it also pointed out the incoherence of previous public policies in the park's slums (providing bus, electricity, water and phone networks), but did little about the anticipated consequences of a sudden withdrawal of public services to almost half a million dwellers.

In reaction to the PIL, slum-dwellers rallied behind two local NGOs to defend themselves: the Nivara Hakk Suraksha Samiti (NHSS), created in 1987 and headed by the architect PK Das, actress Shabana Azmi and journalist Gurbir Singh; and the Ghar Hakka Jagruti Parishad (GHJP), created and headed by the politician and social activist Vidya Chauhan and the former TISS[23] professor Nicky Cardoso. These two NGOs benefited from strong support and back-up in the large slums located in the south-western part of the park. When the forest department suddenly started demolishing

[23] Tata Institute of Social Science, Mumbai.

houses in this area right after the PIL was filed (1995), they referred to the Court without delay. They raised the fact that under the Maharashtra Slum Areas Act (1971), no demolition could be done without a proper alternative accommodation being proposed with the consent of the slum-dwellers.

The survey requested by the Court, aimed at identifying the families who should benefit from a resettlement scheme, was carried out in 1999 by the forest department with the support of the NHSS. Eligibility criteria for resettlement were set up, based on both the SRS' and the High Court's requirements and recommendations. When the SRA would propose an alternative accommodation, the head of the household was required to provide a ration card, a 1995 (or previous) election card, and pay a fine of Rs 7000 to the forest department. During the survey, forest officers painted signs on the door of each dwelling, depending on the eligibility of the family (see **Figure 14**).

A total of 60,000 households were identified as living illegally within the park. Out of these, 33,000 were found to be staying in the area prior to 1995. By the time of the survey, 20,000 families had already lost their homes due to demolitions which took place right after the PIL was filed, mainly in the south-western part of the SGNP.

In 1999, a new interim order from the High Court gave more directions regarding the resettlement option to be provided to the 33,000 potentially eligible families. While the Government of Maharashtra denied its responsibility and passed the buck to central authorities (owning the land of the SGNP), the High Court confirmed that the land for resettlement had to be provided for free by the state-owned MHADA. Households had to be provided 15 by10 ft^2 plots of land (without dwellings) with basic infrastructure such as roads, drainage, electricity and water supply by September 1999. The Rs 7000 fine was payable in several installments.

Figure 14: Door marks painted by forest officers at the time of the survey. Only families with a green tick on their door were proposed a resettlement option.

(Source : Author's survey, 2008)

The resettlement land initially proposed by the MHADA and the forest department was in Sherdon, a distant north-eastern area located outside Greater Mumbai, on the mainland. This resettlement package raised concern among slum-dwellers regarding the small size of allotted plots and the fact that no tenement was to be provided (and thus all previous investments in housing would have been lost). The proposed location turned out to be the major issue, as such a displacement would have meant either loss of jobs or unsustainable increases in commuting duration and cost. Besides that, inhabitants of Sherdon expressed their hostility towards the possible arrival of more than 30,000 households – a whole new and poor city – on their land.

At that time, the two NGOs (NHSS and GHJP) jointly mobilized against the proposed resettlement options, and defended an in-situ rehabilitation approach. Protests were carried out and a number of challenging petitions were filed, all of which were rejected by the Court.

In the area where the influence of the GHJP was strong (Damu Nagar), Vidya Chauhan, corporator and leader of the NGO, convinced a majority of inhabitants that they were not entitled to pay the fine. She defended the idea that the park had been illegally

extended towards slums. According to her, the area of Damu Nagar used to be agricultural land under the property of the Dinshaw Trust. During its 1975 expansion process, the forest department was supposed to acquire only 848 acres under the Maharashtra Private Forest Acquisition Act (1975). However, the map presented by the forest department to the Court showed a 1064 acres area previously belonging to the Dinshaw Trust included in the SGNP. For the GHJP, the balance of 206 acres corresponds to the slum of Damu Nagar, claimed back by the forest department[24].

In 1999 and 2000, the largest and most violent demolition wave took place in the SGNP slums. Local authorities began by demolishing the south of the large south-western slum pocket. They followed the same south/north progression in the small slums located in the east of the SGNP, but their progression was stopped when they reached Rahul Nagar. Demolitions were not carried out everywhere in the same way. In some areas (Gautam Nagar) they were selective and targeted only non-eligible households. In others, such as Ambedkar Nagar or Damu Nagar, the entire built-up area was bulldozed[25]. Few slums were completely spared.

According to our field discussions, demolitions were sometimes held without notification and with excessive violence. Some people were injured and in many cases, the debris was set on fire in order to prevent any reconstruction. Hundreds of slum dwellers lost their official documents at that time, thus losing also their eligibility proofs for resettlement. All kinds of basic infrastructure, such as

[24] This issue was taken up before the Supreme Court, the GHJP asking for the application of the 1997 order under which the forest department was requested to present a clearly surveyed and demarcated map of the SGNP.

[25] We have contradictory information regarding the reasons behind the disparities in the way demolitions were implemented. The most credible hypothesis is political, and linked to the electoral segmentation of the area. Alternatively, selective demolitions could have been only carried out in areas where the proportion of people who paid the Rs 7000 fine was high. Finally, one could simply believe that demolitions were stopped due the physical mobilization of the population.

toilets, water pipes, as well as electricity and sewage networks were destroyed. Slums like Damu Nagar, which used to be very consolidated with two-storey houses, then became shanty-towns with shacks made of plastic sheets (see **Figure 15**). Number of families decided to migrate to other slums of the city at that time.

Figure 15: The fully demolished slum of Damu Nagar at the time of the survey.

(Source: Author's survey, 2008)

There is now a widespread confusion among slum dwellers regarding the localization of the park's boundaries and the status of the land, mainly resulting from the inconsistent behavior of the forest department over the past fifty years. Following the PIL and after forty years of passivity and lack of information, the department suddenly took an aggressive stand towards 'encroachers', while the legality of the park's acquisitions and ownership remained very litigious. These drastic changes of attitude have distorted the message received by slum-dwellers and generated both confusion and mistrust towards local authorities.

It even seems that the PIL did not put an end to this inconsistent behaviour. Before 2000, slums in Malad and Kandivali East used to extend very deep inside the forest, right to the top of a hill. The higher part of these slums was totally demolished and a fence was erected (see **Figure 16**). Dwellers were told that the new fence was demarcating the boundary of the park and that they could legally live on the lower part of the hill. However, the department

changed its position and later said that the fence was only built to prevent further encroachment and claimed a much larger area than the one actually demarcated. Eight years later, not a single tree has been planted on regained lands behind the fence, adding to the misunderstanding of local residents.

Figure 16 : The fence built behind the slum of Damu Nagar after the 2000 demolitions.

(Source: Author's survey, 2008)

A sense of frustration and bewilderment among slum-dwellers has also been exacerbated by rumours of attempts by the builders' lobby to grab new forest land from corrupt officials. The GHJP believes that this is exactly what is happening underhand, that many residential buildings are clearly within the SGNP and that new ones are still under construction, and all this, at the cost of lower-income slum-dwellers. While some of them would have received 'stay orders' from the Court, none of them would be facing threats of eviction. The GHJP is going even further, accusing the ex-leader of the BEAG (who filed the PIL case) of having financial stakes in the real-estate industry and therefore having a hidden agenda.

4.3. The Chandivali resettlement project

Right since 1999, the two NGOs active among slum-dwellers have fought against the Sherdon resettlement proposal. They did not use the same strategy though. On one hand, the objective of the GHJP was to first prove that slums were not inside the SGNP before developing an in-situ rehabilitation proposal. On the other hand,

the NHSS chose very early to take the forest department's map as definitive and to look for another, 'second-best' resettlement option (NHSS had already backed up and managed several resettlement projects in the past). The leader of NHSS himself drastically changed his point of view from pro-rehabilitation to pro-resettlement after the 1999 interim order.

Using the clout of its chairman, actress and former MP (independent), the NHSS approached the Government of Maharashtra and its Chief Minister several times to find an alternative plot of land. Simultaneously, a private builder (Sumer Corporation), proposed a piece of land it owned in the suburb of Chandivali for a resettlement project. This 89 acres plot, located along a hilly scrub, was at that time rented to a private quarrying company and had already raised controversies over its development potential.

The Housing Minister, Nawab Malik, brought together the NHSS leaders and Sumer managers. NHSS and Sumer agreed upon the construction of 25,000 tenements out of which 12,070 would be used for the park's dwellers (phase I). NHSS was said to act as the developer and its leader (PK Das) as the project's architect. The proposal was handed to and accepted by the High Court in 2000. Unlike the Sherdon resettlement proposal which was outside the area administrated by the SRA, the Chandivali project was said to be implemented like any 'project-affected people scheme', under the SRA's supervision. Its name, 'Sangarsh Nagar' (the 'village of struggle'), reflects NHSS' vision of an achievement for slum dwellers after years of legal face-off[26].

The plot and the built-up area are the largest ones to be developed for resettlement purposes in Greater Mumbai. According to the SRS mechanism (described in **Section 2.4**), the project is only financed through the allotment of Transferable Development Rights

[26] The name given to the project by the builder is less inspired: 'Sumer valley'.

(TDR) to the builder[27]. The total market value of TDR to be allocated to Sumer through the project should ultimately reach a record level.

The project differs from conventional SRA schemes by allowing for a wider NGO-involvement. While these usually act as intermediaries, here the NHSS is involved in each and every step of the process (from the legal struggle and the survey of eligible families to the drawing of blueprints and the monitoring of on-going constructions) and initially acted as the developer of the project. Even the control of slum dwellers' eligibility documents by forest officers was done within the NHSS 'welfare centre' and under the NGO's control. On the contrary, the role of the SRA in the project came out to be very limited, with only few controls being done by its engineers.

Plot location and type:

Chandivali is a suburb located 10 km south of the SGNP, near Powai Lake (see **Figure 21, Part 2**). The plot is closer to the historical centre of Mumbai (Mumbai Island) than the original slums, which is quite a unique feature for a resettlement project. It is situated at the junction of the western and the eastern suburban stripes, holds a central position but is isolated from the mass transport networks and especially the two railway lines. It is almost equally distant from the 'Western' railway station of Andheri as from the 'Central' one of Ghatkopar, and is surrounded by very high-standard housing projects, such as the famous Hiranandani Gardens.

Such a large plot of land is actually extremely difficult to find within Greater Mumbai. Yet, half of it – 43.7 out of 89 acres – is used for quarrying purposes and is now under a No-Development Zone (NDZ) regulation. If it had not, Sumer could easily have used it to build upper-class residential structures. Still, using it for

[27] Given the central location of Chandivali and the fact that TDR can only be 'loaded' on projects located north of the resettlement area, these TDR are usable on most suburbs of Greater Mumbai.

resettlement purposes was the only way for the builder to get sufficient political support to lift the NDZ regulation on the second half of the plot. As the CEO of Sumer Corporation puts it, 'The state government assured us that it would make everything it could for the entire 25,000 tenements' project to go until completion. […] We expect the NDZ regulation to be removed on the second half of our plot by April 2008' (Vaquier, 2008). Hence, a Slum Rehabilitation Scheme (SRS) was the best solution for Sumer to use the full potential of its land, especially given the record Transferable Development Rights (TDR) it would get out of it.

As the plot was first used as a quarry where underground blasts had been frequent, concerns arose over the risk of ground instability in case of an earthquake. For this reason, the same plot had already been rejected by the World Bank for another resettlement proposal. Yet, the SRA engineers in charge of the project asserted that the land was perfectly suitable for construction and that the rocky soil would make its foundations even more stable.

Figure 17: Satellite view of the resettlement site in Chandivali.

(Source: Google Earth, 2008)

Project description:

Based on the 1999 survey, resettlement listings were established by the forest department under the control of NHSS. The fine was charged in 2000, at a time when the proposed resettlement option was still in Sherdon. In a number of cases, irregularities have been noticed. The resettlement process and registration is not transparent and sometimes even though people had played by the rule, they were denied their right to being resettled. Some eligible households who paid the fine, but had lost their documents, were denied the right to be resettled. Others simply failed to gather the requested money. A last group was composed of families who refused to pay as all they were offered at that time was a small and empty plot of land in Sherdon[28]. Approximately 12,000 households ultimately paid on time and their names were proposed as beneficiaries during the first phase of the Chandivali project.

Besides the fine, the NHSS also asked eligible households for a financial contribution either called 'filing fee' or 'member fee' when they came to register (Rs 100 to 200). Another Rs 500 was charged by the NHSS at the time of shifting (see **Part 2, Section 5.4**).

The construction of the complex started in 2005, according to the initial blueprints proposed by the NHSS (see **Figure 18**). Massive flattening work was first carried out in order to knock down part of the hill located in the No-Development Zone and to level the ground (see **Figure 17**). At least 45.3 out of 89 acres (183,394 m^2) were used to construct the tenements for SGNP dwellers under the first phase. A total number of 12,070 flats are being built over this area, achieving a density of 870 units per hectare and a total built-up area of 346,568 m^2. All tenements are 225 ft^2. Commercial tenements are to be provided at the end of the project. The permissible FSI is 2.5 and has been fully consumed with seven-floor buildings. The complex is organized

[28] As my field research collegue Akshay Tiwari puts it, those who paid the fine took a bet on the future evolution of the PIL case. Most of them wouldn't have gone to Sherdon anyway.

into 15 clusters (*padas*) of 16 buildings each. If the NDZ regulation is lifted, a second phase of construction (not yet planned for the resettlement of SGNP dwellers) will extend the complex to a total of 25,000 flats.

The inauguration took place on 1 May 2007, when 7 clusters out of 15 planned under phase I had been completed based on NHSS blueprints. The first 4142 families then shifted to their new flats. They were coming from the large south-western slum pocket of the SGNP. The slums of Ambedkar Nagar and Matangad, which faced large unselective demolitions, were shifted first as a matter of urgency. The slums of Appa Pada and Kranti Nagar were then resettled. These will probably be followed by Gautam Nagar and Damu Nagar. Other small slum pockets of the SGNP could be resettled last. All resettled families were requested by the forest department to demolish their dwellings themselves (as per the Maharashtra Slum Area Act, 1971). As the High Court asked for an 'area-wise' resettlement process, people from the same slums were given flats in the same buildings and the allotment of flats within a building was based on a lottery system.

Yet, in 2007 strong disagreements arose between NHSS and Sumer. We believe these were the result of diverging views over the construction plans. NHSS leaders had an ambitious vision of Sangarsh Nagar, both in terms of construction quality and provision of amenities: large open spaces, balconies, 3 primary schools, one secondary school, religious institutions, 385 shops, a hospital, 3 clinics, restaurants, a cinema, shops, banks. These were far higher than what was requested by the SRA. As a matter of fact, Sumer had no financial incentive in delivering such high-quality constructions. The only objective for the builder was to quickly deliver a project in compliance with standard SRA requirements. Thus, the plans proposed by NHSS did not match the cost objectives and timeframe of the builder. For instance, the balconies and the aerated corridors proposed by NHSS required high densities of steel and concrete and increased the cost-per-tenement ratio. The disagreement was also related to

the number of floors to be built as also the full consumption of FSI.

Sumer, not entitled to comply with NHSS blueprints, then stopped its collaboration with the NGO and appointed its own architect. Subsequently, the plans were considerably modified and the 7000 tenements that still had not been delivered for the first phase are now being built in a traditional 'SRA fashion': the balconies were removed, the design of the corridors was simplified and only one school and one hospital are to be 'donated'. For Sunil Rathod, the SRA assistant-engineer in charge of the project, both types of buildings meet the agency's requirements. This change in design is very clear while comparing the blueprints and photographs of the complex (see **Figures 18 and 19**).

Figure 18: New blueprint of 'phase 1' of the resettlement project. Red area: NDZ. Area between the red and the blue lines: designed by Sumer. Area below the blue line: designed by NHSS.

(Source: Author's survey, 2008)

Figure 19: Picture of the resettlement site. The first buildings constructed following NHSS guidelines are in the background while the new ones, without balconies, are in the foreground.

(Source: Author's survey, 2008)

Situation in January 2008:

In January 2008, at the time the research for this report was being finalized, an estimated 5000 families had moved to their Chandivali flats. An additional 4000 tenements had been delivered to the SRA while the last 3000 planned under 'phase I' were expected to be finished by the end of 2008.

The administrative structure in charge of the complex's management had been setup; in every building, a 'building committee' elected, each president participating in the 'cluster committee'. Five elected members of each 'cluster committee' were participating in the 'Sangharsh Nagar Housing and Development Federation' which is the representative body for the entire resettlement complex (ultimately more than 60,000 people). Both these committees and the federation were to be registered as co-

operative societies at the time of writing. These bodies were in charge of the collection of maintenance charges; the payment of water and electricity bills (mainly for the water pumps); the wages of a 'motorman', a 'watchman' and a sweeper; the maintenance of water pipes, the drainage infrastructure and the cleaning of the water tanks.

Sumer had already started loading part of its fresh TDRs on other residential projects it was building in the northern suburbs of the city, the balance being sold on the open market. However, TDRs were only granted progressively as tenements were being delivered to the SRA.

As far as the forest department was concerned, the Rs 84 million[29] received through the payment of the fines had not been used on the Chandivali project, the institution claiming to have spent it to prepare the land for resettlement in Sherdon.

A major breakthrough happened in January 2008 when the High Court allowed for an additional month for slum dwellers to pay their fine to the forest department. Eight years ago, those who did not believe that a better resettlement option than Sherdon would be found, had to change their mind. Almost 13,000 additional families paid their fine and were eligible for resettlement. The total number of eligible families was reaching approximately 25,000, out of the 33,000 who were found to have all necessary documents in the 1999 survey. There was no guarantee from either the builder or the SRA that these additional families would be resettled in the 2nd phase of the Chandivali project, this phase depending on the lifting of the NDZ regulation. SRA engineers confirmed that a general letter of intent had been published to find another plot of land. It will be an issue of equity if newly eligible families are not resettled in the same area.

[29] Rs 7000 fine × 12070 households to be resettled

Part Two: Assessing the impact of resettlement

1. Rationale

1.1. Focusing on employment

The objective here is to assess through a household survey the impact of the shift to Chandivali on the dwellers' *socio-economic integration* with the surrounding urban environment of the city. The key driver of the assessment is employment.

As displayed in **Figure 20**, our overall definition of *socio-economic integration* encompasses the concepts of *access to land ownership* (security of tenure), *access to basic infrastructure and amenities* and *access to employment*. However, there is a hierarchy among these notions depending on the local context. In Mumbai, we make the assumption that *access to employment* is the first and primary factor of integration. Slum dwellers, we believe, will not give much importance to *land ownership* plus *access to basic infrastructure and amenities* unless they have a job.

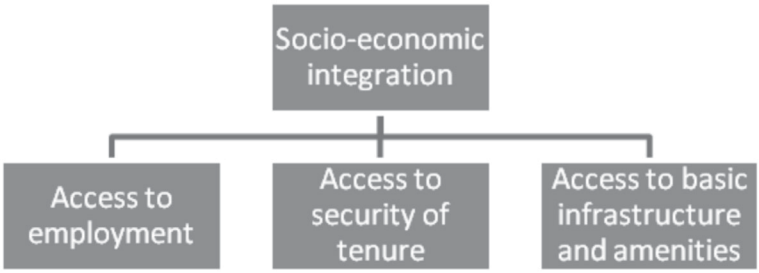
Expected employment is the key factor dragging migrants out of their rural background to Mumbai and pushing them to settle in the vicinity of economic centres of activity. The stock of informal jobs in the city's service sector is considerable and attractive. Finding a casual or self-employed job is often quick and easy. Yet, the cost one has to bear for this benefit is often a long struggle to find, secure and improve a shelter.

Unlike rehabilitation schemes, resettlement projects imply a geographical relocation and therefore alter the employment status of beneficiaries. Even if such projects imply short-term improvements in tenure security and living conditions, they cannot be considered as successful and sustainable unless they take into account the employment dimension.

The choice faced by affected families when shifing intra-city is in opposition with the choice effected at the time of migrating to the city. Short-term benefits (improved security of tenure and

conditions of living) are weighed against the expected effect of relocation on employment. Maintaining the sources of income becomes even more central while considering the potential increase in the cost of living (maintenance charges, transportation costs, tuition fees). When costs are prohibitive and employment opportunities insufficient, slum dwellers simply take advantage of the process, sell their flats and move back to their initial area of residence.

Figure 20: The three dimensions of socio-economic integration in slums.



1.2. Focusing on the Chandivali project

Being a recent, large as well as unconventional resettlement scheme, the Chandivali project is particularly relevant for an academic study. Yet, it remains largely undocumented both by academics and media, who tend to focus solely on the Dharavi rehabilitation scheme.

The Chandivali project is said to be the largest project of its kind in Asia, targeting a total number of 12,070 families under its first phase. Assuming an average family size of 5, the ultimate population of the resettlement complex can be estimated at 60,000[30]. It will hence have a significant impact on the employment structures of the original suburbs of Malad and Kandivali (and to a lesser extent Dahisar, Borivili and Mulund), but also of Chandivali.

[30] Twice more if we take into account the population to be resettled under the second phase.

The location of Chandivali is also very different from traditional resettlement schemes where beneficiaries are relocated in the outskirts of the city. As we have shown in Part 1, Chandivali is located in the south of the Sanjay Gandhi National Park and is then closer to the historical centre of the city. It might then minimize the disruptive impact of relocation on the level of integration and even lead to some positive effects, especially in terms of employment.

Besides that, the Chandivali project is still an ongoing process, started only a year ago when the first 4142 families were resettled. This gives us a unique opportunity to compare 'shifted' and 'not-yet-shifted' households who share the same eligibility criteria and a common history of resettlement under the PIL process. At the same time, our fieldwork was carried out late enough to allow new employment patterns to emerge (see **Section 2.1**) and be taken into consideration.

The Chandivali project is also unconventional in the sense that there is not one, but several slums to be relocated under the PIL process, each of them having different characteristics in terms of socio-economic, religious and geographical origin of its inhabitants. That makes it possible for us to isolate the effect these characteristics could have on integration levels, both in the initial slums and in Chandivali.

Finally, as previously stated, the buildings which have been delivered until 2007 have been designed by NHSS, and their quality is above minimal SRA requirements such as open spaces and balconies. This could play a role in the overall level of satisfaction towards the project.

2. Methodology

2.1. Sampling strategy

Due to time and resource constraints, we have chosen to target only a limited section of the population to carry out our

quantitative survey so as to get a proper picture of their social and economic integration. In that sense, we have focused on the impact the Chandivali project might have on eligible households[31]. However, given the fact that the notion of 'eligibility' was still evolving at the time of the survey (as explained in Part 1, a new delay being granted by the Court for the payment of the fine), we chose to focus only on a reference population composed of all households that held proper SRA-required proofs and who had paid the forest department's fine in 1999. Comparing similar households then allowed us to infer a reliable assessment of the impact of resettlement on this specific group of people. In addition, qualitative discussions have been used to understand the overall background of the project and the implications of the High Court's decision for the non-eligible households.

Our sample is composed of 200 families, interviewed on 32 working days between 9 December 2007 and 11 February 2008. It is premised on a geographical stratification. Out of 12,070 families earmarked for resettlement under the first phase of the Chandivali project, 4142 had already moved into their new flats at the time of the survey. The NHSS provided us with the repartition figures of the remaining project-affected families. As the lists were not finalized by the forest department, some families were missing, but this does not affect the overall repartition.

Table 1 displays the location of eligible families at the time of survey. As our target population is composed of 'eligible households', we can then deduce the number of interviews to be proportionately held in Chandivali and in each slum for a total number of 200 families.

[31] The entire eligible population which fulfills all the three criteria, namely, (i) is on the 1995 or prior election roll; (ii) has a ration card; and (iii) has paid the Rs 7000 fine.

Table 1: Geographical stratification based on the total number of project-affected families per area.

Area Name	Location towards the SGNP	Project affected households	Percentage	Interviews
Chandivali	South	4142	37	75
Gautam Nagar	South West	3892	35	69
Damu Nagar	South West	1436	13	26
Hanuman Pada	East	450	4	8
Ketki Pada	North West	360	3	6
Rahul Nagar	East	350	3	6
Satara Camp	South West	230	2	4
National Park	West	225	2	4
Shankar Tekdi	East	135	1	2
TOTAL		**11220**	**100**	**200**

(Source: Author's survey, 2008)

A sub-stratification in the sample available has been established both within the slums and Chandivali to ensure an optimal geographical coverage. In each slum area, and especially Gautam Nagar and Damu Nagar, a maximum number of *chawls*[32] has been covered with proportionally more interviews being held in those that were more densely populated.

In Chandivali, 83 buildings spread among six clusters were already inhabited at the time of the survey. As 75 interviews had to be conducted on the resettlement site, we decided to carry out an interview per building (changing systematically of floor level) and to leave one building uncovered in each cluster. We collated 77

[32] In this case, a *chawl* is not a traditional building accomodating factory workers, but a group of a dozen of slum dwellings, where inhabitants have organized themselves in order to develop basic infrastructure and services. *Chawl* members often pay a 'society fee' which gives them the right to use local sewage system, private toilets and even sometimes benefit from waste disposal.

interviews among which two were deleted because of poor data quality.

Finally, as we said earlier, our survey was held approximately nine months after the first 4142 households were allotted their flats. But other families only moved in more recently. As our primary focus is employment, we had to make a choice regarding the time necessary for an active worker to adapt to his new environment. We then decided to interview only families that moved into their flats at least four months before the interview was held, that is, in September 2007 or before (the Chandivali part of the survey only started by the end of January). However, our Chandivali sample almost exclusively comprises of initial inhabitants of the complex: 96 per cent of the families we have interviewed in Chandivali shifted before July 2007, meaning at least six months before the survey.

2.2. Questionnaire

Our survey assesses the three dimensions of *socio-economic exclusion/integration* we have presented in the introduction through specific sets of questions. The first version of the questionnaire (Vaquier, 2008) was initially tested in the course of two days on a dozen families before being modified to match both the time and field constraints.

We first evaluate *access to tenure security* by going through the family's settlement history, inquiring about its housing record in Mumbai and in the slum area, its geographical origin, the way it acquired its land/house and whether settlement was done individually or collectively. We also use the number of demolitions, the quality of the tenement and basic infrastructure as also the level of investment in housing improvement as proxies for the perceived security of tenure (Field, 2004).

As far as *access to basic infrastructure and amenities* is concerned, we first assess the availability, the quality and cost of what we have called 'basic infrastructure': water, sanitation, waste collection

and electricity. We then evaluate the average travel time to and cost of transport facilities (auto rickshaw, bus stop and train station) and social infrastructure (schools and healthcare centres).

We then focus on the core interest of our research, *access to employment*, by asking questions on household members' education, employment status and income. Our approach to the employment issue is based on the typology used by the National Sample Survey Organization of India (NSSO): A person is considered as 'participating in the labour market' if he/she has any income-generating activity. This person is then considered as a 'principal status worker' if he/she works for more than 183 days a year (an average of 3 days a week in our case). He/she is considered a 'subsidiary status worker' otherwise. We finally classify the occupation status depending on its nature (self, casual or permanently employed), industry and location, by distinguishing between principal and secondary jobs. Information collected on the job location also allows us to build a variable, representing the time and the commuting distance 'as the crow flies', and to identify the different patterns of job localization that can be found in slums and in Chandivali.

We finally ask specific questions on the respondent's relation with the forest environment, the quality of information that they received on the resettlement plan, and finally evaluate the respondent's level of satisfaction with the Chandivali project.

2.3. Household and individual databases

The questionnaire provides us with information both at the level of the household as a whole, as well as that of the individual member for all members of the respondent's family above 14 years. Individual data includes information on the age, sex, education, professional situation (type, nature, industry and location of job) and employment changes due to the resettlement of adults. In addition to our household database comprised of 200 observations, we have built a second database providing detailed professional information for 729 adults. Both the

'household' and the 'individual' databases will be used in the later sections of this report.

2.4. Complementary qualitative approach

Parallel to our survey, qualitative interviews have also been conducted with all the principal stakeholders of the Chandivali resettlement process. The objective here was to understand the overall background of the project, add qualitative inputs, but also infer several hypotheses that could either be confirmed or rejected through our statistical analysis. We therefore met most NGO and political leaders, as well as the builder and the SRA engineer in charge of the scheme.

2.5. Bias minimization during field work

The survey being on a limited scale, it was essential for us to ensure that the quality and the reliability of the data gathering process were optimal. Before every interview, the knowledge of the respondent regarding the rehabilitation process and the economic status of family members were evaluated by a few very basic questions. The questionnaire was not administered if these were not satisfactorily answered.

Similarly, we have limited as much as possible the number of interviews held in the presence of NGO representatives and local politicians. We have, in that sense, tried to reduce the bias of the external pressure one could have been exposed to while answering our questionnaire. Out of the 200 interviews held, only six were held in the presence of NGO representatives and local politicians.

Although this turned out to be difficult, we minimized the number of interviews held in public as that might have led to 'collective' answers or might have introduced a bias regarding several types of information, including the economic status of the family. Nevertheless, the densities in slums are such that private spaces are almost non-existent, and groups of people usually gather quickly around the respondent. Approximately 82 of the interviews ended up in the presence of non-respondents, at which

point we systematically moved to another *chawl* for the following interview.

We also knew that during week-days, most people were working and could not be found in slums. Unemployment or inactivity might then have been overestimated among respondents. Therefore, as far as employment issues were concerned, we had decided not to restrict ourselves to the respondents but also to collect information on all family members above 14, thus covering the entire active population of the family. This was possible given the fact that in slums, most families always leave someone at home to secure their dwelling and belongings (Field, 2003). Furthermore, our planning of interviews was organized in such way that weekends represent a significant portion of the time we spent on the field.

Finally, and unlike in large-scale surveys where it is impossible to do so, here, the author was present for each and every of the 200 interviews, gathering the data with the help of a research assistant/ interpretor. Misunderstandings and mistakes regarding the questionnaire were then immediately clarified and corrected.

Nonetheless, our results have to be cautiously interpreted for several reasons.

First, the sample remains small, compared to the target population: 200 out of approximately 12,000 eligible households (1.7 per cent). Although efforts have been made to compensate for this shortcoming by ensuring high-quality interviews and an optimal targeting and stratification, our conclusions should not be taken as final but more as general indications calling for more in-depth research. Nevertheless, we believe that the representative quality of the sample has been preserved and that the features identified in the following sections come out as sharp enough for us to be confident that they could apply to the entire eligible population.

Second, the PIL case and the demolition drive which followed have induced population movements out of slums. We found several

families in Chandivali who were allotted a flat though they had left their slum seven years ago, at the time of demolitions (this movement being legal from the point of view that they provided all the proofs and paid the fine on time). Therefore, one weakness of our survey is that the sample is selected based on 1999 criteria, while the targeted population has not been stable since then.

Third, one also has to be careful while interpreting our results, as we know that only 12,000 families would benefit from the first phase of the scheme, while the total number of families found to be living in the SGNP was 60,000 in 1999. Therefore, even if we find that the project has positive impact for the affected people, we have to keep in mind that 48,000 other families will either be rehabilitated elsewhere or simply evicted. This is the reason why further research is required to trace non-eligible families in order to understand where they have been and how they have coped with their eviction.

Fourth, we have to keep in mind that the Chandivali project is an unconventional SRA scheme (see **Part 1, Section 4.3**). It largely involves an NGO, provides tenements above minimal SRA standards, and does not relocate slum-dwellers to the outskirts of the city. Most of our outcomes will therefore not be applicable to other resettlement schemes, especially when these are conditioned to good localization.

3. Comparability of not-yet-resettled and resettled slums

Due to the small sample size and time constraints, traditional methods used in impact analysis research, such as instrumental variables or propensity matching, were not feasible here. It, however, remains necessary to ensure that resettled and 'not-yet-resettled' households share the same initial characteristics, so that we can objectively compare them and infer relevant conclusions. By choosing to restrict our sample to the population having proper eligibility proofs, we first assume that households, whether they are living in Chandivali or in slums, all share a common history. All of them were originally living in one of the five slum pockets

previously identified (**Part 1, Section 4.1**), located within the fringes of the SGNP. None of them has come from tribal villages, as these have been *de-facto* excluded from the resettlement programme. All families had settled in their respective slums before 1995 and have either witnessed or been involved in the PIL process (at different levels though).

Basic statistical comparisons between the two sub-groups confirm their similarity in terms of intrinsic characteristics. First, a simple mean difference test (Vaquier, 2008) based on the 'individual' database reveals that we cannot reject the hypothesis of equal averages of adults' age among the two sub-populations (32.6 years-old).

We then focus on the religious structures. As displayed in **Table 2**, both resettled and 'not-yet-resettled' groups display similar patterns. Hinduism is the principal religion with 80 per cent of each sub-population. Buddhism comes second with 7 per cent in the former case and 10.4 per cent in the latter. Muslims and Christians are respectively the fourth and fifth religious groups represented in the two sub-samples.

Table 2: Religious composition of resettled and 'not-yet-resettled' sub-groups.

Religion	Resettled = no		Resettled = yes	
	Freq.	Per cent	Freq.	Per cent
Hindu	101	80.80	65	86.67
Buddhist	13	10.40	5	6.67
Muslim	10	8.00	3	4.00
Christian	1	0.80	2	2.67
Total	**125**	**100.00**	**75**	**100.00**

(Source: Author's survey, 2008)

The structures of the two sub-populations are again comparable in terms of the households' geographical origin (**Table 3**). The most frequent geographical origin we observe in both sub-samples is Uttar Pradesh (37 to 40 per cent). Maharashtra comes second with

36 per cent in both groups. Mumbai[33] (non-migrants) comes third and Karnataka forth.

Table 3: Geographical origin of interviewed families among the resettled and 'not-yet-resettled' sub-groups.

NativePlace	Resettled = no		Resettled = yes	
	Freq.	Percent	Freq.	Percent
Uttar Pradesh	46	36.80	30	40.00
Maharashtra	45	36.00	27	36.00
Mumbai	12	9.60	11	14.67
Karnataka	8	6.40	2	2.67
Bihar	3	2.40	2	2.67
Tamil Nadu	1	0.80	1	1.33
Other States	10	8	2	2.67
Total	**125**	**100.00**	**75**	**100.00**

(Source: Author's survey, 2008)

Finally, resettled and 'not-yet-resettled' families are also comparable in the sense that they all migrated to Mumbai at the same time, on an average, by the end of the 1970s or the beginning of the '80s.

Notwithstanding these similarities, the two sub-groups differ on two aspects: the date of creation of the slum and the number of demolitions they have faced in the past. This is mainly because all slums that have been resettled until now are part of the large south-western settlement pocket of the park. This group of settlements is more recent and has faced more frequent demolitions than the four smaller slum pockets of the park (see **Part 1, Section 4.1**) which have not yet been resettled. Interestingly, the variance of the number of demolition and of the date of slum creation remains sufficiently high in both sub-groups to identify whether these have played a role in the families' integration at the time of resettlement.

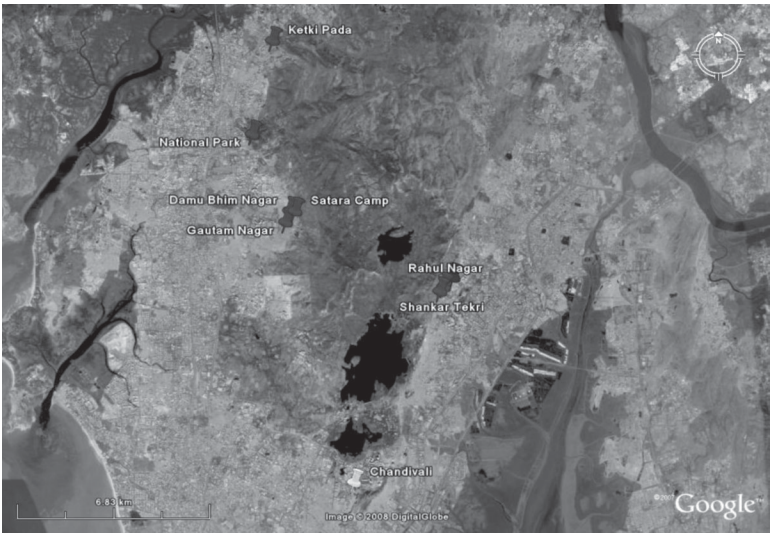
[33] A household is considered as being native from Mumbai if it has no member born outside the city.

4. Descriptive statistics

This section presents basic descriptive statistics regarding the respondents', households' and overall population's profiles. When these are significantly different between our two sub-samples (slums/Chandivali), only the slum data is provided, as changes due to resettlement will be discussed in following sections.

As we previously mentioned, the sample is composed of 200 observations. A total of 75 interviews were held in Chandivali as 37 per cent of the eligible population had already moved into their new flats at the time of the survey. The 125 remaining households were surveyed in all slums that still had to be shifted, in proportion to the ultimate number of families which should be resettled from each of them (stratification detailed in **Section 2**). The two main 'not-yet-resettled' slums are the ones of Gautam and Damu Nagar which represent 35 and 13 per cent respectively of the population from the park which should ultimately shift to Chandivali. **Figure 21**displays a satellite view with the localization of each of the nine surveyed areas.

Figure 21: Areas covered by the survey including the 8 slums to be resettled and the Chandivali complex.



(Source: Google Earth, Author's survey, 2008)

4.1. Respondents' profile[34]

Our pool of respondents comprises of 70 per cent men, 30 per cent women and, more important probably, 75 per cent of people participating in the labour market (see **Table 4**). It, therefore, seems that we have managed to limit the bias related to the absence of male workers during weekdays. On an average, respondents are 37.5 years old (ranging from 16 to 75) and have been to school up to the 7th grade. Almost 99 per cent of them speak Hindi, 65 per cent Marathi, 16 per cent English and 4 per cent Gujarati. Among the 38 per cent of respondents who can also speak a local language, Bhojpuri is dominant with 64 per cent. Then comes Malvani with 10 per cent, Konkani with 9 per cent and Kannada with 6 per cent. Other marginally spoken languages include Bengali, Sanskrit, Telugu, Rajasthani, Punjabi and Tamil.

Largely above Mumbai's suburban mean of 13 per cent (Census of India 2001), 17 per cent of the responding sample is illiterate while 73 per cent can read and write Hindi, 48 per cent Marathi and 11 per cent English. Only three respondents are literate in other regional languages.

Confirming our first results, a mean difference test on our data clearly confirms the fact that people who were resettled first have faced, on an average, significantly more demolitions than others. Our respondents faced an average of 1.3 demolitions. But this figure goes up to 2.2 for resettled households while it is only 0.8 for 'not-yet-resettled' ones. Among the slums that have not yet been shifted, Damu Nagar is an exception, presenting a very high average of 1.8 demolitions per family.

[34] This section only covers the descriptive statistics of the responding population. It has to be differentiated with household-level and more intensive individual-level statistics provided in the following sections.

Table 4: Respondents' profile.

Variable	Obs	Mean	Std. Dev.	Min	Max
GenderAdult (1 if woman)	200	.3	.46	0	1
Participate (1 if participates)	200	.74	.44	0	1
AgeAdult	200	37.45	12.17	16	75
EduAdult (grade)	200	7.39	4.48	0	15
Illiterate (1 if illiterate)	200	.17	.38	0	1
HindiSpeak (1 if speaks Hindi)	200	.99	.1	0	1
MarathiSpeak (1 if speaks Marathi)	200	.65	.48	0	1
GujaratiSpeak (1 if speaks Gujarati)	200	.04	.2	0	1
EnglishSpeak (1 if speaks English)	200	.16	.37	0	1
OtherSpeak (1 if speaks other)	200	1.56	2.45	0	10

(Source: Author's survey, 2008)

4.2. Household-level statistics

Separate figures on the religious structure of our sub-populations have already been displayed in **Section 3**. If we now compute them to get an overview of our sample, it comes out that Hinduism is the main religion among our respondents, representing 83 per cent of the sample. Next comes Buddhism at 9 per cent, third is Islam at 6.5 per cent and finally Christianity at 1.5 per cent.

Most interviewees' families originally came from Uttar Pradesh (38 per cent) and Maharashtra (36 per cent). However, a considerable proportion of them (11.5 per cent) have no relatives born outside Mumbai. Several minorities from other states are also represented, Karnataka being the main one with 5 per cent of the sample. For those whose native place is Maharashtra, we have collected information on the district of origin. 23 per cent of them

come from Ratnagiri, but the rest is quite homogeneously spread over the different Maharashtrian districts, the main ones being Jalna with 10 per cent, Sindudurg and Pune with 8 per cent each, and Raigad, Latur and Satara (which gave the name of 'Satara Camp' to one of the surveyed slums) with 7 per cent each.

The average family size in the slums is 5.3 (**Table 5**). It includes 3.9 adults and 1.4 children under 14[35]. Here, we only limit ourselves to the slums as we will observe a sharp change in family size due to resettlement (see **Part 3, Section 1**).

Table 5: Slum households' characteristics.

Variable	Obs	Mean	Std. Dev.	Min	Max
HouseholdSize	125	5.28	2.26	1	16
Adults (nb per family)	125	3.92	1.76	1	10
Children (nb per family)	125	1.36	1.44	0	7
HouseIncome (from adults' work only)	125	6148.8	3926.64	0	30000
TotalIncome (including other than adults' work)	125	6198.4	3867.13	1500	30000

(Source: Author's survey, 2008)

For the same reason, only the average household's economic profile is presented here for slum-dwellers. The average family monthly income resulting from adults' work is Rs 6149 in slums. If we include 'other forms of income', only concerning 4 per cent of households, the average family income goes up to Rs 6199. These additional incomes can either be retirement pensions, room rent, NGO support, borrowing from relatives or children's work (tea or food delivery mainly).

Slum families own very few assets. 65 per cent of the households have a mobile phone, 50 per cent have a colour TV and 6 per cent

[35] For the purpose of our research on employment, we have defined the threshold between childhood and adulthood at the age of 14 as people often start having an income-generating activity at the age of 15.

have a refrigerator. 5 per cent of households own a bicycle and 2 per cent own a motorbike.

4.3. Overall individual-level statistics

Based on our individual database, composed of 729 adults, we estimate that the adult's sex ratio reaches 754 women per thousand men (see **Table 6**). This figure is slightly lower than the one displayed by the 2001 Census of India for the suburban districts of Mumbai (826). It gives an indication of the role of slums as pools of labour supply to the city - an indication that will later be confirmed with figures on employment.

Table 6: Adults' overall descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
GenderAdult	729	.43	.49	0	1
AgeAdult	729	32.64	13.34	14	100
HeadIncome (slum)	125	1300.15	917.81	300	7500
WorkerIncome (slum)	125	3202.8	2438	0	20000

(Source: Author's survey, 2008)

As far as children are concerned, the sex ratio comes out to be much higher, with 919 girls for 1000 boys. This estimation remains slightly below the world's natural sex ratio for the population under 15, which is 943, still suggesting some kind of parental influence over gender or a higher mortality rate for girls in the early ages.
In terms of education, the average adult has been to school up to the 7th grade (6.88). A simple regression (Vaquier, 2008) shows us that age is negatively correlated with the education level: a 20 year-old person has, on an average, been to school up to the 8th grade (8.48) while a 50 year-old has only been to school up to the 5th grade (4.79). This is obviously an encouraging trend, as it indicates a long-term improvement in the slum dwellers' schooling levels.

The average age among all individuals (adults and children) is as low as 18.6. The population is therefore very young: 56 per cent

of the people are under 14. We are unfortunately unable to calculate the natural demographic growth rate but we can guess that such a pattern characterizes a naturally fast growing population. The contrast is quite stark while comparing this age structure with that of the city in general, where the main proportion of the population is in its 20's, and which displays a low percentage of children (Urban Age, 2007). Rapid natural growth is the mark of well-settled, family-based slums, in which migration is no longer the main factor of demographic increase.

In slums, the average monthly income per capita (including children) is Rs 1300. This results in a daily per capita income of Rs 43 or $1.06[36], slightly above the one-dollar-a-day poverty line threshold. The mean monthly income per slum worker is Rs 3202. Finally, family-based income inequalities are quite limited in slums: the GINI index[37] calculated for the total family income amounts to 0.3 and the per capita one to 0.32, as compared to an Indian urban GINI index of 0.43 in 2005[38]. These figures suggest quite a homogenous income distribution within slums.

5. General results: the situation in slums of the SGNP

The compiled database allows us to illustrate what has been outlined in the first part of this report on the history and propensity of the slums 'encroaching' into the SGNP. It also gives us the opportunity to test the assumptions that have been made. The related information has been gathered directly in eight slums, and indirectly in a few more through interviews held in Chandivali[39].

[36] As per the 2 April 2008 exchange rate of Rs 39.945 for one dollar.

[37] The GINI coefficient is a measure of statistical dispersion which is commonly used as a measure of inequality of income. It ranges from 0 (perfectly equitable distribution) to 1 (perfectly inequitable distribution).

[38] *The Economic Times*, 7 February 2008.

[39] In Chandivali, respondents were not only asked for information on their 'new life' in the resettlement area but also retrospective questions on their 'previous life' in the slums.

5.1. The creation of the SGNP slums

Period of slum creation:

On an average, responding households migrated to Mumbai in 1979 and moved into their slum only eight years later, in 1987 (see **Table 7**). Therefore, unlike what is often said regarding cities in developing countries, the SGNP slums are not a temporary housing solution used by recent migrants before they can access 'formal housing'. Here, settling in a slum is already the result of a long search for professional and housing stability within the urban space. Confirming our fieldwork observations, **Figure 22** shows a very slow settlement process from the 1950s till the '80s, followed by a sharp acceleration by the end of the 1980's - 1989 to be exact. We unfortunately do not have data for the 1995/2007 period, as families who moved in at that time are not eligible for the resettlement scheme.

Table 7: Slums' settlement history, with separate figures for small slum pockets.

Variable	Overall sample					Small slums only				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
WhenMumbai	200	1979.10	11.82	1935	1995	26	1971.65	13.66	1947	1995
WhenSlum	200	1987.41	8.11	1953	1995	26	1976.42	12.23	1953	1995

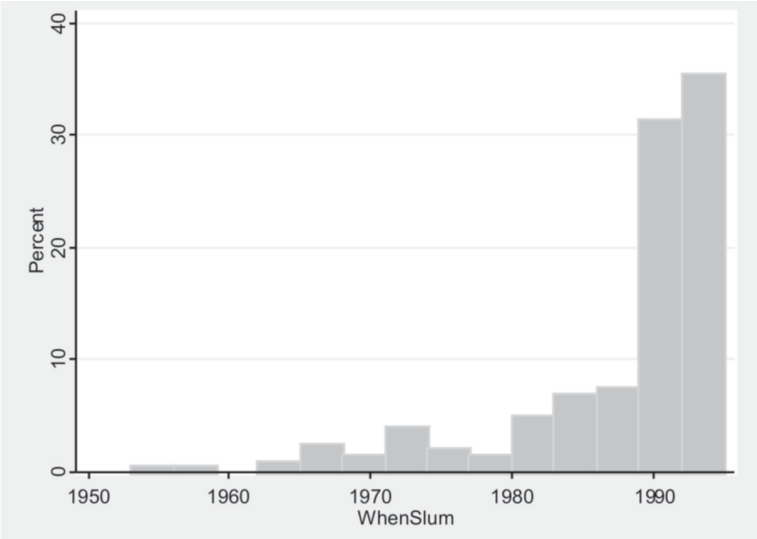
(Source: Authors' survey, 2008)

However, here, we have to distinguish between the large slum pocket located in the south-west of the SGNP and the other small slums situated elsewhere (see **Part 1, Section 4.1**). Our data confirm that small slums are much older. On an average, their inhabitants moved to Mumbai in 1972 – 5 years earlier than in the large slum pocket – and settled in the slum right from 1976.

An interesting pattern can be drawn out of this comparison between the date of migration and the date of slum settlement:

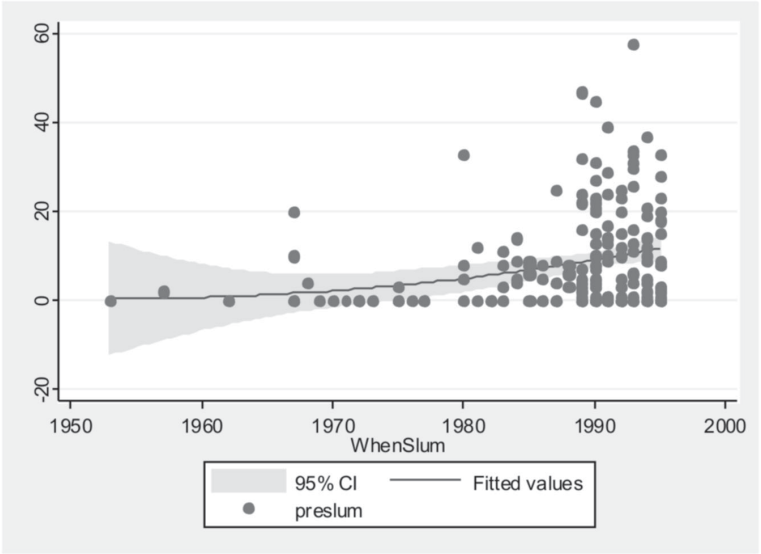
while it took only two years for those who migrated at the beginning of the 1970s to stabilize their housing status, it took nine years for those who came at the beginning of the 1990s (**Figure 23**). Therefore, though they share the same basic religious characteristics and geographical origins, it has become increasingly difficult for migrants to find a permanent place to stay in Greater Mumbai.

Figure 22: Date of arrival in the slum of the first household's member.



(Source: Author's survey, 2008)

Figure 23: Length of stay in Mumbai (years) before settling in the slum for the first household member, depending on the date of arrival in the slum.



(Source: Author's survey, 2008)

Reasons for settling within the park:

At the time they settled in the slums, most households did not have a clear idea about the land property status: 94 per cent of them state that they did not know that they were 'encroaching' on the park's land. Only the very first settlers could then be considered as real 'encroachers', as some of them might have illegally grabbed and sold the land. The ones who followed, purchased the land at increasing prices without knowing who the genuine owner was. Based on our qualitative discussions, it seems that slum-dwellers knew there was a risk that the land would one day be reclaimed but the perceived tenure security remained high as long as the forest department's threats were not credible and no demolition was held (see **Section 5.2**).

Taken as a whole, our results show that the reason why people decided to come and live in the park's slums is a combination of

economic, housing and social factors. For 69 per cent of the respondents, it is the cost and shortage of housing which pushed them to live there, 22 per cent said that they chose these slums because of employment opportunities existing in the neighbouring areas, and 10 per cent told us that social links, such as the presence of relatives in the area, played a major role. As regards the motivation of the 12 respondents who said they knew they were encroaching on the park's land, 8 told us that they could not afford any formal housing in the city and 4 told us that they simply followed the rest of their community.

The settlement process:

As compared to what can be observed in other developing countries, there has not been any quick, massive and organized land invasion around the SGNP. Though the slums' population grew sharply by the end of the 1980s, the large majority of dwellers (95 per cent) settled on an individual basis. Only 5 per cent of our respondents told us that they moved to the slum collectively. In these specific cases, settling down took place with an average of 13 other families. These groups shared common geographical origins and, for most of them, a similar religious background.

All our respondents define themselves as 'owners'. Tenants might also benefit from the Chandivali scheme if they own a house in the area to be resettled, but we did not find anybody in that situation.

Housing is expensive in the slums around the SGNP. Only the very first 'exploratory' settlers grabbed a piece of land for free. The large majority of the people who came during and after the 1980s, when the slums were consolidating, had to pay an increasing price for either an empty plot or a built-up dwelling. 82 per cent of the responding families bought a plot of land in the slum and built their houses themselves. The remaining 18 per cent directly bought a dwelling.

The average cost of a plot of land within slums, over our sample and over time, is Rs 6345($159)[40]. A simple linear regression of the current price paid by slum-dwellers over the date of settlement displays a highly significant correlation coefficient of 346 (see **Table 8**, first column). This means that starting from 1969 – the estimated date of free settlement – the current cost of land has been annually increasing by Rs 346, reaching an estimated Rs 13,549 ($339) in 2008.

Similarly, the average price of a built-up dwelling, over our sample and over time, comes out to be Rs 31,388 ($786). Once again, a least square regression (see **Table 8**, second column) shows us that 36 per cent[41] of the variation in the current price of a built-up house can be explained by the date of purchase (here the date of arrival in the slum) and the number of rooms. According to our estimation, the current cost of a single-room house has been annually increasing by Rs 996, every additional room costing around Rs 10,760. A single-room house would then cost approximately around Rs 43,553 ($1,090) in 2008. Buying such a dwelling would entirely consume seven months of a given family's income (Rs 6149 on average) or fourteen months of a given worker's income (Rs 3202 on average).

[40] All figures in the section are current prices, not corrected for inflation.

[41] The R^2 of this regression being 0.36, 36 per cent of the variation of the dependant variable (HousePrice) can be explained by the explanatory factors (WhenSlum and HouseRooms).

Table 8: Cost of a plot of land and of a house depending on the year of arrival in the slum (and the number of rooms). Least-square regression corrected for heteroskedasticity.

	LandPrice	HousePrice
WhenSlum	346.04 (7.23)***	996.18 (2.69)**
HouseRooms		10,760.41 (6.78)***
Constant	-681,309.06 (7.20)***	-1967537.31 (2.68)**
Observations	132	25
R-squared	0.11	0.36

Robust t statistics in parentheses
*** significant at 10%;**
**** significant at 5%;**
***** significant at 1%**

(Source: Author's survey, 2008)

Social heterogeneity among slums:
Religion, language and geographical origin are the main factors that shaped the households' geographical localization choice and hence communal grouping among surveyed slums. We have not collected data on the caste status. However, the combination of the three factors previously defined (religion, language and geographical origin) provides a fairly good classification. In terms of geographical origin, seven of the eight slums comprise of a majority of Maharashtrians, among whom no specific pattern of district of origin can be extrapolated. Yet, the largest not-yet-resettled slum of Gautam Nagar is an exception with a majority of former migrants from the northern State of Uttar Pradesh (58 per cent). The other small slums spread around the SGNP display higher proportions of non-migrant families (37 per cent for Hanuman Pada), mainly because these are old settlements where none of those who experienced the migration to Mumbai is still alive.

This geographical heterogeneity has of course led to slight differences in terms of spoken languages between slums. Almost all our respondents speak Hindi (99 per cent). Yet, the only few people not speaking Hindi are Maharastrians (especially in Damu Nagar). In addition, though the main religion is Hinduism in every surveyed slum, Maharashtrian slums come out to have important neo-Buddhist communities. These are in fact former 'dalits' or untouchables who converted themselves to Buddhism in the 1950s following the precepts of Dr. Ambedkar. For example, Damu and Rahul Nagar respectively have 38 and 33 per cent of Buddhists, largely above the sample mean of 9 per cent.

5.2. Impact of demolitions and of resettlement on access to basic infrastructure and tenure security

In this section, our objective is first to show that while slums were originally quite well integrated into their urban environment, the demolition process which followed the PIL has had a significant negative impact on the two first aspects of socio-economic integration, namely *access to land ownership* and *access to basic infrastructure and amenities*[42]. The heterogeneity of demolition levels among our sample allows us to identify such effects.

Three different proxies are used to assess the intensity of demolitions: *Demolition,* which is a dummy being '1' if the household has faced at least one demolition and '0' if not; *DemolitionNum* which provides the number of demolitions faced by a given family; and *SlumDemolition* which captures the type of demolitions that have been held in the slum where the family is living ('0' being no demolition, '0.5' selective demolitions and '1' non-selective demolitions).

Table 9 shows that among 'not-yet-resettled' slums, 37 per cent of families included in our sample have had their house destroyed at

[42] Demolitions, however, have had a limited impact on the initial level of *access to employment* in slums, which still remains high today. This will be dealt with in the last part of the report.

least once and faced an average of 2.11 demolitions. Most evictions took place between 1999 and 2000. One striking aspect is the very limited impact these destructions have had on the geographical location of the families interviewed: according to our data, 91 per cent of households who had their houses destroyed have rebuilt it in exactly the same place.

Table 9: General data on demolitions for not-yet-resettled families.

Variable	Obs	Mean	Std. Dev.	Min	Max
Demolition (1 if a least a demolition)	125	.37	.48	0	1
DemolitionNumber, if Demolition=1 only	46	2.11	1.27	1	7
SlumDemolition (slum-level demolition intensity from 0 to 1)	125	.52	.30	0	1
WhenDemo, if Demolition=1 only	46	1999.2	4.89	1970	2003
InSituRebuilt (1 of the house was rebuilt in the same place), if Demolition=1 only	46	.91	.28	0	1

(Source: Author's survey, 2008)

As explained in the first part of this report (**Section 4.2**), not all slums have faced the same intensity of demolitions. This is particularly striking when the large slum pocket located in the south-west of the SGNP is compared with the smaller settlements spread around the park, which seems to have been *de facto* spared by the forest department. Mean tests between the two types of settlements (Vaquier, 2008) confirm that small slums' households have faced a significantly lower number of demolitions: only 4 per cent of them have had their houses demolished at least once, against 45 per cent in big slums.

Changes in housing investment levels due to a decline in perceived tenure security:

We know from several authors that in slums, investment in housing can only be the consequence of a high perceived security of tenure. This, of course, does not imply that dwellers have formal, legal ownership but can instead be the result of several other factors.

According to Field (2003), perceived security of tenure is a function of the size of the family, the date of arrival in the slum, the size and strength of the community, and degree of eviction threats. In our case, eviction threats only became credible in 1995 after the PIL was filed and demolitions started. The resulting low perceived security of tenure has, in turn, blocked all types of investment in housing improvement. Very logically, our results show that the more demolished a slum has been, the more often its dwellers declare that 'tenure insecurity' is their main problem in the area: 10 per cent in non-demolished settlements, 11 per cent in partially demolished slums and 23 per cent in fully demolished areas.

In Mumbai, slum-dwellers themselves define the construction quality of their house according to three categories: *kachcha* (mud or plastic dwelling), semi-*pucca* (partly consolidated) and *pucca* (bricks). Among the 200 responding families, 45 per cent had a *pucca* house, 22 per cent had a semi-*pucca* dwelling and 33 per cent a *kachcha* one[43]. To facilitate the statistical analysis, we convert this qualitative variable into a numeric one so as to obtain a 'house consolidation index' (*HouseQuality*), ranging from 0 to 1, where 0 is the worst quality (*kachcha* hut), 0.5 is a semi-*pucca* house and 1 is the best quality that can be found (*pucca* house).

We then regress this index over the proxies for the intensity of demolitions and for tenure security (family size, income and date of arrival in the slum). The results are presented in **Table 10**.[44]

[43] Retrospective information for the families already resettled in Chandivali.

[44] Regressions are only carried out for 'not-yet-resettled' slums as they require the use of the household's income, a variable that is significantly affected by the shifting to Chandivali.

Table 10: Factors influencing the present quality of a slum house. Least-square regression corrected for heteroskedasticity.

	HouseQuality (consolidation index from 0 to 1)
SlumDemolition	-0.387 (3.12)***
Demolition	-0.317 (2.37)**
DemolitionNumber	0.001 (0.03)
HouseIncome	0.000 (1.71)*
WhenSlum	0.011 (3.08)***
HouseholdSize	0.014 (1.05)
Constant	-20.696 (2.97)***
Observations	125
R-squared	0.39

Robust t statistics in parentheses:
*** significant at 10 per cent;**
**** significant at 5 per cent;**
***** significant at 1 per cent**

(Source: Author's survey, 2008)

Very interestingly, the fact that the family has faced at least one demolition (*Demolition*) comes out significantly, while the number of demolitions it has faced (*DemolitionNum*) does not. Hence, no matter how many evictions a family has faced, only the first one really impacts the long-term level of housing consolidation. There is then a permanent effect of demolitions besides the short-term physical destruction. We believe this is the consequence of a sudden increase in the credibility of eviction threats and of the resulting drop in perceived tenure security. Two other proofs in this regression back up this hypothesis.

First, the family's income does not have a clear effect on the quality of the houses (high p-value of 9 per cent and coefficient too close to zero to infer a credible impact). Therefore, even after demolitions, we cannot firmly say that richer households have consolidated their dwellings more than others. This, we think, is a strong point in ensuring that the credibility impact of demolitions

is not in fact a simple consequence of loss of physical assets (poverty trap). If it was, then income would have played a greater role in the reconsolidation of slums since 2000.

Second, besides the individual impact of demolitions, we can identify a collective impact in affected slums as the variable *SlumDemolition* (intensity of demolitions at the slum-level) comes out to be highly significant. This clearly means that even if their house has not been demolished, all families living in highly affected areas have stopped investing in consolidation. It is then clear that credibility does not affect households' investment individually, but at the collective slum level.

Here, we can assess the average impact of demolitions on housing consolidation. According to our estimates, an average 'not-yet-resettled' family[45] which has not faced any demolition and lives in an area where no demolitions took place owns a house which has a 90 per cent consolidation index. If that family's house was then the only one to be destroyed in the area in 2000, then it would have been rebuilt and the consolidation index would be 58 per cent today. In that case, we think that the perceived security of tenure would remain high and the principal constraint to further consolidation would be the lack of financial resources. But if we now assume that the family's entire slum has been demolished at the same time, then the 2008 consolidation index would only be 19 per cent. The *kachcha* houses that can be found in the fully bulldozed slum of Damu Nagar perfectly illustrate this process (see **Figure 15**).

The issue of perceived tenure security is also central while detailing the last family investment in housing. Only 30 per cent of respondents remember the last improvement brought to their house. In most cases, these were repairs, following the large demolitions of 1999/2000. In others, these were small works done after the monsoon seasons (1995 was a record rainy season in Mumbai). None of these can really be called 'improvements'. More interestingly, none of our respondents was planning to bring about

[45] The average not-yet-resettled household came in the slum in 1985, earns Rs 6149 and comprises of 5.28 members.

new improvement in their dwelling at the time of the survey. In fact, in demolished areas, the ownership perception has become so low that eligible households have accepted the High Court's decision and are resigned to vacate and leave.

This is confirmed by the fact that 93 per cent of families interviewed in slums say that their behavior has changed since the PIL was filed and demolitions started. For 99 per cent of the sample, this change has resulted in a reduction of investment and a wait for resettlement. Very logically, the few families who kept on living as if nothing happened are located in slums where there has been no demolition at all.

We can globally assume that while the housing stock used to be highly consolidated in the early 1990s, the demolition-drive has frozen all improvement dynamics at the slum-level by making further demolition threats credible, thereby reducing the perceived land tenure security.

Hence, as far as tenure security is concerned, we believe what is important for slum dwellers is not the 'formality' or 'legality' of ownership they can access in Chandivali, but rather the perceived security that it implies. Asset ownership levels over the sample finally reflect this idea. A logit regression (Vaquier, 2008) confirms that even though income plays an important role in purchasing such equipment, there is an independent positive impact resulting from the resettlement. This, we believe, partly reflects how important perceived security is for any kind of investment that could be lost at the time of eviction.

The direct impact of demolitions on access to basic infrastructure and amenities:

If demolitions had an indirect impact on the quality of the housing stock through perceived security of tenure, it also had a direct impact on the access slum-dwellers have to basic infrastructure (namely water, electricity and toilets). About 83 per cent of slum-dwellers state that the lack of basic infrastructure is the main problem they face in the slums. Here again, a strong variability can be observed depending on the intensity of demolitions.

Amenities such as water pipes, drainage and electricity networks or collective toilets have been deliberately targeted by authorities during eviction drives. This has had a disastrous effect. It is first a significant waste of public resources (local authorities had invested in the development of these services for the previous thirty years), but more importantly, it has frozen private, local investment which used to be a major source of funding for such collective services in slums.

Water:

Almost 93 per cent of slum-dwellers fetch water at a collective tap. But, very logically, this proportion increases with the magnitude of demolitions held in their area: while it drops to 80 per cent in slums where no demolition took place, it rises to 94 per cent in places where selective evictions were held and to 100 per cent in fully demolished areas. In the most affected settlement of Damu Nagar, people simply broke a BMC pipeline providing water to a large part of the city (**Figure 24**).

Figure 24: In Damu Nagar, inhabitants have broken a pipeline to access water.

(Source: Author's survey, 2008)

In slums, the average overall time needed to fetch the daily quantity of water is approximately 2 hours per household. Very often, women have to wake up at night in order to avoid the daily rush. The average monthly cost for water is Rs 75 but with strong inequalities: 62 per cent of respondents get it for free on collective taps.

On the other hand, in Chandivali, 91 per cent of families state that they are satisfied with the quality of water supply. For the few unhappy households, reasons are mainly the discontinuity of water supply and the bad quality of water. In fact, in the most southern buildings, located below the level of the rest of the complex, dirty water stagnates, leading to a high prevalence of waterborne diseases and malaria. Dissatisfied respondents are concentrated in this area. It is also worth noting that in Chandivali, the water payment is included in a monthly maintenance charge of Rs 215.

Electricity:

In slums, 85 per cent of families have access to electricity (against 100 per cent in Chandivali[46]). Nonetheless, most electrical connections are illegal, as electricity providers are not allowed to operate in the area. The way dwellers have coped with this situation is once again surprising. As settlements are partly spread outside the park, inhabitants who are allowed to have a legal electricity connection are simply retailing it to those who cannot. As a result, tens of thousands of dwellings depend only on a few hundred legal connections.

Such an oligopoly situation has obviously led to a dramatic increase in electricity costs for slum-dwellers. The price is actually fixed by the seller depending on the number of plugs and electrical equipments the family is using. The average monthly cost for an additional plug/equipment is Rs 50. Overall, slum-dwellers pay a

[46] In theory, all resettled families have access to electricity. However, some families do not use their connection as they cannot cover the related cost (though electricity is cheaper in Chandivali than in the slums).

monthly average of Rs 268 for electricity, whereas on the other hand, the average cost of this service for resettled families is only Rs 230[47].

At the same time, the quality of electricity supply is much better in the resettlement area: while 99 per cent of slum households say power cuts are frequent, only 7 per cent of the resettled families experience such a problem.

Sanitation and toilets:

Among our slum respondents, only 2 per cent have private toilets and 73 per cent have access to collective toilets. 25 per cent of them have no toilets at all and defecate in the open.

Collective toilets were either private-funded at a *chawl* level or provided by the MHADA. Most of these have been targeted at the time of demolitions (see **Figure 25**): while 95 per cent of the households have access to such amenities in non-demolished areas, this figure drops to 81 per cent in selectively demolished areas and to 31 per cent in fully flattened ones.

Nearly 72 per cent of families using collective toilets have someone employed for the cleaning and maintenance. The average monthly cost of this service is Rs 37 per family. This, of course, contrasts with the full access to private toilets in Chandivali and to the induced increased privacy and hygiene. The maintenance cost of these private amenities in the resettlement site is difficult for us to assess. However, the low quality of the plumbing work seems to have quickly led to the blocking up and leaking of most pipes, creating dangerously unhygienic conditions in open spaces.

[47] The electricity cost is not included in the Rs 215 monthly maintenance charge.

Figure 25: Public toilets destroyed by the local authorities in 2000 in the slum of Jamruchi Nagar.

(Source: Author's survey, 2008)

As far as sanitation and waste disposal is concerned, here again, demolitions have wiped out the previously existing *chawl*-based systems. On an average, 18 per cent of slum respondents benefit from collective waste disposal. All dwellers in non-demolished slums have access to such services, while nobody has the same in fully demolished areas. The average monthly cost of this service is Rs 9.

In contrast, in Chandivali, all families benefit from a collective waste disposal system, the price being included in the Rs 215 monthly maintenance charge.

Access to social and transport infrastructure, maintained despite demolitions in slums but deteriorating with resettlement:
Slum dwellers' access to *social infrastructure* (schools, hospitals) and *transport facilities* remained broadly unchanged at the time

of demolition. In fact, most of these services are public and located out of slums. However, one can observe a sharp deterioration at the time of resettlement due to the lack of public services in the vicinity of Chandivali.

Educational facilities:

Access to educational facilities is probably the best example of the satisfactory level of 'integration' in initial slums. We came to know, through our qualitative discussions, that the public schools located in the vicinity of the SGNP had an excellent reputation. Expectations are far from being met on this count in Chandivali: 58 per cent of the resettled sample told us that it was not satisfied with the educational facilities available in the area. In 40 per cent of the cases, the deterioration of education quality at the time of resettlement is worrying.

Access is also an issue for 49 per cent of the dissatisfied respondents. Children have to travel an average of 28 minutes to go to school in Chandivali, against 19 minutes in 'not-yet-resettled' areas. In slums, 34 per cent of respondents told us that there is a public school in what they consider as 'their area'. This figure drops to 12 per cent in Chandivali. However, the schooling rate remains comparable between the two sub-samples (70 per cent in slums and 74 per cent in Chandivali).

It should also be emphasized here that private schools are more expensive around the resettlement site than in original slums, the monthly tuition fee rising from Rs 105 to Rs 212 with resettlement. Taken as a whole, the combination of high private schooling fees, access difficulties and low quality of public schools seems to have led to a decrease in the number of children sent to public schools, while families prefer to select those who could go to private ones (mostly elders and boys). Our data clearly backs up this assumption: the share of public education drops from 49 to 20 per cent with resettlement (private schooling subsequently going up from 51 to 71 per cent).

Healthcare amenities:

Healthcare is another example of affordability and satisfactory physical access in original slums. It takes, on an average, only 22 minutes in a 'not-yet-resettled' area to reach a hospital (public or private), while the time needed in Chandivali is almost twice (38 min). The dissatisfaction levels are very high (69 per cent) regarding healthcare supply among resettled households. For 63 per cent of unhappy respondents, the main reason is, once again, distance. Low quality comes second with 26 per cent of the dissatisfied population and cost comes third with 12 per cent. In fact, the few private clinics located in Chandivali and Powai are so expensive that they are not even considered as an option by the resettled families.

Transport infrastructure:

The Chandivali complex, though centrally located, has poor services in terms of public transportation. An estimated 69 per cent of our resettled sample is facing difficulties linked to urban mobility. For a large majority (81 per cent), the main problem is not the location of the resettlement complex itself, but rather the distance needed to reach transport infrastructure. In Chandivali, all transportation networks are organized around the two nodal points of the railway stations of Ghatkopar and Andheri (where municipal schools and hospitals are located). The travel time needed to reach the closest train station increases from 35 to 54 minutes with resettlement. Similarly, the time needed to reach the closest bus stop ranges from 10 to 19 minutes. However, the BMC is actually planning to extend a bus line to the resettlement complex. Several stations of the future metro line under construction between Versova and Ghatkopar, are expected to be located within a few kilometers of the resettlement site. Significant improvement in commuting time could therefore be expected soon.

5.3. Slum dwellers and the Park

What is the degree of interaction between slum dwellers and the forest?

As previously mentioned, 94 per cent of the original slum-settlers did not know that they were encroaching on a National Park. This

seems credible, as, even today, most of the park's fringe land remains disputed and its status unclear. People were pushed to 'encroach' into new plots of land because of what RN Sharma (2007) calls the "irrelevance of Mumbai's real-estate market to the average citizen" that has resulted in an increasing shortage and cost of housing (we have shown in **Section 5.1** that, on an average, slum-dwellers have been waiting eight years within the city before settling down).

Our survey displays very 'urban' livelihoods in slums. Only 14 per cent of the slum households do sometimes go within what they call the 'jungle'. As there might have been a bias in these answers due to fears of retaliatory demolitions, we have also asked the same question to already resettled families. In that case, we obtain a slightly higher rate of 21 per cent of families going within the 'jungle'. However, 59 per cent of these 'incursions' were for leisure purposes. Tree-cutting and poaching, largely exaggerated in the PIL process, are marginal, being only 32 per cent and 3 per cent respectively. If we bring these figures back to the scale of our overall sample, assuming that the 'incursion rate' claimed by Chandivali respondents gives the best picture, tree-cutting is then carried out only by 7 per cent[48] of the total eligible population.

Presence of and pressure from the forest department:
Documents dealing with the PIL case say little about the way the forest department was intervening in slums. We have included a few questions on this point in the questionnaire. As expected, answers vary significantly between the resettled and 'not-yet-resettled' sub-samples.

While only 10 per cent of this sample said that officers could often be seen in the area, this figure goes up to 23 per cent among the resettled population. Even if the statistics gathered in Chandivali

[48] 0.21 (21 per cent of respondents sometime going within the forest) × 0.32 (32 per cent of those going into the forest actually collecting wood) = 7 per cent of the overall sample.

are more realistic, the presence of the forest department comes out as limited. Only 6 per cent of the overall sample declares that the forest officer asked them to pay a fine for unauthorized construction (average amount of Rs 523). These were mainly 'illegal' shopkeepers and families who had done significant work on their house.

We, however, believe that the issue of the forest department's pressure is very difficult to assess through a quantitative approach only. Our qualitative inputs here clearly suggest that moral and financial pressure increased significantly between 1995 (filing of the PIL) and 1999 (High Court's interim order). At that time, before eligibility criteria were set up, erratic demolitions and bribes were frequent. Since then, the park authorities seem to have adopted a more pragmatic approach, even though non-selective demolitions were still conducted in 2000.

5.4. Levels of information and involvement in the resettlement project

Another aspect we have decided to focus on is the resettlement process in itself. Our intention here is to assess the level of information and involvement of the affected families, and the actual cost of shifting; and to identify the factors influencing the level of satisfaction regarding the project.

How informed and involved are eligible families regarding the resettlement process?

We have shown in the first part of this report that the Chandivali project is unconventional. On one hand, being the largest resettlement scheme in Asia, it is difficult for the project to properly involve such a large number of beneficiaries (more than 12,000)[49]. On the other hand, the fact that a social NGO (NHSS) is involved at every level of the process should allow for information to be

[49] In addition, and unlike the procedure for *in-situ* rehabilitation schemes, here slum-dwellers were not requested to approve the project.

made more accessible and comprehensible to the average slum-dweller. This role is essential to vulgarize administrative procedures, act as an intermediary between local authorities and affected families and make sure that the project reflects general needs.

Among our sample, people do not always exactly know what the NHSS[50] is, but they have identified it as being their main interlocutor in the resettlement process. The NGO comes out to be the principal source of information for 70 per cent of the eligible families. Though the forest department is in charge of establishing the resettlement listings, the registration process largely took place at NHSS's head offices. In contrast, only 10 per cent of respondents identified the forest department as their main source of information on the resettlement process.

A limited 13 per cent of respondents state that they do not have any information source or that they are not looking for any kind of information regarding resettlement. This underlines two dynamics. First, people are more active in their information research in areas were demolitions have been massive: while 15 per cent say that they have no information source at all in fully demolished areas, this increases to 45 per cent in non-demolished places. Further, levels of information are much higher in the area of NHSS influence (the large slum pocket located in the south-west of the park) than in smaller slums, with respectively 13 per cent and 35 per cent stating that they do not have any information source.

Though they have to move out of their slums to find reliable information[51], a remarkable 95.5 per cent of our responding sample says getting information on the project is easy. Almost

[50] They often refer to it by using the expressions 'Shabana Azmi's group' or 'Dindoshi offices' (where NHSS headquarters are located).

[51] Only 4 per cent claimed that they had an information office and 15 per cent a notice board within their slum where they could get information on the resettlement process.

77 per cent of households have already taken part in meetings dealing with resettlement, 78 per cent of which were organized by the NHSS.

The level of information on the project is therefore very high. However, the kind of information affected families receive remains general. On an average, slum-dwellers knew as early as 2003 that they would get a flat in Chandivali. Similarly, 61 per cent of the slum-dwellers know the size of the allotted flats and 41 per cent of them have already visited the resettlement site. However, none of them know who would be their future neighbours, only 5 per cent know precisely when they should be resettled and only 1.6 per cent have already received their allotment letter.

Nevertheless, all families ultimately have to go through the NHSS in order to be allotted a flat. While in slums, 23 per cent of responding households have never visited the NGO's offices and have only shown their eligibility proofs to the forest department, the situation is different in Chandivali, where all families have at least once presented their eligibility documents to the NHSS. The NGO therefore plays a real mediation role in the process.

What are the direct costs implied in the resettlement process?
The purpose of this section is to estimate how much has to be paid by an average family in order to benefit from the project.

As previously mentioned, eligible families have to pay a Rs 7000 fine to the forest department so as to be resettled. But several additional payments also have to be made. In fact, while only 69 per cent of the slum sub-sample has already made an additional payment for resettlement, all resettled families have done so.

The first one is called either a 'membership fee' or 'file fee' and is collected by the NHSS at the time families come to register on resettlement listings. According to the NGO's representatives, the money collected is used to cover the documentation and processing costs. 73 per cent of these contributions amount to Rs 100 and 27

per cent to Rs 200. We have not been able to find out the reasons behind these two alternatives, though we have identified a weak correlation between the level of information and the amount paid: it seems here that the best informed households are the ones who paid less.

A second financial contribution of Rs 500 is requested by the NHSS at the time of resettlement. It is a compulsory payment, conditioning the allotment of the flat. We have contradictory information regarding the way this money is used. It apparently goes to the 'Sangarsh Nagar Housing and Development Federation', the large cooperative society in charge of the management of the complex. Yet, we were also told it was being used to cover the cost of judiciary actions taken by the NHSS.

Some other sporadic payments have been registered in slums. About 80 per cent of them have been paid to the GHJP, the NGO defending an *in-situ* rehabilitation option (usually a Rs 10 monthly fee paid in the slum of Damu Nagar). Out of the eight families we met who were paying this fee on a regular basis, six had not paid their 'membership fee' to the NHSS. This might show that they still believe in the possibility of an *in-situ* rehabilitation option. However, the two other households have also paid their 'membership fee' to the NHSS, proving that they are now considering the Chandivali resettlement as a second-best option.

What influences the level of satisfaction towards the resettlement project?

Here, we shall clearly distinguish between the anticipated satisfaction in slums and the actual level of satisfaction of resettled families. According to our survey, there is a large under-anticipation of the resettlement's benefits among not-yet-resettled families: the anticipated satisfaction rate is only 65 per cent in slums, while the ex-post satisfaction rate rises to 84 per cent.

The main factors influencing dissatisfaction do not change with resettlement. These are mainly economic and related to unemployment, lack of commercial rehabilitation and a not yet well-connected location that characterizes Chandivali. Already shifted households also emphasize the rising cost of life and decreasing economic activity, as well as the lack of basic infrastructure and market (Vaquier, 2008).

On the other hand, we observe a significant shift in the factors of satisfaction with resettlement. While 57 per cent of satisfied families in slums believe that the main benefit of the project is an improvement in basic infrastructure, only 35 per cent of the Chandivali sample shares this point of view. On the contrary, the share of interviewees believing that tenure security is the main factor of satisfaction increases with resettlement (41 per cent in slums against 56 per cent in Chandivali).

It then comes out that 'not-yet-resettled' families are overestimating the economic drawbacks of the project and underestimating the 'mental peace'[52] a higher tenure security would bring them. This idea is backed up by the fact that in the slums, 14 per cent of the responding households say that they would not stay in their flat, whereas this percentage drops to 3 per cent only in Chandivali (this has to be carefully interpreted as we know that people are less willing to talk about this in Chandivali).

A 'logit' regression can be used to identify the main factors explaining the level of satisfaction towards the project. Once resettlement is controlled for, several points can be highlighted (see **Table 11**)[53]. First, there is an 'opportunity effect' benefiting those who only moved into the slum just before the 1995 deadline,

[52] This is the expression broadly used while referring to tenure security.

[53] Please note that proxies for initial access to infrastructure have not been introduced as explanatory variable, since these data are only available for the not-yet-resettled section of the sample. We would otherwise have reduced our sample to 123 observations and then have only focused on 'expected' satisfaction.

the variable *WhenSlum* turning out to be statistically positive. This means that the later a family came to live in the slum, the greater the satisfaction it gets from being allotted a flat. This seems very logical, as all eligible families get the same type of tenement, no matter how long they have been staying in the slum and how much they have invested in their house.

Second, demolitions faced by any given family do not influence its satisfaction towards the project, while variables capturing the level of past investment do (*HouseBuilt*, *HouseRooms* and *HouseQuality*). Differences between eligible families in terms of satisfaction levels are thus driven by an 'economically equalizing effect' more than only by a change in tenure security. To put it differently, unhappy households are those who invested relatively more in housing during the past decades, no matter how many demolitions they faced: those who purchased a house rather than built it and those who had upgraded it with *pucca* materials and built new rooms.

It finally comes out that the higher the household's average education level, the more benefits it sees in the project. As we control for income, this effect can only be attributed to additional schooling years. Several options could be drawn out of this observation. It could be possible that more educated families are more prone to understand the PIL process and the fact that *in-situ* rehabilitation is no longer an option. Second, it would be logical to assume that education is changing the type and – more importantly – the location of jobs that adults have. In that sense, educated families tend to have skilled jobs which are less dependent on their housing location (mainly in South Mumbai). They then do not mind shifting to another suburb. Last, it is likely that accessing housing property is a widespread ambition among the most educated slum families.

Table 11: Level of satisfaction towards the Chandivali project. Logit regression corrected for heteroskedasticity.

ChandivaliHappy	Coef.	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
TotalIncome	-.00005	.00005	-0.94	0.348	-.0001	.00005
WhenSlum	.058	.022	2.61	0.009	.014	.1
HouseBuilt (1 if the						
family built its house)	1.015	.466	2.18	0.029	.1	1.93
HouseRooms	-.478	.27	-1.77	0.077	-1	.05
HouseQuality	-1.135	.539	-2.10	0.035	-2.19	-.08
EduAverage (among adults)	.276	.138	2.00	0.045	.005	.55
Inf NHSS (1 if NHSS is the main source of information)	1.263	.394	3.20	0.001	.49	2.03
Demolition	-.265	.445	-0.59	0.552	-1.14	.61
Resettled (1 if resettled)	.605	.458	1.32	0.187	-.29	1.5
_cons	-115.95	44.53	-2.60	0.009	-203.22	-28.68

Logistic regression
Number of obs = 200
Wald chi2(9) = 35.69
Prob > chi2 = 0.0000
Log pseudolikelihood = -95.06881
Pseudo R2 = 0.1983

(Source: Author's survey, 2008).

Part Three: Resettlement and access to employment

The third part of this report deals with the central issue of change in employment that comes with resettlement. It largely relies on the individual database we have extrapolated from the 200 households' interviews, which contains comprehensive information on the professional status of 729 individuals[54] above the age of 14. The first issue we address concerns the changes occurring in the demographic structure, and their impact on the professional configuration of the active population. We then carry out an in-depth analysis of the evolution of the employment structure due to resettlement, and the reach and access our respondents have to different types of labour market. A specific section also looks at how families having home-based income-generating activities have coped with resettlement. We then compare the patterns of work localization before and after resettlement. The questions of income, expenditure and hence purchasing power are also discussed. This part is concluded by expanding our results to garner a long-term perspective.

1. The 'nuclearization' process

One of the first aspects that struck us when we started manipulating our data is the demographical changes taking place at the time of resettlement, for example the sharp reduction in family size. While slum families have an average of 5.28 members, this figure drops by 0.84, to 4.44 in Chandivali. According to the mean difference test displayed in **Table 12**, this hypothesis of family reduction is highly significant (p-value of 0.19 per cent). The objective of this section is to identify its causes and consequences.

[54] 490 in slums and 239 in Chandivali.

Table 12: Mean difference test (t-test) on the household size among resettled and non-resettled sub-groups

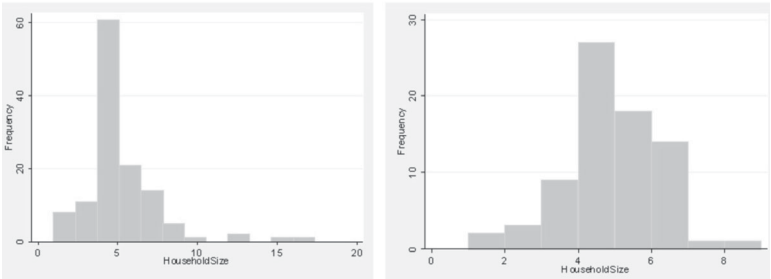
HouseholdSize	Obs	Mean	Std. Err.	Std. Dev.	[95 per cent Conf.	Interval]
Resettled = no	125	5.28	.20	2.26	4.89	5.68
Resettled = yes	75	4.44	.15	1.34	4.13	4.75
combined	200	4.96	.14	2.00	4.68	5.24
Diff		.84	.29		.27	1.41

diff = mean(no) - mean(yes) **t = 2.9245**
Ho: diff = 0 **degrees of freedom = 198**
Ha: diff < 0 **Ha: diff != 0** **Ha: diff > 0**
Pr(T < t) = 0.9981 **Pr(|T| > |t|) = 0.0039** **Pr(T > t) = 0.0019**

(Source: Author's survey, 2008).

While comparing household size frequencies between slums and Chandivali (see **Figure 26**), we observe that the slum distribution is sharply skewed towards the right. In other words, some very large families (up to 16 members) can be observed in slums while in Chandivali, the maximum family size is only 9. This logically pulls the average family size down, while reducing the standard deviation from 2.26 to 1.34. Hence, if we once again performed a mean difference test, this time, however, allowing for different variances between the two sub-samples, the family size reduction becomes even more significant (p-value of 0.06 per cent) (Vaquier, 2008).

Figure 26: Household size distributions in slums (left) and in Chandivali (right).



(Source: Author's survey, 2008)

These alterations in household structure could considerably influence the composition of the active population, and indirectly affect employment patterns. Thus, they need to be better understood. A set of t-test presented in **Table 13** allows us to specify the nature of these alterations and identify their impact on the labour market.

An interesting pattern can first be identified when performing separate mean difference tests between our two sub-samples, for the number of children and of adults (see **Table 13**). On one side, though the average number of children per family is slightly higher in slums, the null hypothesis of mean equality between the two sub-samples cannot be rejected. On the other side, our mean difference test regarding the number of adults per family displays a statistically higher average in the initial slums (3.92) than in Chandivali (3.19). We can then infer that the reduction in the number of adults (0.73 per household) is driving the previously mentioned sharp drop in family size. Some adults, it seems, have not shifted with the rest of their family.

Nonetheless, changes in the family structure are not affecting a specific age group, as no differences emerge between the mean age of adults between the two sub-samples (around 32.6 years; see **Table 13**). Alternatively, the proportion of women per family comes out to be statistically higher in Chandivali (47 per cent) than in slums (41 per cent), allowing us to deduce that adults who are not shifting are actually men.

We also find out in **Table 13** that these 'not-shifting' men have a lower education level than the rest of the population, our results displaying a significantly higher mean number of schooling years among resettled men (9.15) as compared to not-yet-resettled ones (7.97).

Table 13: Set of t-test specifying the nature of the family nuclearisation process and its consequences on employment patterns.

Variable	Resettled = no	Resettled = yes	Combined	Diff. (mean no – mean yes)	t-test	P-value (Ho: Diff = 0)
Children	1.36	1.25	1.32	.11	0.55	0.5818 (Ha: Diff!=0)
Adults	3.92	3.19	3.64	.73	3.22	0.0015 (Ha: Diff!=0)
AgeAdult	32.84	32.25	32.64	.59	0.56	0.5756 (Ha: Diff!=0)
GenderAdult	.41	.47	.43	-.06	-1.55	0.06 (Ha: Diff<0)
EduAdult (men only)	7.97	9.15	8.33	-1.19	-2.9	0.0039 (Ha: Diff!=0)
Family Workers (nb)	2.2	1.63	1.98	.57	3.66	0.0003 (Ha: Diff!=0)
FamilyNon Workers (nb)	3.08	2.81	2.98	.27	0.98	0.3259 (Ha: Diff!=0)
Participate	.56	.51	.54	.05	1.29	0.098 (Ha: Diff>0)
Dependency Ratio (nb non-workers per worker)	1.87	2.05	1.93	-.18	-1.47	0.0706 (Ha: Diff<0)
Principal (1 if principal worker)	.88	.93	.9	-.054	-1.65	0.0503 (Ha: Diff<0)

(Source: Author's survey, 2008)

We could then intuitively assume that the drop in family size could be attributed to the 'non-shifting' of indirect relatives. These are mainly men who have been progressively added to the core household as they migrated to the city in search of job opportunities, generating the kind of extended families that can be found in slums. This assumption can be tested in a very simple way, by comparing the total number of adults who have been said to be either brothers, uncles, friends, cousins or nephews of the interviewee and who are old enough to form their own family (25 years old). The picture is clear: while these 'extended family members' represent 11 per cent of the slums' adult population, they only represent 6.7 per cent of the resettled adult pool.

Similarly, on an average, adults identified as 'son of the respondent' tend to be younger in Chandivali: 19 years old against 22 in slums (the maximum son's age decreasing from 38 to 30 with resettlement). This indicates that those who were old enough to create their own household have not shifted. We can then talk of a 'nuclearization process', where only the original nuclear family benefits from resettlement.

As a result, **Table 13** displays a significant drop in the number of working adults, from 2.2 in the slums to 1.6 in Chandivali, while the number of non-working adults remains stable at 3. At the same time, the percentage of adults engaging in an income-generating activity (or participating in the labour market according to the NSSO terminology) is significantly decreasing after resettlement, declining from 56 to 51 per cent (in contrast, the proportion of non-participants in the labour market increases by 5 percentage points). Given the fact that the number of children remains stable, this leads to a slight (though significant) increase in the family dependency ratio[55] from 1.86 to 2.05 (**Table 13**). As will be shown in the next sections, unemployment has not risen with resettlement. We can here assume that the 'non-shifting adults' were in fact holding jobs or income-generating activities in slums.

[55] Defined here as the number of non-working family members (including children) per working adult.

However, we have to judge whether these 'non-shifting workers' were holding full- or part-time jobs. We, therefore, need to focus on the changes within the active, 'participating' population, between what we have defined as 'principal' and 'subsidiary' working statuses. When performing a t-test comparing the resettled and not-yet-resettled populations (**Table 13**), one can observe a significant shift from subsidiary to principal working statuses: in original slums, 88 per cent of the 'participating' workforce has a principal status whereas this figure reaches 93 per cent in Chandivali.

At the same time, while the 'participating workforce' is decreasing, the overall occupational structure of the increasing 'non-participating' population (presented in **Table 14**) reveals a sharp growth in the proportion of adults recorded as housewives, students and to a lesser extent retired seniors. These family members can be considered as being part of the 'vertical' nuclear family[56]. The fact that their proportion in the adult population increases confirms a reduction of the family to its 'nuclear' members.

Table 14: Changes in occupational status due to resettlement.

		Slum		Chandivali		Variation
		No.	%age	No.	%age	(%age points)
Participate	**Principal**	242	49,39	114	47,70	**-1,69**
	Subsidiary	33	6,73	8	3,35	**-3,39**
	No reason	7	1,43	2	0,84	**-0,59**
	Housewife	94	19,18	52	21,76	**+2,57**
Don't Participate	**Studying**	44	8,98	31	12,97	**+3,99**
	Retired	17	3,47	9	3,77	**+0,30**
	Househelp	30	6,12	15	6,28	**+0,15**
	Unemployed	18	3,67	8	3,35	**-0,33**
	Physically unable	4	0,82	0	0,00	**-0,82**
	Training	1	0,20	0	0,00	**-0,20**
	TOTAL:	**490**	**100**	**239**	**100**	**0**

(Source: Author's survey, 2008)

[56] We define a vertical nuclear family as a household composed of several generations but with very few 'horizontal' links (such as brothers, sisters, cousins, uncles or aunties).

Finally, a brief analysis of income patterns among the two sub-groups of adults provides an interesting feature: while there is no statistical difference between household income levels (see **Section 5.1**), the monthly income-per-worker ratio rises significantly from Rs 3203 to Rs 4023. We understand this as a result of the change in the status of workers from 'subsidiary' to 'principal' and better-paid jobs. This, as we will show later, will raise the income-per-capita in Chandivali.

Taken as a whole, the results we have presented here clearly support the idea of a family 'nuclearization' dynamic resulting from resettlement. Several hypotheses can be proposed to explain this process, but the most logical for us remains the one of housing rigidity in the resettlement area. Housing is known to be highly flexible in slums. Several generations can follow one another within the same dwelling, which is progressively upgraded depending on the family's needs and financial capabilities. On the contrary, in the resettlement site the housing characteristics are set at a 'standard' size (225 ft^2). In many cases, entire households are not able to shift altogether and an implicit 'selection process' is carried out so as to decide which family members should shift, stay in the slum or find an alternative housing solution. This family-level rational economic reasoning, we believe, is driven by a trade-off between core family members and indirect relatives.

This trend affects the employment structure because most indirect relatives come out to be 'subsidiary', low-paid workers. Our results suggest that they are mainly men with low education levels who were added to the core family when they migrated, and who are old enough to start their own nuclear family. As they are professionally unstable and highly dependent on local slum employment, we think that they are implicitly withdrawn from the resettlement process. It actually makes economic sense for those having the most stable jobs and highest incomes to shift and live in a rigid and expensive form of housing.

2. The disruptive effect of resettlement on employment structures

The comprehensive range of information gathered through our survey allows us to carry out an in-depth analysis of the workforce's adjustment to its new environment. Apart from questions on the employment status at the time of the survey, the Chandivali questionnaire also assessed the actual and perceived evolution of employment status: whether the interviewee changed, lost or found a job at the time of shifting, and whether the professional situation was considered as better-off or worse than before.

2.1. Occupational structure in slums

In slums, out of 490 adults, the active population[57] represents 293 individuals. Hence the rate of activity is relatively low, with only 60 per cent of the adult population actually working or actively looking for a job. However, a large share of this 'inactive' population is actually very busy: 63 per cent of 'inactive' adults are either housewives or women providing household help within the family (a difficult occupation, given the poor conditions of living) and 22 per cent are students. At the same time, 9 per cent of the inactive population is composed of retired workers and 2 per cent of people whose handicap do not allow any income-generating activity.

Among the active population, the unemployment rate is quite low with 6.14 per cent. At the same time, the proportion of working adults having a full-time job[58] is 88 per cent. However, only 8 per cent of these full-time workers are actually permanently employed. In fact, most of them are either casual workers (63 per cent) or self-employed (29 per cent).

[57] The International Labour Organization defines the active population as a sum of the working population (at least an hour of work during the reference time period) and of the unemployed population (defined as people with no job, available for working and actively looking for a job).

[58] 'Principal workers', working more than 3 days a week.

Similarly, the type of industries in which they are working reflects the city's needs in terms of low-skilled labour: the main employer is the construction industry (24 per cent), the manufacturing industry remaining important (16 per cent) and the wholesale and retail trade industry ranking third (15 per cent). However, jobs grouped under the 'Other Industry' category, such as a maid, helper or security guard, represents a considerable 19 per cent of the 'principal' workers' pool.

Part-time (or 'subsidiary') activities only concern 12 per cent of the slums' working population. This group logically displays a high rate of self-employed individuals (89 per cent). It is largely composed of women having small home-based jewellery production activities (71 per cent), but also of young men having all types of part-time activities (commercial, daily wages in the construction sector). 'Subsidiary' work can sometimes be used to complement the income received from a 'principal' job.

2.2. Employment changes due to resettlement

Out of the 239 rehabilitated adults, only 11.3 per cent have a changing professional status. But if we now take as a basis the active population only (130 people in Chandivali), this ratio rises to 18 per cent (see **Table 15**). Hence, for one-fifth of the resettled active population, adjusting to the new working environment has resulted in either changing, finding or losing a job. Among these, 42 per cent shifted from one job to another, 25 per cent lost a job and could not find a new one, whereas 33 per cent started working while they were previously unemployed. There is then a balance between lost and found jobs, having no significant impact on the overall unemployment rate, which remains perfectly stable at 6.14 per cent. There seems to be no major structural disruptive effect of resettlement and a strong inertia in employment patterns.

Table 15: Multivariate table crossing changes in employment due to resettlement and present job status, among the Chandivali active population.

	No job change	Job shift	Found new job	Lost previous job	TOTAL
Principal	96	10	8	.	114
Subsidiary	8	0	0	.	8
Unemployed	2	.	.	6	8
TOTAL	106	10	8	6	130

(Source: Author's survey, 2008)

Not much can be said regarding the distinctive evolution of employment structures for men and women. Resettlement seems to have had similar effects over both sub-groups. It cannot be said that the removal of daily burdens (water, fire for cooking) with the improvement of basic infrastructure and tenure security, has freed women from daily chores and led to an increase in women's labour supply. Such an observation might be noticed in the future, but at the time of the survey, no additional women had entered the labour market.

Nevertheless, some interesting points can be highlighted while probing into the causes of professional changes (Vaquier, 2008). Those who have shifted from a slum-based to a Chandivali-based job did it essentially because the commuting time had increased too much for them to carry on with their initial activity (70 per cent) or because, as they say, they had lost their original professional networks (20 per cent). Among those who stopped working, the lack of local opportunities in Chandivali, commuting time, as well as the absence of commercial rehabilitation have played a significant role. In fact, this last group is mainly composed of former shopkeepers or small-scale industry owners who could not continue their activity in Chandivali. Finally, the principal motivation for 50 per cent of those who started working after resettlement is the need for additional income to face increasing expenditure. Issues of job location, commuting duration and increase in expenses will be dealt with in following sections of this report.

Understanding which category of jobs has faced the most alterations at the time of shifting is the key issue. The multivariate **Table 16**, comparing the job status of those who kept, lost or found a job while shifting, provides such a picture. Just like we anticipated, the major alterations take place within the casually employed population (60 per cent of those who changed jobs). Self-employed activities are also affected but we shall see in later paragraphs that this is the result of an 'opportunity effect' for shopkeepers. In contrast, permanent activities are over-represented among those who have kept their jobs: notwithstanding where they were working, their professional status is not affected by resettlement.

Table 16: Multivariate table crossing changes in employment due to resettlement and present nature of employment, among the Chandivali active population.

	No job change	Job shift	Found new job	Lost previous job	TOTAL
Permanent	14	0	0	.	14
Casual	52	6	7	.	65
Self-employed	38	4	1	.	43
Unemployed	2	.	.	6	8
TOTAL	106	10	8	6	130

(Source: Author's survey, 2008)

Confirming the high professional mobility of casual workers, job creations in Chandivali are over concentrated in the casual sector (87 per cent according to **Table 16**). Some of them take place in the self-employed sector (12 per cent), while none of them occur in the permanent sector. Jobs created are mainly small-scale service activities targeting either the large neighbouring upper-class market (maid, security guard, sweeper, washer) or the new local demand (shops).

The case of small-scale industries and shops is an interesting one. Though these are theoretically not allowed in Chandivali, they seem to be *de facto* tolerated. The share of families owning this

type of business only decreases from 14 per cent in slums to 11 per cent in the resettlement area, while no commercial or industrial tenements had been provided at the time of the survey. The large majority of these are commercial, with a significant proportion of small groceries. The number of small-industries created in Chandivali is rather limited, probably because such investments require time, but mainly because flats are inadequate[59].

In slums, 50 per cent of commercial or productive unit owners are legitimately pessimistic regarding the possible continuation of their activity in the resettlement area. Given the fact that no commercial tenement has been provided yet, 68 per cent of them fear that the lottery allotment system will not allocate them a ground floor tenement (the only option allowing them to carry on with their activity within their flat).

Figure 27: A ground floor grocery (illegal but tolerated) in Chandivali.

(Source: Author's survey, 2008)

[59] These production units (textile mainly) were already not frequent in original slums due to low security and tenure. They had been relocated in neighbouring slums outside of the SGNP.

As far as Chandivali is concerned, this 'ground floor opportunity effect' can be clearly identified while examining the distribution of new groceries. All those who opened a shop for the first time are living in ground floor flats, simply because this is the only place where these can be opened towards open spaces and be profitable (see **Figure 27**). On the other hand, most shop-owners who were already running such business in the initial slum have been unfortunately allotted upper floor flats and are now facing significant financial constraints. Logically, our survey shows that 30 per cent of resettled small productive or commercial unit owners are not happy with the location of their tenement (upper floors being an issue) and 40 per cent are dissatisfied with their size (which also has to be shared with living space).

Our results also suggest that opening a grocery in Chandivali requires significant initial financial investment, which none of the previously unemployed workers could afford. On the contrary, by virtue of being previously employed, 30 per cent of those who declared changing jobs while shifting have actually been able to open a grocery shop, thus benefiting from the 'ground floor opportunity effect'.

2.3. Perceived evolution of professional status

While interviewing the active resettled adult population whether it thinks its professional situation is stable, improving or deteriorating, one can detect the key role played by geographical dependence on the initial employment location.

In all, 59 per cent of workers state that their situation is stable, 12 per cent that it is improving and 29 per cent that it is deteriorating. While we saw that there is no major structural change in employment patterns, the share of dissatisfied workers here exceeds the share of contented ones.

Several groups can be identified while crossing this information with the one we have computed regarding employment changes (see **Table 17**). For those who found or lost jobs, the perceived

professional evolution is clearly linked with employment changes and hence does not require further analysis. We, therefore, have to focus on those who have either shifted to a new job or carried on with their initial activity.

Table 17: Professional evolution as perceived by workers themselves, depending on the real status change.

ChangeJob ProfEvolution	No	Yes	LostJob	FoundJob	Total
Stable	138	1	1	0	140
Improvement	17	4	0	8	29
Deterioration	57	5	8	0	70
Total	212	10	9	8	239

(Source: Author's survey, 2008)

First, 81 per cent of those who declare that their professional status is deteriorating have retained their job. For 79 per cent of this group, the main reason of deterioration is obviously the increase in commuting time and cost. Among this group, commuting time has increased from 57 minutes to 1 hour 22 minutes with resettlement. These results suggest that a large part of the Chandivali labour force is still working near areas they were previously living in (this will be detailed in the next section).

Second, a large share (48 per cent) of those believing that their professional situation has improved are either those who were already working close to Chandivali before shifting or those who have found new jobs in the area (Chandivali, Andheri, Powai or Ghatkopar neighborhoods). Decrease in commuting time, from 57 to 54 minutes on an average, is the principal reason for satisfaction for 59 per cent of them. An increase in income comes second, with 38 per cent of this sub-group. Interestingly, this group of satisfied workers also includes those not depending on any specific location for their professional activity, such as auto rickshaw drivers or construction labour.

3. Patterns of employment location

In order to get the best picture possible in terms of changes in employment localization patterns due to resettlement, we have computed distance data for every couple living place/working place of our sample (*WorkDistance*). Distance has been calculated on a map of the city, 'as the crow flies', given the employment location provided by respondents. When major physical obstacles such as bridges, parks or airports were on the way, we have simply taken an alternative 'break-point' to avoid them. As far as workers having no specific employment location were concerned (mainly construction labour and rickshaw drivers), we have assumed, based on fieldwork observations, that they were working at an average distance of 3 km from their home.

In addition, in the case of the Chandivali subsample, a 'work dependency' proxy (*WorkDependency*) has been generated by calculating the distance between the current place of work and the slum where the individual was living prior to resettlement.

We have finally generated two dummy variables. The first one, called '*WorkAreaDummy*', takes the value '1' if the individual is working at 3 km or less from his/her place of living. The second one, called '*WorkDependencyDummy*' equals '1' when a Chandivali adult is working at less than 3 km from his/her original slum.

3.1. Changing patterns due to resettlement

On an average, surveyed workers commute 5.9 km to go to work, but the mean test presented in **Table 18** displays significantly different patterns for not-yet-resettled and resettled households. In the first case, the commuting distance is only 5.2 km, while it increases to 7.3 in Chandivali[60]. We can, therefore, assume that employment is more 'local' in slums than in Chandivali.

[60] This increase might even be underestimated: all non-localized workers have been attributed a standard 3 km commuting distance while we suspect an increase in this distance with resettlement.

Table 18: Mean difference test (t-test) on the commuting distance (km) among resettled and non-resettled sub-groups

Group	Obs	Mean	Std. Err.	Std. Dev.	[95 per cent Conf.	Interval]
Resettled = no	240	5.25	.44	6.88	4.37	6.12
Resettled = yes	113	7.3	.57	6.09	6.16	8.43
combined	353	5.9	.36	6.7	5.20	6.60
diff		-2.05	.76		-3.54	-.56

diff = mean(no) - mean(yes) t = -2.7040
Ho: diff = 0 degrees of freedom = 351
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.0036 Pr(|T| > |t|) = 0.0072 Pr(T > t) = 0.9964

(Source: Author's survey, 2008).

This assumption is confirmed by the significant decrease in the percentage of people working at less than 3 km from their living area, from 75 per cent in slums to 45 per cent in Chandivali. As we could however think that these changes are the result of a threshold effect due to a change in the number of non-localized workers (who have all been attributed a standard 3 km value) we have performed the same test for a 5 km-breakpoint dummy (*WorkAreaDummy2*). The difference remains highly statistically significant, indicating that no matter which threshold we choose, slum-dwellers are always working closer to their homes than resettled families.

As a result, the average commuting time rises from 54 to 62 minutes with shifting. Similarly, resettled workers tend to use both private and public means of transport on a more frequent basis. The proportion of users increases from 60 to 65 per cent for bus, 23 to 32 per cent for auto rickshaw, and 3 to 9 per cent for personal vehicles (motorbikes and bicycles). However, given the increasing distance to the closest stations (34 to 53 minutes), local trains are not as used in Chandivali as they are in slums (45 per cent to 36 per cent only).

Yet, we have to find out whether these results are the consequence of a high professional dependence on original slum areas. The comparison between the slum commuting distance and the distance between the job location and the original slum in Chandivali (*WorkDependency*) provides us with precious information on that point. On an average, resettled adults' employment is located 9.9 km from their original slum, while the commuting distance is 5.2 km for not-yet-resettled workers (**Table 19**). Given that the resettlement area is, on an average, located 10 km south of our slums, the fact that the distance work location/original slum has only increased by 4.7 km (far less than 10) reveals some kind of 'attraction effect' between slums and Chandivali over job location. The fact that medians equal means for these estimates (Vaquier, 2008) excludes the possibility of outcomes being driven by extreme observation points.

Table 19: Comparison between the average commuting distance for non-resettled families and the distance between the working place and the original slum for resettled ones. Both in km.

Variable	Obs	Mean	Std. Dev.	Min	Max
WorkDistance2 (slums only)	240	5.25	6.88	0	31
WorkDependency (Chandivali only)	113	9.88	6.55	1	29.5

(Source: Author's survey, 2008)

If we now focus on Chandivali alone and compute the same data without taking into account home-based activities (because as has been previously shown, they do not follow the same dynamics as outdoor activities) and non-localized activities (as we do not have any precise information regarding their localization patterns), it comes out that the resettled population is actually working closer to the initial slums than their present residence in Chandivali: 9.8 km against 10.2 km (see **Table 20**). Similarly, an impressive 20 per cent of the Chandivali workforce is still working within 3 km

of its original slum. These results confirm a clear professional dependence on the original slum areas.

Table 20: Comparison between the average commuting distance and the distance between the working place and the original slum for resettled families. Excluding home-based and non-localised activities. Both in km.

Variable	Obs	Mean	Std. Dev.	Min	Max
WorkDistance2	72	10.24	5.77	.5	23
WorkDependency	72	9.81	8.23	1	29.5

(Source: Author's survey, 2008)

As far as the 'perceived' professional evolution described in the previous section is concerned, we can now underline employment location trends. First, individuals who have retained their jobs while shifting and who say that their professional situation has improved were, in fact, working quite far from the slum before resettlement (14.2 km). Their commuting distance has dropped by 5.2 km, to 9 km (see **Table 21**).

Table 21: Comparison between the average commuting distance and the distance between the working place and the original slum for resettled workers who kept their job and whose professional situation is improving. Both in km.

Variable	Obs	Mean	Std. Dev.	Min	Max
WorkDistance2	17	9.09	6.88	0	20.5
WorkDependency	17	14.23	8.75	3	28

(Source: Author's survey, 2008).

On the contrary, those who kept their jobs but who face a deteriorating professional situation now have to commute more: 9.6 km against 8.9 before (see **Table 22**).

Table 22: Comparison between the average commuting distance and the distance between the working place and the original slum for resettled workers who have kept their jobs and whose professional situation is deteriorating. Both in km.

Variable	Obs	Mean	Std. Dev.	Min	Max
WorkDistance2	56	9.64	6.19	0	23
WorkDependency	56	8.92	7.45	1	29.5

(Source: Author's survey, 2008)

Finally, those who did not change jobs and who are neutral regarding their professional evolution are mainly non-localized workers: taxi and auto rickshaw drivers, or construction labour. However, if their job has not changed, their working location has[61].

3.2. Workers' profile depending on their employment location

In slums, if we consider the pool of workers practising their activity within 3 km of their house (75 per cent of the workforce), 61 per cent comes out to be casually employed and 38 per cent self-employed, while only 2 per cent have a permanent work contract. Most of these local workers are employed in the construction industry (31 per cent), trade industry (19 per cent), manufacturing industry (13 per cent) and the transport industry (11 per cent). Workers classified under 'other industries', such as small services (maid, security guard) are also mainly employed around slums.

In contrast, for those working more than 3 km from the slum, we observe a higher proportion of permanently employed (28 per cent) and an even higher share of casually employed (70 per cent), while the group of self-employed is shrinking to 2 per cent. These distant workers are mainly employed in the manufacturing sector (22 per cent), in the transportation industry (15 per cent), and even in the financial sector (13 per cent).

[61] In this specific case, the variable '*WorkDependency*' cannot be used to reflect the workplace's distance from the original slum before resettlement.

In Chandivali, three main groups can be identified. The first one is composed of those who have managed to find a job within 3 km of the resettlement area. It is the largest group with 45 per cent of Chandivali workforce. It is largely composed of self-employed workers (67 per cent) who logically face less geographical dependence than employees. It comprises of only 33 per cent of casual workers. No permanently employed workers can be found in this group. Therefore, if we compare with the slum situation, local jobs are much more concentrated in self-employed activities while casual activities have dropped. Unlike in slums where nearby centres of economic activity were pushing the casual employment demand up, the resettlement area is characterized by an obvious lack of small-scale informal industries and hence casual job demand. The construction industry is the only one providing such kind of work in Chandivali, while most self-employed workers are either rickshaw drivers or shopkeepers.

The second group of resettled workers is composed of those who are still employed within 3km of their original slum (20 per cent of the workforce in Chandivali). With 26 per cent, the share of permanent workers is the largest among this subgroup. Hence, what has to be emphasized here is that even though permanent employment only represented a small share of local employment in slums (2 per cent), it comes as a strong professional dependency factor. At the same time, casual employment dependence - representing 70 per cent of jobs in this group – is also high, while there is absolutely no geographical dependence for self-employed workers.

Finally, the last group which can be identified is composed of employees working at more than 3 km from both the resettlement complex and original slums. It logically shares the same characteristics as the group of not-yet-resettled adults working more than 3 km from their slum: a majority of casual jobs (74 per cent), a significant share of permanent jobs (21 per cent), and very few self-employed activities (5 per cent).

3.3. Professional geographical gravity around the living area

The database we have computed on commuting distance allows us to study over 353 workers, the factors influencing the geographical

location of employment for a given living area. The least square regression presented in **Table 23** (corrected for heteroskedasticity) displays several individual and household characteristics which might influence our dependant variable ('*WorkDistance*'). It covers both Chandivali and the slums, a control variable being introduced for resettlement. It is clear that given the very low R^2 (10 per cent), our explanatory variables have a limited predictive power. We think this is mainly because besides age, sex, education and of course employment location, all other explanatory variables are respondents' and not individuals' characteristics. We then have to assume that these other variables, including the respondent's language, are satisfactory proxies for individual characteristics. Nevertheless, some interesting and robust features can be highlighted in terms of 'attractive' and 'repulsive' factors.

First, through all our exploratory regressions on 'professional gravity', the worker's education level plays a highly significant and stable 'repulsive' role. We estimate that an additional year of education increases the commuting distance by an average of 231 metres. This is consistent with the fact that permanent jobs sought by skilled workers are mainly located outside the 3 km perimeter around the living area, often in the southern part of the city (Mumbai Island).

Second, being literate in Marathi comes out to be a strong 'repulsive' factor as well. Adults who can read and write Marathi commute an average of 1.8 km more than other workers. This trend can be explained by the fact that Marathi is the working language used by Municipal and State administrations in Mumbai. Being literate in this local language is then a requirement for many civil servant positions in the city. Therefore, the 50 per cent of our sample's workers who belong to a Marathi-speaking and literate family tend to have an easier access to public jobs often located in the southern parts of the city. They then commute on longer distances. Our results suggest that while only 3 per cent of workers from non-Marathi-literate families have a permanent job, this percentage increases to more than 16 per cent for workers from Marathi-speaking households. Marathi-speakers do not only have a better access to public administration jobs but also to the

manufacturing sector (garment industries) and to jobs classified as 'social' or 'others', such as nurses or teachers.

Table 23: Factors explaining the commuting distance in km. Least-square regression corrected for heteroskedasticity.

	WorkDistance2
EduAdult	0.231 (2.38)**
AgeAdult	0.002 (0.06)
GenderAdult	-2.615 (3.71)***
HindiLiterate	-1.241 (1.49)
MarathiLiterate	1.811 (2.36)**
EnglishLiterate	1.418 (1.01)
Resettled	1.533 (1.96)*
Constant	3.795 (2.97)***
Observations	353
R-squared	0.10

Robust t statistics in parentheses
*** significant at 10 per cent;**
**** significant at 5 per cent;**
***** significant at 1 per cent**

(Source: Author's survey, 2008)

Third, as we have previously seen, resettled workers tend to commute on longer distances than those who are still in slums. Once controlled for all other workers' characteristics, this distance increases by 1.5 km. The 2.1 km difference identified in **Table 18** remains part of the 95 per cent confidence interval for the estimation of this coefficient.

On the contrary, the fact of being a woman is a strong and significant geographical 'attraction' factor that can be pointed out in the job localization process. On an average, female workers tend to work 2.6 km closer to the place where they live than men. This can be explained by the high concentration of the female workforce in self-employed and home-based activities.

4. Participation in the labour market

The objective of this section is to identify the explanatory factors of participation in the labour market and of access to principal (full-time) jobs, using conventional binomial logit regressions.

4.1. Factors explaining participation in the labour market

Our first logit regression, where the dependant variable is a dummy taking a '1' value if the adult participates in the labour market, is displayed in **Table 24**. Several individual or family-based characteristics are significantly correlated to participation.

Table 24: Factors explaining the participation in the labour market. Logit regression corrected for heteroskedasticity.

Participate	Coef.	Robust Std. Err.	z	P>z	[95 per cent Conf.	Interval]
AgeAdult	.432	.053	8.10	0.000	.327	.536
AgeAdultSq	-.005	.0007	-7.25	0.000	-.007	-.004
GenderAdult	-2.647	.256	-10.34	0.000	-3.149	-2.145
EduAdult	.033	.028	1.18	0.238	-.0217	.087
Adults	-.118	.064	-1.84	0.066	-.245	.008
Children	-.046	.064	-0.72	0.472	-.172	.08
Resettled	-.317	.215	-1.48	0.140	-.739	.104
WhenMumbai	-.024	.01	-2.42	0.015	-.044	-.005
HindiSpeak	.126	1.042	0.12	0.904	-1.917	2.168
HindiLiterate	-.234	.336	-0.70	0.487	-.892	.424
MarathiSpeak	-.378	.284	-1.33	0.183	-.935	.179
MarathiLiterate	.351	.282	1.24	0.213	-.202	.905
EnglishSpeak	-.35	.416	-0.84	0.400	-1.165	.465
EnglishLiterate	.234	.516	0.45	0.651	-.778	1.245
Illiterate	.395	.446	0.89	0.376	-.479	1.269
_cons	42.52	19.9	2.14	0.033	3.517	81.53

Logistic regression **Number of obs = 729**
Wald chi2(15) = 162.99
Prob > chi2 = 0.0000
Log pseudolikelihood = -343.50063 **Pseudo R2 = 0.3163**

(Source: Author's survey, 2008)

An individual's age is the first factor highly significantly correlated to the probability of participating in the labour market. Our results suggest an inverted 'U' shaped relation with an increasing relation during the first part of active life followed by a decreasing phase. According to our estimates, the maximum of the probability function is reached around 41 years. The positive phase can easily be explained by experience, learning and network effects (social capital[62] consolidation), while the negative one is mainly due to retirement and increasing physical disabilities.

Second, the earlier the worker's family migrated to Mumbai, the higher is the probability that he participates in the labour market. This outcome, significant at 2 per cent, reveals how socio-professional network building and understanding of opportunities provided by the city's labour market takes time.

Third, a strong bias against female employment is clearly appearing. The corresponding coefficient comes out to be highly significant as well, with a risk of making a mistake when rejecting the null hypothesis of 'no gender bias' which is not even 0.1 per cent. This either means that women face discrimination while hiring or that they simply tend not to look for jobs. Given the fact that our sample's unemployed population is largely dominated by men, we believe the second hypothesis is the most relevant.

If we now look at the impact the family structure has on a given adult's probability of engaging in some income-generating activity, it appears that the number of adults in the family plays an important role while the number of children does not. Actually, the more adults in the family, the lower is the likelihood that one of them participates in the labour market.

Several hypotheses could explain this phenomenon. We could first imagine that if the family has a large number of adults, it means that the probability that some of them are already working is high

[62] Social capital can be defined here as the density of socio-economic networks.

and hence there is no need for any of the others to look for an employment. This might, for instance, be true when we focus on women's employment: according to our fieldwork observations, most women stay at home if their husband has a job and they only look for a job if, for one reason or the other, men are unable to bring home a sufficient income for the family. This case is logically infrequent in large families[63].

A second hypothesis will simply focus on the reason why a given family's number of adults can be high. If this were due to recent arrivals of distant relatives from rural areas, then it would be reasonable to think that these migrants' possibility of finding a job would be lower, thus reducing the average adult participation in the labour market.

However, it is interesting to notice that some factors which could logically influence access to the labour market actually do not. First, it is the case of education: no matter how educated a given adult is, his/her probability to find a job remains stable. Of course, this does not mean that educated and non-educated workers are doing the same kind of job and earning the same income, but rather that there is a strong demand for unskilled jobs in Mumbai. Hence, lack of education is not a barrier to have access to employment. Similarly, spoken, read and written languages do not influence the adults' access to jobs. Coefficients for literacy in Marathi and English have positive expected correlations but they remain insignificant: finding a job is not restricted to those being literate. Lastly, and more importantly for us, resettlement does not decrease the probability of accessing a job: though the coefficient's sign is negative, the p-value is too high (15 per cent) for us to infer a significant link. This point is consistent with our previous observations of stable unemployment at 6.4 per cent between the slums and Chandivali.

[63] It was observed during fieldwork that the larger the family, the higher the probability of having more working male members. On the contrary, all families headed by a woman were found to be small families.

4.2. Factors explaining access to a full-time job

Let's now focus on the 'participating' (working) population in order to find out which factors can explain the distribution between principal (full-time) and subsidiary (part-time) statuses. The logit regression presented in **Table 25** displays our results. Due to lack of significance, several explanatory variables have been dropped. This is, for instance, the case of education and English literacy which were insignificant in all our test regressions.

Here again, the correlation between age and access to principal jobs is characterized by a very coherent, inverted 'U' shape relation with a maximum at 39 years. We believe that the logic for such a relation remains: first, a learning period where the worker gains knowledge about the labour market and its opportunities; and, then, a progressive shift to subsidiary, home-based activity at the time of retirement.

Once again, gender is a key factor. The probability of accessing a 'principal' job is much higher for men than it is for women, with a greater coefficient's significance than for other explanatory variables. Women tend to carry out smaller home-based production activities (such as ornament production).

Similar to what has already been noticed for participation, the date of arrival in Mumbai is also important to understand the pattern of access to full-time jobs. Logically, workers belonging to families which recently migrated to Mumbai face more difficulties than others to find stable and full-time employment. Here again, we have an indication that the active population needs time to build its socio-economic network (social capital). However, it remains difficult for us to capture this trend directly, as we do not have a satisfactory proxy measuring such networking effects.

Unlike the results we had while focusing on participation in the labour market, it comes out here that workers belonging to a Marathi-literate family have better access to principal jobs. This, as we have shown in our 'labour gravity' estimates (**Section 3.3**),

reflects the affirmative action policy of local institutions as well as a facilitated access for *Maharashtrians* to several full-time job categories.

Finally, resettlement does not seem to have any impact on the distribution between principal and subsidiary jobs. This might seem contradictory as we said previously that the proportion of principal workers increases at the time of shifting. In fact, this insignificance is perfectly coherent with our observations, since here we are controlling for the sex ratio which is already capturing the 'family nuclearization effect'.

Table 25: Factors explaining the access to a full-time (principal) job. Logit regression corrected for heteroskedasticity.

Principal	Coef.	Robust Std. Err.	z	P>z	[95 per cent Conf.	Interval]
AgeAdult	.284	.081	3.50	0.000	.125	.443
AgeAdultSq	-.004	.001	-3.69	0.000	-.006	-.002
GenderAdult	-3.423	.463	-7.38	0.000	-4.331	-2.514
Resettled	.536	.494	1.09	0.278	-.432	1.505
WhenMumbai	-.037	.023	-1.61	0.108	-.082	.008
MarathiLiterate	.804	.429	1.87	0.061	-.037	1.644
EnglishLiterate	-.014	.712	-0.02	0.984	-1.410	1.381
_cons	71.236	45.034	1.58	0.114	-17.029	159.502

Logistic regression **Number of obs = 397**
Wald chi2(7) = 66.94
Prob > chi2 = 0.0000
Log pseudolikelihood = -89.649983 **Pseudo R2 = 0.3203**

(Source: Author's survey, 2008)

5. Evolution of income and purchasing power

This last statistical analysis section focuses on the income evolution between 'not-yet-resettled' and resettled families, before broadening the scope of the study to include the purchasing power issue and finally identifying overall income level determinants.

5.1. Income patterns

A large majority of the Chandivali sub-sample (67 per cent) do not declare any family income change at the time of resettlement. However, a considerable 27 per cent say that family income has decreased at the time of shifting (while only 7 per cent declare an increasing family income). Our objective here is to understand whether these perceived evolutions are consistent with the real income changes we have noticed. For this purpose, we perform a set of three mean difference tests for family income, income per worker and income per capita (see **Table 26**).

Table 26: Set of three mean difference tests on income among the resettled and 'not-yet-resettled' sub-samples.

Variable	Resettled = no	Resettled = yes	Combined	Diff. (mean no – mean yes)	t-test	P-value (Ho: Diff = 0)
HouseIncome	6148.8	5970.67	6082	178.13	0.31	0.7569 (Ha: Diff!=0)
WorkerIncome	3202.8	4022.89	3510.33	-820.09	-2.04	0.0423 (Ha: Diff!=0)
HeadIncome	1300.15	1516.1	1381.13	-215.95	-1.52	0.0656 (Ha: Diff<0)

(Source: Author's survey, 2008)

There is first a slight Rs 178 drop in household income from work activities, from Rs 6149 in slums to Rs 5971 in the resettlement complex. Still, this variation does not come out to be statistically significant (see **Table 26**). Hence, not much can be assumed on this point. These results are similar if we take into account all incomes from non-work activities, such as room renting or loans. We believe this limited drop in family income is entirely due to

the reduction in the number of workers per family resulting from the family 'nuclearization' process identified previously. In fact, due to the concentration of employment in full-time and stable jobs, income-per-worker rises significantly by Rs 820, from Rs 3203 to Rs 4023 . In turn, these changes even imply a significantly growing income-per-capita after resettlement by Rs 216 , from Rs 1300 to Rs 1516 (**Table 26**).

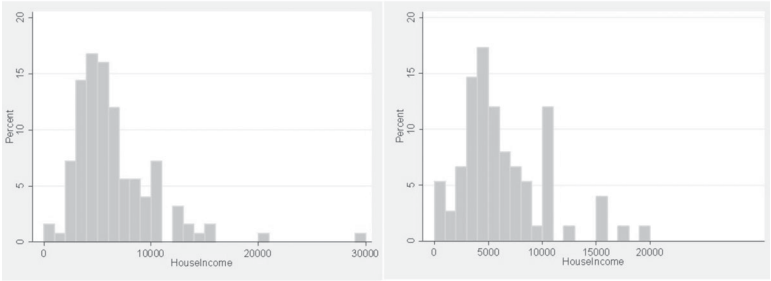
Confirming this trend, an increase in the households' asset ownership rate can be noted. For instance, the families' mobile phone equipment rate rises from 65 to 79 per cent. It similarly increases from 50 to 61 per cent for colour TV and from 6 to 16 per cent for refrigerators. Still, we suspect that income changes are only partially responsible for these trends: a household's capacity to secure their goods – both against theft and disasters – is much higher in Chandivali than in slums and could contribute to this asset ownership increase. Nevertheless, households who have long been looking for other ways to invest their savings join the 'mainstream' consumption habits once they are allotted a secure tenement.

Similarly, we do not think that the increase in ownership of individual means of transport (from 5 to 20 per cent for bicycles and from 2 to 5 per cent for motorbikes) can entirely be attributed to the growth in income-per-capita. We would rather believe that families have decided to invest in individual vehicles in order to deal with both the isolation from mass public transport infrastructure (train and bus) and the required higher professional mobility in Chandivali.

Yet, the number of families having no work income at all is found to be higher in Chandivali (5.3 per cent) than in slums (1.6 per cent). This is probably the consequence of an easier access to subsidiary activities in slums as well as to alternative sources of income that cannot be found in Chandivali. These include NGO support, room renting and even informal borrowing. The latter can be considered as closely linked to the level of social capital which had not yet been reconstituted in the resettlement area at the time of the survey.

Finally, a slight increase in income inequalities can also be noted at the time of shifting. We can get an initial idea of it if we have a look at the increasing standard deviation in income-per-worker averages – from Rs 2438 to Rs 3199 (Vaquier, 2008). This trend is confirmed by our calculation of the GINI indices for both 'not-yet-resettled' and resettled populations. The indicator actually rises from 0.33 in slum areas to 0.38 in Chandivali. It is, however, not obvious in the diagrams displaying the income densities among the two sub-samples (see **Figure 28**).

Figure 28: Household income distributions in slums (left) and in Chandivali (right).



(Source: Author's survey, 2008)

5.2. Evolution of the overall purchasing power

While 94 per cent of resettled households told us their income was either stable or decreasing, 95 per cent of them said they faced increasing expenditure at the time of shifting. There is then little doubt about the drop in purchasing power among resettled families. Besides electricity, all living costs have increased with resettlement (see **Table 27**). Among the few slum households who pay for it, the average costs are Rs 75 for water, Rs 35 for toilets and Rs 9 for waste disposal (Rs 119 in total). In comparison, Chandivali's maintenance charge amounts to Rs 215. Of course, this maintenance charge includes a whole range of services which did not exist in slums, such as lighting and maintenance of public places and amenities. However, just as they were not all ready or able to pay for water and toilets in their original slum, all households did not have the same willingness to pay for these new services.

Electricity is the only cost decreasing with resettlement, as it used to be illegally traded by resellers in slums (see **Part 2, Section 5.2**). The monthly average cost of electricity has dropped from Rs 268 in slums to Rs 230 in Chandivali.

Table 27: Main expenditures faced by families in slums and in Chandivali.

Variable	Resettled = no					Resettled = yes				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Water Cost	125	75	190.8	0	1500	0				
Toilet Cost	67	37.1	39	10	150	0				
Electricity Cost	106	267.7	162.4	100	1000	75	229.7	111.7	75	700
Private Fee	33	105.3	124.7	0	500	32	212.5	127.3	20	500

(Source: Author's survey, 2008)

Transport remains the main problem in Chandivali and the increase in its costs seems to be considerable[64].Though we do not have precise figures on this point, we have shown that the daily commuting time is increasing significantly and that distance towards bus and train networks is a major problem. For instance, a daily return auto rickshaw drive from Chandivali to the nearest bus stop costs an average of Rs 20. This cost would go down if rickshaws were 'shared' by costumers but the transport demand is so high that drivers do not accept it. Considerable efforts will have to be made by local authorities to connect the site to existing transport networks so as to pull down corresponding costs.

Similarly, the fact that more children are going to private schools in Chandivali than in slums leads to an increase in overall schooling costs (see **Part 2, Section 5.2**). In addition, while slum children can go to school walking, in Chandivali they have to take a school bus, thus increasing the monthly family costs by another hundred rupees.

[64] As we have previously shown, the use of public transport is more frequent in the resettlement area than in slums where people usually go to work walking.

Finally, most interviewed families complained about an increase in the cost of food in the resettlement area, as no cheap market is located nearby. In future, we think that the provision of commercial tenements and the increase in the number of traders attracted by high profit prospects might bring these prices down.

5.3. Income determinants among our overall sample

We perform two basic linear regressions to identify the key factors influencing the level of income-per-capita in our sample (**Table 28**). Though we have to be cautious while interpreting this information as income levels we have collected for our survey are family and not worker-based, these new results interestingly complement the ones we have already presented on access to the labour market.

We have previously shown that lack of education did not restrict access to the labour market. However, as one can see in the first regression of **Table 28**, it is an important factor explaining income. According to our estimates, an additional schooling year for a given adult increases the household's monthly per-capita income by Rs 43. Therefore, if education is not required to find a basic job in Mumbai's suburbs, it is useful in accessing well-paid positions.

Although it does not influence the probability of harnessing a job, resettlement has a positive impact on income. On a monthly average, resettled families earn an extra Rs 200 per capita as compared to families settled in the slum. This evolution, we believe, is due to the concentration of the employment structure in full-time and stable jobs in Chandivali. Consistently, if we control for the changes in the size and the number of adults per family – and hence for the impact the 'nuclearization' process has on the active population's structure – resettlement comes out to be non-statistically significant (second column of **Table 28**).

Interestingly, the work location is also strongly linked with income levels: the commuting distance is highly significantly positively correlated to earnings. According to our estimate, a 1 km increase

in the commuting distance is equivalent to a Rs 30 increase in per-capita-income (this, of course, should be balanced with increasing commuting cost). Hence, though informal employment is available close to the surveyed living areas, formal and well-paid jobs (such as civil servants or jobs requiring English literacy) are often concentrated in distant business centres (Bandra, Mumbai Island).

Impoverishment due to demolitions finally has to be taken into account. Our estimates show in fact that an additional demolition decreases the families' per-capita-income by Rs 89 over a period as long as eight years after it took place (even if the family has been resettled). This reveals a 'poverty trap' effect of demolitions, which do not only have a short-term impact (cost of reconstruction, work absenteeism) but also long-term consequences in the form of destruction of family assets.

Table 28: Factors explaining the per-capita income. Least-square regression corrected for heteroskedasticity.

	HeadIncome (1)	HeadIncome (2)
WorkDistance2	30.37 (2.95)***	28.45 (3.01)***
WhenMumbai	3.46 (0.83)	2.88 (0.72)
Resettled	200.4 (1.66)*	9.48 (0.08)
EduAdult	43.14 (3.21)***	41.83 (3.34)***
Demolition	-89.43 (2.29)**	-47.87 (1.74)*
HouseholdSize		-234.05 (7.29)***
Adults		142.9 (4.21)***
Constant	-5834.59 (0.71)	-4004.88 (0.51)
Observations	353	353
R-squared	0.14	0.26

Robust t statistics in parentheses
*** significant at 10%;**
**** significant at 5%;**
***** significant at 1%**

(Source: Author's survey, 2008)

6. Non-estimated long-term effects of resettlement

The Chandivali project being a recent one, the employment effects identified throughout Part 3 of the report have to be interpreted as short-term impacts of the resettlement process. On a longer-term, prospective approach, we believe our positive results are underestimated for several reasons.

First, we know how the process of rebuilding socio-professional networks can take time. Many of our respondents told us that the loss of their 'network' was the reason why they were facing economic difficulties. Given the fact that social capital seems to be slowly reconsolidating in Chandivali[65], we think small service providers could progressively come back to a normal activity level. This could be true whether their consumer base is composed of other resettled households or of neighbouring middle-class families. At the same time, improvement in healthcare facilities among shifted workforce might imply a long-term increase in employment supply. The prevalence of both water-related and respiratory diseases[66] might be reduced, thus increasing labour productivity. Such effects might not be visible but they are almost certainly considerable.

Social infrastructure and amenities planned within the resettlement complex had still not been built at the time of survey. While these should have covered 28 per cent of the built-up area according to initial maps, they might well now be reduced to the minimum: one school and one hospital. Nevertheless, these facilities might, once built, provide new job opportunities for shifted families but also local services which should save their time and money[67].

[65] The appropriation of clusters' open spaces for festivals and national events is an example of this reconsolidation.

[66] The quarries located just behind the resettlement complex should be closed once construction is finished. This should reduce respiratory problems among shifted individuals currently suffering from large emissions of dust.

[67] We, for instance, know that expenditures in schooling transport and schooling fees represent a large part of the resettled households' expenses.

Similarly, the construction of commercial tenements in Chandivali could provide important work opportunities though we do not have much information on the way these should be allotted. The development of such commercial activities might allow for a reduction in food prices to affordable levels and therefore reduce the cost of living for resettled households.

Still, there is a total uncertainty about the timing of the provision of these social amenities and commercial tenements. The High Court's pressure for an immediate resettlement of people living inside the park is currently forcing NHSS and Sumer Corporation to give the utmost priority to housing supply. This timing gap between the allotment of tenements and the delivery of amenities will at least hamper the socio-economic integration of affected families and, at worst, isolate them in a long-term 'poverty trap'. For instance, many resettled families have already chosen to sell or rent their new property though they legally have to wait for ten years before doing so. According to our fieldwork, a 225 ft^2 flat in the resettlement complex can already be rented for around Rs 2000 ($ 50) a month or sold between Rs 500,000 and Rs 600,000 ($ 15,020), a considerable amount for families earning an average monthly income of Rs 6082 ($ 152).

We, therefore, believe that the ability of the project promoters to reduce this gap will be the key determinant of the long-term socio-economic status evolution of resettled households. Doing so would stimulate the local economy, and in turn, improve the families' capacity to face their increasing cost of living.

CONCLUSION

Slums are a salient feature of Mumbai's landscape. The increasing demographic pressure on the built-up structure of the city has pushed 54 per cent of its population to find alternative housing solutions, most of the time in environmentally protected areas. The case of the SGNP is a striking example of the conflicts this situation has created between the 'brown' and 'green' agendas, of the large-scale mobilizations it can generate and the specific public policy responses that are of interest to the SETUP team.

The Chandivali resettlement process benefiting the park's slum-dwellers is everything but a conventional resettlement project for Mumbai. Still ongoing at the time this report was being finalized, it should ultimately be the largest project of its kind in Asia (25,000 affected families), covering not less than five slum pockets. While it relies mainly on the private sector, just like any SRA scheme, the involvement of an NGO in each and every step of the process makes it more suitable for addressing the slum dwellers' needs, both in terms of localization and design. Our results display high levels of awareness, involvement and satisfaction towards the project, although the latter is largely based on 'opportunity effects': families, who settled in the slum just before the watershed year of 1995 and who did not invest in housing, are logically the most satisfied ones.

Based on a rigorous methodology, the stratified quantitative survey we have carried out allows us to identify key sharp structural changes in the dwellers' socio-economic integration at the time of shifting.

Our research suggests that forest 'encroachments' took place on an individual basis, mainly since the 1980s, as a combination of economic, housing and social factors. It is the actual situation of the housing market in Mumbai, and not poverty, which pushed people to live in the park's area (the choice of a particular slum being driven by employment and communal concerns). Our results

also confirm that housing is a long and costly process. It took as much as two years to settle down for those who migrated in the 1970s and eight years for those who arrived in the 1990s. Similarly, land and accommodation have become increasingly expensive, an average plot of land now costing around Rs 13,550 ($ 340) and a single-room dwelling around Rs 43,555 ($ 1090).

The short-term impact of the project on access to basic services and tenure security is positive, especially in the context of the threats and large-scale demolitions which took place in slums following the PIL. In fact, slum dwellers were originally relatively well 'integrated' but the 1999/2000 evictions and systematic destruction of public toilets, water pipes, sanitation systems and electricity networks had significantly increased their 'socio-economic exclusion'. By the time the project started, these areas were displaying dire living conditions, local private investment was frozen, and 83 per cent of the population stated that lack of basic infrastructure was their main daily problem.

Similarly, demolitions suddenly increased the credibility of the forest department's threats, also thereby reducing the perceived security of tenure in slums. This translated into a resignation of the population to accept the resettlement project and, in turn, in a freezing of consolidation investment dynamics. We show that (i) there is a permanent 'credibility effect' as a single demolition is sufficient to inhibit long-term investment; (ii) this 'credibility' dimension affects the lack of tenure security at a collective, slum level; and (iii) income is not a primary explanatory factor of housing investment as compared to tenure security (also true for asset ownership). By granting housing ownership, the project therefore has a positive impact on tenure security, which we believe is an essential aspect of 'citizenship integration'. Interestingly, this notion, referred to as 'mental peace' by the respondents, is underestimated prior to resettlement and over-emphasized by resettled families (taking basic infrastructure as the main factor for satisfaction towards the project).

However, our results suggest a negative effect of the project on access to *social and transport infrastructure*. Unlike basic infrastructure, schools, hospitals and transportation networks were located out of slums and have then been spared from demolition. Such amenities are still seriously lacking in Chandivali (especially transportation facilities). As a result, commuting time and cost increase significantly with resettlement.

We then focus on the structure of professional activities. In slums, the unemployment rate is low (6.4 per cent) and inequalities are limited. The majority of workers are casually or self-employed (63 and 29 per cent respectively), mainly in the construction and manufacturing industries (24 and 16 per cent) but also in trade (15 per cent). At the time of resettlement, the unemployment and labour market participation rates remain perfectly stable. Still, the increase in commuting time or the loss of professional networks pushes 21 per cent of the workers to change their professional status. Interestingly, permanently employed workers are not affected. Logically, changes in commuting time and in income appear as key factors explaining the level of professional satisfaction after resettlement. Finally, we observe a clear positive 'ground-floor opportunity effect' leading to the creation of home-based commercial activities in Chandivali.

As far as the patterns of employment location are concerned, we find a significant increase in the commuting distance, from 5.2 km in slums to 7.3 km in Chandivali. Employment is then 'local' in slums (a frequent observation in Mumbai), while it is more diffused in Chandivali: only 45 per cent of workers are employed within 3 km of their living place in Chandivali against 75 per cent in initial slums. We then clearly point out a very strong geographical dependency on the original slum in the work localization patterns: 20 per cent of the resettled labour force is still working at less than 3 km from its original housing area.

In all, we find that workers having good education levels and speaking Marathi (the local language in Mumbai) tend to commute

more, while women tend to work more locally. In addition, the lack of education does not come out to be a barrier in access to the labour market, while the fact of being a woman or a recent migrant does. Similarly, speaking Marathi does not facilitate entry into the labour market, but is useful to access full-time positions.

Yet, the principal disruptive effect of resettlement on employment is channelled through what we have called a 'family nuclearization process', the average household size decreasing significantly from 5.28 to 4.44. We show that the relatives who are not shifting with the rest of the family are in fact male workers, less educated than the average and engaged in part-time jobs. They are either brothers, uncles, cousins or nephews of respondents and then do not belong to the nuclear household. We assume that they have not been able to shift with the rest of the family because of the inflexibility of the tenements in Chandivali, resulting in an 'intra-household selection process'. Consequently, the share of part-time workers drops in Chandivali, while income-per-worker increases significantly. Logically, income per-capita is not affected at the time of shifting as far as it is controlled for the household's size.

To conclude, some basic policy implications could be inferred out of the above-mentioned results. The major short-term benefits of SRA schemes are undoubtedly the securing of tenure, and, to a lesser extent, the provision of basic infrastructure. But these alone cannot justify the relocation of workers who purposely chose to settle in areas where the labour demand was high and matched their supply. Wherever it is possible, in-situ rehabilitation has to be given priority.

Moreover, when evictions are deemed necessary, the proposed options should not only provide ownership and basic services but also immediately provide social infrastructure (a gap in education or healthcare could potentially have permanent implications on poverty) as well as commercial tenements. From this point of view, there is significant room for improvement in the formulation of resettlement projects. Inclusiveness (in the SGNP, 48,000 families

remain without any resettlement option) and equity among eligible families (depending on the date of settlement in the slum and the level of past investment in housing) should also be emphasized. Such schemes should also take into account the implications of displacement on professional localization and mobility. On the short-term, employment remains very dependant on the original slum and therefore, the relocation distance should be minimized. In the long run, it implies that serious labour market studies should be systematically carried out on the area of relocation in order to evaluate its 'absorbing capacity'.

BIBLIOGRAPHY

Adhikari, Sanchayeeta. 2004. *Urban planning and politics of slum demolition in Metropolitan Mumbai*. Mumbai: Indian Institute of Technology.

Bertaud, Alain. 2004. Mumbai FSI Conundrum. Retrieved from http://alain-bertaud.com.

Bhagat, R.B, Mohua Guha and Aparajita Chattopadhay. 2006. Mumbai after 26/7 deluge: some issues and concerns in regional planning. *Population and Environment* 27(4).

Bombay First. 2003. Vision Mumbai: Transforming Mumbai into a world-class city.

Bon, Emmanuel, Pierre Chapelet, Frédéric Landy and Marie-Hélène Zérah. 2008. Nature in megacities: An impossible challenge? Insights from Mumbai. Paper presented at the SETUP symposium on urban policies, territories and social exclusion, University of São Paulo, 27 & 29 August.

Burra, Sundar. 2003. Changing the rules. Guidelines for the revision of regulations for urban upgrading. Retrieved from www.sparcindia.org.

Chalapati Rao, K.S and M.R. Murthy. 2006. Towards understanding the state-wise distribution of FDI in the post-liberalization period. *ISID Working Paper* 2006/01.

Cropper, Maureen and Akie Takeuchi. 2006. The welfare effects of slum improvement programs. The case of Mumbai. *World Bank Policy Research Working Paper* 3852.

DANIDA Workshop Papers: Improving the Urban Environment and Reducing Poverty. 2000.

D' Monte, Darryl. 2006. Textile and Beyond: Mumbai in 2015. *Mumbai Vision 2015*.

Dupont, Véronique. 2007. La place des slums dans les villes indiennes. *Urbanisme* 355.

Econet. 1997. A comprehensive assessment of the Sanjay Gandhi National Park, Mumbai.

Field, Erica. 2003. Entitled to Work: Urban Property Rights and the Labor Supply in Peru. *Research Programme in Development Studies Working Paper* 220, Princeton University.

Field, Erica. 2004. Property Rights and Investment in Urban Slums. *Journal of the European Economic Association Papers and Proceedings*.

Goyal, Jayaand and R. Swaminathan. 2006. Mumbai Vision 2015: Agenda for Urban Renewal. Chapter 1.

Gupte, Rupali. 2003. Tactical city. Tenali Rama and other stories of Mumbai's urbanism. Retrieved from www.crit.org.in.

Indian Peoples Human Rights Tribunal. 2000. Crushed homes, lost lives: The story of the demolitions of the Sanjay Gandhi National Park. P.A. Sebastian.

Mahadevia, Darshini and Harini Naranayan. 1999. Shangaing Mumbai – Politics of evictions and resistance in slum settlements. *Working Paper of the Center for Development Alternatives*.

Ministry of Home Affairs. 2001. Metadata and brief highlights on slum population. Census of India.

Mukhija, Vinit. 2001. Enabling Slum Redevelopment in Mumbai: Policy Paradox in Practice. *Housing Studies* 16(6): 791-806.

Nijman, Jan. 2007. Mumbai since liberalization: The space-economy of India's gateway city. *Indian Cities in Transition*.

Pacione, Michael. 2006. City Profile. Mumbai. *Cities* 23(3): 229-38.

Ramanathan, Usha. 2004. Illegality and Exclusion: Law in the lives of slum dwellers. *IELRC Working Paper* 2004/2.

Risbud, Neelima. 2003. Urban slum report: The case of Mumbai, India. *Understanding Slums Case Study of the Global Report on Human Settlements*.

Saglio-Yatzimirsky, Marie-Caroline. 2001. Mumbai: Mutations spatiales d'une métropole en expansion. *Mappemonde* 62(2).

Saglio-Yatzimirsky, Marie-Caroline. 2002. *Untouchable Bombay. Le bidonville des travailleurs du cuir*. Paris: CNRS Editions.

Sharma, R.N. 2007. The housing market in Mumbai metropolis and its irrelevance to the average citizen. *Indian Cities in Transition*.

Singh, D.P. 2005. Migration and Occupation in Mumbai: Issues and Implications. Retrieved from http://iussp2005.princeton.edu/download.aspx?submissionId=50938.

SPARC. 2003. Draft report on 'Pro-poor slum upgrading: Framework for Mumbai, India'. Submitted to the Cities Alliance project on pro-poor slum upgrading.

Srinivasan. 2004. Sanjay Gandhi National Park: Justice for Whom, Justice for What?. Urban community development and municipal administration.

The Times of India. 2003. NGO, not developer, will construct slum project. 6 February.

The Times of India. 2004. Chandivli project got Rs 200 excess funds. 12 January.

The Times of India. 2008. Mumbai HC blow to owners of flats built on forest land. 25 March.

The Times of India. 2008. Flat owners on forest land relieved. 26 March.

Urban Age. 2007. Urban India: Understanding the Maximum City.

Urban Design Research Institute. 2006. *Mumbai Reader*.

Weinstein, Liza. 2008. Mumbai's Development Mafias: Globalization, Organized Crime and Land Development. *International Journal of Urban and Regional Research* 32(1).

Zérah, Marie-Hélène. 2007. Conflict between green space preservation and housing needs: The case of the Sanjay Gandhi. National Park in Mumbai. *Cities*.

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The Impact of Slum Resettlement on Urban Integration in Mumbai: The Case of the Chandivali Project

Summary

Developing viable public policies of slum resettlement is a challenge faced by most urban policy-makers. It has, however, become a critical one in Mumbai - a city, housing some of the world's highest population densities - a record number of slums-dwellers, but also the world's largest urban protected forest: the Sanjay Gandhi National Park. By 1999 it was estimated that 60,000 households had illegally 'encroached' into the Park's land and were to be evicted by local authorities.

This paper focuses on the Chandivali project, an unconventional slum resettlement scheme known as one of the largest ever developed, and targeting up to 25,000 of the families settled in the Park. Based on a stratified quantitative survey and an econometric analysis, it provides a detailed picture of the settlement history and the legal struggle that followed, emphasizing the links between demolitions, perceived security of tenure and housing investment.

The paper then concentrates on the key structural changes taking place at the time of shifting, in terms of the dwellers' integration to their urban environment. We show that resettlement has positive short-term impacts on the access to basic infrastructure and to tenure security (mainly because of large-scale demolitions in initial slums), but has a negative effect on the access to social and transport infrastructure. Furthermore, employment comes out as the fundamental driver of long-term integration.

The project's estimated disruptive effect on labour patterns remains limited, due to the satisfactory localization of the resettlement site: unemployment rates remain stable and job creations roughly compensate for loss of jobs. Adjustments mainly take place in the casual labour and self-employed sectors. Most alterations are due to a 'family nuclearization process', resulting from the lack of flexibility of the new tenements and leading to an illusory concentration of the employment structure in stable and better-paid jobs. We finally point out a significant increase in commuting distances and a strong job dependence on the initial area of living.

Keywords: Slum resettlement, Mumbai, Urban Economics, urban India, urban forest.

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