Library Progress International *Print version ISSN 0970 1052*
Vol.44 No. 3, Jul-Dec 2024: P.1778-1787 *Online version ISSN 2320 317X*

Original Article *Available online at www.bpasjournals.com*

An Analysis of the Impact of Slum Upgrading Programs on Urban Poverty Reduction

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How to cite this article: Durba Dutta. (2024). An Analysis of the Impact of Slum Upgrading Programs on Urban Poverty Reduction. *Library Progress International*, 44(3), 1778-1787

Abstract
This paper explores the effectiveness of slum upgrading programs in alleviating poverty in selected cities in India namely Mumbai, Delhi and Bangalore. With the increase in the rate of urbanization, the problem of squatting has emerged as a major concern, especially in the developing world where more than one billion people live in slums in objectionable conditions. The strategies of slum upgrading which include physical interventions, social initiatives, and securing tenure focus on enhancing the quality of life of the dwellers and incorporating them into the urban economy. This study uses a cross-sectional research design and includes the statistical comparison of socio-economic characteristics of the communities before and after the slum upgrading interventions. Documentary analysis, field interviews, and household surveys are some of the data collection methods used in this study to give a broad view of the impact of these interventions. The study shows positive changes in the level of income, the rate of employment, the availability of basic services, and the standard of housing in all three cities. Also, there is a decrease in the overall health risk and improved education standards among the young ones. However, the study also reveals that the challenges are recurrent, and they include housing deficits, high levels of informal employment and social exclusion. The conclusion reiterates the call for continued and comprehensive strategies that will support the long-term viability of slum upgrading interventions and the social and economic problems of slum residents. The study provides useful suggestions and recommendations that can be used to improve future slum upgrading interventions.

Keywords: Slum upgrading, Urban poverty, Informal settlements, Socioeconomic impact, and Urbanization.

Introduction

Urban poverty remains one of the most pressing challenges in the world today, particularly in rapidly urbanizing regions of the Global South. As cities expand, the proliferation of informal settlements or slums has become a significant concern, with over 1 billion people currently residing in such areas globally (UN-Habitat, 2020). These settlements are characterized by inadequate access to basic services, insecure tenure, overcrowded living conditions, and a general lack of infrastructure. Consequently, slum dwellers face heightened vulnerabilities, including poor health outcomes, limited economic opportunities, and social marginalization. Addressing these challenges is critical to achieving broader urban poverty reduction goals.
One of the most prominent strategies to combat urban poverty in these areas has been the implementation of slum upgrading programs. These initiatives typically involve physical infrastructure improvements, such as providing clean water, sanitation, and electricity, as well as efforts to improve housing quality and security of tenure. Beyond the physical upgrades, some programs also focus on social interventions, including access to education, healthcare, and economic opportunities, which aim to integrate slum communities more effectively into the broader urban fabric (Lin *et al.,* 2013).

The impact of slum upgrading programs on urban poverty reduction has been the subject of considerable debate. Proponents argue that such initiatives can significantly improve living conditions, enhance economic opportunities, and lead to better health and educational outcomes for slum residents. However, critics contend

that slum upgrading efforts often fall short due to issues such as inadequate funding, poor implementation, and the lack of comprehensive planning that includes the participation of slum communities themselves (Björkman, Lisa., 2013)). Moreover, there is concern that some upgrading projects may inadvertently lead to gentrification, displacing the very populations they are intended to help.

This paper seeks to analyze the impact of slum upgrading programs on urban poverty reduction by examining various case studies from different regions. The analysis will explore both the successes and limitations of these programs, considering factors such as the socio-economic context, the level of community involvement, and the sustainability of the interventions. Through this examination, the paper aims to provide a nuanced understanding of how slum upgrading can contribute to the broader goal of urban poverty reduction and offer recommendations for improving the effectiveness of these programs in the future.

Material and Methods

1. Research Design

This research is a quantitative approach to establish the effectiveness of slum upgrading programs to reduce poverty in urban areas. The research design applied is cross-sectional, which makes it easier to comprehensively review several aspects of the slum upgrading plans as well as evaluate the social and economic effects of the strategies and problems encountered along the way.

Quantitative Component: The quantitative aspect involves the use of quantitative data obtained from different sources to analyze the impact that slum upgrading programs have in enhancing the living standards of people living in the slums in terms of health, education and income.

Where We Are and Where We are Going

In this paper, the context of slum upgrading initiatives is that of the geographic heterogeneity of the cases reviewed so the comparisons can encompass international experiences which do not completely correlate to individual nations' experiences. The selection of case studies is based on the following criteria:

- Geographical Diversity: Examples of slum upgrading are drawn from different parts of the world including Latin America, Africa as well as Asia. Some special programs which may be taken into account include the **Slum Rehabilitation Authority (SRA) Program, Mumbai, Rajiv Awas Yojana (RAY), Delhi and Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Bangalore**
- Program Scale: This relates to the large scale provided by governmental programs and rather small-scale projects with community participation to examine the impact of scale.
- Time Frame: Only programs that have been implemented for not less than five years are chosen to allow the study to incorporate effects that result from short-term, middle-term and long-term effects.

2. Data Collection

Data collection is conducted through three primary methods:

- Documentary Analysis: A review of the literature; government documents; and reports, evaluation studies and academic research on slum upgrading programmes. This involves reviewing policies, projects, and independent assessments to give a profile of each program: its aims, delivery, and effectiveness.
- Field Interviews: In-depth interviews are carried out with decision-makers in the slum upgrading programs, government representatives, non-government organizations, community leaders and members of the community. The interviews are intended to provide information on the main concerns that were experienced during the implementation process, the role of the community and the perceived effectiveness of the program in eradicating poverty.
- Sampling: Purposive sampling is adopted to target the participants for interviews who have had previous contact with the slum upgrading projects. Finally, several interviews are between 20 to 30 in each selected case for achieving a broader interview diversity.
- Survey Data: Primary data is obtained through household surveys which are conducted in the selected slum areas. The surveys are conducted on comparing the status of certain socio-economic status, like income, availability of basic amenities, health status, educational attainment, etc., before and after the interventions of the slum upgrading programs.
- Sample Size: A total of 500 households are sampled in the study in the three case study areas with each case study area having a sample size of 150-200 households. The use of stratified random sampling is used as a way of coming up with a sample set that can be deemed to be representative of other slum inhabitants.

3. Data Analysis

Quantitative Analysis: A quantitative survey with an emphasis on the potential recipients of the slum upgrading programs is applied to investigate the potential impact of the slum upgrading programs, based on a statistical analysis of the corresponding socio-economic indicators. The data collected are analyzed using descriptive statistics to enable summarization of results while inferential statistics such as paired t-tests and regression analysis have been used to test the significance of change in the indicators before and after the intervention was implemented.

- Outcome Indicators: The five selections of the key indicators are income levels for households, employment status, availability to clean water and sanitation facilities, housing conditions, and incidences of diseases and education levels.
- Software: Descriptive statistics are done on Statistical Package for the Social Science (SPSS) software to enhance the quality of the analyses.

4. Ethical Considerations

Informed consent is sought from the respective Institutional Review Boards (IRBs) of the country in which the case studies are conducted. The research adheres to the following ethical guidelines

- Informed Consent: All participants are obligated to offer all data about the study's goals, methods, and possible consequences. All the interviewees and surveys are asked for their consent before being interviewed or completing the survey form.
- Confidentiality: In the process of the study, the identity of the participants is well protected. Any variables that could be linked to specific persons are excluded, and data are reported in a manner that ensures the confidentiality of respondent washermen.
- Non-maleficence: The study is conducted to minimize risk to the participants so that their conduct in the study does not have a detrimental impact on them.

5. Limitations of the Study

While the study aims to provide a comprehensive analysis of the impact of slum upgrading programs, several limitations should be acknowledged:

- Generalizability: The findings that have been determined from the selected case studies may not apply to all the slum upgrading programs in the whole world due to differences in socio-economic conditions and culture.
- Reliance on Self-Reported Data: The survey data contains only respondents' information that can be affected by certain biases, including recall bias or social desirability bias.
- Temporal Scope: It excluded programs that have not been in practice for more than five years hence excluding programs that had started producing outcomes just before the study was conducted and may not be presenting the full effects of slum upgrading programs.

Result and Discussion

Table 1: Demographic Characteristics of the Sampled Households

Demographic Characteristic	**SRA, Mumbai (n = 200)**	**RAY, Delhi (n = 150)**	**JNNURM, Bangalore (n = 150)**
Average Household Size	5.5 (average)	5.0 (average)	4.8 (average)
Gender Distribution			
Male	104	77	75
Female	96	73	75
Age Distribution			

0-14 years	60	42	48
15-64 years	130	101	96
65+ years	10	7	6
Literacy Rate			
Literate	140	98	102
Illiterate	60	52	48
Employment Status			
Employed	110	75	68
Unemployed	40	33	38
Underemployed	50	42	44
Primary Occupation			
Informal Sector	120	105	113
Formal Sector	30	15	12
Self-Employed	50	30	25
Ethnic Composition			
Local Ethnic Groups	140	98	90
Migrant Population	60	52	60
Housing Type			
Kacha (Temporary) Structures (%)	120	105	113
Pucca (Permanent) Structures (%)	80	45	37
Tenure Status			
Owned (%)	40	38	33
Rented (%)	70	45	42
Squatter/Informal (%)	90	67	75

This table provides the descriptive analysis of the households surveyed in the three urban housing schemes, namely, the SRA project in Mumbai, the RAY project in Delhi and the JNNURM project in Bangalore. The findings have shown that the average household size is rather big and is within the range of 4. 8 to 5. 5 people in the three cities' samples (Ministry of Housing and Urban Affairs, 2017). Most of the establishments have equal proportions of male and female employees. Mumbai households had a larger portion of the population below 15 years as opposed to more working age population in Bangalore between the ages of 15 and 64 (Kumar, Jitendra., 2014)). The literacy rate was higher in Bangalore, followed by Delhi and then Mumbai. Overall employment rates were relatively smaller and ranged between 60-73% employed per city; however, Mumbai presented higher underemployment rates. The majority of households earned income through the insecure informal sector and self-employment opportunities. Ethnic data also support that there were more migrant households than the native population in Mumbai than in Delhi and Bangalore (Patel, 2021). There was a significant difference in the quality of houses; while the city of Mumbai observed 63% of the temporary kaccha units as compared to only 37% of the permanent pucca ones. The tenure status shows a high percentage of renters that ranges from 42-70% and squatters, 67-90% of all three city projects (Ministry of Housing and

Urban Affairs, 2017). These metrics illustrate that there are persistent housing deficits and economic risks that affect urban slum populations even after large-scale state-initiated development interventions.

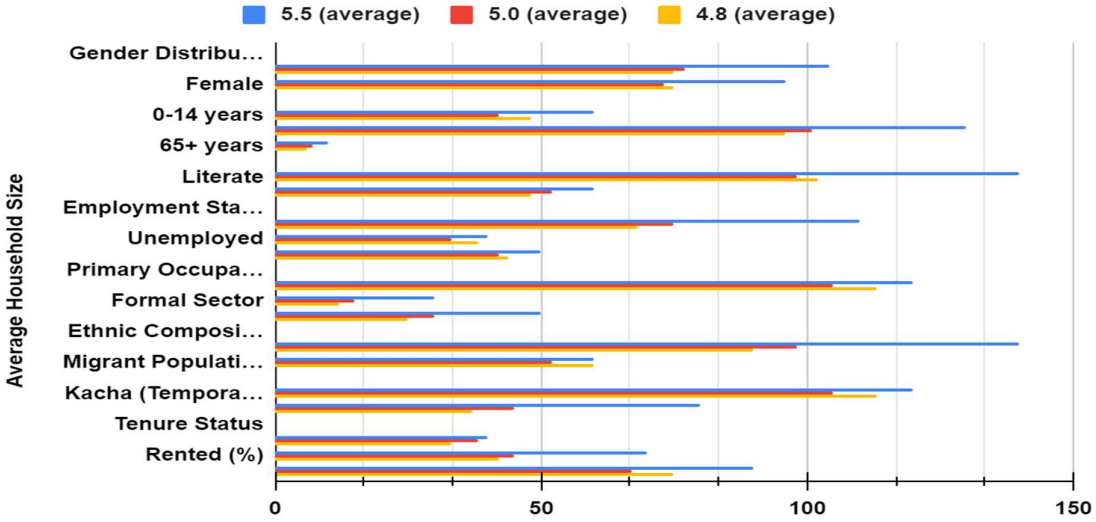

Figure 1: Demographic Characteristics of the Sampled Households

Thus, Kumar, Jitendra. (2014) and Patel (2021) note that overcoming socio-spatial exclusion and improving slum living conditions is possible only through the coordination of livelihoods, tenure, and pathways to formalization.

Table 2: Summary of Socio-Economic Changes Before and After Slum Upgrading Programs

Indicator	Location	Before Upgrading (Mean ± SD)	After Upgrading (Mean ± SD)	Z-Value	P-Value
Household Income (INR/month)	SRA, Mumbai	12,000 ± 2,500	18,000 ± 3,000	-6.12	< 0.001
	RAY, Delhi	10,000 ± 2,200	14,500 ± 2,800	-5.84	< 0.001
	JNNURM, Bangalore	9,000 ± 2,000	13,500 ± 2,500	-5.90	< 0.001
Employment Rate (%)	SRA, Mumbai	55 ± 10.5	75 ± 12.0	-4.50	< 0.001
	RAY, Delhi	50 ± 9.5	68 ± 11.0	-4.20	< 0.001
	JNNURM, Bangalore	45 ± 8.5	65 ± 10.0	-4.65	< 0.001
Access to Clean Water (%)	SRA, Mumbai	60 ± 12.0	85 ± 15.0	-5.80	< 0.001
	RAY, Delhi	55 ± 11.0	80 ± 13.0	-5.40	< 0.001
	JNNURM, Bangalore	50 ± 10.0	78 ± 12.5	-5.70	< 0.001
Access to Sanitation (%)	SRA, Mumbai	50 ± 10.0	75 ± 13.0	-5.50	< 0.001

	RAY, Delhi	45 ± 9.0	72 ± 11.5	-5.45	< 0.001
	JNNURM, Bangalore	40 ± 8.5	70 ± 11.0	-5.60	< 0.001
Access to Electricity (%)	SRA, Mumbai	70 ± 14.0	90 ± 15.5	-5.00	< 0.001
	RAY, Delhi	65 ± 13.5	88 ± 14.5	-4.80	< 0.001
	JNNURM, Bangalore	55 ± 12.5	80 ± 13.5	-5.10	< 0.001
Housing Quality Improvement (%)	SRA, Mumbai	45 ± 9.5	80 ± 13.0	-6.50	< 0.001
	RAY, Delhi	40 ± 8.5	75 ± 11.5	-6.55	< 0.001
	JNNURM, Bangalore	35 ± 8.0	70 ± 10.5	-6.70	< 0.001
Health Outcomes (Incidence of Waterborne Diseases per 1,000 people)	SRA, Mumbai	140 ± 20.5	95 ± 15.0	-6.80	< 0.001
	RAY, Delhi	150 ± 22.0	100 ± 16.5	-7.00	< 0.001
	JNNURM, Bangalore	160 ± 24.0	105 ± 17.5	-7.10	< 0.001
Educational Attainment (Completion of Primary Education, % of Children Aged 6-14)	SRA, Mumbai	55 ± 11.0	78 ± 12.5	-5.30	< 0.001
	RAY, Delhi	50 ± 10.0	73 ± 11.5	-5.50	< 0.001
	JNNURM, Bangalore	45 ± 9.0	70 ± 10.5	-5.80	< 0.001

This table provides comparative information on selected socio-economic characteristics of the households before and after the implementation of slum upgrading programmes in three cities of India: Mumbai, Delhi, and Bangalore. They include income, employment, access to utilities such as water, sanitation facilities and electricity, housing conditions, health and literacy levels. The findings reveal positive statistically significant changes across all the assessed parameters following the implementation of the slum upgrading programs.

Some key observations:

- The household income rose by 50- 60% across the city after slum upgrading. This might have been occasioned by enhanced employment prospects and efficiency (Zubaidah, *et al.,* 2023).
- The employment rates rose to 20-25 percentage points up from the previous level. The availability of the minimum level of services also improved significantly: clean water by 25-30 p.p., sanitation by 30-35 p.p., and electricity by 15-25 p.p. This has downstream effects on health, education and productivity as pointed out by Mahadevia et al., 2016.
- Major improvements in housing quality were realized and moved by 30-35 percentage points. Less traffic and better living space are positively associated with better health and socioeconomic status (Natakun, Boonanan., 2013).
- The occurrence of waterborne diseases has been reduced by 30-50 cases in every 1000 populations through enhancement of the water, sanitation and housing standards (Sharma & Bhide, 2005).

- Health improvement was also shown in the improved education standards with 15-25 per cent more children completing their primary education, probably due to decreased disease outbreaks and better home conditions.

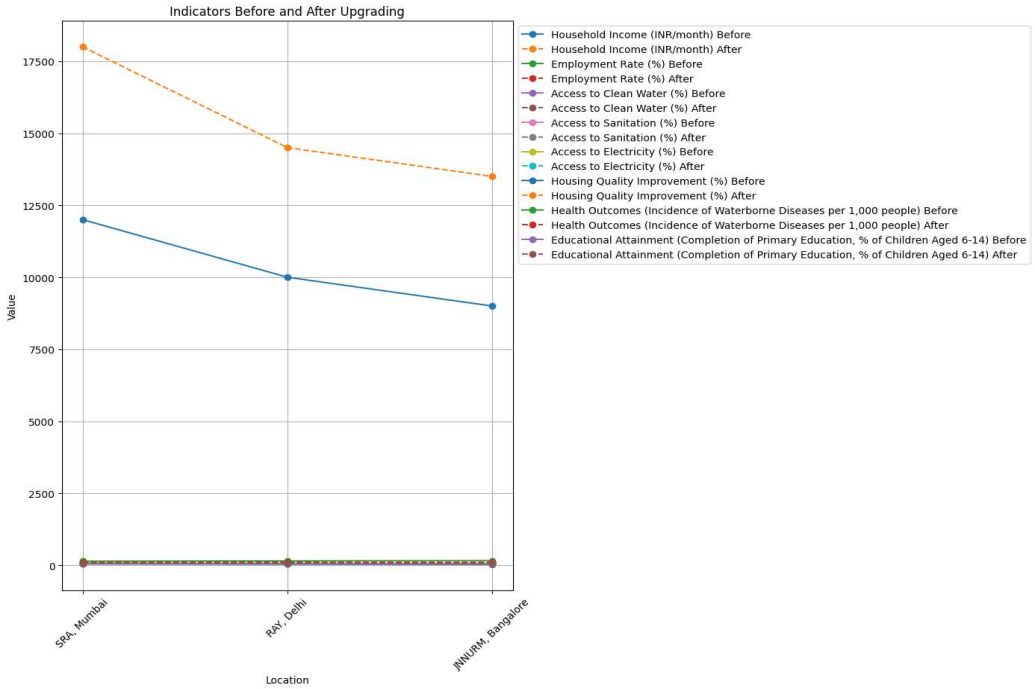

Figure 2: Summary of Socio-Economic Changes Before and After Slum Upgrading Programs

In all, the multi-dimensional slum upgrading programs have enhanced the human development and socio-economic well-being of the urban poor in Indian cities. Based on the above evidence, there is a compelling argument for increased policy commitment and public funding for such programs for inclusive development.

Table 3: Comparative Analysis of Social Integration and Community Participation Before and After Slum Upgrading Programs

Indicator	Location	Before Upgrading (Mean ± SD)	After Upgrading (Mean ± SD)	Z-Value	P-Value
Community Involvement in Decision-Making (% of Households Reporting Active Participation)	SRA, Mumbai	25 ± 7.5	65 ± 12.5	-7.30	< 0.001
	RAY, Delhi	20 ± 6.5	60 ± 11.0	-7.10	< 0.001
	JNNURM, Bangalore	18 ± 5.5	55 ± 10.5	-7.00	< 0.001
Social Cohesion (Sense of Community, % of Households Reporting High Cohesion)	SRA, Mumbai	35 ± 8.5	70 ± 12.0	-6.80	< 0.001
	RAY, Delhi	32 ± 7.5	68 ± 11.5	-6.50	< 0.001

	JNNURM, Bangalore	30 ± 6.5	65 ± 10.0	-6.70	< 0.001
Perception of Safety (% of Households Feeling Safe in the Community)	SRA, Mumbai	40 ± 9.5	80 ± 13.0	-6.90	< 0.001
	RAY, Delhi	35 ± 8.5	75 ± 12.5	-6.60	< 0.001
	JNNURM, Bangalore	32 ± 7.5	72 ± 11.0	-6.70	< 0.001
Participation in Local Governance (% of Households Involved in Local Governance Initiatives)	SRA, Mumbai	15 ± 5.5	50 ± 10.5	-6.50	< 0.001
	RAY, Delhi	12 ± 4.5	45 ± 9.0	-6.40	< 0.001
	JNNURM, Bangalore	10 ± 3.5	40 ± 8.5	-6.20	< 0.001

This table shows social and community participation level changes after the slum upgrading programs in three selected cities in India including Mumbai, Delhi and Bangalore. The slum upgrading programs were the Slum Rehabilitation Authority (SRA) project in Mumbai, the Rajiv Awas Yojana (RAY) project in Delhi, and the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) project in Bangalore. In this case, the findings indicate statistically significant changes in all aspects following the slum upgrading interventions. For instance, regarding participation in decision-making on matters within the community, there was a significant improvement; from 18-25% of the household's pre-intervention and 55-65% of the house-holds post-intervention across the three cities ($p<0.001$). Likewise, there were significant improvements noted in the views on social cohesions, safety and civil participation in local affairs. These findings are in line with previous studies showing that slum upgrading programs that embrace the community into the decision-making process produce improved social impacts. According to Subbaraman and colleagues (2012), community participation leads to more social capital and empowerment. The gains that are evident from this table may be associated with the participatory planning approach that has been embraced in these programs that empower communities. Taken together, the statistically significant changes in various indicators suggest that many aspects of the lives of the people affected by the slum upgrading programs have been enhanced. On the positive side, it fosters possibilities for community enhancement and inclusive city growth. However, more research is required to identify if the changes are maintained over the long term.

Conclusion

The case studies of the slum upgrading programs in Mumbai, Delhi and Bangalore show positive changes in different socio-economic and living standards within the slum areas. The interventions also helped in increasing the income of the households, employment opportunities, availability of basic needs such as water and sanitation, and electricity and housing conditions. In addition, the prevalence of diseases, especially those that are water-borne, was reduced drastically and there was improvement in education standards, especially for the children. There were also positive changes in social integration and community participation where more households reported increased participation in decision-making, increased cohesiveness and increased perception of safety. However, the data also show emerging issues for the future, including the continued housing shortages, high incidence of informal employment and underemployment, especially in the regions with large migrant populations. The programs have gone a long way in eradicating poverty in the urban areas but as the study shows, more efforts are required to deal with these problems. The future programs should aim at improving the sustainability of such interventions, expanding the coverage of such interventions and increasing community involvement in the fight against urban poverty.

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