Addressing Challenges in Slum Redevelopment

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Introduction

Indian megacities face several unique challenges in providing even basic needs and services, notably housing, water, and waste management, for one of the largest and most dense populations in the world. Government campaigns launched in the past year, "Swachh Bharat Abhiyan" (Clean India Mission) and **"Housing For All by 2022"** represent a nationwide call to action for a cleaner, healthier, and safer India.

Achieving these ambitions are complicated in an urban environment where core problems are magnified in scale and particularly daunting in Mumbai, where half of the city's population is estimated to live in slums. Future slum redevelopment projects present an opportunity to learn from past policies, especially now as cities prepare citywide plans for executing the clarion call of "housing for all".

With support from the University of Michigan Dow Sustainability Fellows Program and Dow Distinguished Award seed funding, our six-member team of interdisciplinary students spent eleven days in New Delhi, Mumbai, and Ahmedabad researching urban slums and the innovative strategies used to redevelop and upgrade these common informal settlements. During our time abroad, we spoke with several academic and professional experts about: the strengths and weaknesses of the government's current slum redevelopment approach; emerging technologies implemented by developers and engineers to supply energy and water services with improved efficiency; and the social interactions within and between slum and non-slum communities.

Revised Project Scope and Objectives

Following our trip to India, we revised our project's scope and objectives to highlight best practices of the Slum Rehabilitation Scheme (SRS) currently implemented in Mumbai. Our team represents five different schools including Public Policy, Electrical Engineering, Environmental Engineering, Natural Resources and Environment, and Architecture, and we each had a different take away from our shared experience in India based on our unique discipline's relation to sustainability. Therefore, to create a more holistic approach for improving slum redevelopment, we are examining this policy from the following four aspects of sustainability: political, financial, environmental, and architectural.

Political

Through the literature review and primary interviews, we found that there were two main tensions which caused time delays in past slum redevelopment policies in India - fraudulent identification of beneficiaries and land disputes due to unclear land ownership records. In our research, we have found academia, real-estate players, and lawyers have all reported a time delay of at least two-three years due to unclear enforcement of guidelines on beneficiary identification and due to existing old land records. One potential solution is to digitize the beneficiary

identification process thereby elevating ease, credibility, and transparency in establishing land ownership. Development of an online tool and accompanying mobile application for field-use could meet these goals and significantly reduce these time delays.

Environmental

The environmental aspects of slum redevelopment that we focused on are electricity and sanitation. For these environmental challenges we analyzed current approaches to building utilities in slum redevelopment projects as well as potentially implementing innovative new technologies in future slum redevelopment projects.

- ➤ Energy: We studied the solar rooftop policies and business models exercised by solar developer companies in India to determine the potential of solar panels on rooftop of slum redeveloped buildings.
- ➤ Water: We studied past and current national sanitation policies to understand the effectiveness of each campaigns' implementation strategy. We will compare conventional wastewater management strategies and innovative sanitation facilities, focusing on the differences between centralized utilities and decentralized or community based systems. Sustainability can be encouraged by using resource recovery technologies within the treatment process.

Financial

We will analyze the economic feasibility of implementing our recommendations and will consider the effectiveness in applying business models (i.e. public-private partnerships) with existing policies.

Architectural

Through primary and secondary research we analyzed the vernacular architecture and community spaces of existing slum types as well as the common design strategies implemented in slum redevelopment housing in Mumbai. This analysis includes diagrams of community spaces in each type of housing as well as the pros and cons of each approach. We also studied the successes and failures of precedent designs for low-income housing in developing countries and concluded with recommendations for design approaches of future slum redevelopment strategies.

Progress & Achievements

Our team has met bi-weekly to discuss research findings and to organize a trip for all six of us to travel to India where we gained many primary resources through visiting stakeholders.

Specific achievements thus far include:

I. *16 informational interviews with key stakeholders such as government executives, real estate player, non-governmental organization, private equity player, and academics in 3 cities of India - Ahmedabad, Mumbai and Indore.*

II. *2 site visits to assess existing best practices in action - a wastewater treatment biogas digester in New Delhi and a Slum Rehabilitation Authority (SRA) construction site in Mumbai which uses pre-cast construction methods.*

III. *A blog documenting our research and our team's achievements. To-date we have published over **40 posts**, and have received over **400 unique views**. (https://sfurtiindiateam.wordpress.com)*

IV. *A gap analysis of previous policies in slum redevelopment in Mumbai as well as in the larger context of India through literature review of research papers.*

V. *4 diagrams of public and private community spaces in existing informal houses and redeveloped housing.*

VI. *Created performance management criteria to analyze the performance of slum redevelopment.*

VII. *3 field visit experiences from related (extracurricular) projects undertaken by team members in the past and summarized on the blog: identifying beneficiaries for redevelopment projects in Kukatpally, Hyderabad; pavement dweller housing in Byculla West, Mumbai; and a rooftop solar project in Punjab.*

Critical Review & Areas of Improvement

One of the major challenges of working on government projects is getting access to quality data. While, we did meet SRA executives, they themselves did not have access to data with respect to the number of projects completed, number of units in each building, etc. So a data analysis component from the project is missing.

Skill gaps in the existing team and a plan for how they will be filled:

➤ Political sustainability/ identification of the beneficiaries: Identify an external software coder to write code for the mobile application. The skills and context to create functional specifications for the software coder are available within the team, which will be complemented by the technical skills for coding from outside.

➤ Financial sustainability: Identify and understand other methods of funding apart from public private partnerships; consult with a public financing expert.

➤ Environmental sustainability: Conduct an economic analysis of alternative sanitation systems to support our research and recommendations; more efficiently identify beneficiaries to receive subsidized sanitation facilities through government-led programs (i.e. Swachh Bharat)

➤ Architectural sustainability: Identify an architectural expert in low income urban housing in India to provide feedback on the architectural model.

Remaining Plans and Timeline for Implementation

- ➤ Identify 4 advisors in areas of interest (political, financial, environmental, and architectural) to provide feedback on recommendations, literature reviews, field visits, and case studies by end of September.
- ➤ Develop case studies on innovative solar and biogas energy, decentralized sanitation systems, and alternative construction technologies which have been introduced in other developing countries and post them on the blog by end of October.
- ➤ Create an architectural model to illustrate integrated design concepts by end of October to accompany the final project report, Dow Sustainability Fellowship poster presentation, and other appropriate venues on campus.
- ➤ Write final project report for submission and presentation to the Dow Sustainability Fellowship and larger UM community. Report due at the end of November.
- ➤ Develop a mobile application which provides field revenue officers a valuable tool to expedite and streamline the process to identify beneficiaries of slum redevelopment.
- ➤ Create a plan of action to disseminate research findings and beneficiary identification mobile application (if development is funded and pursued) to cabinet level ministers/ policy makers in India. Possible travel dates under consideration are December Break or Winter Break.

Project Timeline

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Literature Survey	■	■	■						
Partnerships Building with key institutions in India		■	■						
Field Visit & Interviews with key stakeholders			■	■	■	■			
Research and Analysis					■	■	■		
Identifying and brainstorm with advisors to develop recommendations					■	■	▨	▨	▨
Creating an architectural model							▨	▨	▨
Writing and presenting paper							▨	▨	▨

Budget

	Rate	Quantity	Total
Airfare (U.S. to India)	$1,000/trip	6 round trips	$6,000
Transportation within India	$60/person/day	6 people*3 travel days	$1,080
Lodging and Meals	$30/person/day	6 people*10 days	$1,800
Presentations to policy makers			$2,000
Mobile app development (est. total cost to hire consultant)			$6,000
Mobile app promotion and field testing			$2,500
Incidental travel expenses			$620
Total			$20,000

We will be using the awarded money to disseminate our ideas in India as well as to create a mobile application to address what we consider the most time consuming aspect of the slum redevelopment process - the identification of beneficiaries for new housing as well as a survey of the size and type of space previously occupied. If funded at 50% of the proposed level, select team members will be able to travel to India to present our research and recommendations to government representatives and policy makers.

Conclusion

Our aim for this project is to create a resource of knowledge for policy makers, developers, and architects involved in upgrading low-income informal housing and to develop a streamlined process that would benefit all involved parties, including slum dwellers and government agencies. Our research analyses of the Mumbai Model for slum redevelopment and of the existing implementation tools and practices, have given us insight into how the current approach can be improved upon.