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Slum-dwellers as experts: A problem structuring approach to understand housing challenges in slum communities of India

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ABSTRACT

Housing programs in India have rarely engaged with slum communities to understand slum-dwellers' housing needs and preferences as the tools to systematically understand them are lacking. Consequently, the programs are often designed and implemented without the slum community's participation. This paper demonstrates the usefulness of inviting slum residents to understand housing problems from their perspective by using in-depth interviews and focus group discussions in two slums of Odisha, India. We compare their priorities with the provisions of slum policies such as the Odisha Land Rights to Slum Dwellers Act 2017 to highlight that housing needs and challenges in slums are diverse, and preferences are often incremental that the current program has failed to recognize. We use problem structuring methods from decision sciences as our analytical framework that treats the slum residents as experts. Such an approach can potentially transform how we design housing programs and policies in the developing world.

KEYWORDS

Tenure security; land rights; housing; slums; value focused thinking; cognitive maps

Introduction

More than one third of India's urban population, over 150 million people, live in informal settlements or slums.¹ Families in slums generally lack durable and permanent housing structures that protect them against elements of nature, access to basic services such as water and sanitation that could provide healthy habitats, and secure tenure that could protect them against forced evictions (UN-Habitat, 2004). Recognizing slums as a significant urban challenge in India, governments at the local, state, and national levels have implemented several programs and policies in the last 7 decades. However, none have been a panacea, and housing issues in slums persist. We believe that past policies have been ineffective partly because they have been top-down with a "one-size-fits-all" approach that fails to identify, recognize, and address the diverse challenges that slum communities face.

Slums have been traditionally studied and analyzed using multiple disciplinary approaches and varied perspectives, but rarely treating slum dwellers' voices as central to the inquiry. Common approaches have included slum enumerations using demographic surveys (e.g., Dupont, 2008; Patel et al., 2014); delineating slum boundaries using satellite images (e.g., Gruebner et al., 2014; Kohli et al., 2012); using simulations to test scenarios (e.g., Debnath et al., 2019; A. A. Patel, 2012), among others. These top-down approaches primarily rely on aggregating socioeconomic data that fails to capture the complexity of slum dwellers' lives and their multi-tiered and interrelated connections within society and the environment (Mahabir et al., 2016). To overcome the limitations of the traditional approaches to studying slums, we urgently need participatory approaches that emphasize the assessment of problems and identification of solutions, as perceived by the slum communities themselves. In that regard, ethnographic studies (e.g., Doshi, 2013; Walker, 2016) and Participatory Action Research

(PAR; e.g., Cronin & Guthrie, 2011; Das & Takahashi, 2009) are two critical approaches that have brought slum dwellers' perspectives and treated them as the context experts. We contribute to this literature that uses participatory research by offering an alternative approach that identifies challenges in slums and ways to address them from the community's perspective, using tools from decision sciences. In particular, we use Problem Structuring Methods (PSMs)—Strategic Options Development Analysis (SODA; Ackermann & Eden, 2010) and Value Focused Thinking (VFT; Keeney, 1996a) as participatory analytical approaches. The paper's primary objective is to generate a comprehensive understanding of the challenges faced by slum-dwellers and co-create solutions as alternative courses of action in collaboration with the community.

The study invites slum communities as knowledge partners to develop a comprehensive understanding of their problems and encourage discussions on solutions that could alleviate the challenges. While SODA and VFT have been widely used by professionals across multiple fields in the developed world, their application in a slum context in the developing world is novel and innovative. We demonstrate the usefulness and feasibility of using SODA and VFT in two slums named Dhimira Bauri Street and Meta Sahi, in Brahmapur and Chatrapur city, respectively, in the Indian state of Odisha. We study the needs and preferences of the slum communities, specifically in the context of the recently implemented Odisha Land Rights to Slum Dwellers Act (OLRSDA) 2017 (Government of Odisha, 2017), the world's largest slum land titling program (World Habitat, 2019).

The following section elaborates on the policy context for slums in India with a specific focus on the OLRSDA. Next, we briefly introduce SODA and VFT and then lay out the research design, followed by the findings from Dhimira Bauri Street and Meta Sahi, including a comparative analysis. The final section concludes with a discussion and implications for future research.

Policy context

The following subsection provides a brief overview of the role of community participation in housing programs in India, followed by a discussion on the recently enacted OLRSDA, a recently enacted slum policy in India that claims to make community participation central in the implementation process.

Community participation in housing programs for slum communities

Housing programs in India have evolved incrementally and experimentally in the last 7 decades learning from the successes and failures of the past, with the government's role changing from a provider to an enabler (Parashar, 2014), especially in the slums context.

The incremental changes in policies from forced evictions to in-situ upgrading to the provision of tenure security have resulted from long policy cycles that involve agenda-setting, designing, implementing, evaluating, and redesigning the next policy, historically led by policymakers, bureaucrats, and to some extent, civil society. It is striking that the slum residents themselves were rarely involved at any point in policymaking or implementation. Despite the substantial evidence showing that slum communities resist displacement (Weinstein, 2014) and demand public services in their original location (Auerbach, 2020), current policies continue to ignore such community demands. Studies by Kamath (2012) and S. Patel (2013), among others, have extensively critiqued the various welfare programs launched by the Indian government, and have highlighted the need for community participation in the policymaking process. We believe that community participation at every step of the process could improve the effectiveness of slum policies in India.

The international discourse has identified the potential of Participatory Action Research (PAR) as a critical and essential element of development policies to encourage community participation. Consequently, recent slum policies have recognized the importance of community participation for its potential to make slum policies more efficient, effective, and equitable. However, community participation has mostly remained rhetoric, rarely followed through substantively in actual policymaking on the ground. Consequently, communities have remained at the peripheries of policymaking

debates as a result of such tokenism. However, there are noteworthy exceptions, especially in smaller city-level slum improvement programs where community participation has been central (Cronin & Guthrie, 2011; Das & Takahashi, 2009). Unfortunately, they remain isolated success stories and have not yet been scaled to national-level programs. The primary factors that have prevented meaningful community engagement in slum improvement policies are endogenous local factors and flawed program design and implementation (Mansuri & Rao, 2013). Lack of support by the state and lack of social capital of the communities also hinder the implementation of participatory projects.

A critical contribution that participatory approaches could make to policy design is their ability to understand the diverse needs and preferences of the slum communities. This strength has the potential to provide an alternative framework to make slum communities an equal knowledge partner in policy design and implementation and empower slum communities in the process. For example, projects such as Project Map Kibera in Nairobi, Kenya, and a nonprofit MASHAL'S slum mapping in Pune, India, have used participatory tools to spatially map the slum community needs and empower disenfranchised communities at the meta-level (Sanchez et al., 2013). We complement this community-based spatial mapping approach by offering a methodology capable of mapping their aspatial preferences and choices to generate locally relevant knowledge. The framework developed in this paper is part of the participatory research tradition. Together, it has the potential to become an integral part of how slum policies are designed and implemented in India. It is particularly timely since the most recent slum policy we discuss next, explicitly recognizes slum communities' central role in the policy implementation process.

Odisha land rights to slum dwellers act (OLRSDA) 2017

Approximately 500,000 households in the state of Odisha (23% of the state's urban population and 90% of the slum population) lack formal titles for their homes (World Habitat, 2019). The formal title is the only way to get the right to the city because it is often considered the only acceptable proof of residency to access multiple services such as registering their kids in schools, opening a bank account, getting credit from financial institutions, availing basic services, and applying for government identity cards including caste certificates (Pichel et al., 2019). De Soto (2001) has long argued that *de jure* property rights could help residents of informal settlements obtain formal credit, which could help them come out of poverty and eventually improve their living conditions. This idea has been popular among policymakers, and recently, one of the states in India has experimented with it. The Odisha State Government implemented the OLRSDA to provide property rights and primary facilities to all slum dwellers in the state. The act is a part of the umbrella program called Odisha Livable Habitat Mission (OLHM), also popularly known as Jaga Mission (*Jaga* means place in local language, Odia), which aims to provide physical, social, economic, organizational, and environmental improvements to existing slums (World Habitat, 2019).

The act has two interlinked objectives: first, providing tenure security to slum dwellers against the threats of eviction, and second, creating a legal basis for improving the living conditions of slum dwellers (Government of Odisha, 2017). The act allows the beneficiary families to access the Government of India's flagship housing scheme Pradhan Mantri Awas Yojana (PMAY; translated as Prime Minister's Housing Program), which grants up to INR 200,000 (~USD 2,725) to build a permanent house. The act also supports the creation of Slum Dweller Associations (SDAs) in each slum to articulate the needs of the residents to government agencies (Chakraborty, 2020). However, the slum residents were not invited during the policy's design, and was implemented with the assumption that slum communities desire title security over everything else. In our case studies, we examine this assumption and investigate if tenure security is the most pressing need for slum communities over other housing needs. Before turning to our data and methods, we briefly introduce PSM in the next section.

Problem structuring methods (PSMs)

SODA and VFT belong to a group of modeling approaches from decision sciences, commonly referred to as PSMs, that enable participants to model or map the nature of a problematic situation or a state of affairs that people want to change (Rosenhead, 2013). PSMs are a highly participatory process because they build a shared understanding of a problem situation (Franco, 2008; Rosenhead, 1996). PSMs are also capable of quantifying and ranking community's preferences, which could overcome one of the key limitations of traditional participatory methods (Loewenson et al., 2014). Among multiple PSMs, we specifically use SODA and VFT to engage with the community as these methods have minimal barriers to participation, an essential consideration when engaging with slum communities. VFT and SODA also engage with vulnerable stakeholders by following a prescriptive orientation that is inductive in nature, and embraces methodological pluralism to develop equitable interventions, reflecting the concerns of community members (Fabusuyi & Johnson, 2022). These approaches also emphasize that learning about a problem is as important as finding its solutions, which is the central focus of our study. VFT complements SODA by allowing us to deepen the understanding of the problem context identified through the cognitive maps in SODA, and identify values that would alleviate the identified problems. Both SODA and VFT are analytical approaches that rely on traditional data generation methods such as interviews and focus group discussions. Still, they are precise and intentional in generating a distinct form of knowledge, as discussed in the following sub-sections.

Strategic options development analysis (SODA)

SODA enables a group or individuals to construct a graphical representation of the problematic situation (Ackermann & Eden, 2010) in the form of cognitive maps to represent how a person defines an issue (Eden & Ackermann, 2001). The methodology blends the individual perspectives (Guarnieri et al., 2016) to highlight the diverse subjective views of different participants to build a shared understanding of the problem. While SODA has been used to understand the housing challenges and resident satisfaction (e.g., Fernandes et al., 2018; Ferreira, 2016; Pires et al., 2018), ours is one of the first studies to apply it to understand the housing challenges in slum communities. We use SODA to create a cognitive map that presents a comprehensive snapshot of interconnections between issues, problems, and strategies of the slum dwellers, which serve as inputs for understanding the decision-making strategies as discussed in the following sub-section on VFT.

Value focused thinking (VFT)

VFT, originally developed by Keeney (1996a), is built on concepts of decision analysis to identify the values and preferences of multiple stakeholders in a complex decision-making context. VFT enables stakeholders to structure their choices and identify clear and implementable solutions in the form of a network. A typical network has a mix of objectives that participants consider essential to solving a particular challenge, termed fundamental objectives; followed by means-ends objectives that are means to achieve a fundamental objective; and a list of alternatives or solutions known as decision actions that are capable of achieving a means-ends objective.

VFT has been used with various stakeholders across multiple domains to understand decision-making in large organizations (Keeney & McDaniels, 1992), environmental policymaking (Badami, 2004), and tourism management (Kajanus et al., 2004), among others. We build on Keisler et al. (2014) and Alencar et al. (2017), who used VFT to identify solutions for housing improvements. While commonly accepted social science methods such as ethnography and oral histories follow an explanatory/exploratory orientation of inquiry describing the problem situation as they are. There are only two studies that use VFT in the context of slums. Mwititi and Goulding (2018) apply VFT to understand women's preferences and their alternative solutions to the community's problems grounded in their identities and cultural context. Killemssetty et al. (2022) use both SODA and VFT to understand the

housing preferences of a slum community in Odisha, India. We build on these studies and apply SODA and VFT to our case study communities. Additionally, we provide a comparative analysis of two slum communities to go beyond single case studies presented in Mwititi and Goulding (2018) and Killemsetty et al. (2022). Such an approach highlights the commonalities and contrasts in housing preferences between two completely different slums in two cities, further indicating the need to incorporate unique challenges that individual communities face.

Methodology

We describe our case study selection process and provide a background on the case study slums and the main housing challenges faced by the residents. Next, we discuss our data collection strategy and elaborate on using SODA and VFT in our case study contexts as an analytical strategy.

Case studies

Our two case study slums, Dhimira Bauri Street and Meta Sahi, are located in Brahmapur and Chatrapur, respectively, in the Indian state of Odisha's Ganjam district (Figure 1). Brahmapur is the largest city of the district and the fourth largest city of the state with a population of 355,000 (Census of India, 2011), and Chatrapur is a relatively small city with a population of 22,000 that serves as the district's administrative capital. Comparing a case study slum in Chatrapur where the Act has already been implemented, with a slum in Brahmapur where it is not, provides a unique opportunity to observe how communities' priorities change after the provision of land rights. Multiple cases contribute to the richness and depth of the study context that is not possible in a single case setting, and aid in assessing the veracity and completeness of collected information (Mukhija, 2002).

Our study mainly focuses on two small slums in the non-metropolitan urban areas of the country to avoid the metropolitan bias that exists in urban affairs scholarship including in slum studies (Ferré et al., 2012). Larger slums have historically been a subject of investigation in most slum literature (see Kalandides & Hernandez-Garcia, 2013; Mutisya & Yarime, 2011; Sharma, 2000, for examples), but



Figure 1. Location of Brahmapur and Chatrapur in Odisha, India (Source: Authors' adaptation from Google Maps).

small slums are rarely studied in detail. Focusing on these case studies provides opportunities for analytical generalization and yields a detailed picture of a problem situation, often overlooked in studies with large communities. It is important to state that this paper does not aim for statistical generalization, but seeks to fill the gap in the literature with first-hand accounts of small slums in non-metropolitan cities in a primarily rural state of Odisha. Selecting slums in two different cities with significant differences and different categories of respondents who can provide diverse viewpoints on the various aspects of the living conditions are helpful for analytical generalizability. The paper follows Yin's (2018) multiple case study design, by first developing single case studies before comparing them.

The following subsections provide details on our case study slums.

Dhimira Bauri Street

Dhimira Bauri Street is a slum in the heart of Brahmapur. Dhimira Bauri has two distinct neighborhoods: upper and lower streets, inhabited by 50 and 40 households respectively. The critical feature that distinguishes both neighborhoods is the security of tenure. Upper street residents were the first to settle in the slum and had legal ownership of their homes, thus officially recognized in the government records. In contrast, lower street residents were relatively recent settlers with no legal documents to prove their ownership, remaining unrecognized by the government agencies. One of the significant implications of this divide was evident when the national housing program, Integrated Housing and Slum Development Programme (IHSDP), was implemented in Dhimira Bauri in 2010. The program did not include lower street residents as legitimate beneficiaries purely because of the lack of legal recognition. In contrast, upper street residents could avail a subsidy of INR 200,000 (~USD 2,725) to upgrade their existing housing with permanent structures. The local government also followed the precedence set by the IHSDP. It provided a public toilet and water standpipes to the upper street residents excluding lower street residents from having these amenities. The resulting difference is apparent even to an outsider (Figure 2) and has broadened the original divide further.

Meta Sahi

Meta Sahi is a slum community in Chatrapur located close to the city's railway station. It is challenging to place Meta Sahi in any of the slum enumeration categories defined by the Census (Bhan & Jana, 2013). The local government eventually demolished the original slum with about 40 families that emerged in the 1980s in 2014 to remove congestion on the access road to the railway station. Only 14



Figure 2. Upper and Lower Streets of Dhimira Bauri, Brahmapur (Photos taken by authors).



Figure 3. Railway warehouse complex of Meta Sahi (Photos taken by authors).

of the evicted families were provided temporary housing in the railway warehouse. Each family was allocated a storage shed—a single room of approximately 100 sq. ft., originally constructed to store grains and goods (Figure 3). These 14 families were the poorest of the poor who had no alternative housing or support to move elsewhere. While they live in the temporary housing in the warehouse, they still identify themselves as the Meta Sahi community, reminiscent of their long-demolished original slum.

The future was uncertain for all the residents after the initial eviction in 2014, but the OLRSDA has become a boon for the majority. Under the act, some families were provided with land rights certificates near the slum's original location. Five families were not provided land rights certificates despite having all the necessary documents. All families who received titles also received a subsidy of INR 200,000 (~USD 2,725) to construct their homes under PMAY. However, many families have not completed the construction work since the approved subsidy was insufficient for such an undertaking.

Data collection strategy

We used semi-structured and open-ended interviews, and focus group discussions (FGD) with 14 residents from Dhimira Bauri Street and 16 from Meta Sahi. There was an attempt to interview participants from diverse genders, age groups, and occupational backgrounds to ensure that internal differentiation within the community is aptly represented (Kennedy et al., 2020). However, more women in the slums participated in the interviews than men, who were either unavailable or would join only for a short time. Consequently, our respondents included 10 women in Dhimira Bauri and 11 in Meta Sahi; the rest were men. While this is potentially a limitation, we believe that women's housing preferences represent the community preferences well, as studies have shown that women in slums display a higher attachment to their homes than men and are generally aware of housing issues in their community (Datta, 2006). The age of the participants varied from 18 to 75 years. The participants in the study represented diverse occupational backgrounds, such as daily laborers, retirees, homemakers, and beggars.

One of the researchers spent a couple of weeks in each slum to establish trust, build rapport with the residents, and break the outsider barrier before recruiting the study participants. The first few participants were selected with the assistance of volunteers from a local NGO called Youth for Social Development (YSD). The subsequent participants were identified with snowball sampling. The interviews were stopped when the saturation in responses was reached in a particular community. Our sample size is within the acceptable range of existing VFT studies that typically range between 3 to 12 (see Keeney, 1996b; Keisler et al., 2014; Mwit & Goulding, 2018). The fieldwork was conducted from August to October 2019 for 3 months. The interviews were conducted at their homes, lasting about 30 to 45 minutes, and divided into two parts. The first part focused on identifying the housing

challenges of the residents, which were then aggregated to create a cognitive map using SODA. The second part aimed to identify their primary housing preferences and solutions to develop the VFT hierarchy networks.

The interviews were conducted in Odia, the primary language spoken in these slum communities. All the interviews were audio-recorded and subsequently translated into English for further analysis. Both interviews and translations were done by one of the authors, who spoke the local language and has been cognizant of the local culture as a long-time resident of Odisha. In addition, three FGDs were conducted with six to eight participants selected from the original interviewees, two in Dhimira Bauri and one in Meta Sahi. The University of Massachusetts Boston's Institutional Review Board (IRB) approved the study design and protocol.

Since our study was one of the first to apply VFT and SODA in the context of Indian slums, implementing these methods in a new setting created challenges that required creative adaptation of standard frameworks. VFT is traditionally used with professionals and heads of organizations (Bernardo et al., 2018; Keeney & McDaniels, 1992), who generally assist the researcher in creating these networks in an FGD. However, many participants in our study could not read or write to assist us in creating VFT networks during the interactions. Therefore, we used Mwititi and Goulding's (2018) approach by relying on interviews in addition to the FGDs, and subsequently aggregating the individual details to create the VFT networks. To increase the validity of such representations, we requested NGO volunteers to be present during the interviews. We further asked them to review the network diagrams at a later stage to ensure we did not miss or misrepresent the slum community perspectives in the construction of these networks.

It is important to note that the findings elaborated in the paper are based on engagements lasting for 30–45 days with each slum community, a duration that is insufficient to capture the change in challenges or preferences over time resulting from the implementation of a particular program. In addition, the findings reflected the prevalent conditions at the time of conducting the fieldwork, in the middle of a major program under implementation. Therefore, we argue that the needs and preferences of a slum are not only diverse across space but also across time. Given that our study was conducted at a single point in time, we could not capture such temporal diversity.

Analytical strategies

Data from the first part of the interviews with individual participants were aggregated to create a cognitive map using SODA that identified the challenges faced by the slum community. We used SODA to organize the challenges of the residents across themes as causal pathways identified by individuals in their distinct forms. For example, a home with limited access to water supply meant that the residents would have to walk long distances to collect water, reducing their time to engage in other activities such as work or socialization. The participant responses were recorded as action-oriented phrases to highlight specific issues (e.g., live in temporary structures). Such phrases were aggregated to build a cognitive map connecting the issues to their consequences. These cognitive maps, in turn, form the basis for formulating their needs and solutions for the VFT networks.

The second part of the interviews were used to list the fundamental objectives, means-ends objectives and decision actions that highlight housing needs and the preferences they value the most. The objectives were then aggregated through thematic analysis and pattern matching to identify the unique values of residents. These inputs are then converted into a hierarchy network, where the fundamental objectives are tied to specific means-ends objectives that list specific decision actions. We used an open-source software XMind for building the VFT networks.

Subsequently, the initial VFT networks created from the interviews were validated with the FGDs. The FGDs were also used to understand the collective priorities of the residents by requesting the participants to rank fundamental objectives in the order of importance in their view, which were then converted into relative weights. We used the rank-sum method (Barron & Barrett, 1996) that calculated weights based on the ranks assigned to objectives by the participants. During the FGD,

the participants were provided with the list of objectives generated from the interviews, and were requested to rank them in order of their preferences. The weights were allotted from the strategic fundamental objectives (the fundamental objective at the highest level) and get distributed along with the network as we move from fundamental objectives to the means-ends objectives and then to the alternatives using the rank-sum method (Barron & Barrett, 1996). The method allows us to convert ranks into the corresponding weights by normalizing them (EQ 1).

$$w_i = \frac{2(n + 1 - i)}{n(n + 1)}; \tag{1}$$

Where, w_i is the weight of rank i (where $i = 1$ to n); n is the total number of objectives;

The final score for each decision action allowed us to understand its relative importance to the community. Next, we grouped decision actions within policy-relevant themes since many of the decision actions identified by different individuals were related to each other.

Findings

In this section, we provide the main findings for both Dhimira Bauri Street and Meta Sahi slums.

Dhimira Bauri street

Cognitive maps with SODA

The challenges identified by residents of the upper and lower street of Dhimira Bauri are elaborated as a cognitive map in Figure 4. The challenges varied between families who did not have land titles (residents in the lower street) and families who had land titles (residents in the upper street). While some challenges were unique only to residents of the lower street and some to the upper street, few were shared by residents from both streets. These challenges could be broadly classified into four themes that emerged from these maps: lack of ownership documents, incomplete house construction, poor infrastructure services, and bureaucratic hassles.

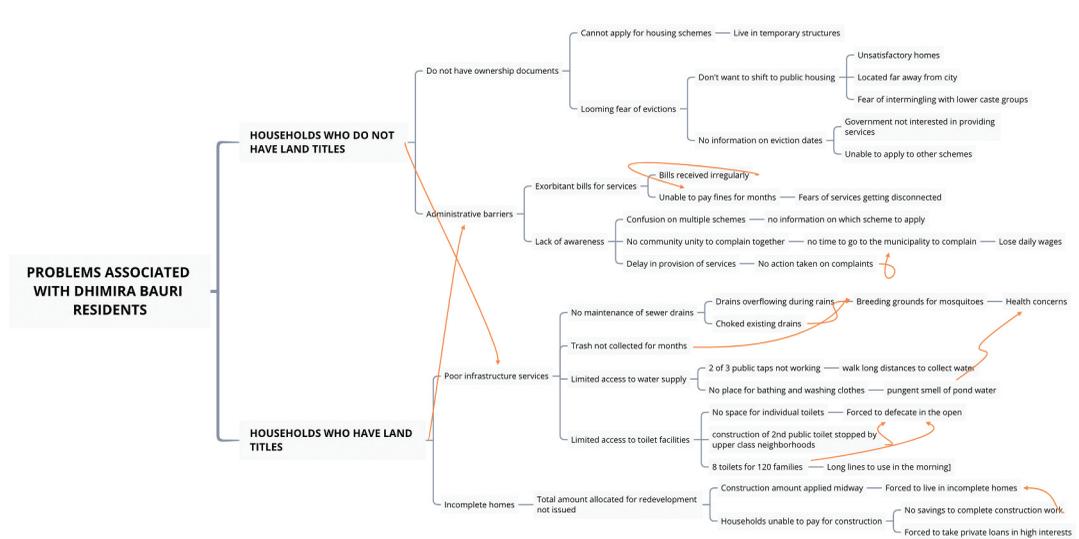


Figure 4. Cognitive Map showing the challenges faced by Dhimira Bauri Residents.

Lack of ownership documents. None of the residents at the lower street had any kind of ownership documents, unlike their counterparts from the upper street. This lack of ownership documents meant ineligibility for housing programs such as IHSDP. The residents were thus forced to live in semi-permanent structures with aluminum or tarpaulin sheets as roofs. As aptly mentioned by a resident:

... We do not have title deeds as the residents from the upper street despite living here for 30 years. If only we could get the ownership documents, even we could be eligible for loans and build a permanent roof instead of living under a plastic sheet. (Resident, Lower Street)

In addition, the residents reported that they were constantly being forced to relocate to one-room residences built on the city's outskirts by the local municipal corporation. The residents did not like the prospect of relocation because they were concerned about the lack of access to livelihood, markets, health, and education facilities due to the poor location of the resettlement housing.

Incomplete house construction. The residents at the upper street who received housing subsidies through IHSDP were not satisfied with the experience of constructing their homes. The residents could not afford to finance the construction costs upfront, as the IHSDP funds were released only after completing the construction work. Thus, most of the families were forced to live in incomplete structures. Some families who took loans from private lenders in high interests were now struggling under massive debts, unable to repay their loans.

Poor basic infrastructure services. Residents at upper and lower streets had poor access to infrastructure services. Most homes had limited space for expansion or the construction of toilets. A public toilet was built by the municipal corporation in 2018 for the upper street residents, but the lower street residents still had to defecate in the open. Another critical basic service issue was the limited access to water supply to residents of both the upper and lower streets. Families living in the upper street had three public taps installed in their lane, out of which only two were operational. In addition, the water was supplied at an inconvenient time, late in the night from 12–2 a.m. The only alternative was joining their lower street counterparts in walking 1.5 km (~1 mile) to the nearest public tap with running water for 24 hours. Finally, the lower street had no sewage system, and the drains in the upper street were blocked entirely because of a lack of maintenance.

Bureaucratic hassles. Dhimira Bauri residents from both the streets highlighted their extreme dissatisfaction regarding their interactions with the government officials. For example, many residents complained of receiving exorbitant monthly electricity bills of around INR 3,000 (~USD 40) when other families in the same street would receive a bill of only INR 150–200 (~USD 2–3). The residents complained about faulty meters, but those complaints remain unaddressed. Consequently, they are forced to pay the higher bills until the complaints are resolved or risk losing their electricity connection. Residents complained that it required multiple visits to various government offices to report their grievances for basic services, including electricity. These visits are prohibitive because the residents also lose their daily wages to pursue these grievances, and most of them remain unaddressed for years.

VFT hierarchy networks

As shown in [Figure 5](#), the housing needs and preferences of Dhimira Bauri residents could be summarized into three critical fundamental objectives: (i) improving physical conditions of the built environment, (ii) improving socioeconomic conditions, and (iii) reducing administrative barriers. Most of the sub-objectives within these critical fundamental objectives were common to residents of both upper and lower streets (highlighted in black), while some were specific to either upper (in blue) or lower street (in red).

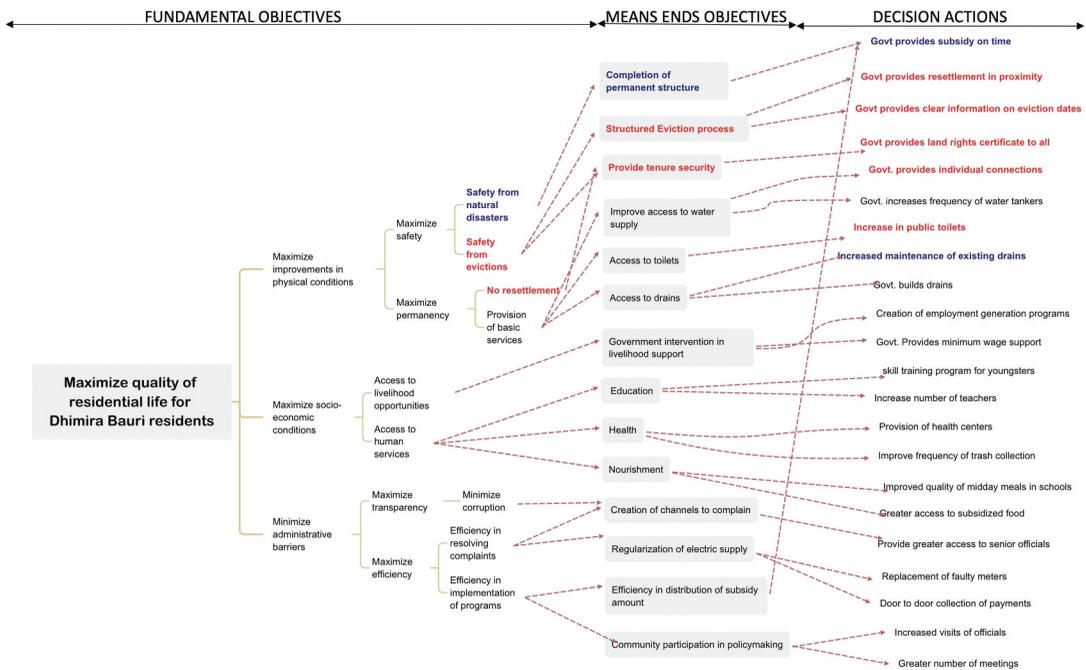


Figure 5. VFT Network highlighting preferences of Dhimira Bauri Residents.

Improving physical conditions. Residents focused on housing structures as a means to enhance their physical living conditions. For lower street residents, the physical structure was a means to achieve permanency and avoid evictions, in addition to getting protection from the frequent cyclones and heavy winds that are common in the area. Lower street residents saw tenure security as their pathway to getting permanent structures. If eviction from temporary structures is inevitable, lower street residents wanted resettlement sites close to the city center, highlighting the strong preference for location over the quality of the physical structure. For upper street residents, financing the physical improvements was the biggest concern. They hoped for the timely release of funds from programs such as the latest Pradhan Mantri Awas Yojana (PMAY, roughly translated as the Prime Minister’s Housing Programme) that provides subsidies to construct their homes.

Improving socioeconomic conditions. The community valued access to social amenities such as healthcare and education facilities within the slum, and improved livelihoods as the means to improve their socioeconomic conditions and, in turn, increase their financial and emotional well-being. The residents saw skill generation programs, minimum wage policies, and loans for small enterprises to improve their livelihood opportunities.

Reducing administrative barriers. Residents from both the streets wished that the government created awareness, maintained transparency and provided adequate information on various welfare programs, including the eligibility criteria to qualify for benefits. The residents also wished for improvements in accessing government officials with fewer administrative barriers, especially for receiving program benefits and complaint redressals.

Specific decision actions for these three themes are summarized in Table S1 in Supplementary Material 1. There are 27 decision actions as proposed solutions by residents categorized into seven policy-relevant themes. Each theme has an aggregated weight of individual decision actions within them to show the relative importance. For example, the provision of basic infrastructure services theme has ten specific decision actions. In aggregate, it receives a total weight of 30%, making it the

highest priority for Dhimira Bauri residents. The provision of housing ranked second most important theme (18%). While housing was salient for residents of both streets, the specific decision actions were completely different for both streets. Residents of upper street wished to prioritize the provision of subsidy amounts for completing their construction work, and have access to greater subsidy funds and loans. On the other hand, residents from the lower street wished to have clarity on the relocation dates and hoped for the provision of public housing in the vicinity. The third-ranked policy priority was tenure security (13%), and residents of the lower street primarily drove this demand. Policy themes of creating awareness (12%) and effective complaint redressal (12%) were also considered essential. Interestingly, social infrastructure facilities accounted for only 5% of the total weight of decision actions. The low preference shows the importance of their central location in the city, which already provides them greater access to social infrastructure facilities.

Meta Sahi

Cognitive maps with SODA

Figure 6 shows the cognitive map of the challenges identified by Meta Sahi residents. The challenges primarily focused on their living conditions at the warehouse, and their challenges with respect to the OLRSDA and housing subsidies under PMAY.

Challenges at the railway warehouse. Fourteen families lived in abysmal conditions in the makeshift one-room units at the railway warehouse, originally constructed to store grains and goods. Some families have four to five members living in a 100 sq. ft. room, used for sleeping, cooking, and storing all the materials from their old house. The residents at the railway warehouse had no access to basic infrastructure facilities and services. All the families defecated in the open in the absence of individual toilets or a community toilet in the vicinity. The roofs leaked during monsoons, and rooms got inundated with rainwater in the absence of storm water drainage. The warehouse did not have access to sanitation or water networks. Women were forced to walk over 1.5 km (~1 mile) to collect water daily, taking 2 hours of their time. The community also did not have access to social infrastructure facilities such as health centers and schools in the vicinity.

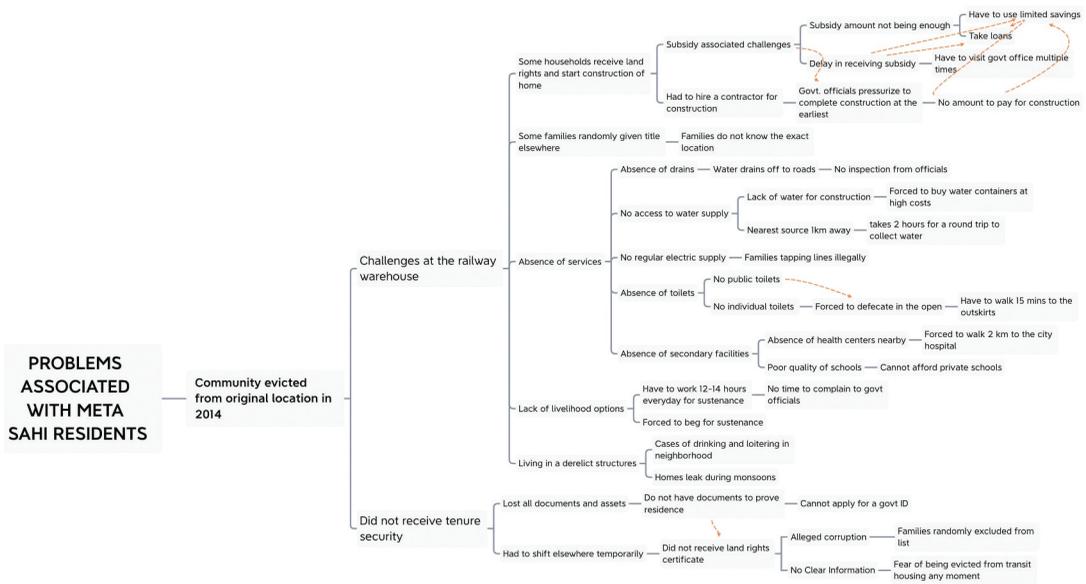


Figure 6. Cognitive map showing the challenges faced by Meta Sahi Residents

Challenges associated with tenure security. The provision of land rights certificates through the OLRSDA was a boon for most Meta Sahi residents already living under such challenging situations. The tenure security enabled families to receive subsidies to construct their houses under PMAY. However, many families complained about delayed payments under PMAY and were forced to either take private loans at a much higher interest rate or use their limited savings. Families also believed the subsidy amount of INR 200,000 (~USD 2,725) was not enough to construct a home. While the Act clearly states the title deed document could be used for taking loans from banks, the local banks routinely rejected the loan applications because the title deed by design was nontransferable and hence not deemed eligible as collateral by the bank officials.

In addition, many families did not receive title deeds under the OLRSDA. Some families were excluded from receiving land rights because they were not physically present during the surveys as they had moved to neighboring towns after their houses were demolished during the 2014 evictions. Some families also lost all their documents during the evictions, making it hard for them to prove their residency in Meta Sahi. These families have not received clear information on their eligibility to secure tenure, leaving them in eternal confusion and deep uncertainty. As quoted by a resident:

I have been tired of the multiple visits to the local office just to confirm if I could receive the land rights again after being rejected for the first time. Sometimes, the officials send me back saying they would intimate me when the next round would begin. Some officials have also threatened to evict me from the warehouse if I keep asking questions. First, they do not provide a valid justification for our rejection, and then they threaten. This is the life of us poor families. (Resident, Meta Sahi)

VFT hierarchy networks

The three critical fundamental objectives, as seen in Figure 7 that highlighted the housing needs and preferences of Meta Sahi residents were: (i) improving existing living conditions at the transient housing at the railway warehouse, (ii) improving living conditions at the future permanent location, and (iii) maximizing a sense of identity.

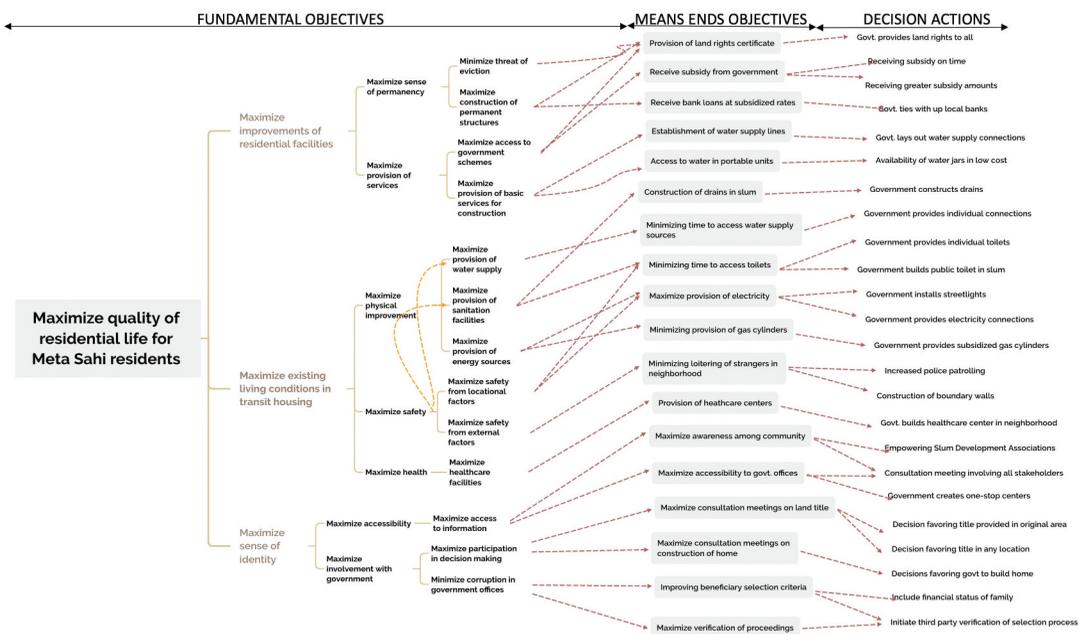


Figure 7. VFT Network highlighting preferences of Meta Sahi Residents.

Improving existing living conditions in transient housing. The residents who did not receive title deeds or those who could not complete the construction of their homes due to insufficient subsidies were uncertain about their ability to leave the transient housing. Hence, they demanded improved living conditions in the railway warehouse. The main improvements they demanded were in water supply, sanitation, and healthcare.

Maximizing living conditions at the future permanent location. Since the railway warehouse was only a transient housing solution, residents wanted to secure better living conditions in their permanent future housing. For those who did not receive tenure security had the highest preference for getting the land rights under the OLRSDA. However, they were conscious that land was in limited supply at the original location. Hence, they were willing to accept a land title or resettle in a public housing unit in the vicinity. Those who received the land title at the original location expressed the need for adequate subsidies under PMAY to complete the construction of their homes.

Sense of identity. The poorest of the poor at Meta Sahi were particularly concerned about their sense of identity and belongingness, especially because they felt that the current policies were discriminatory, and the programs excluded them. In particular, they felt the need for improved access to government programs, improved communication with government officials, and increased participation in the decision-making process to reduce the existing instances of corrupt practices and injustice against them. In the context of the OLRSDA, they felt that the current selection criteria of cutoff dates and availability of documents are particularly exclusionary because poor residents, in particular, do not have access to legal documents. In their opinion, the criteria such as income poverty or poor living conditions would be better indicators for selecting beneficiaries of the OLRSDA.

There were 31 specific decision actions categorized into seven policy-relevant themes that are reported in Table S2 of Supplementary Material 2. Residents of Meta Sahi allotted the highest share of decision actions (46%) on the provision of title security, reflecting that they were frustrated with living in transient housing for five years. Provision of basic infrastructure services (31%) also gained salience because residents wanted improvement in basic infrastructure at the railway warehouse complex and the location where they were constructing their new homes. Interestingly, decision actions focusing on creating awareness (3%) and effective complaint redressal (0.5%) had the lowest share in Meta Sahi, perhaps because they have lost their trust in government officials based on their experience at the transient housing in the last 5 years.

Solutions identified at Dhimira Bauri and Meta Sahi: A comparative analysis

This section elaborates on the similarities and differences in solutions identified by residents of Dhimira Bauri Street and Meta Sahi. Table 1 highlights the variation in percentage shares of decision action weights across policy themes between two slums. Permanent housing and access to basic infrastructure services were among the highest-ranked preferences of both slum communities.

Table 1. Difference in percentage share of policy-relevant themes between Dhimira Bauri and Meta Sahi residents.

Policy Relevant Themes	Dhimira Bauri Street	Meta Sahi
Provision of housing structure	18.31	16.05
Provision of Basic Infrastructure	29.94	31.25
Provision of tenure security	13.58	46.01
Ensuring effective complaint redressal	11.62	0.41
Improving Access to Livelihood Generating Sources	8.64	-
Creating Awareness Among Slum Community	11.72	3.09
Provision of Social Infrastructure	4.94	3.19

Dhimira Bauri and Meta Sahi residents had a similar percentage share of solutions focusing on providing basic infrastructure services, though for very different reasons as discussed in previous sections.

There was a significant difference in the importance given to tenure security by both communities. Residents from Dhimira Bauri and Meta Sahi who were denied tenure security wished that they benefit from the OLRSDA. Also, families who had recently received land rights certificates through the Act at Meta Sahi also valued the importance of tenure security. However, residents of upper street in Dhimira Bauri who have enjoyed the property rights from a distant past found it unimportant, as they took it for granted. Similarly, there were significant differences in the percentage share of objectives on community awareness and complaint redressal. This is partly due to Meta Sahi residents' poor experiences of interacting with government agencies on their unaddressed complaints on the railway warehouse. Consequently, they had limited expectations on the advantages of community awareness compared to their counterparts in Dhimira Bauri, where NGOs such as YSD are present and advocate for communities' rights and increase awareness among residents through their programs.

Finally, it was interesting to observe that residents of Meta Sahi did not identify any objectives focusing on improving access to livelihood generation sources, unlike Dhimira Bauri residents. The difference could be attributed to the fact that Dhimira Bauri residents were aware of skill training programs implemented by the local government, partly because they lived in a large city where such skill training programs were prevalent and because of YSD's presence and awareness generation efforts. In contrast, Meta Sahi residents lived in abject poverty and could not think beyond their immediate needs of shelter and basic infrastructure services.

Conclusion

In conclusion, our study identifies four critical lessons for policymakers: (i) housing needs and challenges in slums are diverse, (ii) residents demand equal rights to policy benefits, (iii) housing preferences are incremental, and (iv) communities' voices are a critical input for making slum policies relevant and inclusive. First, the case study of Dhimira Bauri and Meta Sahi clearly highlighted that housing needs are diverse, and they range from the need for physical infrastructure to social amenities. The diverse priorities highlight that we need flexible programs that provide control over resources to the community to address the diverse and prioritized needs as they perceive them. The aggregation of specific preferences from slum communities across the city identified using VFT could allow the local governments to implement localized and customized interventions within the overall umbrella of slum improvement programs.

Second, lower street residents of Dhimira Bauri and Meta Sahi demanded land rights certificates for tenure security and equality of rights. In Dhimira Bauri, the residents demanded it because their upper street counterparts had received them about 30 years ago, long before the implementation of IHSDP. The fact that IHSDP treated lower street residents unequally because of their lack of tenure status, has continued to be the basis for excluding them from subsequent benefits, and has further exacerbated a sense of social injustice and exclusion among residents. Moreover, once the community learned that the OLRSDA would exclude the five municipal corporation cities, including Brahmapur, they felt a stronger need to demand for equal rights. It was only in December 2021 that the state government of Odisha finally approved the proposal to confer land rights to slum residents living in the five municipal corporations (OMMCOM News, 2021). This welcome change in the Act validates our findings and reciprocates the thought process of the Dhimira Bauri lower street residents along with residents of other slums in Brahmapur city and other municipal corporations in the state. In Meta Sahi, families who were denied tenure security, often the poorest of the poor, insisted that they are treated equally and provided with land titles just like the other residents in the community.

Third, it was clear that the perceived housing needs were incremental in nature. For instance, lower street residents of Dhimira Bauri and some Meta Sahi residents demanded land titles, which would be the basis for all other housing improvements in the future. Meanwhile, the upper street

residents of Dhimira Bauri and most Meta Sahi residents who had tenure security sought to construct permanent structures on their land parcels. However, it should be noted that not all needs are incremental. The findings clearly indicated that access to basic infrastructure services such as water, sanitation, and drainage was demanded by all residents regardless of legal status and the physical conditions of their houses. Moreover, the OLHM provided improvements in basic infrastructure facilities only after the implementation of the OLRSDA. This meant that families not part of the act could not hope for improved access to basic infrastructure facilities even if they were in urgent need.

Finally, the case studies show that using PSMs such as SODA and VFT could provide a platform for slum communities to systematically express their needs and housing preferences. The framework has the potential to engage communities as experts to seek housing solutions and incorporate their voices into the policymaking processes rather than treating them as passive recipients of top-down slum policies. We believe that the use of SODA/VFT can greatly aid SDAs' work created under the OLRSDA for community engagement, as it has assisted community development organizations and civic groups in public participation elsewhere (Keeney & McDaniels, 1992; Keisler et al., 2014). Placing the preferences of the slum residents as the primary basis for policymaking and relying on them as the context experts also advocates to the notion of equity by showing a fairness toward the implementation of procedures, outputs, and outcomes. Incorporating SODA and VFT as participatory approaches in the policymaking process supports the notion of inclusion by creating an environment for people to feel safe, supported, listened to, and feel valued (Johnson & Chichirau, 2020).

The paper supports Turner's (1968) argument, who believed in dweller control through participatory policies that could enable the informal low-income households to acquire financial, material, and technical resources. The recommendations from the study places the values of slum communities at the center of policy design and implementation. In this sense, the study provides a novel approach to exemplify how bottom-up approaches to policymaking could complement the current top-down practices of providing housing and infrastructure services. Thus, slum dwellers get opportunities to have their voices heard, and be treated as experts. Simultaneously, governmental organizations can design welfare programs that reflect the slum community's actual needs, providing an opportunity to design policies differently based on the slum community's recommendations.

In conclusion, using SODA/VFT to understand the housing preferences of slum dwellers in our study provides multiple novel insights. First, the VFT hierarchy diagrams allow us to comprehensively describe the linkages between the problems faced by the slum communities along with the preferred solutions, all in a single diagram. Second, the findings derived from SODA and VFT are based on an empirically grounded and community-driven description of problems and solutions. And third, using VFT provides a clear picture of the community priorities based on the ranks to the proposed solutions given by the slum community.

It is worth noting that the findings from the slum community are primarily in line with what we know about successful slum policies from the literature. Our findings thus increase the confidence in the current knowledge base as we triangulate and validate existing literature using a unique set of methods uncommon in slum studies. In addition, the use of SODA/VFT highlighted the importance of relying on slum residents as domain experts that gave us the conclusions within a single exercise, formerly found only in a piecemeal approach to policy experimenting and program evaluations often spread across the span of decades.

An immediate extension of the study could include similar discussions with other stakeholder groups, such as government officials and civil society members, to find a middle ground of implementable solutions. A discussion of these solutions acceptable by all groups would lead to creating an informed policy design process that incorporates diverse stakeholder needs. In addition, the framework and use of PSMs do not limit to the provision of housing for slum communities. They can be expanded to multiple domains and services such as education, healthcare, and livelihood, among others anchored in slums and essential for the development of communities.

Note

1. *Slum* is a widely accepted term in the international development literature and does not refer to the slums as understood in the developed world, particularly in the U.S. where its usage is widely criticized for being pejorative.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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