Exploring Community Collective Decision-Making Process for Incremental Spatial Modifications in Underserved Settlements: A Case Study of Pollwatta, Koralawella, Sri Lanka

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Abstract

This research explores the community decision-making process in an underserved settlement, with special reference to Pollwatta, Koralawella, focusing on how residents collectively address challenges through incremental spatial modifications and provision for expansions. Despite extensive research on informal housing, little is known about how communities decide to modify and expand their homes over time. This study addresses that gap by examining the social and spatial dynamics of community-led decision-making in an underserved settlement. It highlights the need to understand these local processes as essential for creating more inclusive and adaptable housing strategies. Through literature, house layout, spatial usage, and provisions for expansions were selected as the physical parameters affecting the incremental spatial modifications of the dwelling spaces. The selected decision-making parameters include social profile, reason for decision-making, time taken, and actors involved. In Pollwatta, five houses with incremental spatial modifications were selected for the study. House plans and spatial data were collected through onsite measurements, observations, and photographic recordings. Families' details, needs, spatial usage data, and knowledge of incremental spatial modifications and the collective decision-making process were gathered through observations, semi-structured interviews, interactive workshops, and visual documentation. Spatial analysis identified house characteristics and incremental spatial modifications, while social data analysis examined community knowledge of these modifications and the collective decision-making process. Research outcomes include detailed mapping of the incremental spatial modifications and the community's decision-making process. The research found that families apply a community decision-making process, referencing house layout, spatial usage, and provision for modifications, when implementing incremental spatial modifications. Findings highlight that socio-cultural and economic factors influence this process over time and that the community actively participates in the decision-making process to facilitate incremental modifications.

Keywords: Collective Decision-Making Process, Incremental Spatial Modifications, Underserved Settlements, Sri Lanka.

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Introduction and Background

Urbanization in developing countries often leads to the emergence of underserved settlements characterized by socio-economic vulnerabilities, spatial deficiencies, and inadequate infrastructure. These settlements, frequently formed through informal or incremental processes, present unique challenges in terms of housing quality, spatial organization, and access to services. In Sri Lanka, particularly in coastal communities like Pollwatta, Koralawella, residents continue to struggle with limited land availability, environmental risks, and persistent economic hardship.

Addressing these conditions requires more than physical improvements. It also depends on how communities collectively make decisions about change. When resources are scarce and adaptation becomes a continual necessity, collective decision-making emerges as a vital process through which residents organize, negotiate, and reshape their living environments to meet changing family needs and external pressures. However, despite the significance of these processes, academic literature often overlooks the participatory and incremental spatial adaptations prevalent in underserved settlements. Understanding how residents collectively decide to modify and expand their homes provides valuable insight into their resilience, social cohesion, and capacity for sustainable and adaptive development within their settlements.

Research Question

This study seeks to understand how community members in underserved settlements collectively make decisions when they need to modify or expand their homes. It explores what social, cultural, and economic factors influence these collective decisions, and how families negotiate such changes within limited resources. It also examines how physical aspects, such as house layout, spatial usage, and provision for expansion, interact with community decision-making, shaping the overall process of incremental spatial modification.

Aim of the Research

This research aims to explore the community collective decision-making processes that shape incremental spatial modifications in underserved settlements, with a focus on Pollwatta, Koralawella as a case study. It seeks to understand how families employ collective decision-making in relation to house layout, spatial usage, and provisions for expansion, in response to socio-economic constraints and cultural influences, to improve their living environments.

Objectives

- To examine spatial usage, house layouts, and provision for expansions as physical aspects of the incremental spatial modifications.
- To identify and document the processes, factors and actors involved in incremental spatial modifications and collective decision-making.
- To understand the relationship between factors which support incremental spatial modifications and collective decision-making process.
- To provide recommendations to support informed community participation in the incremental spatial modifications and collective decision-making processes

Literature Review

Conceptual Understanding of Settlements

A settlement can be understood socially and spatially as defined community where people live and interact socially, economically, and culturally. Settlements provide basic necessities like shelter, infrastructure, and social networks and vary greatly in size and physical form, ranging from small rural villages to large urban neighborhoods (Turner & Fichter, 1972).

In the Sri Lankan context, settlements are often categorized based on infrastructural development, land tenure security, and access to basic services. Urban and rural settlements alike may include formal or informal characteristics and are shaped by historical, socio-economic, and political factors unique to the region (Balachandran & Thennakoon, 2023).

This conceptual understanding of settlements provides a foundation for examining how underserved settlements in Sri Lanka emerge and evolve within broader socio-economic and spatial constraints.

The Context of Underserved Settlements in Sri Lanka

“Communities lacking essential services, adequate living space, safe housing structures, and tenure security. These areas are usually occupied by low-income groups and suffer from environmental and infrastructural deficits exacerbating vulnerability and poverty cycles” (UN-HABITAT, CEPA & Sevanatha, 2013; cited in Balachandran and Thennakoon, 2023).

Underserved settlements in Sri Lanka specifically refer to communities with limited access to essential services and infrastructure, including safe housing, sanitation, clean water, electricity, and formal land tenure. These settlements often emerge as informal or squatter settlements on marginal or hazardous lands such as riverbanks, steep slopes, or coastal areas vulnerable to flooding and erosion (*Centre for a Smart Future, Colombo Settlements Survey 2023, p. [*, n.d.).

These communities are characterized by:

- Limited infrastructural provision
- Economic marginalization and poverty
- Insecure land tenure leading to vulnerability
- Social exclusion from formal city planning and municipal services (Centre for a Smart Future, n.d.).

With rapid urbanization and internal migration, such underserved settlements have increased in Sri Lankan cities like Colombo, reflecting global trends of increasing urban informality. Notably, the 2023 Colombo Settlements Survey highlights that most low-income settlements have seen significant infrastructural improvements, with over 97% having individually metered water and electricity connections and 80% having individual toilets. However, social infrastructure remains weak, with low community organization and limited access to recreational spaces (*Centre for a Smart Future, Colombo Settlements Survey 2023, p. [*, n.d.) .

Researchers and policymakers emphasize the need for inclusive urban policy and participatory housing strategies that build on these improvements while addressing social vulnerabilities, informal tenure issues, and environmental risks to enhance the living conditions and socio-economic resilience of underserved communities.

Building on this understanding of structural deprivation, it becomes essential to explore how communities themselves exercise agency through collective decision-making in managing spatial challenges.

Understanding Community Collective Decision-Making Process

Community collective decision-making, especially in underserved or informal settlements, is shaped by multiple social, economic, and cultural dynamics that influence how residents negotiate and implement changes in their living environments. Scholars identify key parameters crucial for understanding these decision-making processes: social profile, the reason for decision-making, the time taken to reach decisions, and the individuals or groups involved (UDA, 2020; UN-Habitat, 2023).

The social profile, which includes aspects such as number of family members, number of school children, number of family members with jobs or earning power, occupation type, problems after resettlements, show how the social profile of the family as well as the community shape the residents' house design and development patterns as well as their decision making process (UDA, 2020; UN-Habitat, 2023).

The reasons for decision-making typically revolve around addressing shared challenges within the community, such as environmental hazards, overcrowding, or infrastructure deficits. These motivations lead to collective negotiations where community members prioritize interventions that improve their living conditions. Often, these decisions are reactive as well as proactive, aimed at both immediate needs and long-term aspirations (Boonstra & Boelens, 2011).

The time taken for decision-making is influenced by urgency, social cohesion, and available information. Incremental modifications provide flexibility, as decisions on smaller spatial or structural changes can be made continuously, avoiding delays that large-scale formal planning might incur. Established social norms and local leadership typically facilitate quicker consensus on commonly understood issues (Cornwall' & Jewkes, n.d.).

The actors involved extend from individual households to neighbors, extended family networks, and informal community leaders. The level of participation depends on social status, gender, and expertise in community needs and spatial knowledge. Participation is enhanced by informal communication patterns and social gatherings where shared knowledge is exchanged. Participation and trust-building are fundamental aspects in fostering accountability and shared responsibility for housing improvements (Banks et al., 2020) (Payne, 2004).

Methods such as participatory observation and interactive workshops are recommended for effectively capturing and supporting community decision-making, enabling residents to voice their preferences and collectively create solutions. Thus, community decision-making is an ongoing, negotiated social process rather than a one-time event (Cornwall' & Jewkes, n.d.).

Understanding these decision-making dynamics provides the basis for examining how such processes materialize physically through incremental spatial modifications in underserved settlements.

Theoretical Perspectives of Incremental Spatial Modifications in Underserved Settlements

Incremental spatial modifications refer to the gradual adjustments and expansions residents undertake in their homes and surroundings, reflecting evolving household needs, financial capacities, and socio-cultural values. In underserved settlements, this process is crucial as residents often lack the resources or legal security to undertake comprehensive housing schemes (Elgohary et al., 2024) (Watson, 2015).

Key physical parameters influencing these modifications include spatial usage, house plans, and provisions for expansion, material choice, and structural adaptations. Spatial usage in these contexts is inherently multifunctional; rooms are adapted for various activities, balancing living, economic, and social functions in limited space (Henry Kwaku Boafo, n.d.).
Incremental changes in house plans commonly involve extending rooms, creating temporary partitions, or adding verandas and service areas as family needs evolve. Importantly, many residents anticipate future expansions during initial construction by leaving open spaces or using lightweight, inexpensive materials that facilitate flexible growth (Kedanibone Maganadisa et al., n.d.).

Socio-cultural elements deeply influence these spatial modifications. Cultural preferences for privacy, gendered use of space, and communal living practices guide how families organize and expand their homes. Economic factors also dictate material choices and the pace of incremental adaptations, with resource scarcity often limiting immediate development but encouraging resourceful, phased improvements (Banks et al., 2020)(Payne, 2004).

Finally, the literature emphasizes that such incremental modifications are not isolated individual decisions but part of a collective knowledge system. Communities have developed shared practices for spatial planning and material use, continuously learning from each other and adapting to changing circumstances. Recognizing and supporting this community agency is essential for sustainable housing development policies (Elgohary et al., 2024)

Recognizing incremental spatial modification as a social and adaptive process calls for a methodological approach that captures both physical transformations and the collective decision-making processes behind them.

The literature review establishes that while many studies discuss incremental housing and informal settlement development, few examine how communities collectively engage in decision making process and incremental spatial modifications. It highlights the importance of understanding settlements as socio-spatial systems shaped by both physical and social dynamics. From this synthesis, the study identifies key parameters, **physical** (house layout, spatial usage, and provision for expansion) and **social** (social profile, reasons for decisions, time, and actors involved), to investigate how collective decision-making influences incremental spatial modifications. These insights which form the conceptual basis for the methodological framework are outlined in the next section.

Methodology Overview

This study adopts a mixed-method case study approach to explore how collective decision-making shapes incremental spatial modifications in underserved settlements. Guided by the research questions, the methodology integrates both physical and social parameters derived from the literature review. The physical parameters house layout, spatial usage, and provision for expansion, and the social parameters social profile, reasons for decision-making, time, and actors involved, form the analytical framework linking the research objectives with the field investigations.

In Pollwatta, Koralawella, five houses with incremental spatial modifications were selected for in-depth research. The number of case study houses were limited to five, as the research included a sixteen-month data comprehensive data collection and analysis process as follows. Limiting the number of case study houses allowed the researchers to study the selected houses and families in-depth.

House plans and spatial data were collected via a quantitative research method with onsite measuring, observations, and photographic recordings. A spatial data analysis of the physical data as well as in-depth interview data was adopted to identify house character and the incremental spatial modifications.

Family members' details, their needs, spatial usage data, and knowledge of incremental spatial modifications and collective decision-making process were collected via a more qualitative research method with observations, semi-structured in-depth interviews, interactive workshops, photographic, and video recordings. A social data analysis of the observation data as well as in-depth interviews was conducted to examine the community knowledge on incremental spatial modifications and the decision-making process of the community.

Data analysis was conducted in two stages. First, **spatial analysis** was applied to examine how physical parameters such as house layout, spatial usage, and provision for expansion reflect incremental modifications. Second, **thematic analysis** was used to interpret qualitative data from interviews and observations, identifying recurring patterns in social parameters such as social profile, reasons for decisions, time, and actors involved. Findings from both analyses were then compared to reveal relationships between community collective decision-making and incremental spatial modifications.

Data Collection Methodology and Duration

Data collection was conducted over a 16 month period, from March 03, 2024, to July 31, 2025, encompassing weekdays and weekends to capture diverse daily activity patterns. While this study provides detailed insights into the dynamics of collective decision-making in Polwatta, its scope is limited to five households within a single community. The findings are therefore context-specific, though they offer valuable directions for broader comparative research across similar underserved settlements. Multiple qualitative and quantitative methods were employed for comprehensive data gathering:

- **Participatory observations:** Community meetings, household activities, and spatial usage during mornings, afternoons, and evenings to understand decision-making interactions and spatial dynamics.
- **Semi-structured interviews:** Interviews with family members and influential community actors were held to elicit reasons for decisions, timelines, actors involved, and material choices.
- **Onsite measurements:** Detailed spatial data including house plans, expansions, and provision spaces were acquired through direct measurement of the five selected houses, supported by photographic records.

Fig.1: Participatory observations, Semi-structured interviews, Onsite measurements
Source: Author

- **Interactive workshops :** Conducted within the neighbourhood to engage residents in articulating their decision-making processes related to incremental spatial modifications.
- **Video recordings and photographic documentation:** Captured spatial usage and discussions on housing modifications to supplement qualitative data.

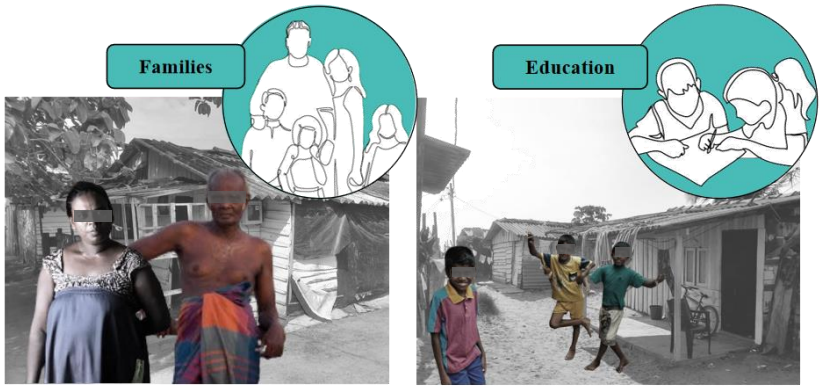
Fig.2: Interactive workshops and games, Video recordings and photographic documentation
Source: Social Innovation Lab. Sri Lanka (2024)

The study began with recognizing a clear research gap in existing literature, where the community collective decision-making processes behind incremental spatial modifications in underserved settlements remain insufficiently explored. This research was therefore driven by the question of how underserved communities engage in collective decision-making process when community needs incremental spatial modifications and provisions. The importance of this study lies in its attempt to bridge physical and social perspectives to explore how and why such decisions are made collectively within constrained living environments. The literature review provided the conceptual foundation for this inquiry, identifying both physical parameters (house layout, spatial usage, and provision for expansion) and social parameters (social profile, reasons for decision-making, time, and actors involved) as key components for the analysis. Building on this theoretical framework, the selected methodology was designed to capture these parameters through participatory observations, interviews, and spatial analysis. The following section presents the case study of Polwatta, Koralawella, where this methodological framework was applied to examine how collective decision-making processes shape incremental spatial modifications within a real community context.

Study Area and Selection of Case Study Houses

The study area is situated within Koralawella, Moratuwa in Colombo district of Sri Lanka, specifically in Polwatta, a locality within Koralawella. Geographically, Polwatta is delineated by the new Galle Road to the west, the coastal railway line to the east, and the sea to the south. The locality is further separated from the neighboring Moratuwalla area by locally recognized physical boundaries known as "Walla," "Pittaniya," and "Adi Haye Para."

Source: Satharasingha (2025).



Polwatta comprises approximately 80 families, with average household sizes ranging between five and six members. The community predominantly consists of low-income families who encounter significant challenges in accessing basic infrastructure and essential utilities.

Educational attainment within the area is limited, as demonstrated by high dropout rates prior to reaching key educational milestones such as the Ordinary Level examinations. This situation reflects that limited access and opportunities, rather than a lack of motivation, often prevent community members from pursuing higher education.

However, recent socioeconomic changes have altered this trend. Factors such as widespread drug addiction have led to a decline in fishing-related employment, contributing to an increase in female-headed households. Many women now find employment in the private sector, particularly in cleaning services with companies like *Abans*, which have become key local employers.

Fig. 4: Polwatta, Koralawella low-income settlement -Social Profile

Source: Satharasingha (2025).

Polwatta is a community that showcases a linear settlement pattern with dwellings as the core of the built environment. The community's resourcefulness is evident in modest structures, which reflect the community's ingenuity and resilience. Despite facing challenges such as limited resources and basic infrastructure, Polwatta exhibits strong social cohesion. The shared experience of poverty and inadequate housing has fostered a strong sense of community, with neighbors actively supporting each other during hardships. This collective spirit highlights the resilience and humanity of the community in the face of adversity. However, the community's future is threatened by coastal erosion and rising sea levels, leading to displacement of residents and destruction of homes. The forced relocation of displaced families to the "Pittaniya" neighborhood underscores the urgency of the situation and the need for immediate attention and effective mitigation measures to safeguard the lives and livelihoods of the residents of Polwatta.

Fig. 5: The community members share their limited basic facilities.

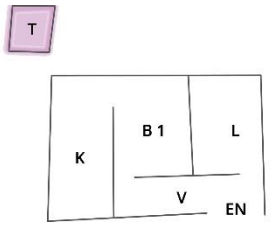
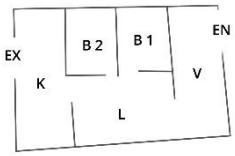
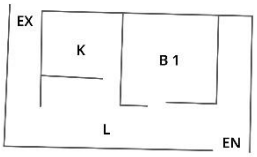
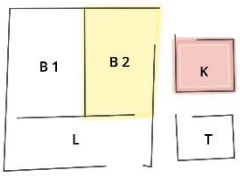
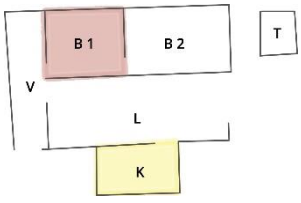
Source: Satharasingha (2025).

Selected Houses

Five houses were selected for the case study based on their exposure to sea erosion due to rising sea levels in 2024. These houses have since been resettled near a playground. Due to ongoing reconstruction efforts, these homes have received police complaints regarding unauthorized rebuilding. According to Figure 6, three clustered houses (case study no. 1, 2, 3) were identified as sharing a single toilet facility among neighboring households, illustrating communal resource-sharing practices. Additionally, two houses (case study no. 4, 5) experienced family expansion due to recent marriages, providing valuable insights into how household growth impacts spatial and social dynamics.

Fig.6: Annotation of Selected Five houses for the Case Study
Source: Satharasingha (2025).

Table 1 – Physical Parameters Affecting Incremental Spatial Modifications of Dwelling Spaces

Housing No	Housing layout (P-P1) Spatial Usage (P-P2) Provision for expansion (P-P3)	Images of (P-P2) & (P-P3)	Description of special details (P-P2) & (P-P3)
1		  	When confronted with a common challenge, the individuals collectively collaborate to develop a unified solution, sharing which should have been a private space, such as a toilet, in a neighborhood with non-related individuals.
2			
3			
4		 	They repurposed their kitchen area into a bedroom to accommodate a newly married couple, thereby safeguarding their privacy. Subsequently, they expanded their residence and constructed a separate, communal kitchen.
5			The kitchen space was converted into a bedroom, and an adjoining area was incorporated into the living room to serve as a kitchen and common space.

EN=Entrance, EX=Exit, V=Veranda, B=Bedroom, K=Kitchen, L=Living, T=Toilet
= Modified Space, =Provisionally Expanded Space, = Shared Space

Source: Author

Table 2 – Decision Making Parameters - Social Profile (S-P1)

Selected House No	Number of Family members	Number of School children	Number of people attend to work	Occupation	Problem they faced after erosion and resettlement
01	05	02	02	Cleaning service & Fishing	Do not have a toilet
02	04	02	01	Fishing & Cleaning service	They have a toilet and they do not have water supply.
03	03	-	01	Entrepreneur - Household based food making	Do not have a toilet
04	05	01	02	Fishing & Cleaning service	Lives with her Married daughter. They share the same house and they do not have electricity.
05	06	02	03	Cleaning service & Fishing	Their Married son is living in their house, and they lack a kitchen space.

Source: Author

Table 3 – Decision Making Parameters – S-P2, S-P3 & S-P4

House No	Problem	Reason for decision making (S-P2)			time taken for decision making (S-P3)	Actors who participate in the decision-making process (S-P4)			Solution
		Social	Environmental	Financial		Family only	Neighbors	Outsiders	
01.	Inability to afford the construction of a toilet.	✓		✓	1	✓	✓		They develop a collective solution by sharing a single toilet and water supply among individuals, experiencing the same issue.
02	They possess a toilet; however, the water supply has been discontinued due to financial constraints.	✓	✓	✓	1	✓		✓	
03	Financial constraints and lack of space to build both a toilet and a pit.	✓	✓	✓	1	✓	✓		
04	Insufficient space to construct a new room for a married daughter.	✓		✓	2	✓			The kitchen area is transformed into a new room, accompanied by an extension of space to accommodate kitchen facilities. Additionally, electricity is shared with neighboring households.
05	Inadequate space for cooking purposes	✓	✓	✓	3	✓	✓	✓	Condition of the existing kitchen space, an extension is created adjacent to the living room to serve as a kitchen area.

Source: Author

Research Results

The study identified key processes physical parameters affecting incremental spatial modifications of dwelling spaces (P-P1–P-P3), and community collective decision-making parameters (S-P1–S-P4), among five households (House No. 01–05).

Incremental Spatial Modifications – Research findings with reference to physical parameters

Housing Layout (P-P1)

The layouts revealed significant constraints:

- House 01 and 03 lacked private toilets.
- House 02 had insufficient water supply.
- House 04 and 05 had to repurpose kitchens into bedrooms due to household growth, showing the limits of original layouts.

Spatial Usage (P-P2)

Households adapted spaces beyond intended functions:

- House 01 developed a shared toilet arrangement.
- House 02 managed without water supply, relying on collective adjustments.
- House 03 built makeshift sanitation solutions.
- House 04 converted its kitchen into a bedroom for a married daughter, then created a communal cooking area.
- House 05 transformed its kitchen into a bedroom, extending the living space for combined cooking and gathering.

Provision Expansion (P-P3)

Despite financial and spatial barriers, households improvised incremental expansions:

- House 01 and 02 developed collective toilet and water solutions.
- House 03 struggled with sanitation and relied on provisional structures.
- House 04 expanded by adding a new communal kitchen after repurposing the old one.
- House 05 extended living areas to incorporate both cooking and social space.

These changes were often provisional and low-cost, underscoring both limitations and adaptability.

Majority of cases (60%) have gone into a solution based on space sharing and few of the cases (40%) have gone into spatial expansions which relate to incremental modifications.

These incremental adjustments mirror Turner's (1976) concept of "dweller control," where residents continuously adapt their spaces to meet evolving needs. Similarly, Habraken's (1998) theory of "open building" is reflected in the flexible, provisional nature of the spatial modifications observed in Polwatta.

Community Decision-Making - Research findings with reference to Social Parameters

Social Profile (S-P1)

The social profiles (House No. 01–05) revealed diverse challenges after erosion and resettlement:

- House 01 and House 03 lacked toilets.
- House 02 had a toilet but no water supply.
- House 04 lived without electricity and had to share space with a married daughter.
- House 05 faced a shortage of kitchen space due to an expanded household.

Occupations were concentrated on fishing and cleaning services, while household sizes varied from three members (House 03) to six members (House 05), reflecting socio-economic vulnerability.

Reason for Decision-Making (S-P2)

Financial constraints were the dominant driver of household decision-making across all five cases.

- House 01 and 03 could not afford toilet construction.
- House 02 could not maintain water supply because of cost limitations.
- House 04 and 05 struggled with space adjustments due to household expansion and inadequate income.

Social and environmental pressures (e.g., need for privacy, overcrowding, sanitation) further shaped these decisions.

Time Taken for Decision-Making (S-P3)

Decisions were made within short time frames, reflecting urgency:

- House 01–03 decided within 1 day,
- House 04 within 2 days,
- House 05 within 3 days.

This immediacy highlights survival-driven priorities where delays could worsen daily hardships.

Actors Who Participate in Decision-Making (S-P4)

- House 01 and House 02 engaged both family and neighbors, sharing toilets and water resources.
- House 03 relied solely on family members for decisions.
- House 04 depended on family only, particularly in managing electricity and shared housing.
- House 05 involved family, neighbors, and external actors to extend kitchen and living spaces.

This demonstrates that while family was central, community collaboration was often essential to achieve solutions.

Majority of cases (60%) relied solely on family members for decision-making, indicating how survival pressures led households to act within their own limited means, while a smaller portion (40%) turned to neighbors or outsiders, highlighting the role of community ties when familial resources were insufficient.

The collective negotiation and shared decision-making processes identified here reinforce Boonstra and Boelens' (2011) notion of "self-organization in urban development," emphasizing how informal networks substitute for formal governance structures in managing spatial change.

Overall Analysis & Discussion

This section presents the findings and analysis derived from the field study, structured around the physical and social parameters identified through the literature review. The results revealed that households in the resettlement community faced pressing challenges such as lack of toilets (House 01, 03), inadequate water supply (House 02), absence of electricity (House 04), and insufficient kitchen space (House 05). Physical modifications (P-P1–P-P3) , such as transforming kitchens into bedrooms or expanding communal spaces , were not improvements but necessity-driven adaptations, highlighting how resettled families reconfigured space to cope with unmet basic needs. These conditions emerged due to the limited financial resources of households (S-P2), which restricted their ability to construct or upgrade facilities. Rapid decision-making (S-P3) reflected the urgency of survival needs, while collective reliance on neighbors and external actors (S--P4) showed how households compensated for deficits in state-provided infrastructure.

Incremental Strategies: Physical modifications (P-P1–P-P3) consistently followed an incremental, low-cost model, with spaces repurposed or provisionally expanded rather than permanently reconstructed. Shared Constraints: All households experienced financial barriers (S-P2), and most reported challenges with essential services (toilet, water, electricity, and kitchen). Differences in Priorities: While House 01 and 03 prioritized sanitation, House 04 focused on privacy and electricity, and House 05 on cooking space. These variations were tied to household size and composition (S-P1). Speed of Decision-Making: Quick decision-making (1–3 days) was common across cases, but House 05 took longer (3 days) due to the complexity of reorganizing kitchen and living areas (S-P3). Actors Involved: Families were the primary decision-makers, but some (House 01, 02, 05) required collective support from neighbors to manage shared resources (S-P4).

The framework of physical and decision-making parameters provided clarity in analyzing the problem:

- P-P1 (Layout): The rigid initial layouts were inadequate for changing family structures.
- P-P2 (Spatial usage): Families creatively repurposed spaces beyond original design intent.
- P-P3 (Expansion): Incremental and provisional expansions became a defining characteristic of adaptation.
- S-P1 (Social profile): Household size, occupation, and socio-economic vulnerability directly influenced the type of challenge faced.
- S-P2 (Reason for decisions): Financial limitations were central but intersected with social and environmental pressures.
- S-P3 (Time): Quick responses were a function of urgent, survival-driven needs.
- S-P4 (Actors): Patterns of collaboration emerged as essential strategies in overcoming deficits.

The findings of this study align with and extend existing literature on underserved settlements, incremental housing modifications and collective decision-making. Consistent with prior research (UN-Habitat, CEPA & Sevanatha, 2013; Balachandran & Thennakoon, 2023), the households studied faced persistent infrastructural deficits such as lack of toilets, water, electricity, and space, despite broader improvements reported in Colombo's settlements. Decision-making was rapid and necessity-driven, shaped by urgency and supported by neighbors and external actors,

reinforcing scholarship that emphasizes the role of informal networks and collective strategies. The incremental spatial modifications observed,repurposing kitchens, extending rooms, and sharing facilities,mirror established studies on adaptable housing practices (Turner, 1976; Habraken, 1998), while also highlighting the role of community knowledge and resilience in shaping collective responses. This research contributes beyond existing literature by applying a parameter-based framework (S-P1–S-P4, P-P1–P-P3) to systematically link physical housing adaptations with decision-making processes, offering a structured lens to evaluate resilience in resettled communities.

This case study contributes to knowledge by demonstrating how financial constraints and rapid decision-making directly shape spatial modifications in resettled communities. Incremental and provisional expansions emerge not only as housing strategies but as vital survival mechanisms, with neighbors and collective action playing a central role in bridging infrastructural gaps. By applying a parameter-based framework (S-P1–S-P4; P-P1–P-P3), the study offers a structured way to systematically analyze household decision-making and spatial adaptation.

The findings have clear implications for policy and practice. Resettlement housing should be designed with built-in flexibility to accommodate incremental expansion, while essential infrastructure such as toilets, water, and electricity must be prioritized at the planning stage rather than left to household improvisation. Engaging community networks as active partners in planning, along with introducing design innovations such as flexible kitchens and multi-use living spaces, can reduce the need for disruptive adaptations and strengthen resilience.

These findings extend UN-Habitat's (2023) view of participatory housing by demonstrating how community collaboration, rather than formal planning, enables ongoing adaptation in resource-constrained environments. Beyond the Pollwatta case, these insights reveal how everyday, community-based decision-making becomes a quiet but powerful form of resilience in similar coastal and low-income settlements. The small, adaptive changes made by families often through collective effort carry lessons for how urban development can grow from the ground up, guided by people's lived experience rather than imposed plans. Recognizing this localized agency invites planners and authorities to see residents not as beneficiaries but as active partners in shaping more inclusive and responsive housing futures.

Conclusion

This study offers an original contribution by integrating physical and social parameters (P–P1–P3; S–P1–S–P4) into a single analytical framework that connects spatial and social dimensions of adaptation. This framework provides a deeper understanding of how community collective decision-making directly shapes incremental modification and expansion, adding a new perspective to participatory housing research in Sri Lanka.

This study was confined to a single case area Pollwatta, Koralawella representing an underserved coastal settlement in Sri Lanka. The analysis focused on five resettled households selected for their engagement in incremental spatial modifications following coastal erosion. Consequently, the findings are context-specific and provide in-depth qualitative insights rather than statistically generalizable conclusions.

The scope was limited to examining physical parameters (house layout, spatial usage, and provision for expansion) and social parameters (social profile, reasons for decision-making, time, and actors involved). It did not incorporate quantitative modeling or policy implementation assessment. The sixteen-month study period enabled detailed documentation and analysis but restricted longitudinal tracking of spatial and social transformations.

While the study contributes to understanding community-led decision-making and adaptive spatial practices, it does not fully capture broader aspects such as community knowledge contributing to resilience, gender-based power relations, or cross-settlement comparative dynamics.

This study examined the processes of incremental spatial modifications and community collective decision-making among resettled households in an underserved settlement context. Using a framework of physical (P-P1–P-P3) and social (S-P1–S-P4) parameters, the findings revealed how limited resources, urgent needs, and community networks shaped housing adaptations. Households responded to pressing challenges such as lack of sanitation, inadequate space, and financial constraints through rapid, necessity-driven decisions and incremental, often improvised, spatial modifications.

Across the cases, common themes emerged: decision-making was primarily family-centered but supported by neighbors and external actors; modifications to layouts and space usage were multifunctional and flexible; and incremental expansions reflected both financial limitations and adaptive creativity. These patterns underline the resilience and agency of low-income communities, while also highlighting the structural vulnerabilities they continue to face in resettlement contexts.

Overall, the study contributes to understanding how resettled households navigate housing challenges through collective and adaptive strategies. The findings also have clear policy relevance. Recognizing community collective decision-making process in low-income settlement can inform inclusive urban policies and resettlement programs, ensuring flexibility and community participation are embedded in the future housing schemes. It emphasizes the importance of recognizing incremental housing practices and community decision-making processes in shaping more inclusive and responsive resettlement policies. By linking local practices with broader housing and planning debates, the findings suggest pathways for more sustainable, participatory, and resilient settlement development in Sri Lanka and similar contexts.

Recommendations

Building on these findings, several recommendations can enhance future resettlement and housing programs:

- **Flexible design:** Future resettlement projects should adopt modular or adaptable housing designs that allow families to expand or reconfigure spaces without lengthy approval processes.
- **Capacity building:** Establish community technical workshops to guide residents on safe, cost-effective methods for incremental construction and spatial expansion.
- **Participatory planning:** Involve residents' representatives and local actors in design review committees to ensure that community-led decisions are formally recognized in planning frameworks.
- **Policy integration:** Embed flexibility and participatory processes within housing and urban policies to support self-organized, resilient settlement development.
- **Equity and inclusivity:** Address gender-sensitive and intra-household decision-making dynamics that influence how space is valued and modified.

Future Directions

Future research should broaden the scope beyond a single case and include larger, comparative, or longitudinal studies to understand how incremental modifications evolve over time. Linking these processes with environmental risks such as flooding, coastal erosion, or climate-related vulnerabilities could reveal deeper insights into resilience-building in underserved settlements.

Methodologically, future work could integrate digital mapping, immersive participatory research, and social innovation experiments to document and co-create adaptive solutions with communities in real time. Comparative analyses between coastal and inland settlements and across regions of the Global South would help situate Sri Lanka's case within global discussions on incremental housing and community resilience.

Ultimately, this study reinforces that community collective decision-making is not only a mechanism of survival but a vital driver of spatial resilience and social cohesion in underserved settlements.

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