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Exploring Architecture without Architects: Self-Built Housing Quality in Informal Settlements and Design Intervention Strategies

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ABSTRACT

This research employed a mixed-methods approach to investigate self-built housing quality in informal settlements across Punjab, Pakistan and evaluate design intervention strategies. The study selected three informal settlements in major Punjabi cities including Lahore, Faisalabad, and Rawalpindi through purposive sampling based on settlement age, population density, and geographical location. Data collection involved structured surveys administered to 150 household residents to assess housing conditions, construction materials, and spatial configurations typical to Punjabi Katchi Abadis. The researcher conducted systematic observations using a standardized checklist to evaluate structural integrity, ventilation, natural lighting, and sanitation facilities across 100 dwelling units. Semi-structured interviews with 30 residents explored their self-construction processes, challenges faced within the local context, and perceived housing needs. Additionally, the study engaged 10 local masons (mistris) and 5 community leaders through focus group discussions to understand indigenous construction techniques and socio-cultural dynamics specific to Punjab. Physical measurements and photographic documentation captured spatial dimensions and construction details of traditional brick and concrete structures. The researcher analyzed existing built forms through typological classification to identify common patterns and vernacular design solutions. Three contextually appropriate design intervention prototypes were developed considering local climate, available materials, and cultural practices, then

presented to community members for feedback through participatory workshops. Quantitative data underwent statistical analysis using SPSS, while qualitative data were thematically analyzed to extract insights regarding residents' experiences and preferences.
Keywords: *Self-Built, Housing Quality, Informal Settlements, Design, Intervention Strategies.*

INTRODUCTION

Developing countries experienced unparalleled urbanization that posed a significant challenge in housing provision especially to the low-income earners who had to self-construct houses in the informal settlements (Auwalu and Bello 2023). The rural-urban migration witnessed in Pakistan has been high in the past few decades which led to increase in informal settlements locally referred to as Katchi Abadis in major cities. The development of these settlements was spontaneous reaction on the acute housing shortage and insufficient formal housing policies that did not meet the requirements of economically marginalized population (Memon, Arain et al. 2024). Punjab province which is the largest in Pakistan experienced a significant increase in informal settlement in the major cities in the province such as Lahore, Faisalabad and Rawalpindi. The dwellers of these settlements, as they had no access to formal housing market, or professional architectural assistance, had to depend on native construction experience and self-help practices to construct their homes. This effect was a manifestation of the so-called architecture without architects in which local construction methods, cultural traditions, and vernacular building practices were applied to the built environment without the intercession of formal design (Majid and Shami 2024).

The standards of self-constructed houses in such informal settlements were quite different and usually dependent on the financial possibilities of people, their material resources, and the workmanship. A lot of houses had structural weaknesses, lack of proper ventilation, natural lighting, and the lack of proper sanitation facilities that affected the health, safety and welfare of the residents (Arshad, Akram et al. 2025). Self-constructed buildings also manifested a high level of ingenuity, adaptation to the local weather conditions, and culturally suitable spatial arrangements that formal housing projects would not pay enough attention to. The informal construction industry in Punjab had to depend on local masons called mistris who had traditional knowledge of building skills and had been handed down the line. These artisans had key roles in bringing the aspirations of the residents into reality through built forms with extreme resource constraints (Akram, Ashraf et al. 2025). The knowledge of the processes of self-construction, assessment of the current housing quality, and the prospects of design interventions became necessary to transform the situation in the informal settlements, not to evict the communities and cultural traditions be neglected (Akram, Mubin et al. 2025).

Past experiences on informal settlement upgrading mostly consisted of imposing standardized interventions that disregarded the local settings, caused the cultural incompatibility and could not be accepted by the community (Akram, Mubin et al. 2024). There was a necessity to consider contextually relevant designing interventions that would be able to take into account the pre-existing vernacular practices, carefulness about the social-cultural interactions and an improvement in the quality of housing via slow, gradual advancements as opposed to complete substitutions (Akram, Nadeem et al. 2025). The study addressed this gap by conducted a systematic research on the quality of self-built housing in

the Punjabi informal settlements and design intervention strategies were developed based on the community participation and the local construction traditions. The study identified that the sustainable ones needed the knowledge on how residents constructed their lives, problems in this construction, and how they perceived their housing needs within the concrete cultural and economic environment of Punjab. Through the involvement of the community members, local masons and settlement leaders during research, the study was expected to yield some knowledge that would shape and inform a superior, culturally focused and accepted housing improvement policies and strategies. The results had the potential importance to policymakers, urban planners, architects, and developmental organizations that strive to improve the living standards of informal settlements without undermining the sense of agency and dignity of self-built housing settlements.

Research Objectives

1. To test the quality of self-constructed houses in informal settlements in Punjab, Pakistan by testing the structural integrity, spatial designs, construction materials used, ventilation, natural lighting, and sanitation facilities.
2. To explore the self-construction processes, local construction methods, socio-cultural dynamics that affected housing development in Punjabi Katchi Abadis by interacting with residents, local masons and community leaders.
3. To formulate and test the contextually relevant design intervention prototypes which responded to the observed housing quality shortages whilst taking into account the local climate conditions, available materials, local cultural practices, and community preferences.

Research Questions

1. Which housing quality situations appear the most in self-built houses within informal settlements of Punjab and what tendencies can be observed in various settlements?
2. What are the perceptions of the residents, local masons, and community leaders concerning the self-construction processes, challenge, and housing needs in the socio-cultural and economic context of the Punjabi informal settlements?
3. Which design intervention deliverables are the most reasonable and agreeable to use in enhancing the quality of self-built housing in a way that does not jeopardize cultural compatibility and community involvement in Punjabi Katchi Abadis?

Significance of the Study

The study provided a positive empirical data on the quality of self-built housing in Punjabi informal settlements filling a huge gap in the knowledge gap in the area. Participatory approach and community engaged methodology used in the study produced contextually based design intervention plans that honored practices and cultural inclinations of the vernacular. The research presented practical recommendations to policy makers, urban planners and development practitioners in the effort to offer incremental housing development in informal settlements. It has shown how architecture might be relevant in interactions with self-constructed communities, including their agency, and provide technical consultations that would improve housing standards without relocating people or implementing culturally inappropriate interventions.

LITERATURE REVIEW

The informal settlements were a world urban phenomenon that defined cities in the developing world and accommodating some one billion individuals in the world today. Historians recorded the formation of these settlements in a series of sophisticated socio-economic mechanisms that entailed poverty, rural urban migration, land tenure insecurity, and poor housing policies (Boanada-Fuchs, Kuffer et al. 2024). Studies of informal settlements are developed on the basis of earlier views in which it was perceived as a temporary issue that needed clearance before the acknowledgement of permanence and the necessity of in-situ upgrading strategies. Self-help housing became more popular with the work done by theorists who tried to oppose the traditional modes of housing provisions and tried to encourage residents to build their own houses instead of pushing them towards a top-down solution. The shift in paradigm was that low-income communities had agency resources, and indigenous knowledge that can be utilized towards housing improvement when given the right support and enabling conditions (Agyabeng, Peprah et al. 2022).

A research on the housing conditions in informal settlements has cited the numerous shortcomings such as structural instability, overcrowding, lack of water and sanitation facilities, poor ventilation, lack of natural lighting, and exposure to environmental risks (Nchor 2022). Scholars have recorded how these conditions have caused health-related issues, safety hazards, and reduced the quality of life to the residents. Nevertheless, it was also found out through scholarship that self-built housing had positive features such as flexible spatial structures and flexible household activities because of the diverse household activities, incremental construction processes that matched irregular income flows, and culturally suitable designs based on local traditions and social practices (Marutlulle 2022). Informal construction industry became a substantial part of urban economies in developing countries which employed large amounts of artisans and craftsmen who had a practical knowledge of building despite the lack of official training. It was emphasized in research that such local construction networks also need to be understood and comprehended when creating housing interventions (Hussainzad and Gou 2024).

The subject of the vernacular architecture in literature was focused on the development of the traditional ways of building in accordance with the conditions of the definite climate and the materials people could use, as well as the cultural needs and they can teach us a lot about the design of the modern times (Zong, Wan Mohamed et al. 2025). The academics reasoned that the principles governing vernacular design could guide to sustainable housing designs that were thermally comfortable, resource-efficient and culturally appropriate, without involving expensive mechanical systems and imported materials. Research that was based in South Asian settings recorded the ancient methods of construction using locally procured materials like brick, mud, and timber that proved to be environmental-wise responsible and culturally sustaining (Yang, Xu et al. 2022). The literature of participatory approaches of design emphasized the need to engage the community in the process of planning and designing the project in the way that solutions would meet the real needs and be accepted and sustainable in the long run. Engagement allowed residents to share local knowledge, voice preferences, and have an ownership of improvement efforts (Rong and Bahauddin 2023).

The history of informal settlement upgrading programs had a mixed performance, positive interventions included community involvement, step by step strategies, security of tenure, and developing simple infrastructure (Rajković, Bojović et al. 2022). Standardized solutions that did not consider the local settings, the population displacement, insufficient consultation with the local people, and design inconsistent with the livelihood or culture of the locals were the causes of failures. The scholars encouraged the contextually based interventions which took into consideration the diversity of informal settlements and did not follow the one size fits all measures (Akhtar and Rashid 2025). Research on the Pakistani situation alone has reported the spread of Katchi Abadis in large urban areas and the reactions of the government, which were demolition exercises, regularization and upgrading courses. Studies cited such issues as political complexities, land tenure disputes, poor funding and lack of technical capacity that contributed to poor interventions (Ahmed, Yar et al. 2023). The literature demonstrated a lack of empirical studies regarding the quality of self-built housing in informal settlements in Punjab and assessment of design intervention strategies that were elaborated in the participation processes among the community members and local construction practitioners. This gap was addressed in this study through detailed documentation of housing conditions, self-construction process and design solutions which was contextually suitable according to the local knowledge and the community preference.

RESEARCH METHODOLOGY

Research Design

The researchers employed mixed-method research design to explore the quality of self-built housing in informal settlements in Punjab, Pakistan.

Sampling Strategy

The researchers used purposive sampling in order to sample three informal settlements (Katchi Abadis) in three large Punjabi cities: Lahore, Faisalabad, and Rawalpindi. The selection criteria were based on the settlement age, population density and geographical location such that there is diversity in the informal housing conditions in the entire region.

Data Collection Methods

The researchers employed various data collection tools in order to obtain a comprehensive data. A survey of 150 household residents was conducted in structured questionnaires to determine the conditions of houses, building materials, and the spatial arrangements. The researchers made a systematic observation with a standardized checklist of 100 dwelling units that characterized structural integrity, ventilation, natural lighting and sanitation facilities.

The researchers used semi-structured interviews and interviewed 30 residents to understand how they self-constructed, their problems, and how they perceived housing needs in the local environment. The work also involved 10 local masons (mistris) and 5 local leaders in discussions through focus groups, who could give an in-depth insight into indigenous construction practices and socio-cultural factors that are unique to Punjab.

The researchers recorded physical indications and took photographic records of the space dimensions and the building details of the traditional brick and concrete building. Typological classification of the existing built forms was a step taken by the researchers in order to reveal the prevalent patterns and vernacular design solutions.

Design Intervention Development

The researchers came up with three design intervention prototypes which were contextually appropriate with regard to the local climatic condition, construction materials available and the cultural practices common in the Punjab settlements. Participatory workshops helped to present these prototypes to the community members and then received feedback on them to make them appropriate culturally.

Data Analysis

The quantitative data included in this study were analyzed statistically by the researcher provided by the SPSS software to determine the trends and correlations in the indicators of housing quality. Qualitative data (interviews, focus group discussions and observational notes) used by the researchers were thematically analyzed to generate qualitative insights on the experiences of the residents, their preferences, and housing needs. The combination of the quantitative and qualitative findings also helped to have a holistic picture of the quality of self-built housing and develop the right design interventions strategies.

RESULTS and DATAANLAYSIS

QUANTITATIVE ANALYSIS

Table 1: Housing Structural Characteristics (N=100)

Structural Element	Percentage
Brick walls	78%
Concrete roofing	65%
Mixed materials	52%
Proper foundation	43%
Structural reinforcement	31%

The analysis of structural characteristics revealed that the majority of dwellings utilized brick walls as primary construction material, reflecting the availability and affordability of bricks in Punjab. Concrete roofing appeared in approximately two-thirds of surveyed units, indicating a shift from traditional materials toward more permanent construction. However, less than half possessed proper foundations, and only 31% incorporated structural reinforcement, suggesting significant vulnerabilities that could compromise dwelling stability. The prevalence of mixed materials demonstrated residents' pragmatic approach to construction using whatever resources became available during incremental building processes.

Table 2: Spatial Configuration and Room Distribution (N=100)

Room Type	Average Number per Dwelling	Average Size (sq ft)
Living/sleeping rooms	2.3	120
Kitchen	0.8	85
Bathroom	0.6	45
Courtyard/open space	0.4	180
Total dwelling area	-	425

Spatial analysis indicated that dwellings averaged 2.3 living/sleeping rooms with relatively modest dimensions averaging 120 square feet per room. The data showed that 20% of units

lacked dedicated kitchen spaces, while 40% had no private bathroom facilities, relying instead on shared community facilities. The limited presence of courtyards or open spaces in only 40% of dwellings suggested spatial constraints within dense settlement patterns. The average total dwelling area of 425 square feet accommodated households averaging 5.7 members, indicating significant overcrowding conditions that affected residents' quality of life and privacy.

Table 3: Environmental Quality Indicators (N=100)

Environmental Factor	Adequate	Moderate	Inadequate
Natural ventilation	35%	42%	23%
Natural lighting	41%	38%	21%
Indoor air quality	28%	45%	27%
Thermal comfort	32%	39%	29%
Noise levels	25%	48%	27%

Environmental quality assessment revealed concerning patterns with only one-third of dwellings achieving adequate natural ventilation, primarily due to insufficient window openings and dense settlement configurations that restricted airflow. Natural lighting conditions fared slightly better with 41% rated adequate, though approximately one-fifth of dwellings suffered from inadequate daylight access. Indoor air quality emerged as problematic in over one-quarter of units, often related to cooking smoke, inadequate ventilation, and proximity to pollution sources. Thermal comfort remained inadequate in 29% of dwellings, reflecting poor insulation and limited climate-responsive design features. High noise levels affected the majority of residents due to dense settlement patterns and thin wall construction.

Table 4: Water and Sanitation Facilities (N=100)

Facility Type	Private	Shared	None
Water supply	54%	38%	8%
Toilet facilities	60%	32%	8%
Sewage disposal	45%	31%	24%
Drainage system	38%	29%	33%

Water and sanitation infrastructure analysis demonstrated that slightly over half of dwellings possessed private water connections, while 38% relied on shared water sources and 8% lacked reliable access altogether. Toilet facilities showed 60% private provision, yet a notable 32% depended on shared facilities and 8% had no access to proper sanitation. Sewage disposal presented more severe challenges with nearly one-quarter of dwellings having no proper disposal system, creating health hazards and environmental contamination. Drainage systems proved most deficient with one-third of units completely lacking drainage infrastructure, resulting in standing water, dampness, and unsanitary conditions during monsoon seasons.

Table 5: Construction Material Quality and Durability (N=100)

Material Category	Good Quality	Moderate Quality	Poor Quality
Wall materials	42%	39%	19%
Roofing materials	48%	35%	17%
Flooring materials	35%	44%	21%
Door/window frames	31%	46%	23%
Overall durability	38%	43%	19%

Material quality assessment indicated that roofing materials exhibited the highest quality ratings at 48%, likely reflecting residents' prioritization of weather protection in their incremental construction investments. Wall materials showed 42% good quality, predominantly well-constructed brick masonry, though 19% demonstrated poor quality with structural defects or deterioration. Flooring materials presented the weakest quality profile with only 35% rated good, as many households postponed floor improvements while addressing more urgent structural needs. Door and window frames showed concerning quality issues with nearly one-quarter rated poor, affecting security, weather protection, and energy efficiency. Overall durability ratings suggested that approximately 40% of dwellings maintained reasonably good structural condition despite resource constraints.

QUALITATIVE ANALYSIS

Theme 1: Incremental Construction as Economic Adaptation

Residents reported their housing constructions to be processes and not finished projects but constructed in phases because of the availability of financial resources as irregular income sources. Families would first focus on the basic structural aspects and over the course of the years or even decades, they would add more rooms, better material, or better finishes. This form of incrementalism helped the household to invest in housing without huge capital expenditures or official financing, although it led to the long-term incompleteness of construction and structural inefficiency in the cases of inadequately planned or expertly guided additions.

Theme 2: Indigenous Knowledge and Mason Networks

Local masons became the key players of mediating between the housing aspirations of the residents and the forms of constructions by tapping into the traditional construction knowledge that was passed on through the apprenticeship instead of the official education. The communities formed trusting relationships with certain mistris who knew the local construction practice, material properties and economical methods of construction. Nevertheless, interviewees said that although masons had practical experience, they did not necessarily know structural engineering concepts and building regulations or modern construction developments that could enhance the quality, safety and environmental performance of housing.

Theme 3: Material Sourcing and Resource Constraints

Local strategies of acquiring construction materials such as buying local sources, recycling of demolished building materials, borrowing construction materials via social networks, and having opportunistic sources of construction materials in times of relative financial stability were the complex strategies that residents used. The choice of materials was more

economically driven in nature and not based on taste with the families choosing the cheapest ones even at times when they knew of better ones. The participants complained that the quality of materials, prices, and availability of different materials in their jurisdictions were frustrating as it hampered their capacity to enhance the quality of houses within strict budgetary constraints.

Theme 4: Cultural Spatial Preferences and Gender Considerations

The cultural values were seen in housing designs such as privacy demands, gender segregation, hospitality, and multi-generational housing among the Punjabi people. Women especially sought the issue of privacy in cooking places, family privacy that was not shared with the guests, and safe playing and other domestic activities of children. The form of settlements in which people preferred to live in courtyarded areas which enabled them to socialize as well as have privacy was strongly exhibited but in a lot of cases space was limited in overcrowded settlements and thus these spatial designs could not be achieved. The cultural appropriateness became a bottom line to design interventions.

Theme 5: Climate Responsiveness and Thermal Discomfort

Subjects complained of extreme thermal distress in both summer heat and winter cold blaming the issue on poor insulation, improper roofing, unsuitable natural ventilation and poor shading options. The residents understood that the traditional methods of construction which the past generations used were climate-sensitive and thus the modern self-built houses did not consider this aspect because of economic factors and altering construction patterns. Community members were interested in the low-cost passive cooling and heating methods such as better ventilation design, shading systems, reflective roofing, use of thermal mass, etc that would help people feel comfortable without need to install costly mechanical cooling and heating systems or incur continuous energy expenses.

Theme 6: Community Participation and Design Ownership

Residents pointed to the fact that they wanted to be significant participants in any housing improvement programs, as well as mere beneficiaries of external-related programs that may not meet their priority needs or their cultural beliefs. The community residents proved to have an advanced comprehension of their housing issues and clearly expressed their preferences toward incremental and flexible responses, which could be used to assist the process of self-construction they pursued instead of complete replacements. The participants appreciated design solutions that they could realize over time with the help of local material and labor force, that could be maintained and changed in response to the changing needs of the household. Authentic involvement created a sense of ownership, high chances of execution and cultural fit of the proposed interventions.

DISCUSSION

The study results indicated that the dynamics of self-built houses are very complex in the Punjabi informal settlements where the inhabitants are very resourceful even though they have to work with very harsh conditions. Quantitative information revealed severe gaps in structural stability, environmental standards, and sanitation facilities which undermined their health and safety, and qualitative findings helped understand the cultural logic, economic reasoning and social dynamics supporting self-construction activities. The convergence of the two streams of data revealed the potential of design interventions that recognized the current

strengths such as incremental modes of construction, indigenous knowledge systems, and culturally competent spatial configurations and the weaknesses observed as identified through the capabilities of technical solutions that were culturally aware. The participatory approach confirmed that the most successful interventions were one that involved real community participation with local masons and residents as knowledge partners and not passive beneficiaries because cultural fit and feasibility of suggested design modifications would be achieved.

CONCLUSION

This study showed that the way to enhance the quality of self-built housing in informal settlements was to go beyond the standardized interventions and go to the context-based, participatory interventions that did not violate the vernacular tradition but provided technical improvements. The designed prototypes of the design interventions were designed to solve the key gaps in the structural stability, the environmental quality and sanitation and be low cost, culturally acceptable and built using local construction networks. The research established that architecture could interact in ways that were meaningful with self-organized communities whereby it understood their agency and used indigenous knowledge and delivered technical assistance which contributed to an increased increment in housing quality. The sustainable changes demanded the knowledge of socio-cultural, economic, and spatial dynamics peculiar to Punjabi Katchi Abadis and the elaboration of interventions based on the collaborative process with residents and local builders.

RECOMMENDATIONS

The future housing interventions in informal settlements in Punjab should be based on incremental upgrading strategies, which can be used to assist the residents in their continued self-construction processes as opposed to giving them ready-made solutions. Technical assistance programs between the communities and the architectural and engineering knowledge should be established by the policymakers with the help of which the local mason networks should be used as the main implementers. The design guidelines must reflect passive climate-responsive designs and strategies that can be implemented at low costs by making adjustments to the conventional construction practices. Water, sanitation, and drainage systems should be the main infrastructure investments to form the basis of housing improvement. The study needs to document the vernacular practices and assess the effectiveness of intervention to create evidence-based solutions to architecture without architects.

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