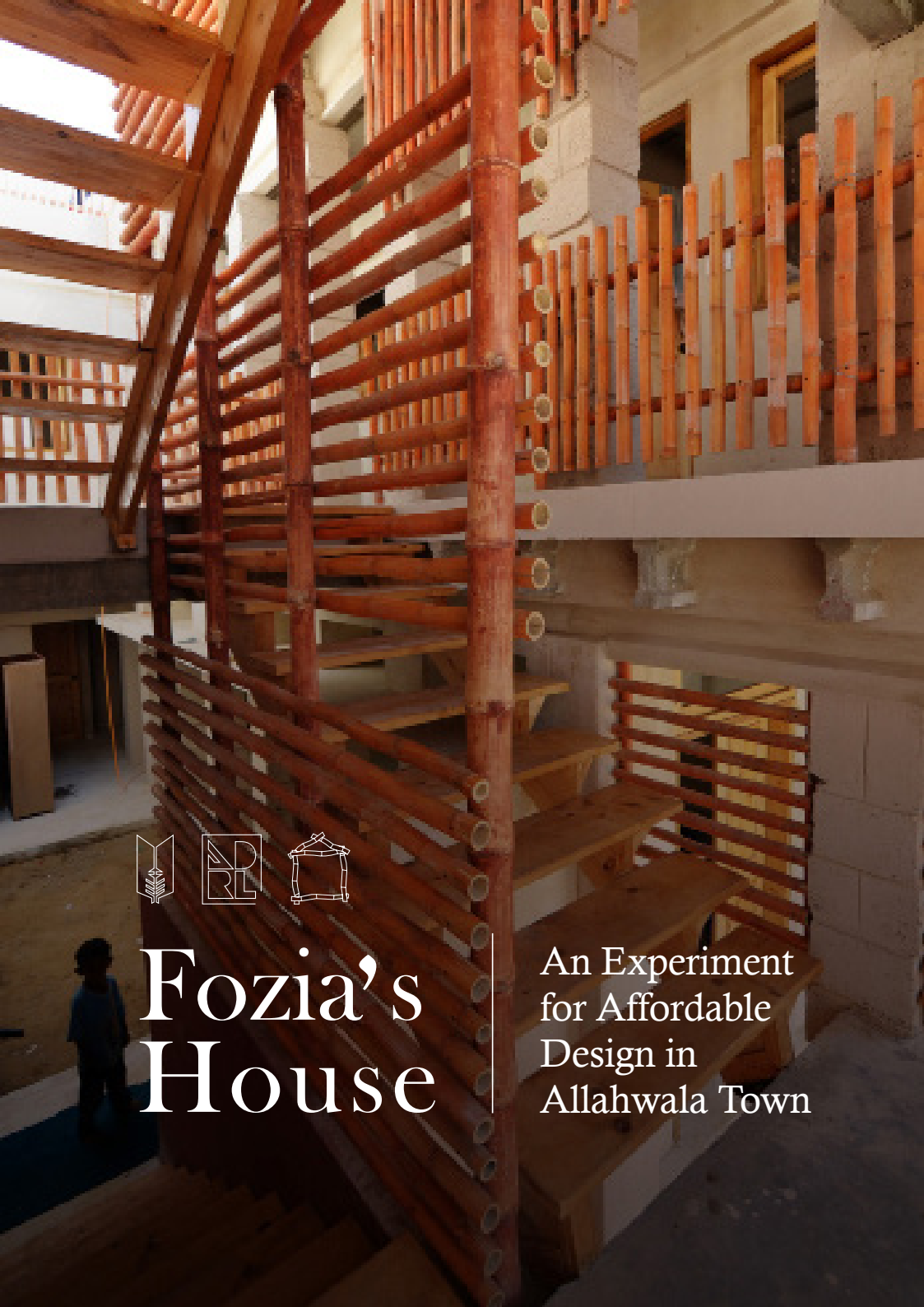

Fozia's House

An Experiment for Affordable Design in Allahwala Town

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Zohaib Zuby : 2015/16

Fozia's House | An Experiment for Affordable Design in Allahwala Town

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Fozia's House
An Experiment for Affordable Design in Allahwala Town

Fozia's House is an experiment in affordable housing for the lower-income strata of Karachi. This marginalized section of the population resides in informal settlements that are embedded in the urban fabric of the city and lack access to basic amenities including durable and efficiently designed structures.

The primary objective of this project was to build a cost effective and efficient house while thinking of communal space possibilities and intelligent infrastructure systems. Considering the contextual challenges and financial restraints, a unique house model was created where the intention was to generate funding for the project, allow for a participatory design process and apply context sensitive design strategies to ensure that the architectural output was aptly influenced by the socio-cultural and climatic context. Fozia's House is a forerunner in Research Through Design frameworks and can be seen as a precedent rendering critical lessons for building for the urban poor in Pakistan and other comparable South Asian contexts.

Location: KDA / Allahwala Town,
Korangi Industrial Area, Karachi

Area: 2160 ft^2 (2 floors)

Budget: Rs 3,738,724

Starting date: October, 2015
Completion Date: December, 2016

Output Type: Architectural Design and Construction Management

User: Fozia, her husband & her four children

Architect: Zohaib Zuby,
Project Architect: Nuvera Khatri
Structural Design Engineer: Sadaf Fatima
Student Interns: Afraz Qazi & Roohal Larik

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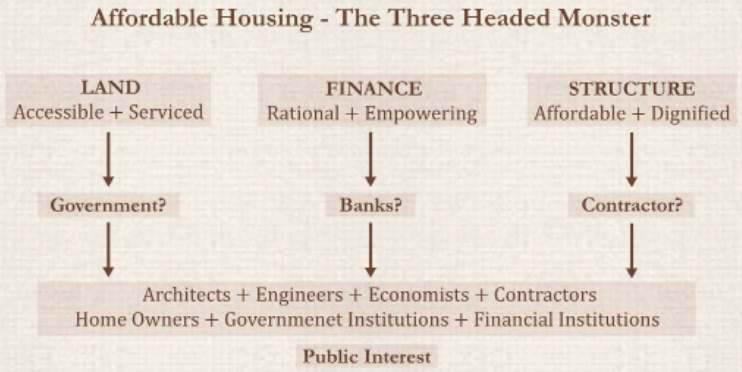

Figure 1.1

Lack of leased land by the government, limited investment in infrastructure and inadequate funding are all leading contributors to the issue of affordable housing in Pakistan

Research Background and Challenge

Pakistan faces a myriad of urban problems. Lack of affordable housing is one of these issues, where the country faces a deficit of at least 700,000 houses annually. It is estimated that in 2010, Karachi had about 600 to 800 slums that sheltered 7.6 million of the city-dwellers. The complacency of the state coupled with urban planning skewed in the favor of middle and upper classes has led to a severe crisis in Karachi. These trends should be alarming because it is estimated that by 2025 Karachi should reach a population of about 26.5 million with half its population living in slums.

The truth is that a design of a decent house/structure is only one component in the battle for affordable housing in megacities like Karachi. Lack of leased land by the government, with robust housing laws, property rights, and decent urban planning policies is a serious gap. Additionally, limited investment in infrastructure, especially in slum areas worsens the condition for those in most need of land to build. Lastly, inadequate funding/loan/mortgage services commensurate with the specific needs of the lower social class; all partake in the growth of this beast. (See Figure 1.1)

Thus, in order to actually attempt to take on this housing challenge an integrated approach is mandatory. The first effort has to be at using demand-driven finance strategies. Otherwise 'affordable housing' will almost remain an oxymoron; where housing that the poor can afford is not good enough and where it is good enough, can never be afforded. The second step is to set quests for the design of the housing unit to offer solutions for lack in infrastructure and community spaces which the context is thoroughly deprived of. If a housing unit design can also tackle these two separate issues simultaneously, there is a possibility that some solutions can be found to the severe lack of housing for the underprivileged.

Research Framework and Questions

Research Through Design essentially comprises an approach of learning by doing. And several variations of this idea have been conceptualized, like “project-grounded research”. Being primarily rooted in transdisciplinarity in operation, this has been a contentious domain because its epistemological foundations have been unclear. And this is despite the effort of the likes of Sir Cristopher Frayling, who has made critical contributions in formulating this method as an expression of action research in the design and art fields. The idea is that valuable insights or knowledge can be created by following through a question with an action which results in a tangible product, instead of pursuing an answer solely through mundane bookish research. It also informs that design practice in essence leads to solutions which are “research objectives” by nature.

Therefore, for Fozia’s architectural project this research method translates as a means to building a structure which aims to tackle the specific challenges experienced by users, like Fozia and her family, who are seeking dignified and affordable housing in informal settlements.

In this view the following can be articulated as research questions:
1. How can a demand-driven financial model be found for developing a low-cost house?
2. How can we create a unit that is timely efficient and cost effective, in terms of building?
3. How can our unit respond to inadequacies in context, specifically provide communal space opportunities, and offer some infrastructural solutions?
At the time this project was conceived,

Introducing the User and the Process

Fozia was working as house help and earned a basic wage and benefits. She had four children - all of school going age, and her husband was working a white-collar job as clerical staff at a local company. Fozia was living in a one-room accommodation at her maternal uncle’s house, for which she paid rent, but had severe problems of privacy and autonomy. The process that sparked this project was that her employer approached the architect to discuss the possibility of funding a house for Fozia’s by consolidating his Zakat* for the year.

Following through with his promise, he allocated a specific budget for buying land at Allahwala Town in the Korangi Industrial area of Karachi. This was as per Fozia’s request as it was the area where she currently lived, along with many of her family members. We found a plot very close to her maternal uncle’s house, which was ideal for her as this is where she lived at the moment. The donor also allocated a budget for the construction and the design process was kickstarted.

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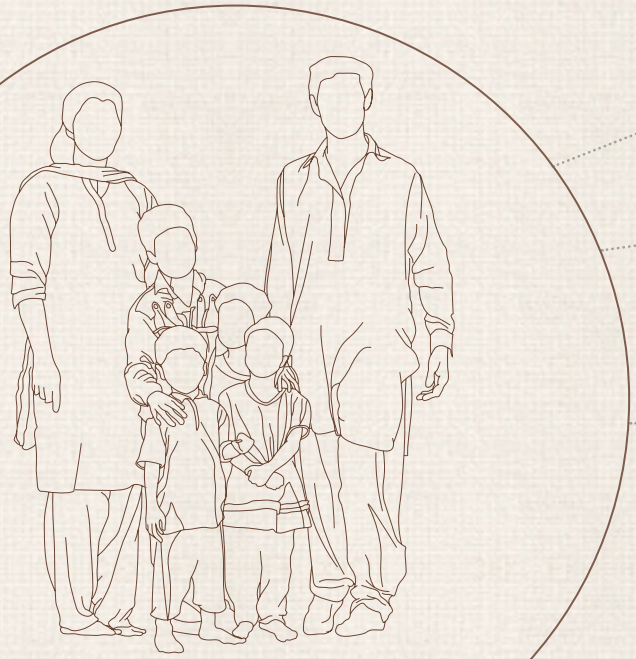
People Involved



Fozia's Family

Fozia, her husband and four children: One teenage son, two young daughters and another young son.

Users

Lal Chand & Asim Kaimkhani
Admin & Finance

Mr. X
Donor

Zohaib Zuby
Architect & Researcher

Additional Responsibilities: Setting up the Financial Model, Conducting Top Supervision & Management of Construction Activities.

Danish Zuby
Design Advisor
- Staircase

Nuvera Khatri
Job Architect/Captain

Fahim Siddiqui
Design Advisor
- Gray water

Afzal
Carpenter

Roohal Abid Larik
Site Management

Sadaf Fatima
Structural Advisor

Afraz Qazi
Site Analysis & Research

Collaborators

KDA/ Allahwala Town,
Korangi Industrial Area, Karachi

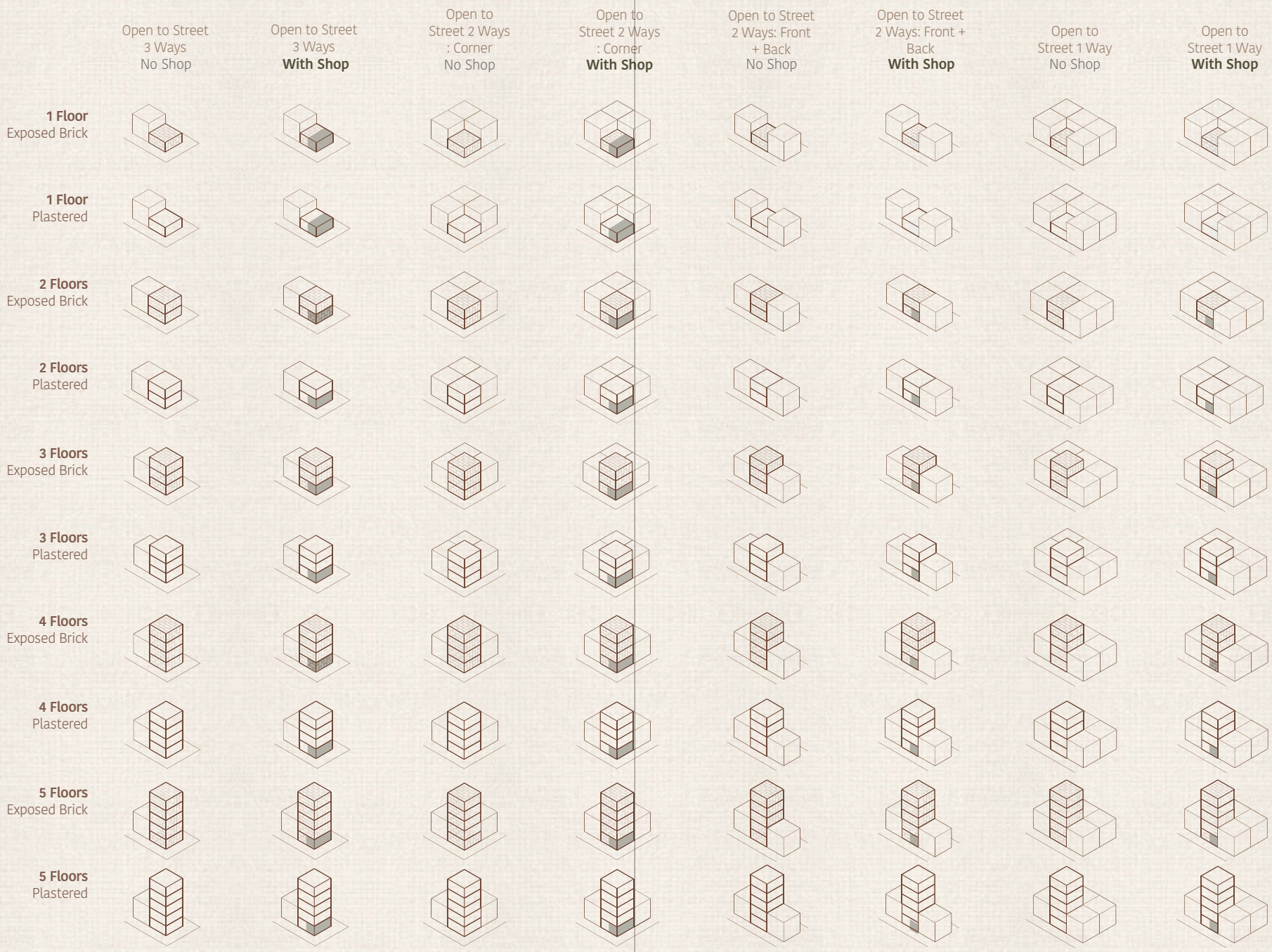
Lack of serviced land, appropriate fiscal policy and decent structural solution - all contribute to a very complex challenge in providing affordable dwellings to the masses

Introducing the Context

Allahwala Town is situated in Korangi Industrial Area, in the south-western part of Karachi. The land is legally leased through Karachi Building Control Authority (KBCA). This means it isn't technically classified as an informal settlement. However, it has little to no infrastructure and has expanded and densified over time following the pattern of an informal settlement, and lacks the basic services needed for residents to have a decent quality of life. These include carpeted roads, sewage systems, gas lines and easy access to clean water. Since the Korangi District is an industrial zone the neighborhood's air, noise, and water quality are directly impacted. The inability of the government to provide its citizens the right to essential services has led the residents to acquire an electricity connection called 'shared kunda', for which residents pay an initial amount to K-Electric Company and then a monthly bill through an electric meter attached to each house. However, no formal underground or overhead wiring systems are set for the neighborhood.

The residential plot sizes in Allahwala Town range between 60 sq yards to 120 sq yards. On investigation one can see incremental development on these plots, without any limitation on number of floors, which means that residents start building single-floor houses and continue to add more floors on top as and when they have the financial means to do so, and go up to five or six floors. Additionally, since there is no regulatory body overseeing these matters, people often build beyond their allotted land which can create serious congestion on the road network. Moreover, there is a mixed land-use within the neighborhood, where we can often see small-scale commercial activity on the ground level and residences on the floors above. The neighborhood gasps for green spaces as densification is taking over any and all open plots with time. Thus, this haphazard densification adds pressure on the broken infrastructure whereby the dwellers continue to suffer.

Allahwala Town is a mixed-ethnicity neighborhood. However, there is an apparent domination of Saraiki and Sindhi ethnicities. Fozia also belongs to the Saraiki community.



Variety of permutations possible at a semi-formal or informal urban settlement

All neighbors are shown to have two floors, only to simplify this diagram

Figure 1.2

Figure 1.3

Figure 1.4

Immediate Context

Design Process

The design process was led through two major research initiatives. The first was a detailed site survey and analysis. The second was multiple conversations with Fozia to understand her needs. Both of these exercises helped develop the framework for major design decisions.

The architect's team spent abundant time at Allahwala Town, especially around the plot purchased for Fozia. They conducted photographic surveys to identify the condition of the infrastructure, user experiences and activities in and around the plot, and state of current construction practices. There was also a thorough architectural analysis of the house Fozia was currently living in to benchmark a type for how informal settlers were building for themselves. This became pertinent also because Fozia used these premises, which could be used as a means of thinking about what the design would develop as. It was apparent that with limited resources and several people needing rooms, the houses were not able to get natural light into the center of the house. The flow of air was restricted and some ducts were left haphazardly in the rooms. Often rooms were given for rent, and the first floor usually had a staircase opening to the road, to segregate the movement from the ground floor. The analysis of the context revealed immediately that several activities of the public/ community for which we need public parks were being accommodated in the narrow streets. (See Figure 1.2, 1.3, 1.4) This included children playing, elders lounging on charpois and livestock resting under the shade of trees.

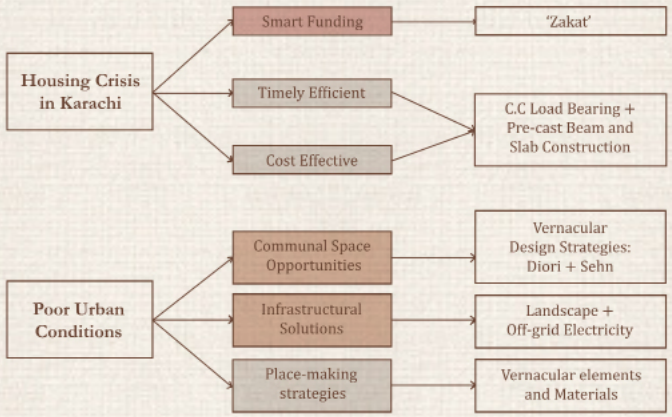
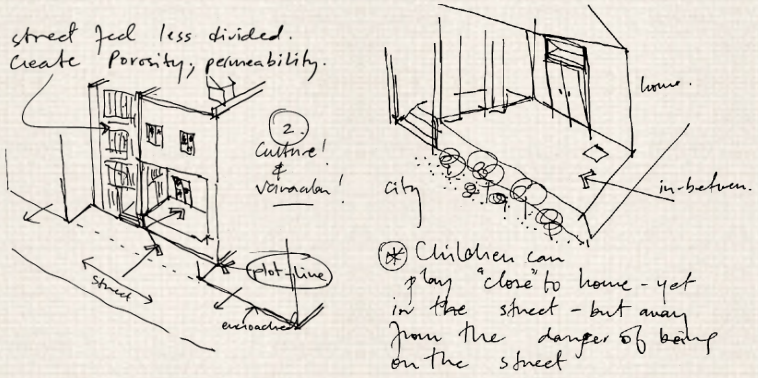


Figure 1.5

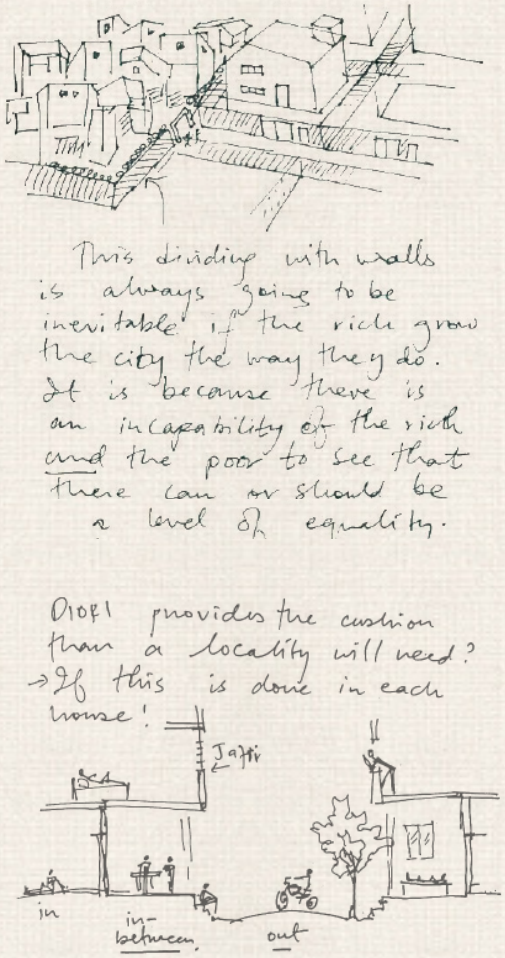


Process Sketches by Zohaib Zuby

As a result of the detailed contextual analysis a number of design ideas surfaced in brainstorming sessions. One critical idea was to make opportunities for communal/ public activities in a safer zone - by pushing back the house and creating a threshold between the road and house. Another critical idea was to organize the house around a courtyard to ease the flow of light and air in the structure, while making a double storey structure to accommodate for the large family. Both these ideas connected with vernacular housing typology from the Punjab region where a semi-open "Baramdah" (verandah) was drawn around a "Sehn" (courtyard), and which opened up into rooms. Moreover a "Diori" (threshold) was made between the road and the house to accommodate multiple communal functions like meeting with guests, play area for children, livestock space, casual lounging area, segregating men and women at larger gatherings, etc.

These ideas were discussed by Fozia in multiple meetings. Moreover she was asked to explain how she wanted her house to be, how many rooms she needed, etc. Despite the forthcoming attitude of the design team and the kind role of the donor's wife to assist in developing a communication between the design team and Fozia, there remained a kind of communication gap. Fozia was not very vocal in what she needed. She would sometimes discuss pieces of information with the donor's wife, which was relayed to the design team, but never in a structured manner. The design team made several efforts to invite her husband to come for a meeting but it never materialized. However, when the design came to a close, after multiple internal deliberations and interactions, the design team made a physical model at a large enough scale so she could study, hold it in her hand, see the spaces by lifting the slabs, and share with her family. There were no comments received by her or her family. The only person who gave some feedback during construction was her maternal uncle, who she was living with. All in all it became clear that all the effort for engagement would prove to be inadequate for a truly participatory design process model.

Figure 1.5 demonstrates how the project moved forward from research questions, identifying design challenges and arriving at the critical decisions made to tackle the problems.



Process Sketches by Zohaib Zuby

Final Design

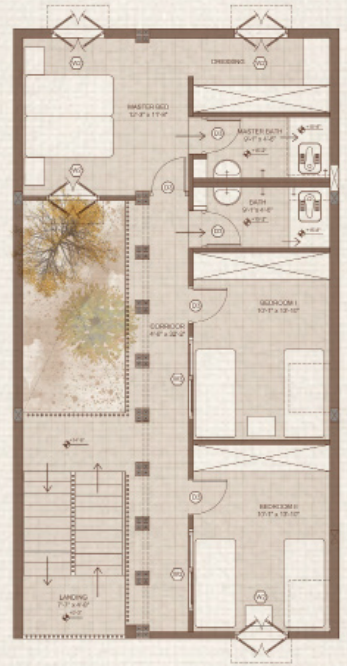
The final design was born out of multiple design iterations. Most of these iterations were done in consultation with a team of structural engineers who were kind enough to come on board for this project, as a kind of service to the community by their firm. It is with their feedback that some critical decisions were made. This included the choice of construction technology. This was Load Bearing Cement Block technology coupled with Pre-Cast Concrete Slab and Beam, easily available from the vicinity of Allahwala Town.

The final design took the shape of a vernacular organization, with a courtyard in the center, surrounded by sheltered spaces (or verandahs) which served as functional areas, like multipurpose family area and kitchen on the ground floor, and as simple circulation on the first floor. The staircase came right to the edge of the plot, following the local precedent, to enable easy movement from the main entrance. The bathrooms and kitchens were organized around one location for rational and efficient plumbing design. The ground floor housed all the main public functions, like family entertainment and utilities, whereas the first floor had three bedrooms. The roof was kept flat for additional utility and possible lightweight additions for future, if needed. Skylights were strategically organized to enable better light quality in the bedrooms and flow of air in the rooms.

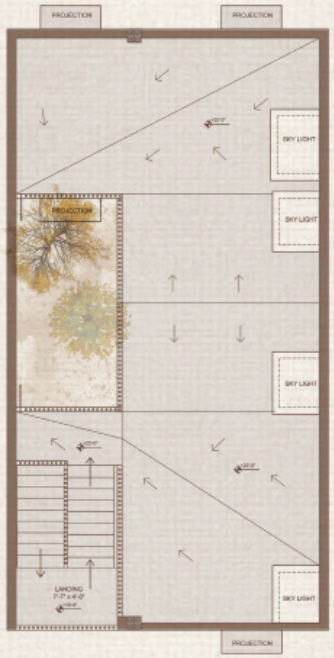
The exterior of the house was designed to have a personality which would blend in its context. The house was finished in lime plaster and vertical bamboo screens and railings hiding the staircase, made from reused pellet sourced timber. A multipurpose threshold space pushed the entrance slightly back, leaving adequate space for the family to use in multiple informal ways, especially for children to play and to organize people at larger gatherings.

Front Elevation - South West Facade

Ground Floor Plan



First Floor Plan



Roof Plan






Fozia's House Interior and Exterior Views






Fozia's House Interior and Exterior Views

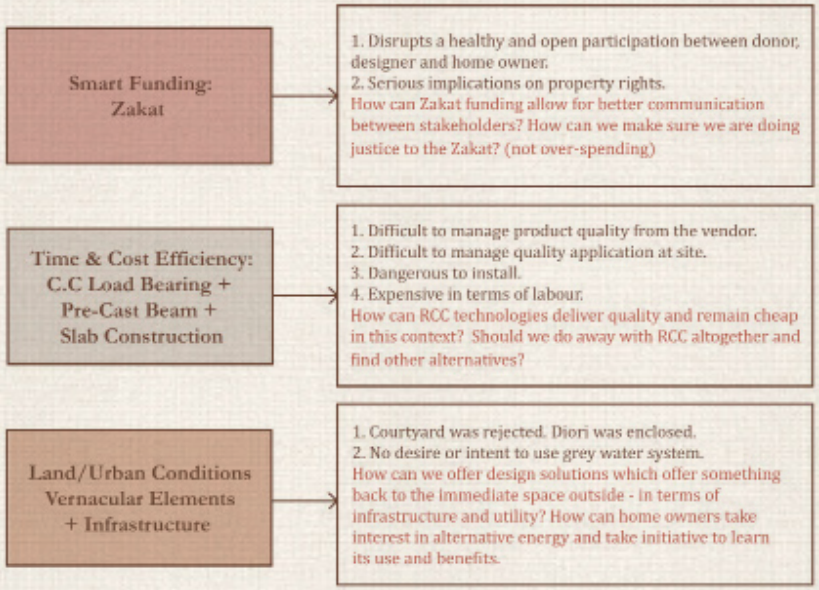


Figure 1.6

Project Roll Out and Analysis of Decisions

Although the construction commenced as per the time frame expected, there were many hurdles and challenges faced during construction. These became opportunities for learning and the methods to mitigate the errors became important lessons of the construction process.
The given table (See Figure 1.6) helps us analyze to what degree the decisions undertaken proved useful and what new questions they opened up for us.

ZAKAT AS THE METHOD OF FUNDING LOW-COST HOUSING

The most pressing need for low-cost housing is to derive a demand-driven strategy for sustainable and innovative funding. In the context of a Muslim majority society, the religious obligation to make donations in the forms of Zakat or Sadaqah* to lower-income households is an untapped potential area for investigation. For Fozia's project this became the sole funding method. Hence, in principle it proved to be a funding resource which can be scaled for other projects of a similar nature.

However, there were specific issues with the use of Zakat. One of the critical problems derived from the use of Zakat was the incapacity of Fozia and her family to voice their concerns and vision of the project. Since she was getting "something for free" she felt unable to confidently question the design decisions and construction methods. This became a serious barrier to build the participatory design process model which was the original intention of the design project. This realization became evident at the close of the project when specific changes to the house were undertaken by Fozia after completion, which the design team didn't know about.

Upon reflection it was realized that if Fozia was able to table something of value for the project, she could have found the voice of a genuine stakeholder. This could have been in the form of money (which she may have saved), property (had she owned the land where she wanted to build), labour or materials (during construction). Had she been positioned as a volunteer in the building process and 'participated' in the project, her contribution would have shaped a house more suitable to her needs from the get go. And this could only have happened if she didn't feel obligated to agree to whatever her donors (including design team) are giving her. This was the best way to mitigate the obvious power differential between Fozia and her donors. Thus, for a participatory process, Zakat shouldn't ideally fund 100% of the project.

There was a major cost overrun because of technical challenges (details of which are as follows). This put a lot of pressure on the donor's pocket, which created an uneasy situation for all stakeholders. The

build solution with a palatable budget for donors. For example, if the donor felt the user is also tabling some value (and sharing the cost) they can just play their own part to fund the project, without feeling like they have to take complete responsibility. Another way to see this is if the donors felt they only needed to contribute for one aspect, like land or construction cost or even cost of specific materials (which they may be able to source very cheaply) they would be more forthcoming to contribute without feeling the pressure of funding an entire house from scratch to completion.

Thus, the major learning is that Zakat holds a huge potential for low-cost housing. However, in order to build a truly participatory design and build process, and in order to invite donors to agreeably spend spend of housing for poor, we need to strike some balance in terms of proportion of bearing the overall cost. The users/ home owners need to contribute something of tangible value to sit at the table as stakeholders. This will enable them to feel more confident in making claims on how the design should materialize and to stop being submissive in front of donors who are from elite backgrounds. Moreover, in this way, the donors will also feel ease in donating, since they will feel the users are not getting a free ride, but are serious in the building project.

Another complication surfaced with the use of Zakat. This was connected to land ownership and its implications in terms of rights of the home owner/user. Fozia's House is not as yet in her name, although the land was purchased intending as Zakat in her name. This is because of specific legal challenges related to her nation identity, tax paying status, etc. Although these issues can be handled with some effort, there was no follow through from Fozia's side or the donor's side. The critical question from the perspective of scaling low-cost housing work is what are the ethics of apportioning Zakat donations for land purchasing. Once purchased, land takes the form of an "investment". Any house becomes a product in the market, which is affected by prevalent market trends and land value. If escalation takes place should Fozia have the right to sell "her" house (even though it is not in her name)? From the perspective of those donating and building the house, a family like Fozia's which is struggling with poor urban conditions of an informal settlement, making a house as a permanent shelter is a great relief and achievement. However, from Fozia's perspective, her family may feel the need to use the sum acquired by selling the house for other purposes, which may be more pressing than having the stability of a home. Do they have the right to move forward with such a decision? Or should donors "protect" the slum dwellers from such a step, given that women could be pressured by their husbands or

LOAD BEARING AND PRECAST CONSTRUCTION TECHNOLOGY

After a thorough deliberation with the engineering team it was decided to develop a Load Bearing design with Cement Concrete Blocks, coupled with Pre-Cast Concrete Beams and Slabs which can be used to 'put together' the house (almost like lego). This decision was made in order to save cost and time. It was considered that this system ensured very little use of steel (in comparison to conventional Reinforced Concrete Cement technology) which is an expensive element for any construction exercise. This also ensured that there will not be a curing time delay for RCC elements (of usually 14 days) and the work can continue smoothly till completion. Moreover, a specific type of column was designed with hollow CC blocks to hold the structure up from the side of the courtyard, with a steel bar knitted in between the hollow spaces. A unique construction detail was thought through to tie this to the slab above.

In order to achieve the above local "Thallas" (workshops specializing in cement products like beams and slabs) were visited and identified, which were close to the site and could be assigned the task of preparing the modules we needed. This due diligence included explaining the exact quality standards of the products needed, with drawings and verbal explanations. And after this lengthy process of due diligence and analysis, on paper we budgeted the house at Rs 1335 PSF ($12.7 PSF), and a construction time of 3 to 4 months.

Despite the hard work of designing on paper and the due diligence in sourcing materials as per our need, and detailed discussions with the construction team, there were major challenges faced during construction. At the closing of the project the construction cost came to Rs 1832 PSF and the time frame was 9 months.

Fozia's House Cost Breakdown

Property Footprint: 1080 SF
Courtyard: 120 SF
Total Covered Area: 2040 SF

TIME
Estimated: 3 months
Actual: 9 months

COST
Budgeted: Rs.1335/SF
Actual: Rs. 1832/SF

Cost of Plot: Rs. 1,300,000
Cost of Construction :
Rs. 3,740,000
Total: Rs. 5,400,000

Cost of Construction in USD:
(1:105) = 35,620
Cost in USD: 17.4/SF

Cost of Plot: Rs. 1,300,000
Cost of Construction :
Rs. 3,740,000
Total: Rs. 5,400,000

Cost of Construction in USD:
(1:105) = 35,620
Cost in USD: 17.4/SF

		Budget	Actual
Structure			
	Cement	189,000	309,647
	Steel	88,000	67,878
	Steel Binding	-	10,500
	Raiti	100,000	118,500
	Blocks	337,950	286,100
	SBR	-	6,060
	Wire mesh	-	25,990
	Welding	-	10,000
	Steel Works by Imtiaz Steel Works	-	21,000
	120 Bags of Lime	-	35,000
	Bitumen	-	15,380
	Crush	-	16,000
	Soakpit	-	18,000
	Soil	18,000	18,000
	Soiling	18,000	21,000
	Precast Slaps & Beam	324,960	283,442
	Bricks for Kitchen	-	18,000
	White Cement for Mosaic	42,500	73,130
	Dana for Mosaic	20,000	62,000
	Polish for Mosaic	45,024	36,000
	Main Door	20,000	2,750
	Paint	50,000	8,641
	Labour for Paint	20,000	15,000
		1,273,434	1,478,018
Labour			
		420,000	987,657
		420,000	987,657
Wood Works			
	Wood Works	300,000	109,270
	Afzal Carpenter	-	195,950
	Glass Works	-	30,000
	Bamboo Works	-	65,900
	Polish Works	-	37,740
	Indus Valley	-	59,220
		300,000	498,080
Electric Items			
	Labour	40,000	20,000
	Electric Items	220,000	133,689
		260,000	153,689
Plumbing			
	Labour	60,000	46,000
	Sanitary Items	123,468	82,139
	Mono Block Motor 2	12,000	24,500
	Water Tank	7,000	20,500
		202,468	173,139
Miscellaneous			
	Sui Southern Gas Connection	45,000	45,000
	K-Electric Connection	20,000	10,090
		65,000	55,090
Running Expenses			
	Architect & Supervisor Salaries	84,000	252,395
	Water Tankers	45,000	54,000
	Petrol	5,000	6,060
	Internet Device & Expenses	-	5,315
	Petty Expenses	69,500	75,281
		203,500	393,051
Total Construction Cost		2,724,402	3,738,724

Figure 1.7

The expense sheet (See Figure 1.7) clearly reveals that the most costly element was the labour. The Load Bearing and Precast system turned out to be extremely strenuous in terms of labour time of construction. The cement blocks used for the foundations turned out to be tedious to build with, and time consuming in comparison to what could have been In-Situ RCC construction. Additionally, the unique details developed for knitting a steel bar in between stacked hollow blocks, and stitching it to a precast slab were difficult to understand by the labour, which resulted in faulty construction and repair work.

The most challenging moment was the realization that the precast slabs delivered to the site by the Thalla were of very poor quality. After the first floor slabs were put up through cranes, it was immediately observed that they were developing cracks. The design team were notified by Fozia's maternal uncle who had been visiting the site often to see the progress of work. Upon a detailed inspection by the design team we realized that the slabs were not made according to the specifications we had given to the vendor. Moreover, it becomes apparent that there would be no way to replace them. This is because of the cumbersome method of putting them together as well as the specific socio-cultural context of the slum where we were working. The only solution left was to add additional beams in between the span of the slab. This operation was tedious to manage, dangerous to execute and became expensive despite all our best efforts. However, it solved the problem. The impact came directly on the cost and time duration of the project.

We had also decided to use Lime Plaster for finishing, in keeping with our vision for environment friendly materials and application techniques, where possible. Once again, the specific time for preparation, curing, application and maintenance of Lime Plaster proved to be more costly in comparison to what could have been achieved with regular cement plaster.

All in all, it became apparent that load bearing technology, with precast systems, used with intelligently designed details and joinery is more time consuming and hence costly in front of conventional RCC technology. We were not able to claim a substantial decrease in carbon emission for our house, nor were we able to develop the house as a kind of proto-typical structure with resolved technical details which can be emulated. Therefore, the major learning was that if there was something more cost-effective in comparison to RCC, then that would be the norm. Hence, RCC is still the most cost effective, if used intelligently.

Another aspect which became a tangible hurdle in the project was the fact that the contractors and vendors

(Dec'2016)

(Jan' 2021)

need so much "effort" to build. This was a unique bias which was not expected and the design team was unequipped to address it. Although we couldn't manage to change their hearts, we had to negotiate with them, and convince them to offer the best possible quality despite everything. This sentiment certainly contributed to the delay of the work, and hence, costs.

REVIVING VERNACULAR ELEMENTS AND GREEN TECHNOLOGIES

Although the overall design of the house, the layout of spaces, etc. was all thoroughly communicated with Fozia, there was an ambivalence with regards to how she and her family felt about these major decisions. For example, there was no clarity on whether they saw the courtyard as a 'waste of space' or as an essential part of their utility at home. Likewise, the design team did not know how the threshold was perceived. Was it seen as a space which was dangerously left unattended and wasted; or if it would serve their activities/needs in view of the wider context of the street with her neighbors and family which functioned as her social capital.

The design team heard whispers of some discomfort with the courtyard and threshold but nothing which could be used as a data point to investigate or use for design alteration. Even Fozia's maternal uncle, who did communicate more freely with the design team than any of Fozia's family members did not offer any critiques or suggestions regarding these spaces. However, after completion of the project and at the time Fozia was shifting in, without notifying the design team, Fozia's husband erected a wall to cover and enclose the threshold space. This wall badly affected the quality of light entering the main family space inside. Moreover, it was done with no plan except for simply erecting a wall. For example, the space could have easily been curated to make a small shop opening to the road, which has a wide precedent in the vicinity. This sudden construction did well to prove to the design team that not only did Fozia have some resources to invest in the project, the initial design did not reflect the vision and utility of the family. And it became evident that the design team needs to learn how to develop a better rapport with the home users.

There was a great deal of use of bamboo for developing screens. This is a green material, easily accessible and cost effective to build with. However, bamboo proved to be a material that needs maintenance. Over time bamboo railings and screens were badly affected by weathering. Also as a house with young children, bamboo was susceptible to damage by 'play'. This also came as a surprise. Although the material was great to build with, and 'green' - it did not

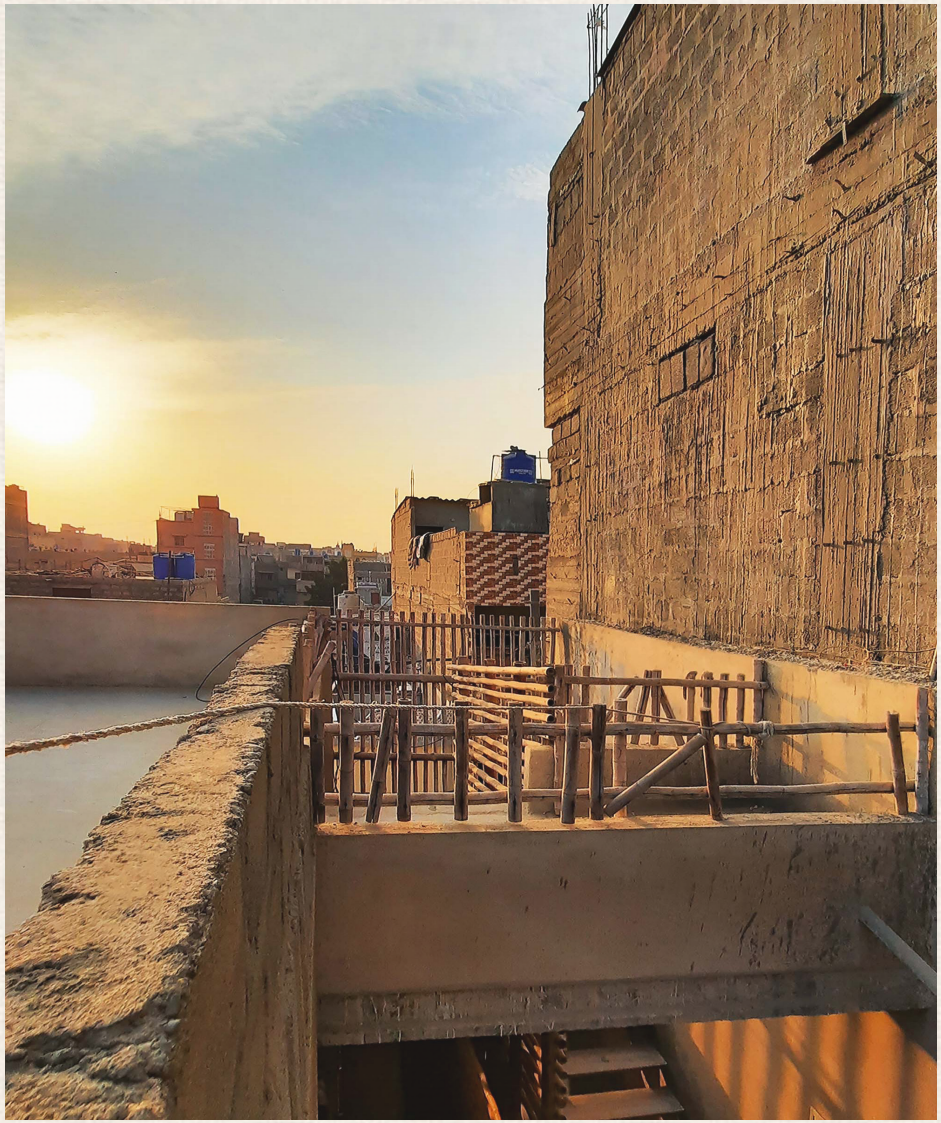
(Dec'2016)

(Jan' 2021)

project. Thus, it is of critical importance to try to make the house robust and as maintenance friendly as possible.

The design team went through a lot of effort to develop a grey water system. This became pertinent since we were going to dump all the waste into a septic gutter made specifically for the house. Treating the waste before dumping it was technically efficient. The design team went through the effort of explaining to Fozia how the water can be reused for greening the courtyard and adjoining spaces within the vicinity. Although the information was cordially received, there was no effort made by her or the family to use the grey water system. The courtyard remained empty and the single tree planted at the time of hand-over was also lost over time. The courtyard remained a dusty negative space of the house over time; a place which was like an extended 'storage' space where things would get piled up or dumped.

All in all we can say that the use of vernacular organizational elements and green technologies and materials remains an important avenue to explore, despite the minimal utility by the Fozia's family. It may be that the courtyard and threshold have minimal utility in terms of their activities, they remain useful in the organization of the entire house and render the entire spatial arrangement with light and air as expected by the design team. However, the most important realization is that the design of the house and the selection of materials needs to be done with a complete buy-in from the users. In case the users are not happy with something, there is a need to communicate with them, to explain the technical aspects and the utility which they might not be fully aware of themselves. This negotiation and deliberation is what chisels the final design into a nuanced livable home. This communication is critical to organize spaces closer to the needs of the users and attend to the aspirations of the design team.



Conclusions and Lessons for Future

Fozia's House was conceived as an experiment in low-cost housing for the underprivileged living in semi-formal and informal settlements of Karachi. The severe lack of housing stock, and the derelict condition of the informal settlement makes it an absolute necessity for the designers and engineers fraternity to step up and attempt to apply their mind to offer solutions to this challenge, which not only needs input in the design of structures, but also finance and infrastructural limitations.

Fozia's house can best be framed as a Research through Design project, whereby the act of design and construction became the intentional means of answering the fundamental questions of how we can house the poor, with some arrangement of sustainable finance, in a place which has severe infrastructure challenges. This project, from beginning to end, was able to render very critical fruits to our inquiry.

Fozia's house was conceived to be completed at Rs 1335 PSF (approx.) with an estimated time of completion of 3 months. However, the project did not come close to these targets. The time duration increased threefold to 9 months and the cost escalated to Rs 1832 PSF. The total budget came to Rs 5.4 M which included the cost of the land. It is therefore of paramount importance to lend a close ear to the learnings of the project in order to strategize for any future projects of such a nature.

If we think of Zakat as a source of Zakat as a sustainable funding for housing development for the underprivileged, it has immense potential as this is a resource which is renewed each year by the elite and distributed with the intention of serving the underprivileged. However, the most appropriate utility of this fund will be to use it as a portion of the funding of the homes to keep a manageable contribution from willing donors, and to empower the home-owners/users for whom it is critical to contribute value in any form possible for them.

In terms of building and construction technology, the most critical learning is that conventional RCC stands tallest in terms of ease of construction, speed of construction, durability and cost-effectiveness. Any form of experimentation in materials and technology will not be useful unless it can outmatch RCC in terms of its timeliness and cost effectiveness. This is despite the fact that RCC technology uses steel and cement, which are materials that do not offer the best carbon footprint. In an ideal setting, the design and engineering fraternity should be using other materials which are more environment-friendly. However, especially for the informal settlement context, building in anything except RCC means increasing their vulnerability in terms of expected capital appreciation of a

despite the technical challenges, there is a low value of the house in comparison to a neighboring house made in RCC. In principle, the aspiration of the slum-dwellers is to emulate the form and conditions of formal settlements. And in the formal areas RCC is the norm. Thus, this poses a question of ethics. Should the formal-settlement dwellers come to the informal settlement, make donations and design in technology which they do not chose for themselves, or should it be the same? For the design team of Fozia's house, the answer is absolutely not. If we are to dream of a city where the fault lines between the slums and formal settlements should go away, then the materiality must be uniform. This complies with the aspirations of the slum-dwellers as well.

The urban context of an informal settlement is often quite uncomfortable. It is clear that every housing unit has the potential to house the informal-dwellers, while simultaneously creating resources for recycling water, growing food, having open air spaces for multiple communal activities, generating energy and offering some space for commercial utility. Luckily, this potential is available in these informal settlements, which is unavailable in formal settlements because of their rigid laws. In case a healthy participatory design process can be instrumented, and home owners/ users can work with the design team and other associated specialists, like energy providers, engineers and professionals, there is no doubt that a housing unit can be developed which handles several of the discussed limitations. Notwithstanding, some fundamental things will always remain under the responsibility of the government, like building roads, keeping public spaces available, clean and open for use. In Fozia's house design, although some of these solutions were dreamed, deliberated on and attempted to be given tangible shape, they were not fully endorsed by the family. This led to underutilization and in some cases, wastefulness. The critical learning then is to invest abundant energy in developing a participatory design process, mutual sharing of aspirations for the project and arriving at a balanced and nuanced design solution.

Fozia's House, though not the best example in terms of meeting the expectations it set out for, has been able to render some critical lessons which can be used for future work in low-cost housing for slum dwellers by designers and donors. Moreover, there is no doubt that additional design and build of such projects will offer their own fruits of knowledge and lessons. Fozia's house, hence, can best be seen as the first iteration which is asking for more work.

Glossary

Baramdah
Verandah; an open air, roofed space attached to the interior of a building. Similar to a balcony but located on ground level connecting to the courtyard.

Diori
Diori is a traditional Punjabi architectural element which acts as a threshold space between the house and the street, offering multiple social functions.

Jafri
a locally-practiced jali design in which a rhythmic pattern is carved out of a flat, normally wooden, panel.

KBCA
Karachi Building Control Authority (KBCA) is a wing under Sindh Building Control Authority (SBCA). It is the official supervisory body established to regulate building plans and NOCs in accordance with the proper Building & Town Planning Regulations.

K-Electric
Formally known as Karachi Electric Supply Company (KESC), K-Electric is a Pakistani power utility responsible for the generation, transmission, and supply of electrical power to all consumers residing in Karachi, Sindh, Pakistan.

Khairat
Urdu word for 'alms'. It refers to the notion of "donating money and other form of goods to the poor"

Kunda
Kunda - Local term referring to the act of rewiring and redirecting an amount of electricity from nearby transformers to a separate outlet outside of the electric grid system. Normally used by houses that are not officially wired to the main grid as a substitute for electricity usage.

Sadaqah
The literal meaning of the word is 'righteousness'. It refers to the Islamic concept of voluntarily offering aid (usually refers to monetary goods) to another with purely the intent of pleasing Allah and to not expect nor ask for any gesture in return.

Sehn
Courtyard; a space open to sky while being partially or fully walled

Zakat
'Zakat' is a sacred obligation in Islam. Muslims have to invest 2.5% of their annual savings for the betterment of the livelihood of lower-income individuals.

Endnotes

1. Shaikh, H. (2016). Housing inequality in Pakistan. International Growth Center, www.theigc.org.

2. Shaikh, H. (2016). Housing inequality in Pakistan. International Growth Center, www.theigc.org.

3. Gazdar, H., & Mallah, H. B. (2011). Housing, marginalisation and mobility in Pakistan: residential security as social protection. CSP Research Report 04, Center for Social Protection.

4. Davis, M. (2006). Planet of Slums. Verso.

5. Jabeen, A., Sheng, H. X., & Aamir, M. (2015). Housing Crisis in Pakistan: Review of Population Growth and Deficiencies in Housing Laws and Policies. International Journal of Sciences: Basic and Applied Research: Vol. 24, No. 3, 323 - 427.

6. Mumtaz, B. K. (2014). Affordable Housing: Chimera or oxymoron? DPU60 Working Paper Series: Reflections No. 164/60, Development Planning Unit, UCL.

7. Frayling, C. (2015). Provocations at RTD 2015, www.vimeo.com/129775325. (A. Durrant, & J. Price, Interviewers)

8. Dorst, K. (2016). Design practice and design research: finally together? Future-Focused Thinking (pp. 1 - 10). Brighton, UK: Design Research Society.

Bibliography

Aravena, A. “Visions of the Future.” Architectural Record, (September 2016). 140 - 144.

Brown, T. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. HarperCollins Publishers, 2009.

Ceulemans Nick, T. L. “Research Through Design by Action.” in Learning from the Real (Antwerp: Theory by Design Conference, 2012), 447-453.

Davis, M. Planet of Slums. Verso, 2006.

Dorst, K. “Design practice and design research: finally together? Future-Focused Thinking.” Brighton, UK: Design Research Society, 2016. 1 - 10.

Findeli, A. “Introduction.” Design Issues 15, No. 2, (1999): 1-3.

A., Brouillet, D.; Martin, S.; Moineau, C.; Tarrago, R. “Research Through Design and Transdisciplinary: A Tentative Contribution to the Methodology of Design Research,” in Focused: Current Design Research Projects and Methods (Berne, Switzerland: Swiss Design Network, 2008), 67 - 91.

Frankel, L.; Racine, M. “The Complex Field of Research: for Design, through Design, and about Design,” in Design and Complexity (Montreal, Canada: Design Research Society, 2010), 1 - 12.

Fraser, M. “Design Research in a Globalized Age.” Architectural Design Research Symposium. Venice: Victoria University of Wellington, 2014. 24 - 28.

Frayling, C. “Research in Art and Design.” Royal College of Art Research Papers 1, (1993/4): 1-9.

Frayling, C. Provocations at RTD 2015, www.vimeo.com/129775325. (A. Durrant, & J. Price, Interviewers)

Gardezi, H.; Mumtaz, S. “Globalization and Pakistan’s Dilemma of Development.” The Pakistan Development Review 43, No. 4 (2004): 423-440.

Gaver, W. “What should we expect from Research through Design.” Critical Perspectives on Design. Austin, Texas: CHI, 2012. 937 - 946.

Gazdar, H.; Mallah, H. B. Housing, marginalisation and mobility in Pakistan: residential security as social protection. CSP Research Report 04, Center for Social Protection, 2011.

Ghaus, A.; Pasha, H. A. “Magnitude of the Housing Shortage in Pakistan.” The Pakistan Development Review 29, No. 2 (1990): 137-153.

Godin, D.; Zahedi, M. “Aspects of Research through Design: A Literature Review.” Design’s Big Debates. Umea, Sweden: Design Research Society, 2014.

Hamdi, Nabeel. Housing without Houses. New York: Von Nostrand Reinhold, 1991.

Hasan, Arif . Housing for the Poor: Failure of Formal Sector Strategies. Karachi: City Press, 2000.

Jabeen, A.; Sheng, H. X.; Aamir, M. “Housing Crisis in Pakistan: Review of Population Growth and Deficiencies in Housing Laws and Policies.” International Journal of Sciences: Basic and Applied Research 24, No. 3 (2015): 323 - 427.

Koskinen, I., Zimmerman, J., Binder, T., Redstorm, J., & Wensveen, S. Design Research through Practice: From Lab, Field, and Showroom. Morgan Kaufman Elsevier Inc., 2011.

Kovac, Tom. 100 YC [100-Year City]. Log, no. 27 (2013), 43 - 49.

MASS. (2016, December). About. Retrieved from Mass Design Group: www.massdesigngroup.org.

Mumtaz, B. K. “Affordable Housing: Chimera or oxymoron?” DPU60 Working Paper Series: Reflections 60, no. 164. Development Planning Unit, UCL (2014).

Schoenauer, Norbert. 6000 Years of Housing. New York(?): W. W. Norton and Company Ltd., 2000.

Shaikh, Hina. “Housing inequality in Pakistan.” International Growth Center. 2016. www.theigc.org.

Short, C. Alan. “What is ‘architectural design research’?” Building Research and Information 36, no. 2 (2008): 195-199.

Siddiqui, Tasneem. “Housing for the Low-income.” Policy Brief Series - Pakistan’s Urbanization, Woodrow: Wilson Center, 2014.

Swann, C. “Action Research and the Practice of Design.” Design Issues 18, (2002): 49-61.

Verbeke, Johan. “Developing Architectural Research through Design.” Conference Architectural Inquiries. Gothenburg: 2008. 1 - 11.

Zimmerman, J., Forlizzi, J., & Evenson, S. “Research Through Design as a Method for Interaction Design Research in HCI.” Research Showcase. Carnegie Mellon University, 2007.