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Brooks World Poverty Institute

A survey of the built environment in two Dhaka bustees: Lotabel and Shandekka

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Creating and sharing knowledge to help end poverty

Abstract

Two low-income settlements in Dhaka, Bangladesh, are surveyed – one is publicly owned, and one is privately owned by a local influential person. Taking both a macro and micro perspective, the built environment of the two settlements is examined and compared, in terms of materials, the evolution of housing, space and land use patterns, zoning, access pathways and climate change impact. The survey finds that residents of the publicly owned settlement experience greater flexibility in terms of ability to adapt and innovate in their living space, and have a greater sense of belonging. Residents of the privately owned settlement were found to be more restricted in many ways and to lack a sense of belonging. The characteristics of the land also affect the built environment in both settlements.

Keywords: Dhaka, built-environment, public low-income settlement, private low-income settlement, bustee environment, Bangladesh

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Introduction

In this study, the stories behind two different low-income settlements were researched. Both settlements are situated in Dhaka, but have different characteristics. One is overly dense, with lesser community facilities and the other one is less dense, resembling the characteristics of a rural Bangladeshi settlement. Lotabel settlement is public and Shandekka settlement is privately owned by a local influential person.¹ Each low-income settlement has its own characteristic development.

An elaborate study on built environment, taking both a macro and micro perspective, is presented in this report. It focuses particularly on housing materials, the process by which housing evolves, space utility and land use patterns, zoning, access pathways, the impact of climate change on dwelling uses and living conditions.

According to the analysis, Lotabel, the public settlement, has more flexibility in terms of space making and use. People have a deeper sense of belonging, due to having lived here for a longer period and being able to have flexibility in terms of changes in households. They have a greater tendency to explore new housing and recycling materials, innovate sustainable ways of re-creating green spaces, consider climate, and use multiple ways of creating common spaces.

On the other hand, in the private settlement, Shandekka, residents are restricted in many ways. Community facilities are insignificant here; there is minimal opportunity to change materials and a non-flexible space pattern has failed to create a sense of belonging among people.

The basic character of the land has a visible effect on the built environment and structure of both settlements. One is developed around a water body and a field; the other is developed on water, mostly on marshy land. There are significant differences between the two in terms of building materials, space usage, activities, and the nature of climate impact due to land characteristics. This survey was undertaken through intensive study, staying a number of days in the settlements, talking with the inhabitants and observing daily activities.

¹ We changed the actual names of these settlements to ensure anonymity.

Lotabel low- income settlement

Site location

Lotabel low-income settlement is located in Dhaka, the capital of Bangladesh. It is mainly placed in Mirpur, an area in the northeastern part of the city. The whole neighbourhood of the settlement is in the compound of the House Building Research Institute (HBRI) of the Bangladesh government.



Settlement description

The settlement is situated in the compound of HBRI, where there are offices and staff houses. One can enter the settlement through the road from the HBRI office or a road opposite. The settlement is located on the west of a big field. The pond positioned to the south ensures a good amount of southern breeze, and is a good source of fishing. Although it serves as a positive point in the site, the worst impact of the pond is waterlogging.

Lotabel settlement is comparatively less dense and cleaner than other low-income settlements. Most of the houses are one-storey buildings; there are one or two visible two-storey buildings.. The main building materials are corrugated iron (CI) sheets, brick, bamboo and bamboo mat. Most community activities occur around the field and in the pathways. There are many kinds of shops to meet residents' daily requirements. The settlement is divided into areas such as 'Liberation war Barak' and 'Differently abled area'.

Map of Lotabel settlement



Access paths

The main access pathway to Lotabel low-income settlement is from the east side – that is from the field. It is then divided into several secondary pathways. The main paths are paved, and the rest are 'Kacha' (not paved) paths. The settlement has high permeability. The paths in the differently abled side of the settlement are paved for universal accessibility. As this settlement has been randomly extended, people have made their own pathways, according to their needs. Many activities can be seen taking place in these pathways.

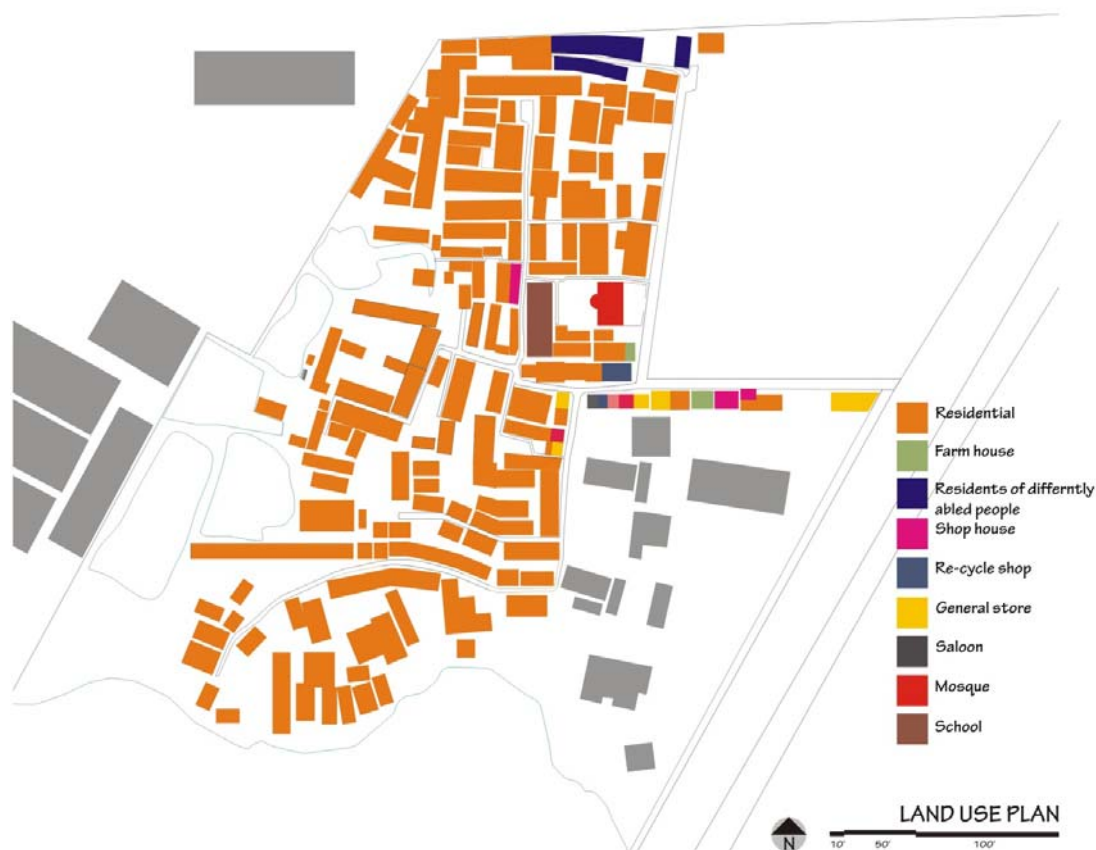
Access pathways. Lotabel



Land use pattern

Lotabel settlement is used mainly as a residential zone. A mosque and a daycare school, with some local general stores, tea stalls, shop houses, a firewood shop, a recycled material shop, etc., are located in the neighbourhood, mainly along the edge of the field. There are some houses built on government-allocated lands for families of freedom fighters killed during the war of independence, and some houses are provided for differently abled people. The large field provides an opportunity to the people of the community to use it as a playground, or for keeping pets and cattle, parking rickshaws and so on. The water body is gradually being filled by buildings as the settlement extends, mainly in the western part of the settlement.

Land use in Lotabel



Land-use intensity

The settlement is less dense along the water body. The deeper part of the settlement is fairly densely built up, with a narrow aisle and a continuous growth pattern. Free pockets of space are being filled with small extensions over time. The western part of the water body is being filled with new houses and pathways.

The houses along the water body and field have more natural air and ventilation than those in the denser deeper part of the settlement. This density of building means many of the houses are very damp and dark, creating unhealthy living conditions. Many activities, like cooking, drying clothes, playing, etc., take place along the pathways at different parts of the day.

The whole settlement pattern is continuous. New structures like kitchens or two-storey houses are constructed very quickly. If a visitor returns to the settlement after a period of only two or three weeks, they will find it has changed. It is becoming denser, phase by phase, within a very short time period.

Space and building density within Lotabel



Green spaces and water

Lotabel low-income settlement benefits from the positive feature of a water body. As this is located in the south, it provides a great amount of cooler breeze. Aside from the bigger pond, other ponds are being filled up to build houses.

There is not much grass growing on the big field, but there are large trees which provide shade. In other areas of the settlement there are some trees, though not enough. Rather than planting large trees, residents try to grow vegetation for food.

Map of Lotabel showing green spaces and water



Waterlogging

Although the water body provides some advantages, it brings disadvantages too. Since the boundary wall was made on the west of Lotabel, waterlogging has become a major problem. During monsoon season, this problem increases, due to heavy rain, and most of the houses are flooded. Outside of the monsoon season, some areas still remain waterlogged.

Areas of waterlogging according to season

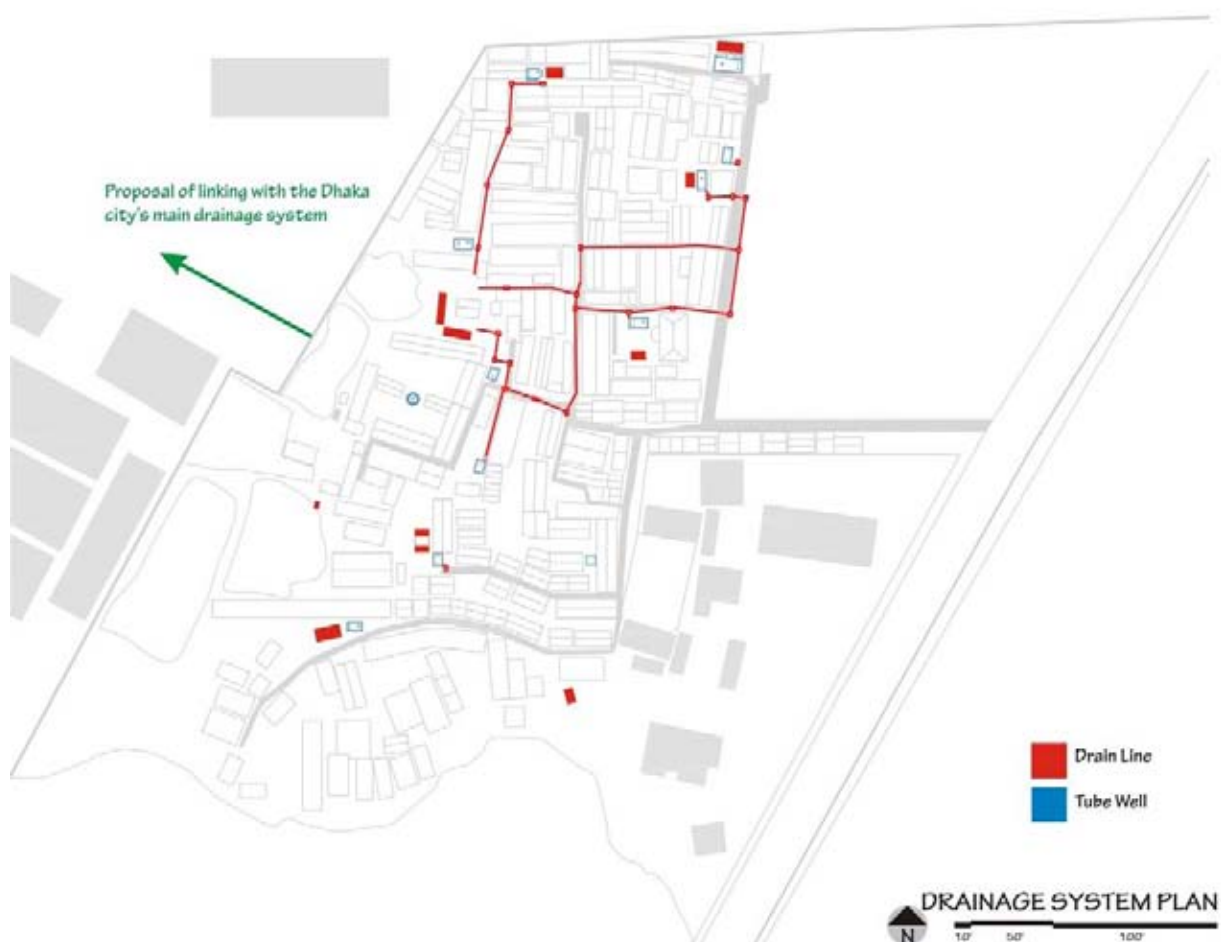


Drainage system

All branches of the drainage system end up in the western part of the water body, since it is on the lower ground level. Although some parts of the settlement have a drainage system, it does not work properly, due to inappropriate use and a lack of proper maintenance. The drains are jammed and people sometimes use the pits as a dustbin. The outlet of the whole drainage system makes the environment unhealthy, as its opens beside the residential area.

As the water body adjacent to this settlement is on the lowest ground level, rainwater from the eastern part flows into it. Water overflows, as it is not connected to the main city drainage system. There are plans to connect this water body to the city drainage system (see below) , in order to prevent waterlogging in that area.

Existing and proposed drainage system

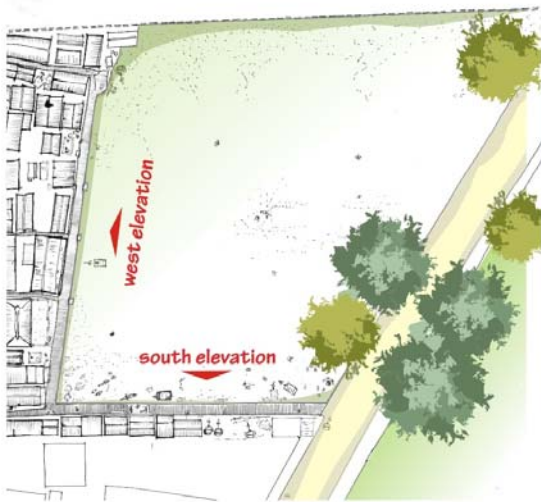


Community space

Field

The field is a good activity-generating community space. Since there is a lack of open space, the field acts as a great relief for people to pass time. Generally children play here, and occasionally various types of fair take place here. In summer, people sleep in the field, due to frequent power outage load-shedding.

Over time, the function of this field changes. Sometimes it becomes a garage for rickshaws and three-wheelers; sometimes it provides a home for pets and sometimes it is just a space for relaxing.



Views of the field



SOUTH ELEVATION

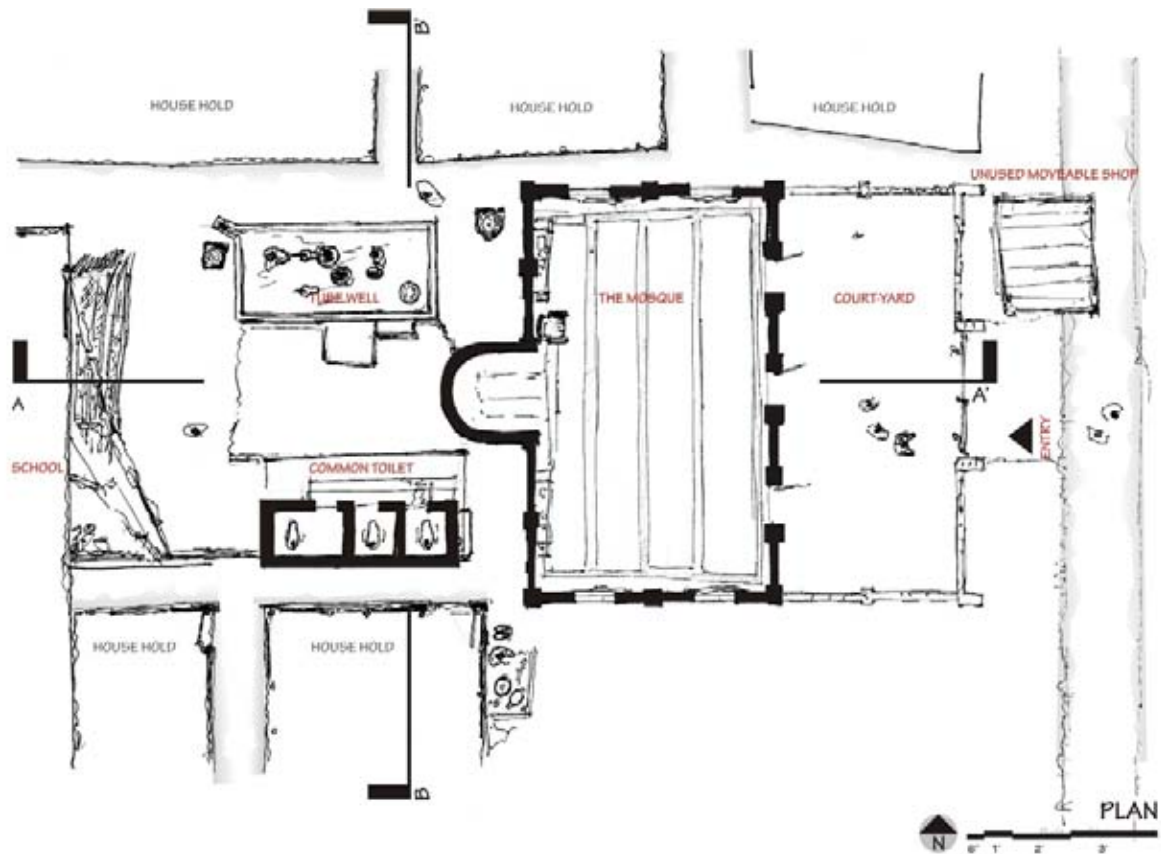


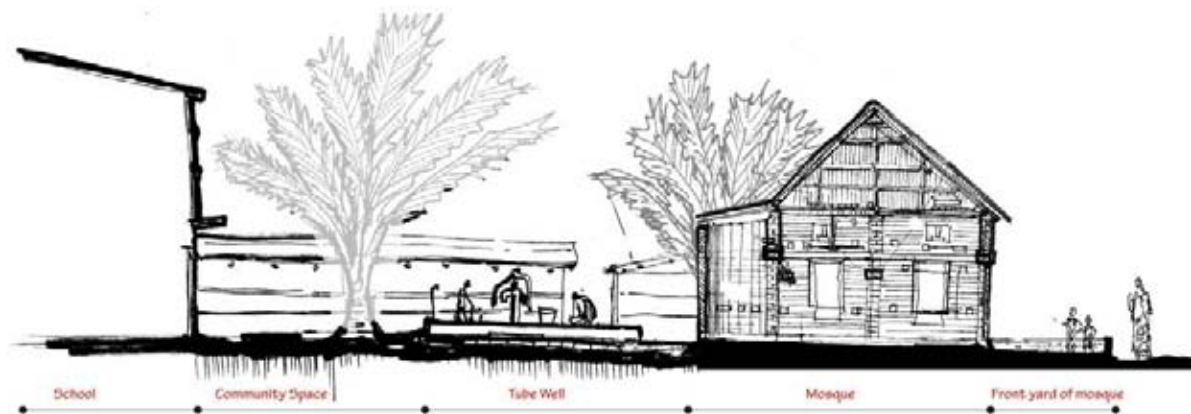
WEST ELEVATION

Mosque

The mosque is located on west corner of the field. The area attached to it is well used as a community space. It has a tubewell and a common toilet adjacent to it. The space behind the mosque provides a good communal space. The space in front, facing the field, is also important for the community.

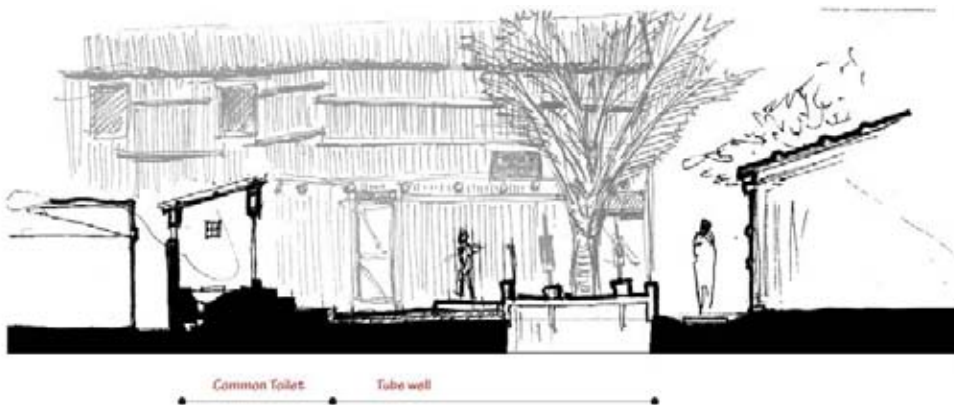
Mosque and surrounding buildings





SECTION AA'

The mosque compound is linked to the field. The front yard or '*Shaan*' of the mosque gives provision for people to gather after prayers. It is more linked to the outdoors. The space between the school and mosque is interesting. It has gradually become a community space for women (see Section AA above). They use it for washing, sewing, etc.



SECTION BB'



Household 01 – a self-sufficient house

This household is a good example of a self-sufficient house, typical of those seen in Bangladeshi villages.

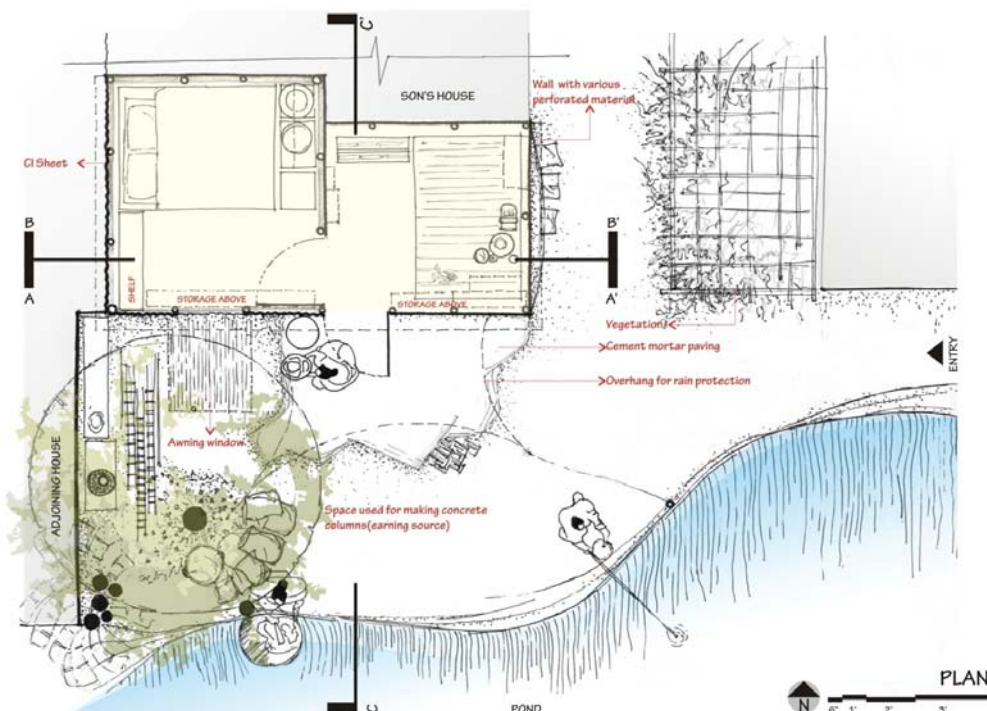
HOUSEHOLD_01



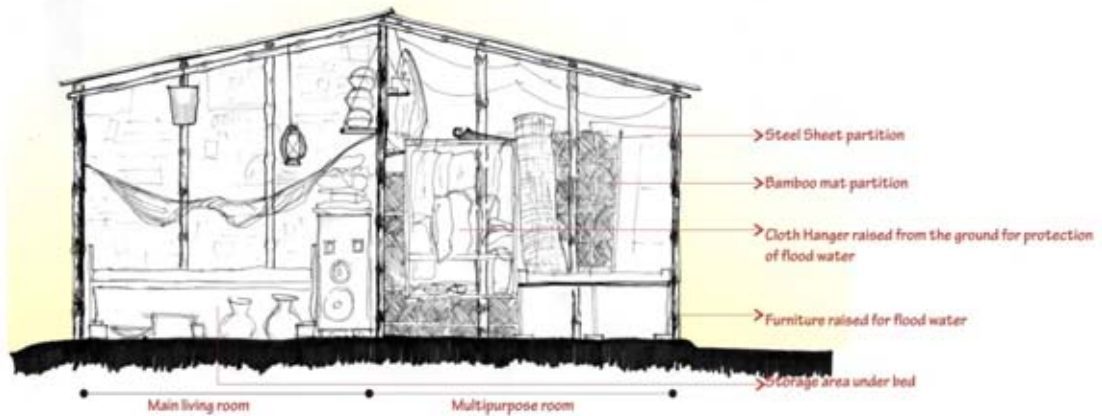
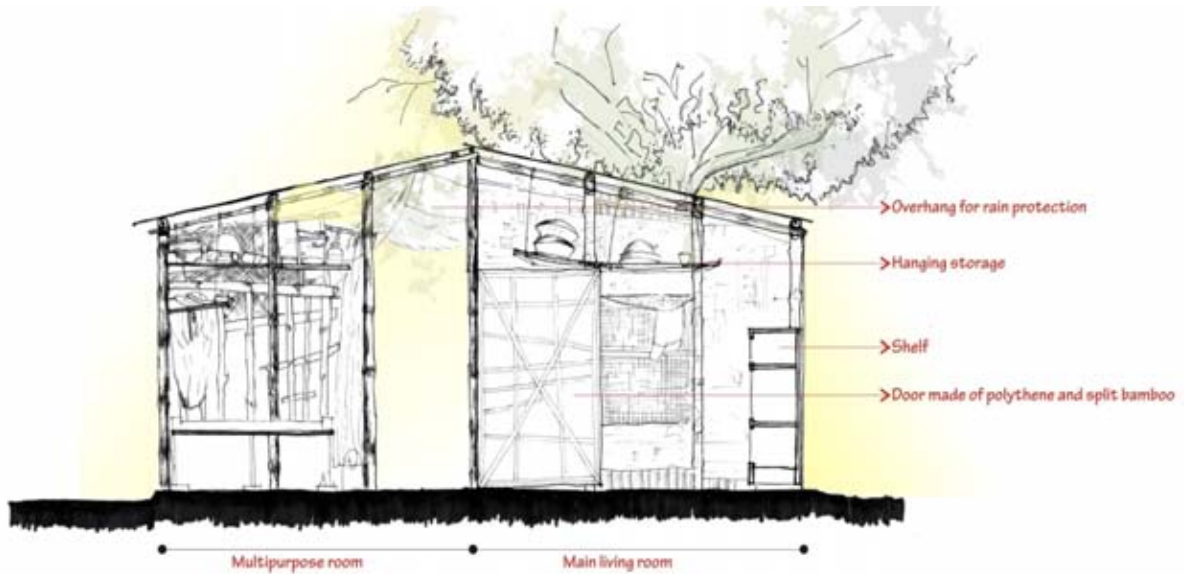
A SELF SUFFICIENT HOUSE

Sufia Begum, one of the first residents of Lotabel settlement, started to build her house near the pond. Once she had started, she also planted many trees and grew vegetables around her house. The pond became a good source of water for growing food. Now, the house has a green canopy all over from its entry to the front yard. The pond invites cooler breezes from south. The house is comparatively well ventilated and comfortable to live in.

Sufia Begum's husband is a mason. He uses the front yard space for his construction. They have three daughters and a son. Two of the daughters live with them. The son is a driver, and lives separately but adjacent to her home.



The two sections shown in the sketches below show the measures the family has taken to make maximum use of the space (vertically and horizontally). The multipurpose room is more perforated than the main living area. Valuable assets are kept in main living area, where the walls are made of more permanent, strong material.



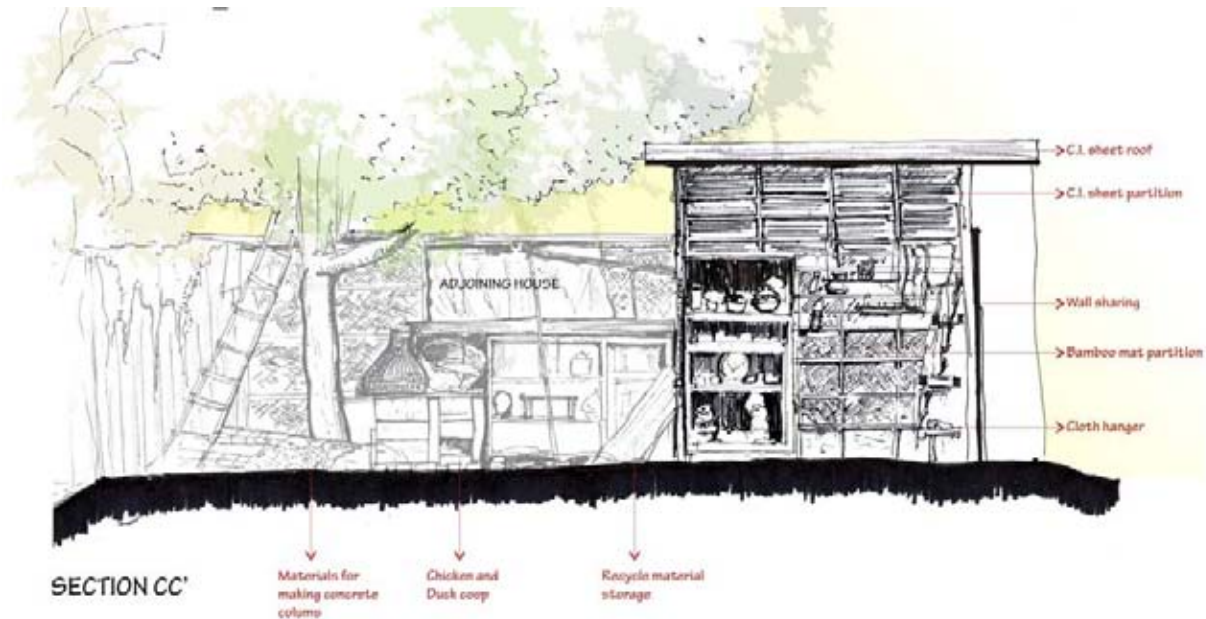
SECTION BB'



Construction materials

Floor: 2-3 inch thick layer of cement mortar (left over from her husband's construction work).

Wall: Corrugated iron sheet, split bamboo, bamboo mats, bamboo, recycled cement bags, newspapers, fertilizer sacks, used bricks, polythene, clothes, etc.



Construction process/ planning

The construction process of this house is spontaneous. Parts of the partition wall, exterior wall, along with some of the canopy are continuously being changed or renovated according to the needs of the household. It is a low-cost process, since different kinds of recycled materials have been used. Planning of the house is very efficient.

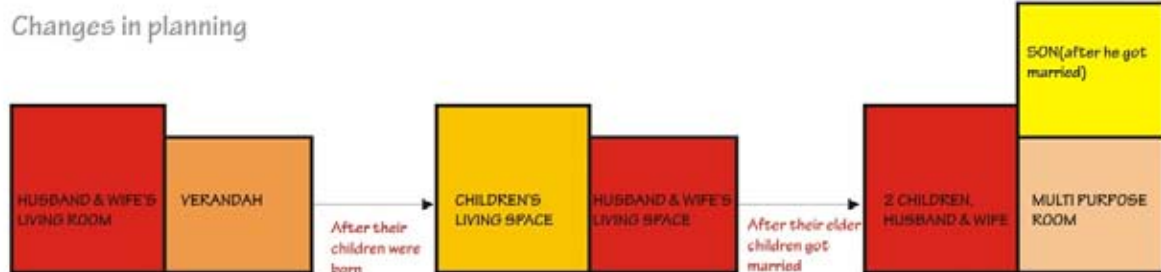
Climatic considerations

In summer the pond makes the southern air cooler for the house. Perforations in the bamboo mats allow adequate airflow into the house. The corrugated iron (CI)_sheet roof gets quite hot, but the mango tree provides shade cover for the CI sheet and keeps the area cooler in summer. In winter, the CI sheet roofing brings moisture inside the house and makes things wet.

Analytical diagrams

Changes in planning

Changes in house planning are a very common issue in informal settlements. Planning changes according to the season, social issues and financial conditions (see diagram below).

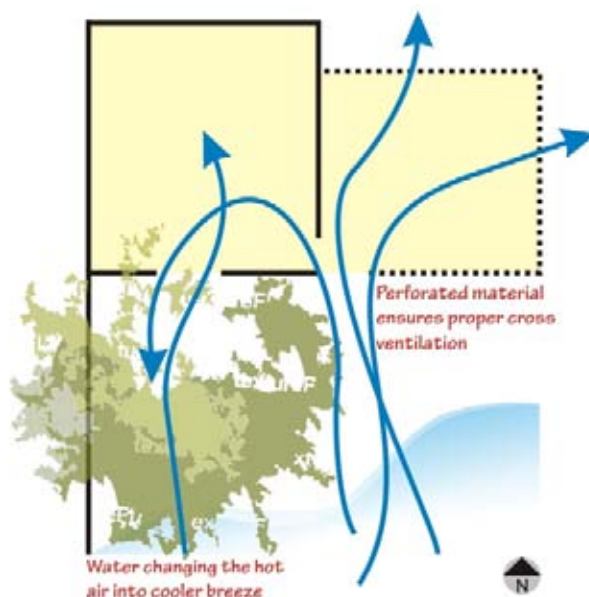


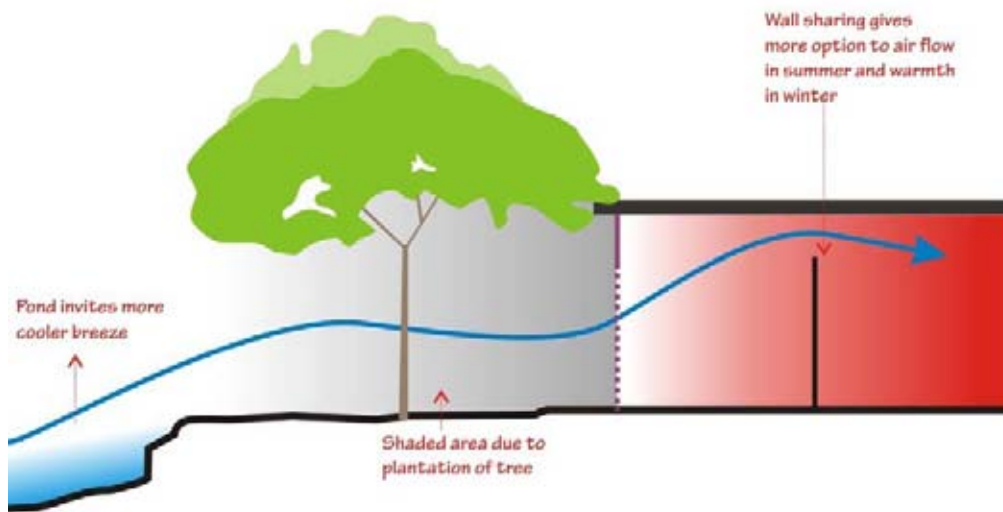
When Sufia Begum and her husband first started living here, they had one long room of their own. A few years after their four children were born, they partitioned the room. When one of their sons and a daughter were married, they started using the other room as a multipurpose room (study space, dinning area). Sufia Begum's son now lives in their adjacent house.

Climatic issues

Climatically the house is sound and wisely built. Both rooms have an inlet for air flow, in the form of a window and door. The main living room is better secured, with well built partition walls, whereas the multipurpose room is built with flexible, temporary material. The southern wall is kept perforated to let the breeze flow inside.

The positive thing is that both rooms have a proper inlet and outlet for air flow. The location of the pond ensures a cooler breeze.





The house takes on a different appearance according to the season. In summer, the family removes the temporary material of the multipurpose room, and sometimes they sleep in the front yard.

Household 02 – a shop house

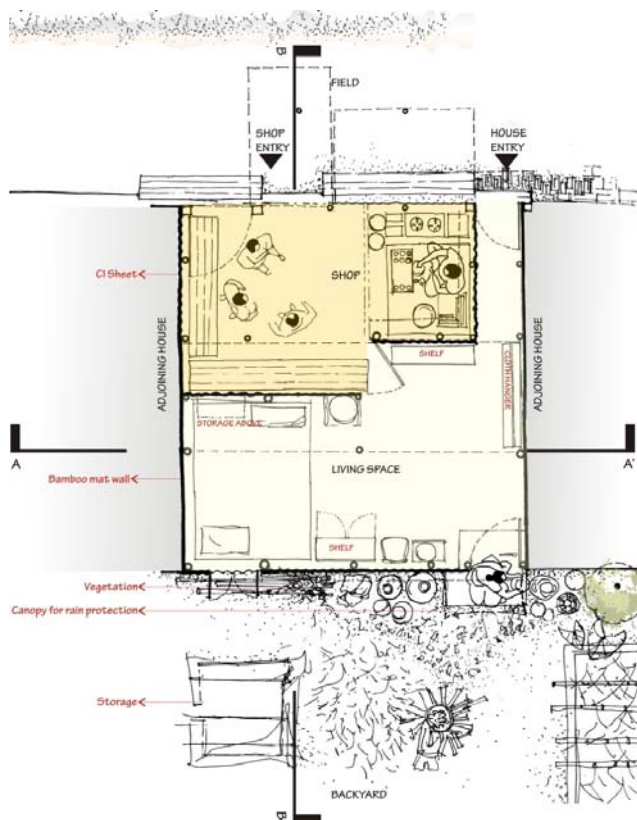
HOUSEHOLD_02



A SHOP HOUSE

The owner of this shop house lives behind the shop in a house which is attached. Our reason for looking at this particular household is to show how a house functions when it becomes a revenue-generating source.

Nuru Mia, a shopkeeper, has lived in this house for the last three years. He has three children. The family does quite well on his earnings. They have tried to grow vegetables in the backyard. The front space is used as a tea stall. The back yard is used for cooking and growing vegetation. The intermediate space between these two spaces is used as living space (see plan of house below).



Construction materials

Floor: Net cement finish (NCF) is done on top of a thin layer of brick chips made from recycled bricks.

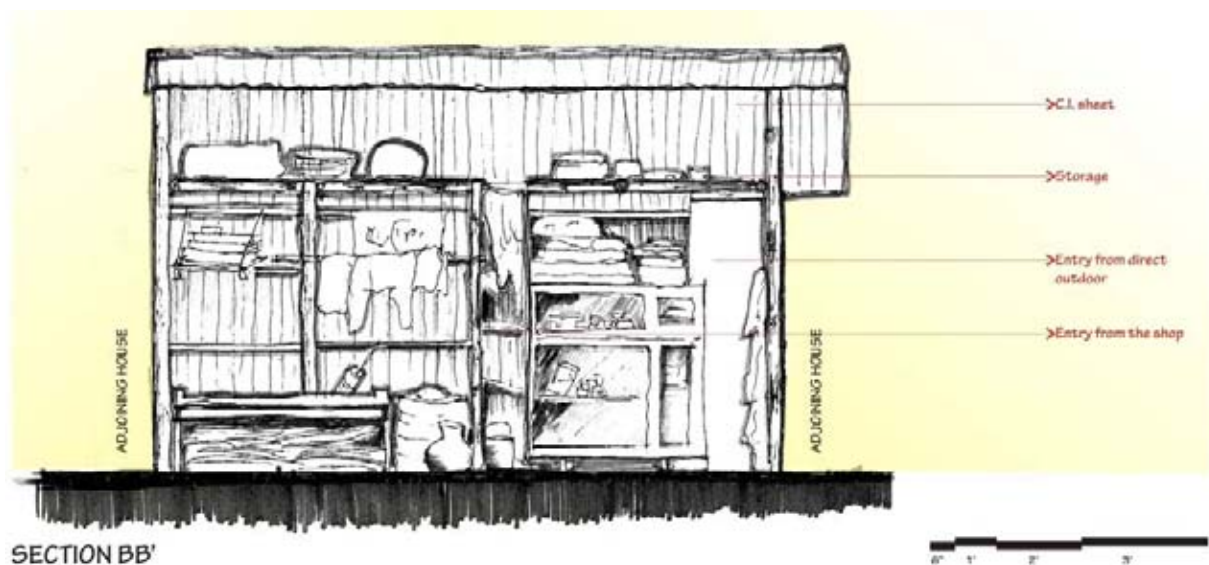
Wall: CI sheet, bamboo mats, bamboo, recycled cement bags.

See cross-section below showing use of materials.



Construction process/ planning

Planning of the house has been done to keep the tea stall as its focus. The house has its own separate entry adjacent to the shop. There is another linkage between the shop and the house (see section BB below). The back yard is used wisely, for cooking, drying clothes, growing vegetables and storage.



Climatic considerations

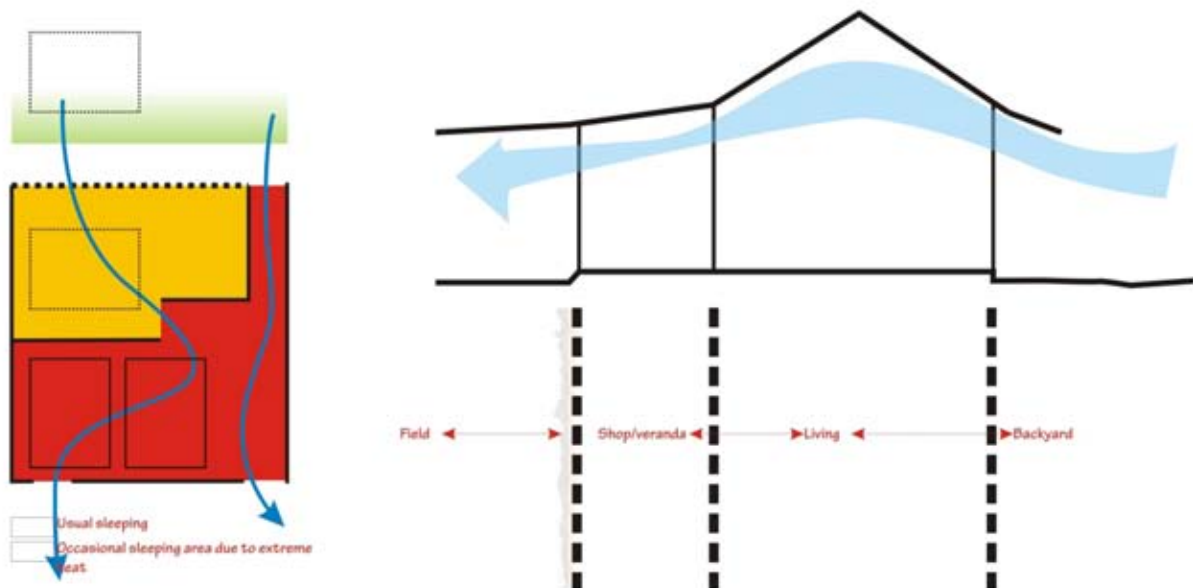
This shop house has taken advantage of the front field and back yard. A good amount of southern breeze flows from the vacant field. Cross-ventilation is observed through the house. The vegetation in the back yard keeps the environment much cooler than the attached area. There is adequate daylight as the south side opens towards a courtyard of the HBRI staff quarters.

Analytical diagrams

Planning

The whole house was built after the last evacuation three years ago when the area was waterlogged and the residents had to move to a temporary location. The idea for the shop was to create a veranda-like space that made the height of the shop lower than the other rooms. The doors of the shop are of an overhang structure, which makes the interior space free-flowing.

The shop remains open till 1-2 am in summer and 11-12 pm in winter. Most importantly, the shop acts as a community hub. As the shopkeeper lives just behind the shop, it is convenient for him to keep it open till midnight.

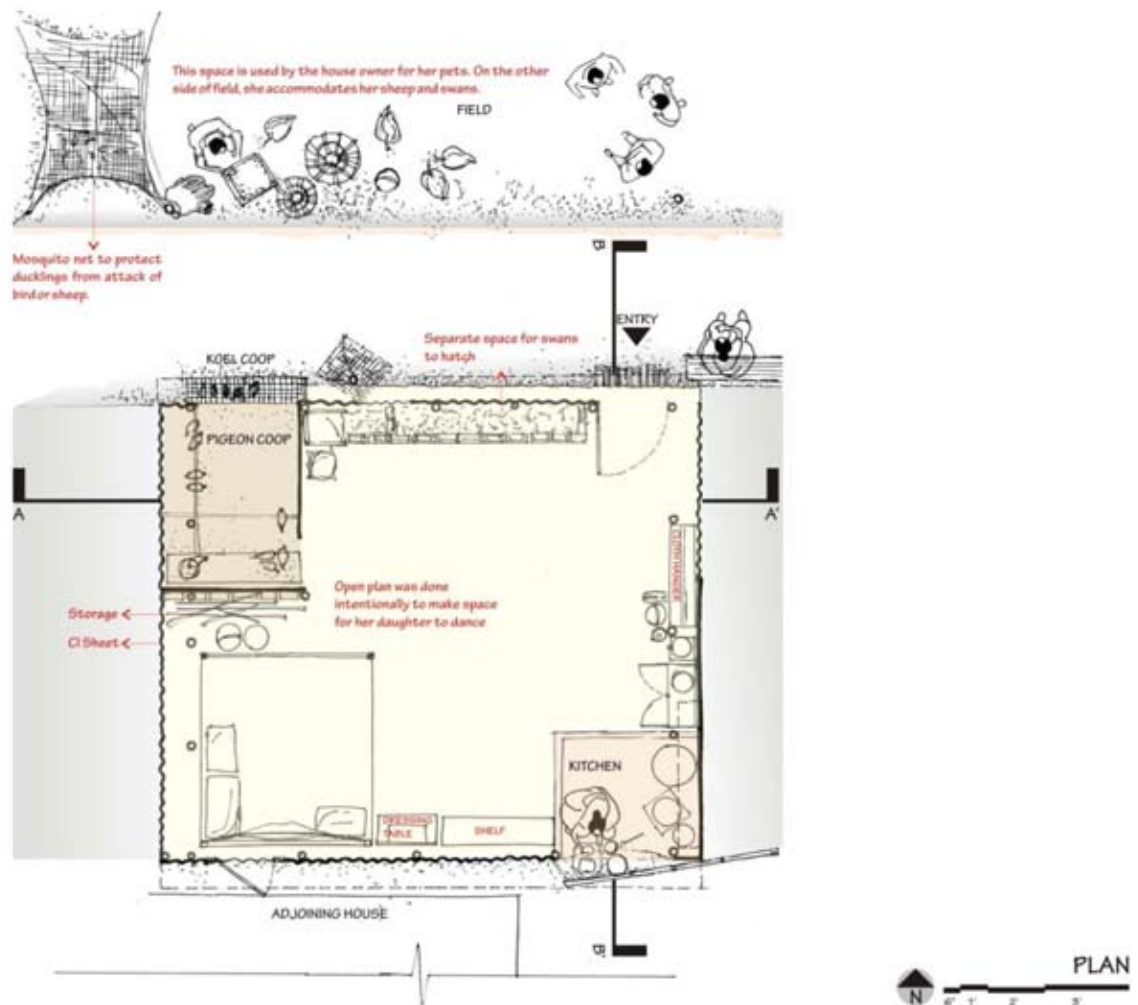


Household 03 – a farm house

HOUSEHOLD_03



A FARM HOUSE



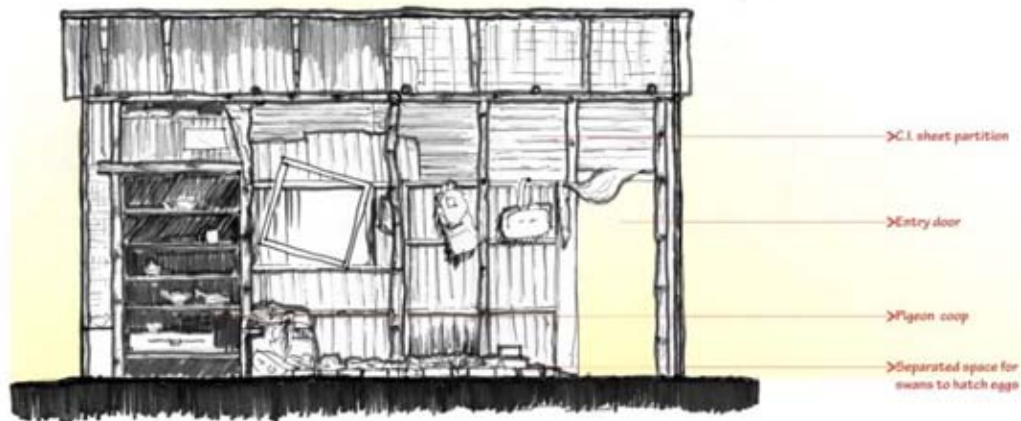
This house is a wonderful example of keeping one's aspirations alive, even in times of financial constraint. The owner keeps various pets, and manages to live under one roof with them. Fahima Begum works as a caretaker at the community school. She has two daughters and a son. His husband does not usually have any fixed income. Most of what Fahima earns from her job is spent on taking care of the pets, and the family lives on the rest.

The house has been customized to accommodate the pigeon, swans, rabbit and koel (bird of the cuckoo family). They live like a family under one roof. Part of the back yard is used as a kitchen. She takes advantage of the location by keeping some of her animals on the field.

Construction materials

Floor: 2-3 inch thick layer of cement mortar, recycled brick (for partition).

Wall: CI sheet, bamboo mats, bamboo, clothes, etc.



SECTION AA'



SECTION BB'



Construction process/planning

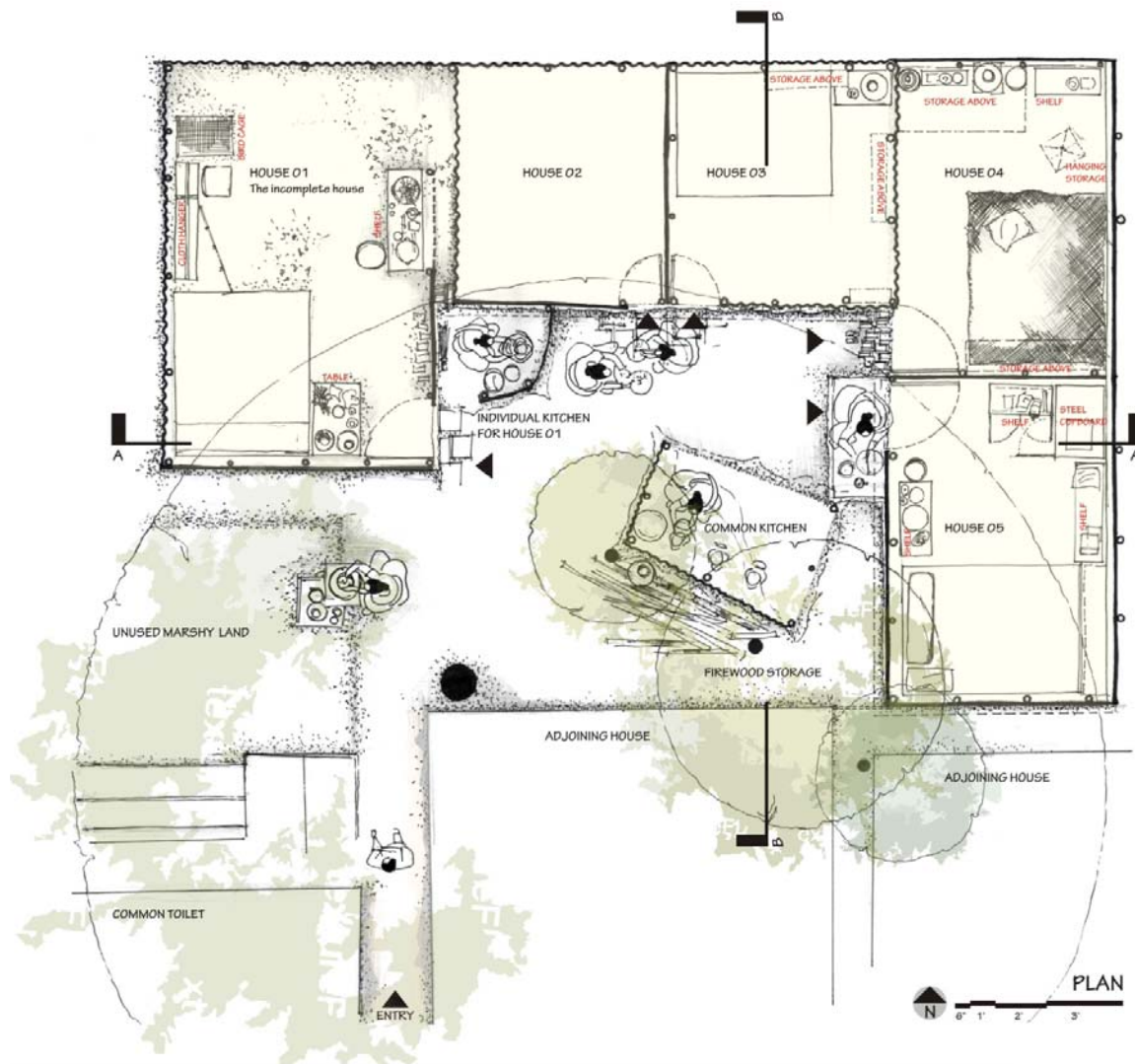
The house is quite well planned. The column-free central space is a positive point. The zoning for keeping animals, cooking and sleeping is efficient to use.

Climatic consideration

The huge field allows a southern breeze to flow through the house. The higher ceiling height helps to make the house less suffocating and more airy.

Household 04 – a courtyard house

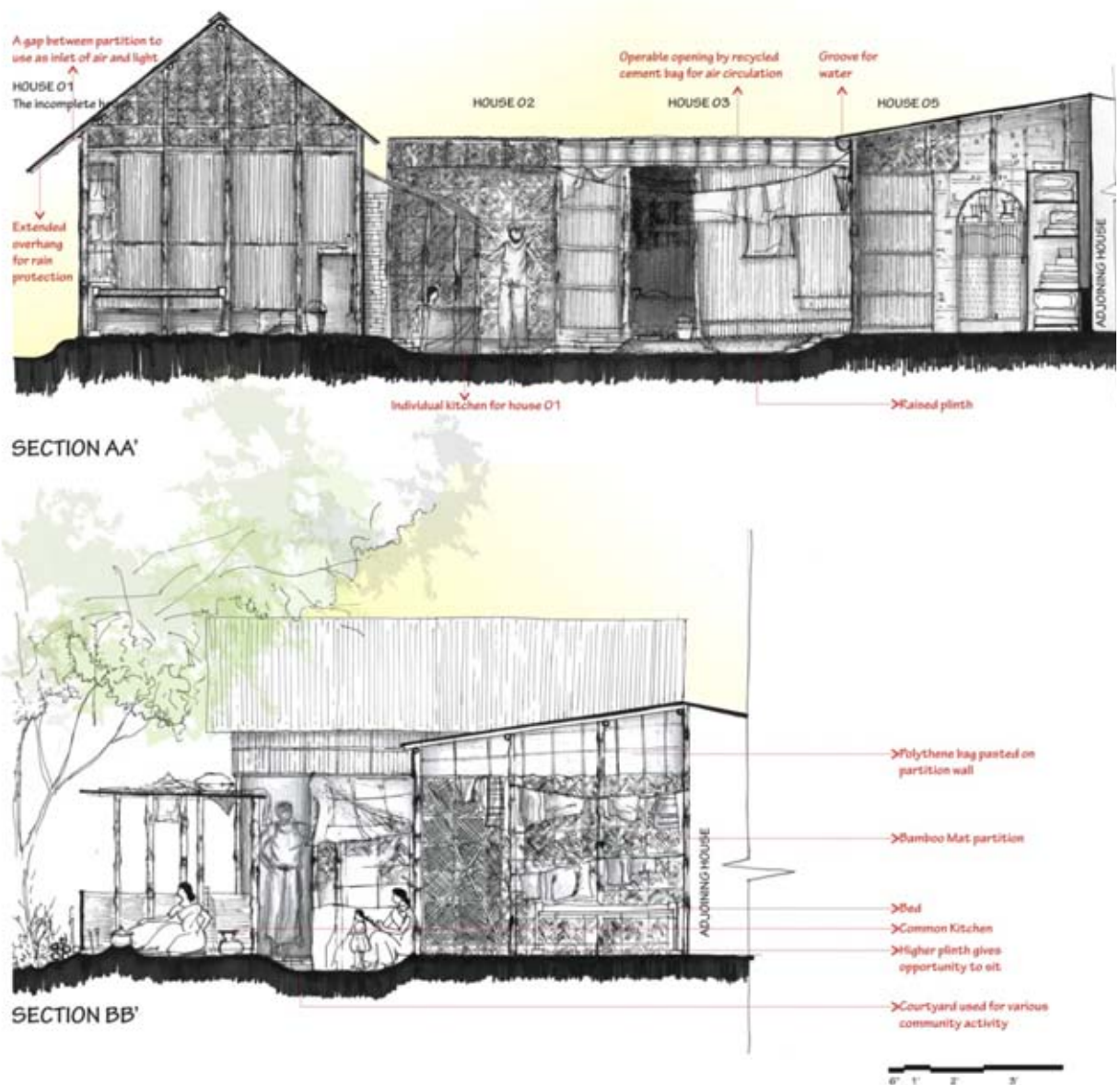
This cluster of households consists of five families around a courtyard. Rather than the character of the individual households, the special aspect of this courtyard house is the spatial quality and its use. There is a courtyard at the centre, where all the activities and functions are generated. There are five houses around the yard, with one more house yet to be completed.



Construction materials

Floor: The floor material varies from house to house. Two of the houses have net cement finish (NFC) flooring and two have mud floors. The last house is still unfinished, as construction has only recently started. Every house owner has tried to extend the floor material towards the courtyard.

Wall: CI sheet, split bamboo, bamboo mats, bamboo, recycled cement bags, newspapers, fertilizer sacks, used bricks, polythene, clothes, etc.



Construction process/ planning

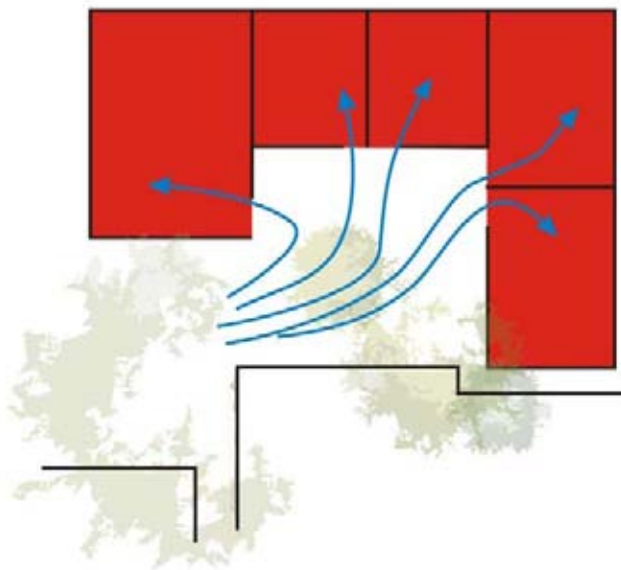
Five houses are planned, keeping a courtyard in the centre. The outdoor courtyard space is shaded by different types of trees. As the land is slightly lower than the surrounding land, attempts have been made to raise the houses and the kitchen higher off the ground. The kitchen, situated in the middle of the courtyard, is the heart of all other activities.

Climatic considerations

Trees in the courtyard provide good shade for carrying out household activities, such as chopping vegetables, different kinds of washing, cooking, shaving, etc.

The whole courtyard is beside a community toilet, which overflows with unhygienic waste, making the whole environment unhealthy. The houses do not have proper daylight inside or fresh air, since some rooms are blocked on three sides by adjacent rooms.

Analytical diagram



Planning

After the evacuation, noted above, five people came to a decision to have their rooms surrounding the courtyard, as the other sides of the rooms have adjacent houses. The courtyard works as a multipurpose space for cooking, washing, drying clothes, interacting with the community, children playing, etc. The house is beside the community toilet and the outlet point of the drain. The canopy of trees creates shade for the courtyard. The rooms have no windows, as the bad smell creates a very unhealthy and uncomfortable environment.

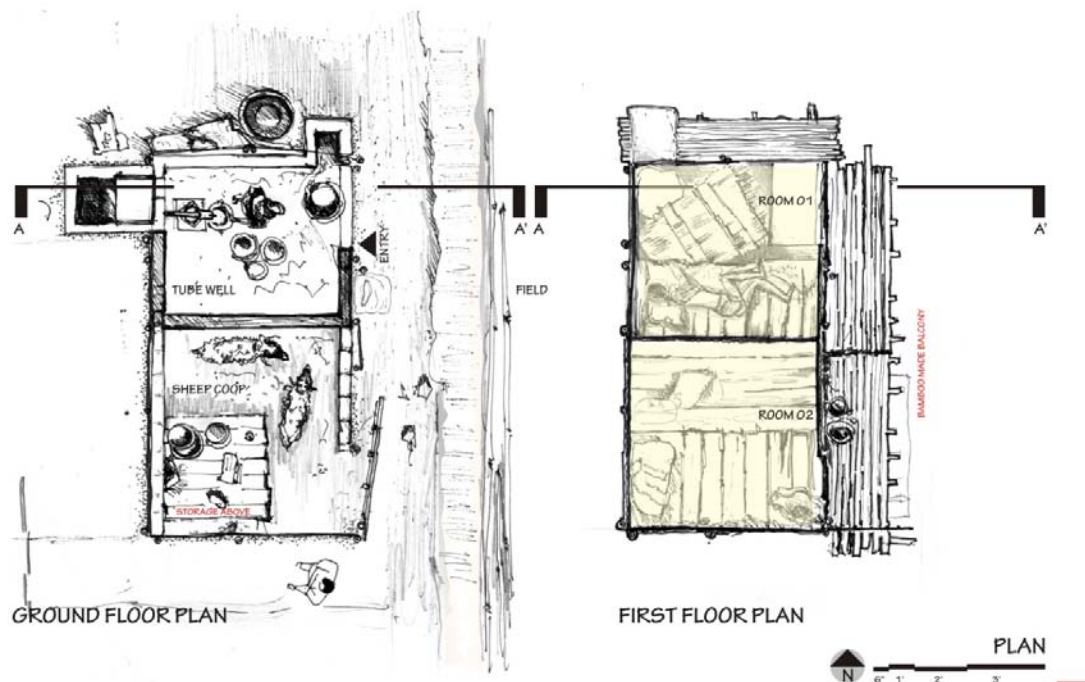
Household 05 – two storey house

HOUSEHOLD_05



TWO STORED HOUSE

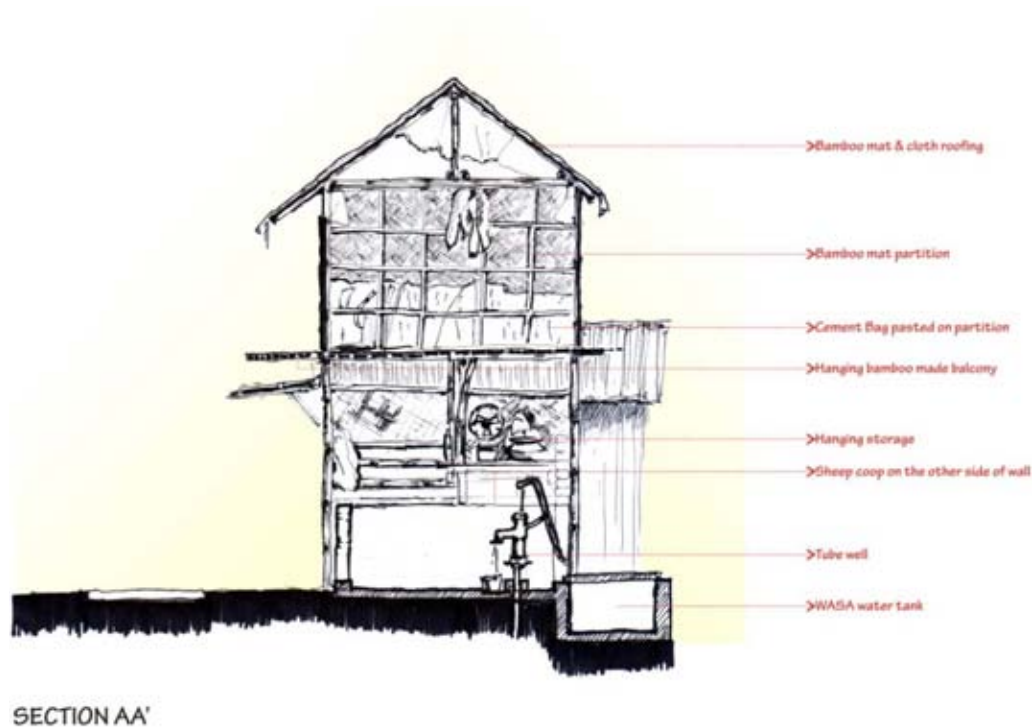
This is a unique structure in the low-income settlement. It is a good example of a two-storey building constructed with local and recycled material to extend the settlement. Two-storey structures can reduce the building footprint and allow for more groundwater recharge and vegetation. The open space would help create a better built environment, with more ventilation and natural light, along with more space for people in the community.



Construction materials

Floor: The floor is made of bamboo and wooden planks.

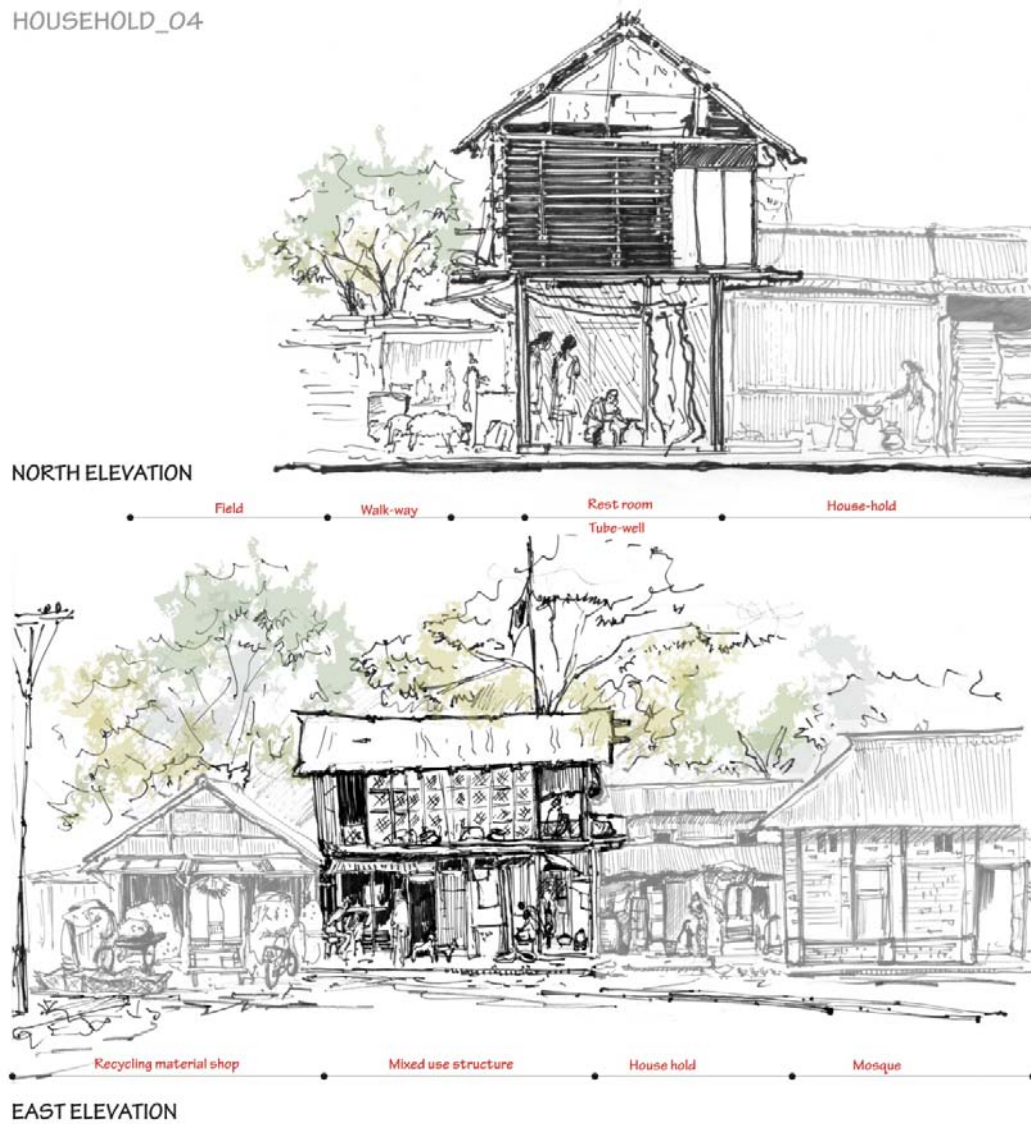
Wall: Bamboo mats, recycled cement bags, clothes, etc.



Construction process/planning

The upper level of this two-storey house is used as a resting area. The lower level is used to accommodate a tubewell and a small coop for sheep. A hanging balcony gives extra value to this building, and is also used as a way to approach the second room. Bamboo poles used in supporting the first floor are densely arranged for strengthening. Wooden planks are placed over the bamboo poles for flooring.

HOUSEHOLD_04



Climatic considerations

This household is climatically more sound than other houses in the settlement. The construction materials used are mostly perforated and the house faces towards the empty field, which ensures more air flow. The roof materials are bamboo mats and cloths, and the roof therefore absorbs less heat than a CI sheet roof. This house is comparatively comfortable to live in.

Innovative ways of re-creating greenery

Many of the households grow climbing vegetables on a small scale. The migrant members of the settlement are traditionally skilled in growing vegetation. In spite of inadequate space for vegetation, these people from rural communities have put their indigenous skills to use in innovative ways. Some are producing crops in sacks or in empty water bottles, and some are growing vegetation on the small area adjacent to the houses. These skilled migrants can grow vegetables and fruit to reduce pressure on the rural food market. Roof-top vegetation on a larger scale could even act as an urban heat sink. Examples are shown in the photographs below.



Street activity

Streets are one of the main community spaces and activity zones of the slum. Activities in the streets vary according to location, size and quality, as shown in the sketches below.



Cooking
Playing
Drying Clothes
Planting

NARROW STREET BETWEEN RESIDENTIAL STRUCTURES



Buying daily necessities
Community interaction
Sleeping at summer nights
Temporary parking for rickshaws
Playing

STREET BESIDE FIELD



Cooking
Storage
Playing
Recreational space for women

STREET ACTIVITY BETWEEN TWO HOUSE FACES EACH OTHER

Growth pattern of built structure

The adding of new structures happens in a very organic way through a step-by-step pattern (broken down into phases in the photographs below). Lotabel is a public low-income settlement, and here people's sense of affiliation with their living space is high. They try to adapt as much as they can to the changes in their surroundings caused by human and natural interventions.



1st Phase of occupying space



2nd Phase of adding partition for protecting from air



3rd Phase of adding roof for protecting from rain water



The outlet of the drainage system is blocked and landfill has been done to make new structure.

4th and final phase of occupying the area by making it a part of home.

At the end of the rainy season and the start of winter, construction work begins at quite a speed. The water level of the waterlogged area goes down and new pathways are made with landfill for new houses.



New Two
Storey
Structure

New School

New Recycling
Material Shop

New Two-story
Shop-House

Recent
photo

Previous
photo

Photographs of Lotabel low-income settlement



1. From the South-West corner of the play ground



2. From the Mid-West side of the play ground



3. From the opposite of the southern part of the slum.

Waterlogged areas of Lotabel



Activities in the pathways of Lotabel

Cooking, drying clothes, playing, working, doing social interaction with neighbours, etc, taking place along the roadsides of the settlement, as shown in the photographs below.



Shandekka low-income settlement

Site location



1



2

3



Shandekka was a private low-income settlement owned by a local influential person. The whole area was on marshy lowland when it was started. The real scenario became evident when the residents had to evacuate at short notice on the instruction of the owner. People had lived here for more than eight years, and have now moved to other low-income settlements.

Land filling has been started in recent months and because of it, the structures have started to collapse gradually. All of the rooms were provided on a rental basis, with shared kitchen and toilet. Residents' sense of personal affiliation with the place is less here than in the Lotabel, the publicly owned settlement.



Community kitchen



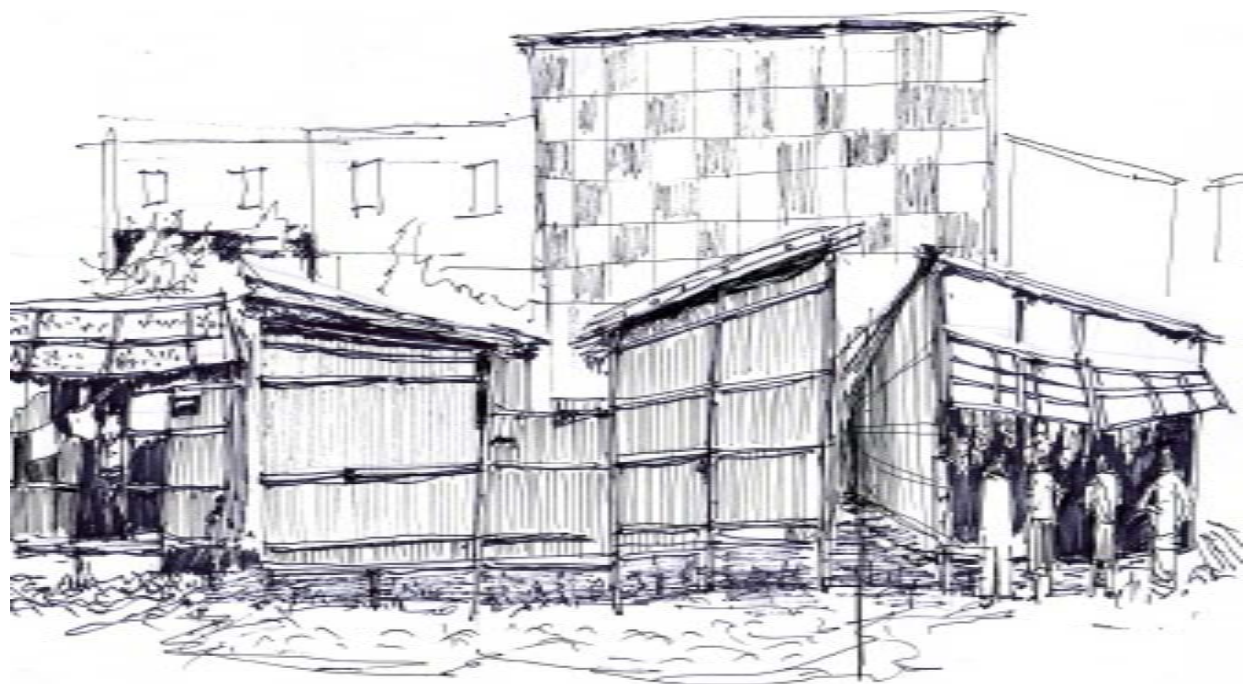
Tubewell



Walkway



Community toilet



Front elevation

September 2011



September 2011 adjacent structure



January 2012 before eviction



Panoramic view of Shandekka settlement



Construction materials



Bamboo frames holding the structures out of the water



Wooden planks for the deck/floor of rooms

Split bamboo for community kitchen and toilets and circulation path



Roofs have a sandwiched layer of bamboo mat on the top, plastic sheet/polythene in the middle, then another layer of bamboo mat. This makes the room warmer than corrugated iron sheet roofing.



Walls made mainly of corrugated iron sheets



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