

imagining an alternate
feminist future to
increase women's
access to resources

HOUSING FOR THE WOMEN OF HAORS

Housing for the Women of Haors

Global Housing Graduation Studio 2023-24
Sue Vern Lai

Design Mentors
Nelson Mota **Marina Tabassum**
Rohan Varma **Dick Van Gameren**

Technical Building Design Mentor
Mo Smit

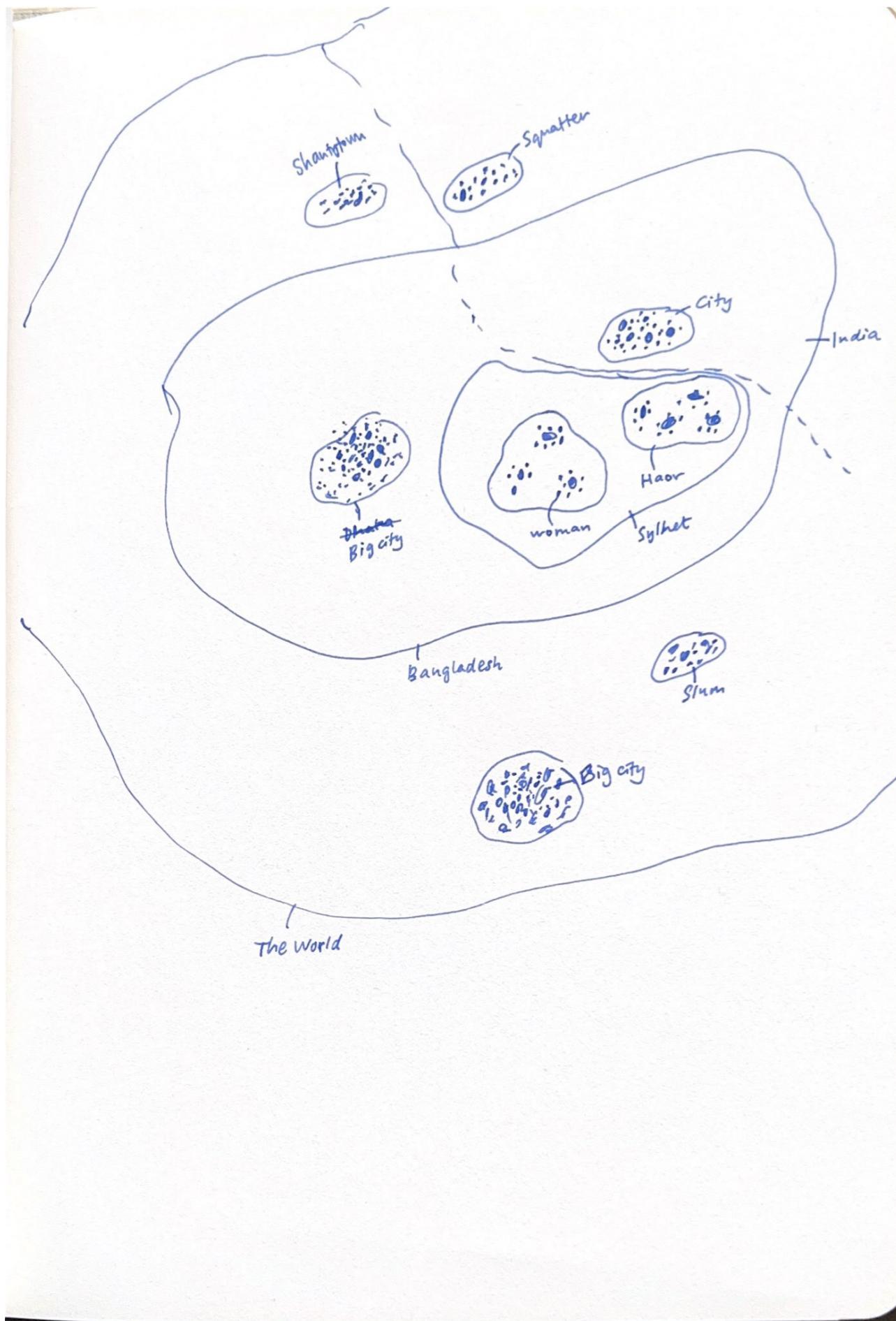
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My forever household
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and the people of the Haors for welcoming us into their homes



initial sketch exploring women-centred cartography and the limits to agency of a woman of the Haors

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POSITIONALITY

As a woman from a different culture, it is inevitable that I will perceive socio-spatial phenomena as well as religious and cultural norms from a completely different lens as the individual women of the Haors. Hence, in my practice, I seek to move away from a feminist critique towards an affirmative approach, learning from current strategies in the Haors to imagine an alternate feminist future- where women have increased access to resources, and hence, increased agency.

TERMINOLOGY

As “words are not a transparent medium”¹ it is important to define some terms, which will inevitably influence frames of thinking, before moving forward.

Feminism

2. bell hooks, *Feminist Theory: From Margin to Center* (Boston, United States of America: South End Press, 1984), 31.

Feminism is a movement to end sexism, sexist exploitation, and oppression.²

Resources

3. UN ESCWA, “Access and Control over Resources,” 2022, accessed October 2, 2023, <https://www.unescwa.org/sd-glossary/access-and-control-over-resources#:~:text=Access%20refers%20to%20the%20ability,the%20use%20of%20that%20resource>.

Means and goods, including economic (household income) or productive means (land, equipment, tools, work, credit); political means (capability for leadership, information and organization); and time.

Access

According to UN Women, “access” and “control” have different meanings. Access refers to the ability to use and benefit from specific resources whereas control over resources also entails being able to make decisions over the use of that resource. In this research, “access” will mean both.³

Agency

4. Naila Kabeer, “Resources, Agency, Achievements: Reflections on the Measurement of Women’s Empowerment,” *Development and Change* 30, no. 3 (July 1999): 435–64, <https://doi.org/10.1111/1467-7660.00125>.

The ability to define one’s goals and act upon them.⁴

Women

This research will investigate the people who are regarded as a woman in their communities and further expected to conform to gender roles.

1. Adrian Forty, “Words and Buildings. Revisited.” (Delft, Netherlands, October 11, 2023), <http://critical.es/>.

THE PROBLEM STATEMENT

**Women of the Haors
have unequal access to
resources**

RELEVANCE: THE GENERAL PROBLEM

According to UN Women, lack of access to resources is a key barrier to women's agency, and by extension, the achievement of Sustainable Development Goal 5- gender equality.⁵

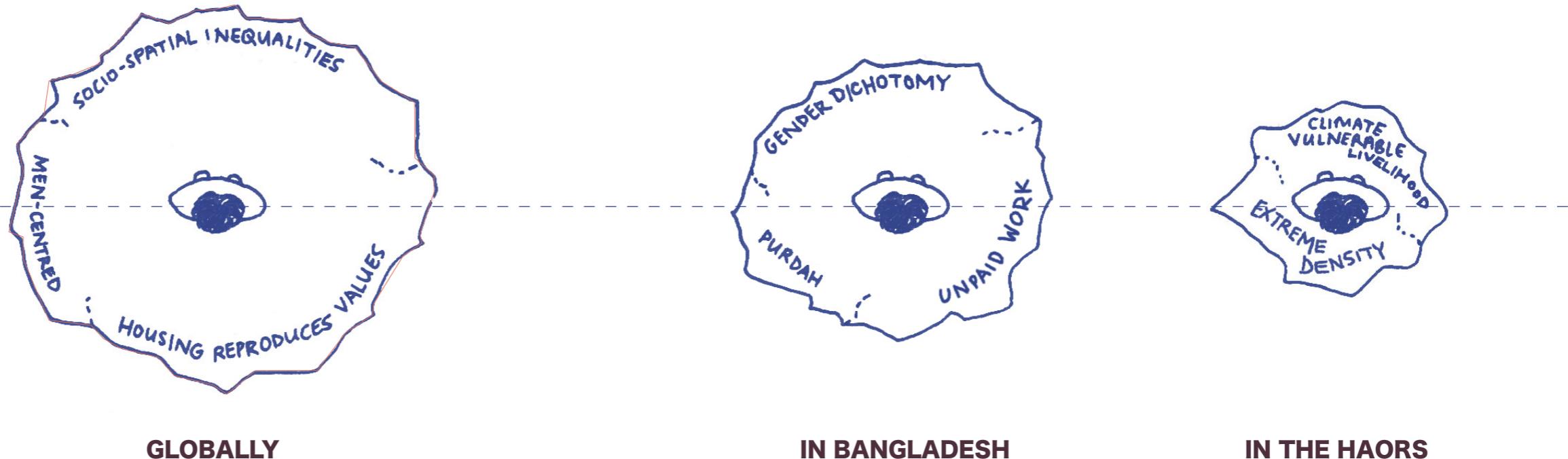
As conceptualised in Figure 1, a woman of the Haor faces unequal access to resources on all scales, from global to national to the dwelling scale. The erosion of the ground upon which a woman can act, as seen from the top, is a metaphorical visualisation of the woman's agency deprivation.

5. UN ESCWA, "Access and Control over Resources."

6. The World Bank, *Voice and Agency: Empowering Women and Girls for Shared Prosperity* (The World Bank, 2014), https://www.worldbank.org/content/dam/Worldbank/document/Gender/Voice_and_agency_LOWRES.pdf.

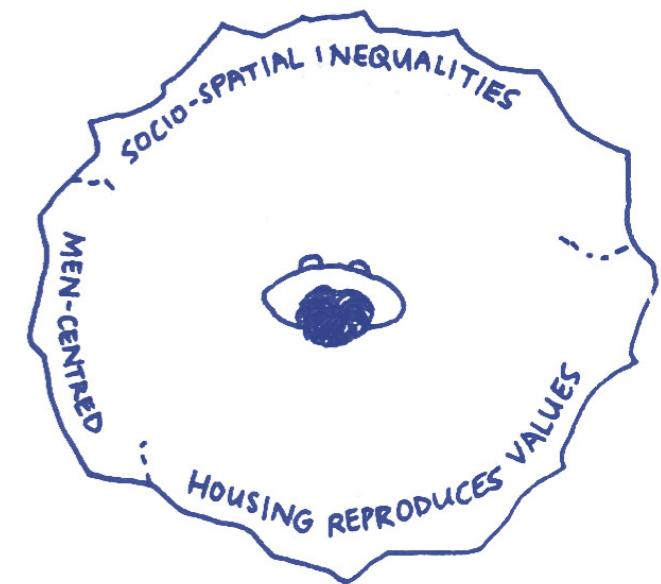
According to World Bank's *Voice and Agency* report, "The persistent constraints and deprivations that prevent many of the world's women from achieving their potential have huge consequences for individuals, families, communities, and nations. The 2012 report recognized that expanding women's agency—their ability to make decisions and take advantage of opportunities—is key to improving their lives as well as the world we all share."⁶

women's unequal access to resources on all scales and the metaphorical erosion of a woman's agency





Map of topography that exists across Bangladesh (Google Earth)



GLOBALLY

In the book *Feminist City*, human geographer Leslie Kern unpacks how gender inequalities are built right into our cities, communities and everyday lives, giving women less access to resources than men.⁷ Architectural educator Leslie Kanes Weisman furthers the argument stating that “Discriminatory laws, governmental regulations, cultural attitudes, informal practices and lack of awareness by professionals have created conditions which reflect and reinforce women’s second-class status.” Weisman refers here to the wider system of public space, neighbourhoods and transport, but places a particular emphasis on housing.⁸

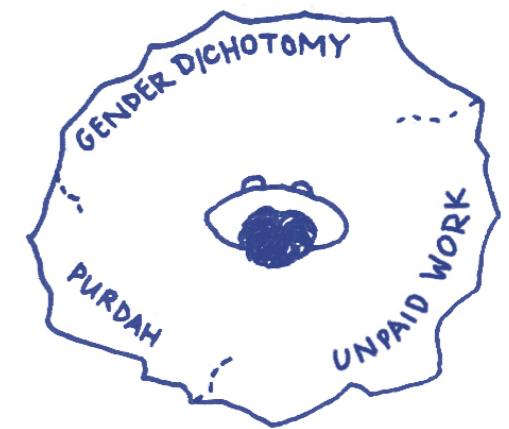
Historically and across borders, from the Victorian home to Islamic vernacular courtyard houses found in rural Bangladesh, the blind replication of housing typologies has and continues to perpetuate the reproduction of socio-spatial inequalities, rendering women with unequal access to resources.

7. Leslie Kern, *Feminist City* (Verso Books, 2020).

8. Leslie Kanes Weisman, “Women’s Environmental Rights: A Manifesto,” *Heresies* 11 (1981): 1–5.



Map of Bangladesh's Northeastern Haor region with part of the mountains in Meghalaya, India (Google Earth)



IN BANGLADESH

Bangladesh is a predominantly Muslim country (91%), with the second largest religious group being Hinduism (8%).⁹ Common among Muslim and Hindu communities, the practice of Purdah is prevalent in Bangladesh. Purdah is a religious and social practice of female seclusion, often through veiling and restrictions in outside mobility.¹⁰

As a result, women are often constrained to the home, and in particular, the woman's domains within the home, reinforcing the gendered dichotomy of public-men and private-women. According to Bangladeshi architect and researcher Tasneem Chowdhury, "This duality of space in turn reinforces the seclusion and segregation of women." This then creates further barriers to women's access to resources.¹¹

9. Ministry Of Planning, "Population Distribution And Internal Migration In Bangladesh" (Dhaka, Bangladesh: Bangladeh Bureau of Statistics, November 2015).

10. M. Niaz Asadullah and Zaki Wahhaj, "Missing from the Market: Purdah Norm and Women's Paid Work Participation in Bangladesh," Social Science Research Network, January 10, 2017, 3-7.

11. Tasneem Chowdhury, "Segregation of Women in Islamic Cultures and Its Reflection in Housing: A Study of Spaces for Women in a Bangladesh Village," *Shelter, Women, and Development*, 1992, 338-46.



Map of a part of the Surma River in the Haors of Sunamganj, Bangladesh (Google Earth)



IN THE HAORS

Haors are large bowl-shaped floodplain depressions located in the Northeastern region of Bangladesh covering about 1.99 million ha (19,998 sq km) of the area and accommodating about 19.37 million people.¹²

The livelihood of the people of the Haors relies largely on nature-dependent sectors like farming and fishing. With climate change, these wetland areas are facing increasingly frequent flash floods and increasingly severe droughts, forcing adaptation strategies for shelter and livelihood, including climate-induced migration of men.¹³

The women of Haors exist within the struggles of inadequate housing and the climate vulnerabilities of the ecosystem, as the men of Haors do. But woven into the fabric of these struggles, and compounding on them, are the detriments of having unequal access to resources.

12. Ministry of Water Resources, "Master Plan of Haor Area" (Bangladesh Haor and Wetland Development Board, 2012).

13. Sawon Istiak Anik and Mohammed Abu Sayed Arfin Khan, "Climate Change Adaptation through Local Knowledge in the North Eastern Region of Bangladesh," *Mitigation and Adaptation Strategies for Global Change* 17, no. 8 (January 5, 2012): 879–96, <https://doi.org/10.1007/s11027-011-9350-6>.

RELEVANCE: THE SPECIFIC PROBLEM

In this research, women's unequal access to resources in the Haors is investigated as a way to study agency deprivation. As an architectural designer, a suitable entry point of research is into the access of spatially-determinable resources. The selection was based on World Bank's report *Voice and Agency: Empowering Women and Girls for Shared Prosperity*.

In table 2.1, there are various entry points suggested, including "Expansion of economic opportunities", "Education", "Sexual and reproductive health and rights" and "Voice and collective action".¹⁴ From these, 3 resources were formulated as the scope of study, namely income generation, communal space, and basic amenities.

14. The World Bank, *Voice and Agency: Empowering Women and Girls for Shared Prosperity*, 55.

Women's radius of access to three resources respectively from left to right





INCOME GENERATION

Lack of access

Due to restrictions on outside mobility, most work women do is within the settlement and sometimes the surrounding paddyfields.¹⁵

According to the 2021 Time Use Survey, women spend disproportionately longer hours doing unpaid care/domestic work as compared to men, especially in rural settings. Even though this contributes to household income and livelihood considerably, this work often goes unacknowledged, and women often do not have self-control over the generated income. This work, considered the duties of a woman, also robs women of time that could be used to generate income.¹⁶

Furthermore, during natural disasters, there is a loss of household essentials like coal and firewood, and resources like cattle and chicken, all necessary for women's livelihood and/or income.¹⁷

Agency deprivation

Unequal access to income generation increases women's economic dependence on their husbands, and deprives women of her voice within the family. Income generation is also a way to improve a woman and her children's nutrition, and decrease domestic violence rates.¹⁸

Left: A man and his cow in a Haor settlement

15. Fatema Akhter Hiramoni, "Quality of Life among Women Living in Haor Basin in Bangladesh and Its Socio-Economic Predictors," *International Journal of Public Health Science (IJPHS)* 12, no. 3 (2023): 973–80.

16. Ministry of Planning, "Preliminary Report on Time Use Survey (TUS) 2021" (Dhaka, Bangladesh: Bangladesh Bureau of Statistics, 2022).

17. Anik and Khan, "Climate Change Adaptation through Local Knowledge in the North Eastern Region of Bangladesh."

18. Romaza Khanum and Muhammad Salim Al Mahadi, "Economic Empowerment of Haor Women through Duck Farming in Bangladesh," *The Agriculturists* 13, no. 1 (January 24, 2016): 18–25, <https://doi.org/10.3329/agric.v13i1.26543>.



COMMUNAL SPACE

Lack of access

Due to the low lying characteristic of Haors, wave erosion or Afal is one of the major threats to the Haor settlements. Due to scarcity of land, the people are forced to live in extremely dense settlements and houses.¹⁹ The lack of space in general translates to a lack of communal space for women.

Moreover, due to Purdah practice and the gendered dichotomy of public-men and private-women, the spaces women can occupy are generally limited to within the settlement, and in non-male domains. Women lack access to public spaces like urban streets, mosques and markets.²⁰

Women have little access to communal space not only for income generation, but for recreation and relaxation.

Agency deprivation

When women lack access to safe and inclusive communal space, they are not only deprived of obvious benefits such as increased health and wellbeing, they are deprived of the increased potential for collective action.²¹ Collective action is a powerful tool for social transformation and is fundamental to women and girls' empowerment on a societal level.²²

Left: Two women in the narrow 'alley' between houses in a Haor settlement

19. Ministry of Water Resources, "Master Plan of Haor Area", 41.

20. Bimal Kanti Paul, "Female Activity Space in Rural Bangladesh," *Geographical Review* 82, no. 1 (January 1, 1992): 1, <https://doi.org/10.2307/215401>.

21. UN Women, "Creating Safe and Empowering Public Spaces with Women and Girls," accessed October 15, 2023, <https://www.unwomen.org/en/what-we-do/ending-violence-against-women/creating-safe-public-spaces>.

22. Gender Equality Toolbox, "Collective Action," May 9, 2019, accessed October 15, 2023, <https://www.gatesgenderequalitytoolbox.org/measuring-empowerment/agency-collective-action/>.



BASIC AMENITIES

Lack of access

Women of the Haors lack access to healthcare. In all the Haor districts, women have less assistance during delivery from skilled health personnel (13.4%) compared to the national average (18%). Women have difficulties accessing health clinics and hospitals due to their dependency on water infrastructure, money and husbands or male relatives.²³

Additionally, women and girls have unequal access to formal and informal education. Unlike in the rest of Bangladesh (other than the CHT) school attendance by girls is lower than that of boys.²⁴ Furthermore, partly due to geographical segregation and poor communications infrastructure, women's access to information, such as family planning and children's nutrition, is greatly impaired.²⁵

Agency deprivation

With unequal access to healthcare and education, women are deprived of professional help and access to information, which are key tools of empowerment.²⁶

Left: Part of the family living in this Khudi Bari

23. Fatema Akhter Hiramoni, "Quality of Life among Women Living in Haor Basin in Bangladesh and Its Socio-Economic Predictors."

24. Goutam Roy, "Education in Haor Areas: Should Distance Be the Barrier to Access Education? | Bangladesh Education Article," October 16, 2020, accessed October 15, 2023, <https://bduarticle.com/education-in-haor-areas-should-distance-be-the-barrier-to-access-education/>.

25. Sarah Gillingham, "CARE Bangladesh Programme Strategy: Haor Region 2015 – 2020" (CARE, February 2016), https://www.carebangladesh.org/publication/Publication_5340141.pdf.

26. The Carter Center, "Women and the Right of Access to Information," accessed October 15, 2023, <https://www.cartercenter.org/peace/ati/women.html>.

RESEARCH QUESTION + METHODOLOGY

**How can an alternate
feminist future be
imagined to increase
women's access to
resources?**

THE RESEARCH GAP

There are a number of literary references that discuss socio-spatial inequalities women face in rural Bangladesh, but the housing typology and settlement patterns discussed are not directly applicable in the unique Haor ecosystem. Hence there is a gap in the knowledge base on socio-spatial inequalities women in the Haors face.

Within existing research specifically into the Haor regions, discussions on gender inequalities are limited to social science perspectives. This research will build upon that knowledge, and go beyond into an interdisciplinary approach across architectural design, urban planning and ecology.

Furthermore, since the issue of unequal access to resources transgresses through all scales, its contribution to feminist spatial practice reaches far beyond the Haor regions.

THE RESEARCH QUESTION

How can an alternate feminist future be imagined to increase women's access to resources?

In order to investigate alternate futures, existing conditions must first be analysed:

What can be learnt from spatial practices of women within existing settlement patterns in the Haor region?

What are the resources that exist within the Haor region?

Subsequently the following sub-question can be explored:

What are the ingredients necessary to build a new settlement within the Haor region?

THEORETICAL FRAMEWORK

The research positions itself within a relevant frame of reference regarding theory, history and practice.

Future

To imagine alternate futures, first it is important to delve into the concept of ‘future’. Philosopher Elizabeth Grosz states that “The future is that openness of becoming that enables divergences from what exists.”²⁷

Constructing an alternate future is a concept that requires a framework. Hence futures studies is used as an approach that seeks to open up the future, moving from a deterministic view of “the” future to alternative futures. Through questioning ideologies that underlie each future, emerging issues analysis, and scenarios, the intention is to move out of the present and create the possibility for new futures.²⁸

Alternate feminist future

Futures studies is commonly used by planners, economists and social scientists. This research will bring futures studies into architectural and feminist terms: “Through constructing abstract concepts in forms available for empirical (bodily) experience, the imagery and materiality of futures studies and design is powerful, shaping market demand, public opinion and cultural imaginaries.”²⁹

Feminism theory has evolved throughout the feminist waves. The research will build on bell hooks’ definition that “Feminism is a movement to end sexism, sexist exploitation, and oppression.” It is not about being anti-male, because women can also be sexist. This theory makes it clear that the problem is sexism.³⁰

Access to resources

‘Access to resources’ is a framework used by World Bank and UN Women to practically increase women’s agency.

UN Women defines ‘resources’ as “means and goods, including economic (household income) or productive means (land, equipment, tools, work, credit); political means (capability for leadership, information and organization); and time.”

According to UN Women, ‘access’ and ‘control’ have different meanings. Access refers to the ability to use and benefit from specific resources whereas control over resources also entails being able to make decisions over the use of that resource.³¹ In this research, ‘access’ will mean both.

Agency

Another concept that underlies the research is ‘agency’. Nabeer defines it as “The ability to define one’s goals and act upon them.”³²

27. Elizabeth Grosz, *The Nick of Time: Politics, Evolution, and the Untimely*, 2004, <http://dx.doi.org/10.4324/9781003118121>.

28. Sohail Inayatullah, “Futures Studies: Theories and Methods,” 2013, accessed October 15, 2023, <https://www.bbvaopenmind.com/en/articles/futures-studies-theories-and-methods/#:~:text=Futures%20studies%20is%20the%20systematic,myths%20that%20underlie%20each%20future>.

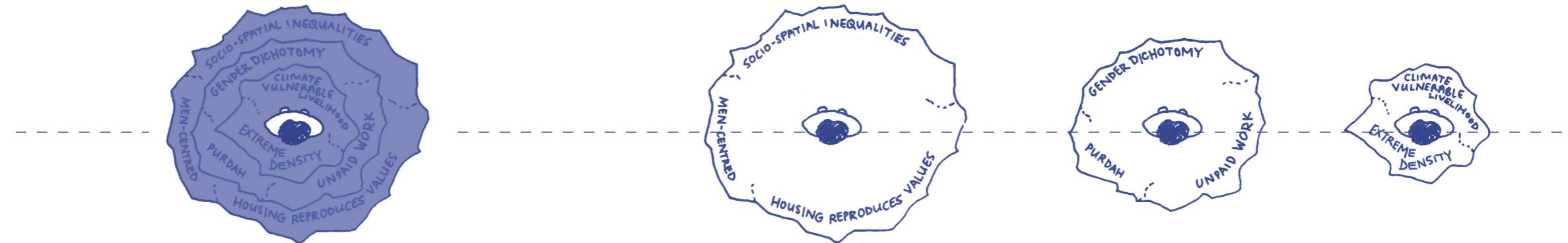
29. Schalk, Thérèse Kristiansson, and Ramia Mazé, *Feminist Futures of Spatial Practice : Materialisms, Activisms, Dialogues, Pedagogies, Projections*.
 30. hooks, *Feminist Theory: From Margin to Center*.

31. UN ESCWA, “Access and Control over Resources”

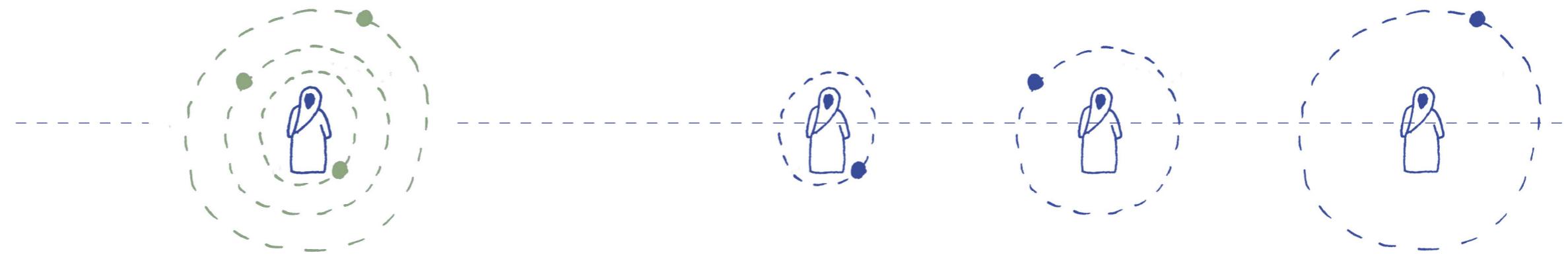
32. Kabeer, “Resources, Agency, Achievements: Reflections on the Measurement of Women’s Empowerment”

RESEARCH BY DESIGN

SCOPE OF RESEARCH



SCOPE OF DESIGN

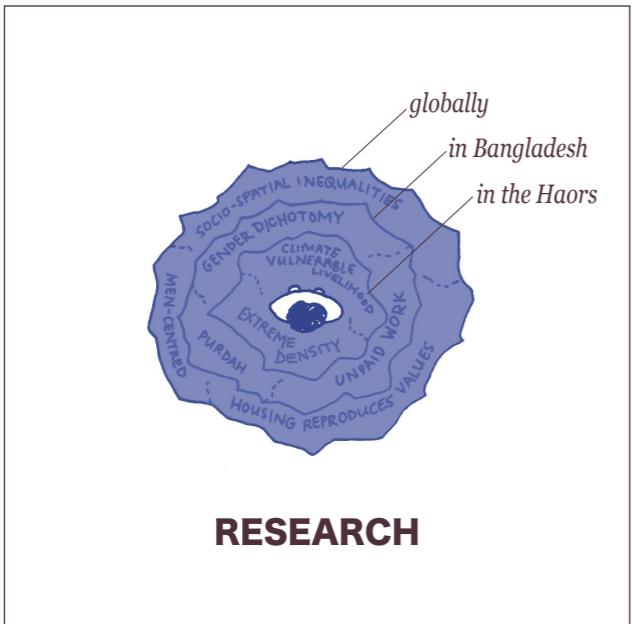


RESEARCH BY DESIGN

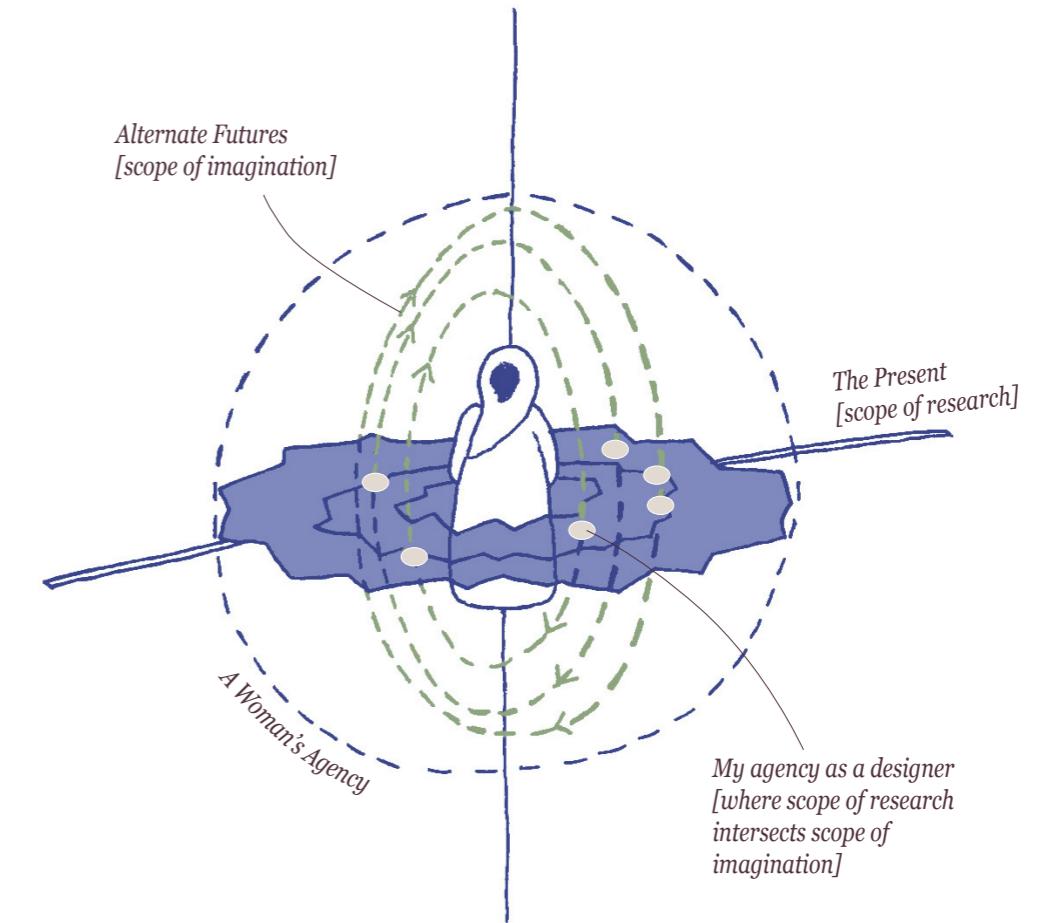
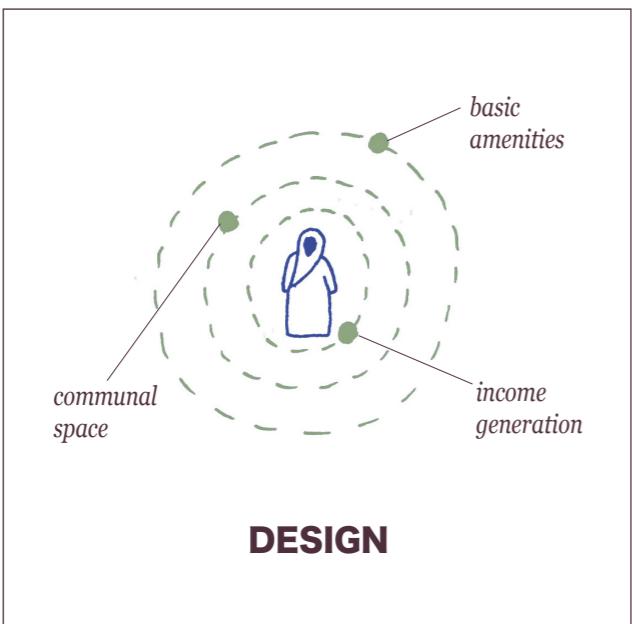
To answer the sub-questions and thereby the main research question, research by design is conducted, generating critical inquiry through design work.

This includes firstly, analysing barriers and opportunities to women's access to resources, that therefore erode or increase a woman's agency, using a scalar approach- from territory to village to cluster and finally dwelling scale. And concurrently, Increasing the radius of a woman's access to resources, not only the three resources income generation, communal space and basic amenities, but the fundamental parts of the everyday life of a woman- domestic practices and craftsmanship.

PROPOSED CONTRIBUTION



X



**EXPANDING
A WOMAN'S SPHERE OF AGENCY
IN THE HAORS**

METHODOLOGY

MIXED METHODS

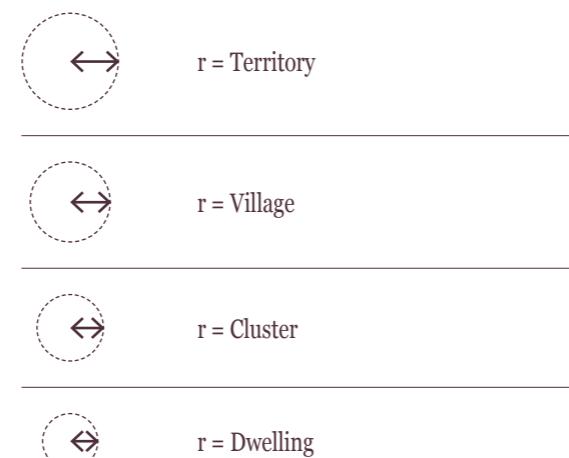
The methodological approach will be Mixed Methods. This is chosen because of its potential to present multiple findings about a single phenomenon by deploying various elements of quantitative and qualitative approaches in one research.³³

This is extremely suitable for the research question. To pragmatically increase women's access to resources will require some quantitative data, and to imagine an alternate feminist future will need an understanding of qualitative information.

33. Muhibul Haq, "A Comparative Analysis of Qualitative and Quantitative Research Methods and a Justification for Adopting Mixed Methods in Social Research," Annual PhD Conference, *Management and Law Publications*, June 2014, <https://bradscholars brad.ac.uk/bitstream/10454/7389/3/MethodsReviewArticle-Dec24-2015-reposit.pdf>.

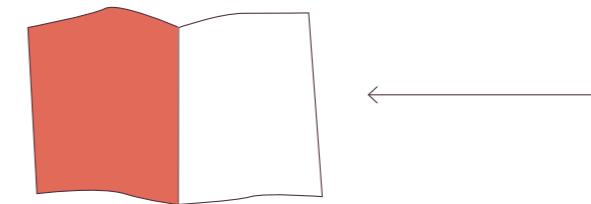
SCALAR

The research is organised in four scales: territory, village, cluster and dwelling.



Scalar Binder: "Radii of Collective Action of Women of the Haors"

The compilation depicts patterns of everyday life of a woman in the Haors, situated in the morphological context.



Cataloguing

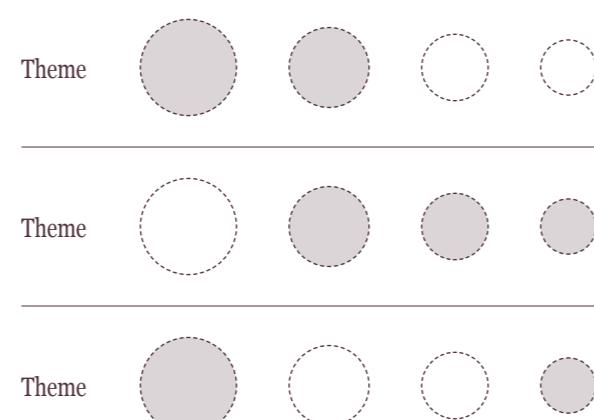
Mapping

Fieldwork

Literature Review

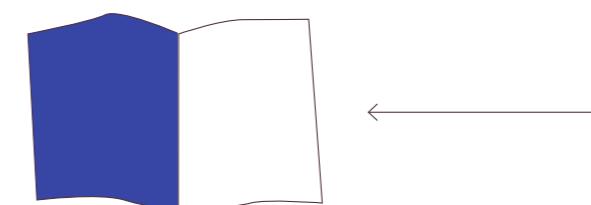
THEMATIC TRANS-SCALAR

The research is organised thematically, and often involves more than one of the four scales.



Thematic Binder: "Thematic Studies on Issues and Opportunities for Women of the Haors"

Themes were chosen to be explored (e.g. women's vision, water management). The multiple sources used to explore each theme contribute a diverse set of perspectives to inform design decisions.



Case Studies

Fieldwork

Literature Review

METHODS

Fieldwork

During the two-week fieldtrip to Bangladesh, the two cities, Dhaka and Sylhet, will be sites for contextual analysis. This includes taking photos and videos, material study, interviews with residents with the help of interpreters, and learning from researchers from Shahjalal University of Science & Technology.

There are ethical considerations in using this method. Visiting the homes of people whose sense of privacy is strong will cause a level of disturbance. Furthermore, for the women in seclusion, this might be a bigger concern especially when photographs and videos are taken. Hence, it is a method that will require using existing local networks to enter settlements, and discernment with consent for photos and videos.

Literature Review

Research papers, government framework publications, news articles, and books about the history, development and vision for housing typologies in climate-vulnerable sites in Bangladesh will be studied to learn from existing practices and design strategies. Specifically, this includes but is not limited to: climate adaptation strategies of the Haor people, local material usage and innovation in housing design, settlement patterns and expansion, embankment strategies, land ownership and architectural identity.

Case Studies

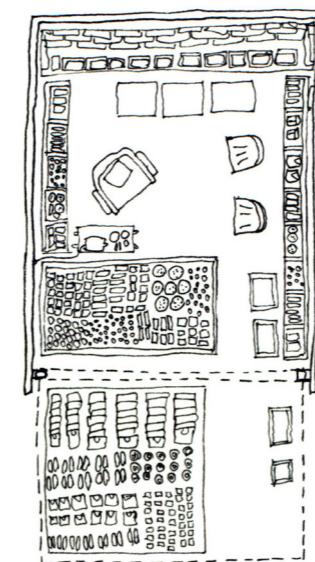
Real-life cases of implemented strategies, services or designs will be studied. This will help assess suitability to the climatic and cultural context, as well as provide a point of reference for feasibility. Some case studies include the Khudi Bari, Women's Refuge in the Rohingya camp, SEWA Bank, NGO-led drinking water systems, etc.

Cataloguing

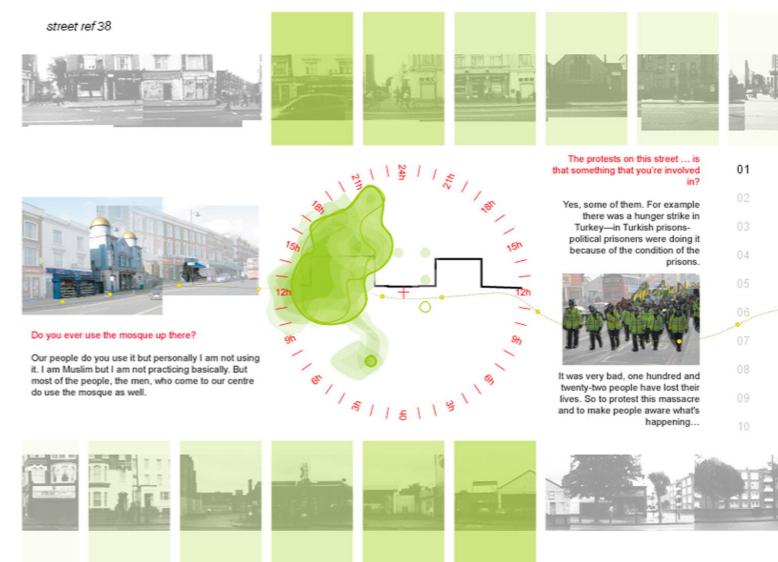
Based on Huda Tayob's *Architectures of Care*, research will also be conducted through sketching. By cataloguing the intimate spaces and objects of daily life of a woman, 'a woman's radius', this research aims to analyse activities of women in a spatial sense, with an unconventionally personal perspective. This data will be pertinent for identifying barriers to resources and designing for the everyday practices of women.

Mapping

Mapping is firstly used in a conventional sense to investigate the elements (e.g. paddyfield, village mound, kitchen, etc.) that make up the morphology of the four scales: territory, village, cluster and dwelling. This is used to situate the catalogue of activities of women. Secondly, mapping is used to investigate the temporal dimension by studying rhythms of life in the Haors, highlighting the experience and subjectivity of women, this empowers visibilisations of marginalised perspectives. This method draws on mapping practices by Nishat Awan, an architect and researcher.



CCA, "Architectures of Care," accessed October 15, 2023, <https://www.cca.qc.ca/en/articles/issues/30/of-migration/81159/architectures-of-care>.



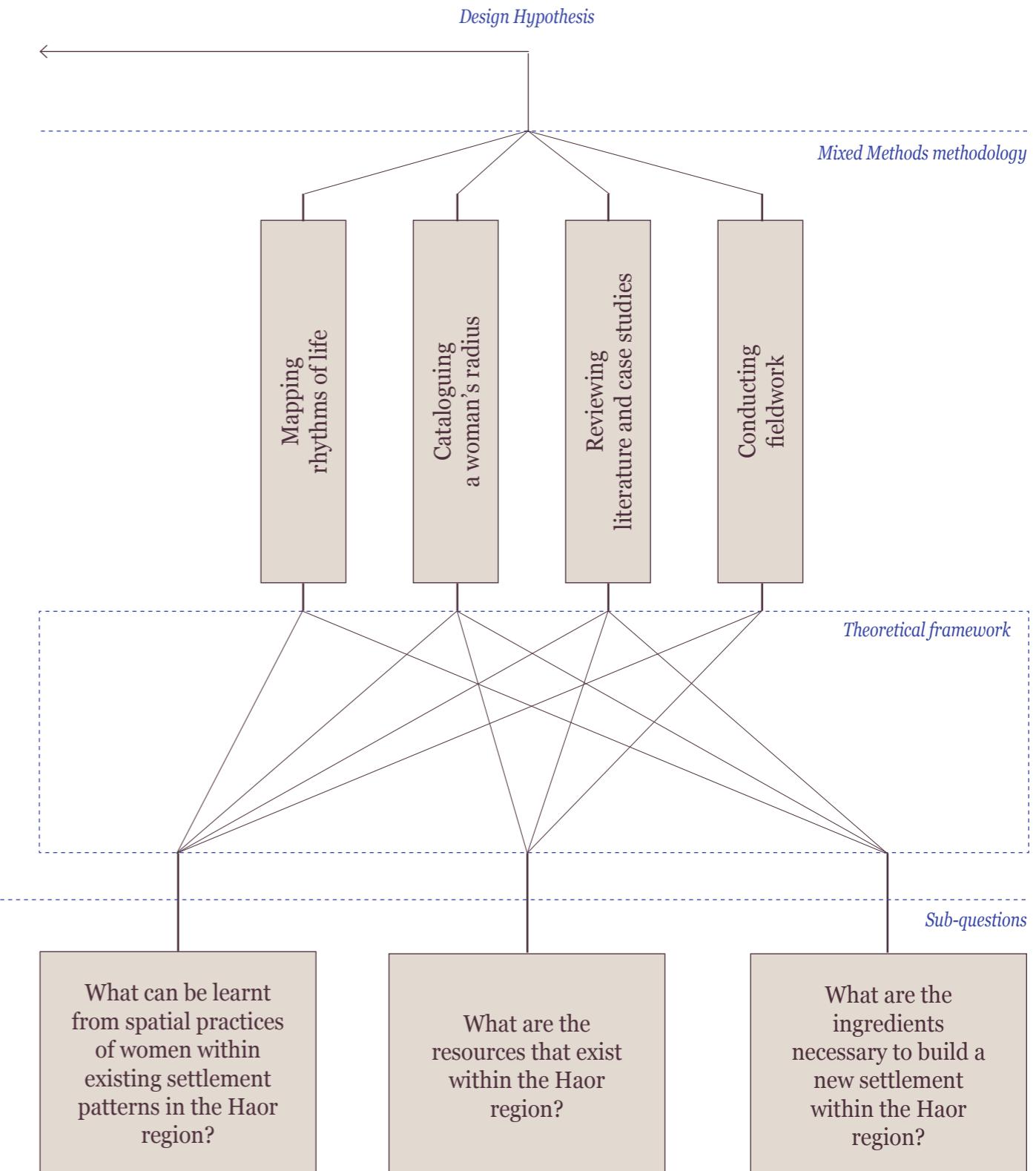
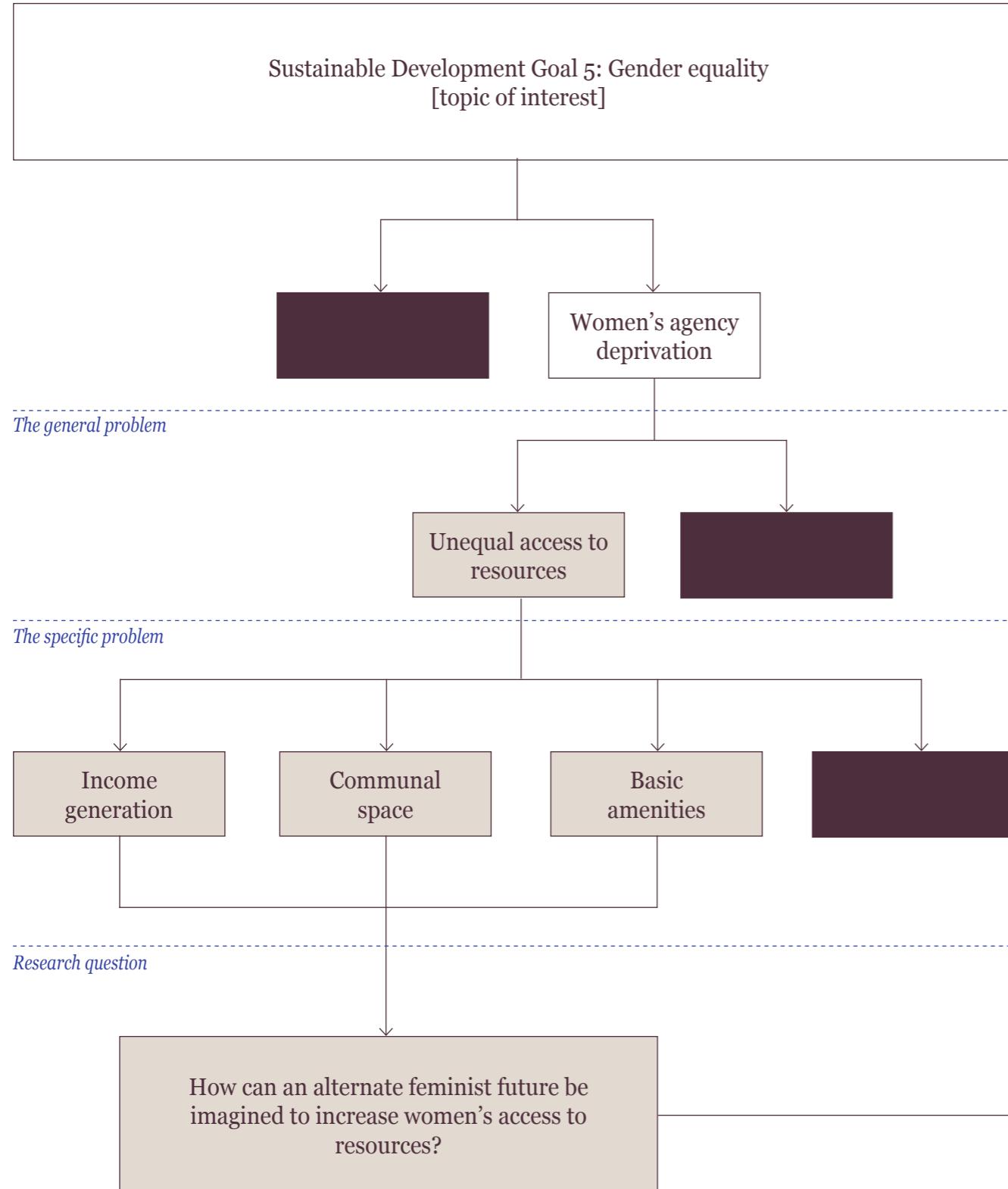
Nishat Awan and Phil Langley, "Mapping Migrant Territories as Topological Deformations of Space," *Space and Culture* 16, no. 2 (April 4, 2013): 229–45, <https://doi.org/10.1177/1206331213475746>.

RESEARCH DESIGN

Other entry points for research

My agency as a designer

Relevance



THE MANIFESTO

**To create a hierarchy of
collective action to increase
women's access to resources**

**“WOMEN AND GIRLS ENGAGE
IN *collective action* WHEN
THEY STAND TOGETHER IN
SOLIDARITY AND EXERCISE
VOICE *to transform
institutions and power
relations.*”**

“Collective action is a powerful tool for social transformation and is fundamental to women and girls’ empowerment on a societal level.”

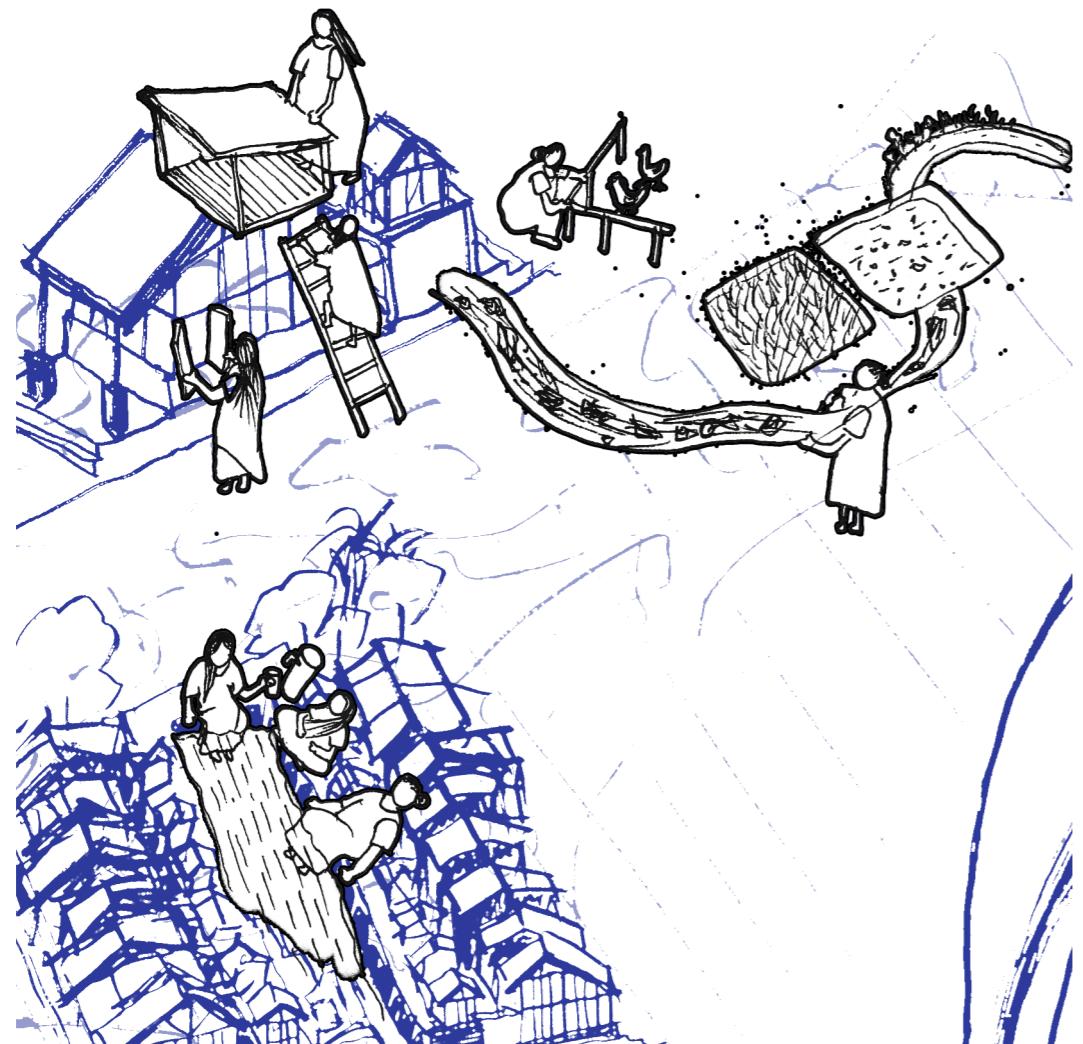
“Many factors can contribute to a woman’s ability to participate in collective action, including social capital through her network and her ability to move safely and freely throughout her community.”

Gender Equality Toolbox, “Collective Action,”
May 9, 2019, accessed October 15, 2023,
<https://www.gatesgenderequalitytoolbox.org/measuring-empowerment/agency/collective-action/>.



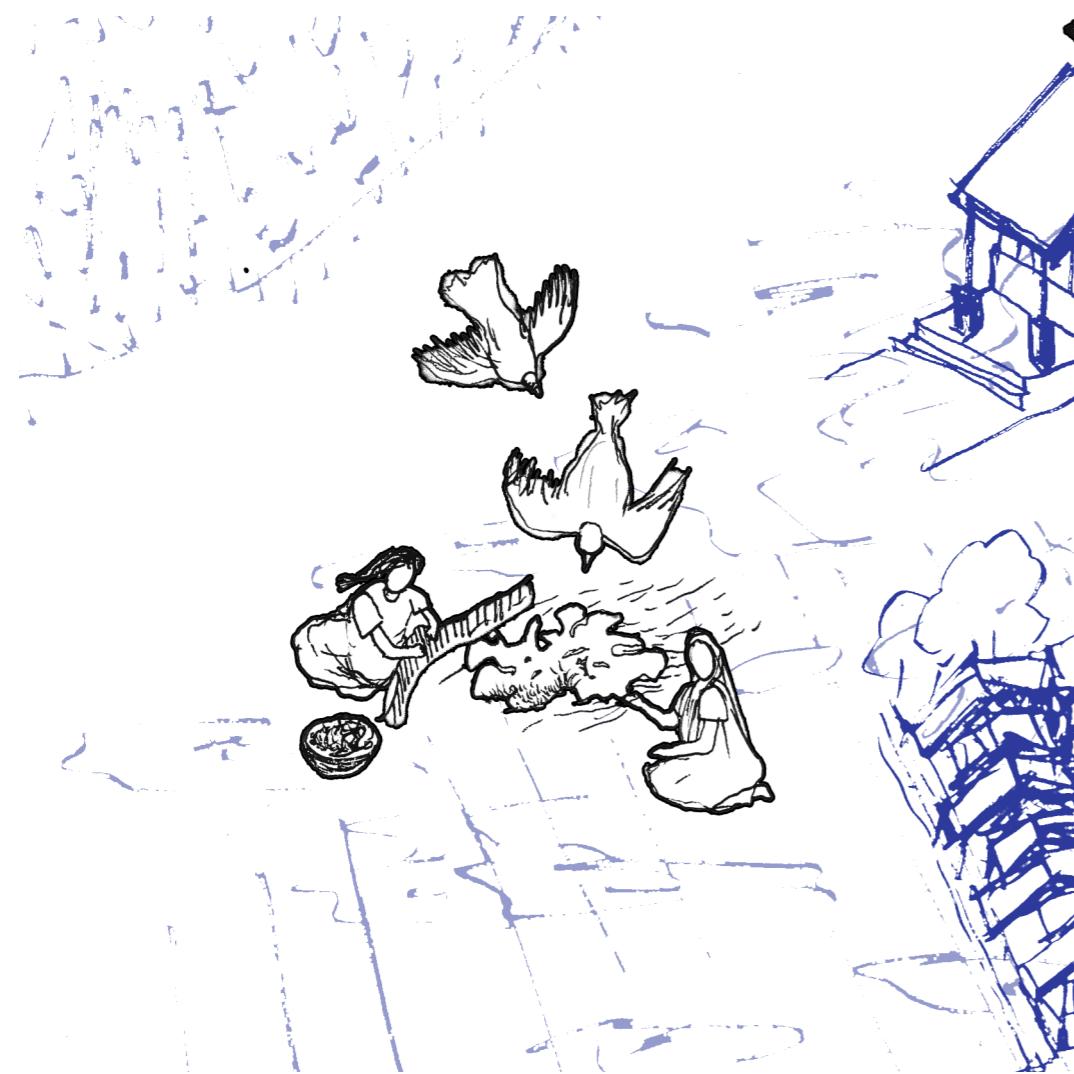
1 *Spatial*

Women have the ability to interact with other women and form increasingly large groups for collective action, in a safe gender-sensitive way



2 *Temporal*

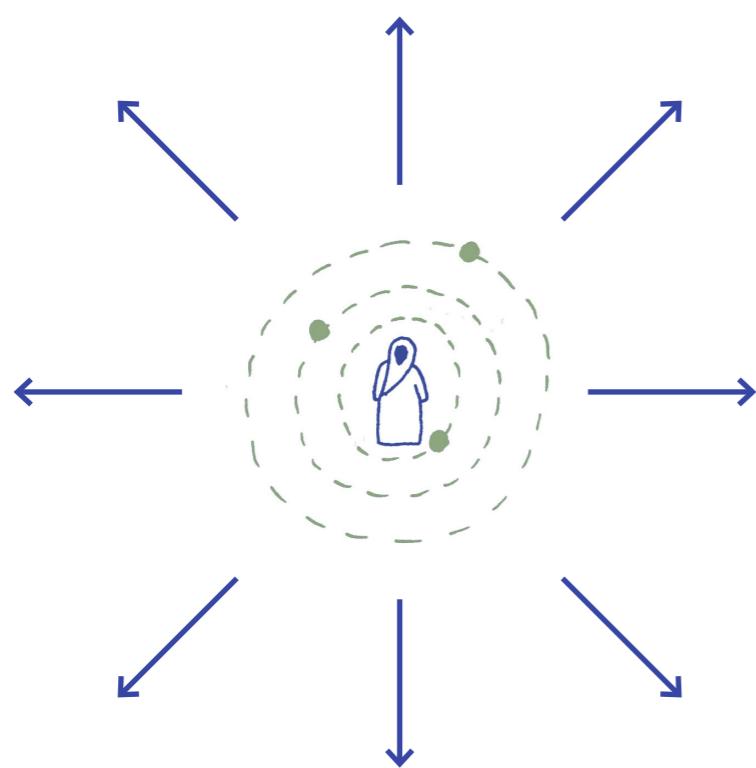
Women can be secure and continue to participate in collective action during floods and dry season



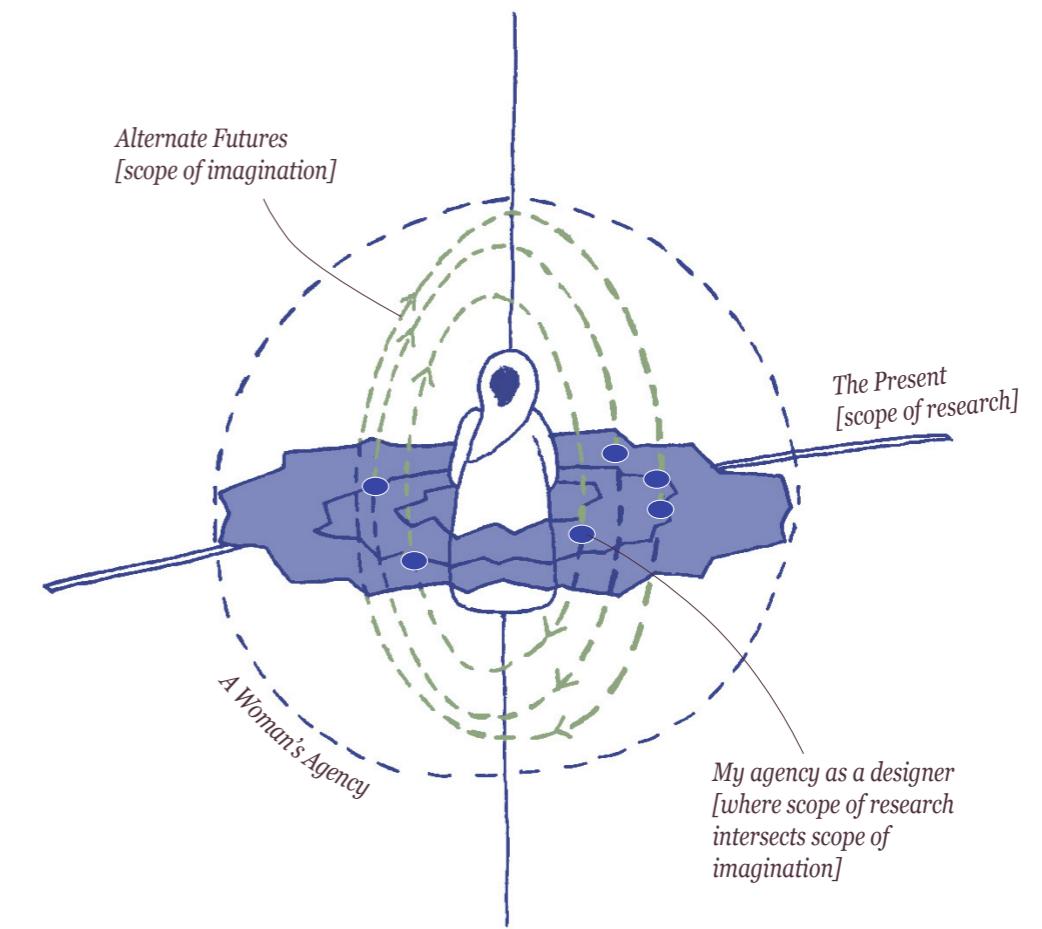
3

Managerial and Ecological

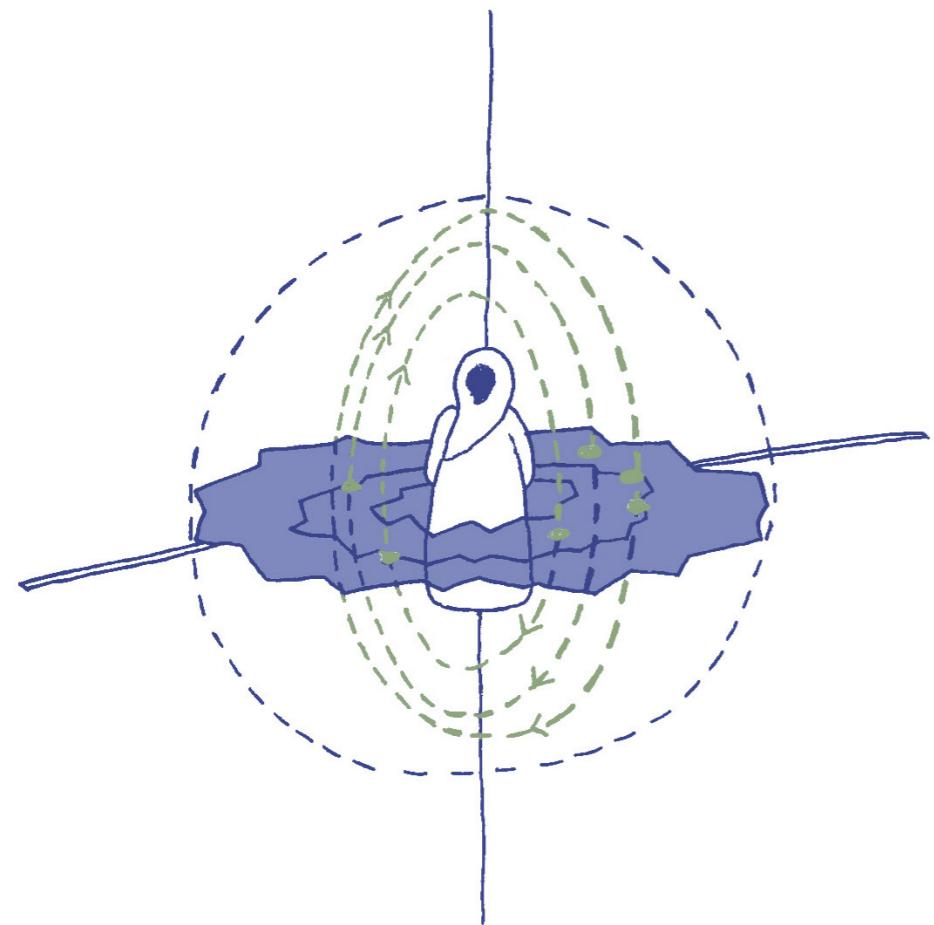
The systems are sustainable
and safeguarded



**INCREASING OPPORTUNITIES
FOR COLLECTIVE ACTION**



**EXPANDING
A WOMAN'S SPHERE OF AGENCY
IN THE HAORS**



**EXPANDING
A WOMAN'S SPHERE OF AGENCY
IN THE HAORS**



focusing on women leads to a myriad of development in other areas



increase in children's nutrition,
reduction in domestic violence,
increase in income,
better climate resilience,
increased rates of education,
increased food security,
lower infant mortality rate,
lower maternal mortality rate,
better wetlands conservation (flood buffers,
biodiversity, etc.),
etc.

SCENARIO

There is a new feminist village in Tahirpur. Families from a nearby over-densified village will build and inhabit the new mound incrementally.



REFERENCE VILLAGE

Fieldwork was conducted in 3 settlements in the Haors. Of the 3, Ratonshri village had the highest density and appeared saturated. Hence this village is taken as a density reference.

There are roughly **600 people** in this village of approximately **1.3 hectares**
= 460 people per hectare

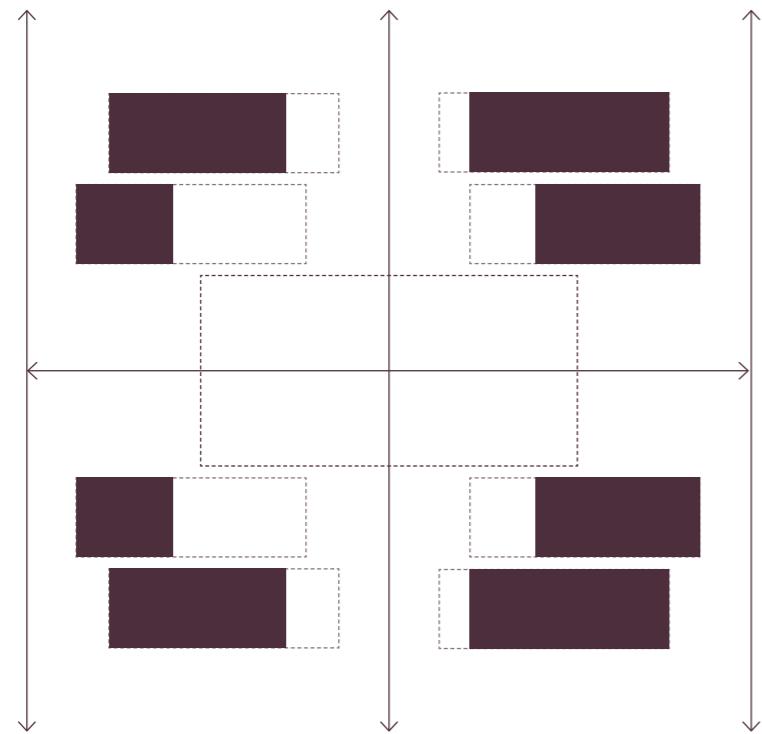
Approximately **100 houses** were counted, confirmed by the statistic that the average household size in the Haors is 6 people. This gives a density of **77 houses per hectare**.

MODEL VILLAGE

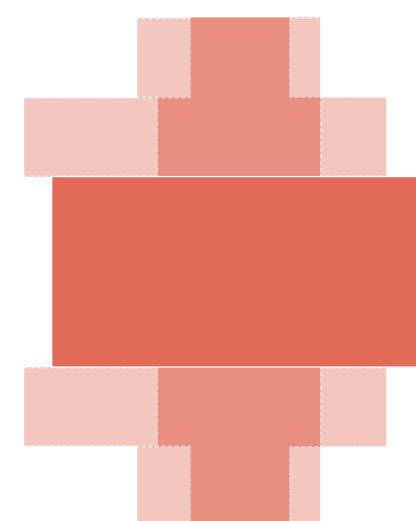
For increased efficiency and futureproofing, the model village aims to achieve higher density than the reference village.

The model village will house up to **700 people per hectare** which is slightly above **1.5 times** of the reference village. To create a good balance between high density and access to quality public space, the model village will aim to provide at least the same number of houses per hectare as the reference village with improved public space.

DESIGN PRINCIPLES



access to amenities



hierarchy of collective action

Stem and Service Core diagram

The Feminist System

Each house has connection to the ground, and at least 1 upper level that is safe from floods.

Each house will have a service core within a durable structure, safe from floods. This will consist of a toilet, accessible without being seen by other households; a kitchen, and a private courtyard that leads to the communal courtyard.

The plot size is 59 sqm for the smaller types and 118 sqm for the larger type for extended families, with incremental growth allowable up to GF+1.5 storeys.

Each house has space for composting, a biodigester, a rainwater harvesting tank and livestock rearing.

Replicability

This feminist village will be replicable throughout the Haor region. The financial model that allows new mounds to be built and expanded will be sustainable. The main axis of the village will be designed to provide paddyfield and river access to its inhabitants, and the orientation of houses can be adapted to this main factor.

Incrementality

Based on typical housing in the Haors, the housing plots will house up to 9 people in the smaller plots, and up to 18 in the large plot. Plots will be delineated and the maximum height and building setback will be set out. Residents are able to personalise and expand their houses up to 1.5 floors.

Typology Mix

The main inhabitants of the village will be part of the lower income group, with the flexibility of accommodating a mix of middle income as well. This middle income group will be residents who increase their income or receive remittances.

PROGRAMME OF REQUIREMENTS

Territorial amenities (shared with other villages):

Market/bazaar	1 per town centre
Hospital	2 per town centre
Bank	4 per town centre, 1 is the Grameen bank
Pharmacy	4 per town centre
Khola (shared land available during dry seasons)	approx. 1 site per 6 villages
Graveyard	approx. 1 site per 15 villages

Amenities shared between neighbouring villages (at least initially):

Schools (primary and secondary)	min. 1 per 2 villages
Health clinic	min. 1 per 2 villages
Women's centre/refuge	min. 1 per 2 villages
Garden	
Temporary accomodation	
Daycare and breastfeeding space	
Counselling room	
Activities room	
Prayer room	
Store	
Toilets and showers	min. 1 per 2 villages
Mosque	home-based shops and rentable plots
Shops	

Cluster amenities:

min. area is the total of 16 sqm per standard plot

Communal Courtyard	
Pond	
Communal cropland	
Communal grazing land	
Communal social space	1 nos.

Ghat

Series of brick vaults	
Communal stairs	
Communal storage/shop lots	
Gateway into cluster	
Communal space on the upper floor	
Drinking water tank and filter	

1 U-shape

min. 1 per 8 dwellings

Dwellings:

Plot size	4.3 x 13.7 m; 8.6 x 13.7 m
Living zone	incremental to 5 rooms and balcony per standard plot
Open-to-sky zone	on average 10 sqm per standard plot
Service zone	1 kitchen, space for livestock, storage, rainwater tank, biodigester, 1 toilet and 1 bath



imagining an alternate
feminist future to
increase women's
access to resources

RESEARCH

SCALAR RESEARCH

THE SCALAR BINDER:

“Radii of Collective Action of Women of the Haors”

The scalar binder is organised in 4 scales: territory, village, cluster and dwelling. In each scale, activities of women (e.g. harvesting, bathing, cooking) are analysed in the context of morphological elements (e.g. river, earth mound, cow shed).

In order to build up a layered understanding of the patterns of living/working of women in the Haors, this approach of a working document drawing from multiple sources (literature review, maps, site visits, news articles) and times (the vernacular, the present, the futures) aims to reflect the dynamic nature of life in the Haors.

It hopes to encapsulate deeper and less tangible cultural values, and simultaneously learn from wisdom of existing practices in the Haors.

To conduct scalar research is to find opportunities and threats to build social, ecological, aesthetic, economic and cultural values; to establish various radii of collective action for women rooted in socio-spatial context, in order to increase women's access to resources, and hence, agency, in **housing for the women of haors**.

SCALES

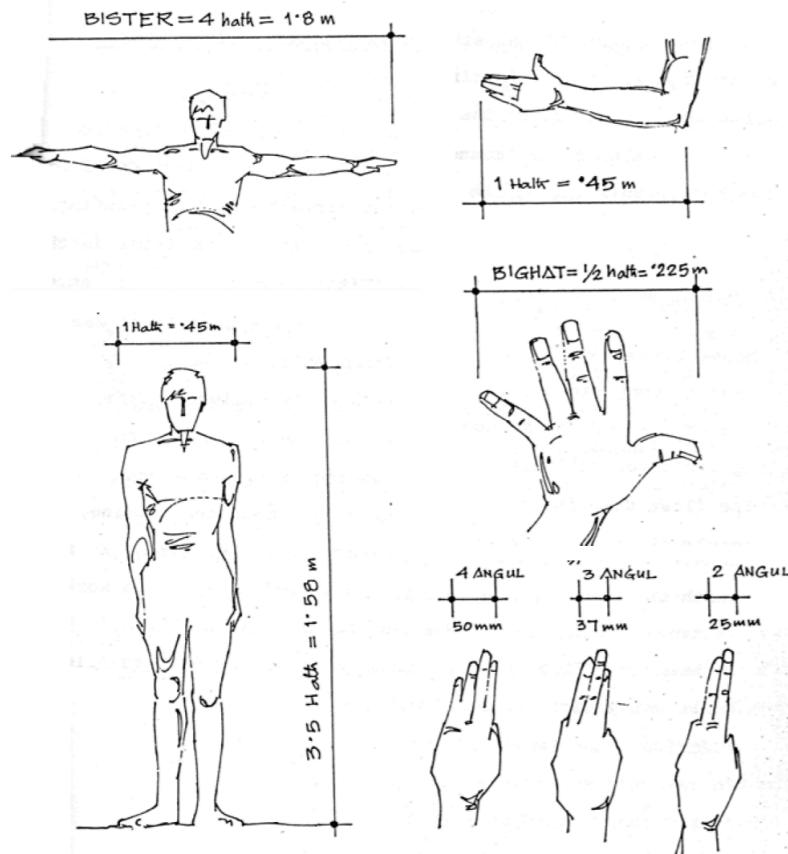


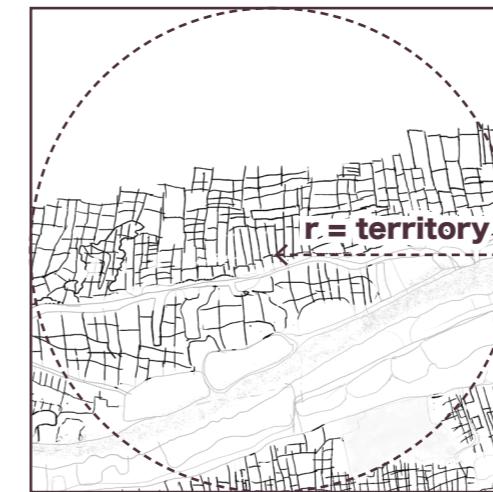
Fig. 04 Traditional measurement unit (Hasan, D. M., 1985, modified by author)

In literature, there are examples of measurement units that are traditionally used in the Haor regions (see figure). The measurement units are derived from the average man, hence construction methods and resulting spaces can present challenges for the average woman.

To design **housing for the women of haors**, is to design inclusively. It is to consider the large and beautiful range and diversity of women, not pertaining only to physical measurements but also age, mobility and aspirations. For women to have access to resources to develop their individual, collective and changing aspirations, there needs to be refocused scales in conducting research and design- one that enables women to shape the spaces they need, and take part in constructing them too.

Hence, as a women-focused research and design tool, this scalar binder will utilise various scales with women at the centre of the 'radius'.

TERRITORY SCALE



TERRITORY SCALE

5m
5m



ACCESS PUBLIC AMENITIES

Constraints

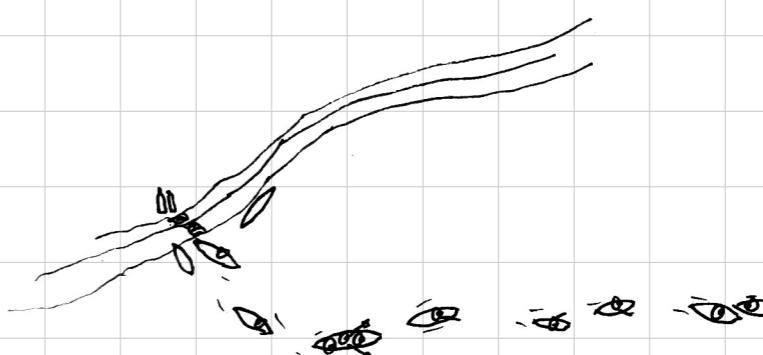
There are very limited amenities within the villages, and so women have to travel long distances from the villages to either the town centre or even further. These amenities include but are not limited to: hospital, bank, post office, pharmacy, high school, etc.

Due to the practice of purdah, women have socio-cultural mobility constraints. This is further compounded by climatic and spatial challenges- the villages are nearly isolated from land (and road networks) for more than half of the year during wet seasons. Hence, women are dependent on water infrastructure, money and the permission and accompaniment by husbands or male relatives in many cases.

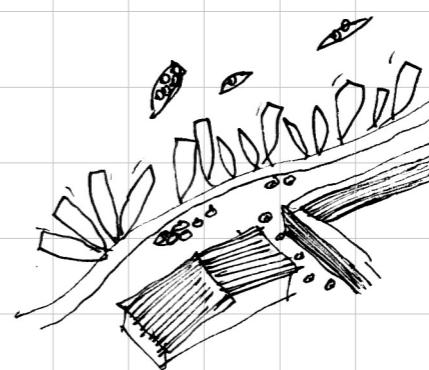
Opportunities

Women are able to greatly increase their access to resources by gaining and maintaining connectivity to the centres throughout the year. Designing to maximise boat connectivity and boat access perhaps by boat sharing practices would increase the radius of collective action of women.

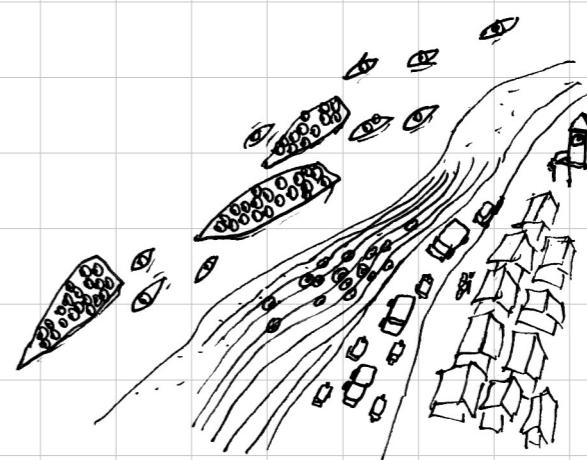
Fatema Akhter Hiramoni, "Quality of Life among Women Living in Haor Basin in Bangladesh and Its Socio-Economic Predictors."



to leave the village



to arrive in the town centre



to arrive in the district centre

COLLECT WATER AND FUEL

Constraints

During droughts, water becomes extremely scarce, and women have to travel kilometres to access ponds or tube wells to collect water for the household.

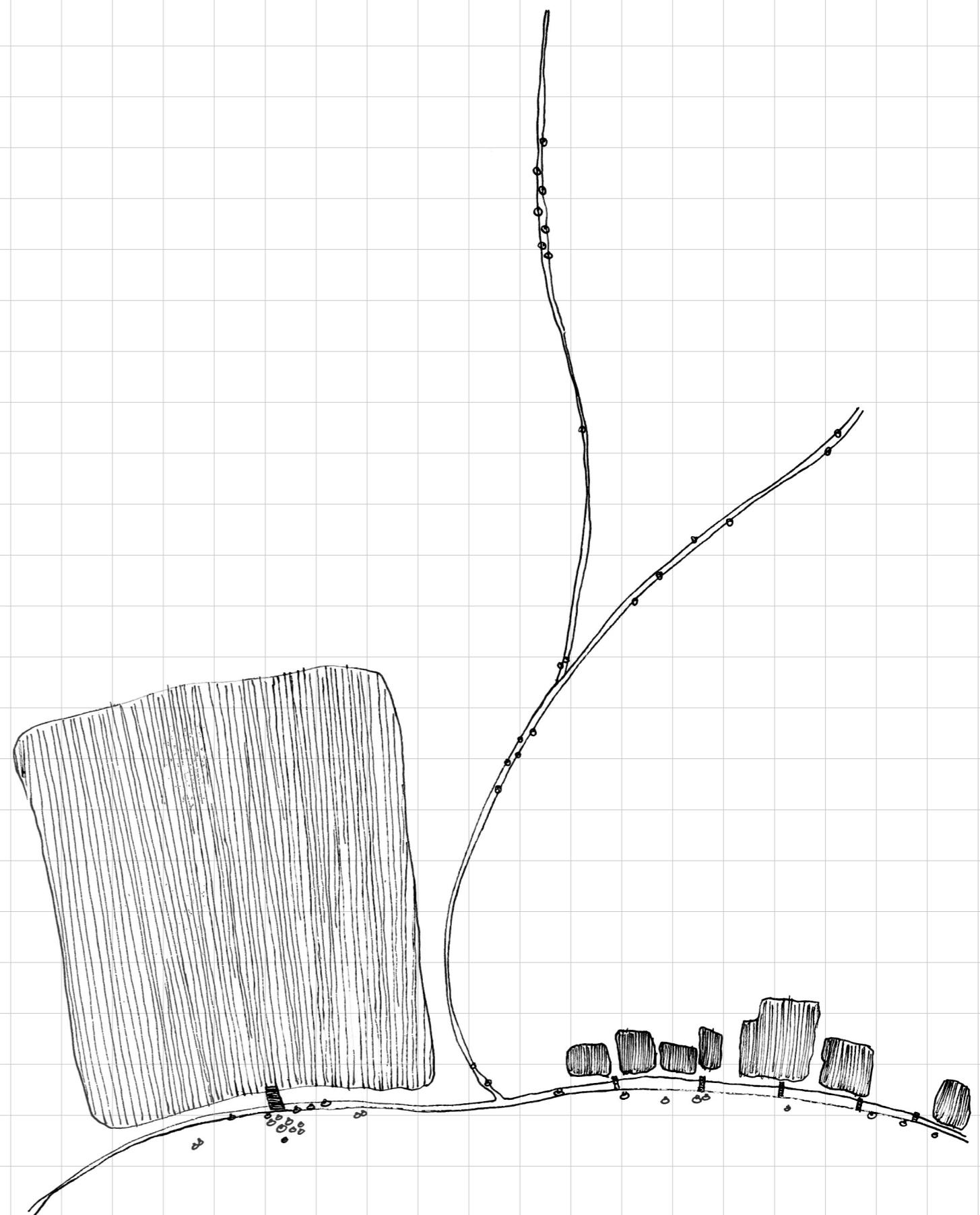
This is seen as the woman's duty and has three main consequences. Firstly, women have to carry extremely heavy kalsi (aluminium water jar) under the hot sun. Secondly, the water is not always clean, especially since arsenic contamination is becoming increasingly widespread. Thirdly, the time cost of this activity renders women with less time for income generation or other activities.

Furthermore, fuel is also very inaccessible. With the depletion of forest resources, women spend hours searching for firewood or even plastic trash as fuel to cook.

Opportunities

Existing practices of using ponds to store for dry season can be learnt from. This can be enhanced to increase water security with natural filtration systems, pumps and clean storage tanks. Furthermore, finding an alternative fuel source for cooking would enable women to save hours within a day, reducing time poverty,

Ahmad, Sk Akhtar et al. "Arsenic contamination in groundwater in Bangladesh: implications and challenges for healthcare policy." Risk management and healthcare policy vol. 11 251-261. 30 Nov. 2018, doi:10.2147/RMHP.S153188



WORK THE PADDYFIELDS

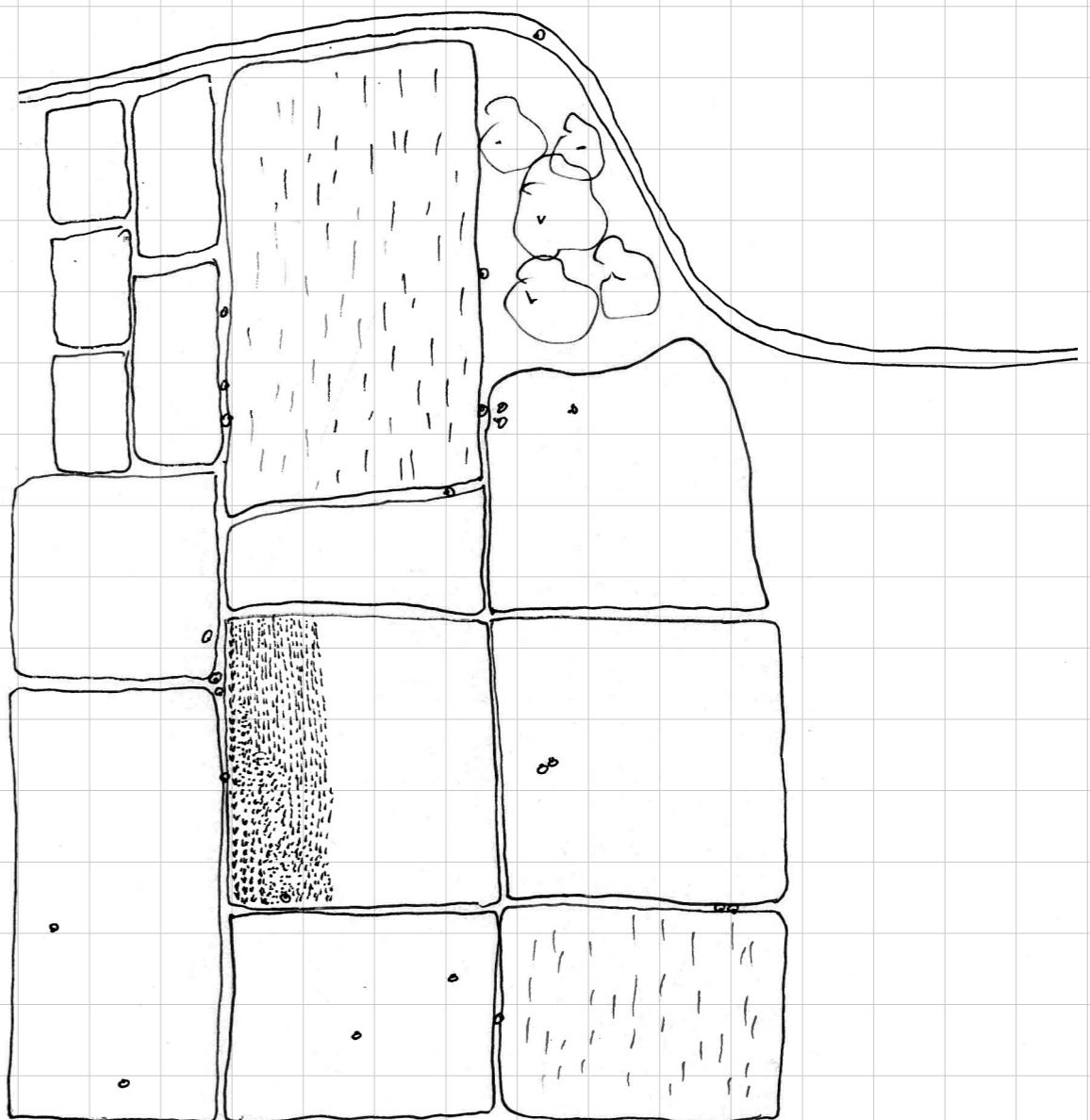
Constraints

When women work in the paddyfields, a lot of this income is not accessible to women, since men have access to markets to sell. Furthermore, the livelihoods of households are vulnerable since flash flooding and droughts are increasingly jeopardising rice and to a smaller consequence, vegetable crop production. This not only directly increases food insecurity for the households themselves, the climate-vulnerable income indirectly causes many health and wellbeing issues.

Opportunities

With income diversification, there will be more resilient and stable income for households, able to respond and adjust to climate patterns or external factors. Moreover, in the process of income diversification, women are able to take more ownership and also access income directly.

Mondal, Sushmita & Akter, Liza & Hiya, Hafsa & Farukh, M.. (2021). Effects of 2017 Early Flash Flooding on Agriculture in Haor Areas of Sunamganj. *Journal of Environmental Science and Natural Resources*. 12, 117-125. 10.3329/jesnr.v12i1-2.52007.



DO LARGE-SCALE AGRICULTURAL PROCESSING

Constraints

This large open space is only available when monsoon waters recede and dry season starts. Women take part in rice threshing and rice winnowing mainly, and women generally have no decision-making power in the generated income.

Opportunities

The large area of land, as well as its existing networks of secondary pathways that connect to multiple villages makes the Khola a extremely valuable and high potential space for women to participate in collective action in the territorial scale.

Bamboo production and crafts, as well as mobile duck farms, amongst many other activities, can be income-generating activities that take place in the Khola for women in the territory to collectively own and run.

Haque, Ashraful. "The Mobile Duck Farms in the Haors." The Business Standard, August 8, 2023. <https://www.tbsnews.net/features/panorama/mobile-duck-farms-haors-678814>.



CELEBRATE

Celebrations are a big part of life in the Haors. Fairs, where various handicrafts, agricultural products, and so on are sold, with singing and dancing, take place in large open spaces such as Kholas. Weddings are also a big celebration, with a series of rituals and ceremonies, and involving entire communities concerned. Muslim festivals such as Eid ul-Fitr are a highlight, full of culture, sports and social events.

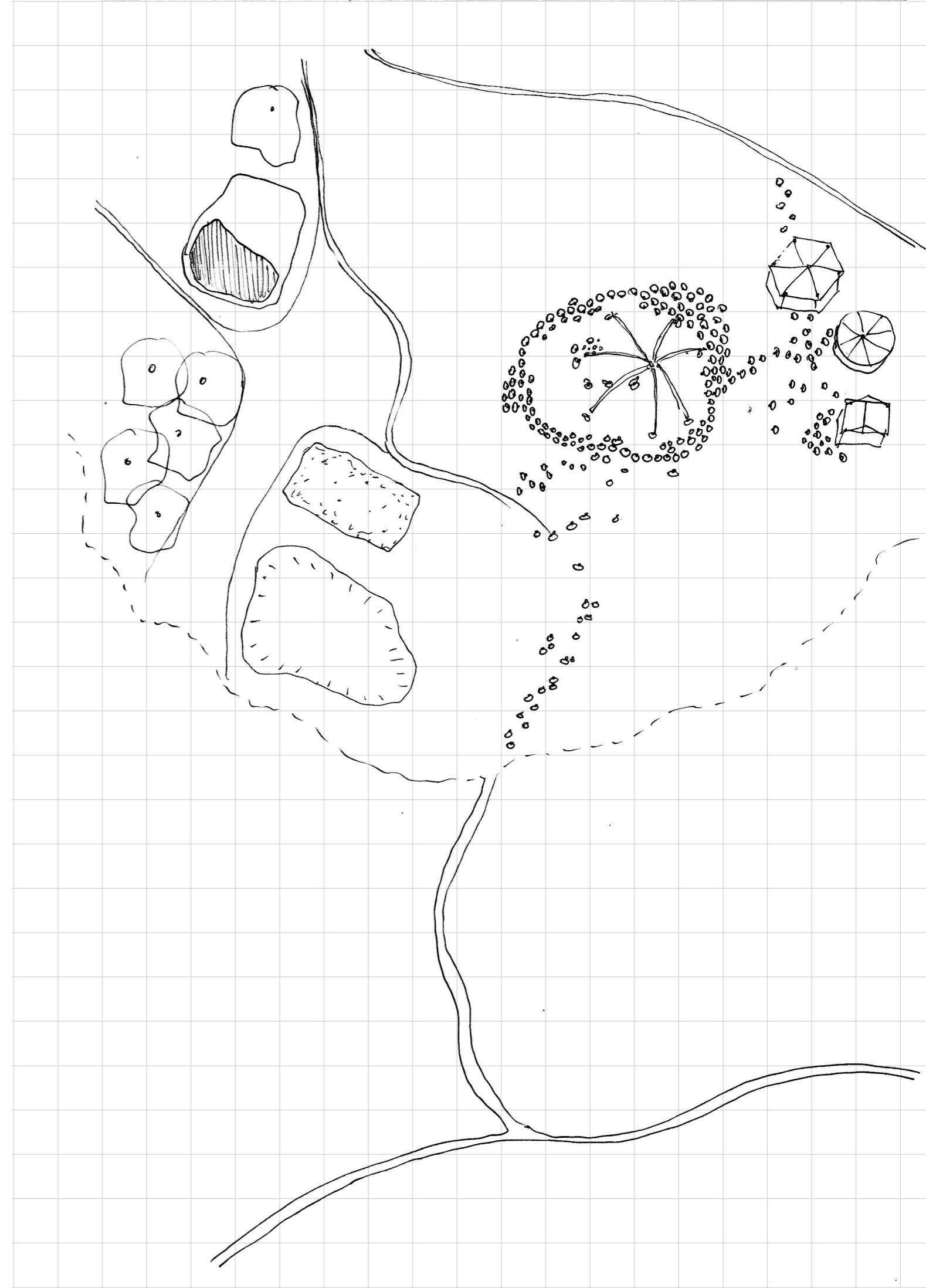
Constraints

These are dependent on the availability of land, and the connectivity of villages to the land. The Kholas can be mismanaged by leaseholders, and the disruptions in the ownership system or the ecological ecosystem affects livelihoods and the culture of celebrating.

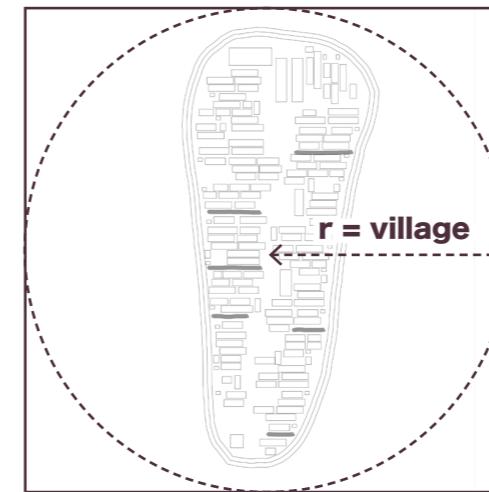
Opportunities

With water management, waste management and wetlands conservation, amongst the myriad of interconnected ecosystems, the model villages can make an increasingly large impact on the health of the wetlands ecosystem (and wider), and preserve this part of life- celebrating. This enables women to connect to women in the territory scale and form increasingly large groups of collective action.

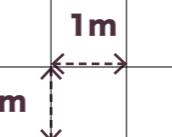
"Festivals and Celebrations of Bangladesh." 2024. *Embassy of the People's Republic of Bangladesh Mexico*. Accessed June 24. <https://mexico.mofa.gov.bd/en/site/page/Festivals-and-Celebrations-of-Bangladesh>.



VILLAGE SCALE



VILLAGE SCALE



REPAIR THE EMBANKMENTS

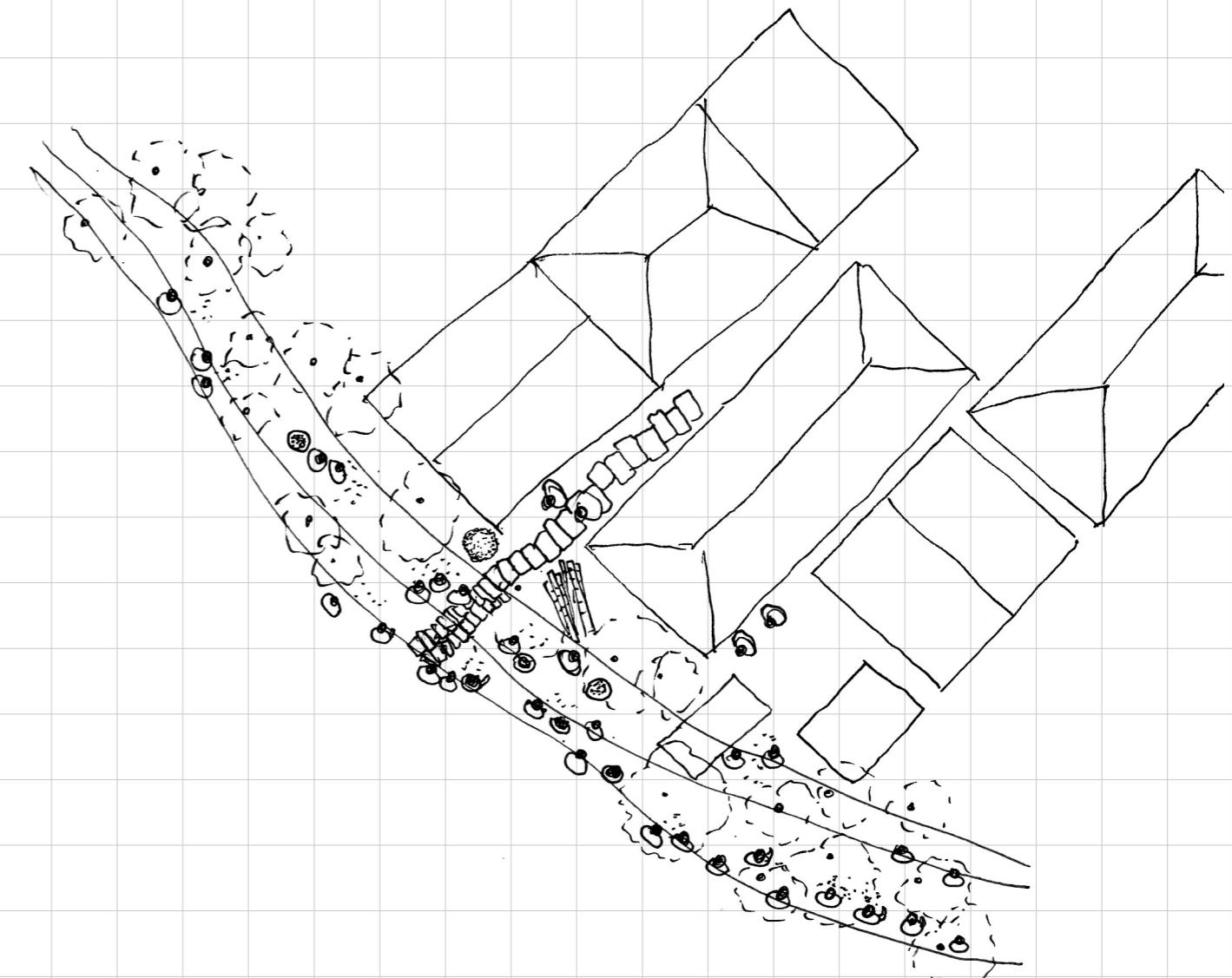
Constraints

Every year, wave erosion caused by flash floods, known as Afal, is a big threat to the villages. This is because the embankments of the higher mounds of the villages are eroded and need a lot of repair in preparation for the next cycle. This creates a large barrier in breaking poverty cycles, as both men and women are unable to commit time to other activities.

Opportunities

By increasing the buffer zones surrounding the village mound, the impacts of wave erosion can be dampened, reducing the workload and time cost of the village households. Furthermore, natural embankment strategies that exist within the Haors can be implemented. This involves planting Vetiver grass, bamboo and submergible tree species such as Koroch in the perimeter of the mounds. This creates opportunities to create communal space within the embankments, which are safe and gender-sensitive for women.

"Standard guideline for rural housing in disaster prone areas of Bangladesh." 2018.
Housing and Building Research Institute.



ACCESS SHOPS OR RUN SHOPS

Constraints

Shops require space and an initial investment that most women do not have. Moreover, because the shops only cater to the village households, this limits the number of shops that can operate within a given village.

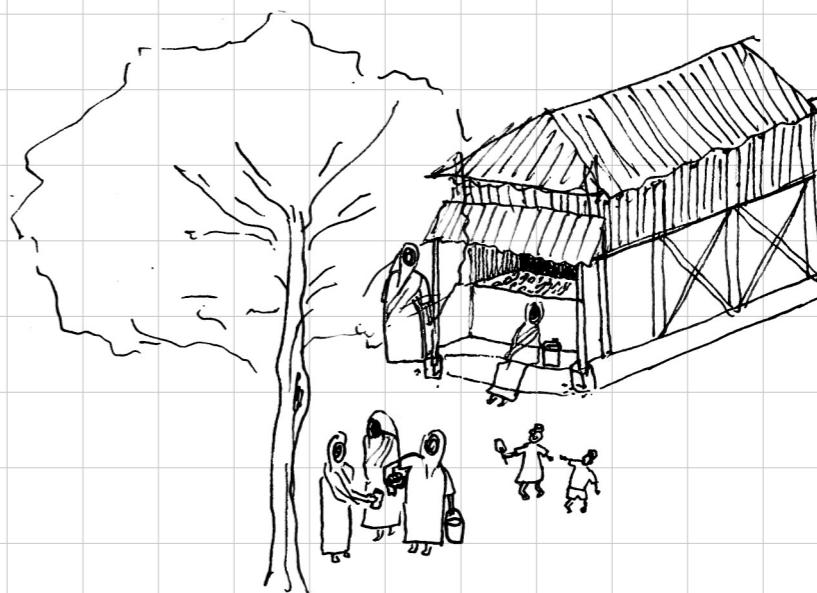
Additionally, there is a traditional model of stores stocking only what store managers want to sell, or what they might make best profit margins on. This does not provide items which women need frequently, or find hard to get access to.

Opportunities

Dwelling design solutions offer opportunities to increase the ability for women to own shops and sell products or services to generate income. By increasing frontage of the shops, connectivity between villages, and diversifying the products that can be sold, a large number and diversity of shops can operate.

Furthermore, NGOs such as Transform Trade have encouraged community-owned shops, set up with capital raised by the community themselves and located in rural locations largely dependent on agriculture. Owned and run entirely by women, they have been created with their needs at the forefront. These shops sell chemical free fertilizers, seeds and produce from local farms, including eggs and homemade snacks. On top of this, they act as a pharmacy, selling nonprescription drugs and providing contraceptives.

⁹² "How Remarkably Radical Village Shops Are Fighting Gender Norms in Rural Bangladesh." 2024. Transform Trade. Accessed June 24. <https://www.transform-trade.org/blog/how-remarkably-radical-village-shops-are-fighting-gender-norms-in-rural-bangladesh#spn-bsp>.



ACCESS VILLAGE AMENITIES

Amenities that can exist within the villages include a mosque, a school and a small clinic. Mosques are culturally men-only, so women do not have access to them. Schools are a much-needed resource that empower the future generation, especially young girls in the fight against child marriage and domestic violence. Clinics are necessary for the wellbeing of all the households, but especially needed during a woman's pregnancy and after-labour care.

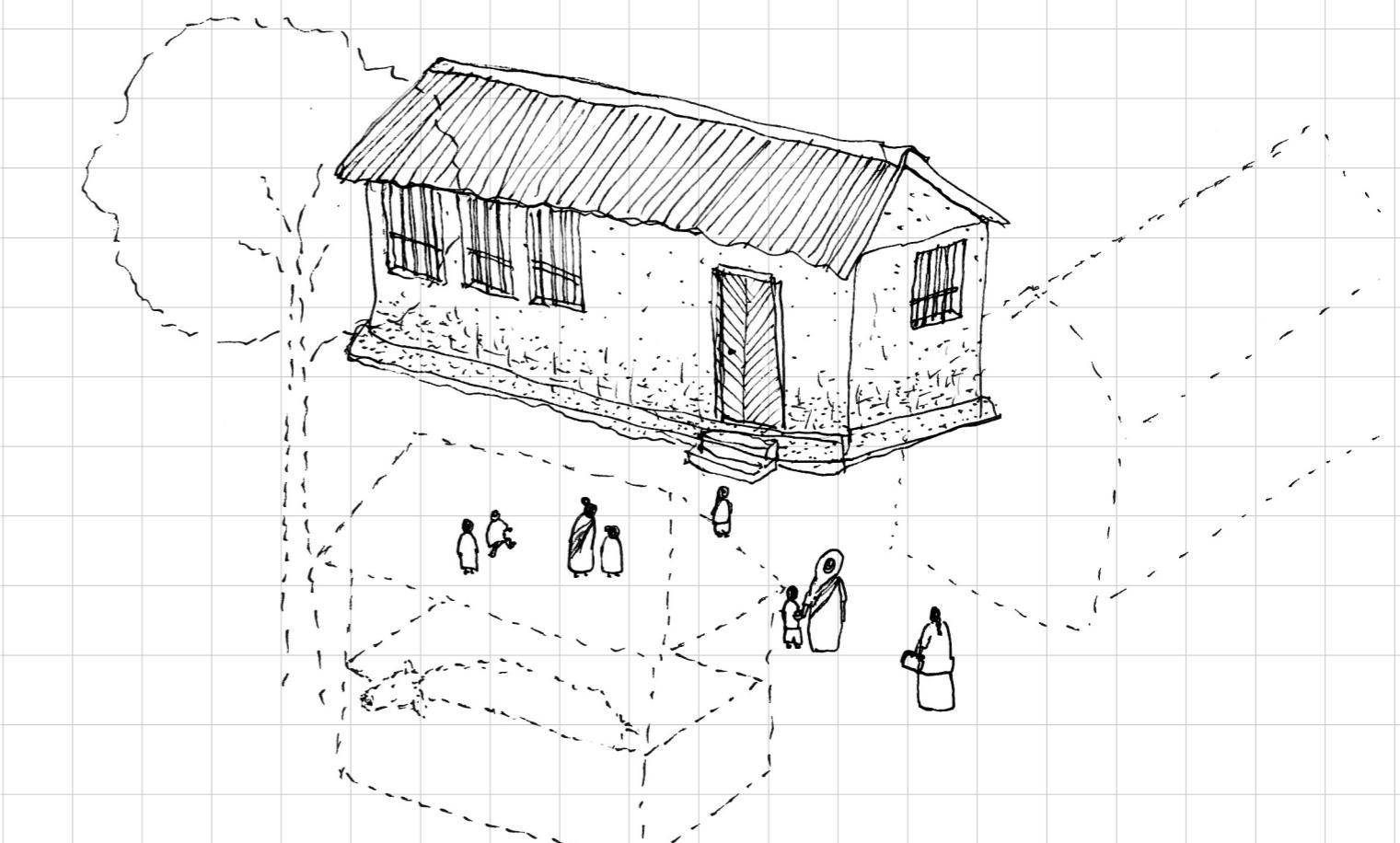
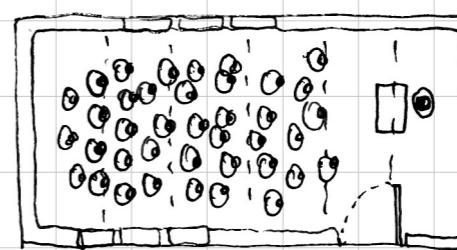
Constraints

Provision to these amenities remains challenging as space and ownership and managerial systems are not in place to enable them.

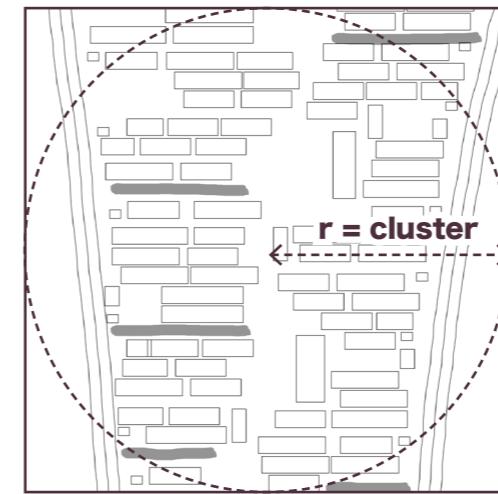
Opportunities

By creating clear ownership and managerial systems shared with neighbouring villages, these amenities become affordable and sustainable. This is especially important for women who have less mobility to access amenities outside the village.

Goutam Roy, "Education in Haor Areas: Should Distance Be the Barrier to Access Education? | Bangladesh Education Article," October 16, 2020, accessed October 15, 2023, <https://bdeduarticle.com/education-in-haor-areas-should-distance-be-the-barrier-to-access-education/>.



CLUSTER SCALE



CLUSTER SCALE

50cm
50cm



RECEIVE TRAINING

NGOs, microfinance banks and govermental organisations do reach out to the village women to provide training and inform about microfinance loan options, etc.

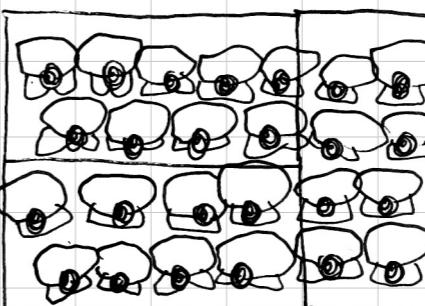
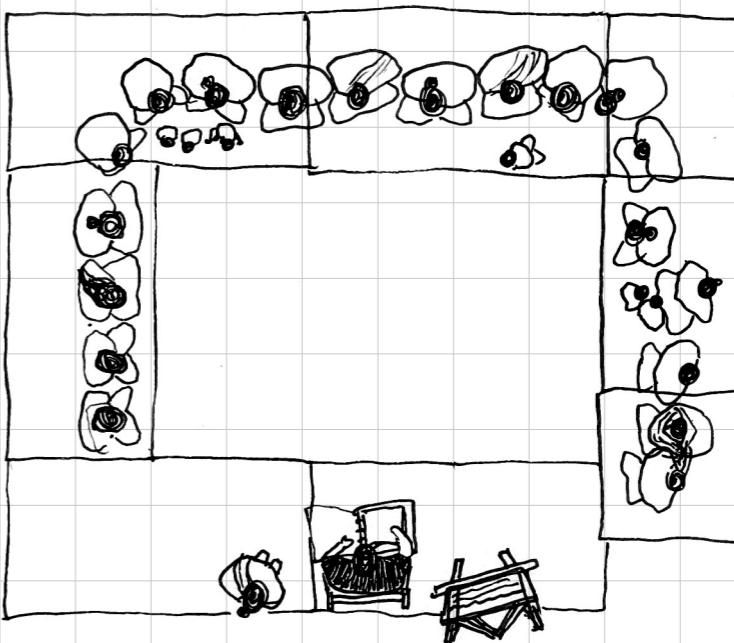
Constraints

Women generally organise themselves in the formations seen in the catalogued sketches. This occurs in 'modules' of the woven mats they sit on. Training requires a lot of space and daylight, as well as a more quiet atmosphere. In the existing conditions of over-densified villages in the Haors, this presents an inhibition to women's access to quality informal education and training.

Opportunities

The practice of women gathering in a small courtyard to have meetings, and to receive training is built on and expanded. A large communal courtyard would provide women access to the infrastructure needed to receive training on nutrition, duck rearing, homestead gardening, savings plans, rainwater harvesting, biodigester maintenance, etc.

"SHOUHARDO - Improving Nutrition for Mothers & Young Children." 2024. CARE. Accessed June 24. <https://www.care.org/our-work/food-and-nutrition/agriculture/shouhardo/>.



COLLECT WATER FROM A TUBE WELL

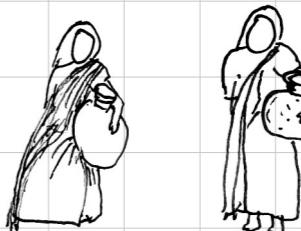
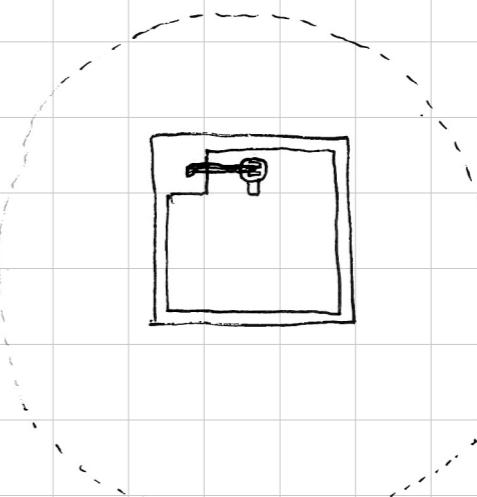
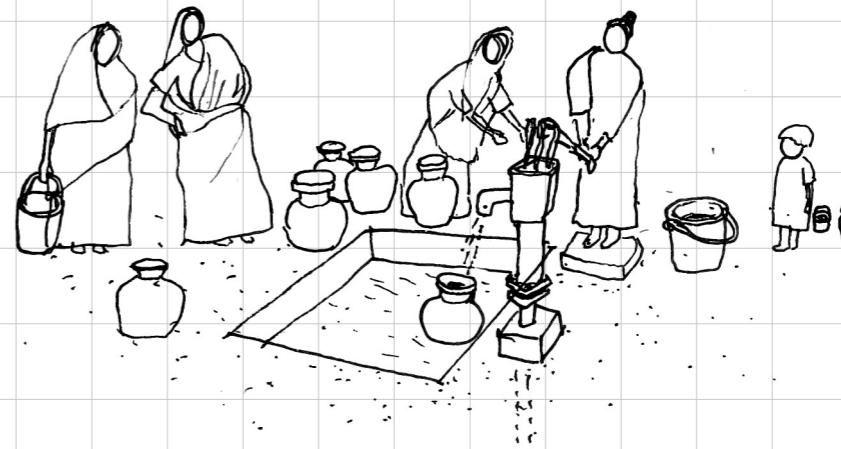
Constraints

Many tube wells that extract groundwater from as far as 12m below ground are increasingly ineffective in catering to households' drinking water needs. Firstly, groundwater is not being recharged sufficiently due to imbalances in the ecosystem caused by poor waste and water management amongst other factors. Secondly, arsenic contamination is becoming more widespread. Thirdly, during flash floods that occur yearly submerging the village for 6-7 days, households have no access to the tube wells.

Opportunities

There is an opportunity for an alternative drinking water source, such as rainwater harvesting coupled with a natural heleophyte filter that cleanses the water. This has the benefit of increased futureproofing compared to continuously increasing the plinth heights and extraction depths of tube wells. Furthermore, the communal aspect of collecting water, where women gather and help each other fill their jars, is retained, preserving the ability of collective action to occur, even during flash floods.

Ministry of Water Resources, "Master Plan of Haor Area", p. 41.



SHARE RESOURCES

There is a culture of sharing within the villages in the Haors. This is partly due to the scarcity of resources including money and land.

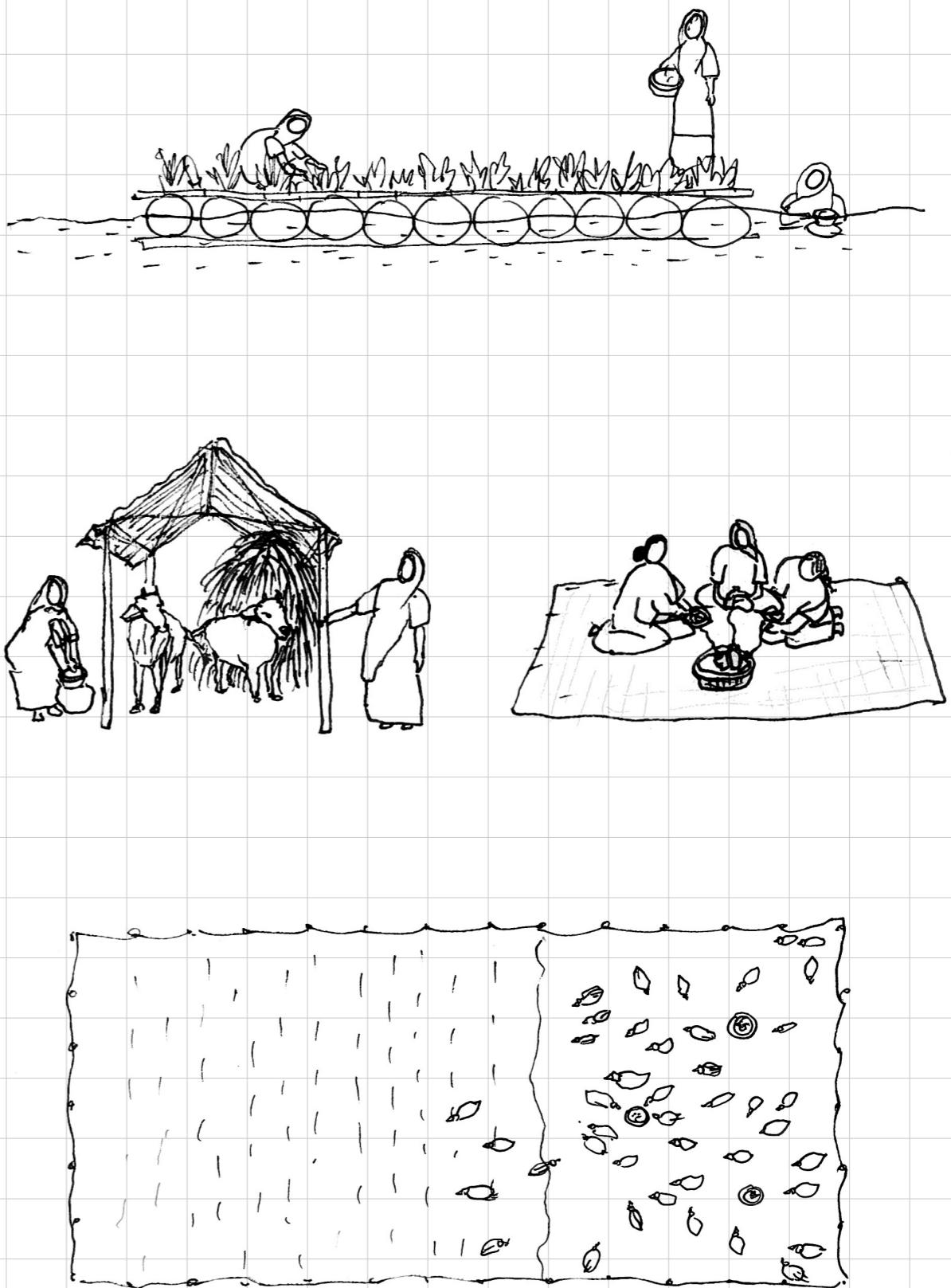
Constraints

Although many households share fuel stocks like haystacks, and even build a communal shed for their cattle, there is still overwhelming scarcity.

Opportunities

Through cluster design measures, space can be more efficiently used and community action groups (CAG) formed for the cluster households to share more resources more effectively. Since a lot of women's work revolves around the maintenance of the house and home-based (mainly unpaid) labour, creating a communal courtyard for shared activities and exchanges can provide many opportunities for collective action within the cluster scale.

"Learning Brief Community Women and Girls Enjoy the Benefits of Reformed Community Groups." 2022. CARE. Accessed May 15. https://careevaluations.org/wp-content/uploads/Final_Community-Group-Learning-Brief_26-June.pdf



PRACTICE COMMUNITY MARKETING

Community marketing wa an application of collective action where small-scale women farmers gathered and sold agricultural produce at a pre-arranged place and time to local traders. While prior applications of collective action have focused on cash crops, community marketing now also focuses on homestead food (i.e. vegetable, poultry, and eggs) as well as to ease participatory conditions in marketing.

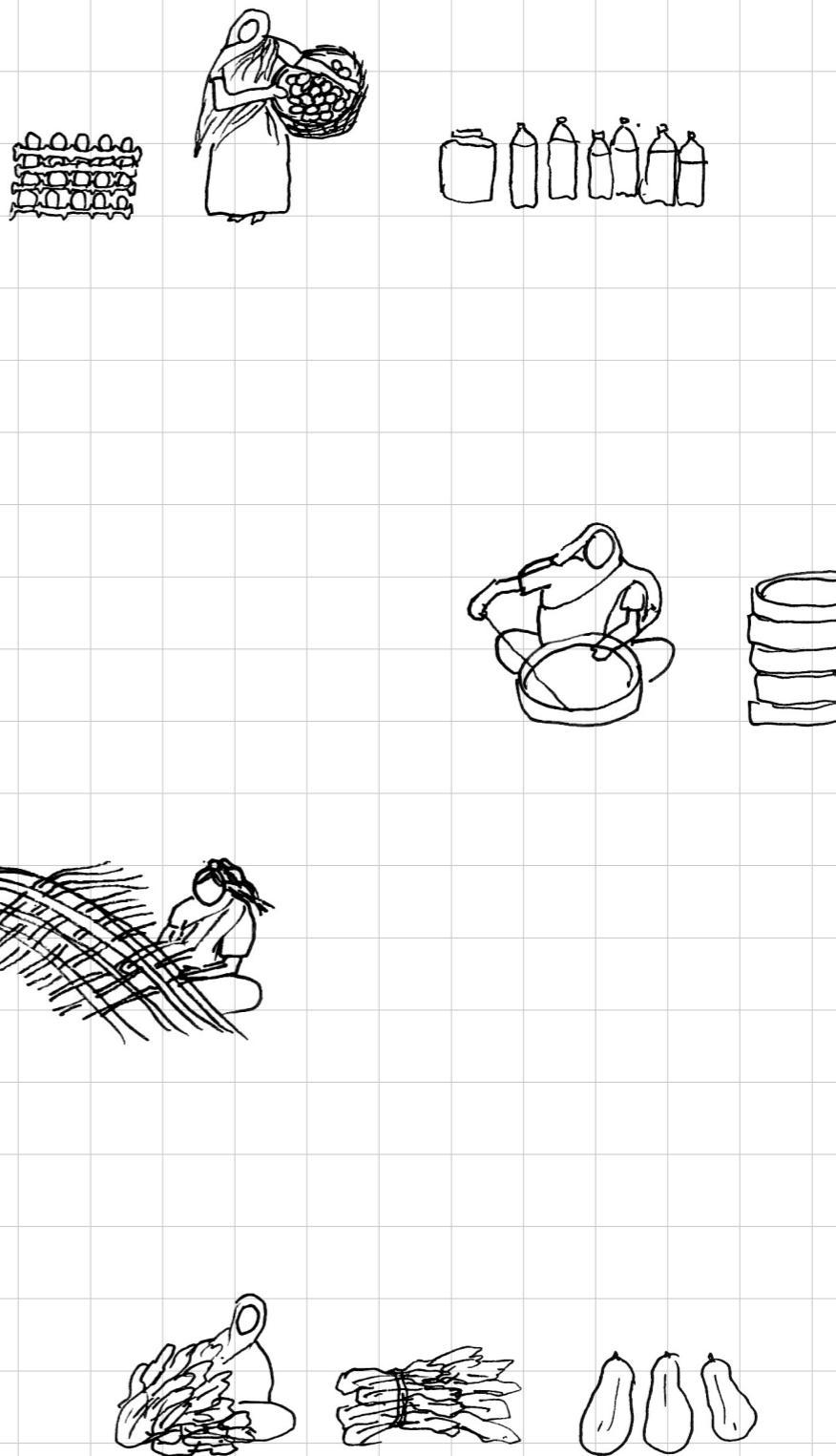
Constraints

Although wholesalers visit villages and NGOs provide market linkages for women with mobility restrictions, the production quantity from the village women can make such systems unprofitable.

Opportunities

Since such systems are in place, there is an opportunity to increase the production quantity and diversity from women's farming, gardening, crafting, cattle and poultry rearing practices. Furthermore, a system where wholesalers can easily access and buy all the goods would make the systems more effective.

Lee, Han Bum, Paul E. McNamara, and Kamal Bhattacharyya. 2022. "Does Linking Women Farmers to Markets Improve Food Security? Evidence from Rural Bangladesh." *Agriculture & Food Security* 11 (1). doi:<https://doi.org/10.1186/s40066-022-00373-6>.



BATHE AND WASH CLOTHES

Constraints

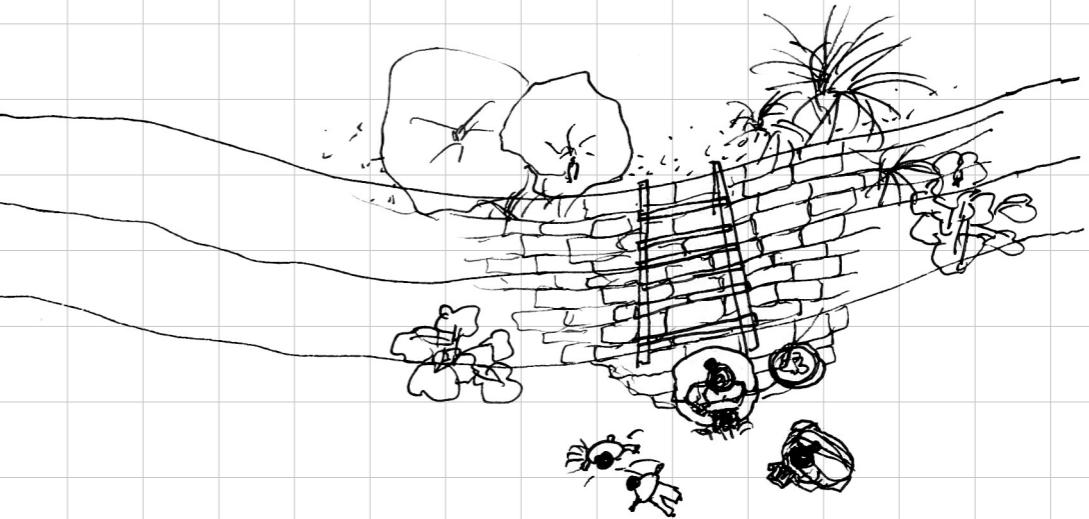
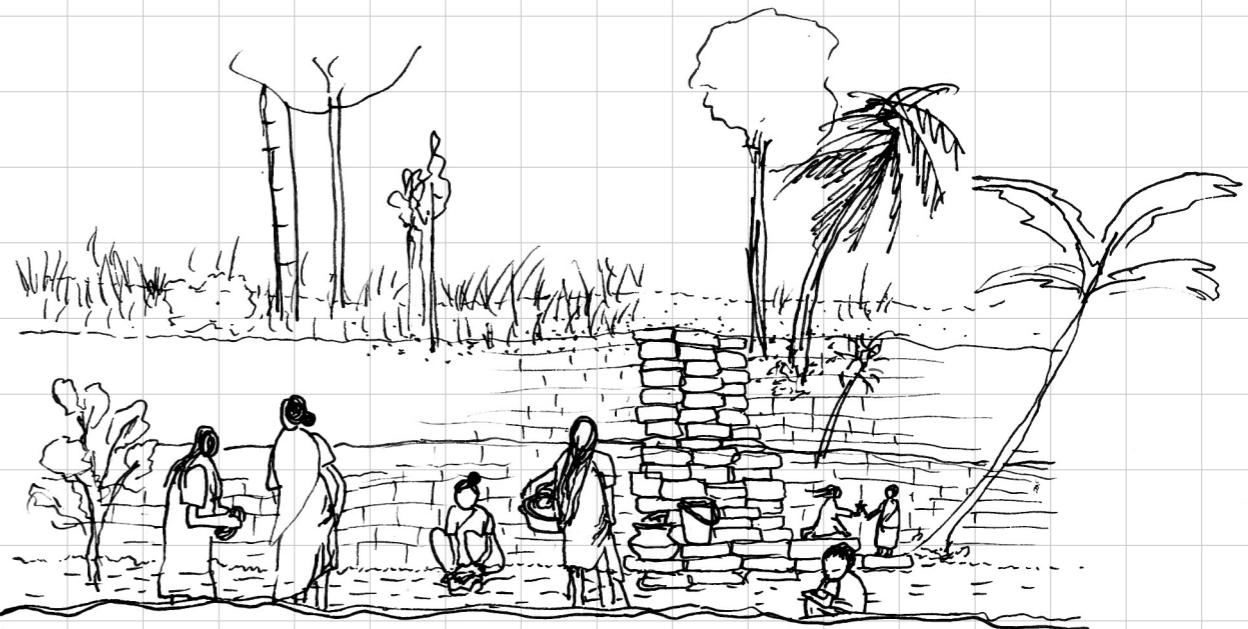
During flash floods, women are unable to bathe and wash clothes, since there is a higher likelihood of snakes and water-borne diseases. Furthermore, even outside of flash flooding, the water in which these activities take place are contaminated by human waste, due to prevalent open defecation practices.

Opportunities

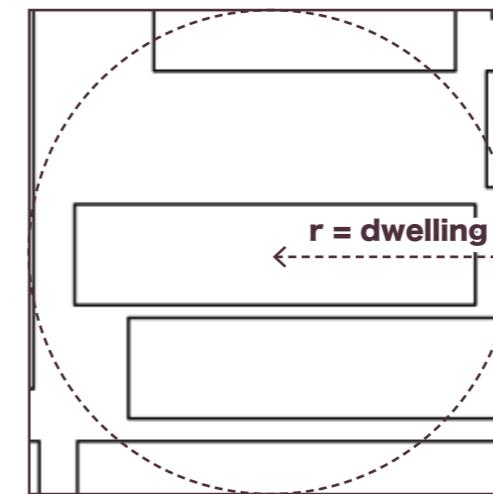
There is an opportunity to provide an alternative infrastructure for bathing and washing clothes. This should ensure women can resume normal life even during flash floods, and prevent disease transmission through contaminated waters.

Culturally, women bathe and wash clothes in small groups. This is a social activity and a 'communal space' of sorts. Hence water purification and proper waste management will also enable these practices to continue without compromising the health of households.

Ahmed, Mushtaq & Chowdhury, Rezaul & Farzana, Syeda & Islam, Md. 2006. WATER SUPPLY AND SANITATION (WATSAN) CONDITION OF THE CHAPTIR HAOR WETLAND IN BANGLADESH.



DWELLING SCALE



DWELLING SCALE

20cm
20cm



EAT

Traditionally, households eat together on the floor on a mat or on slightly raised platforms. 'Khana' refers to a household, or an 'eating unit'. The staple foods include rice and fish. Dishes are served in the centre, and each person has a plate to eat from. Eating with hands is common.

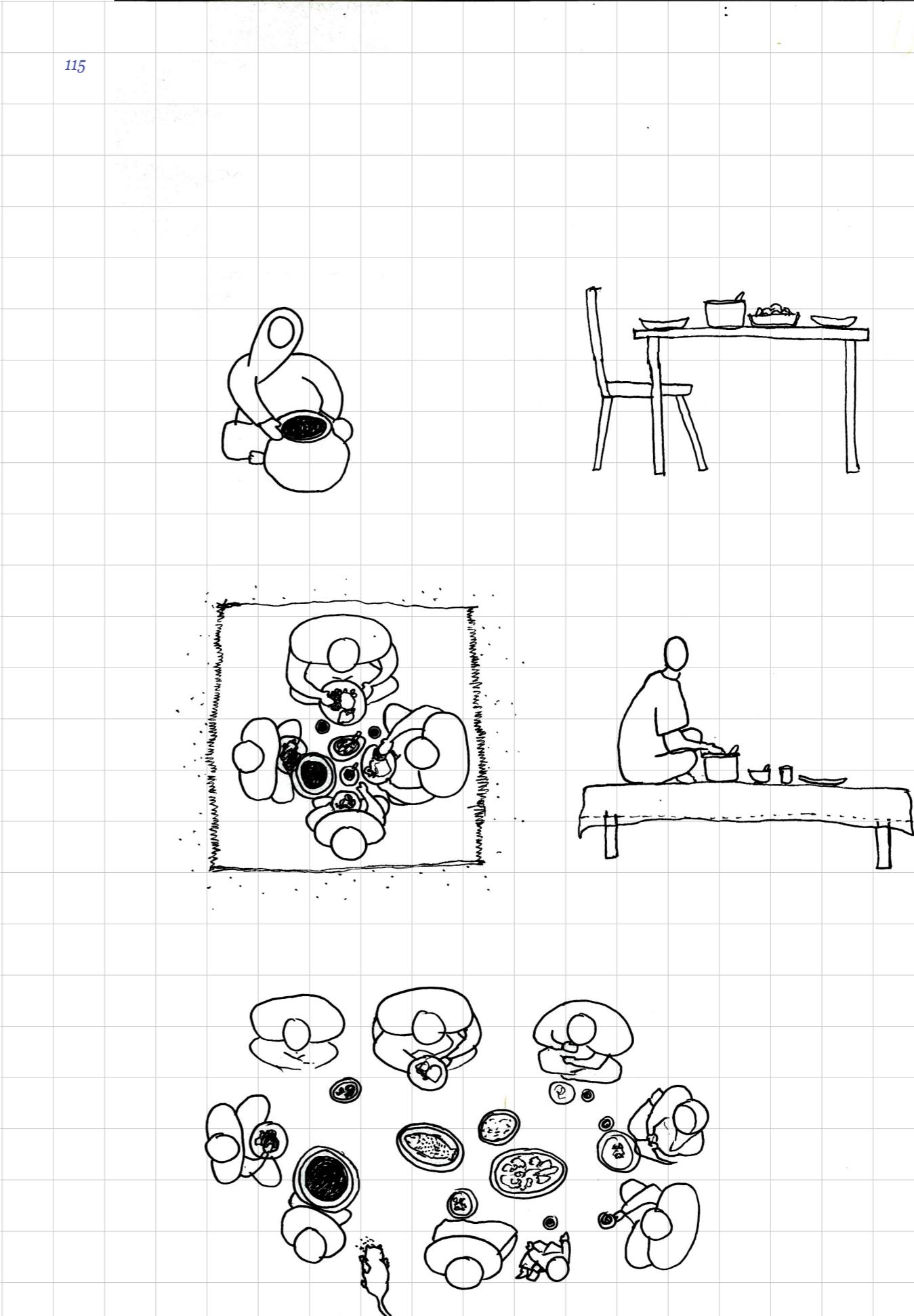
Constraints

Due to land scarcity and the high density of dwellings, food is commonly eaten on the beds. Also due to poverty and climate vulnerabilities, there is food insecurity, negatively impacting children's health in particular.

Opportunities

The communal nature of eating and the ephemeral and flexible characteristics of eating spaces are seen as opportunities. Roofed and semi-outdoors space needed for a range of other activities, can be multipurpose spaces used for different activities at different times.

McElroy, Linda. 2024. "Customs and Cuisine of Bangladesh." TOGETHER WOMEN RISE. Accessed March 24. <https://togetherwomenrise.org/customsandcuisine/customs-and-cuisine-of-bangladesh/>.



COOK

Constraints

Cooking is considered a woman's duty in households. There are many ways in which current cooking practices negatively impact a woman's life. Firstly, cooking on average can take 6 hours of a woman's day, this is because of the nature of the cuisine, which involves longer hours to cook, but more importantly because of the lack of cooking infrastructure. The 'Chula' (mud stove made from local clay) with open fire require a lot of fuel to provide energy to cook the food.

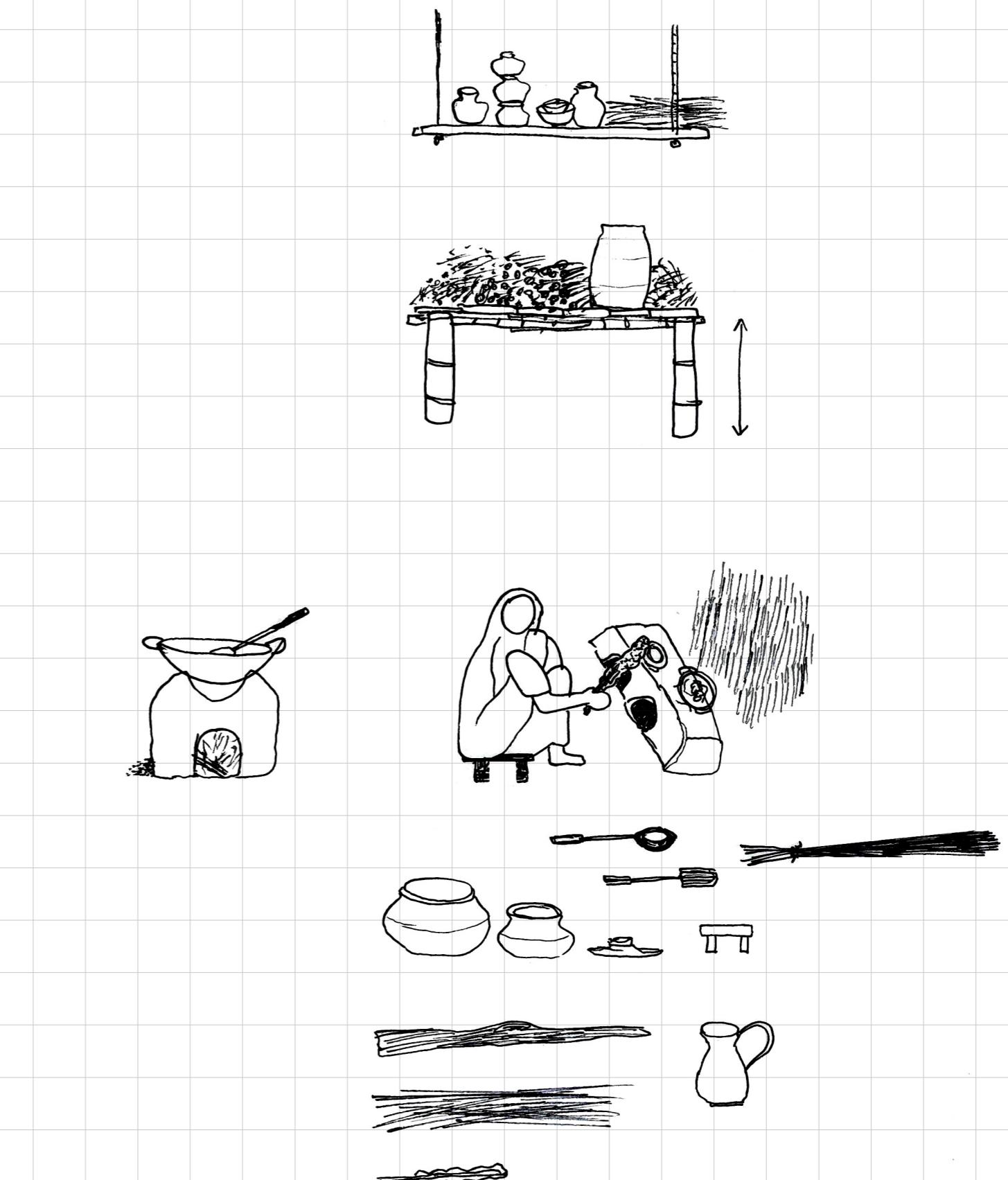
Secondly, cooking is considered 'back-breaking' work because the work space is confined and not ergonomically comfortable.

Furthermore, a lot of smoke is released in the process, generally in a smaller, less-aerated space. This creates health consequences and older women find it hard to cook because the smoke impairs vision further.

Opportunities

There are many opportunities to make cooking easier, faster, healthier and cleaner in terms of energy. There is an opportunity to use fuel sourcing as a way to build collective action of women.

Siddiquee, Muhammad. 2024. "Achieving a Climate-Smart Bangladesh, One Biodigester at a Time." *Climatelinks*. March 19. <https://www.climatelinks.org/blog/achieving-climate-smart-bangladesh-one-biodigester-time>.



USE THE TOILET

Constraints

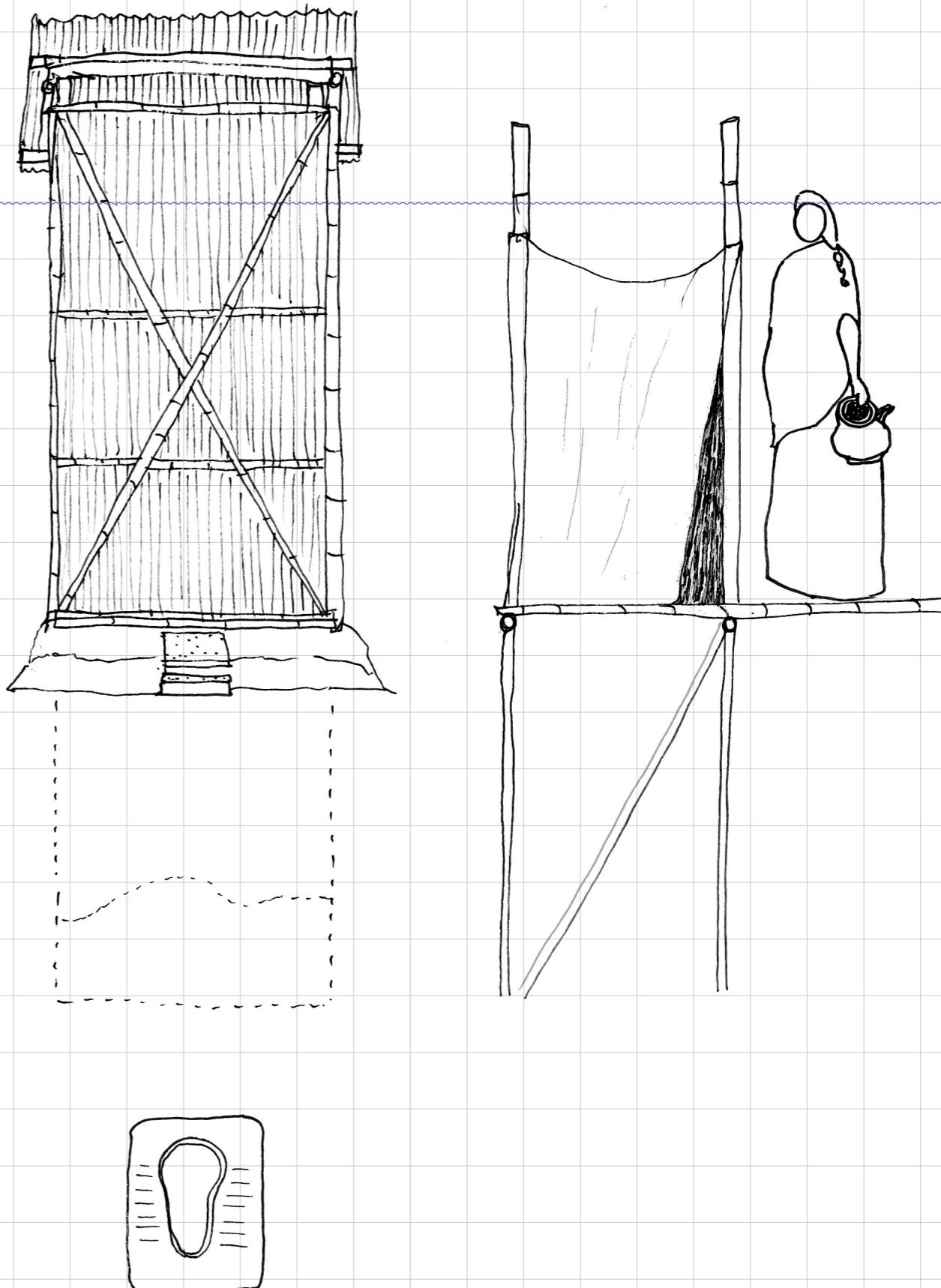
Waste management is a problem, but especially during flash floods. During flash floods in the Haors, about 68% of respondents practice urination or defecation in open space into floodwaters. The majority of households (90%) then take a bath in the floodwaters. Pit latrines are usually inaccessible and the waste in the pits contaminate the floodwaters further.

In addition to that, privacy for women when using the toilet is a major concern. During flash floods, women face more harassment as they travel further to access toilets. Pregnant women and menstruating women also face additional difficulties.

Opportunities

Waste management is an opportunity to create fuel and fertiliser. Furthermore, ensuring that every household has a toilet that is usable all year round even during flash floods ensures women's safety and privacy.

Nahar, Najmun & Islam, Shahana & Mahiuddin, Sanjia. (2021). Flash flood impacts on the life and livelihood of women at haor areas in Bangladesh. National Geographical Journal of India. 67. 322-333. 10.48008/ngji.1780.



MAINTAIN THE DWELLING

Constraints

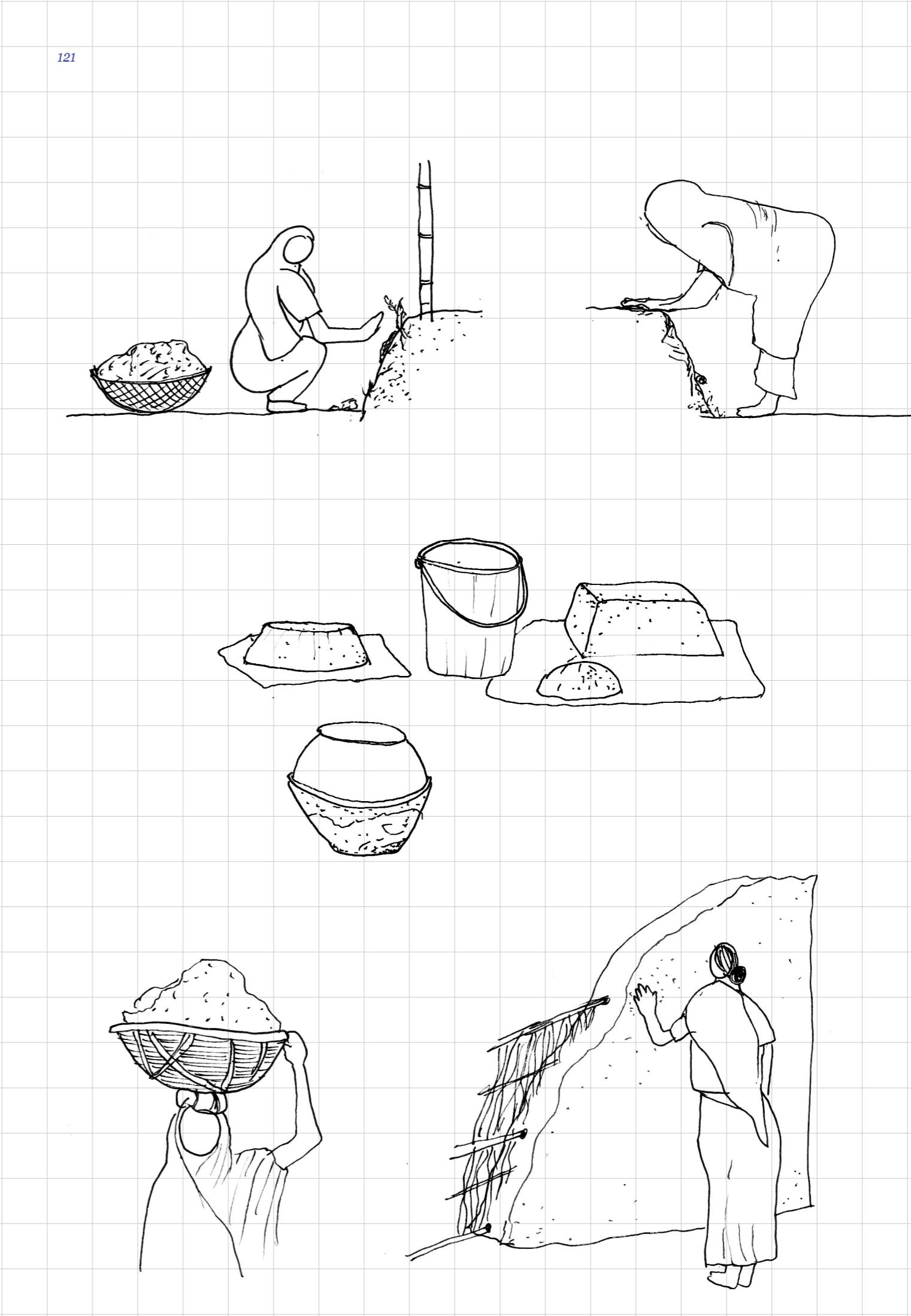
Maintenance of the dwelling is considered a woman's duty. This costs women a lot of time yearly, as most dwellings are built with mud and perhaps plastered with a cow dung and straw mix. After flash flooding which occurs in pre-monsoon, and monsoon, the plinths and walls of the houses need to be repaired. Women have to collect mud from rivers or ponds, mix them and begin what many consider 'physical suffering'.

Opportunities

The circularity of existing building practices, not just in the material sense, but in the act of building, can be seen as an opportunity for collective action for women. There is an opportunity to introduce a pre-fabrication process for wall panels, so that the maintenance work becomes a source of income generation and reduces time (and economic) costs considerably.

Moreover, the earthen plinths can be collectively built by clusters and capped with stabilised earth, as recommended by the 'Handbook on Design and Construction of Housing for Flood-Prone Rural Areas of Bangladesh'. This will greatly reduce the frequency and intensity of maintenance work by women.

Asian Disaster Preparedness Center, *Handbook on Design and Construction of Housing for Flood-Prone Rural Areas of Bangladesh*, 2005.



DO SMALL-SCALE AGRICULTURAL PROCESSING

Women help out with agricultural processing. This includes rice threshing, rice winnowing, jute processing, and fixing and making equipment used for agricultural work (e.g. fishing apparatus, woven baskets, etc.).

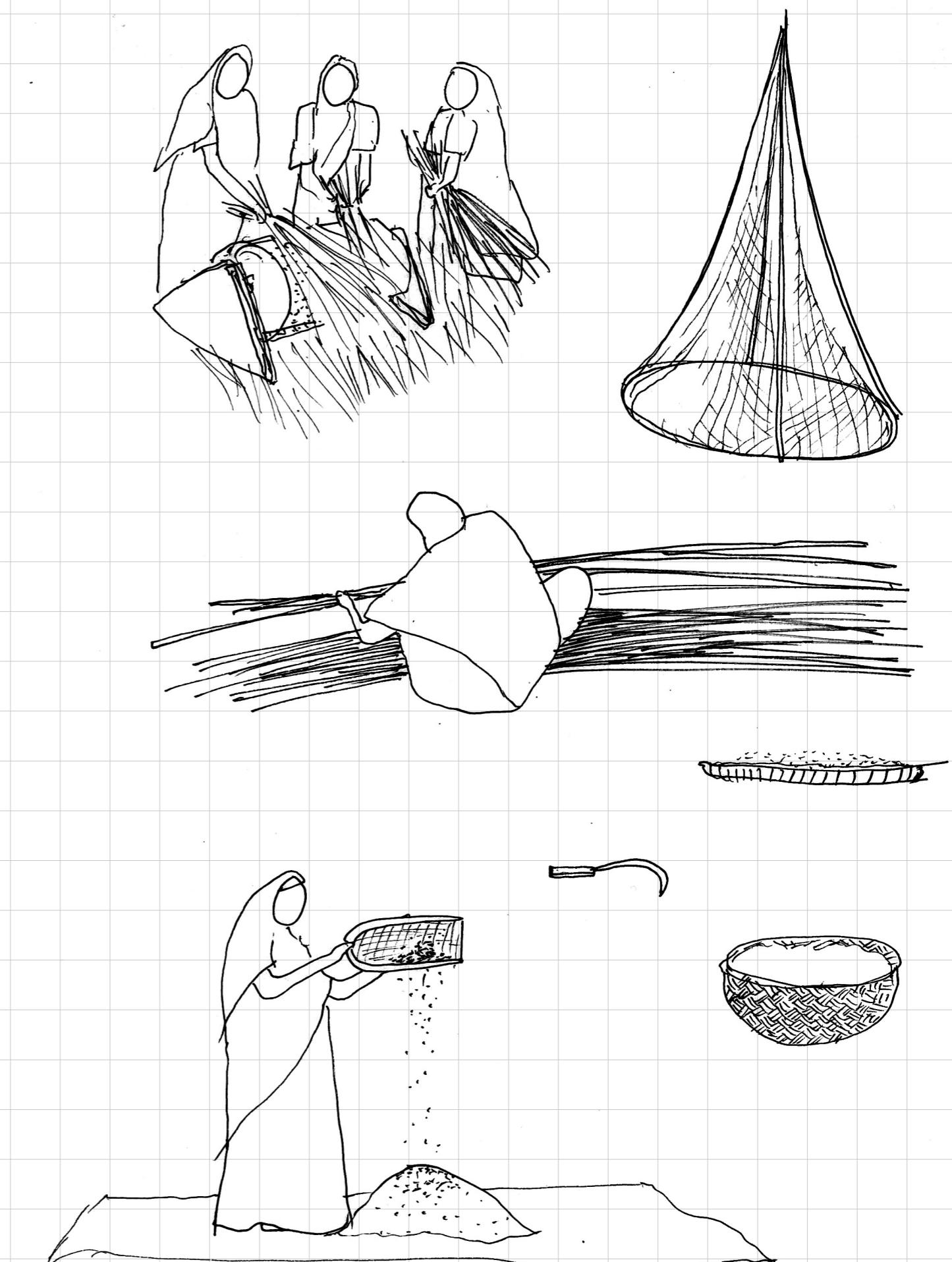
Constraints

Land scarcity and high density means that women do not have space to carry out this work within the dwellings or even within the clusters. Furthermore, this work generates income which women generally do not have control over. Lastly, the income from agricultural such activities is climate-dependent and hence, increasingly vulnerable.

Opportunities

Space needed for small-scale agricultural processing activities can be multi-purpose and communal. This will enable opportunities for women to socialise, work and help each other, whilst ensuring access to quality conditions to carry out these works.

Anik, Sawon Istriak, and Mohammed Abu Sayed Arfin Khan. 2012. "Climate Change Adaptation through Local Knowledge in the North Eastern Region of Bangladesh." *Mitigation and Adaptation Strategies for Global Change* 17 (8): 879–96. doi:<https://doi.org/10.1007/s11027-011-9350-6>.



GENERATE INCOME IN THE HOMESTEAD

Constraints

Space, time and material resources are the largest barriers for women to generate income within the homestead.

Opportunities

Since space is scarce and precious, and the connection to the ground extremely valued, a 'new ground' can be explored to provide two storeys of ground, essentially doubling the 'ground' space. This will also provide 'ground' during flash flooding for income generation (and other activities).

Women are extremely time poor in the Haor region. Many design factors can relieve women of maintenance work, fuel collection, etc. to spare time for income-generating activities.

The government's 'Integrated Livestock Development Programme' and various NGOs provide training and the initial starting kit for income generation in the home. Material resources include ducks, money, pergolas, enclosures, etc. Furthermore, many design factors such as communal courtyards for collective action and collective infrastructure spines can greatly reduce monetary costs and increase income generation opportunities, creating space for existing programmes.

Ministry of Fisheries and Livestock, *Integrated Livestock Development in Haor Zone project*, 2020, Dhaka.

Ministry of Planning, Statistics and Informatics Division (SID), Bangladesh Bureau of Statistics (BBS), Demography and Health Wing and UN Women, *Preliminary Report on Time Use Survey (TUS) 2021, 2022*, Agargaon, Dhaka.



THEMATIC TRANS-SCALAR RESEARCH

THE THEMATIC BINDER:

“Thematic Studies on Issues and Opportunities for Women of the Haors”

There is a gap in existing research on socio-spatial inequalities women in the Haors face. Literature on socio-spatial inequalities faced by women in Bangladesh are not specific to the Haors context, and inequalities women in the Haors face are analysed from a social science perspective. Hence this thematic research aims to be a working document that brings together multiple disciplines, from urban planning to architecture, ecology and management. The nature of the document, with sections and the flexibility to update and add information, is akin to the workings of a binder. Hence the conception of the name.

Only in this pluralistic way, can the thematic binder serve as an effective research and design tool, for ***housing for the women of haors***, but also for other research and design in similar wetland regions. Furthermore, the binder is envisioned as a replicable tool that can be appropriated to other contexts, as the issue of socio-spatial inequalities is not just a Bangladeshi one, but a global one.

SOCIAL ISSUES FACED BY HAOR WOMEN



INTRODUCTION



A family get on a boat as they look for shelter during widespread flooding in Sylhet, 2022

Bangladesh has made substantial progress in the last two decades in improving the lives of women and girls. The maternal mortality rate has decreased by more than two-thirds since 2000, fertility rate is declining and there has been greater gender parity in school enrollment. Due to more women receiving education, there has been progress in women's labor force participation, albeit constrained to limited, low-paying sectors. Despite remarkable progress made, inequality persists- child marriages and gender-based violence remain common and even increased during the COVID-19 pandemic.



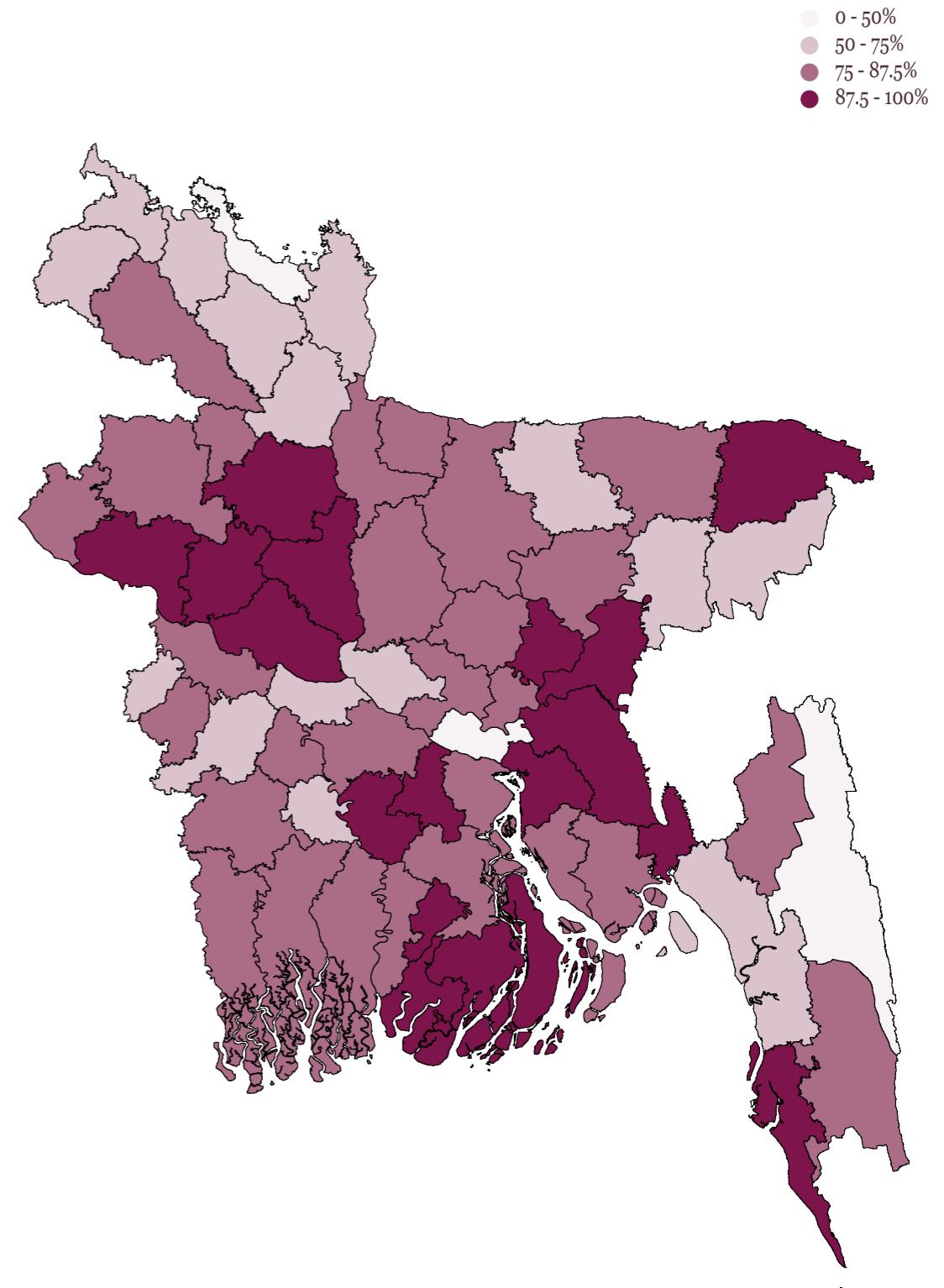
A woman cooks in a flooded corridor outside her home after heavy rainfalls in Sylhet

PURDAH AND UNPAID WORK

Purdah is a religious and social practice of female seclusion prevalent among Muslim and Hindu communities. As seen in the map on the right, the practice of purdah is common across Bangladesh. Zooming into the Sylhet division, Sylhet district stands out as particularly conservative.

There is a significant link between the practice of purdah and women's labor force participation (LFP). Despite substantial progress in female education in Bangladesh, this has not translated into a comparable improvement in gender gaps in LFP. Women remain largely in the informal sector or in unpaid work. Access to paid jobs has a positive impact on women- smaller family size, increased age at first marriage age, female autonomy, and career aspirations. Yet due to community norms surrounding purdah, women are kept out of the labor market despite increases in education or household income.

There is a stigma against the employment of educated women in lower-level work, coupled with the slow growth of employment in sectors appropriate for educated women. Additionally, the gender division of labor within marriage constrains women further. There is also concern for women's safety in public spaces and restrictions to outside mobility. Both push and pull factors impact women's LFP decisions. Women can be pushed into paid work during economic crises, and pulled by greater demand for female labor in the industrial sector.



TIME USE SURVEY

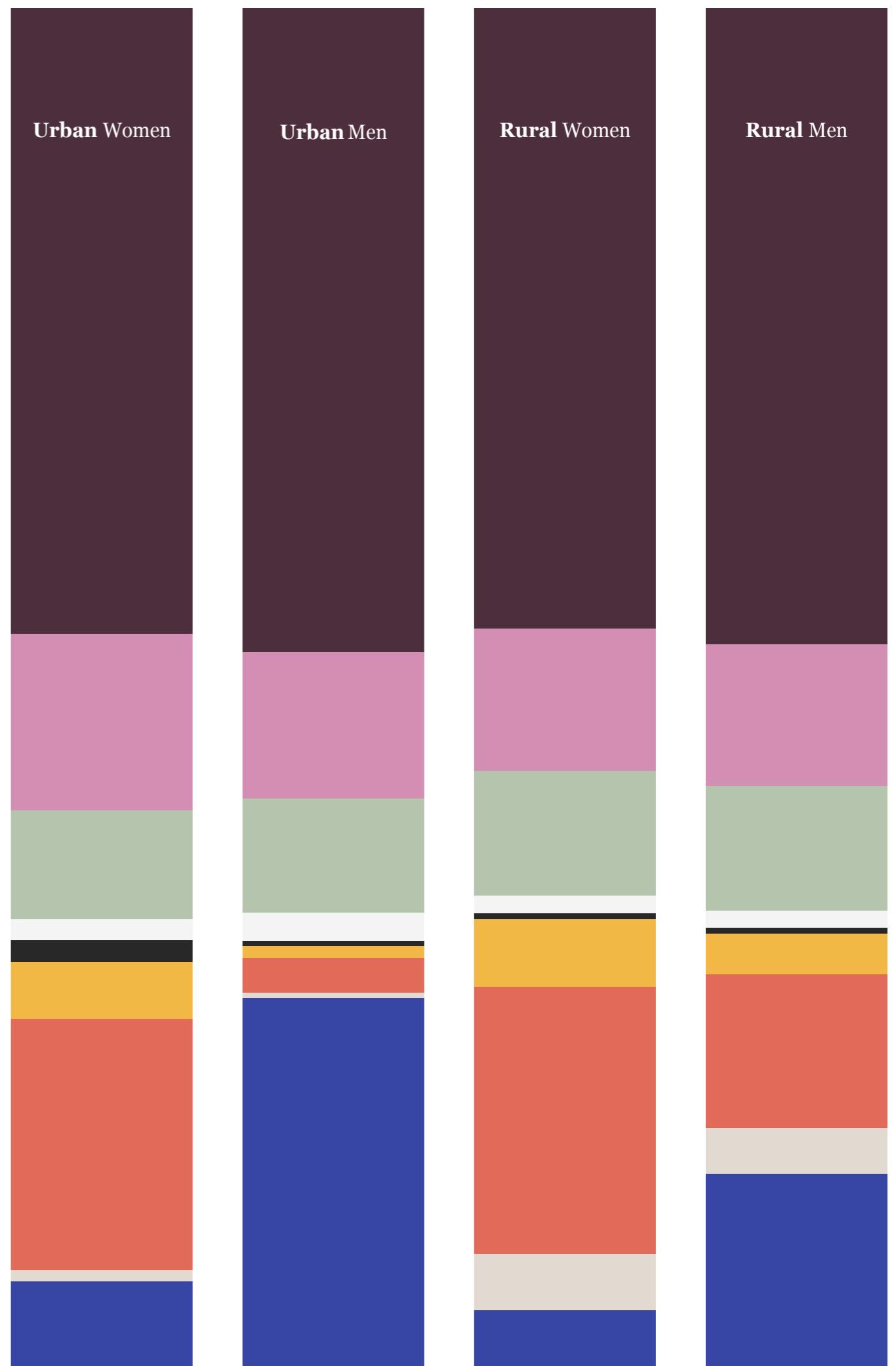
In the 2021 Time Use Survey, the 24-hour day of urban and rural women and men were recorded. One of the largest disparities is the number of hours women spend doing unpaid care/domestic work as compared to men, regardless of the setting.

Unpaid work affects almost all aspects of a woman's life critically, irrespective of the woman's economic status, family type, profession, number and age of children, and level of education.

Considered the duty of a woman despite her being employed, this unpaid work goes unacknowledged and adversely affects women's ability to participate in the labor market. This increases women's economic dependence on their husbands, thereby reducing their decision-making power in the family. Furthermore, this gender gap results in a vast economic and competitive loss for the development of Bangladesh.

Right: Time usage per day of urban and rural men and women, 2021

- Self-care and maintenance
- Culture, leisure, mass-media and sports practices
- Socialising, community and religious practices
- Learning
- Unpaid volunteer, trainee and other unpaid work
- Unpaid caregiving services for household and family
- Unpaid domestic services for household and family
- Production of goods for own final use
- Employment and related activities



INTIMATE PARTNER VIOLENCE

♀ Ever-married women

● Almost two-thirds (72.6%) have experienced one or more forms of violence by their husband at least once in their lifetime.

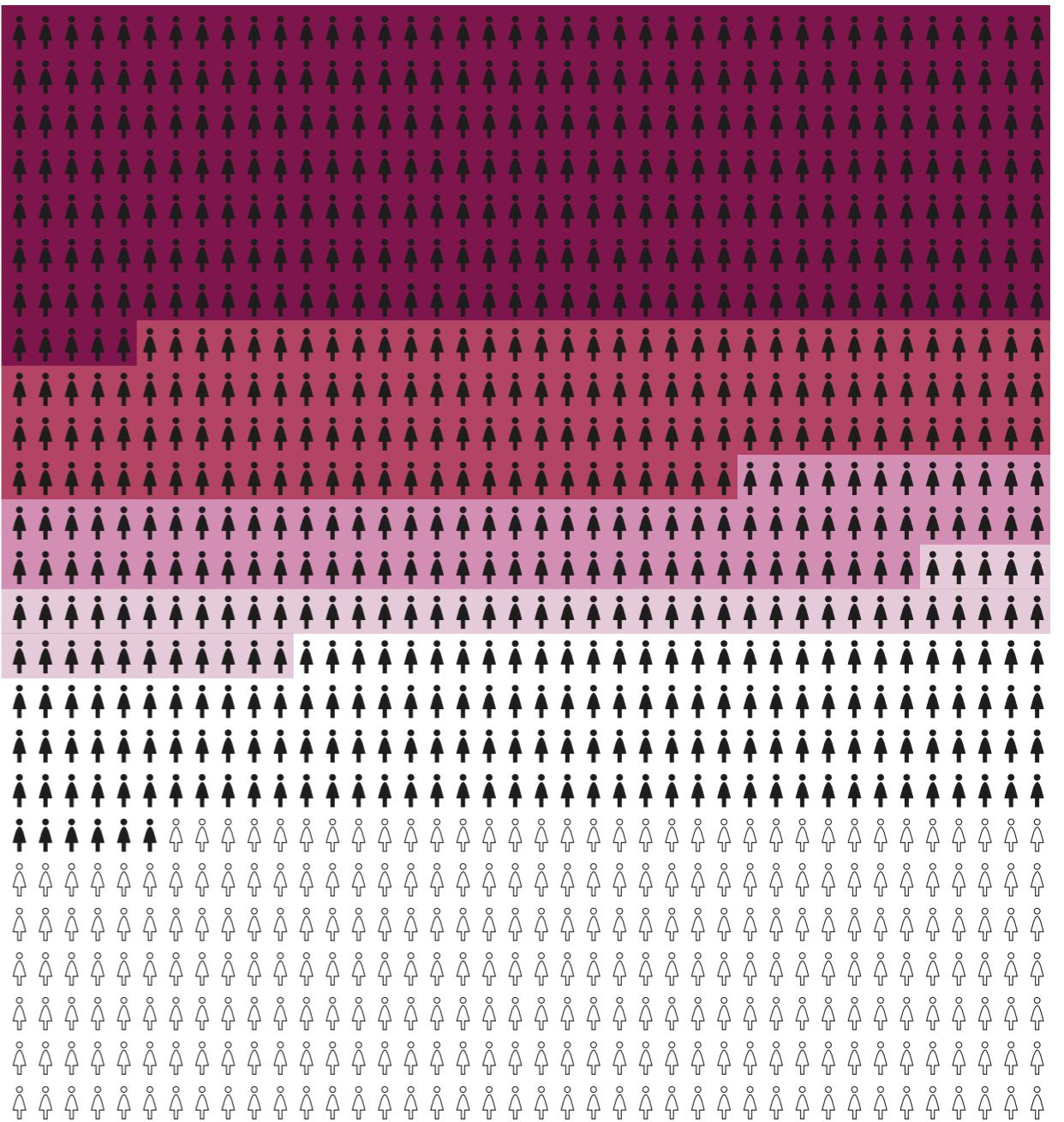
54.7% experienced violence in the last 12 months. Forms of violence include controlling behavior, physical, emotional, sexual, and economic violence.

Rates of lifetime partner violence were highest in rural areas (74.8%) and lowest in city corporation areas (54.4%). Rates in urban areas outside of city corporation areas were 71.1%.

Despite high rates of partner violence, 72.7% of women never reported it.

- they did not consider it necessary to report it (39.3%)
- concern about family honour (15.6%)
- fear of the perpetrator (12.0%)
- shame or embarrassment (7.7%)

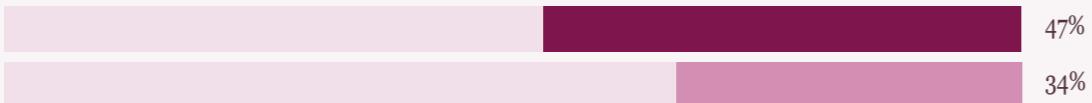
Right: Infographic on intimate partner violence rates and reporting, 2015



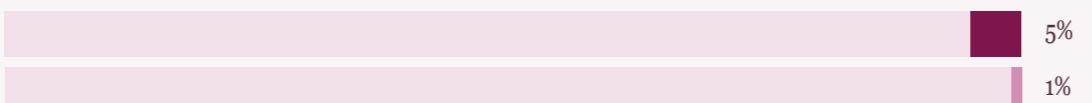
CHILD MARRIAGE: BANGLADESH

- ever-married women aged 20-24 years married before 18
- ever-married women aged 20-24 years married at or after 18

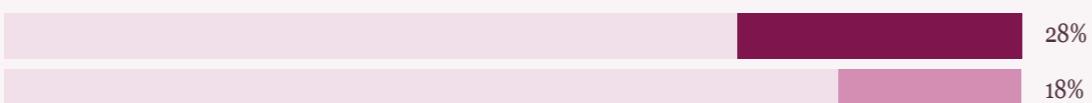
51%
of women between the ages of 20-24 married before 18



Who did not have a skilled attendant at their last live birth



Who have had three or more live births

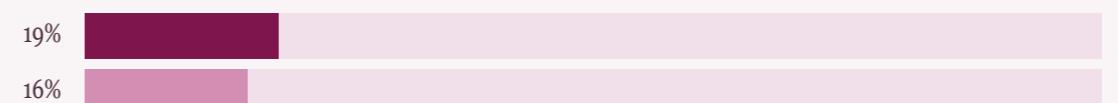
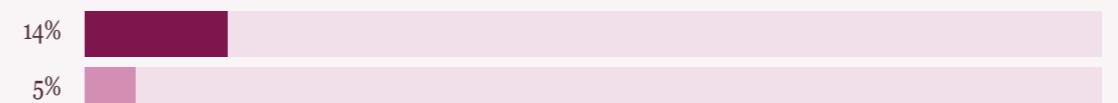


Who believe a husband is justified in beating his wife under certain situations

CHILD MARRIAGE: SYLHET

Nationally and in the Sylhet division, women who married before 18 reported higher levels across all 3 categories compared to women married at or after 18. Although Sylhet has lowered child marriage rates from 64% in 1994 to 31% in 2019 (lower than the national average), women in Sylhet in general still experience less quality labor care and higher fertility rates in the 20-24 age range.

31%
of women between the ages of 20-24 married before 18



WOMEN'S VISION



“BEGUM: HOW ONE MAGAZINE BEGAN A REVOLUTION”



July 20, 1947
The first issue of Begum was published with a print run of 500 copies. Women's rights activist Begum Rokeya's photo was on the cover of that issue.

“I consider myself a feminist. And so do a lot of girls. Sure, we are fighting the good fight, and sure we are trying our hardest to bring change in society; what many of us missed out on was the history of feminism here in our country. How it came about, who were the fighters, like us, in those days, and most of all, how much one magazine contributed to the empowerment of women in our country. Begum Magazine, had turned the tides in our society at a time where such a thing as women empowerment was little heard of. Way ahead of its time, this magazine was where it had all begun. Women writers, women editors, women workers, women fighters emerged- all through the inspiration of the words found in this magazine.”

Published initially in Kolkata, the magazine shifted its base to Dhaka in 1950 following the partition of India and Pakistan in 1947. Today the magazine costs 10 Taka. Famous editor Nasiruddin's daughter, Nurjahan Begum, joined as a journalist and editor; making her the first Bangladeshi female journalist. From the very first issue, Begum wanted to reach the Muslim women. It became an important site for the articulation of Bengali Muslim women's thoughts and ideas about education and progress.

During the 60's, author Selina Hossain was involved with Begum Magazine as well. "At that time, copies of Begum were found in every household," she says. "There were articles on how one can make sewing, cooking, and childcare their careers. These articles inspired girls to come out of their homes and start earning using their honed skills." Selina Hossain would wait for the Eid issue every year. "In the Eid issue, I would have my writings published. And back then, having a writing published along with a photograph of the writer meant a lot. It inspired us to write more."

"The response to Begum was paramount! Not only were women from across the city writing letters and giving feedback on the different topics and articles published in the magazine, but many girls from the villages were regular readers," says Dil Monowara Monu. "We had a letter from 5 girls who had subscribed to one magazine. They would all collect money to buy it, and they would take turns reading it," she says with a smile.

“Begum Magazine had begun the revolution for us long before we had become a part of it. The Magazine fought for us and paved the path for women all across the region to step out of their shells. It gave them courage. “Of course there are magazines of this sort now too-- lifestyle magazines, fashion magazines. While they offer a good deal of information on the latest trends, on the best recipes, I think the one thing that makes Begum different is the inspiration it had to offer. Stories of empowerment, ideas to make a living for women, courage to write—these are what Begum offered along with all the other interesting tidbits,” says Dil Monowara Monu.

WOMEN-LED COMMUNITY CENTRE



MTA with Khondaker Hasibul Kabir and Mahmuda Alam, 2022, Camp 8E, Kutupalong, Ukhiya.

The community center was intended to serve primarily as a refuge for women, a place especially needed in one of the largest refugee camps in the world. The existing center was destroyed in a major fire in February 2020 during the covid pandemic. MTA was appointed to design the new center. The project began with a workshop with the beneficiaries, who developed a program revealing that a garden was an aspiration for all. In order to make this possible within the confines of the refugee camps, the building was designed to have two floors. Within the camps, building is highly regulated and only temporary materials, such as bamboo, are allowed for construction with shallow foundations. Khudi Bari's structural system was used for this purpose, standing on a flat building foundation. The center provides consulting rooms, counseling rooms, offices, kitchen, bathroom and toilet, childcare with breastfeeding room and rest rooms for women. However, it also provided a meeting room for men, as there was no place within the camps that allowed men a space for learning.

During workshops with women in the camp, they found that the garden was a common aspiration. The center provides consulting rooms, counseling rooms, offices, kitchen, bathroom and toilet, childcare with breastfeeding room and rest rooms for women. It also provided a meeting room for men, as there was no place within the camps that allowed men a space for learning.



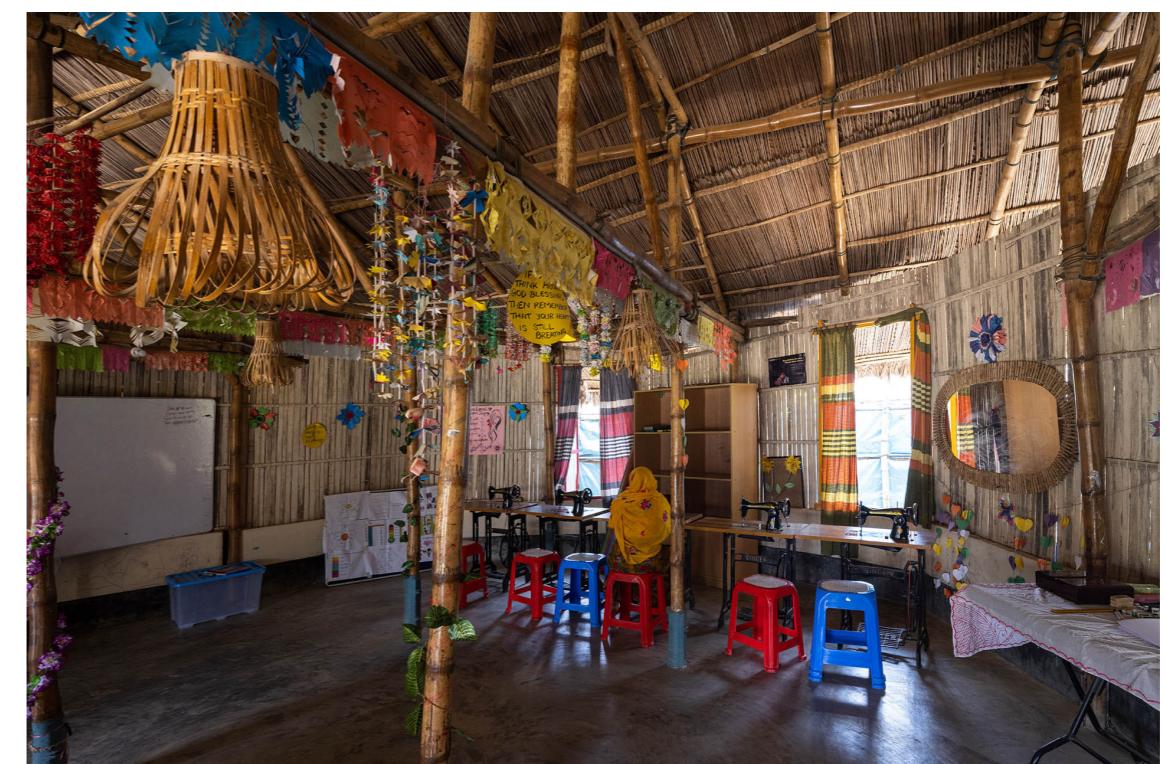
WOMEN'S REFUGE, ROHINGYA CAMP

Rather than separate projects, the six sustainably built structures in the world's largest refugee camps, housing Rohingya fleeing Myanmar's genocidal violence, are a collection of practice exercise: each created scope for the next according to need.

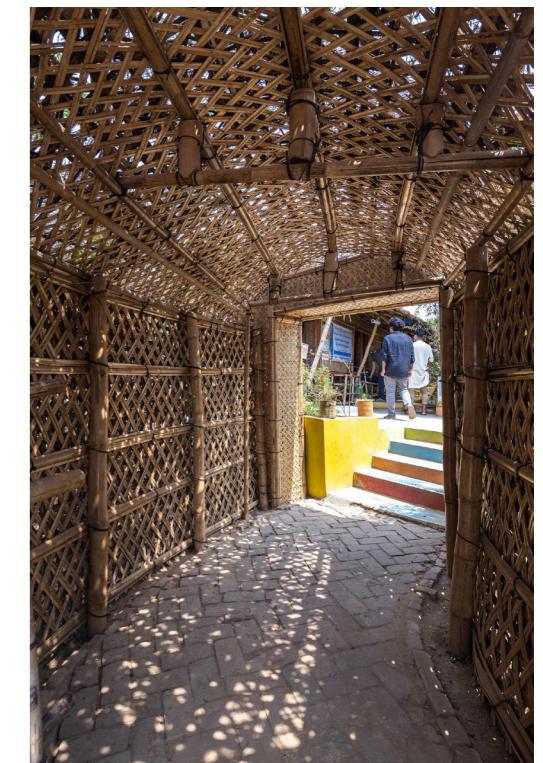
Much of the design occurred collaboratively in the field. A women-friendly space, very low to withstand cyclones, features a complex roof truss built by Rohingya bamboo workers without drawings or models. A safe space offering practical support to women and girls employed local materials and an exterior scheme that avoids the disturbance caused to visiting elephants by the blues and pinks of standard camp structures. A facility for women to create and showcase their handmade products is built of bamboo and thatch. One community support centre uses colourful mattresses as roof insulation; another mixes natural materials with industrial ones; another is built around existing betel nut trees, resisting the tendency to deforestation.



Camp 4ext: Eight main rooms are arranged in a horseshoe pattern around a central courtyard. A large roof made of bamboo and palm leaves covers all rooms and interstitial areas.



The Women Friendly Space (Camp 4ext) comprises spaces for skill development, community-based protection (CBP) activities, psychosocial support activities, as well as children's areas and breastfeeding areas.



The display centre in Camp 11 is accessed through a carefully designed tunnel-shaped entrance.

HOUSING STRUCTURE

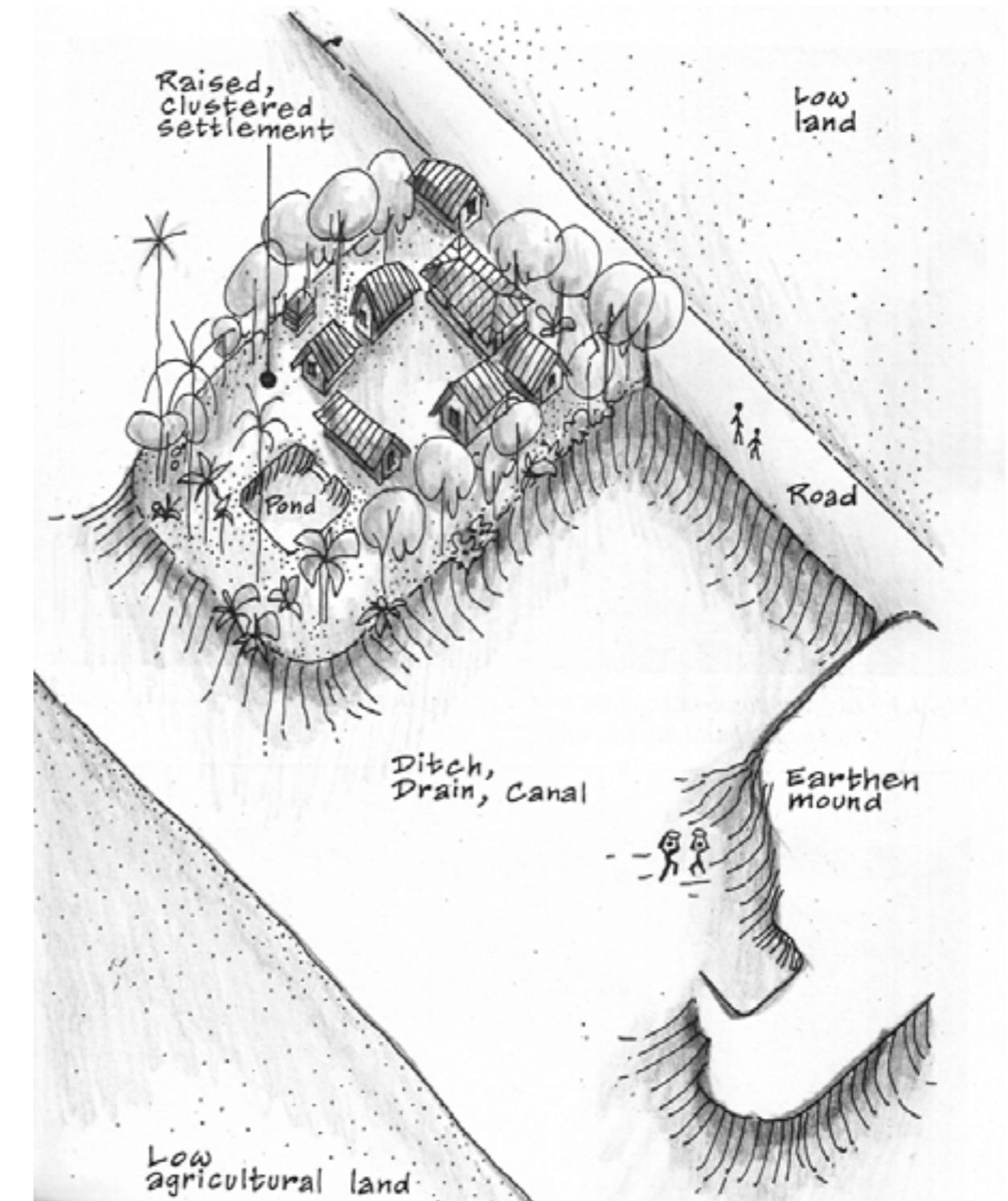


VERNACULAR

In rural areas, most of the houses are placed around a courtyard. This inner court provides light, ventilation, seating and cooking area and a private space for family members. This is a very vernacular, fundamental and indigenous concept of house building in the country, and has been practiced in Bangladesh for many generations.

Vernacular building forms are well developed in rural Bangladesh, but these are undergoing rapid changes because of industrialised building materials. The use of corrugated iron (CI) sheets has become quite popular and widespread, and the production and use of traditional building materials is diminishing consequently.

Thatch house, 1999



GOVERNMENT RECOMMENDED

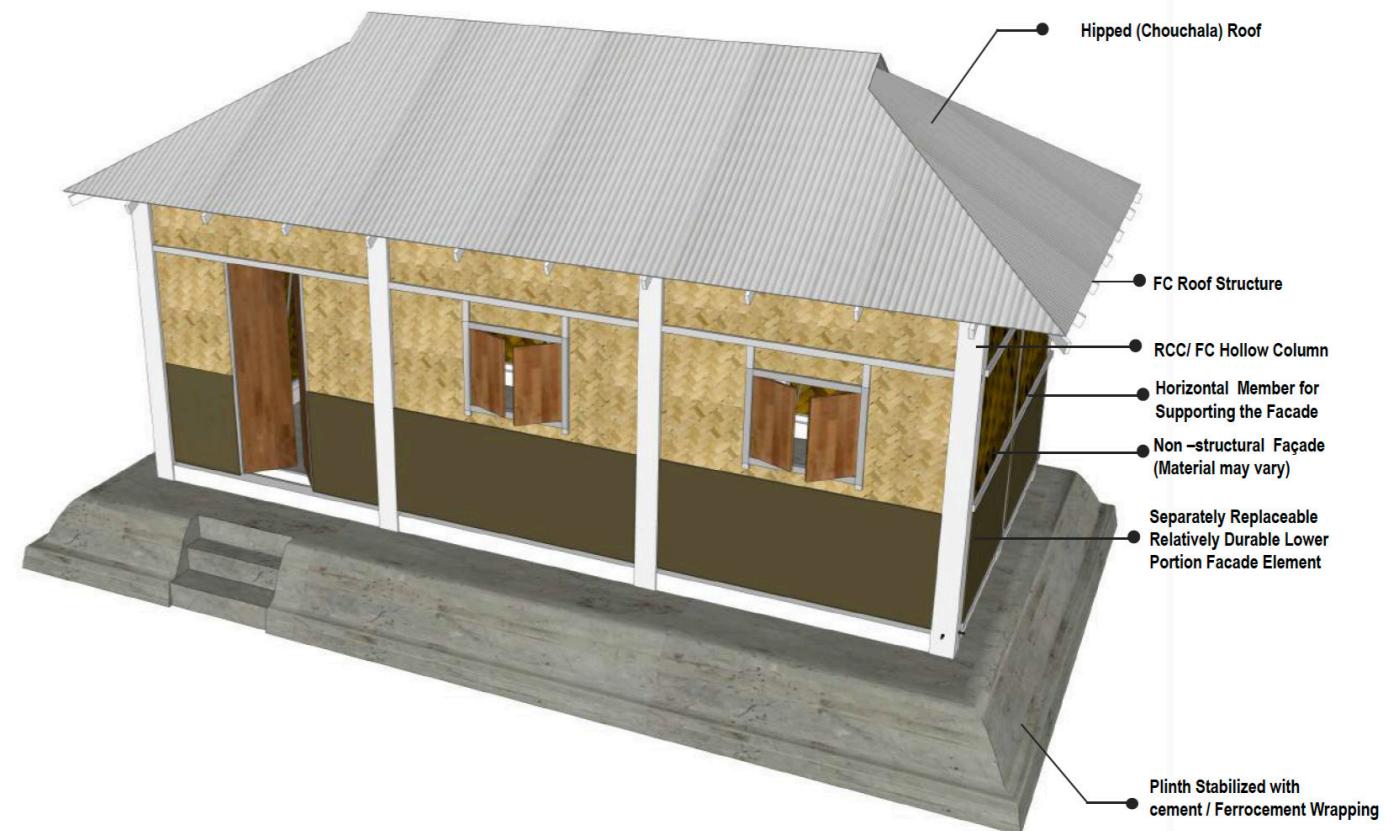
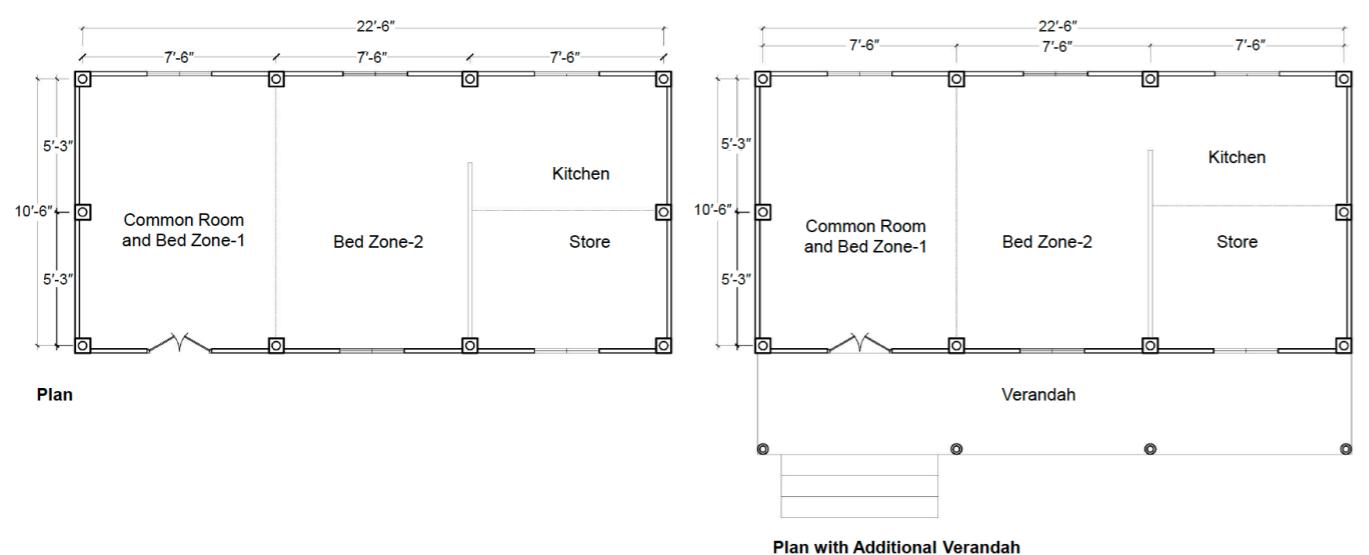
Issues Identified

Durable structural members concerning issue of longer house lifespan.

Structural members to be fastened to each other properly.

Additional structural stability to be ensured by the means of introducing bracing elements at due strategic points.

Mound raising should be undertaken.

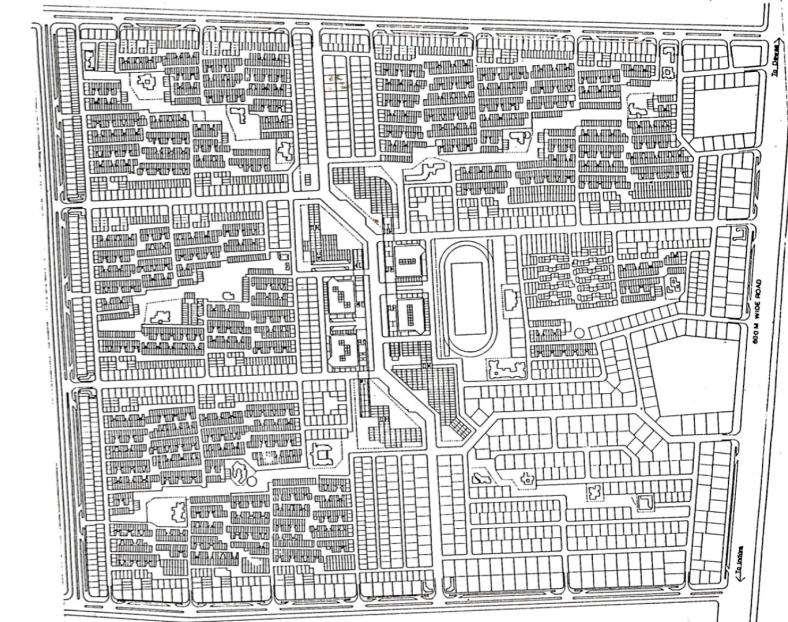


ARANYA LOW-COST HOUSING

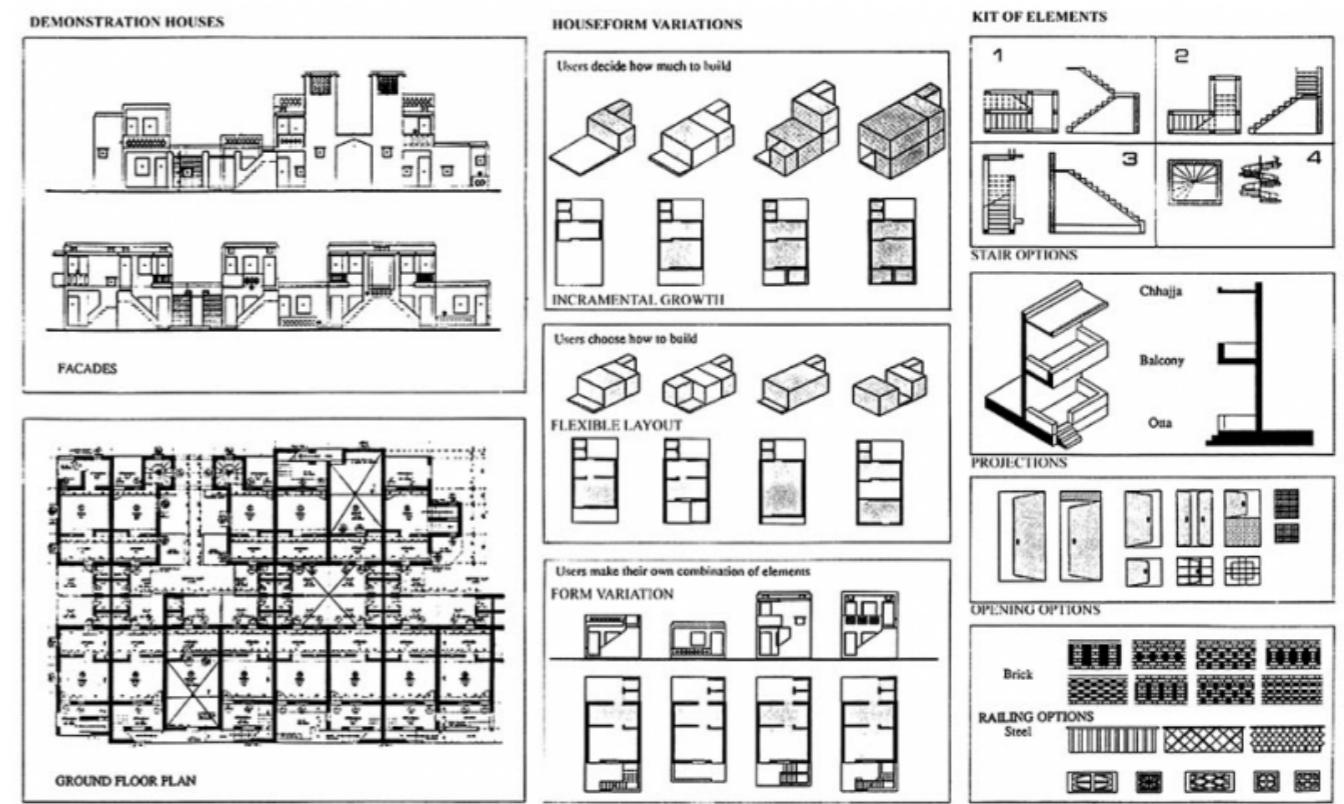
Sites and services scheme

The master-plan provides housing for economically weaker sections (EWS). This also includes households of middle and high-income groups. In each sector's inner core, a 30 sqm plot with a brick plinth, a built toilet, water and electricity was allotted to each EWS household.

Eighty demonstration houses, designed by architect Balkrishna V. Doshi, display a wide variety of possibilities, ranging from one room shelters to relatively spacious houses. Most of the income groups buy only a house plot. Available to the poorest, in addition to the plot itself, are a concrete plinth, a service core, and a room. The down payment is based on the average income of the family, the loan balance being paid in monthly instalments. Brick, stone, and concrete are available locally, but owners are free to use any material they choose for house construction and decoration.



hierarchy of streets



kit of elements

WATER MANAGEMENT



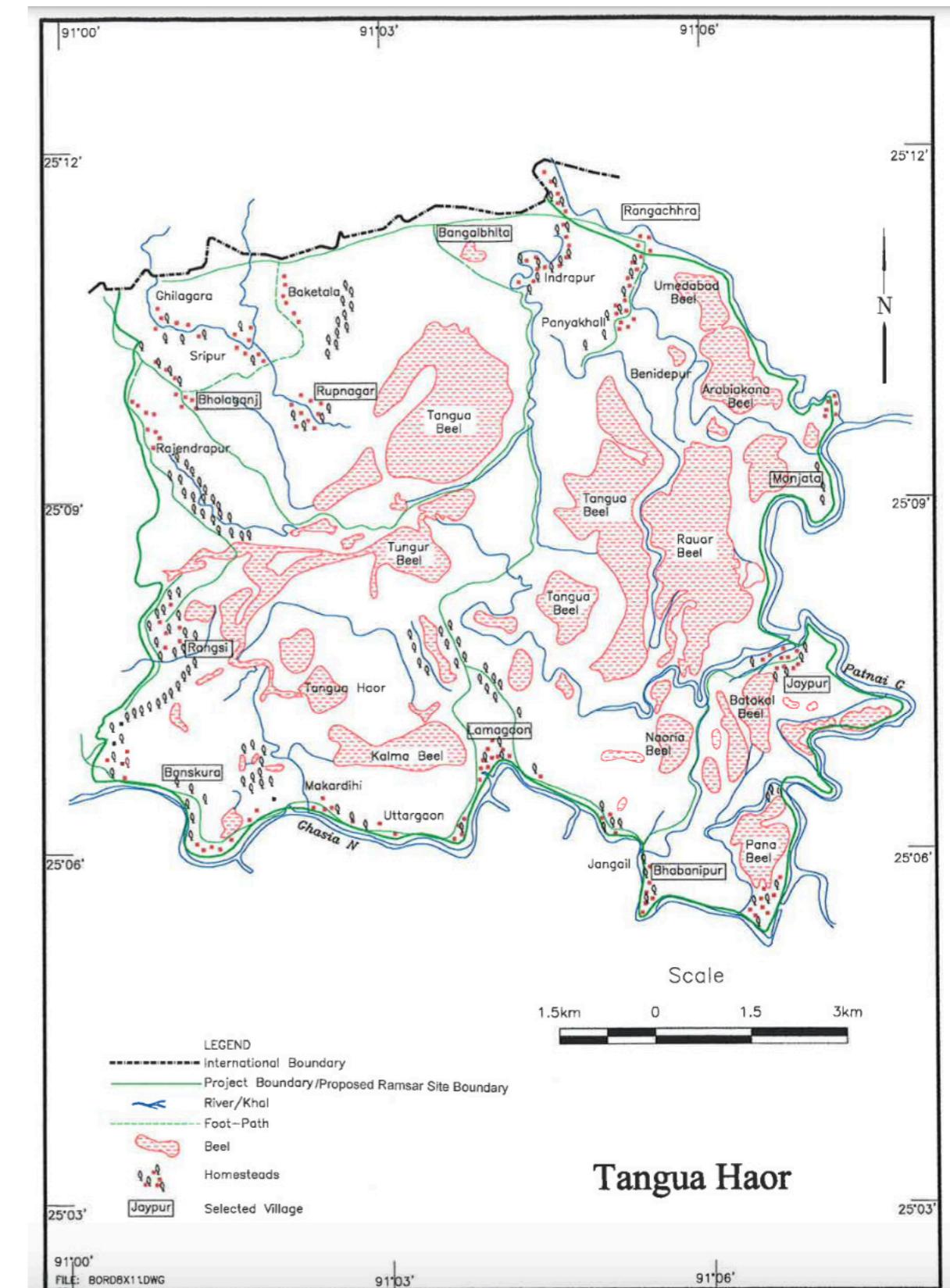
RAMSAR SITE OF WETLANDS CONSERVATION

Tanguar Haor, Sunamganj (9,500 ha; 25°09'N 091°04'E) was declared a Ramsar site of conservation in 1999.

Bangladesh's most important freshwater wetland lies in the northeastern part of the country in the floodplain of the Surma River, one of the main tributaries of the Brahmaputra at the base of the Meghalaya Hills in adjacent India. The area harbours some of the last vestiges of natural swamp forest and is totally flooded in the monsoon season, apart from artificial hillocks upon which homesteads are constructed. Tanguar Haor provides habitat for at least 135 fish and 208 bird species, including 92 waterbird species and 98 migratory bird species, and including 10 IUCN Red Book and 22 CITES listed species. About 30-40,000 migratory waterfowl converge on the area in the northern winter months, and rare species such as Pallas's Fish-eagle *Haliaeetus leucorhyphus* are relatively common and breed in the area. Tanguar Haor also supports a rich fishery and is regarded as one of the country's richest breeding grounds for freshwater fish.

Threats include over-exploited fishery stocks and uncontrolled taking of waterfowl, and the local community has been denied access to the resources by leaseholders of the fishery, which has led to conflicts. Hunting of turtles, tortoises, and waterfowl is widespread and part of everyday life, and the way of life - living in homesteads built on mounds - is said to be unique in this part of Bangladesh.

"Tanguar Haor | Ramsar Sites Information Service." n.d. Rsis.ramsar.org. Accessed June 24, 2024. <https://rsis.ramsar.org/ris/1031>.
Irfanullah, Haseeb. 2022. "Restoration in Action: Cases from Bangladesh." March 2022. https://www.researchgate.net/publication/359253804_Restoration_in_Action_Cases_from_Bangladesh.



Sobhan, Istiak, A. B. M. Alam, and Mohammad Chowdhury. 2012. "Biodiversity of Tanguar Haor: A Ramsar Site of Bangladesh." International Union for Conservation of Nature.

KHUDI BARI



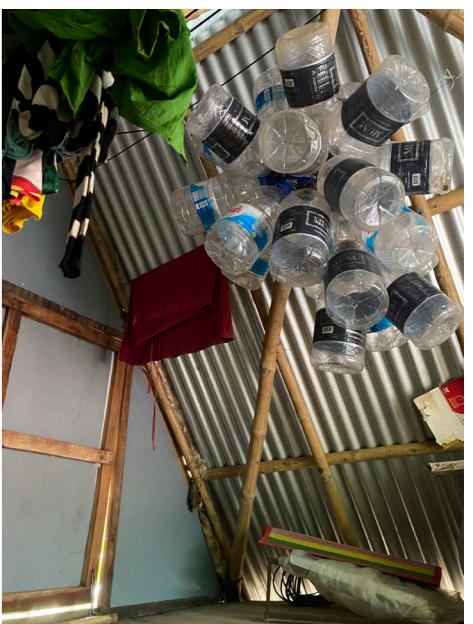
MTA, 2020 (ongoing), Various locations across Bangladesh

Khudi Bari is a modular shelter structure initially conceptualised for the marginalised landless population living in the sand beds of river Meghna. Khudi Bari is now being implemented in various climatically and geographically challenging locations in Bangladesh as houses for the vulnerable.

The strategy of having floodable zone on the ground floor and a safe zone on the upper floor was studied.

162

163 Site photos from October 2023, Tahirpur, showing appropriation of the Khudi Bari by a household



FLOODING PRIORITIES

The priority need identified by both men and women in all 27 locations was for immediate food assistance.

Most of the communities assessed reported that almost all households in the affected areas have lost most or all their food stocks and have adopted negative coping strategies. Most have also lost a significant proportion of this season's (i.e. this year's) income. Negative coping strategies such as reducing food intake or selling livestock and poultry are being used. People are likely to be forced into more desperate coping strategies if alternative income or sustained assistance is not available.

Feed for livestock and assistance with livelihoods support were the second priorities in almost all locations.

In ten sites, inadequate sanitation facilities were reported as a priority. This was a key area where some difference could be noted between the male and female group responses. Women found sanitation to be more of a concern than men and this could be related to or lead to protection concerns. Although the sample size was small, this is in line with other recent flooding events in Bangladesh.

Access to safe drinking water was identified as a priority in five of the six sites in Sylhet, but not prioritised elsewhere, although it was highlighted as an issue in half the assessed sites overall.

Health and hygiene promotion activities need to be enhanced, water purification tablets provided, and InterAgency Emergency Health kits prepositioned, to minimise, and respond

to, the likely increase in communicable diseases usually associated with severe flooding and a breakdown in sanitation.

In the areas where shelters/houses have been damaged, or are likely to degrade in the coming monsoon period, assistance in effecting repairs (cash or materials) is a priority need.

“Bangladesh: Floods in Northeast (Haor) Areas (April-May 2017).” 2017. Government of Bangladesh.

visualising flooding priorities with plinth heights

FLASH FLOODS (6-7 DAYS)

+0 of village mound

Living zone

Open-to-sky

Service zone

Communal courtyard

MONSOON MONTHS

paddyfields or river

secondary walkway

MONSOON MONTHS



PAANI APA

During dry season women of every household have to walk for hours to fetch water from sources far from their homes.

Raushan Ara Akhter, locally known as «Paani Apa», has received training to install rainwater harvesting systems and fix technical issues related to them. She now goes door-to-door, fixing the water tank pipelines of every house and cleaning the filters.

Under a project funded by the Green Climate Fund and supported by the UN Development Programme (UNDP), families in the vulnerable coastal upazilas of Koyra, Dakop, and Paikgachha in Khulna and Assasuni and Shyamnagar in Satkhira have been given a 2,000-litre water tank to collect rainwater, in an attempt to solve their drinking water crisis over crucial months.



“Rainwater Tanks and ‘Paani Apa’ Bring Relief to Women and Families Living in Bangladesh’s Southwest | Climate Change Adaptation.” n.d. UNDP Adaptation. Accessed June 24, 2024. <https://www.adaptation-undp.org/resources/videos/rainwater-tanks-and-paani-apa-bring-relief-women-and-families-living-bangladesh>.



Raushan Ara Akhter, locally known as
‘Paani Apa’

“But many people do not know how to manage the filter properly. So I was given training on how to properly install and clean it, to ensure a steady supply of safe drinking water,” said Raushan.

“All the families have my contact number. They can call me if they face any issue with the rainwater tank. I go immediately to fix it,” said Raushan.

UNDP Climate. 2022. “Rainwater Tanks and ‘Paani Apa’ Bring Relief to Women and Families Living in Bangladesh’s Southwest.” YouTube. December 18, 2022. <https://youtu.be/1B8ZhugiRoo>.

SIZING THE WATER TANKS

 Wet season

 Rainwater collected in the pond is enough for wet season usage

	mm	Catchment area (m ²)	Rainwater collected (m ³)	
Jan	6.5	44	0.29	0.29
Feb	33.3	44	1.47	1.47
Mar	128	44	5.63	5.63
Apr (flash flood)	371	44	16.32	16.32
May	578	44	25.43	25.43
Jun	762	44	33.53	33.53
Jul	756	44	33.26	33.26
Aug	627	44	27.59	27.59
Sep	547	44	24.07	24.07
Oct	191	44	8.40	8.40
Nov	27	44	1.19	1.19
Dec	11.5	44	0.51	0.51
	4038.3			177.69

Minimum 44m² of catchment area is required for April (when flash flooding occurs).

34 m³ total is taken from the storage pond from October to May.

144 m³ total is stored in the pond during wet season from May to October.

Hence, water supply is greater than water demand, excess water can be drained out.

 Separate communal water tank

During flash floods,

	YES or NO	l/day/person
Drinking	X	3.53
Cooking	/	6.71
Bathing	/	27.26
Domestic washin	X	12.18
Toileting and catt	/	12.75
		46.72

Drinking water needs,

	YES or NO	l/day/person
Drinking	/	3.53
Cooking	X	6.71
Bathing	X	27.26
Domestic washin	X	12.18
Toileting and catt	X	12.75
		3.53

Islam, Muktarun, Tahmid Imran Imon, and Ataur Goni Polash. 2019. "Analysis of Rainfall Variability in Sylhet Region of Bangladesh." *Journal of Water Resource Engineering and Management* 6 (2): 1–10. <https://doi.org/10.3759/jowrem.v6i2.2614>.

Milton, Abul Hasnat, Habibur Rahman, Wayne Smith, Rupendra Shrestha, and Keith Dear. 2006. "Water Consumption Patterns in Rural Bangladesh: Are We Underestimating Total Arsenic Load?" *Journal of Water and Health* 4 (4): 431–36. <https://doi.org/10.2166/wh.2006.0027>.

A 3000 litre rainwater tank per household provides a household of maximum 9 people with water usage of 420 litres per day, for 7.1 days.

A 3000 litre communal rainwater tank provides maximum 8 dwellings (half a cluster) of maximum 9 people each with water usage of 254 litres per day total, for 11.8 days.

WASTEWATER AND BIODIGESTERS

ATEC Biogester

A biogester is a machine that digests organic waste products and converts them into byproducts, such as biogas and fertilizer. In Bangladesh's agricultural sector, biogesters are mainly fed manure, which prevents its disposal in and the contamination of local waterways. The biogas byproduct is then typically connected to a gas burner for indoor cooking. Not only is this more convenient than cooking with wood, but the gas stoves are cleaner burning, less toxic, and help prevent deforestation.

The ATEC biogesters made for Bangladesh, aptly named Shobuj Shakti ("Green Strength"), are a pioneering model. Unlike traditional models, they are made of modern materials (linear, low-density polyethylene) to protect them from water damage during monsoon season. They are also small and movable, allowing for more flexibility.

Through a partnership with the Feed the Future Bangladesh Livestock and Nutrition Activity, funded by USAID and implemented by ACDI/VOCA, ATEC introduced Shobuj Shakti to a wide market of prospective buyers. By partnering with USAID, ATEC was able to contract in-person agents like Abrar Nayeem to lead on-the-ground marketing campaigns. ATEC recruited 10 agents, including livestock service providers and smallholder farmers who already had valuable networks. These agents made sales, handled installation, and earned a commission from ATEC. ATEC, in turn, achieved its business goal of reaching 10 new rural areas.



Source: <https://projects.rvo.nl/projects/nl-kvk-27378529-sdg7190014>



Lima Akhtar, a local farmer and ATEC customer

"Us women, we cook every day. Now, with the absence of smoke in the house, it's undeniably a breath of fresh air! None of the women with biogesters, nor their husbands, dispute this," said Akhtar.

MATERIALITY

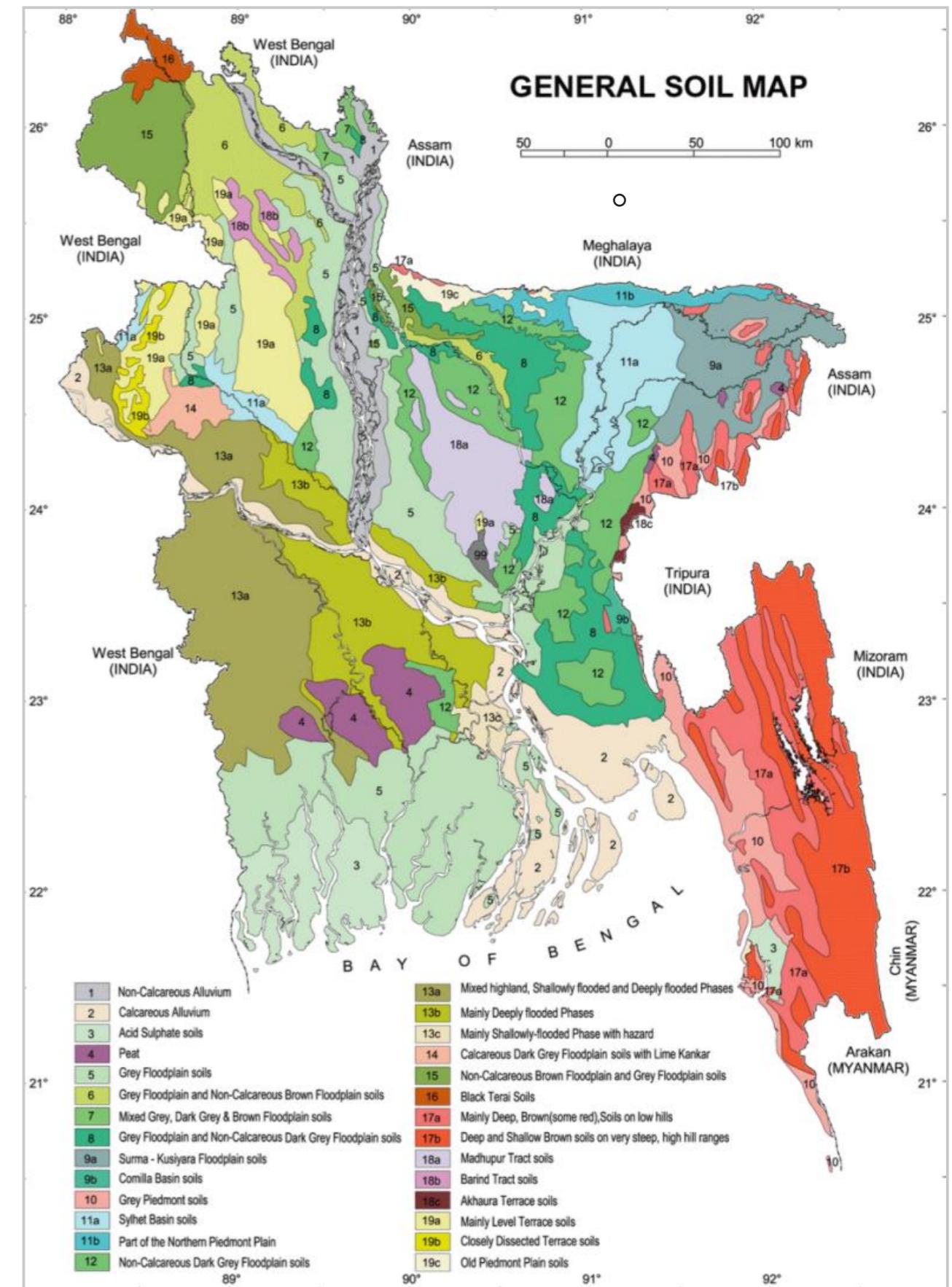


SOIL

Haor region soil

In Sunamgonj district, brown and grey in colour cohesive and grey non-cohesive soil layers are observed.

Cohesive soil layers are found up to the maximum depth of about (0-1.7m), whose sizes vary about 0.0014-0.074 mm and stiffness varies from very soft to stiff and then there are non-cohesive soils up to depth 1.8m whose sizes vary from 0.074-4.76 mm and the relative density varies between loose and medium dense.



Mud plaster

Mix of earth and water (sometimes with the addition of animal dung or fibres such as straw)

Building with mud around Bangladesh

Earthen walls vary, from thick adobe structures where sticky mud is thrown in layers rather than rammed to sundried earthen blocks laid with earthen mortar and rammed earth walls. Earthen plasters also feature in all three divisions. In Rangpur basic single storey bamboo frames with split bamboo weaved panels are plastered, in Khulna and Barisal jute and coconut timber are favoured, again plastered to a smooth hand finish. Other earthen based solutions include fired products such as bricks, terracotta roof tiles (which are sadly out of fashion) and clay products which support daily life.

Image of mud

When one walks into the houses topped with terracotta tiles or golpata leaf it is noticeably cooler than walking into the two that feature corrugated iron (CI) sheets. In fact those are quite unbearable during the heat of the day. Talking to all of the beneficiary households everyone responded that they would prefer a brick house with CI sheet roof rather than an earthen wall or plastered structure with terracotta tiles. They were fully aware of the comfort issues, but believed longevity to be more important. In a society which relies heavily on status there is a real desire to upgrade houses with more 'durable' and expensive solutions.



Three Key Categories

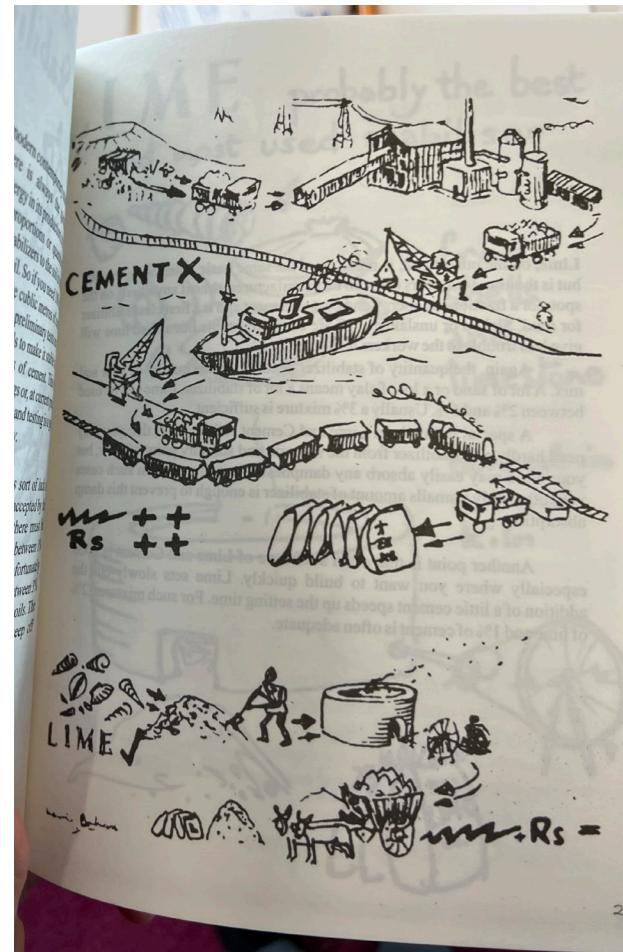
- Plinths
- Walls
- Plasters

LIME

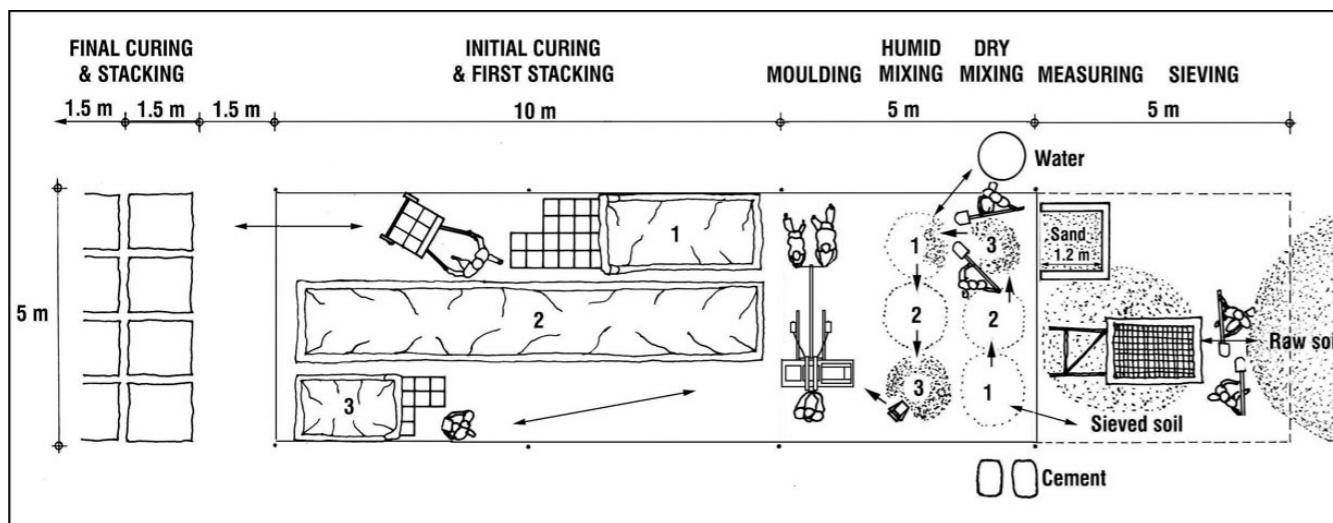
Lime is biodegradable. Lime is burnt at a lower temperature than cement in the production process (900°C as opposed to 1300°C), therefore making lime production not only more environmentally friendly but also more economic as well. Lime is recyclable.

Lime mortar is a truly ecological and an environmentally friendly building material in its production, its use and afterlife. The carbon footprint of lime production is considered carbon-neutral for a number of key reasons.

"Mineral Resources - Banglapedia." n.d. Banglapedia. Accessed January 5, 2024. https://en.banglapedia.org/index.php/Mineral_Resources#/media/File:MineralResource.jpg.



COMPRESSED STABILISED EARTH BLOCKS (CSEB)



There are 6 stages for the production of CSEB.

The following details are given for an Auram Press 3000 which can produce 1000 blocks 240 per day:

Preparation (Digging + Sieving)

2 to 4 people

Measuring

1 people

Mixing (dry + wet)

2 people

Pressing

Initial curing and first stacking

Final curing and stacking

Total No.

1 people

3 people

1 people

2 people

11 to 13 people

Production

Soil, raw or stabilized, for a compressed earth block is slightly moistened, poured into a steel press (with or without stabiliser) and then compressed either with a manual or motorized press. CEB can be compressed in many different shapes and sizes. For example, the Auram press 3000 can make 70 different blocks using only 18 moulds.

More sustainable material

The embodied energy of CSEB is 10.7 times less than country fired brick.

Carbon emissions of CSEB are 11.8 times less than country fired brick.



Auram 3000 press

Suitability for the Haors

However, there are challenges in utilising CSEB in a humid sub-tropical climate like Bangladesh, and more so in the flash-flood prone wetlands.

Notes for the production stages:

The number of persons for digging & sieving will vary with the type of soil.

The number of persons for the final curing & stacking will depend on the transportation distance.



Shibbari, Sylhet. 5km from Sylhet City

Abdus Samad Sadi. 2021. "Bangladesh Bricks | Bricks Manufacturing Process (Part 2) | Sylhet." YouTube. March 20, 2021. <https://www.youtube.com/watch?v=ZRTB8RXGLfQ>.

Production

During the dry season, when there is no work to do in the fields, workers of all ages come from rural parts of Bangladesh to earn a little money in brickyards. The entire process involves workers wearing their own clothes and no special protective gear.

Pollution

The red dust from brick production spreads to nearby towns and villages, potentially creating health problems.

Demand

Bricks are the main construction materials in Bangladesh and rapid urbanisation has increased demand. This is a complex problem that includes engineering problems as well as financial, technical, social, and political problems.

"Eco-Friendly Brick Helps Build a Cleaner Bangladesh." 2011. Ministry of Ecology and Environment PRC. June 24, 2011. https://english.mee.gov.cn/News_service/media_news/201106/t20110624_213072.shtml.

Cleaner production

The United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) have recently introduced energy efficient, smokeless brick-making technology to curb greenhouse gas emissions in Bangladesh.

The new device, known as the Hybrid Hoffman Kiln, was originally developed in Germany to replace the older, highly pollutant brick-making technology. It was later modified in China and remodeled to accommodate the specific needs of Bangladesh's brick-making industry. As a result, brick-making technology in Bangladesh is now maximally efficient, eco-

BAMBOO

Bamboo building tradition

The traditional bamboo houses are not the product of any theory design, but influence of instinct, intuition, common sense and communal memory.

Typically bamboo houses have bamboo mat walls with bamboo or timber posts. Also organic materials like jute sticks, catkin grass are used. Flood with strong currents can destroy wall panels, get washed away and may be partially or complete lost, especially if the connections to posts are weak.

Local treatment of the bamboo mat walls is done by bituminous, oil etc. Simple chemical preservative treatment methods (dip diffusion method, intemodal injection method or hot and cold method) for increasing the longevity of organic materials have been developed a long time ago. Cost can increase 20-25% but can increase longevity by more than three or four times. Untreated, bamboo mat walls do not last more than 4-5 years in outdoor conditions, but after treatment lasts for 15-20 years.

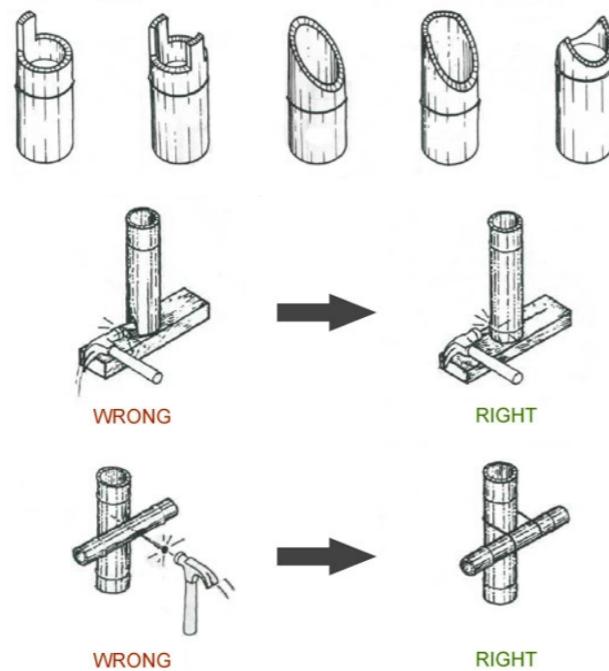
Khan, Md., and Ruman Rashid. n.d. "The Sustainable Architectural Principle of Traditional Bamboo Houses in Bangladesh." *Sustainable Architecture and Urban Development*, 261-70.

Haor bamboo species

Bangladesh has over 32 species of native bamboo, most notably: Muli (melacanna baccifera) Borak (bambusa balcooa), which can grow 18 inches a day to reach over 65 feet in just two months. Raised soil beds, use hardy species for Haors like Phyllostachys rubromarginata "Red Margin Bamboo"

"What Bamboo Grows Well in Swampy Soil? | Bamboo Plants HQ." 2022. Bamboo HQ. September 26, 2022. <https://bambooplantshq.com/bamboo-for-swampy-soil/>.

Vernacular techniques



Ly, Wynne. 2016. "Bamboo Joints and Joinery Techniques." *WoWeQ* (blog). March 10, 2016. <https://lyquynhblog.wordpress.com/2016/03/10/bamboo-joints-and-joinery-techniques/>.

Case study: Arcadia Amphibious School

The bamboos, collected from neighbouring villages, were chemically treated by applying a liquid made by boiling local Gaab fruits. This traditional Bangladeshi method made the bamboo waterproof.

Most of the joints in the bamboo school structure do not use steel wires which could corrode in the water but prefer a rope-tie method.

Yasmeen Lari's empowerment of women through bamboo building

In Pakistan and Bangladesh, Yasmeen Lari's bamboo and thatch roof, as well as mud sculpting workshops have encouraged and inspired women to build.



Yasmeen Lari's Zero Carbon Channel. 2022. "Tying Knots: Pakistan & Bangladesh Build Together Zero Carbon Prefab Bamboo Structure." YouTube. July 29, 2022. <https://www.youtube.com/watch?v=sXMKsfIbfIw>.

Bamboo as an industry

Bamboo treatment centre in Cox's Bazar, six-foot-deep pond - The bamboo has spent seven days in a bath made up of water and borates – a naturally-occurring pesticide. By infusing the poles in the solution – the bamboo's lifespan is increased from one or two years to five years. The aim is to build the bamboo supply chain into a sustainable industry.

"Unleashing Bangladesh's Bamboo Potential." n.d. IOM UN Migration. Accessed June 24, 2024. <https://storyteller.iom.int/stories/unleashing-bangladesh-bamboo-potential>.

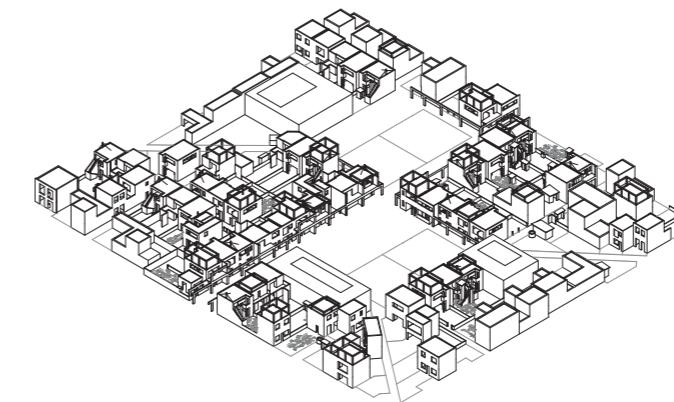
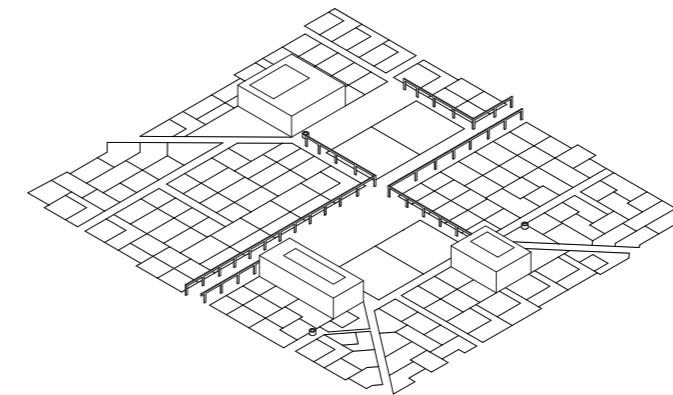
STRUCTURING PUBLIC SPACE



MONUMENTALITY AND EPHEMERALITY



José Manuel Rodrigues, aerial view of the Malagueira neighbourhood, 1990. Figure from the article 'To be Continued ...'



Steven Holl, James Tanner and John Cropper, honorable mention for their design for the IAF 'International Design Competition for the Urban Environment of Developing Countries', Manila, 1976. Project analysed and redrawn in 2014 by the students of TU Delft's Research Seminar of the 'Global Housing Studio'. Extracted from the article 'To be Continued ...'

Service spine

In the case of the 'conduta' in Siza's Malagueira, and the arcade/paseo in Holl, Tanner and Cropper's project for the Dagat-Dagatan resettlement area, the public spine is defined and secured by an infrastructural element. This acts as a service core for the clusters of housing to be built against it with individual agency.

Defining another scale

The service spine also functions to define another scale- a monument. This creates a dialogue between the "anonymous character of the dwellings and the exceptionality of the monument".

Signs of the collective will

Mota makes a link to Aldo Rossi's *The Architecture of the City*, where Rossi argues that there is a dialectical relation between the transient nature of the dwellings and the permanence of the monuments, where the monuments are "signs of the collective will as expressed through the principles of architecture."

PUBLIC GHAT PROJECT



Location: Jhenaidah, Bangladesh
 Client: Residents & Jhenaidah City Authority
 Architect: Co.Creation Architects / Khondaker
 Hasibul Kabir, Suhailey Farzana
 Completed: 2019



The community-driven project provides two ghats (steps leading down to the river) in the riverine city with 250,000 residents; over time, as access to and use of the river and banks had become impeded. Future phases focus on public use of the river area with walkways, gardens, cultural facilities and environmental efforts to increase biodiversity in the river.

MANAGERIAL STRATEGY



BAAN MANKONG RURAL PROGRAMME

Background

In 2004, the Thai government launched a new project to identify and register the country's poor citizens, in both urban and rural areas. The registration process revealed that 4.8 million people were living in poverty in rural areas, without land for cultivation or housing – or both. In response to the growing problem of rural poverty and landlessness, CODI began expanding the Baan Mankong Program in 2016 to address housing problems in rural areas as well as urban communities. In many rural areas, community-led surveys show that a lot of families have lost their land, for various reasons: debt, family crises, land problems, eviction, market forces, disasters or sheer poverty. And without land or housing or means of survival, the poor are compelled to migrate into cities, and that just adds to the problems of overcrowded cities and depopulated rural communities.



Housing security to include livelihood

Because the rural also covers issues of agriculture, food production, climate change and environment, the Rural Baan Mankong projects can promote a broader form of housing security, to include such things as secure livelihood and access to healthy food, and can build on the work that has already been done by rural NGOs and government programs. The program will be flexible enough to cover all these various constituencies and development possibilities. The program will develop comprehensive plans to develop secure livelihoods, with social and economic activities that will allow them to stay – and thrive – in those rural areas.

In the urban Baan Mankong program, each family is eligible for a subsidy of up to 80,000 baht (\$2,500) to be applied directly to the cost of buying their land, building their houses and developing their physical, social and economic infrastructure (see table below). In the rural Baan Mankong program, each family will get the same amount of subsidy, but the funds can be used in more flexible ways than in the urban Baan Mankong subsidies, according to each particular context. The housing in these rural projects could take a variety of forms, but the focus of the program is on land security, decent housing and some kind of livelihood arrangements, where the people live together as a strong community organization, with other elements adding social and economic value to the housing projects.

RURAL BAAN MANKONG PROGRAM SUBSIDY PACKAGE <small>(figures as of Jan 2019)</small>	
Subsidy element	Per family subsidy
1. Support for housing construction / improvement	40,000 baht <small>(US\$ 1,250)</small>
2. Infrastructure development subsidy	12,000 baht <small>(US\$ 375)</small>
3. Economic development, collective economic activities	2,500 baht <small>(US\$ 78)</small>
4. Social development activities, youth, elderly, etc.	2,500 baht <small>(US\$ 78)</small>
5. Community organization strengthening, exchange, building network	5,000 baht <small>(US\$ 156)</small>
6. Reserve for groups with unexpected and special needs	800 baht <small>(US\$ 25)</small>
7. Support for support for CODI's management, capacity building, NGOs or supporters of the community process (part remains with CODI) (12% of the total 80,000 baht subsidy package)	9,600 baht <small>(US\$ 300)</small>
TOTAL	72,400 baht <small>(US\$ 2,262)</small>

THE MAHILA HOUSING SEWA TRUST

“What we saw over time, as Ben said, is that women who... were regarded as beneficiaries always were actually, when they were given an opportunity, they would develop into leaders and they would lead not only within their communities, but they would lead in fact a lot of what Vigil said, city planning issues also.”

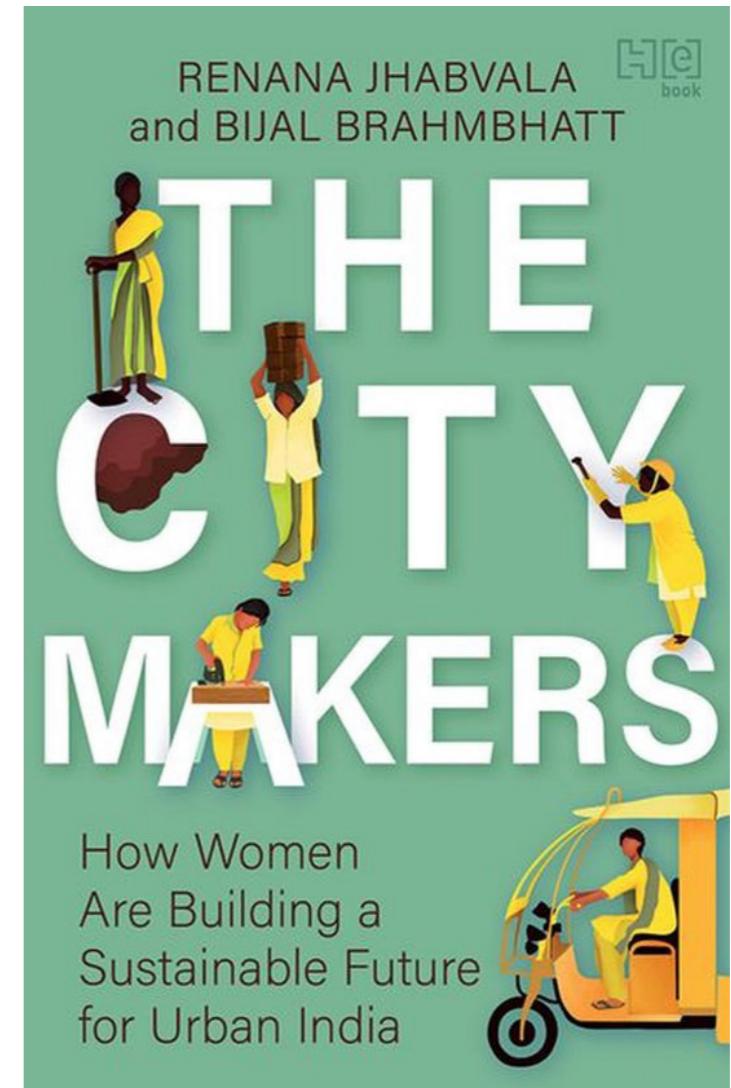
13:55:21

Transcript from 'The City Makers' Book Release

“Living on the margins of India’s urban sprawls, the poor women of the nation’s slums bear the manifold burdens of housework, childcare and earning a livelihood. The Mahila Housing SEWA Trust (MHT) was established in 1994 with the aim of mobilizing and empowering these urban poor women, and supporting their access to adequate housing. Twenty-five years on, the MHT has changed the lives of over 1.7 million individuals, reaching more than 3,30,000 households and skilling over 17,000 women.

The City-Makers tells the story of this incredible journey – a journey of transformation that has the potential to one day change the cities in which we live. The accounts of the innumerable courageous women workers who have taken steps – individually and collectively – to bring about change at the personal and community levels speak of the struggles, the sense of solidarity and the triumph they experience as they build their homes with their own hands; bargain with government and private agencies for access to water, sanitation, affordable energy and land rights; find solutions to make their homes climate-resilient; and participate in city-level planning and decision-making processes. Together, the success stories of Meena, Mumtaz, Parul, and others like them, reflect the central message of the MHT’s mission: that women living in urban informal settlements must be taken along if India wishes to make its cities participatory, inclusive and sustainable.

Excerpt from the publisher



INCOME DIVERSIFICATION



INTEGRATED LIVESTOCK DEVELOPMENT PROGRAMME

Programme objectives

Accelerating poverty alleviation and improving animal food security of rural poor communities through integrated livestock production management;

Extension of improved and sustainable technologies in the livestock sector;

Creating self-employment of women and improving their quality of life.

Constraints and opportunities

Ducks, chickens, goats and sheep can easily adapt to the natural environment and changing climate of the region. Therefore, rearing of ducks, chickens, goats and sheep in this area and adjacent Haor area can be a source of immense potential income. But the productivity and production efficiency of the livestock are not satisfactory due to the lack of advanced animal husbandry in the area. Disease prevalence, underdeveloped technology, lack of proper farm management, poor quality of health care and technical services, inadequate technical knowledge, lack of coordination between farmers and organizations are major obstacles to livestock development and production in Haor region.

Programme outline

2552 Beneficiary Groups (BG) will be formed in 39 upazilas.

51276 trained beneficiary families will receive materials, technology and livestock services in various packages.

A total of 380 silage demonstration plots will be established in 39 upazilas.

A total of 676 (50% female) trained vaccinators will be produced from 338 unions. 338 Livestock Field Facilitators recruited will be trained.

50 cheese producing beneficiaries of Ashtagram upazila will receive assistance.

The proposed project will achieve self-sufficiency in livestock feed through grass cultivation and market creation;

serial no	The name of the package	Number of Beneficiaries (t)	Type of grant	Comment
1.	Duck farming	17975	15 (13 chickens, 2 roosters) housing, food vaccines and medicine	** 6000/- (Six thousand rupees) for goat/sheep, 6000/- (Six thousand rupees) for poultry/chicken and 10000/- (Ten thousand rupees) for grass cultivation will be provided for construction of temporary house.
2.	Chicken farming	17480	15 (13 hens, 2 roosters)	
3.	goat rearing	5850	2 goats (accommodation, food, vaccines and medicine)	
4.	sheep rearing	5865	2 sheep (housing, food vaccine and medicine)	
5.	Cultivation of grass	3380	Grass seed, fertilizer/cutting assistance to 3380 grass farmers	
6.	Immunization and first aid	676	A total of 676 people as 2 people in each upazila (cool box, worm box and other materials)	
7.	cheese maker	50	Assistance will be given only to cheese producing beneficiaries of Ashtagram upazila of Kishoreganj district	
8.	Silage demonstration plots	--	Demonstration of silage production by improved varieties of grasses	
51276 people				

Packages

WOMEN'S EMPOWERMENT THROUGH LIVESTOCK REARING

Raiser group	Stock Values (Tk.)	Family size	Male (%)	Female (%)	Average no. of Livestock and Poultry				
					Cattle	Goat	Chicken	Duck	Pigeon
Small	Below 10,000	5.57	42.37	57.63	1.05	0.57	6.20	8.97	5.73
Medium	10,001-15,000	7.25	53.52	46.48	0.80	1.02	3.70	5.55	6.53
Large	Above 15,000	6.68	47.75	52.25	0.93	0.85	10.87	7.06	3.12
Average	-	6.50	47.88	52.12	0.93	0.81	6.92	7.19	5.12

Source: Field survey, 2012

Raisers	Household income from Livestock and poultry rearing							
	Livestock (%)		Poultry (%)		Total income from livestock and poultry (%)		Others (%)	
Small	17.75		39.53		57.28		42.72	
Medium	20.51		17.34		37.85		63.15	
Large	38.83		23.81		62.64		37.36	
Average income	25.70		26.89		52.59		47.74	

Note: *others income: crops, fisheries, services, petty business, day labour, rickshaw pulling, sewing, earth workers, and handicrafts etc.

Activities	Small (%)			Medium (%)			Large (%)			All (%)		
	M	F	O	M	F	O	M	F	O	M	F	O
Feeding & collecting of grass, fodder etc.	19	57	24	24	55	21	21	63	16	22	58	20
Putting to and taking out of shelter	11	61	28	18	53	29	8	65	27	12	60	28
Cleaning of shed	7	59	34	5	67	28	10	58	32	8	61	31
Offering water to the animal	17	64	19	10	59	31	16	69	15	14	64	22
Collecting of egg	8	47	45	11	49	40	47	53	-	22	50	28
Milking	56	39	5	69	31	-	62	35	3	62	35	3
Selling egg and milk	25	58	17	21	63	16	18	59	23	21	60	19
Selling livestock and poultry	67	33	-	63	11	26	74	7	19	68	17	15
Purchasing livestock and poultry	63	11	26	67	9	24	64	13	23	65	11	24
Contact with doctor	68	21	11	63	24	13	69	21	10	67	22	11
Purchasing medicine	71	19	10	69	23	8	63	37	-	68	26	6
All (%)	37	43	20	38	40	7	41	44	15	39	42	19

Source: Field survey, 2012

Livestock and poultry rearing is an important income generating activity for Haor women. Traditionally this is a significant part of their daily work. In the study, the findings indicate that women's participation is more significant in rearing activities than men. Haor women were more involved in terms of feeding, management, and marketing of livestock and poultry products. It was also found that women's participation increased decision making regarding livestock and poultry rearing activities, as well as family aspects.

Mahadi, A, Romaza Khanum, and Kaynath Akhi. 2014. "Participation in Livestock and Poultry Rearing: A Study on Haor Women in Bangladesh." *Journal of Chemical Biological and Physical Sciences* 4 (4). <https://doi.org/10.4236/jcbps.201404004>.

Many women in Haor areas of Sunamganj have found alternative source of income in duck rearing after losing their crops to recurrent floods. One of them is Minara Begum, 46, of Birnagar village in Shanir Haor area of Tahirpur upazila.



"After losing Boro crops last year, our six-member family including my sick husband faced starvation. Anxious to save my family, I bought seven ducks including their feed with Tk 2,000 that I borrowed from someone. Now I have 70 ducks. I also employed a female worker here. Now I am very happy to be self-reliant. I have a plan to extend my farm."

Deshwara, Mintu. 2018. "Duck Farming Now a Saviour for Many Haor Women." *The Daily Star*. March 9, 2018. <https://www.thedailystar.net/country/duck-farming-now-saviour-many-haor-women-1545478>.

WOMEN'S EMPOWERMENT THROUGH BAMBOO PRODUCTION

Bangladesh presently suffers a deficit in bamboo supply. Forecasts are that the shortfall will increase alarmingly by the year 2000 due to large-scale death of forest bamboo due to gregarious flowering. The available forest supply is about 20% and the remaining 80% is coming from the village source. So the bulk of the bamboo are being produced by farmers not foresters. In the southern part of the country: Kassalong, Rangkhiang, Sangu and Matamuhuri, Chittagong, CHT and Cox's Bazar reserves are rich bamboo areas. In the northern part, Patharia and Rajkandi Reserves of Sylhet forest are also rich with natural bamboo areas.

Stem	Years				
	1998	1999	2003	2008	2013
Natural forest supply					
- Potential supply	193.7	222.1	293.6	138.8	65.7
- Available supply	128.7	152.3	228.3	110.3	49.4
Village supply	527.5	527.5	527.5	527.5	527.5
Total supply	656.2	679.8	755.8	637.8	576.9
Demand					
- Domestic	576.1	621.7	666.6	712.3	730.1
- Urban housing	30.1	34.3	38.5	42.7	47
- Industrial	100.1	105.1	110.4	113.1	124.4
Total	706.3	761.1	815.5	868.1	901.5
Surplus/(Deficit)	-50.1	-81.3	-59.7	-230.3	-324.6

Note: Banik 1993a

Founded in 2019, Kawayan Collective specializes in bamboo treatment and collection. It partners with private individuals through engagement with contracted farmers in planting and harvesting bamboos. Each bamboo pole undergoes the BASE's nine-step process to ensure construction-grade quality.

With its bamboo waste treatment, the facility developed additional products including panels from cracked poles, furniture and home goods, and composite bamboo tiles from sawdust.



Aarong was born out of the need to create livelihoods for rural women in the mid-1970s. The word Aarong means 'village fair' in Bangla. It sells handcrafted products made by more than 65,000 artisans located all over the country. The Aarong team consists of over 3800 women and men who work together.

Women weave and craft a large variety of products ranging from baskets of different shapes and sizes to fruit bowls, jewellery boxes, hampers, ladles, mugs, pen-holders, trays, etc.

Chowdhury, Md. 2022. "Present Bamboo Status in Bangladesh Contiguous with Demand and Supply," August. <https://doi.org/10.13140/RG.2.2.30113.42084>.

"Supply and Treatment Facilities | Base Bahay Foundation." n.d. Building Sustainable Future Today - BASE. <https://base-builds.com/bamboo-supply/>.

"Uravu Indigenous Science & Technology Study Centre." n.d. Uravu. Accessed April 30, 2024. <https://www.uravu.in/home/livelihood-support-programme/>.
 "The Bamboo Effect: Kawayan Collective." 2022. Kanto - Creative Corners. September 20, 2022. <https://kanto.com.ph/spaces/architecture/the-bamboo-effect-kawayan-collective/>.



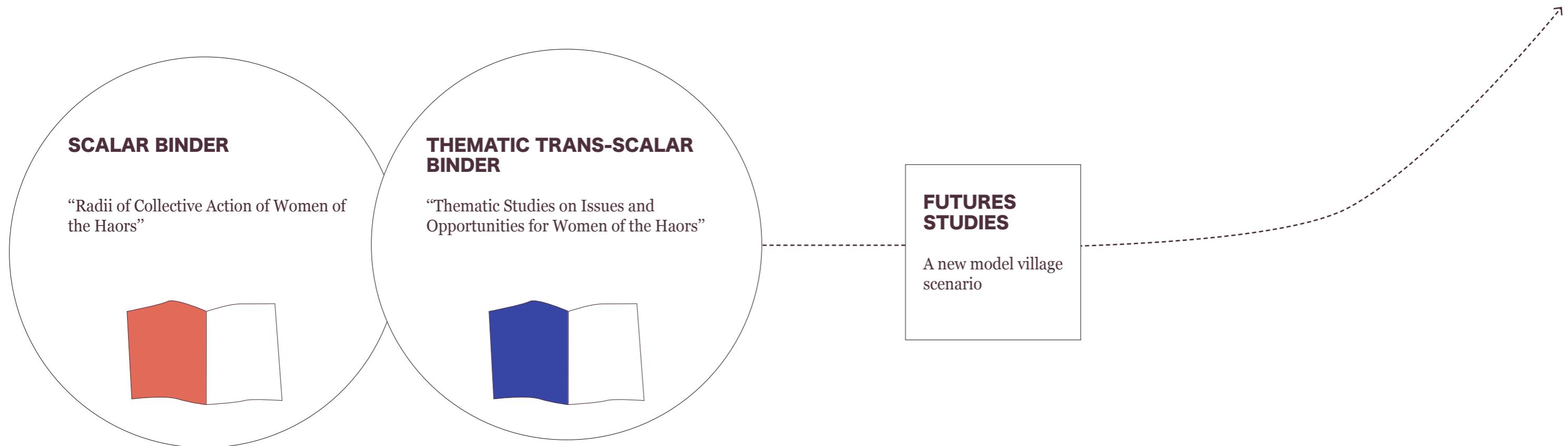
imagining an alternate
feminist future to
increase women's
access to resources

**RESEARCH-DESIGN
LINK**

APPROACH: DIVERGENCE

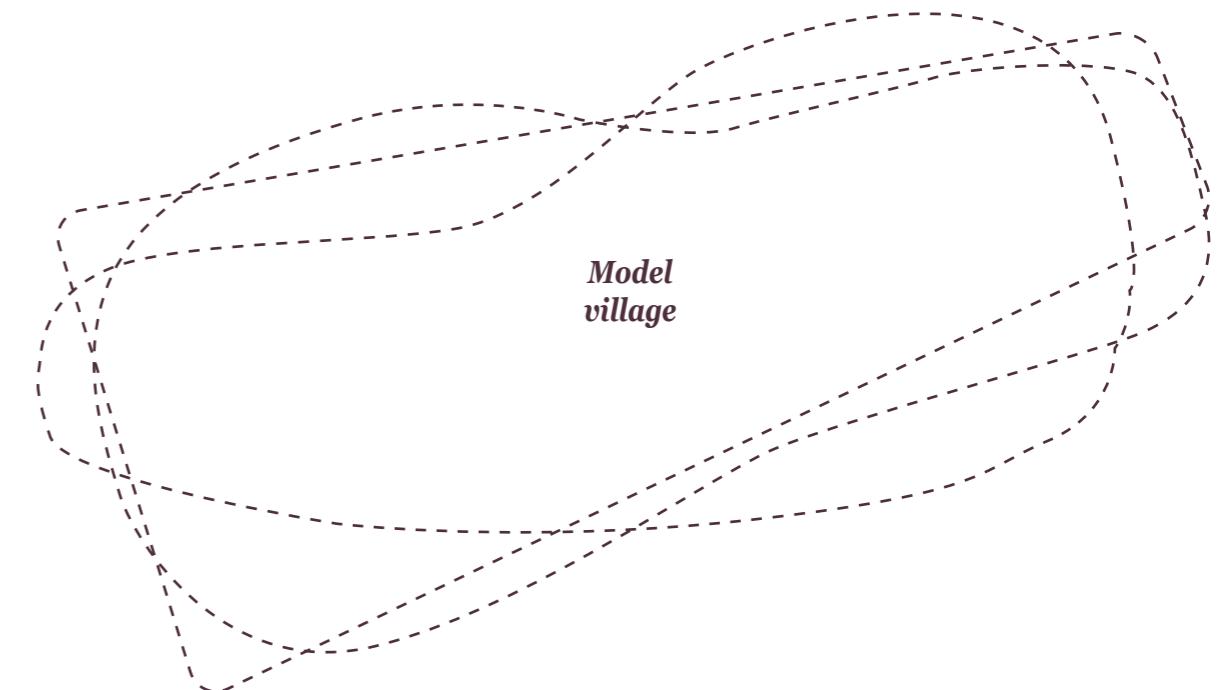
“an approach that seeks to open up the future, moving from a deterministic view of “the” future to alternative futures.”

Sohail Inayatullah, “Futures Studies: Theories and Methods,” 2013, accessed October 15, 2023.





211



1.5x people per hectare

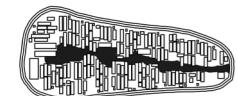
same dwellings per hectare,

each dwelling has access to a toilet, bathroom, kitchen, communal courtyard, street front, water supply, electricity and biogas generation

min. 2.4x more floor space per resident

2.6x more amenities area per resident

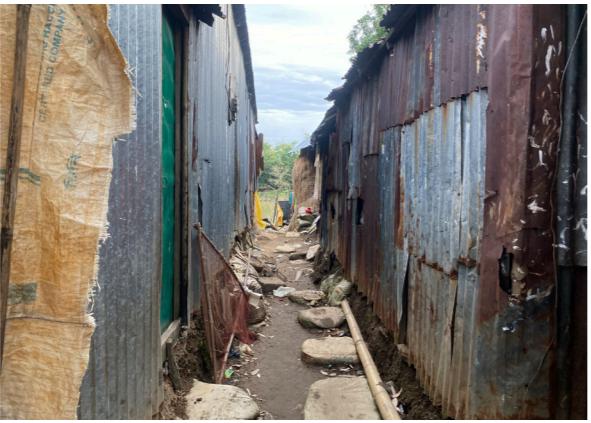
HIERARCHY OF COLLECTIVE ACTION



central linear courtyard



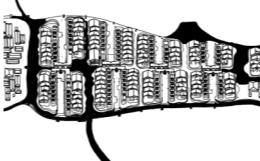
ghat



tertiary alleys



existing



territory



village



cluster

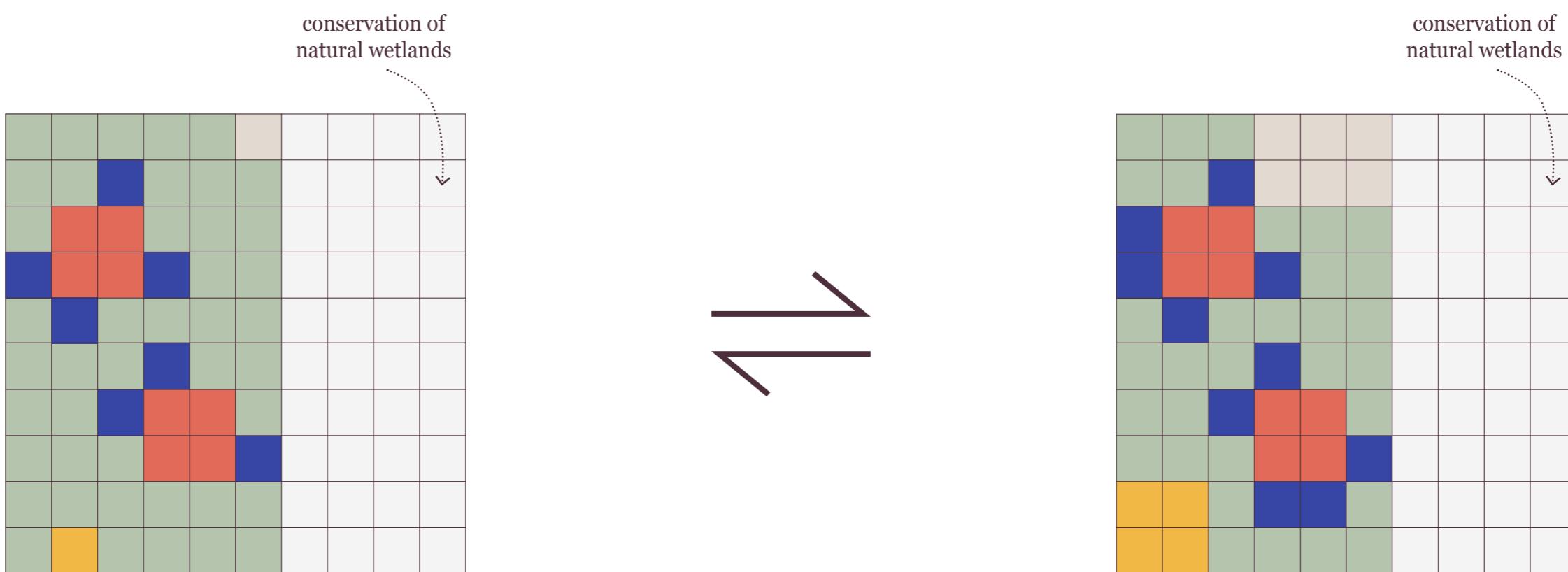


dwelling and details

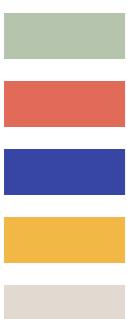


proposed

INCOME DIVERSIFICATION AND CLIMATE CHANGE



Space



Income source

Paddyfields	crops
Villages	shops/small businesses, local contracting
Ponds	fish, duck
Grazing land	cow, chicken, sheep, duck, goat, cheese, silage
Bamboo plantation and hub	prefab panels, bamboo equipment

Climate change, income diversification and wetlands conservation

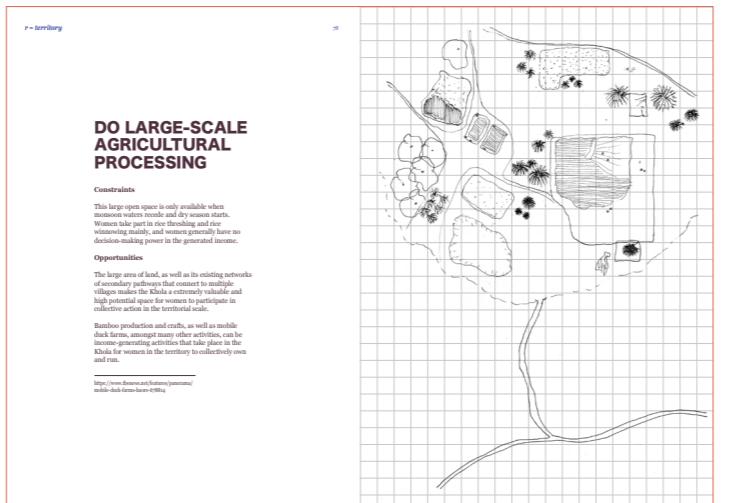
Climate change is increasing the vulnerability of certain sources of income generation such as Boro crop cultivation and fishing. Hence, the patchwork of paddyfields which exists is seen as a malleable landscape that can be excavated or built up for new industries. The composition of industries is constantly in flux, responding to external disturbances, and securing the livelihoods of residents of the Haors.

Akter, Muslina. 2020. "Factors Affecting Extent of Haor Livelihood Diversification in Sunamganj District, Bangladesh." *Asian Journal of Agricultural Extension, Economics & Sociology* 38 (10). https://www.academia.edu/105215640/Factors_Affecting_Extent_of_Haor_Livelihood_Diversification_in_Sunamganj_District_Bangladesh?uc-sb-sw=88249514.

TERRITORY

NODES TO ACCESS WIDER TERRITORY

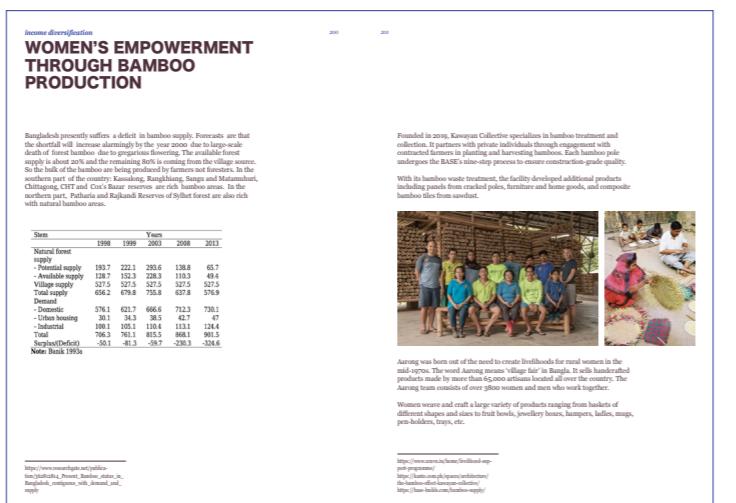
scalar binder_territory_do large-scale agricultural processing



spatial

use the existing networks of Khola and secondary walkways to create nodes for social and economic activity

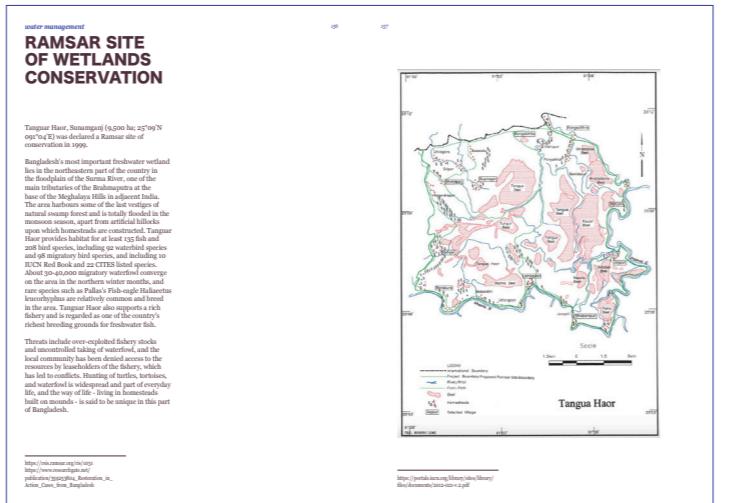
thematic binder_income diversification_women's empowerment through bamboo production



temporal

use the patchwork of paddyfields as a base for income diversification, adapting to external disruptions

thematic binder_water management_ Ramsar site of wetlands conservation



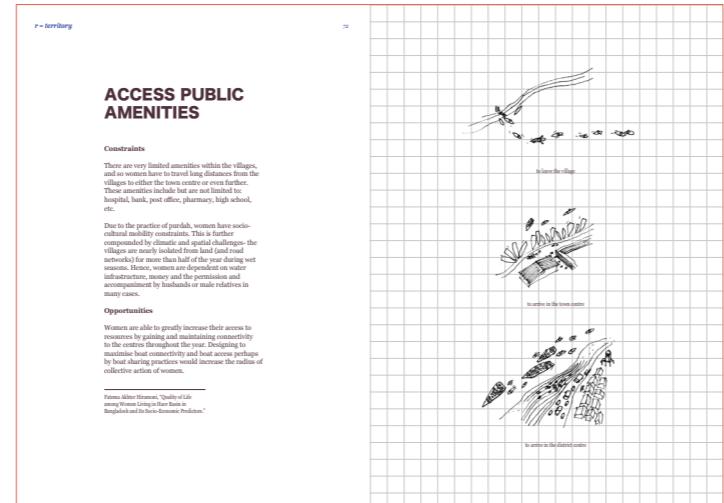
managerial and ecological

protect the natural wetlands, improving diversity and thereby managing flood risks

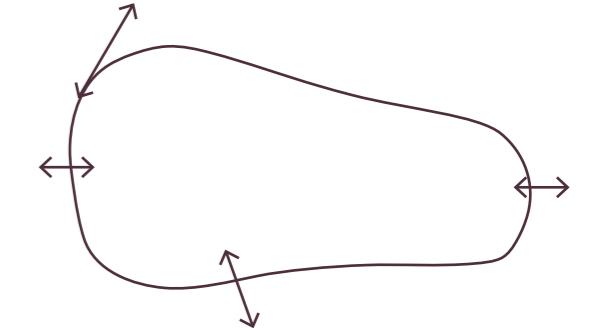
VILLAGE

A RESPONSIVE SYSTEM TO MAXIMISE ACCESS FOR WOMEN

scalar binder_territory_access public amenities

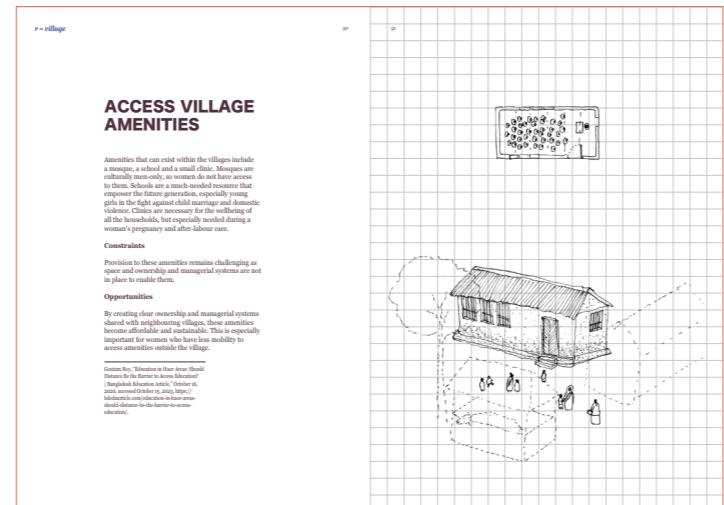


spatial

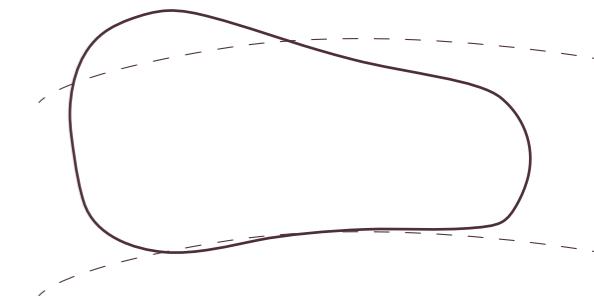


increase connectivity to share amenities between nearby villages

scalar binder_village_access village amenities

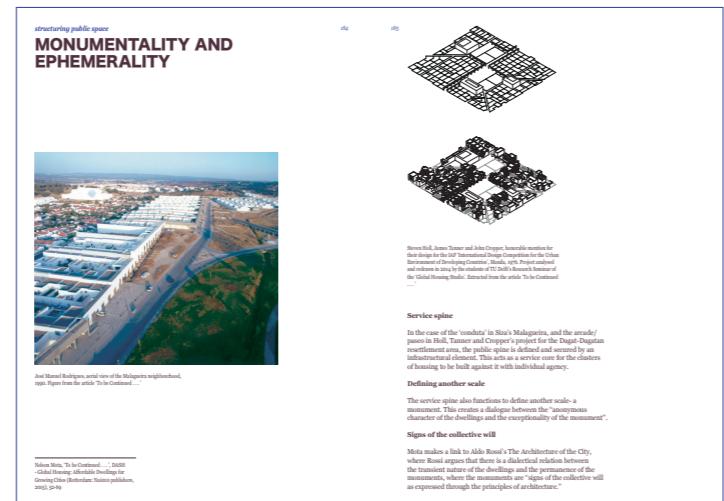


temporal

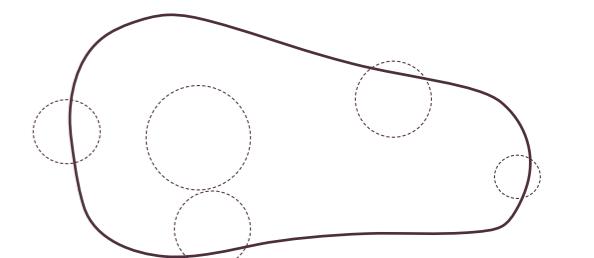


shape the village along the river, creating maximum access to both the river of one side and the paddyfields on the other.

thematic binder_structuring public space_monumentality and ephemerality



managerial and ecological

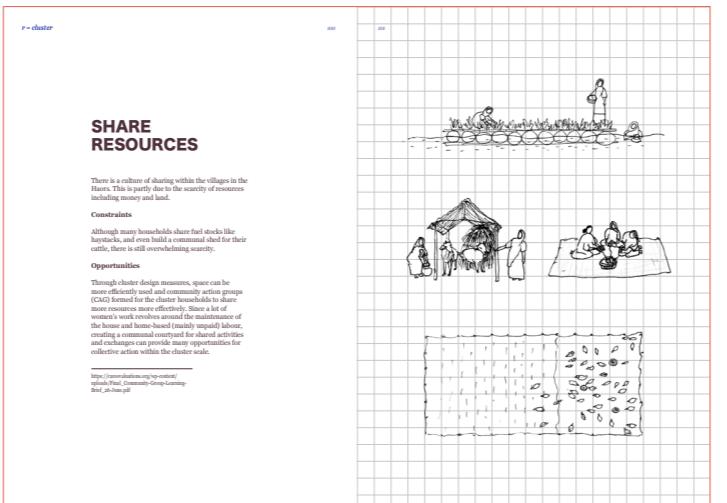


create a hierarchy within public space, responding to managerial levels within the village

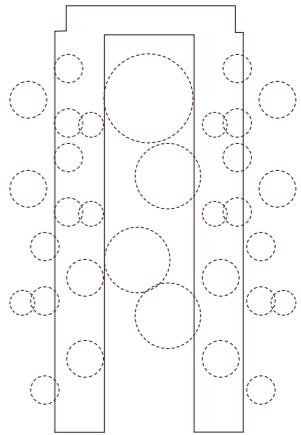
CLUSTER

COMMUNITY ACTION GROUPS: SAFEGUARDING THE COLLECTIVE AND THE INDIVIDUAL

scalar binder_cluster_share resources

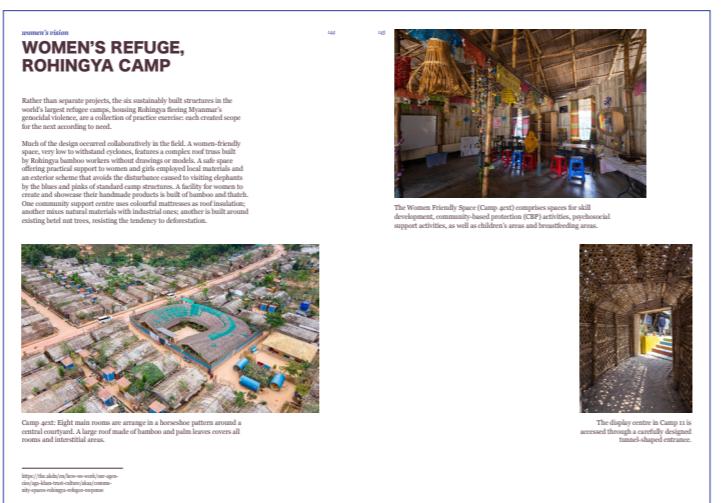


spatial

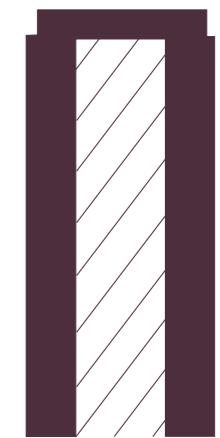


allocate space for women to generate income within the collective cluster and the individual dwellings

thematic binder_women's vision_women's refuge, rohingya camp

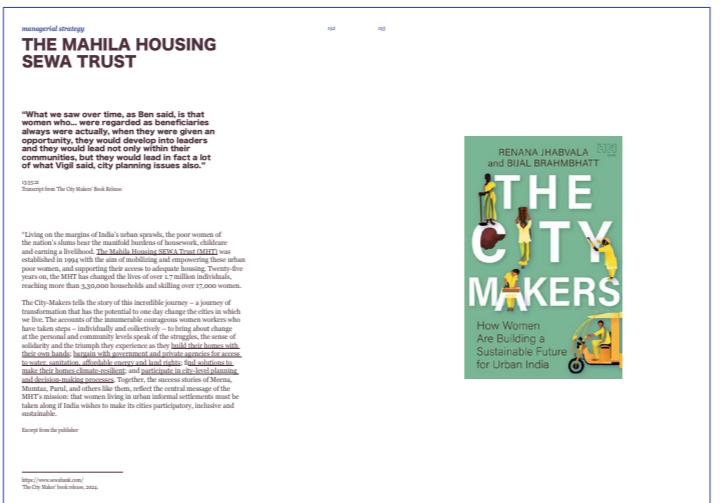


temporal

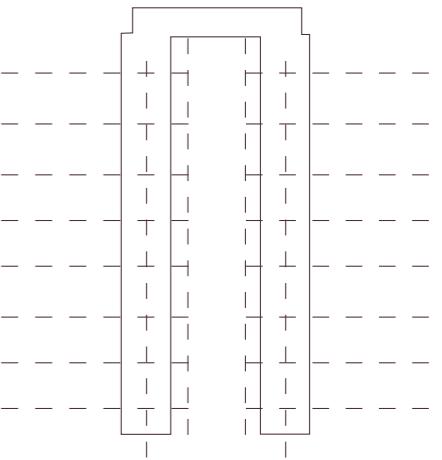


safeguard a communal courtyard for women to work in a safe space

thematic binder_managerial strategy_the mahila housing sewa trust

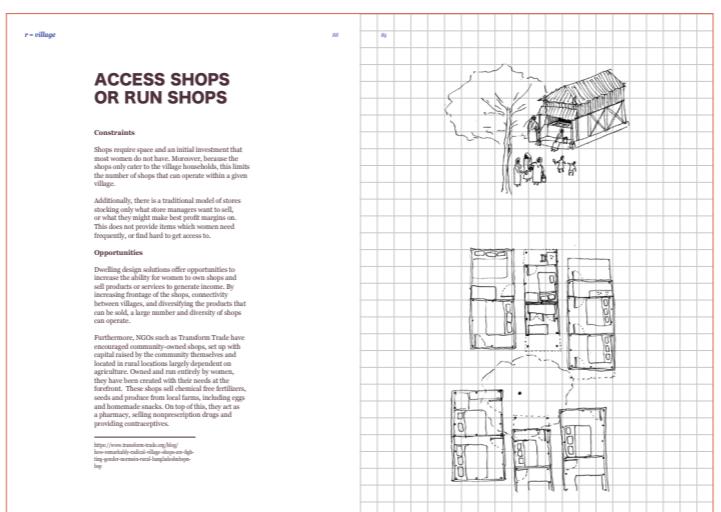


managerial and ecological

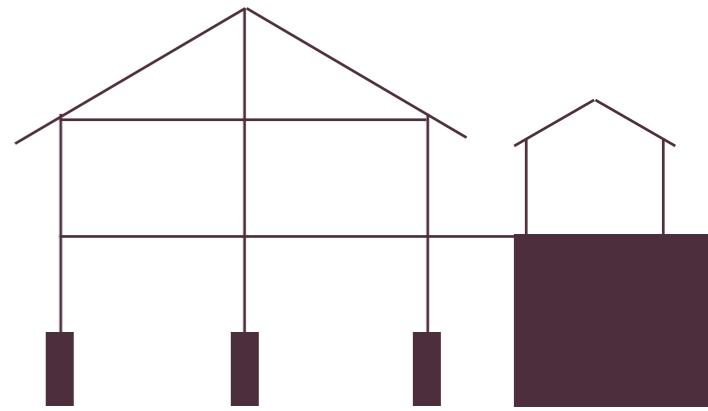


create clusters which have clear demarcations for maintenance and ownership, and group finance possibilities

scalar binder_village_access shops or run shops



spatial



contrast between front and back | live and work zone | individual and collective | bamboo and earth | ephemeral and monumental | frame structure and load-bearing structure

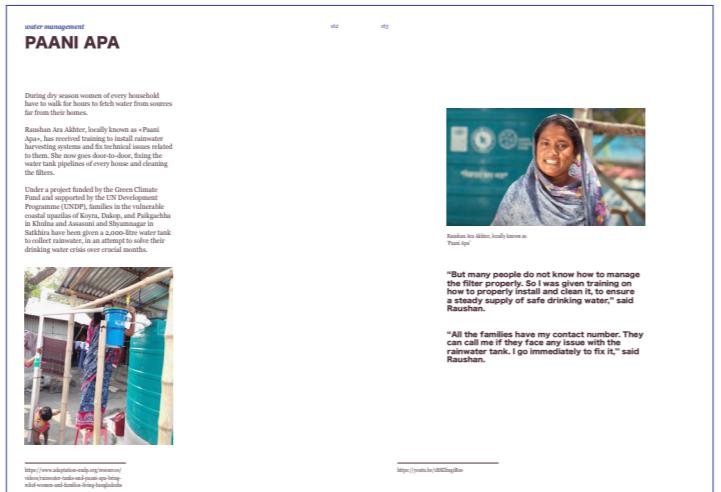
thematic binder_water management_flooding priorities



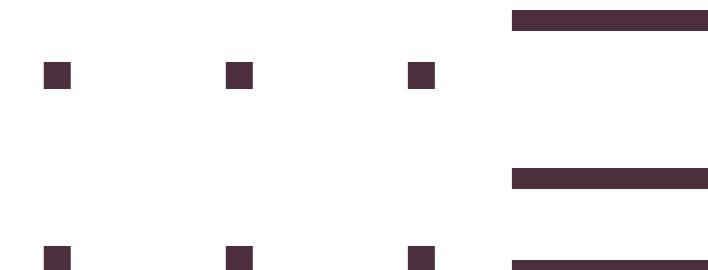
temporal

women's priorities during floods translated into plinth heights for different spatial zones

thematic binder_water management_paani apa



managerial and ecological



the collective and individual are delineated clearly, so it is easy to implement cluster groups and infrastructural systems

DETAILS

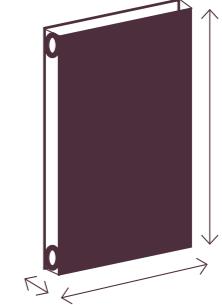
SHEARING LAYERS FOR WOMEN

scalar binder_dwelling_maintain the dwelling

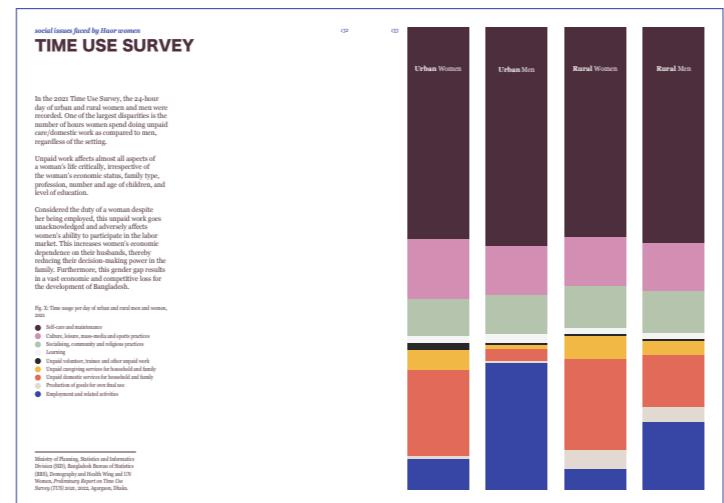


spatial

ensure women have access to materials and construction by using a grid (a scale) centred around women



thematic binder_social issues faced by Haor women_time use survey

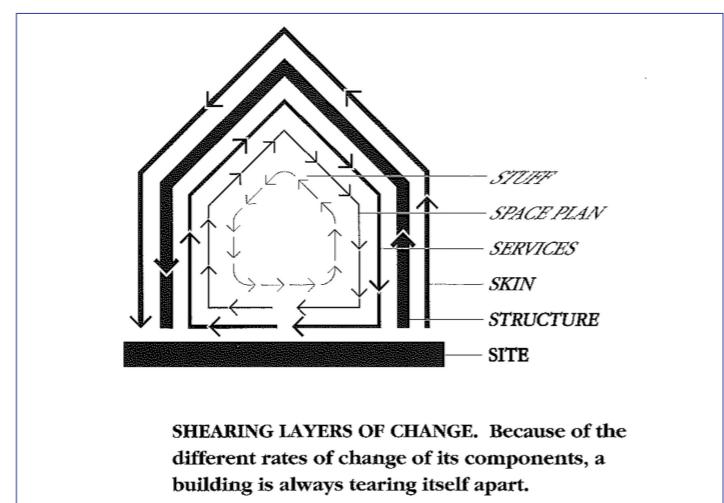


temporal

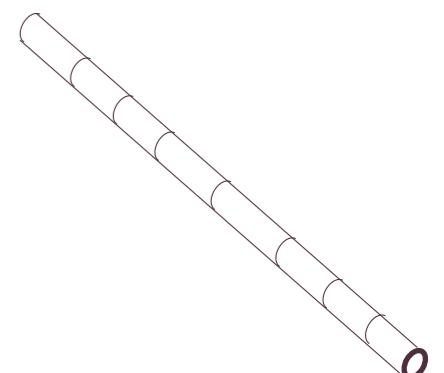
reduce time women spend in building maintenance



Stewart Brand, "How Buildings Learn: What Happens After They're Built"



managerial and ecological



close loops as much as possible to allow circularity of construction

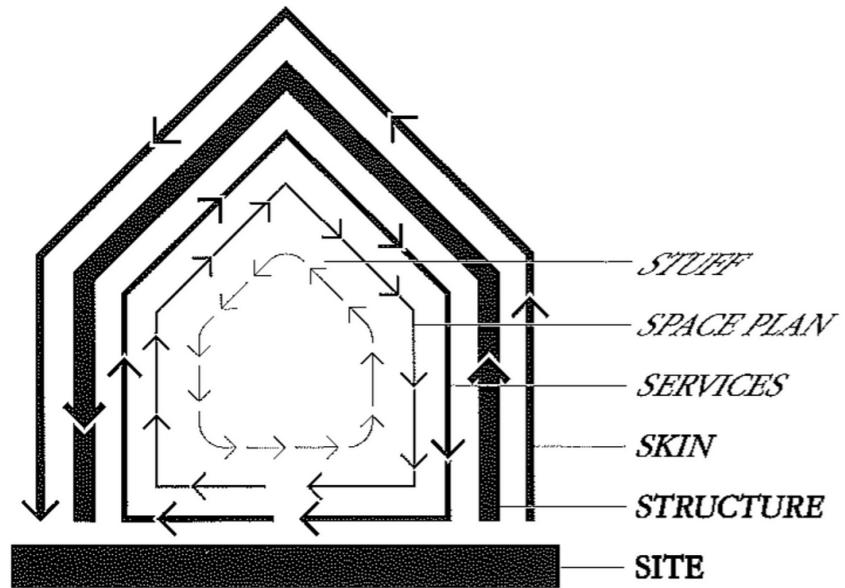


imagining an alternate
feminist future to
increase women's
access to resources

DESIGN

SHEARING LAYERS

LIFESPAN CYCLES



SHEARING LAYERS OF CHANGE. Because of the different rates of change of its components, a building is always tearing itself apart.

SITE

Earthen plinths can compress or waterlog. This can be **washed away every monsoon season**. The maintenance of the plinth is seen as a woman's duty, and women consider this physical suffering. Hence the compacted earthen plinth is capped with lime-stabilised earth for increased durability.

STRUCTURE

There are 6 **brick piers** and quadruple bamboo column sets that **hold up the roof** of the living zone. And the service zone has 3 shear walls, creating an infrastructure spine that is shared within clusters. The **foundation is secure**, and the **bamboo posts are easier to replace** as they come in sets of 4 per footing.

SKIN

Thatch roof panels with bamboo frame: 2-3 years.
 Bamboo mats: 2-5 years.
 Bamboo posts without brick footing: 5-10 years with treatment.
 Bamboo panels: 5-8 years.
 The wall panels are replaced more frequently, but they will not have to be done in-situ, as the **prefabrication** of the panels will allow **natural resources to be used whilst keeping time and cost down**.

SERVICES

Toilets, bathrooms, private courtyards and shared drinking water sources are all **located in an infrastructure spine on the first floor**. This secures the basic needs of the residents during flash floods. There will be **rainwater harvesting, greywater purification** via fish ponds, and biodigesters that provide **fertiliser and biogas**. There is the possibility for **solar panels** to be placed on the South-facing roofs, for **electricity**.

SPACE PLAN

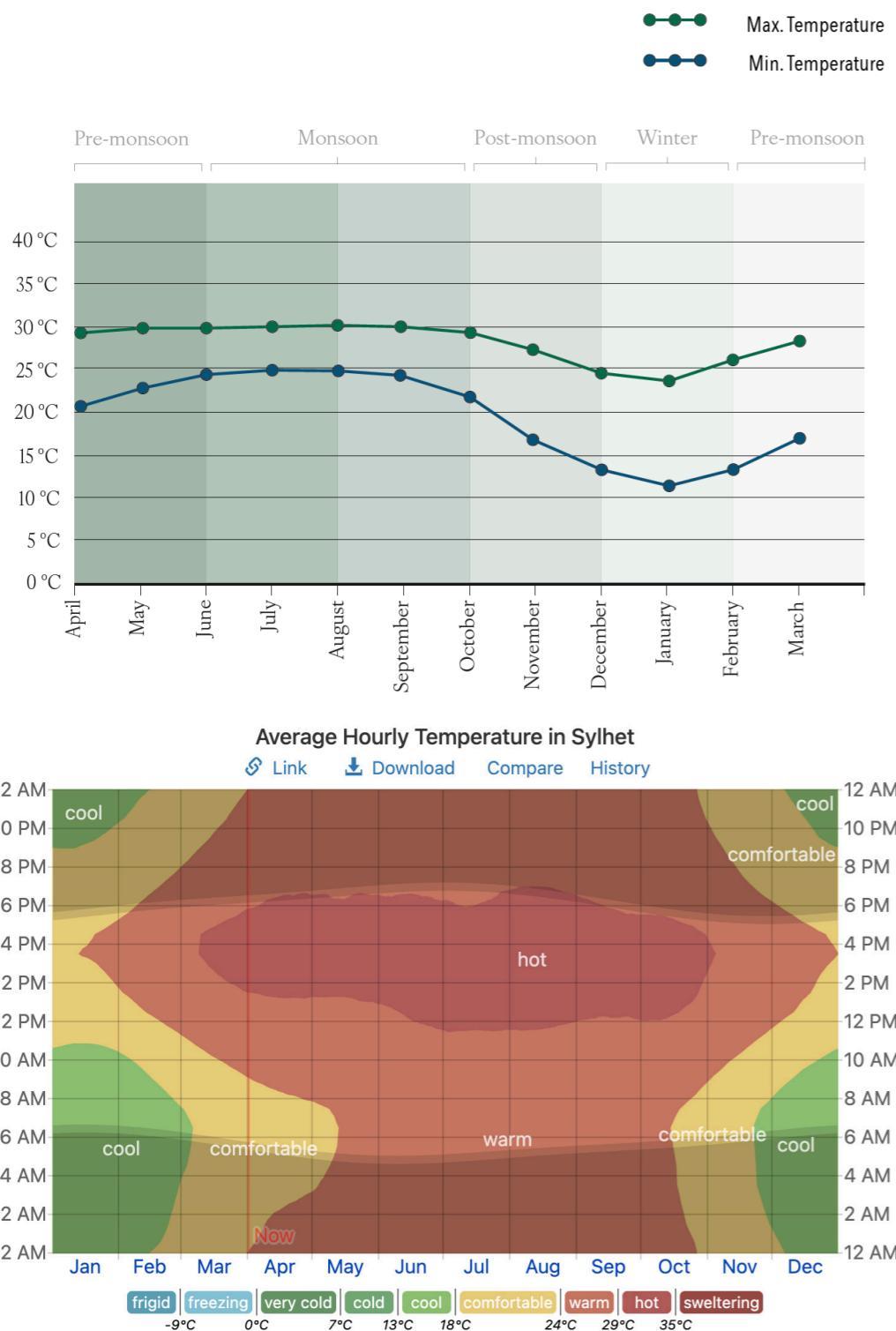
Extremely flexible space plan within the primary structure frame, with the grid set out by the brick piers. **Partition walls** and **infill panels** allow flexibility within the grid. The living zone has approximately 18 sqm in each floor, subdividable into 2 to 3 rooms based on need. Terraces, balconies, verandahs, a loft and open plan are all possibilities.

STUFF

The varying plinth levels allow each family to decide on their **priorities of floodable stuff and non-floodable stuff**. The ground floor will have disposable stuff, and built in storage space will allow rice, fuel, equipment and valuables to be placed higher up.

COMFORT STANDARDS

Fig.17: Minimum and maximum monthly temperature in Sylhet



“Sylhet Climate: Temperature Sylhet & Weather By Month,” n.d. <https://weatherspark.com/y/111977/Average-Weather-in-Sylhet-Bangladesh-Year-Round>, figure by Lisa Wassink.

TEMPERATURE

In Sylhet, the wet season is hot, oppressive, and mostly cloudy and the dry season is warm and mostly clear. Temperatures range from 13°C to 32°C and rarely go below 11°C or above 35°C. Ideal room temperature depends largely on personal preference, with age, health conditions and other factors playing a part. However, based on a general comfort index, more cooling is required than heating.

SMELLS

Toilets and livestock are fine if slightly separated from bedrooms.

KITCHENS

Roof is needed above kitchens, with a lot of natural ventilation.

High roof or plastered roof with clay for open-fire cooking smoke.

AMENITIES

Governmental primary schools, health clinics and mosques can exist in small scale within a village or shared between neighbouring villages. However, hospitals and governmental secondary schools exist only in the upazila level.

ACOUSTICS

Culturally, people spend a lot of time together outdoors and insulating the internal environment acoustically is not very important. However, for better quality of life, there should be acoustic insulation between different households.

PESTS

Co-exist- gaps and openings are fine and more important for natural ventilation than to keep out pests; beds have mosquito netting.

TOILETS

Keep watertight against floods, so water-borne diseases are not transmitted. Privacy is needed especially for women.

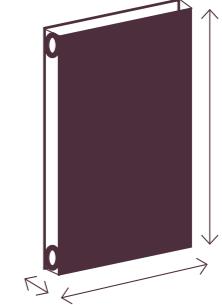
ELECTRICITY

Most houses have a solar panel and can generate electricity. This is because the power connections are often disrupted during storms.

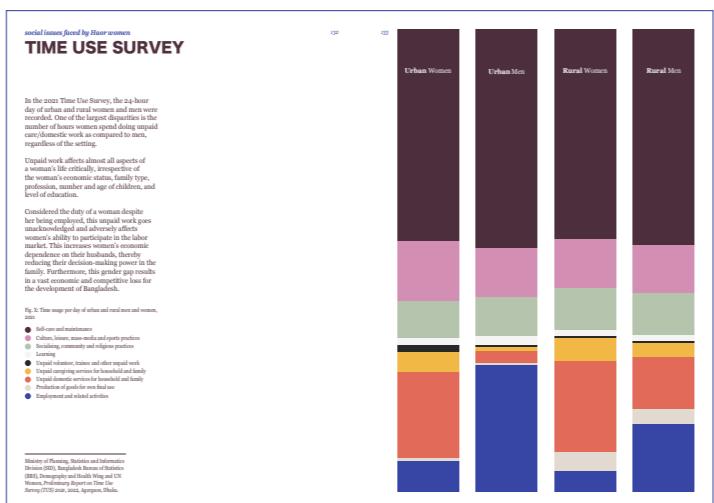


scalar binder_dwelling_maintain the dwelling

spatial



ensure women have access to materials and construction by using a grid (a scale) centred around women

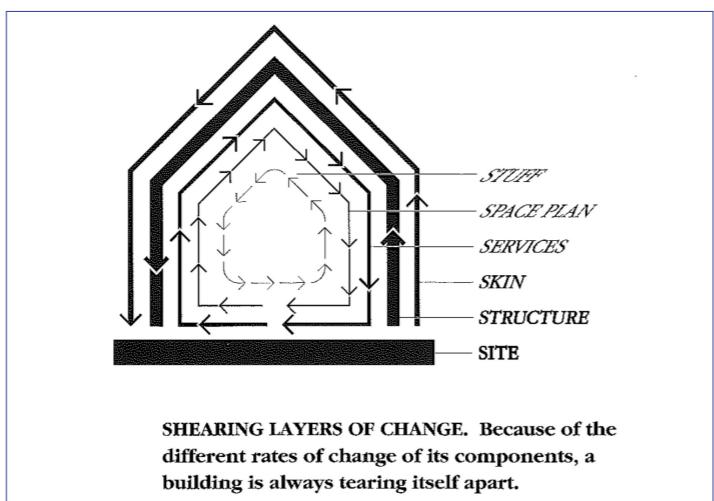


thematic binder_social issues faced by Haor women_time use survey

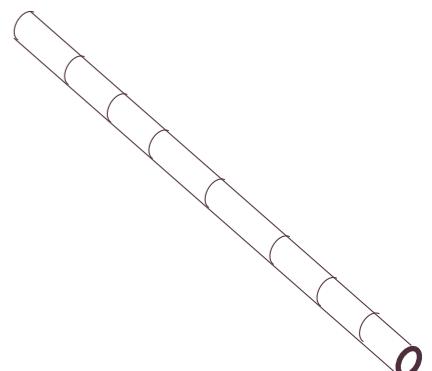
temporal



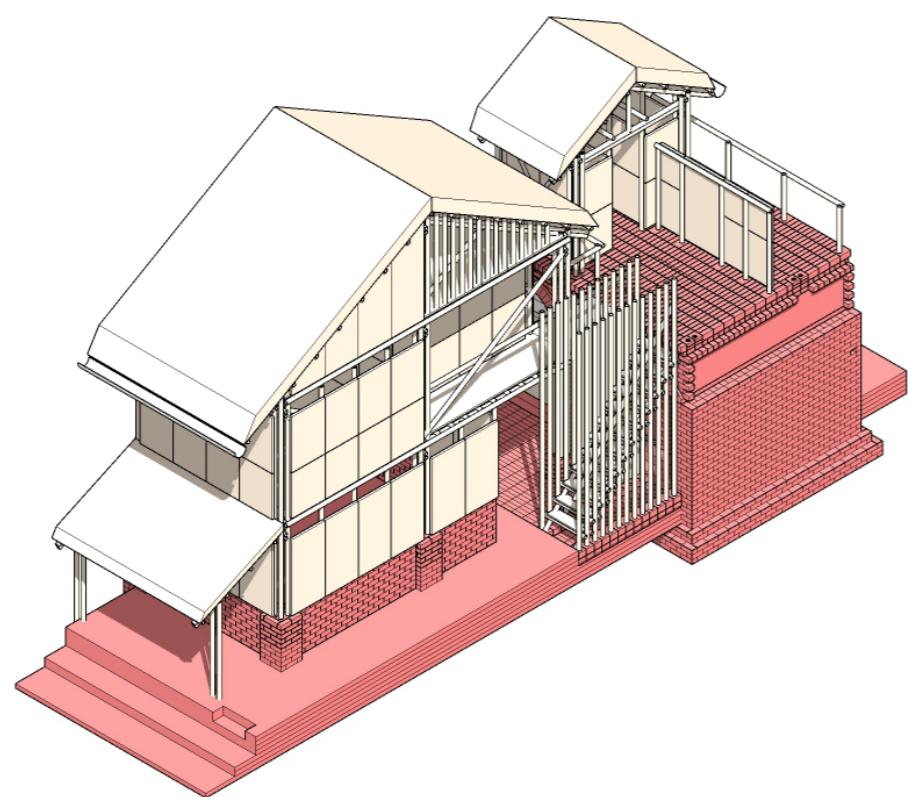
reduce time women spend in building maintenance



managerial and ecological



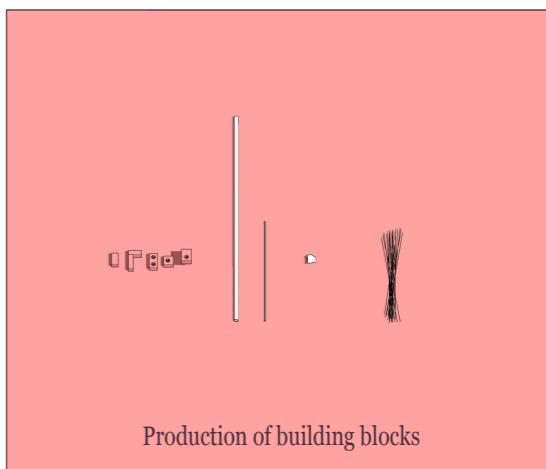
close loops as much as possible to allow circularity of construction



dwelling unit

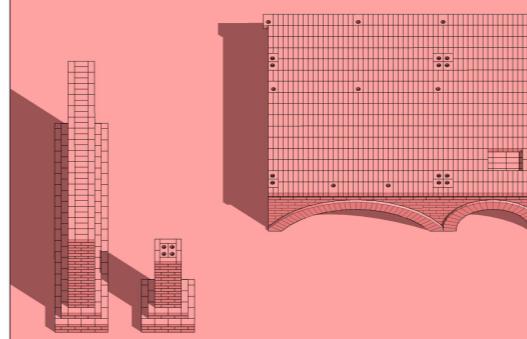


Accessibility of raw materials



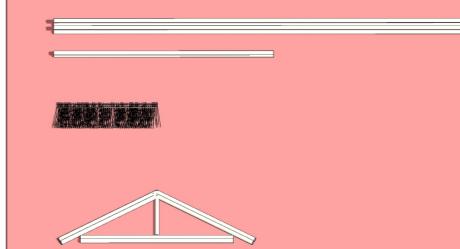
Production of building blocks

SITE: 100+ YEARS



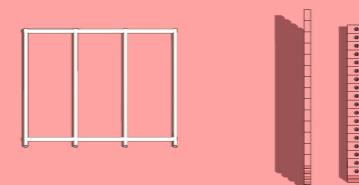
Brick primary components

STRUCTURE: 30+ YEARS



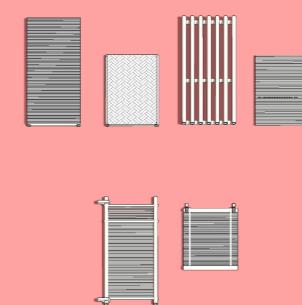
Primary bamboo structure + thatch roof

SPACE PLAN



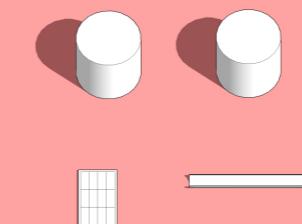
Secondary and tertiary structure

SKIN: 5-10 YEARS



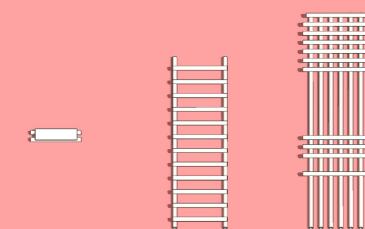
Prefabricated bamboo panels

SERVICES



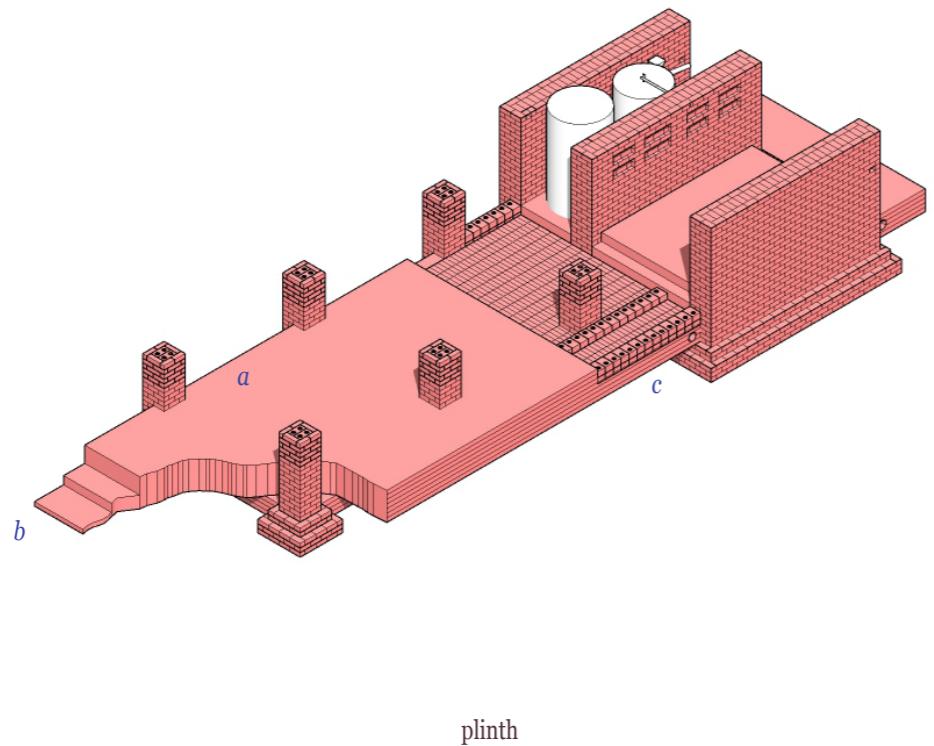
Rain, sun, waste

STUFF

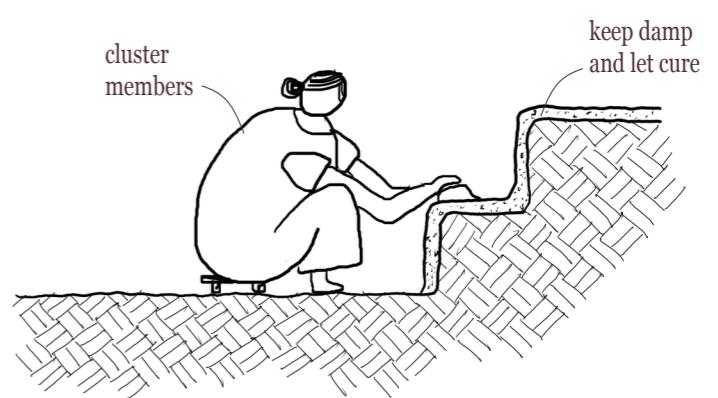


Furniture and stairs

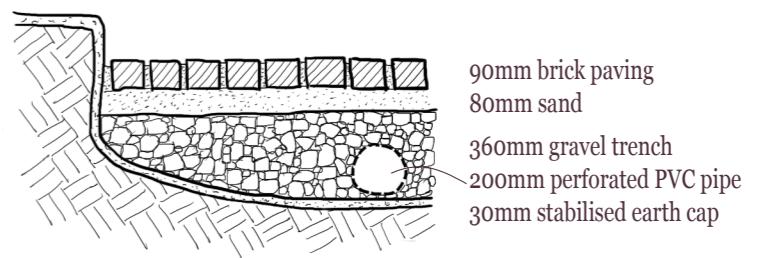
kit of parts



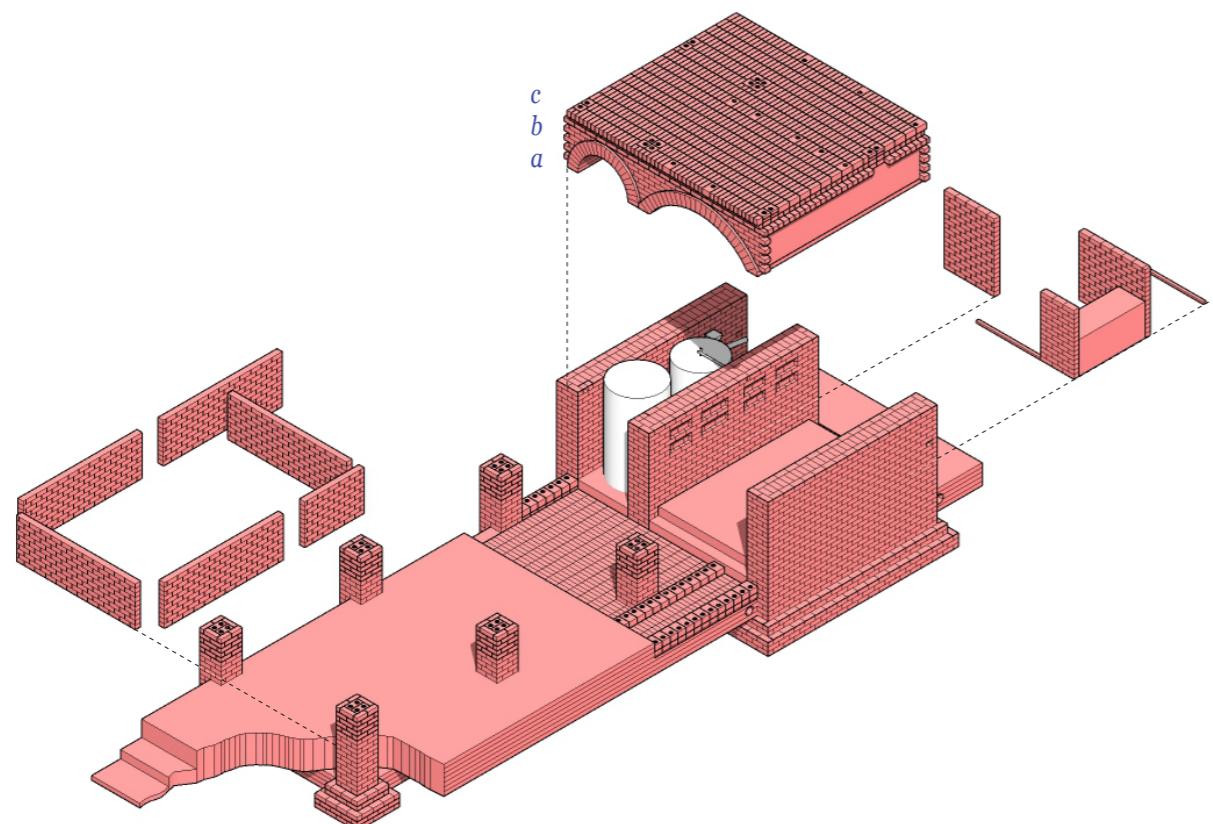
a compacted with hand-held rammer



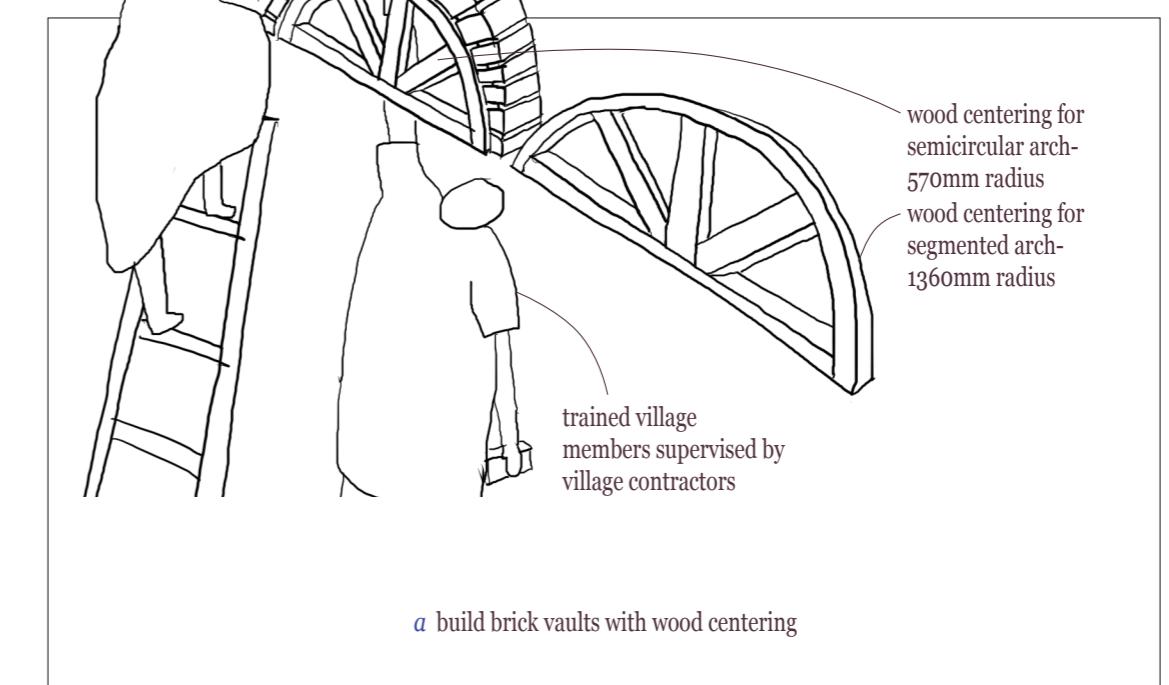
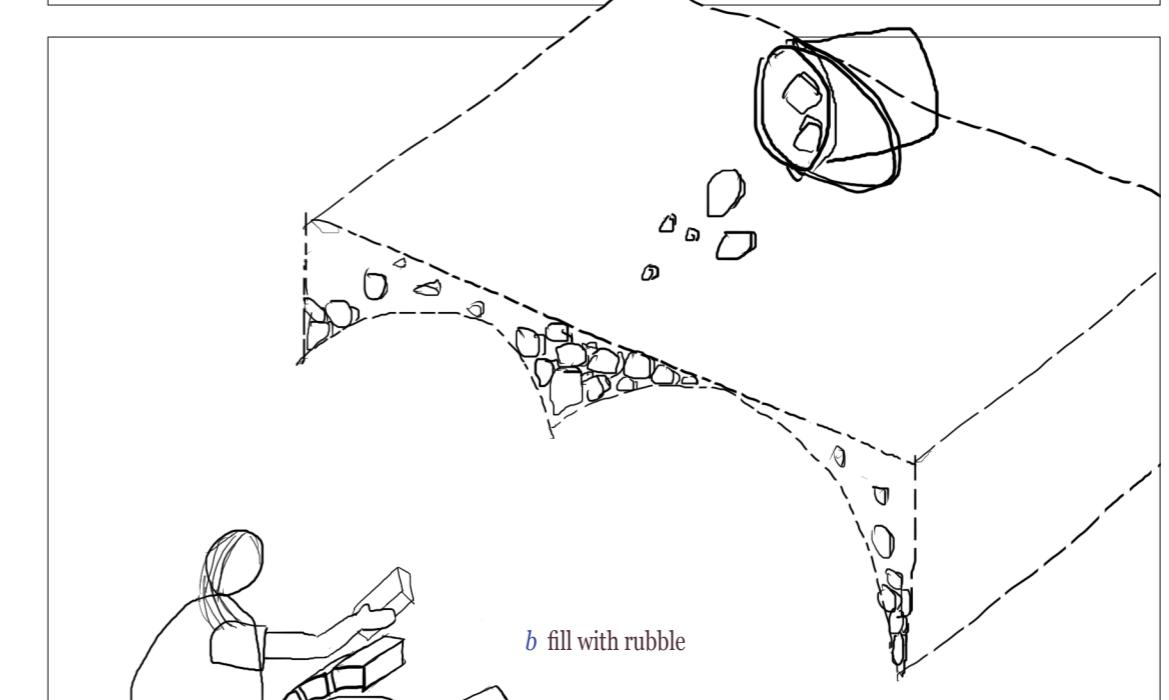
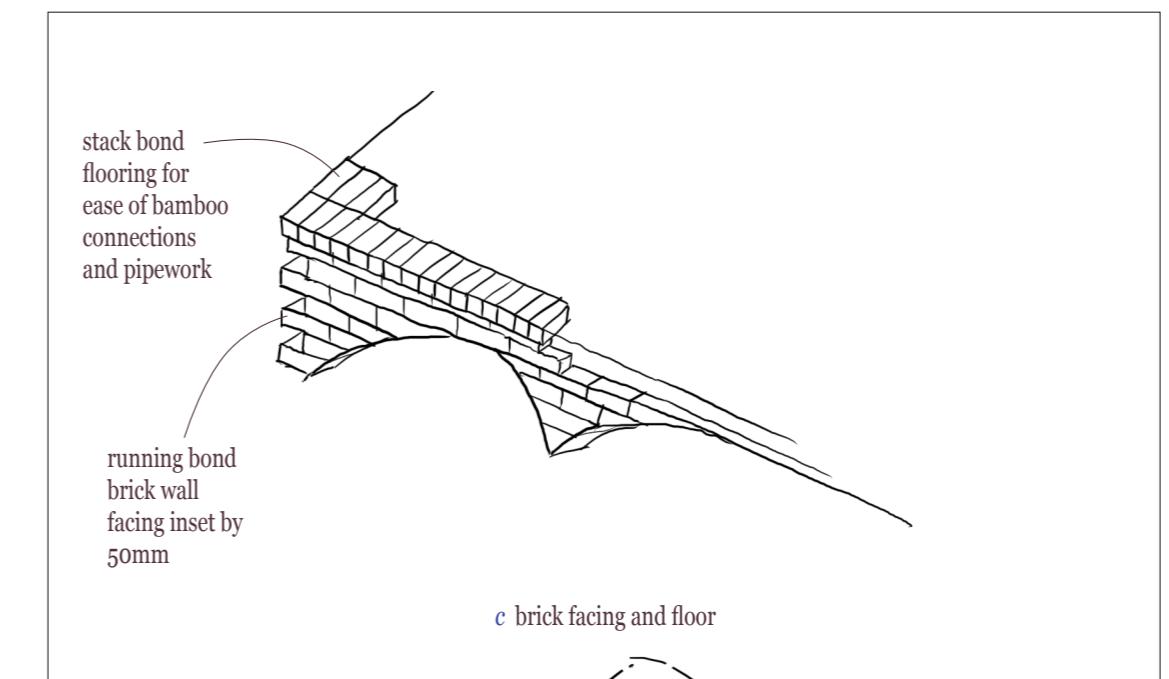
b capped with lime-stabilised earth

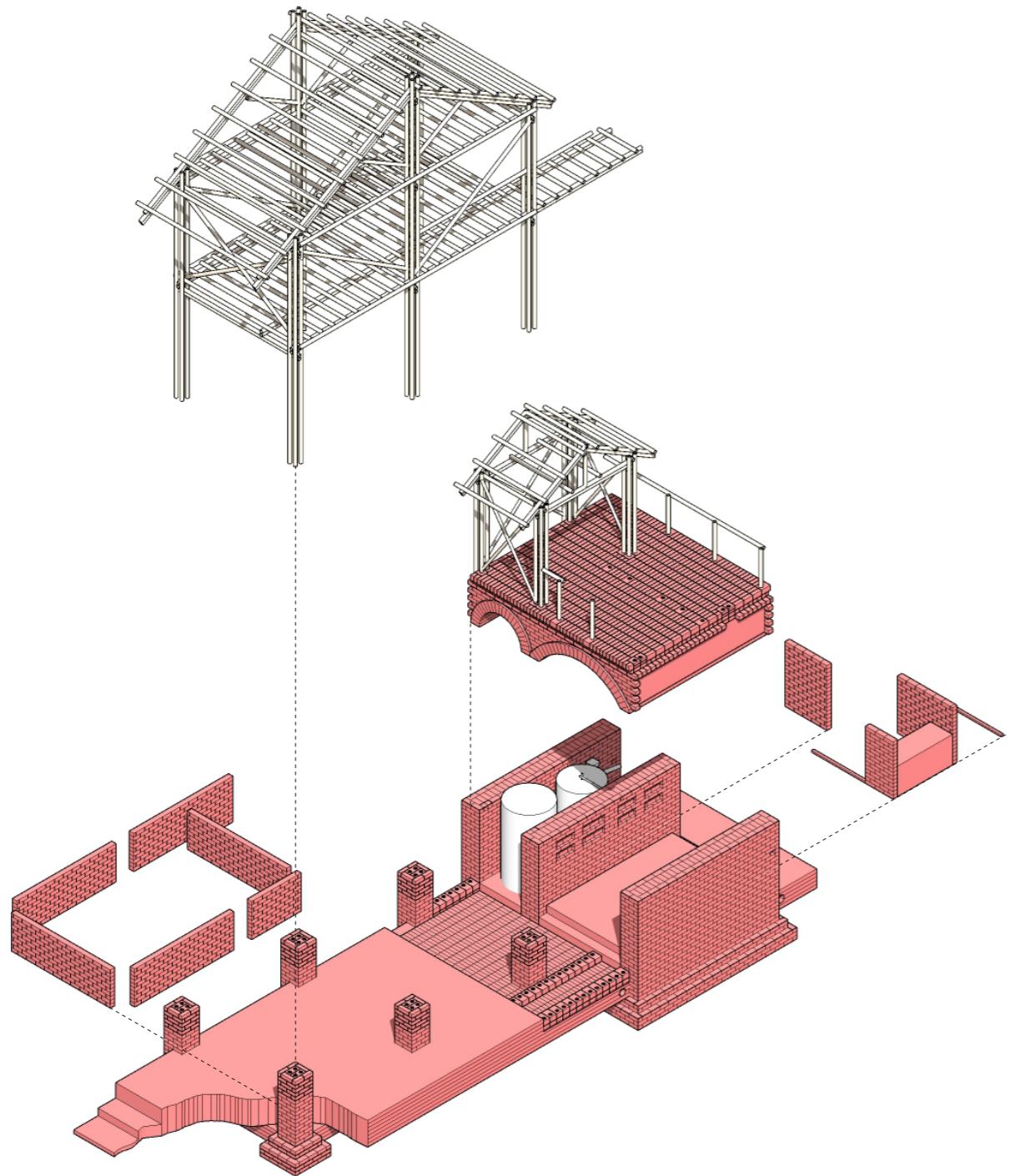


c french drain detail

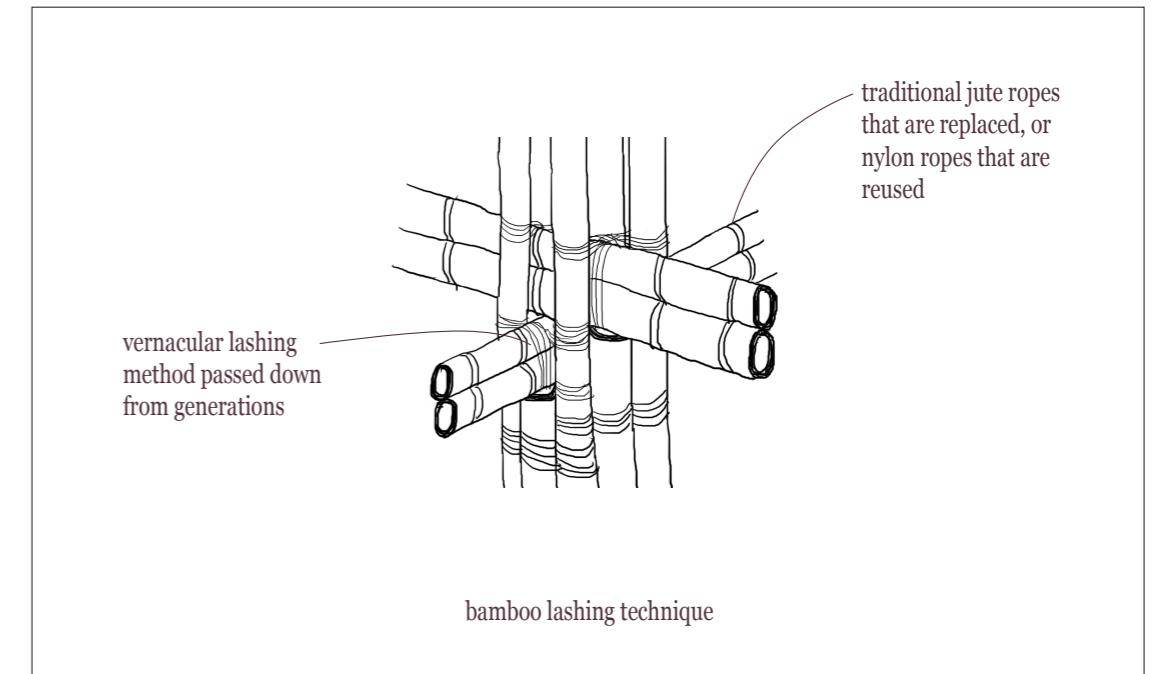


loadbearing and infill brickwork

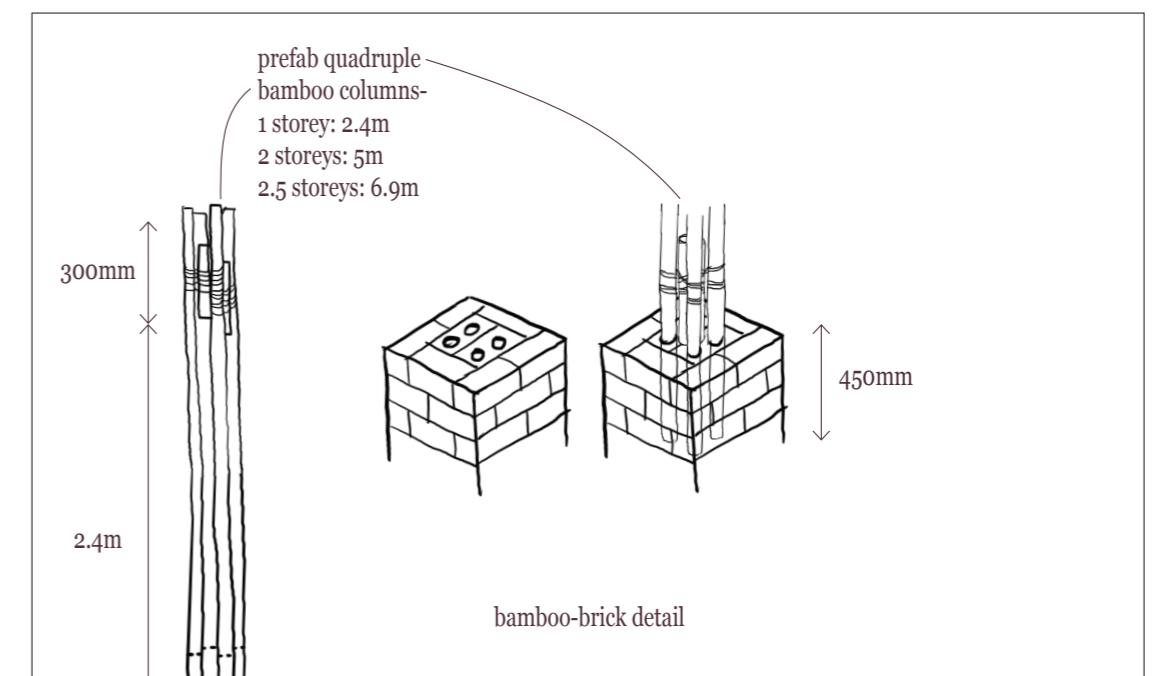




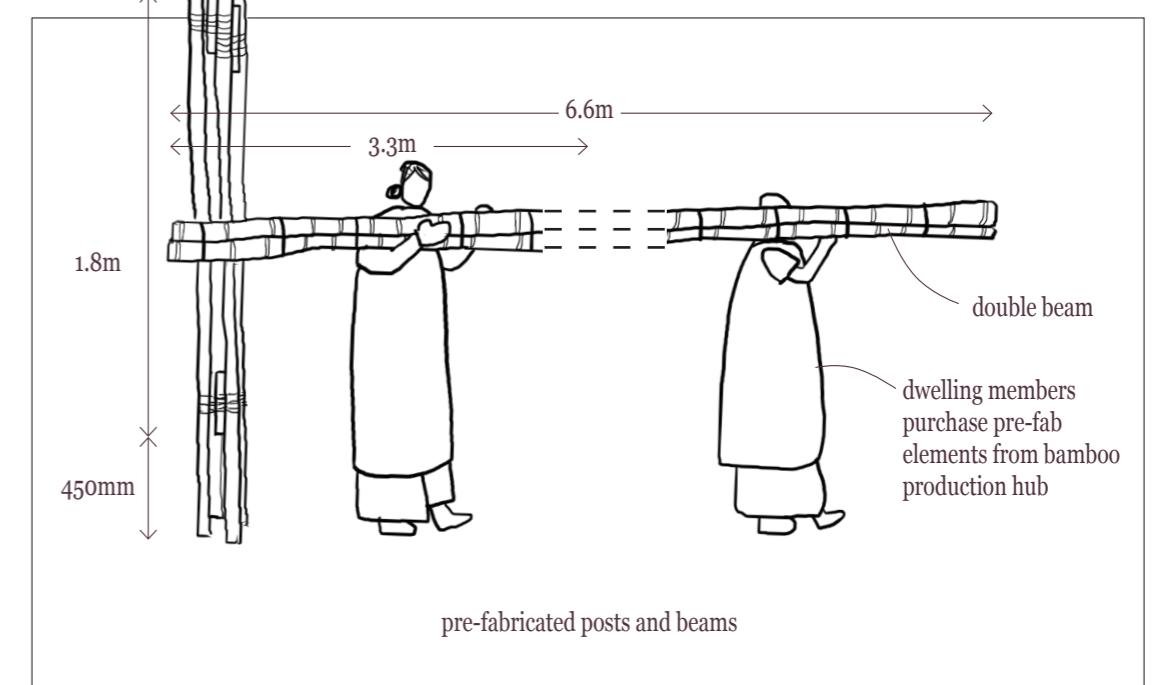
post-and-beam structure



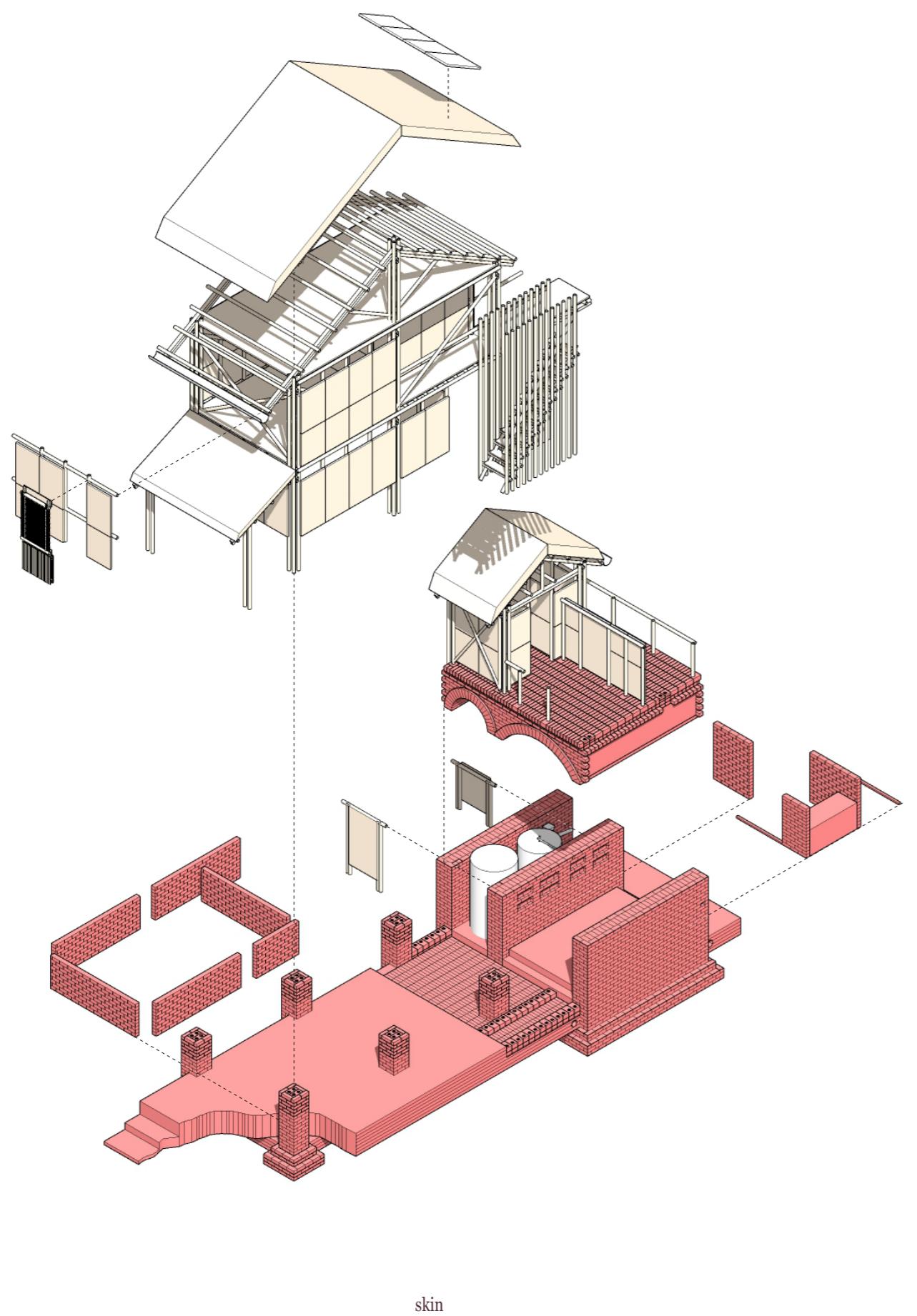
bamboo lashing technique



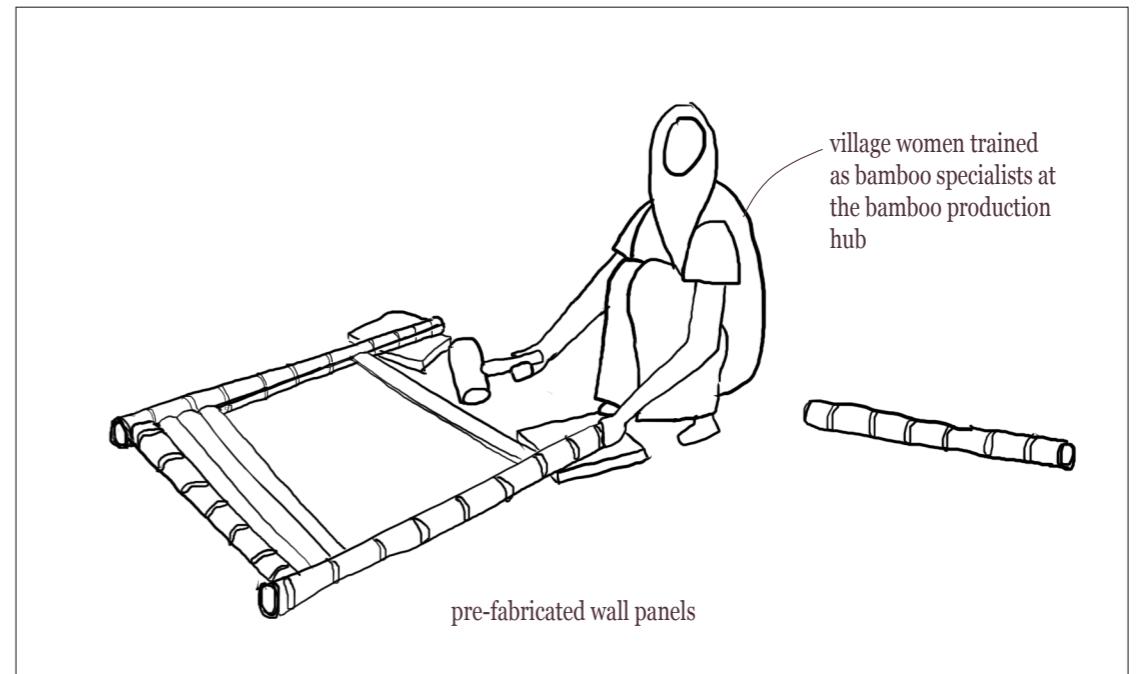
bamboo-brick detail



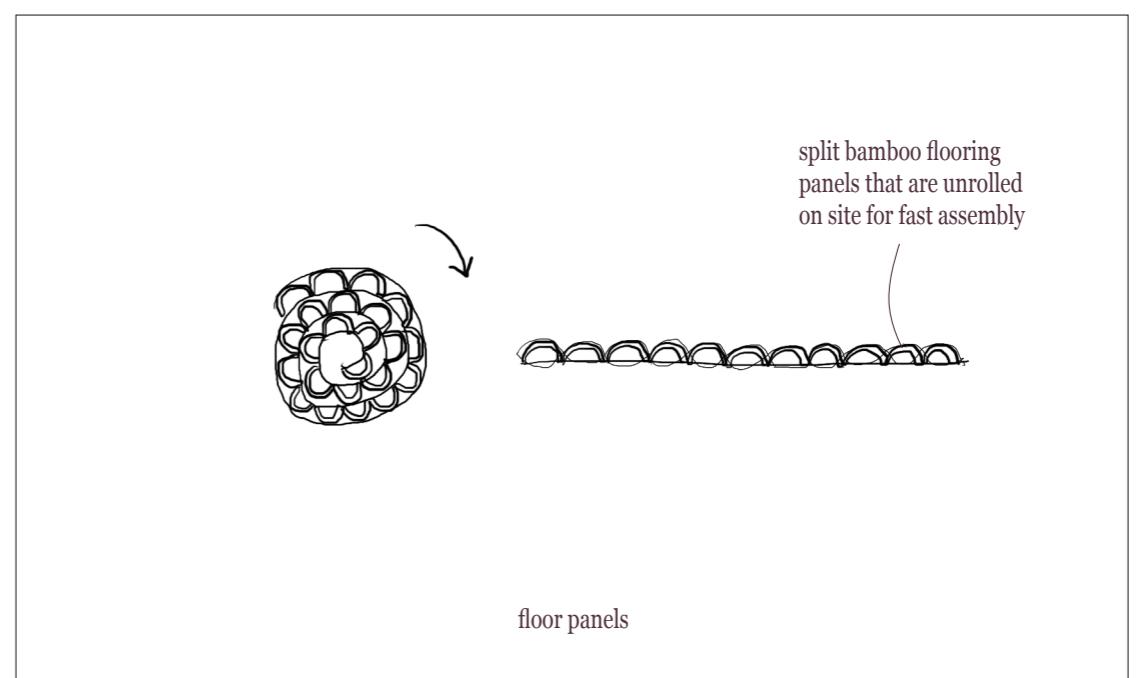
pre-fabricated posts and beams



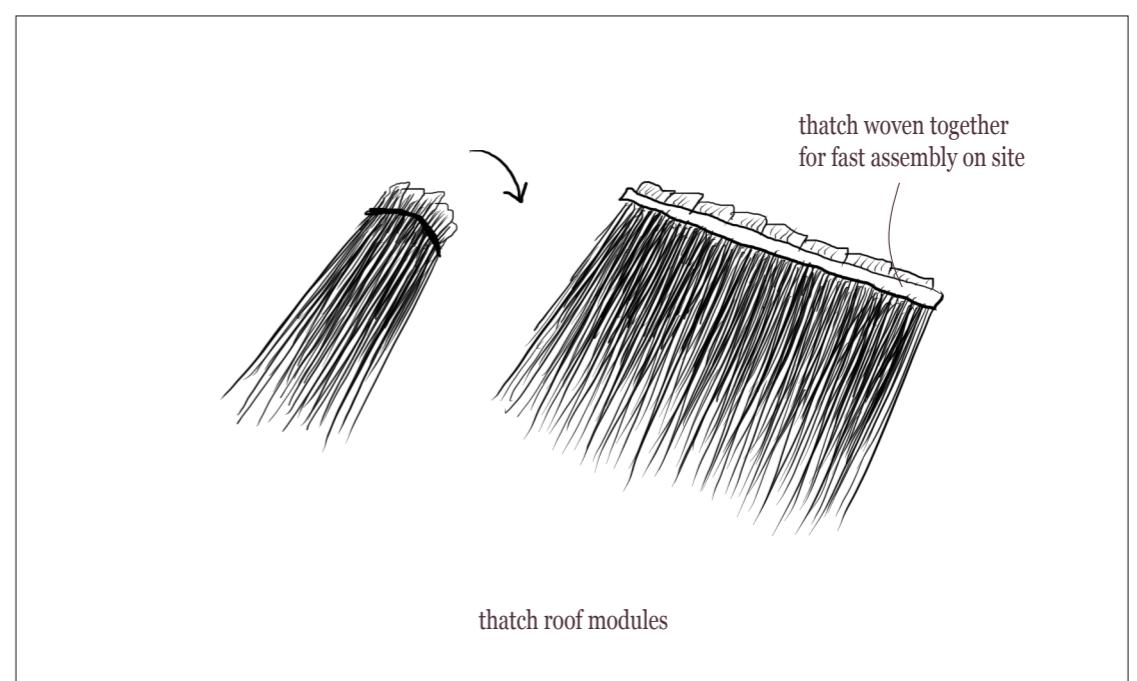
skin



pre-fabricated wall panels

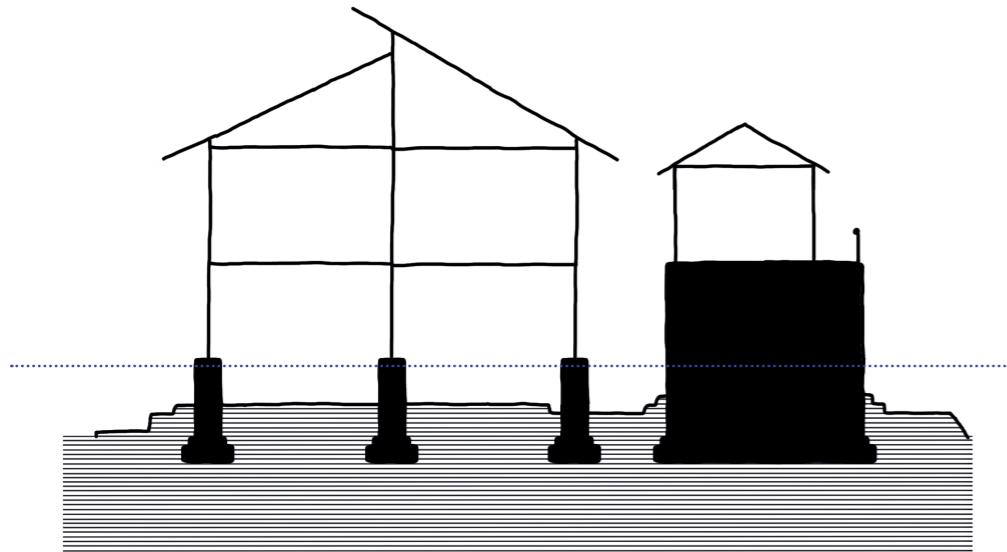


floor panels

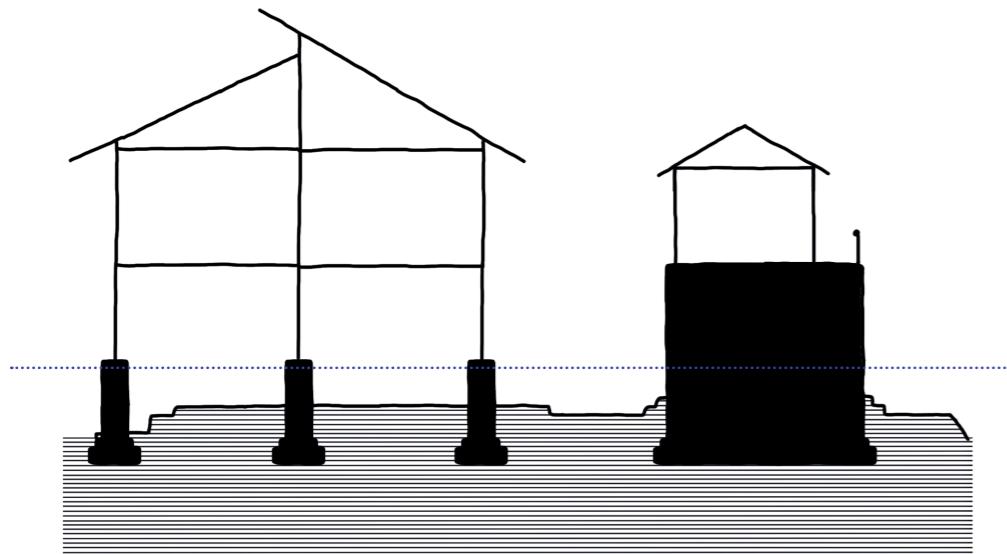


thatch roof modules

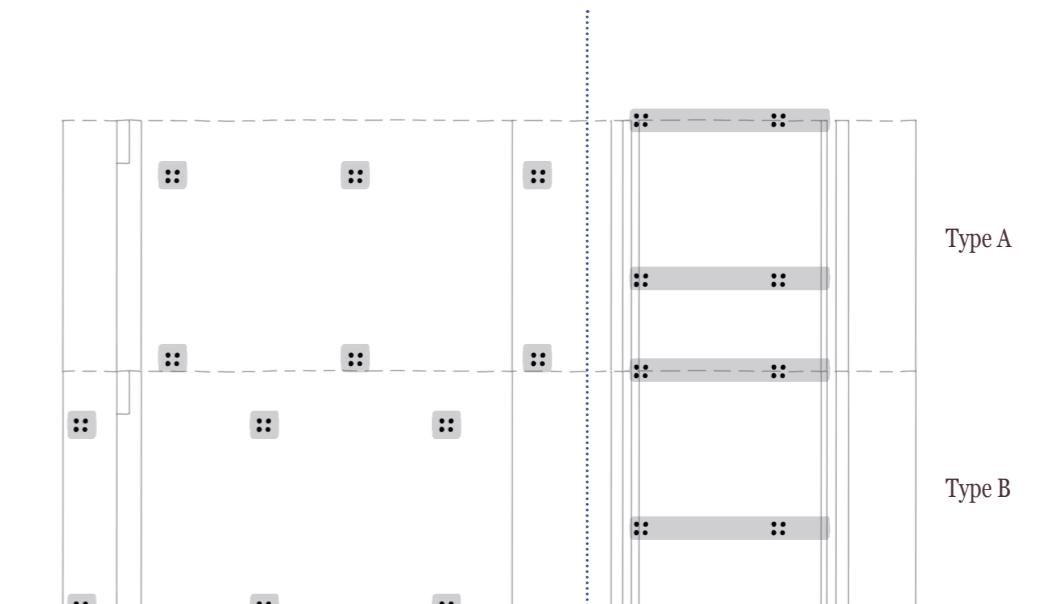
STRUCTURAL CONCEPT



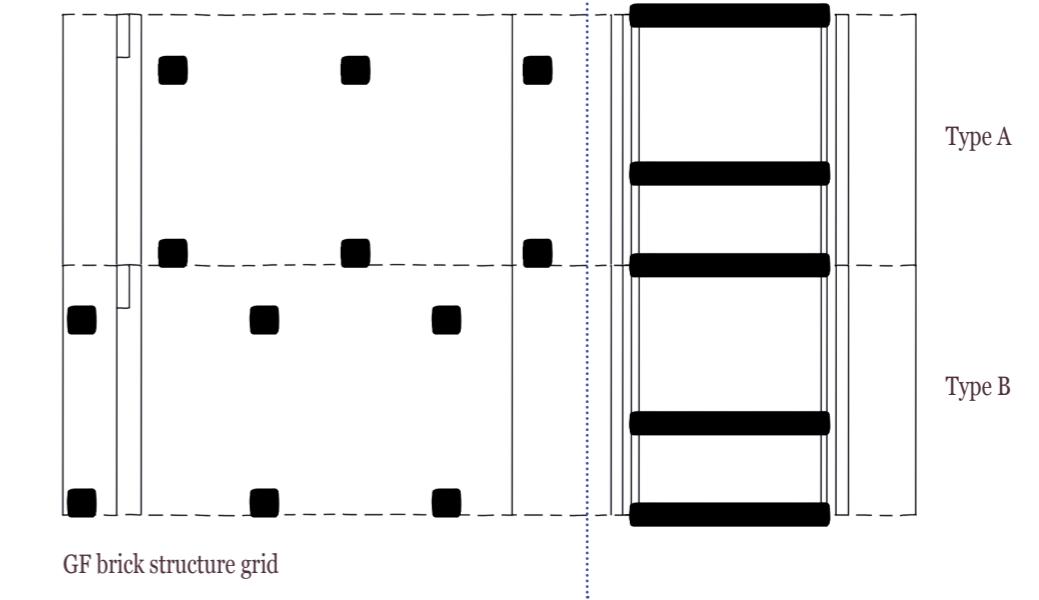
Type A



Type B



1F bamboo columns grid



GF brick structure grid

EARTH PLINTH THAT HOLDS UP BAMBOO FRAMES

earth+bamboo/permanent+temporary

THE INDIVIDUAL AND THE COLLECTIVE

living zone+service zone/individual+collective

DWELLING SHOPFRONT DETAIL

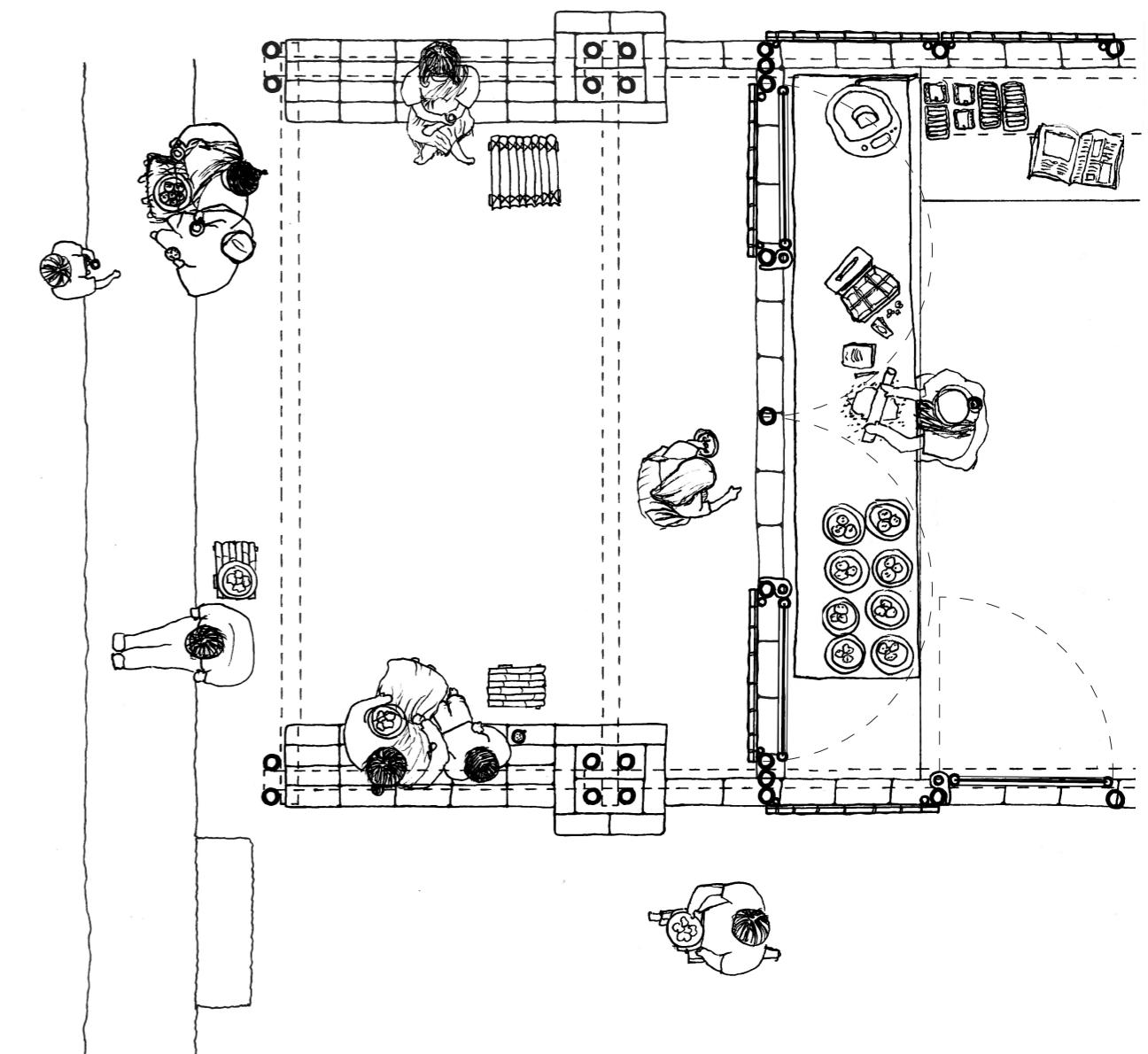
0 20 60 120cm

NGOs such as Transform Trade have encouraged community-owned shops, set up with capital raised by the community themselves and located in rural locations largely dependent on agriculture. Owned and run entirely by women, they have been created with their needs at the forefront. These shops sell chemical free fertilizers, seeds and produce from local farms, including eggs and homemade snacks. On top of this, they act as a pharmacy, selling nonprescription drugs and providing contraceptives.

"How Remarkably Radical Village Shops Are Fighting Gender Norms in Rural Bangladesh." n.d. Transform Trade. Accessed June 24, 2024. <https://www.transform-trade.org/blog/how-remarkably-radical-village-shops-are-fighting-gender-norms-in-rural-bangladeshnbspn-bsp>.

detailed section

detailed elevation



DWELLING SHOPFRONT DETAIL

0 20 60 120cm

Primary structure (PS)

Brick piers 480 x 480mm with strap beams
 Prefab quadruple bamboo posts (pre-treated) 75 mm diameter
 Bamboo cross-bracing 75 mm diameter
 Prefab bamboo double beams 75mm diameter

Secondary structure (SS)

Bamboo posts and beams (pre-treated) 75 mm diameter

Split bamboo panel 750mm width (1) comes in 900, 1100 and 1500mm heights

40mm diameter split bamboo
 75mm diameter bamboo frame

Woven bamboo panel 750mm width (2) comes in 900, 1100 and 1500mm heights

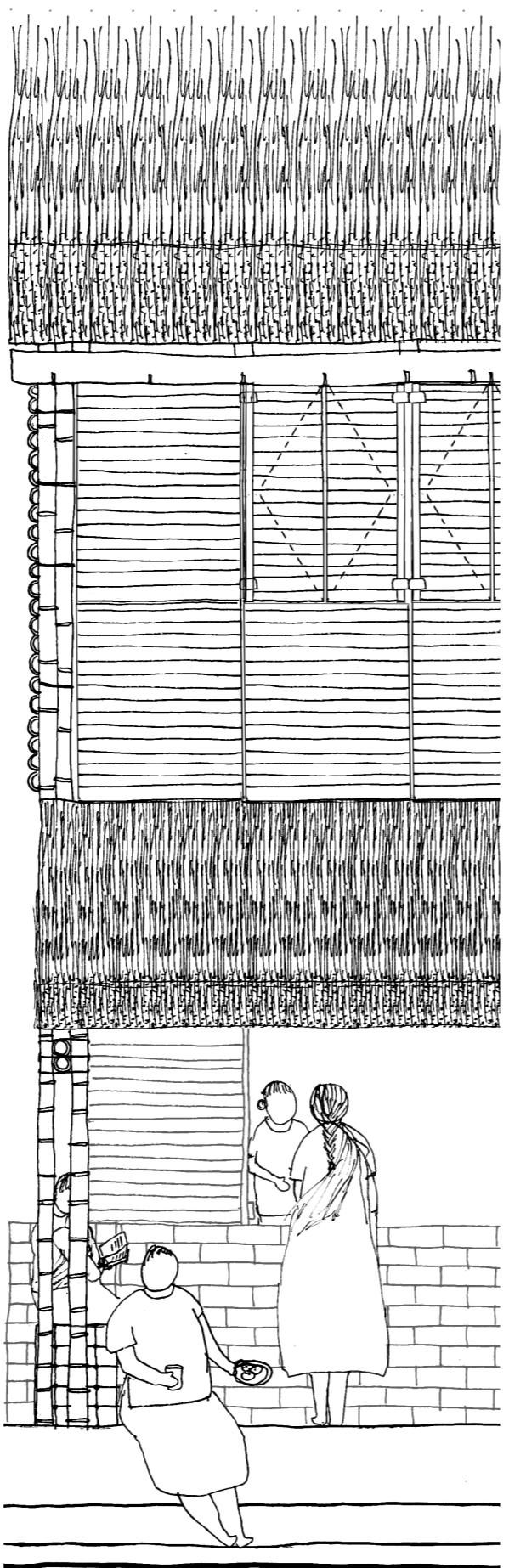
Woven bamboo 5mm thick
 75mm diameter bamboo frame

Louvre window module 750mm width (3) comes in 900, 1100 and 1500mm heights

40mm diameter split bamboo angled at 45 degrees
 75mm diameter bamboo frame

Roof panel 1200 x 900 (R)

Thatch (catkin grass, rice, straw) sewn together onto bamboo strip

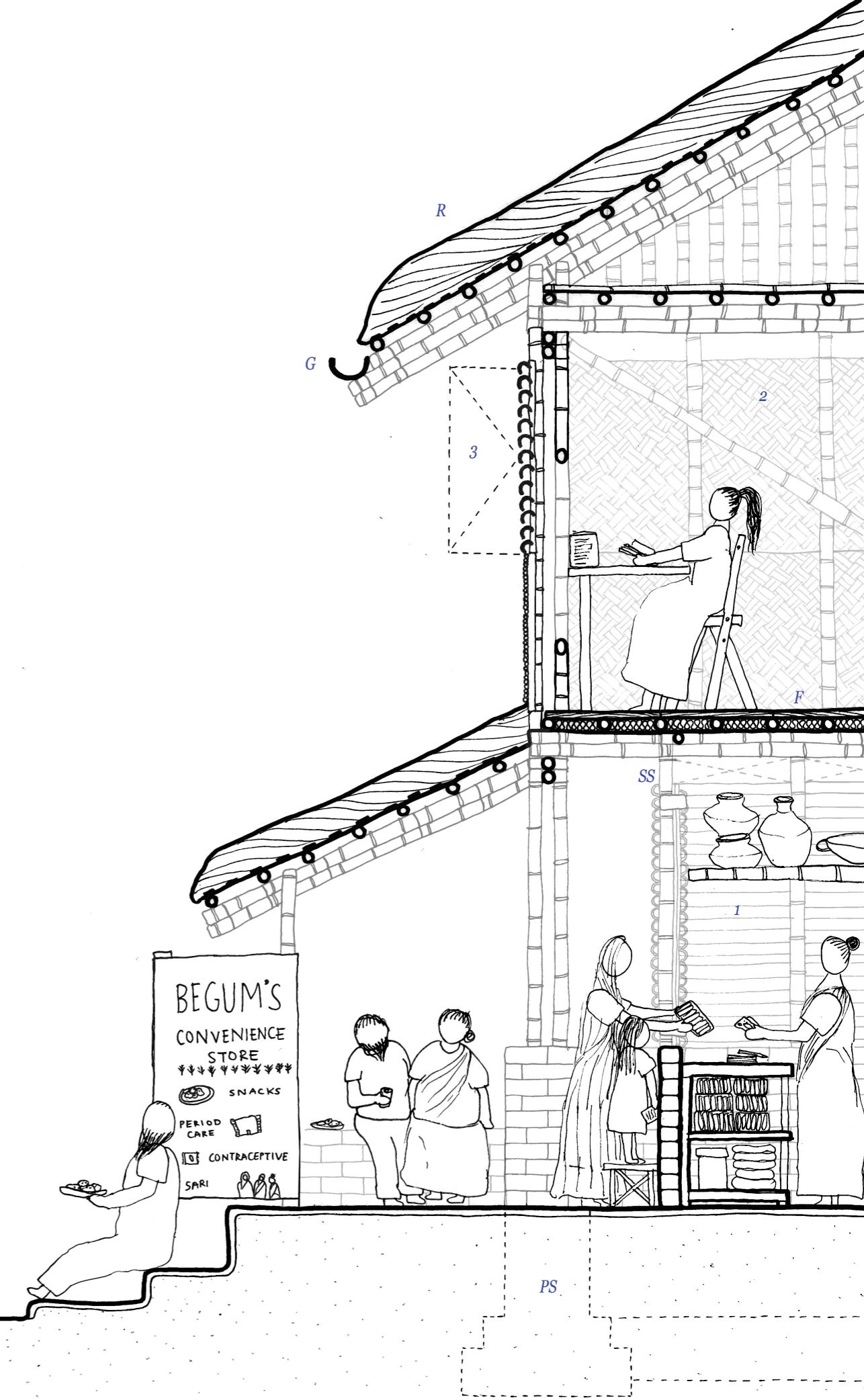


Treated bamboo gutter (G)

250mm diameter lined bamboo gutter

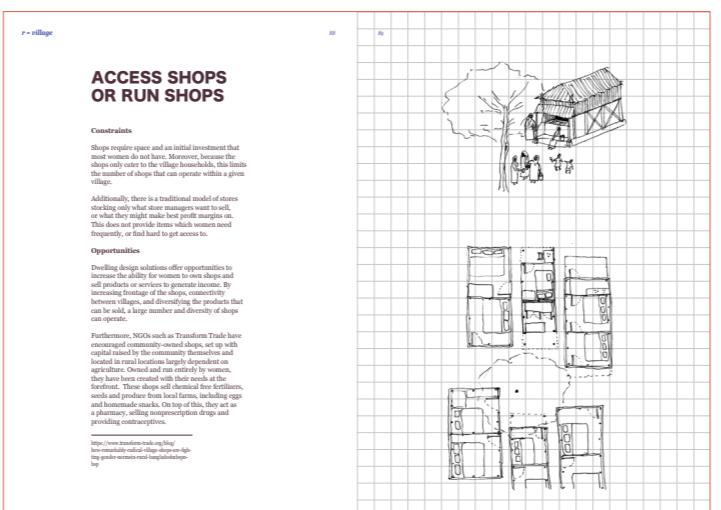
Wooden floor boards (F)

150mm wide floor boards made locally in the Haors, 40mm thick

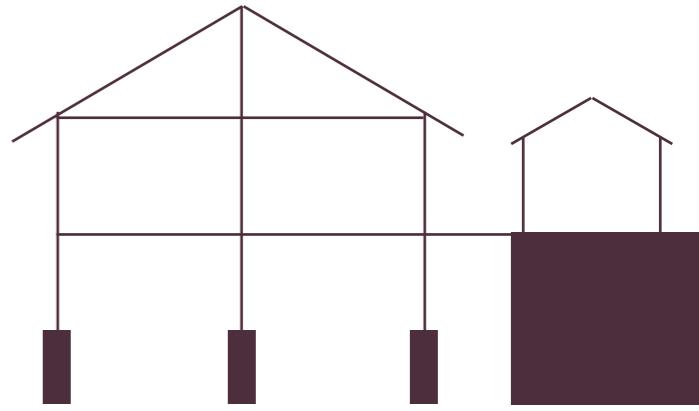


DWELLING STRATEGY

scalar binder_village_access shops or run shops



spatial



contrast between front and back | live and work zone | individual and collective | bamboo and earth | ephemeral and monumental | frame structure and load-bearing structure

thematic binder_water management_flooding priorities

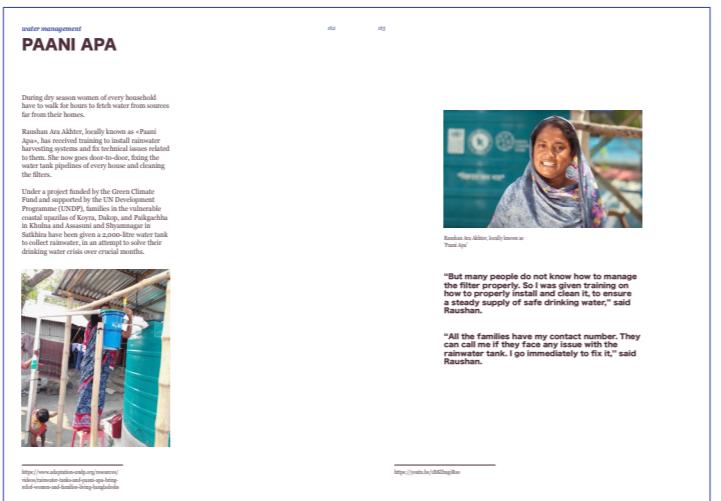


temporal

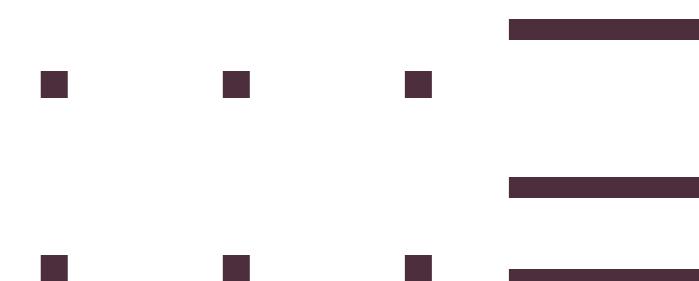


women's priorities during floods translated into plinth heights for different spatial zones

thematic binder_water management_paani apa

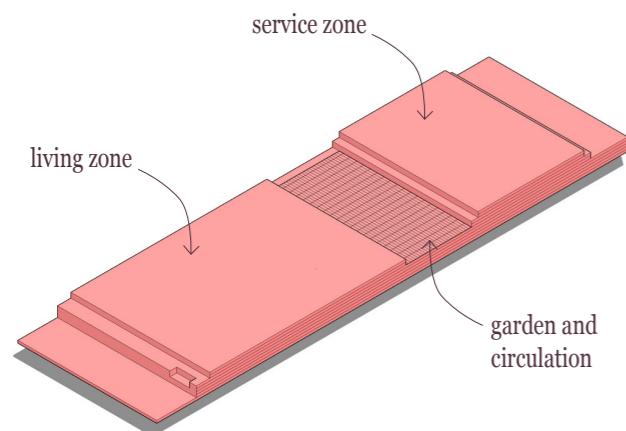


managerial and ecological

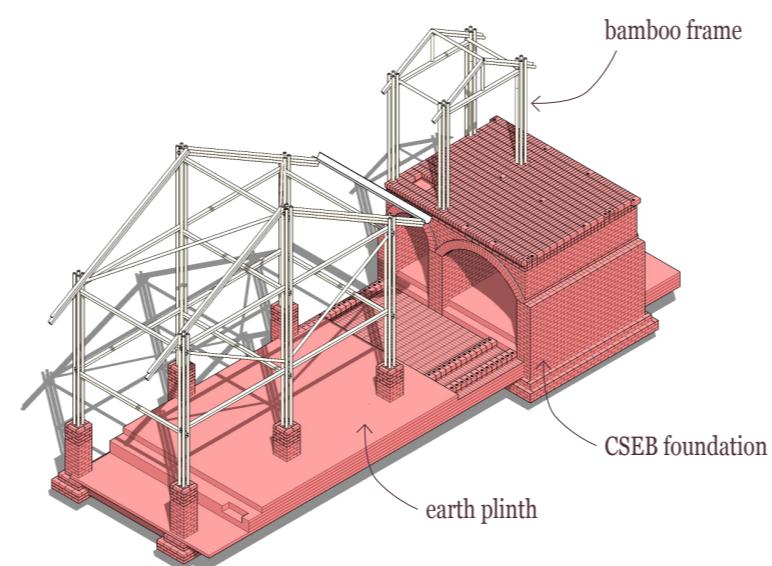


the collective and individual are delineated clearly, so it is easy to implement cluster groups and infrastructural systems

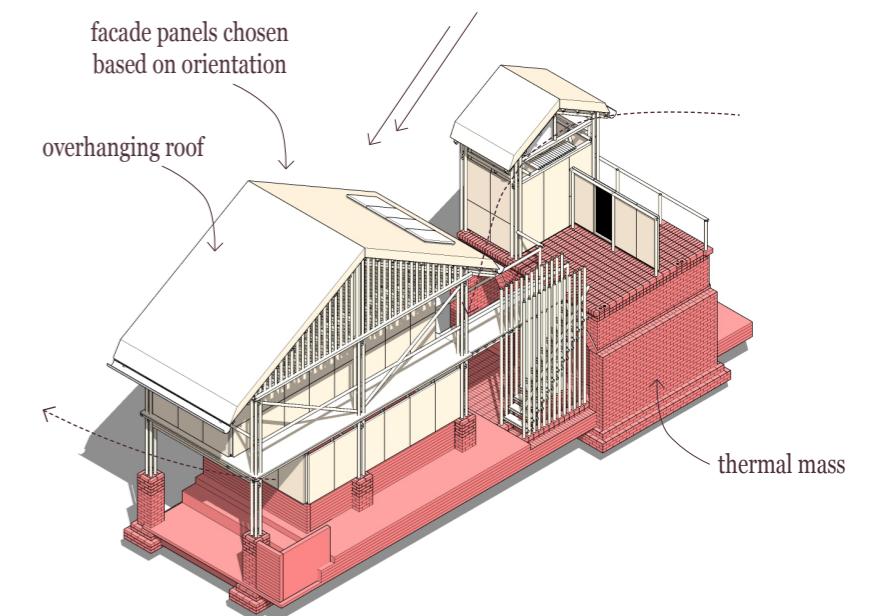
DESIGN PRINCIPLES



SPATIAL ZONES

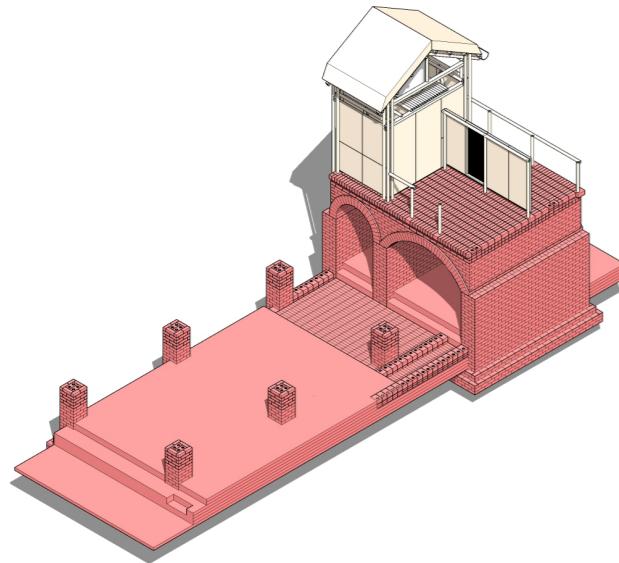


STRUCTURAL CONCEPT

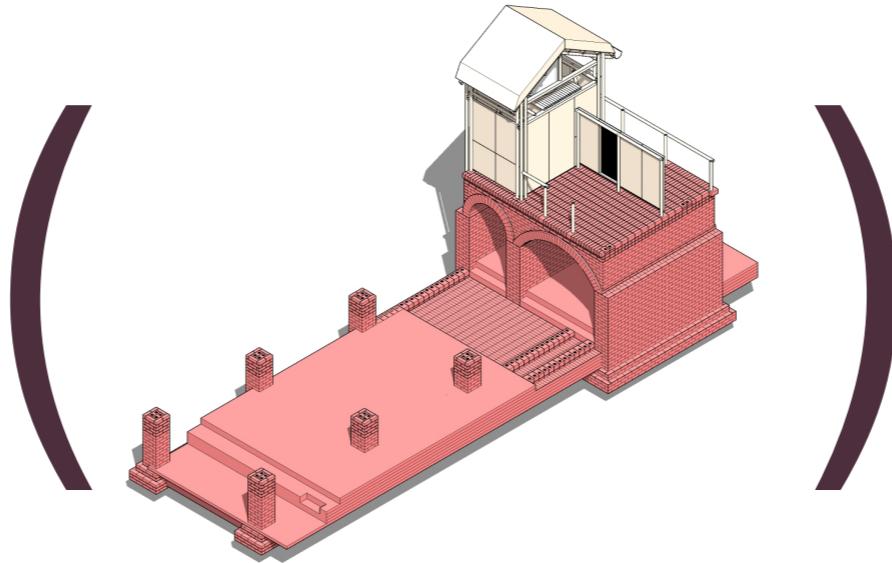


CLIMATE DESIGN

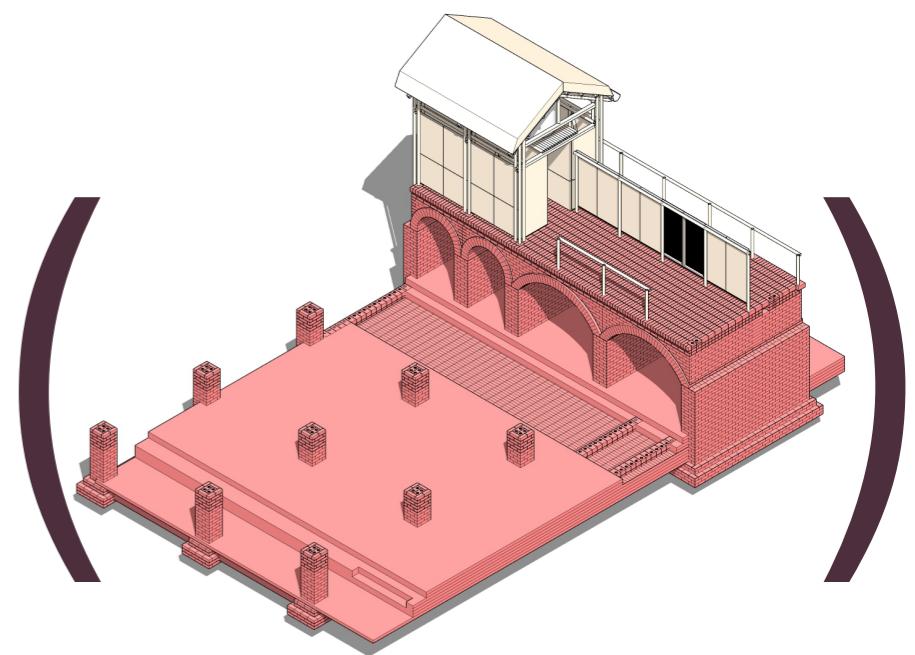
HOUSE TYPE(S)



TYPE A

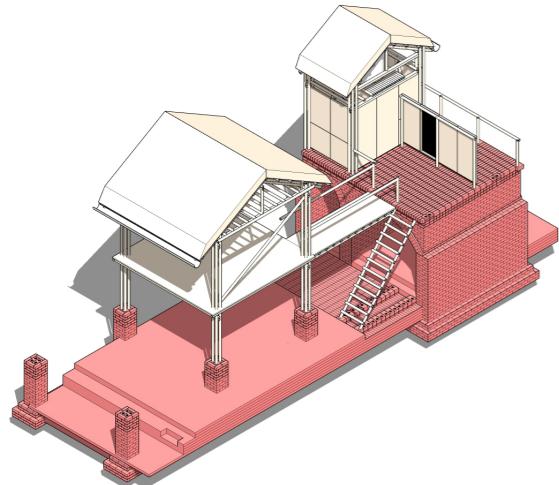


TYPE B

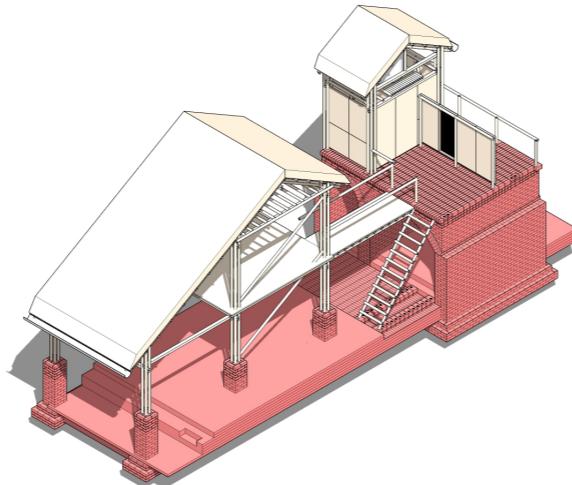


TYPE C

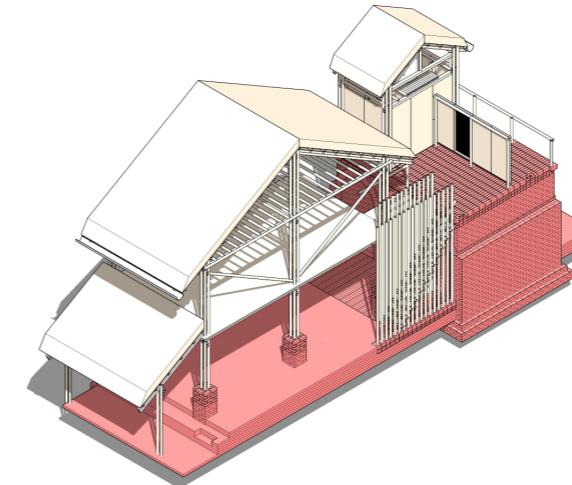
FLEXIBILITY



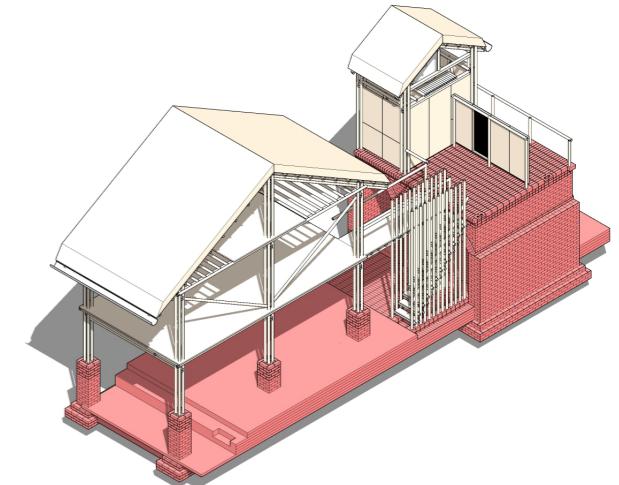
SMALL FAMILY



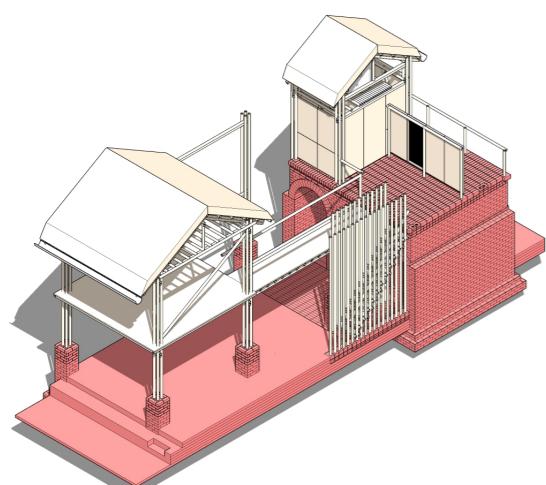
WORKSHOP SPACE IN THE FRONT



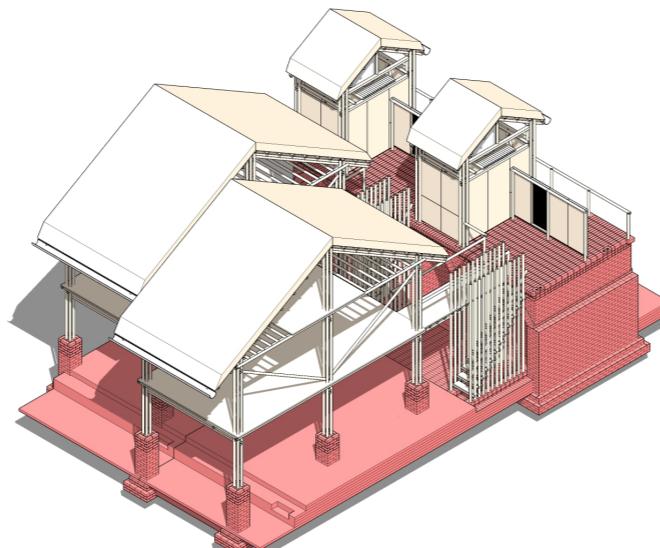
VERANDAH SPACE



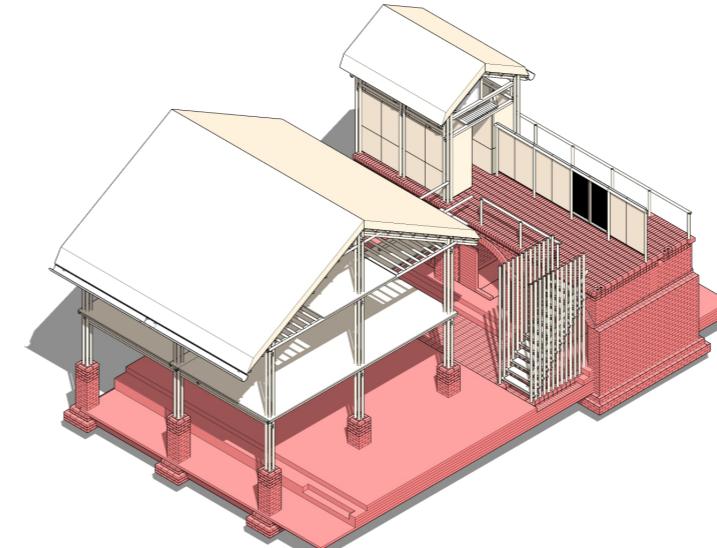
BALCONY IN THE FRONT



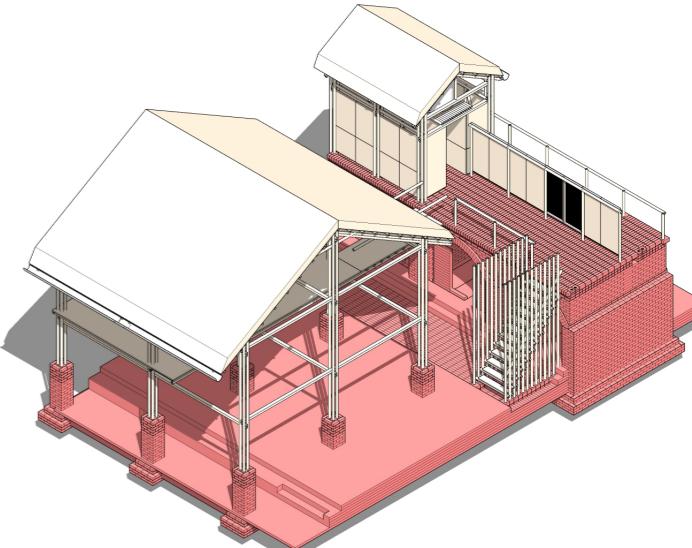
SMALL GF SHOP



NEIGHBOURING PLOTS CONNECT

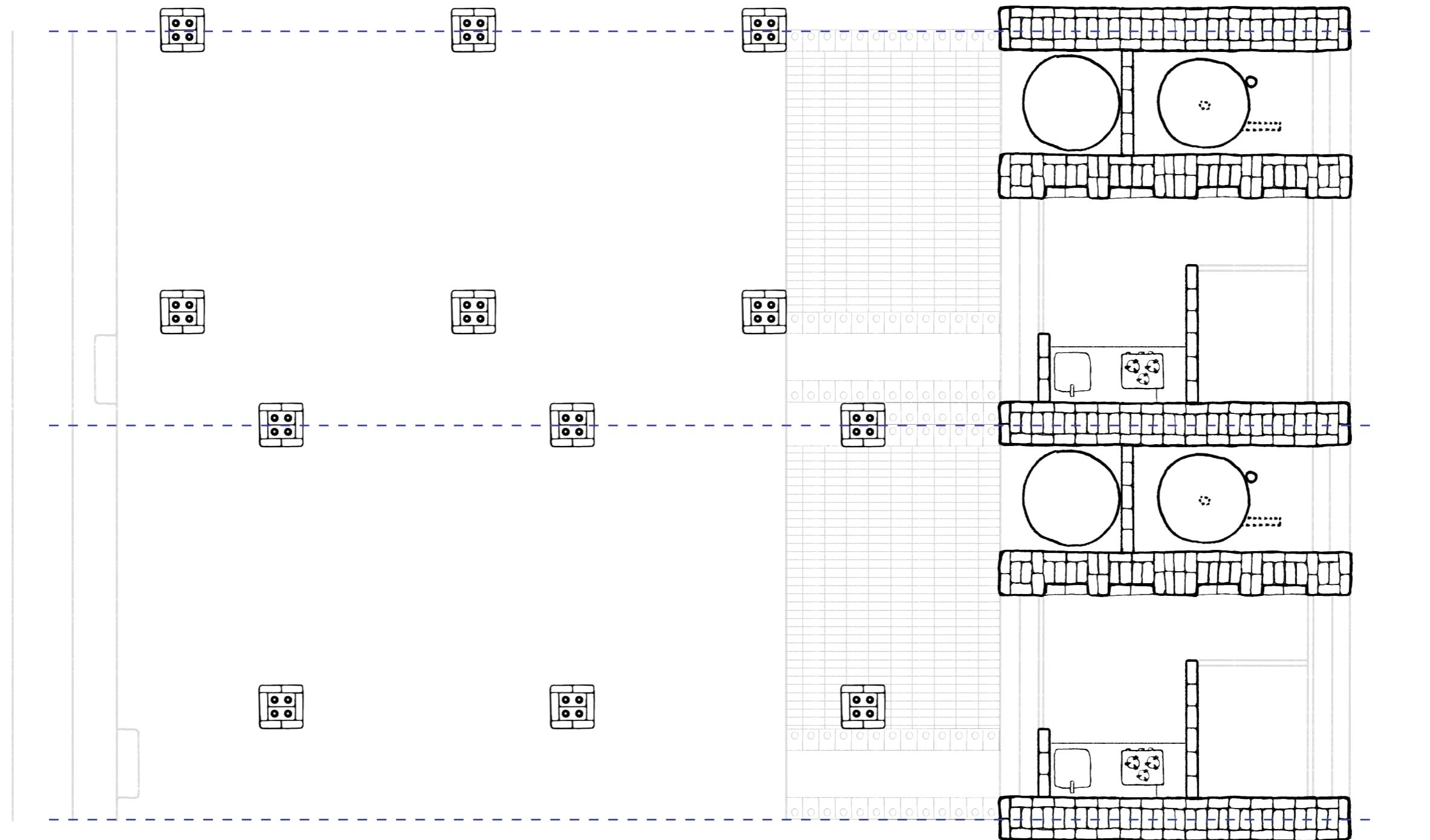


WOMEN'S REFUGE

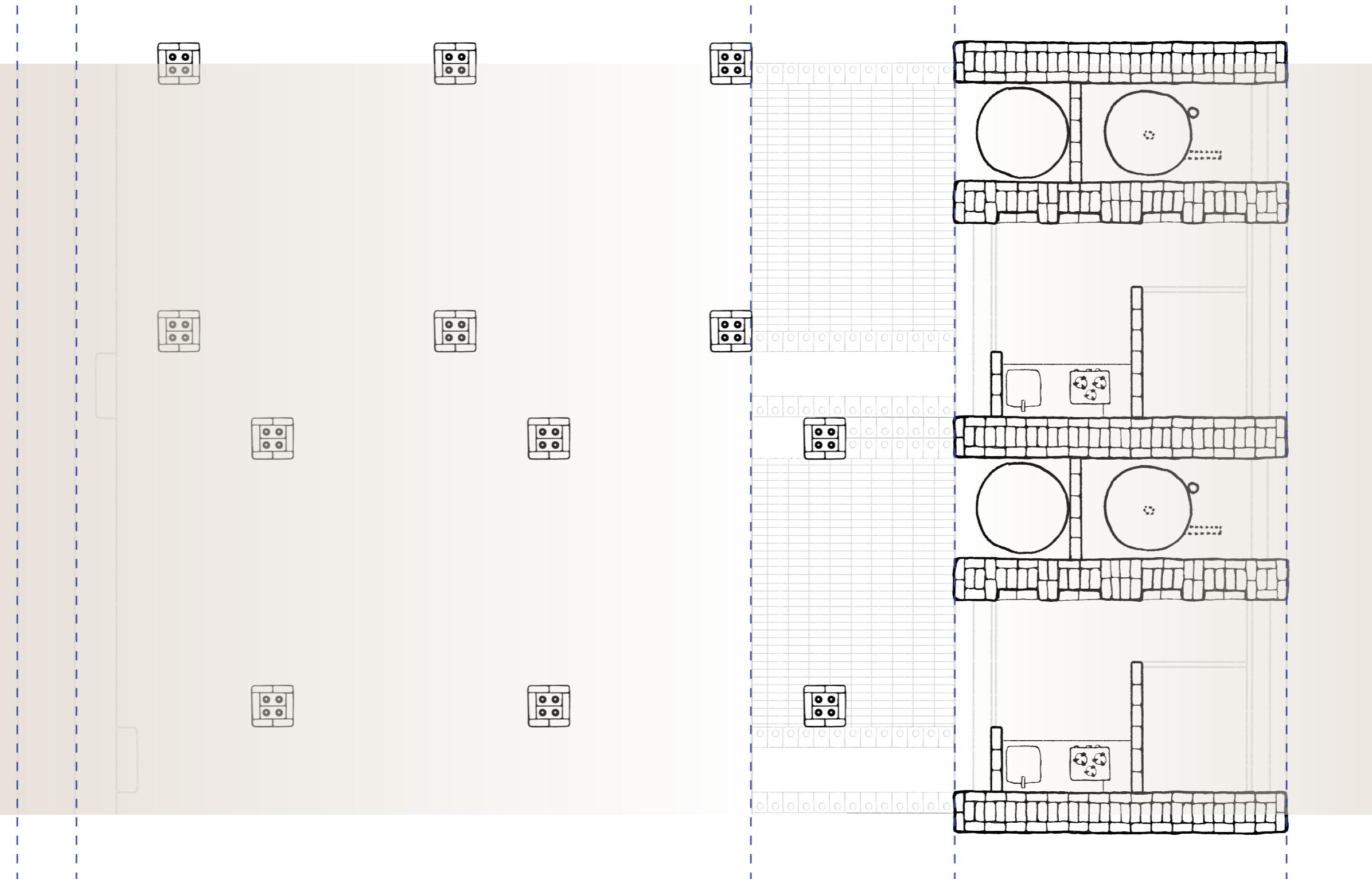


PUBLIC AMENITY

TYPE A, TYPE B: GF SEEDS



TYPE A, TYPE B: GF SEEDS



street

shared
walkway

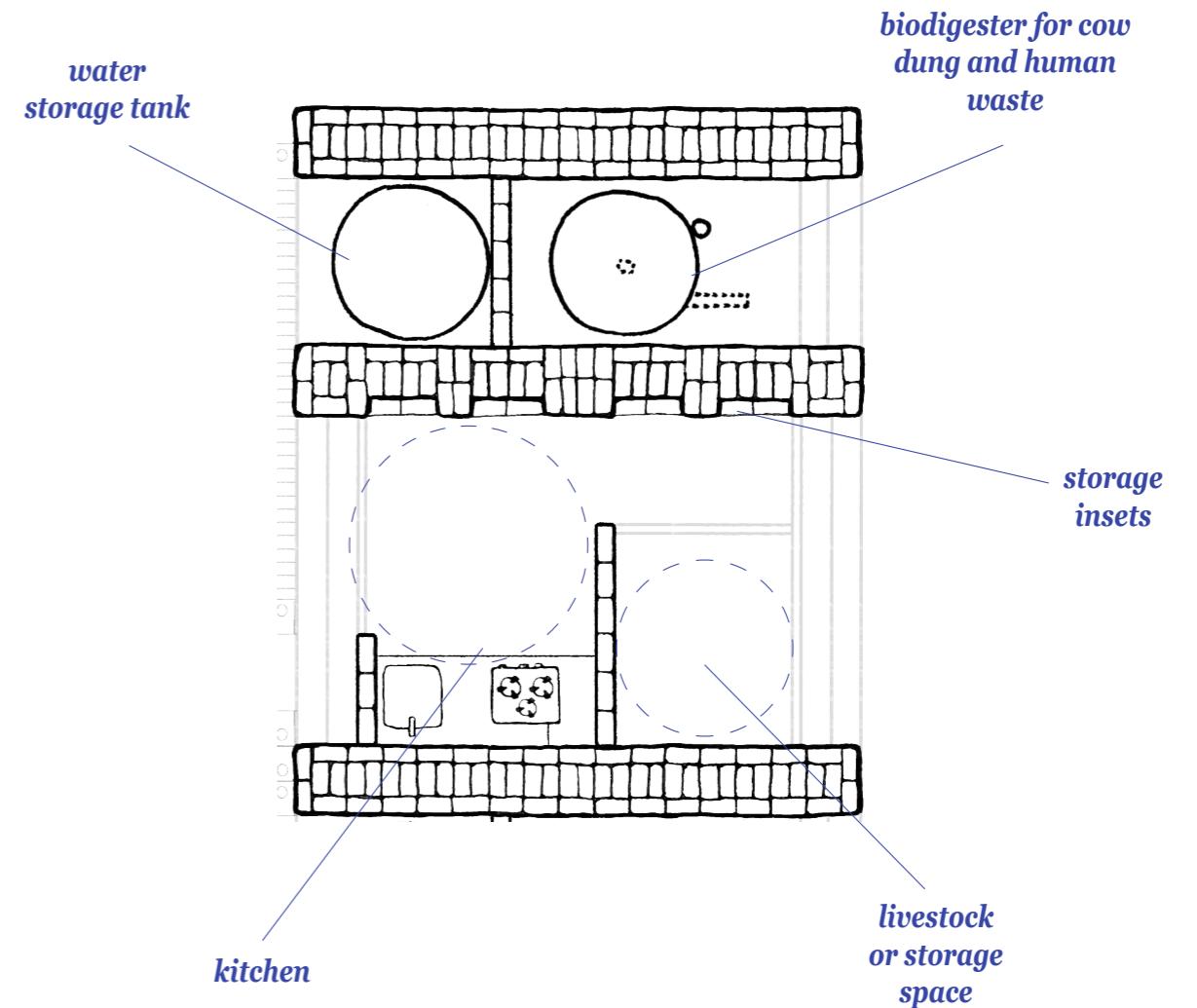
living zone

open-to-sky space

service zone

shared
walkwaycommunal
courtyard

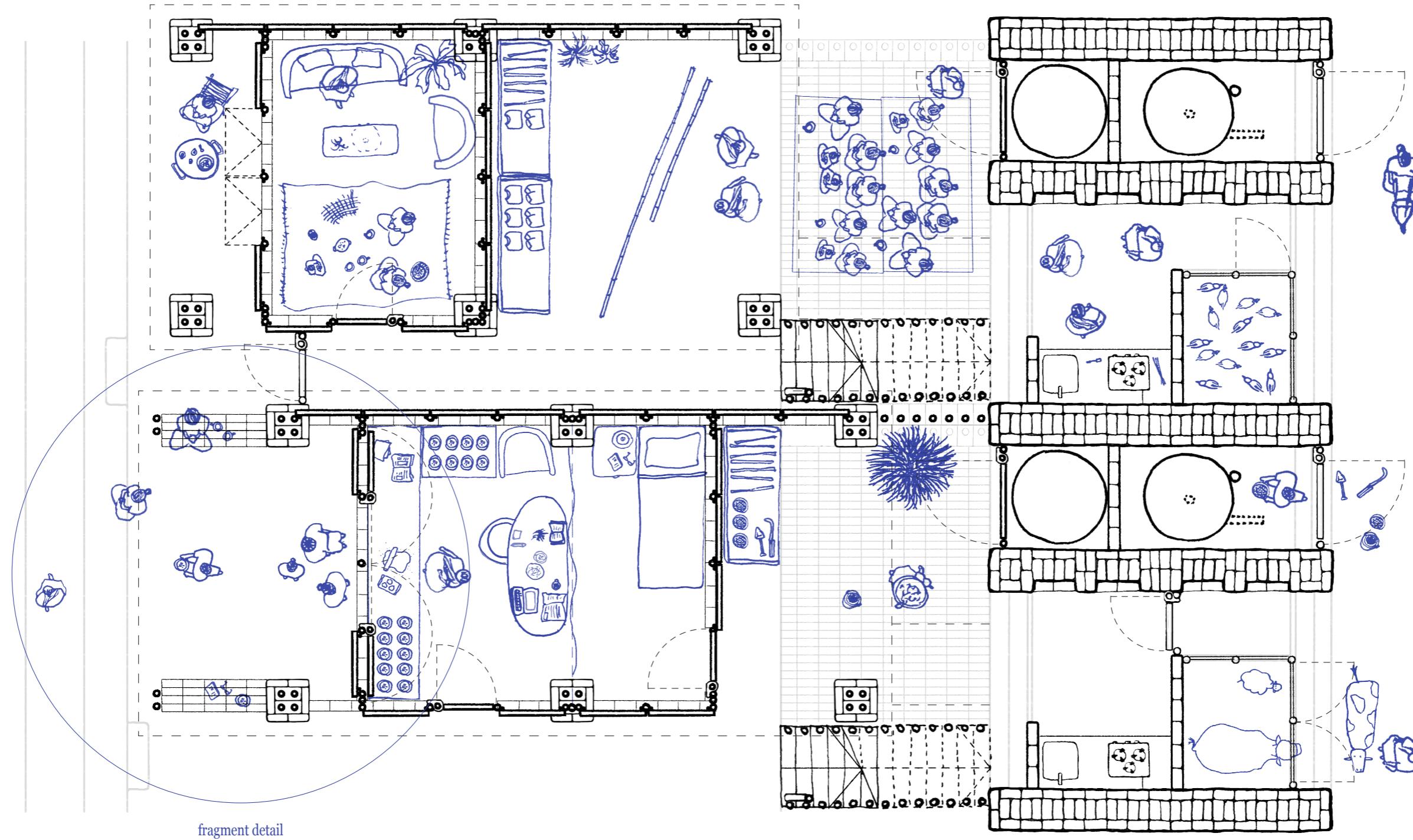
TYPE A, TYPE B: GF SEEDS



TYPE A, TYPE B: EXAMPLE 10AM



craftswomen household with poultry rearing, part of community marketing group

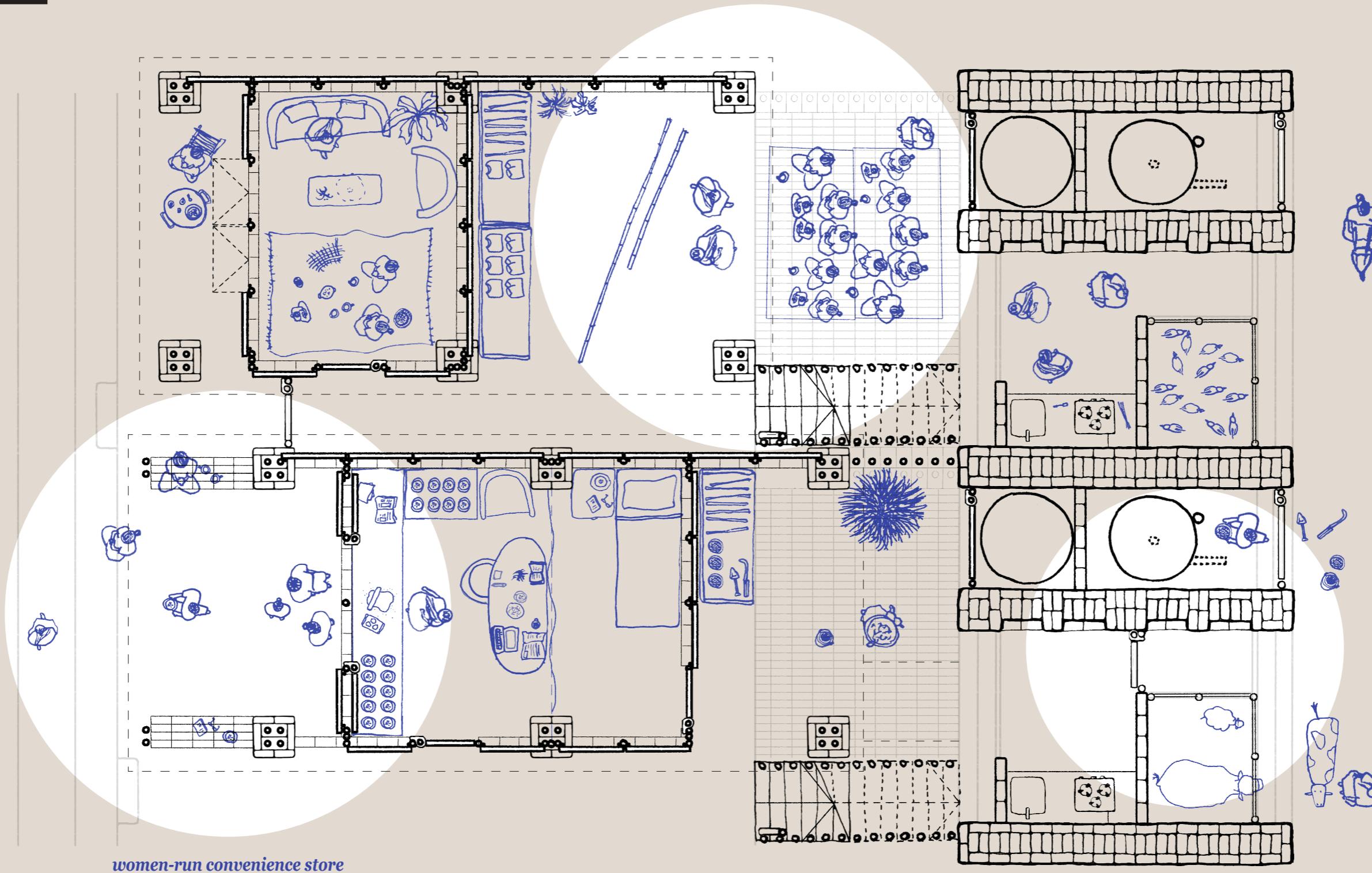


farming and small business household

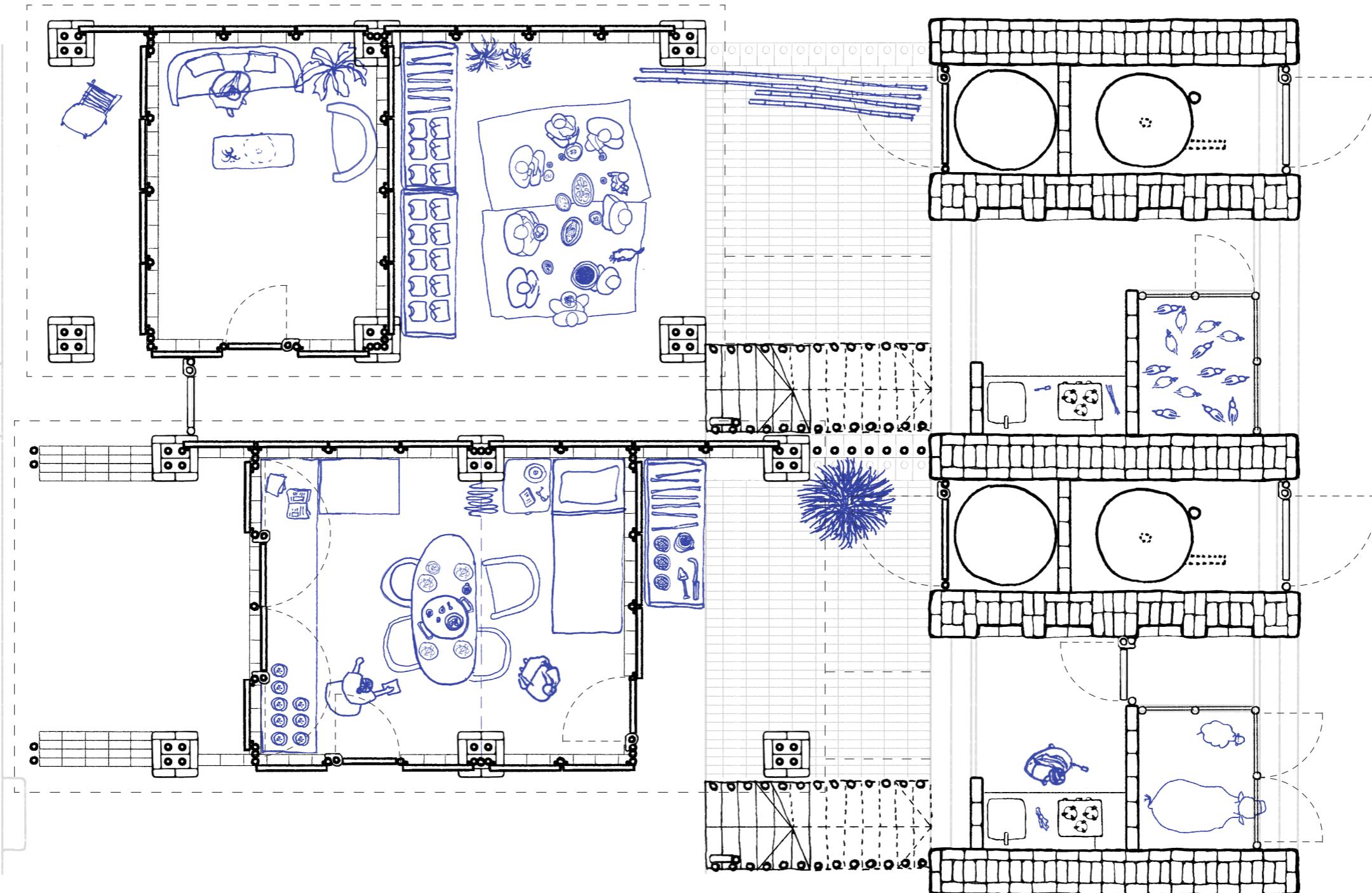
TYPE A, TYPE B: EXAMPLE 10AM



NGO-led training



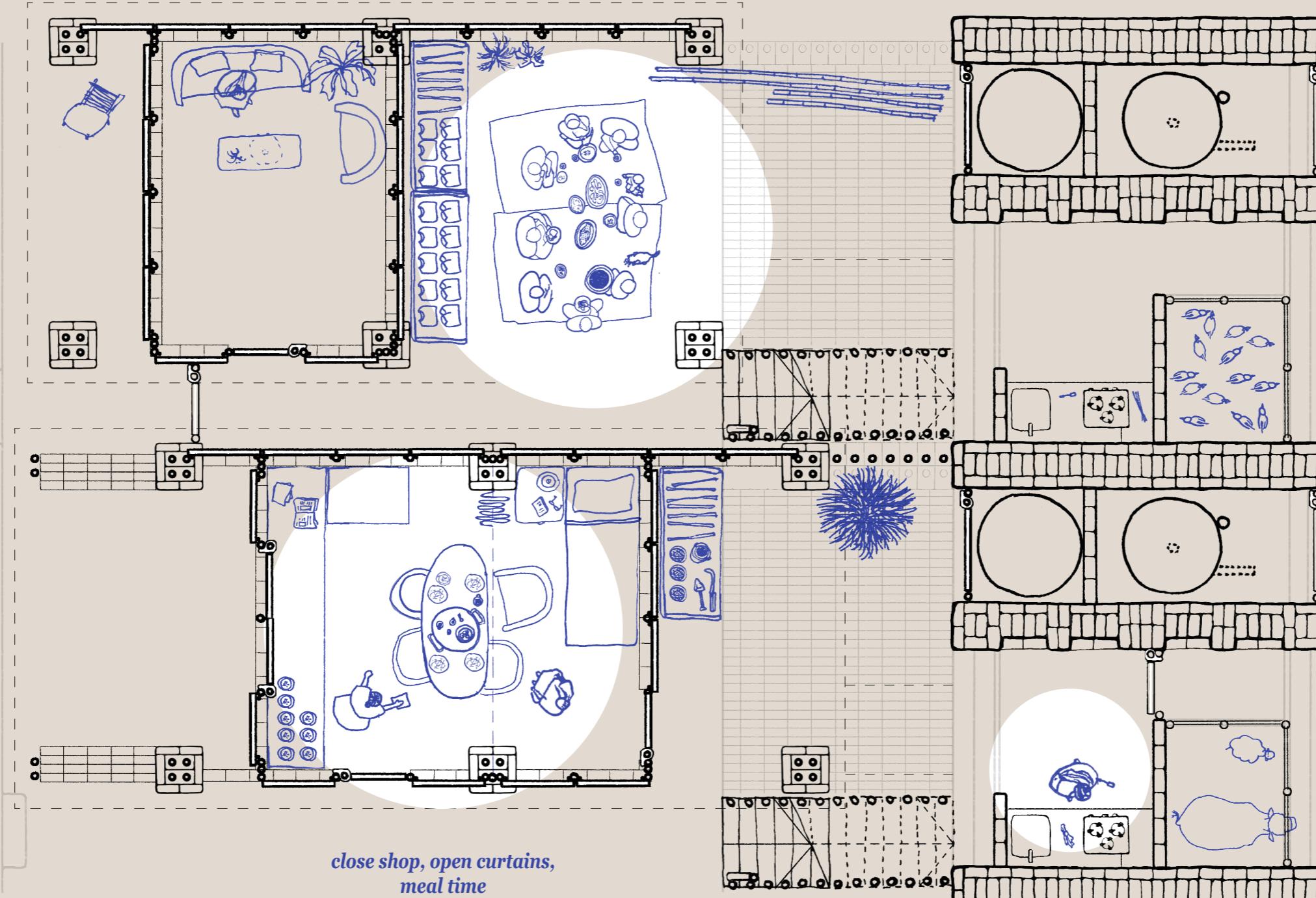
TYPE A, TYPE B: EXAMPLE 6PM



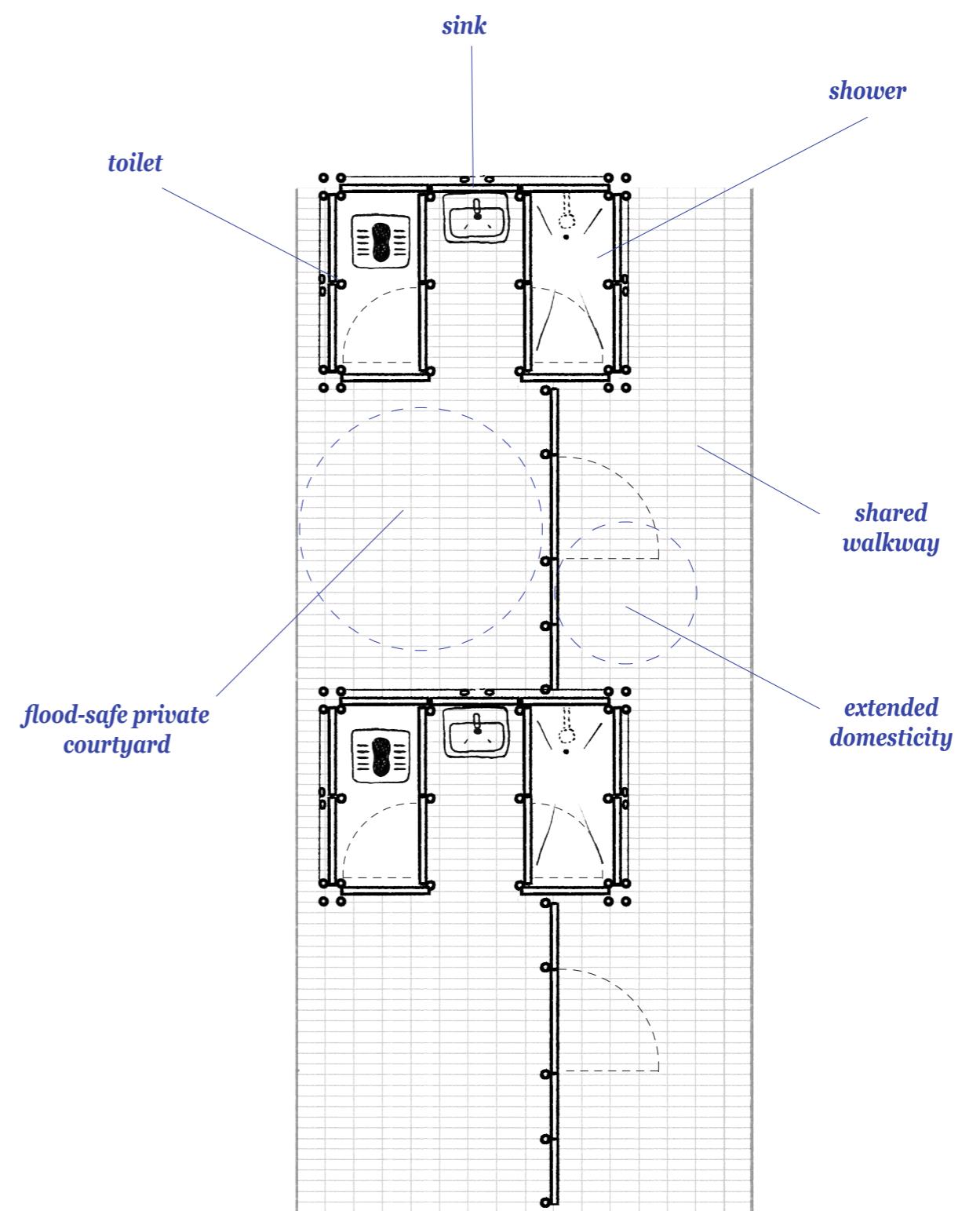
TYPE A, TYPE B: EXAMPLE 6PM



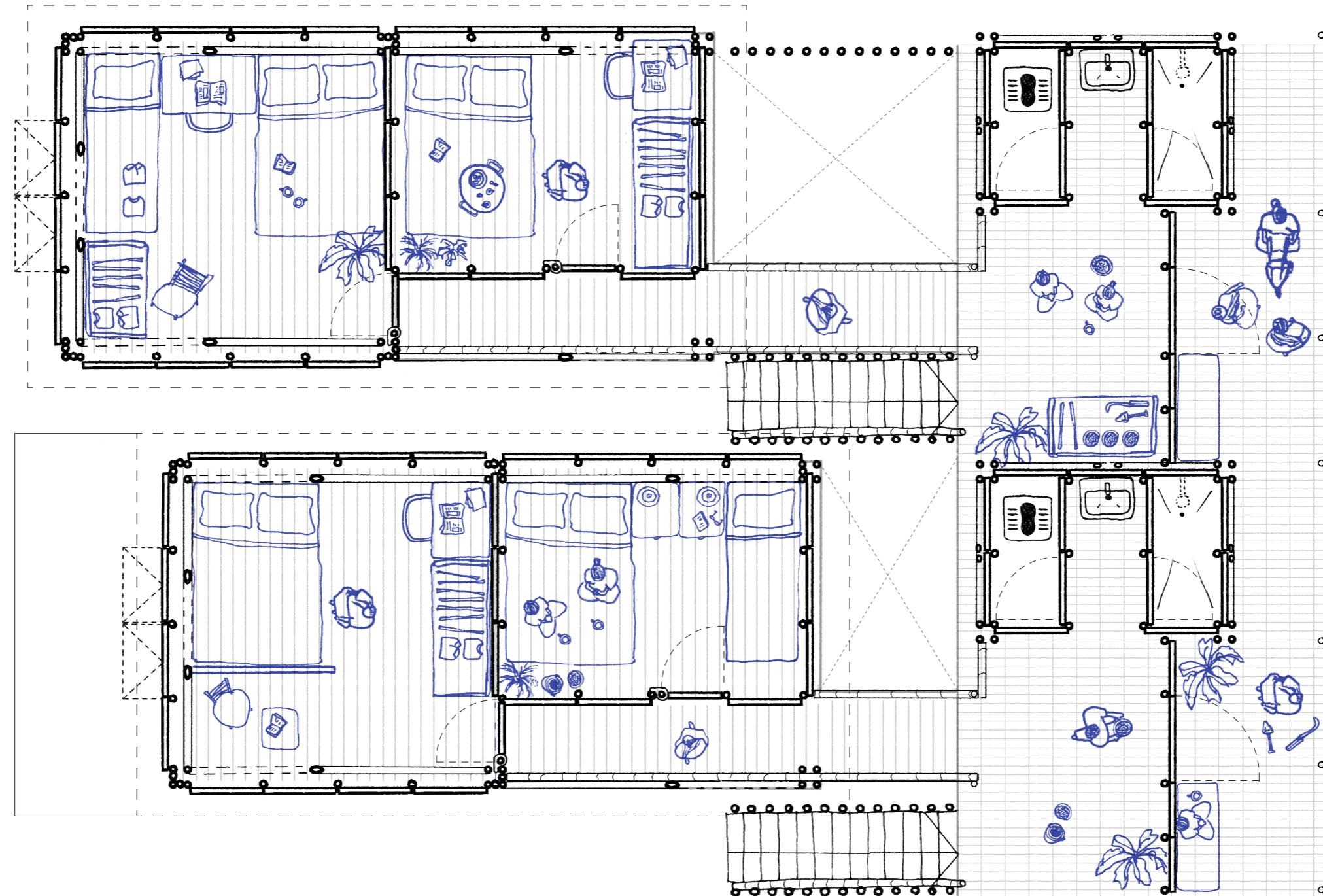
meal time



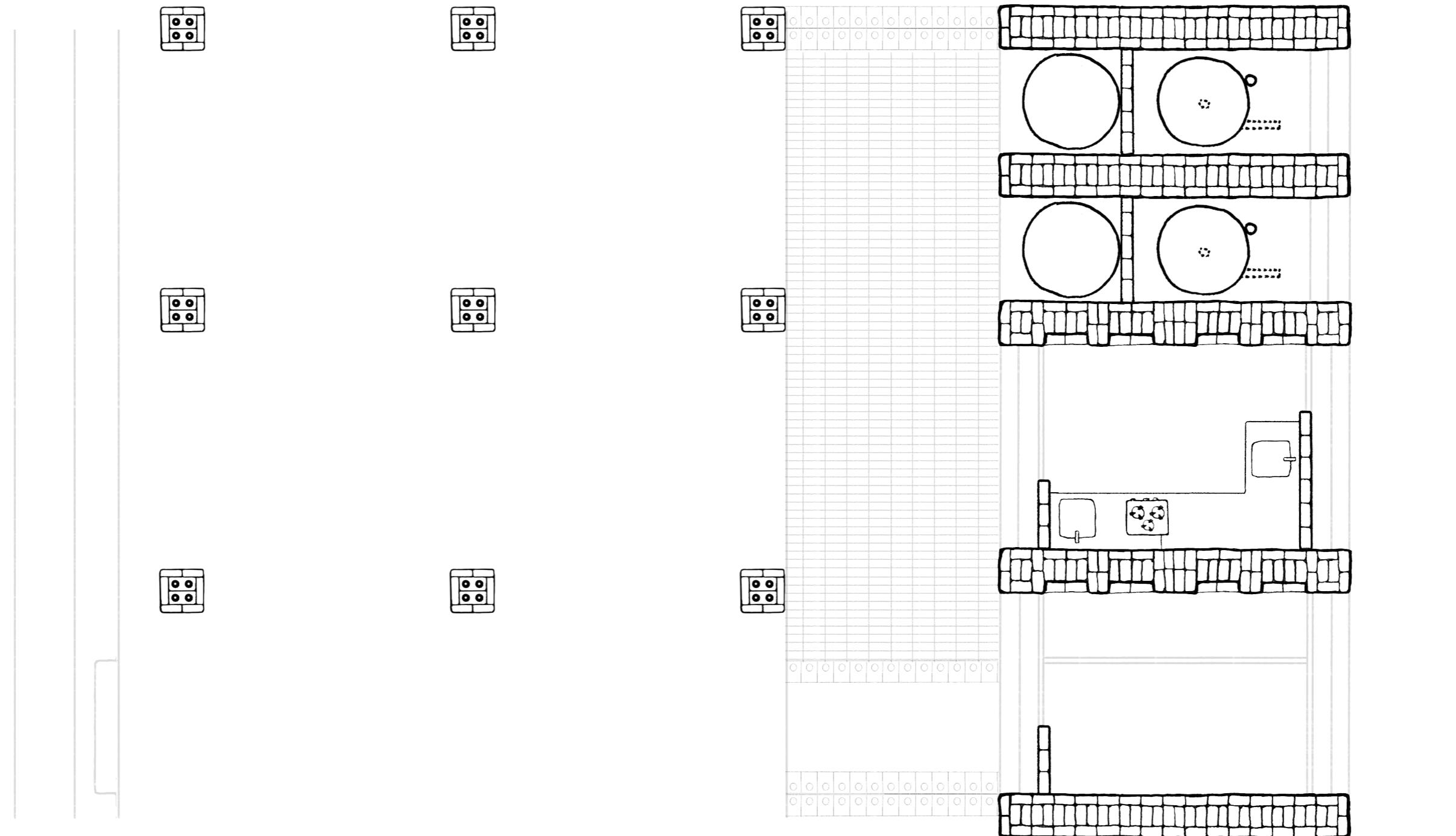
TYPE A, TYPE B: 1F SEEDS



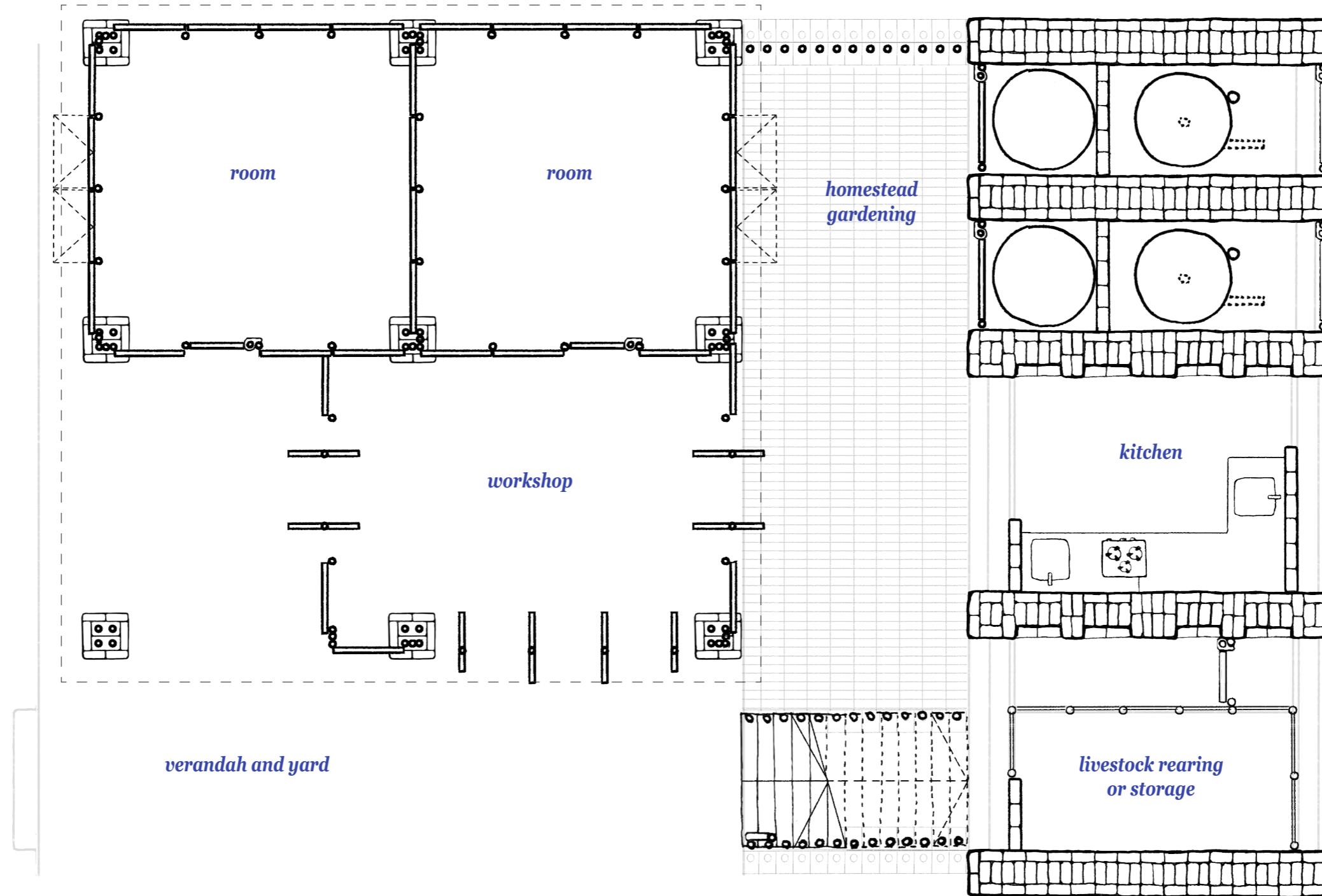
TYPE A, TYPE B: EXAMPLE 1F PLAN



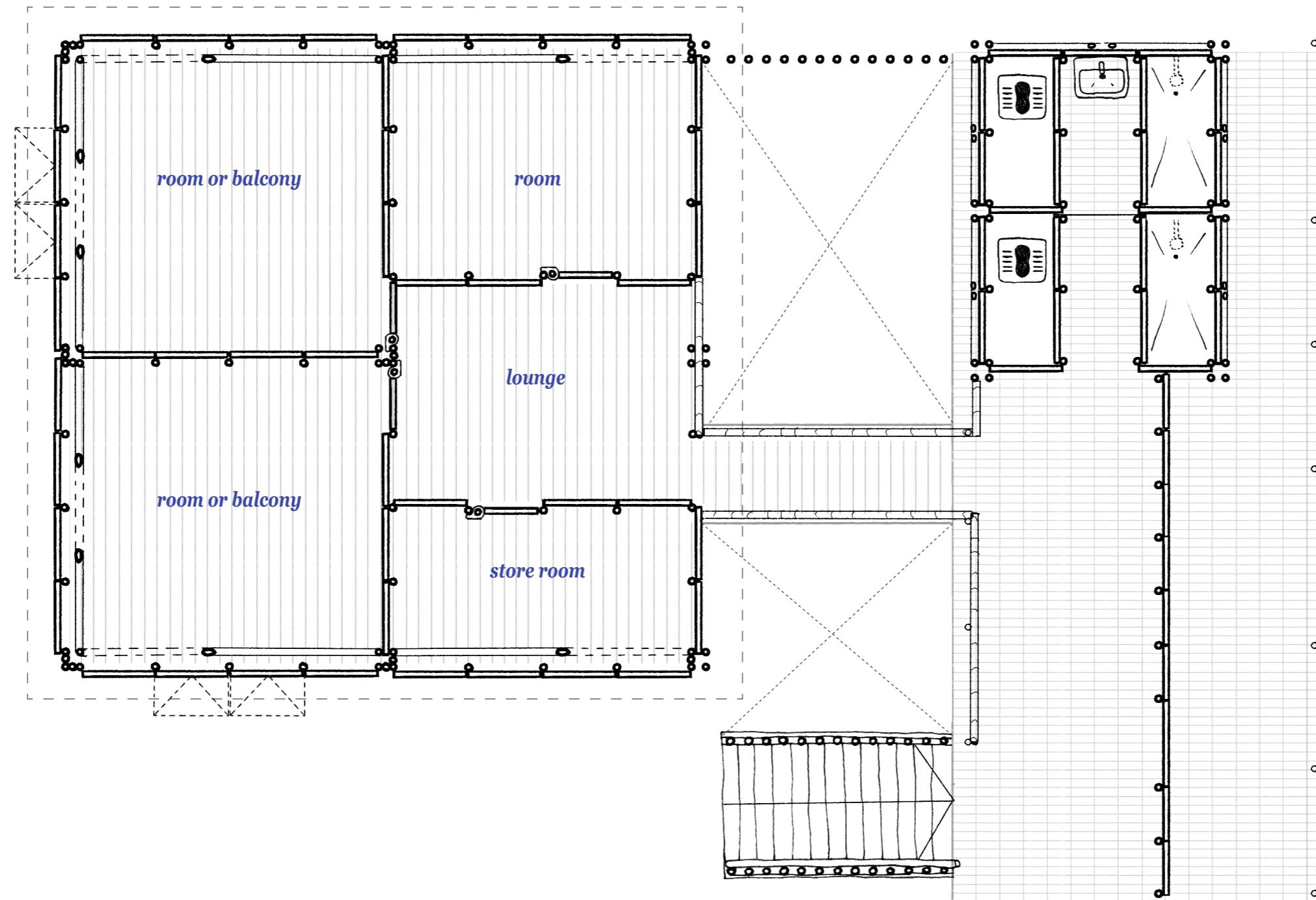
TYPE C: GF SEEDS

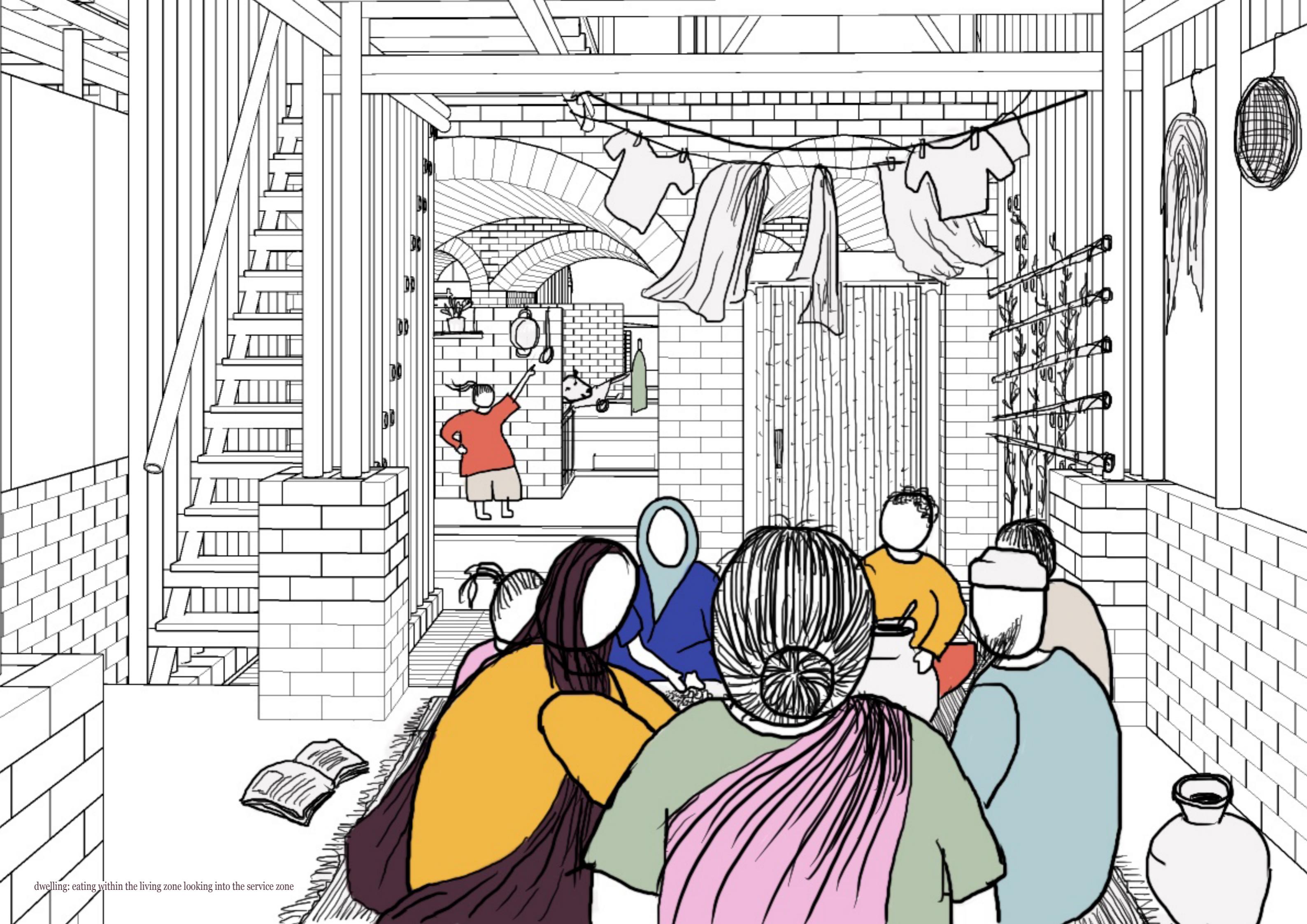


TYPE C: EXAMPLE GF PLAN



TYPE C: EXAMPLE 1F PLAN





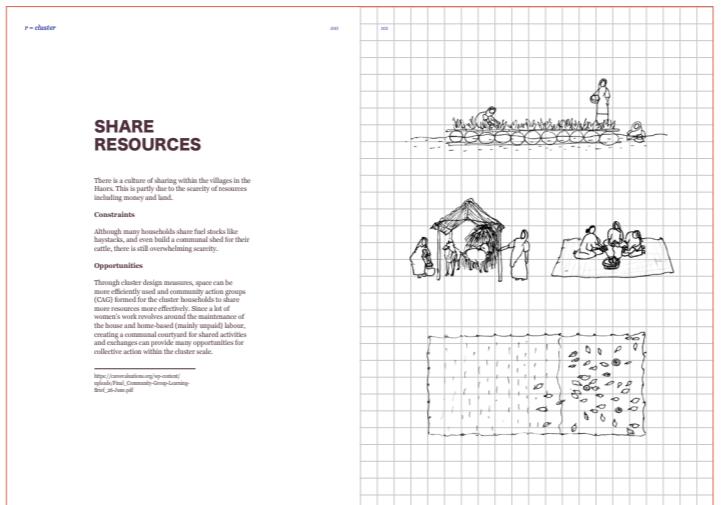
dwelling: eating within the living zone looking into the service zone

CLUSTER STRATEGY

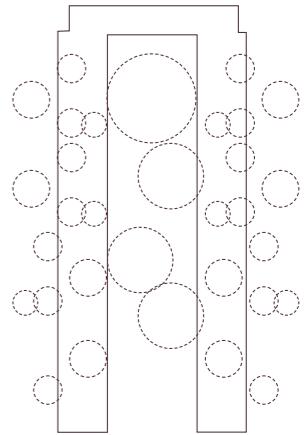
CLUSTER

COMMUNITY ACTION GROUPS: SAFEGUARDING THE COLLECTIVE AND THE INDIVIDUAL

scalar binder_cluster_share resources

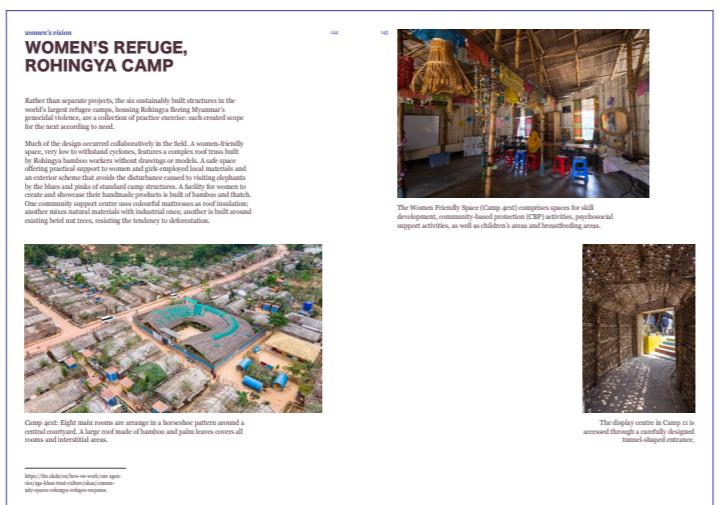


spatial

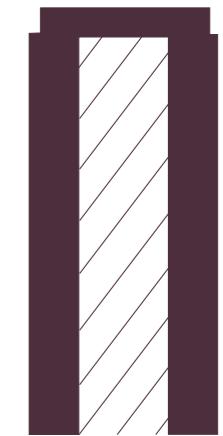


allocate space for women to generate income within the collective cluster and the individual dwellings

thematic binder_women's vision_women's refuge, rohingya camp

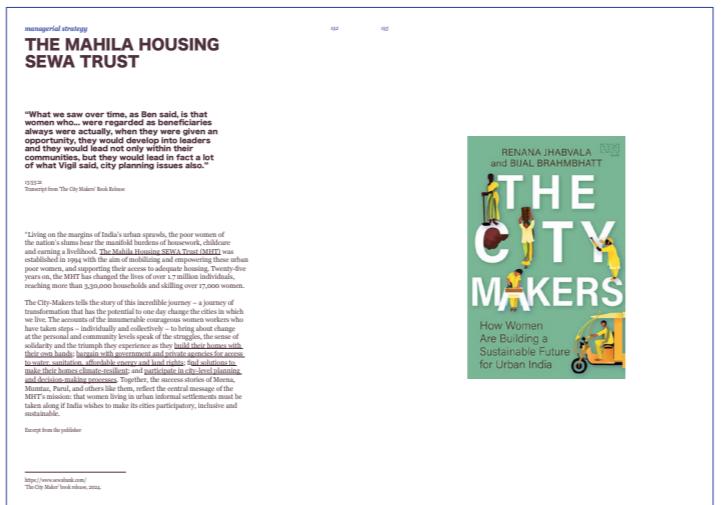


temporal

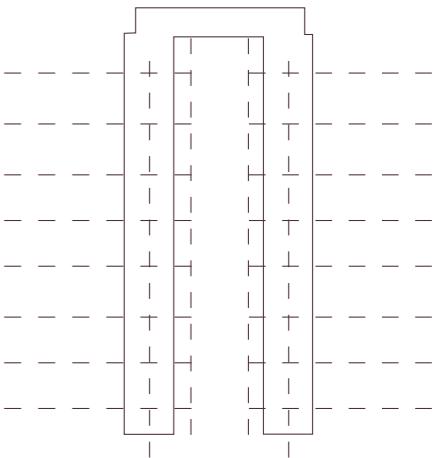


safeguard a communal courtyard for women to work in a safe space

thematic binder_managerial strategy_the mahila housing sewa trust



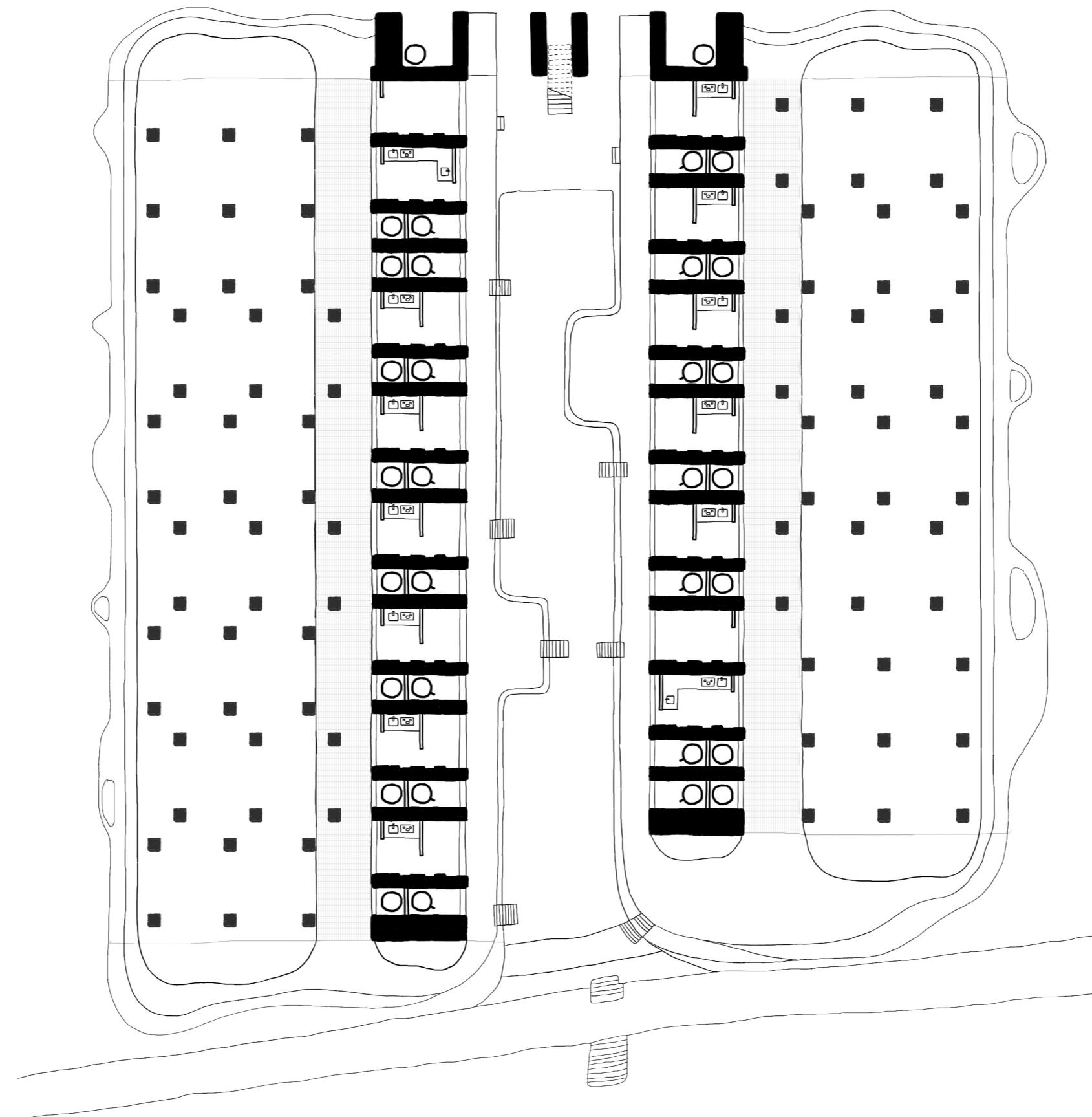
managerial and ecological



create clusters which have clear demarcations for maintenance and ownership, and group finance possibilities

1:200

CLUSTER GF SEEDS

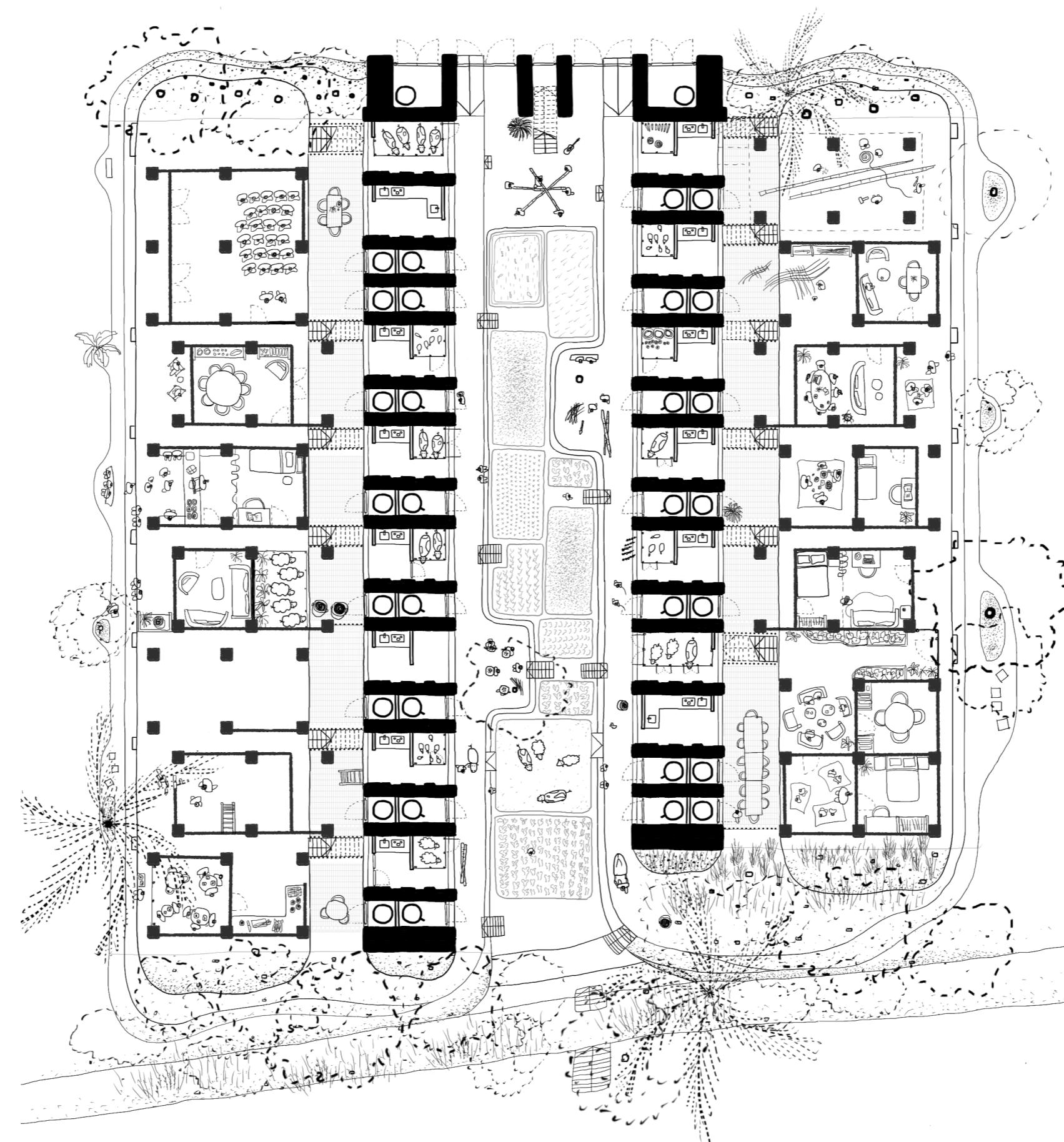


CLUSTER GF PLAN



0 2 6

12m



CLUSTER GF PLAN

0 2 6 12m

public amenity

patrilineal family line

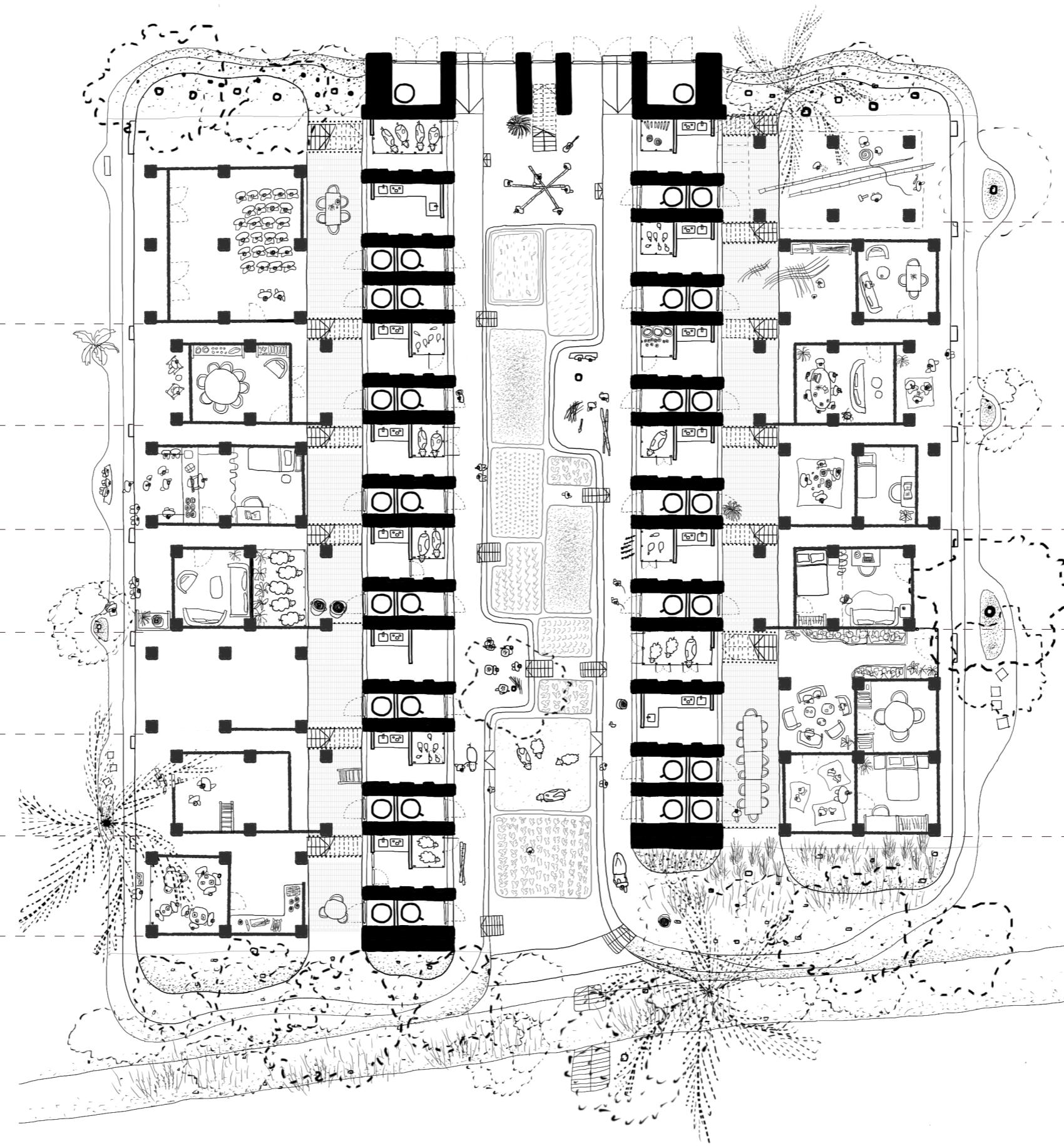
shophouse

livestock rearing

young couple in co-design process with architect

expanding family doing construction

teahouse and residence



ground floor workshop

combined units Type A and Type B, women-headed households

small family

business partners of livestock-rearing household opposite

women's refuge



INFRASTRUCTURE SPINE



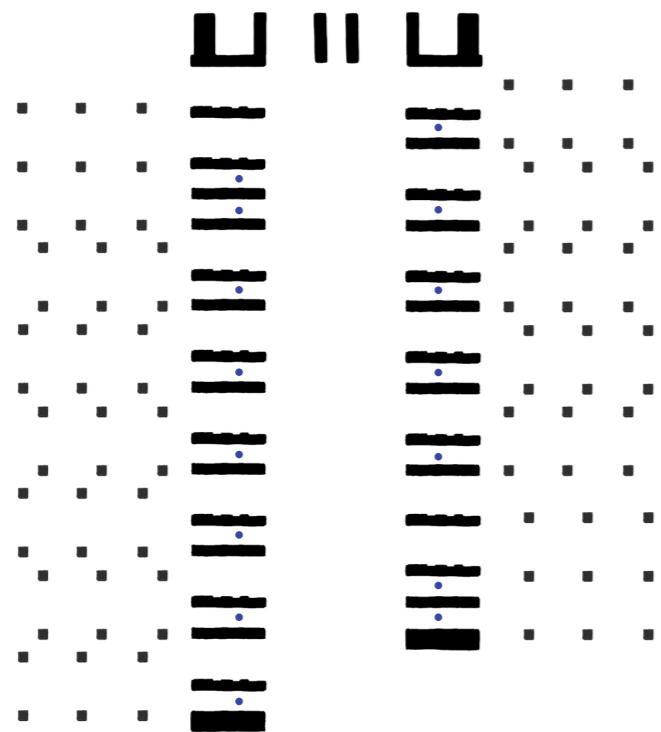
WATER SECURITY

water storage ponds with helophyte filter,
supplies to water tanks

GREYWATER PURIFICATION

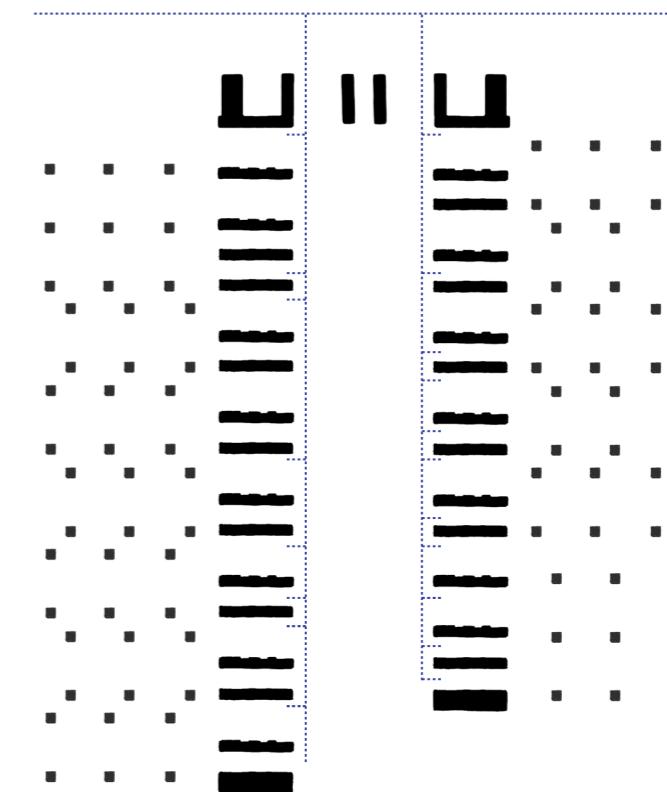
greywater purification by fish ponds or reed
beds

INFRASTRUCTURE SPINE



BLACKWATER

by gravity, the waste from the 1F toilet directly enters the biodigester below, getting rid of blackwater at the source, and generating useful energy simultaneously



FUTURE SEWAGE SYSTEM/ ELECTRICITY/PIPED WATER/GAS

the spine design makes future implementations of systems easier

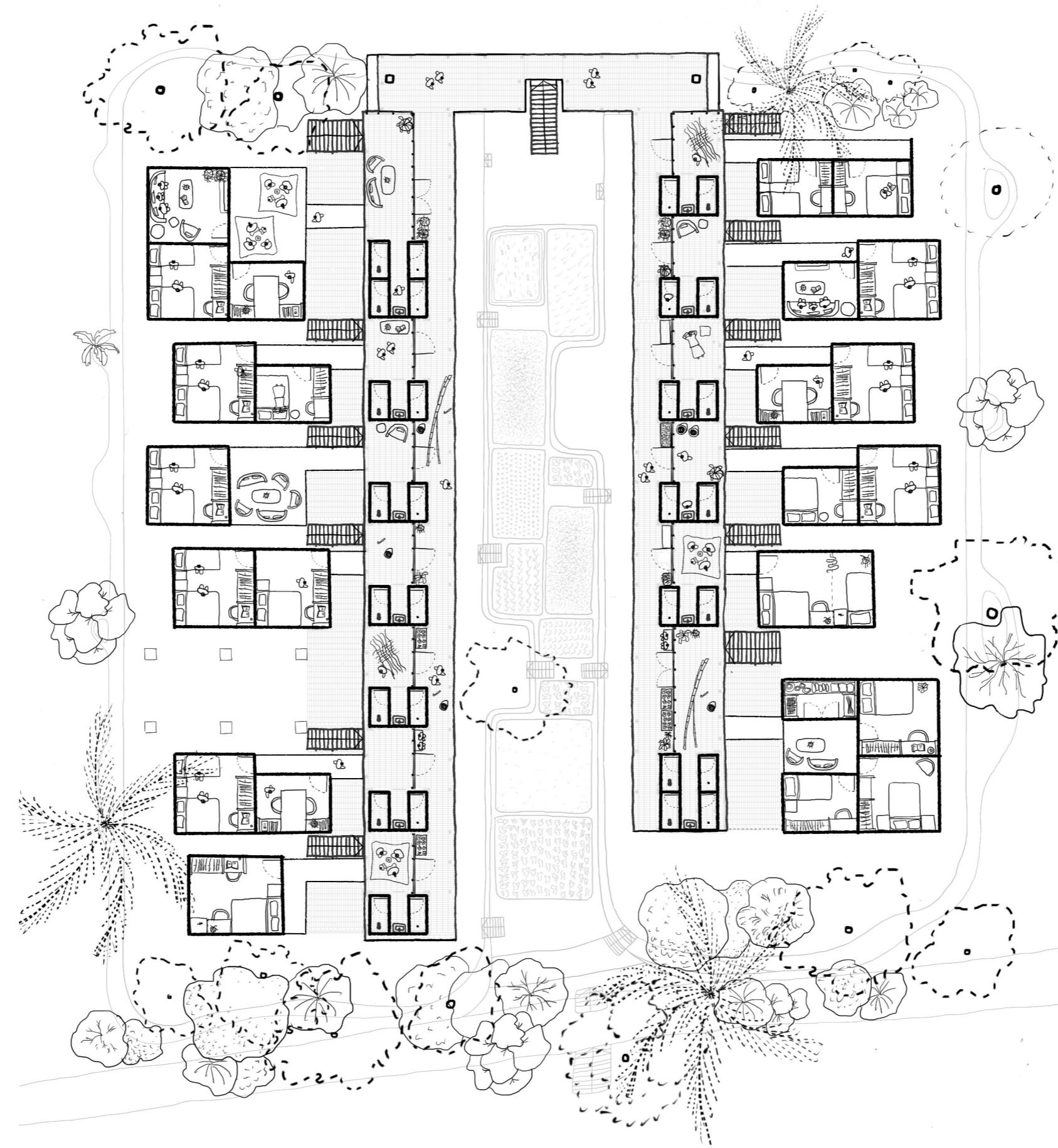
1:200

CLUSTER 1F PLAN



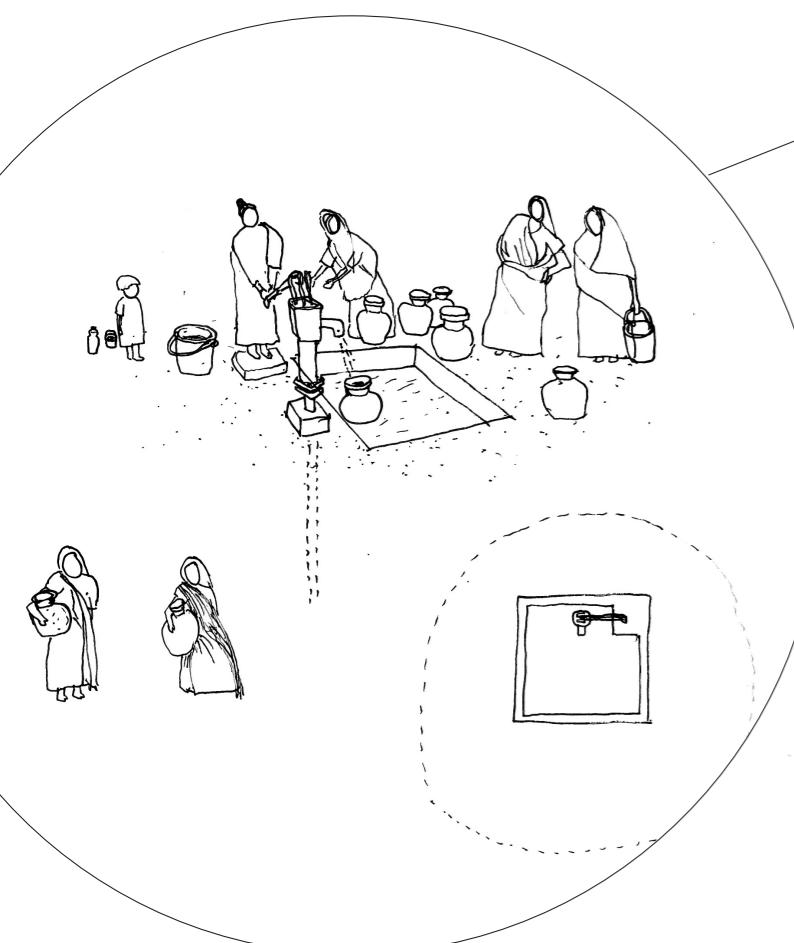
0 2 6

12m

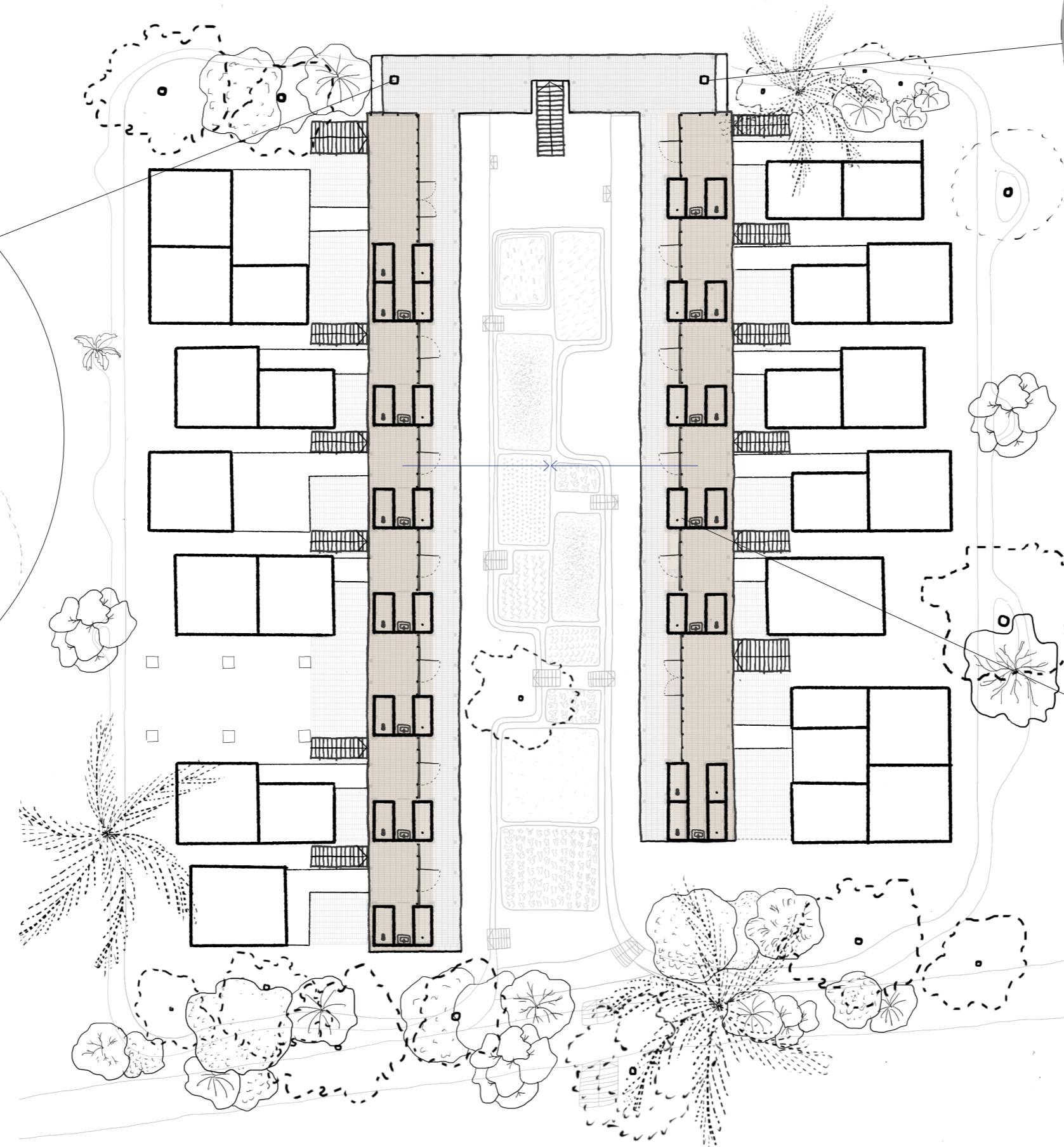


CLUSTER 1F PLAN

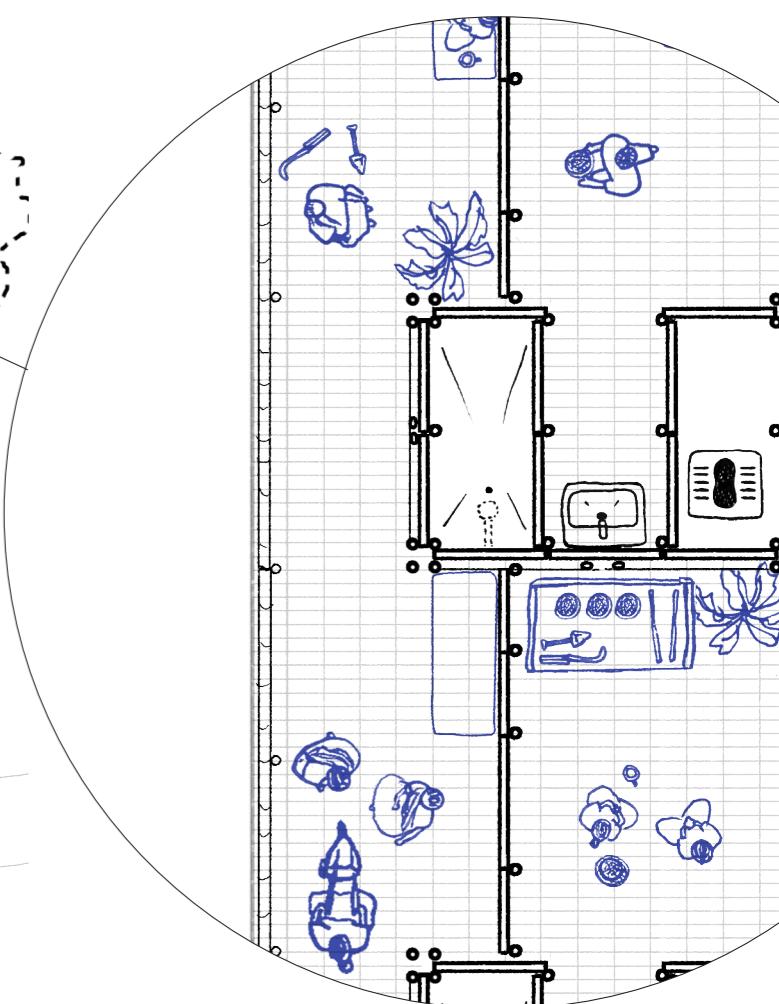
0 2 6 12m



drinking water supply is traditionally also a social space for women



biosand filter
<https://www.ledars.org/wash/bfscb/>

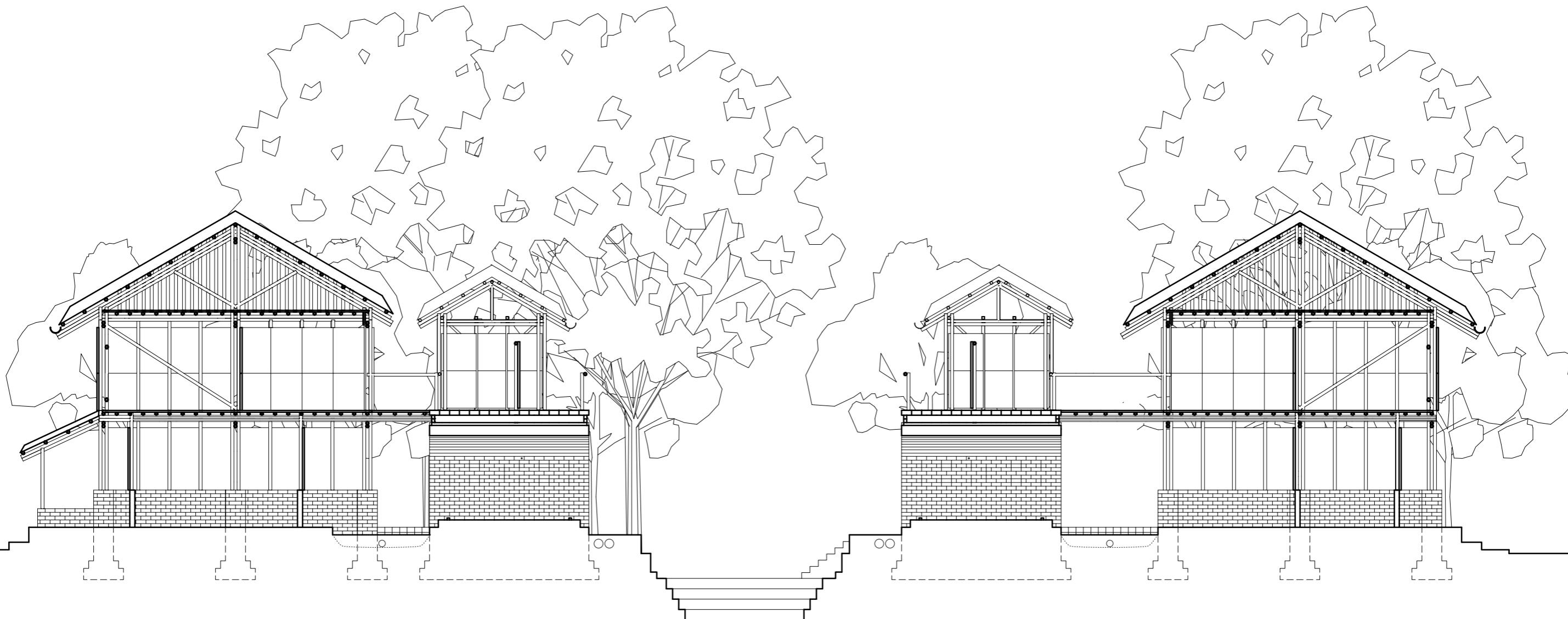
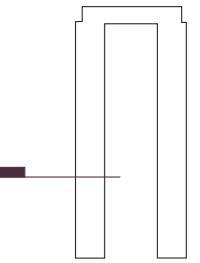


extended domesticity

ACTIVATION OF COMMUNAL SPINE

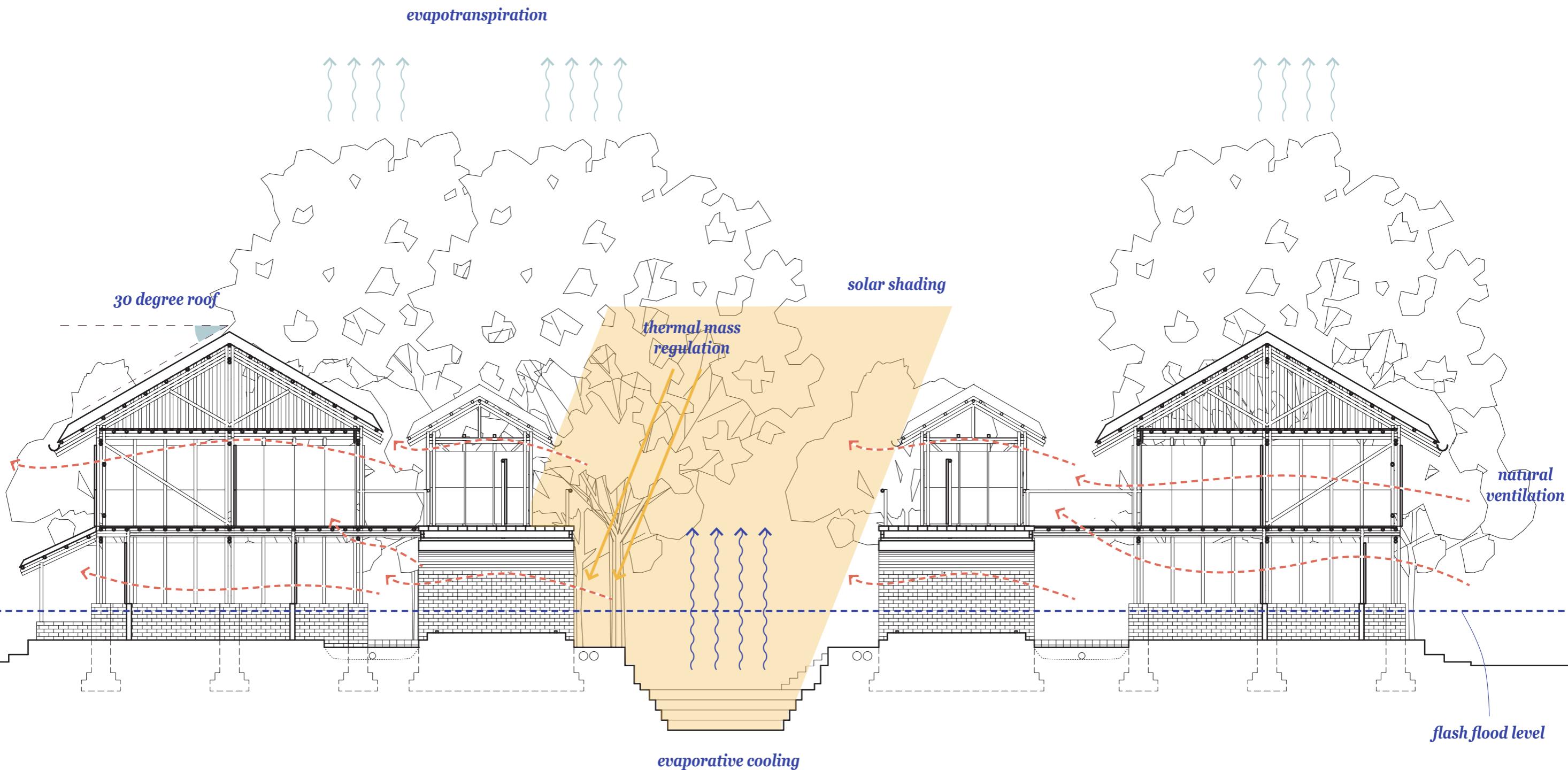
CLUSTER SECTION

0 1 3 6m



CLIMATE DESIGN

0 1 3 6m



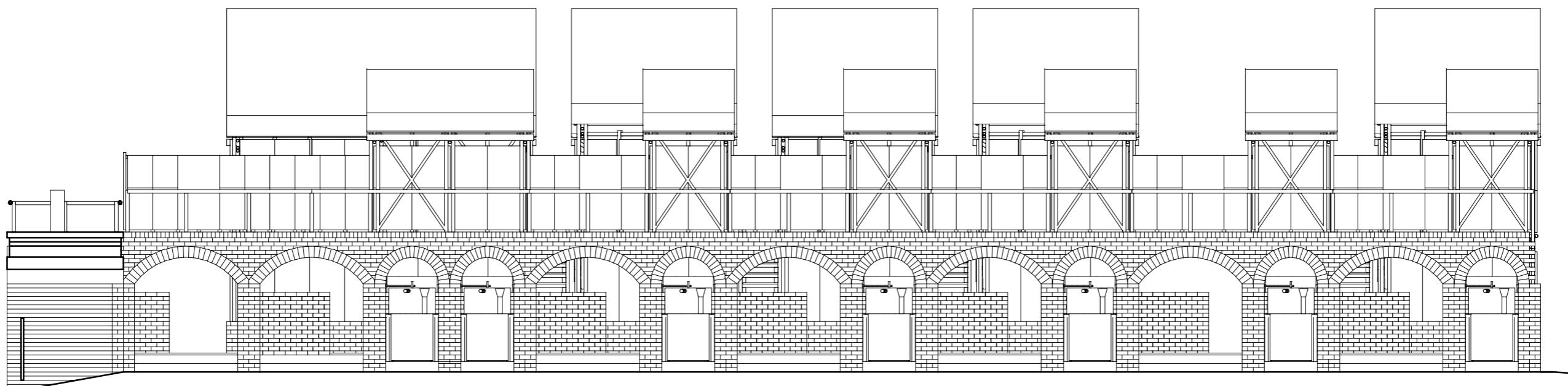
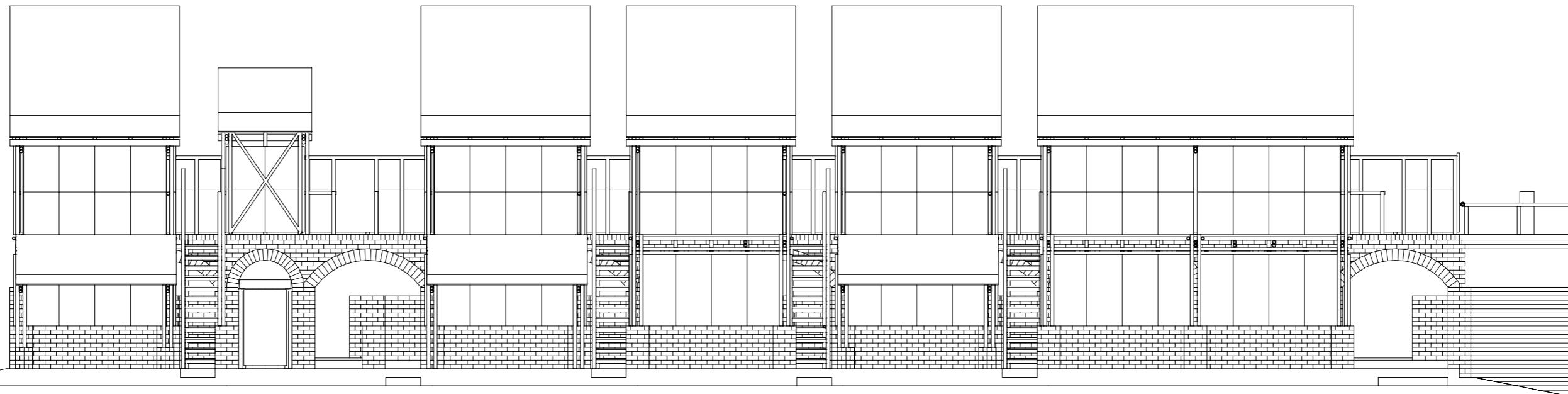
1:100

312

313

CLUSTER FRONT AND BACK ELEVATIONS

0 1 3 6m



cluster

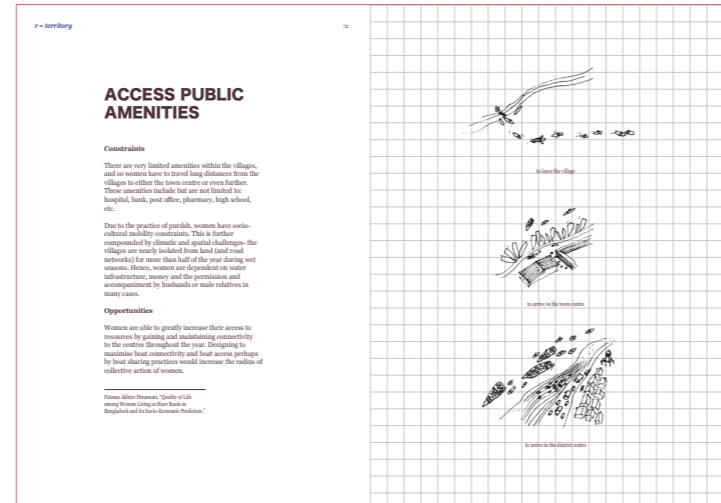


VILLAGE STRATEGY

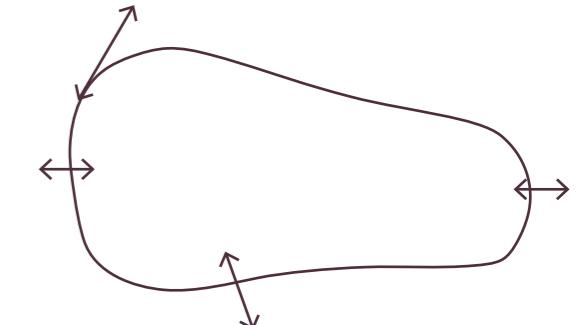
VILLAGE

A RESPONSIVE SYSTEM TO MAXIMISE ACCESS FOR WOMEN

scalar binder_territory_access public amenities

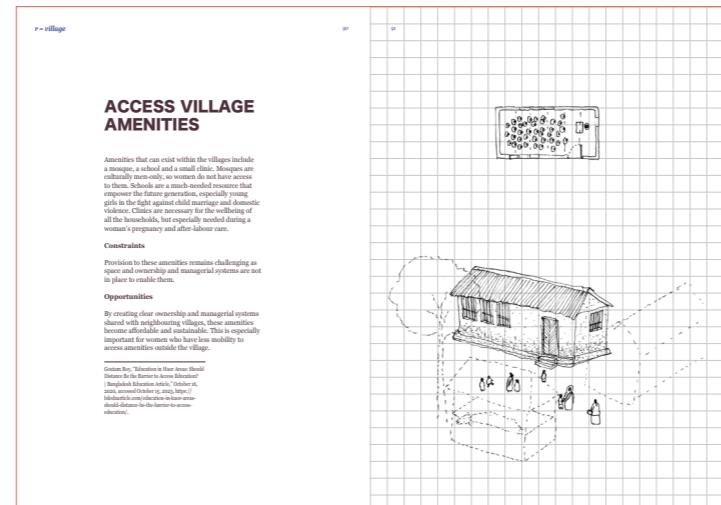


spatial

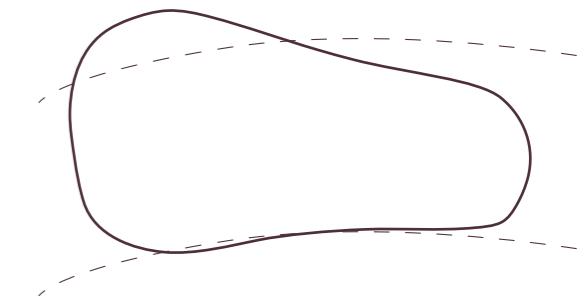


increase connectivity to share amenities between nearby villages

scalar binder_village_access village amenities

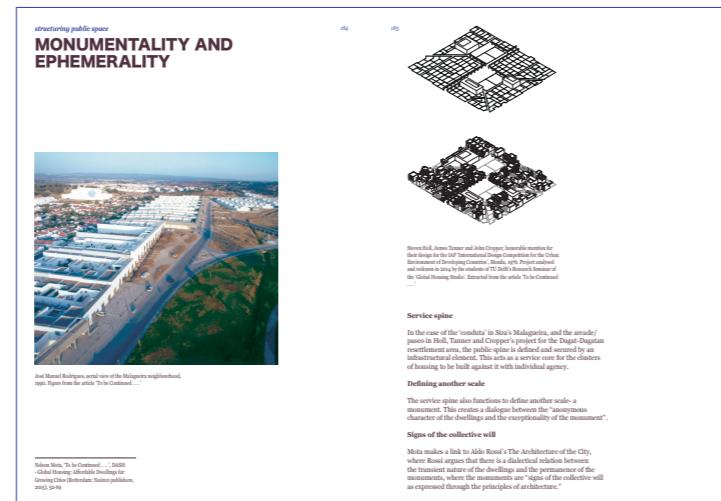


temporal

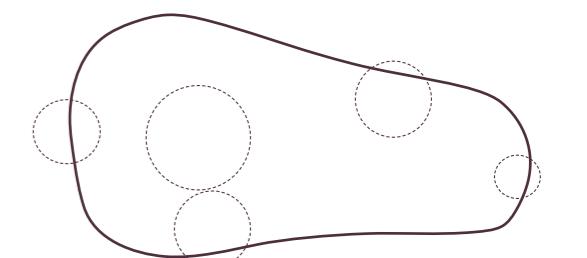


shape the village along the river, creating maximum access to both the river of one side and the paddyfields on the other.

thematic binder_structuring public space_monumentality and ephemerality



managerial and ecological



create a hierarchy within public space, responding to managerial levels within the village



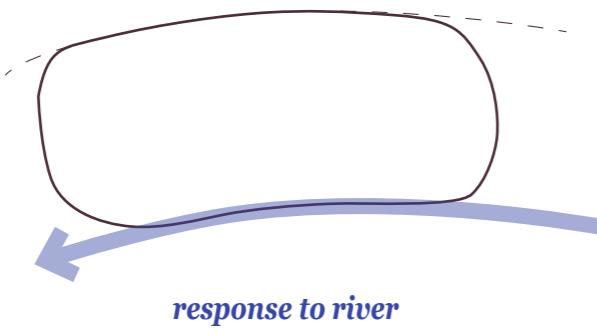
1:500

VILLAGE PLAN

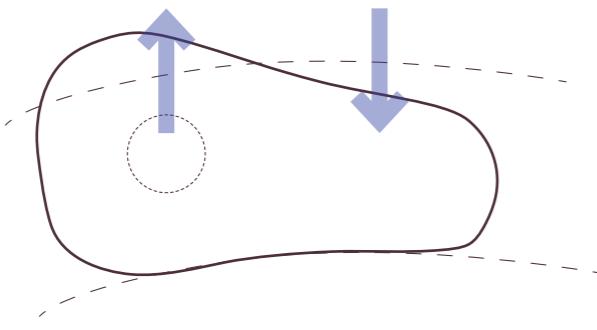


0 5 15 30m

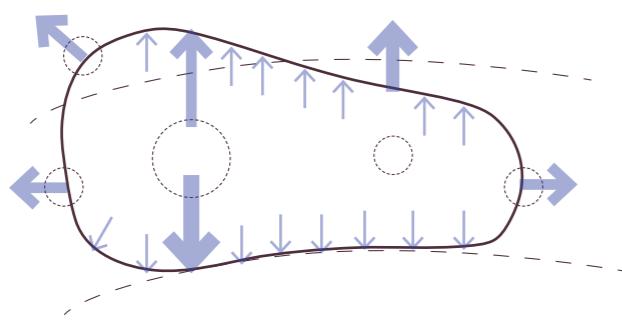
RESPONSIVENESS



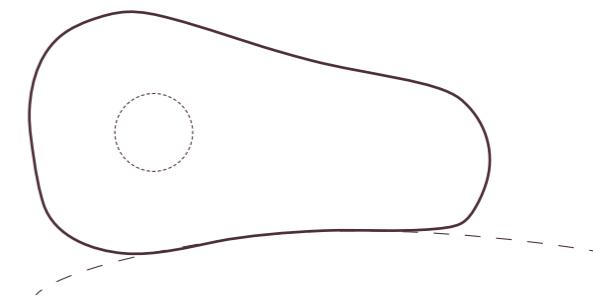
response to river



creating a heart



hierarchy of nodes



responsiveness





1:500

CENTRAL LINEAR COURTYARD



0 5 15 30m

village



village: school's out in the main heart of the village



1:500

MAIN NODES



0 5 15 30m



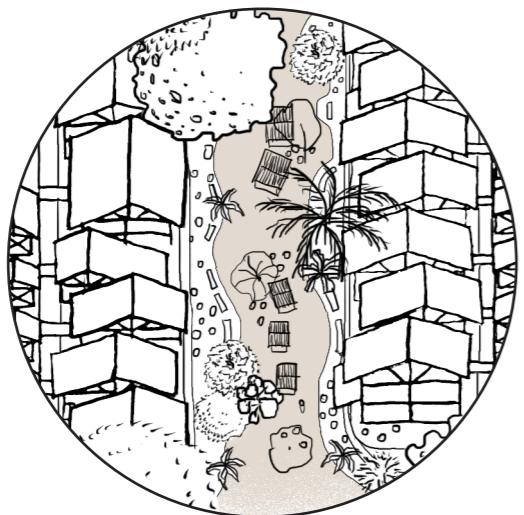
1:500

MAIN NODES

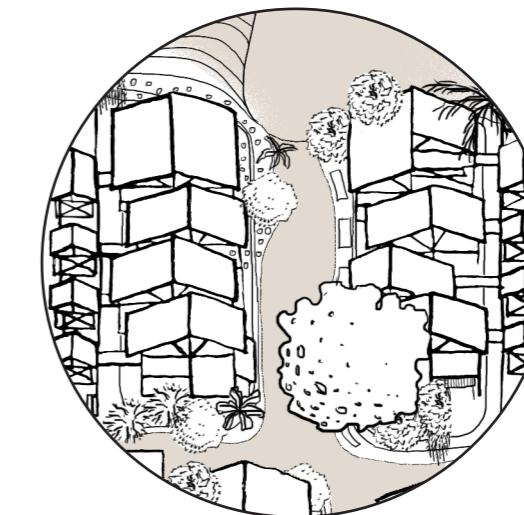


0 5 15 30m

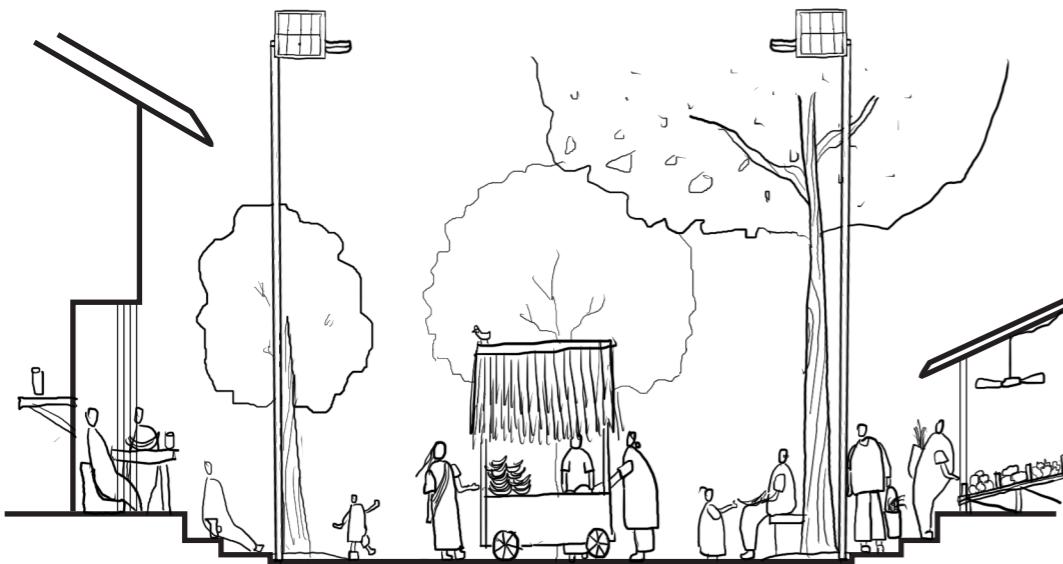
PLACEMAKING



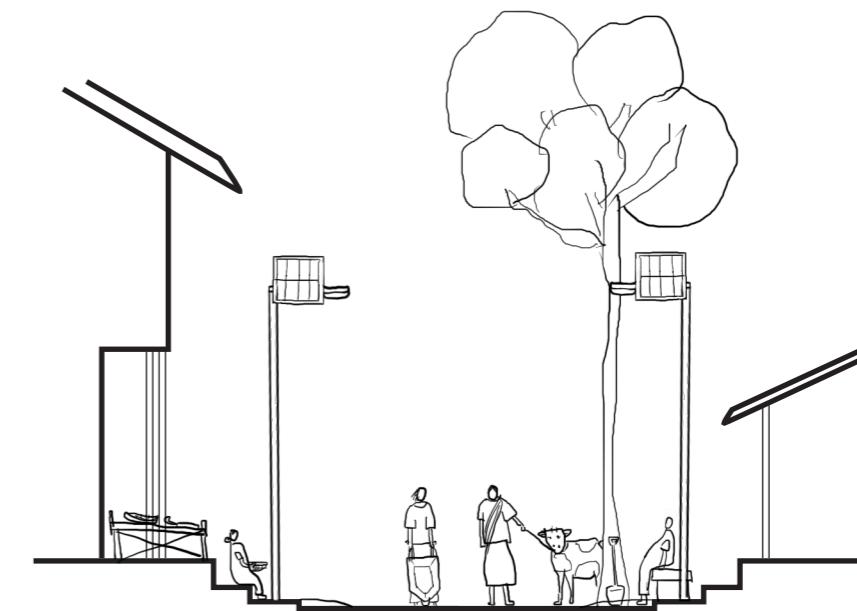
9m



6m

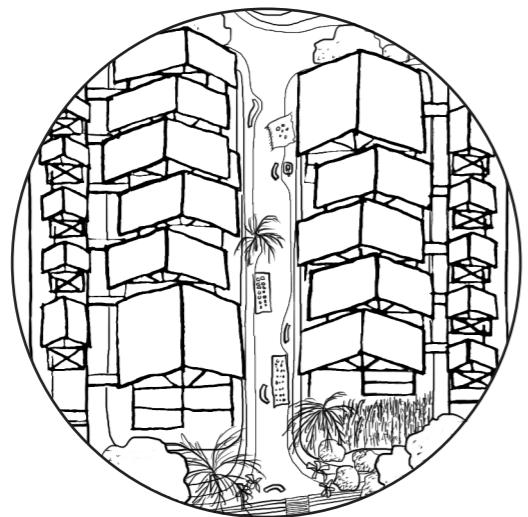


bridge street

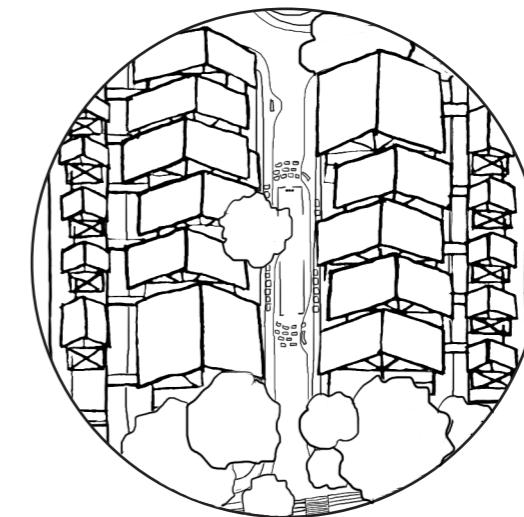


paddyfield street

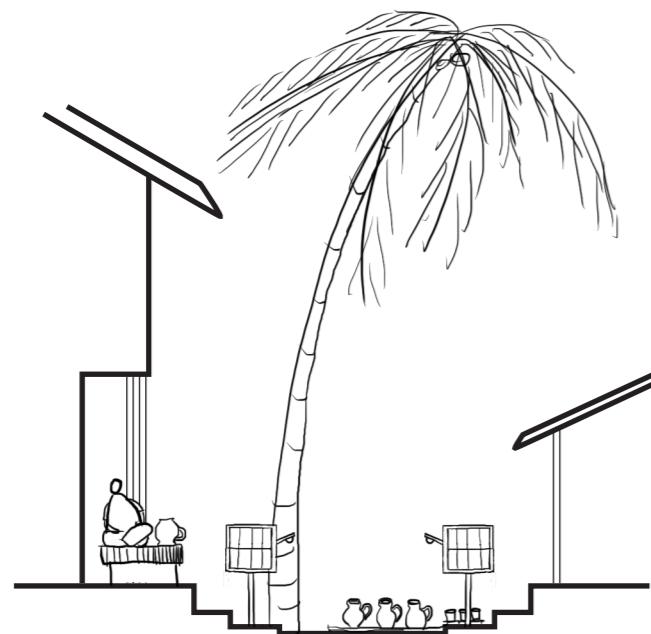
PLACEMAKING



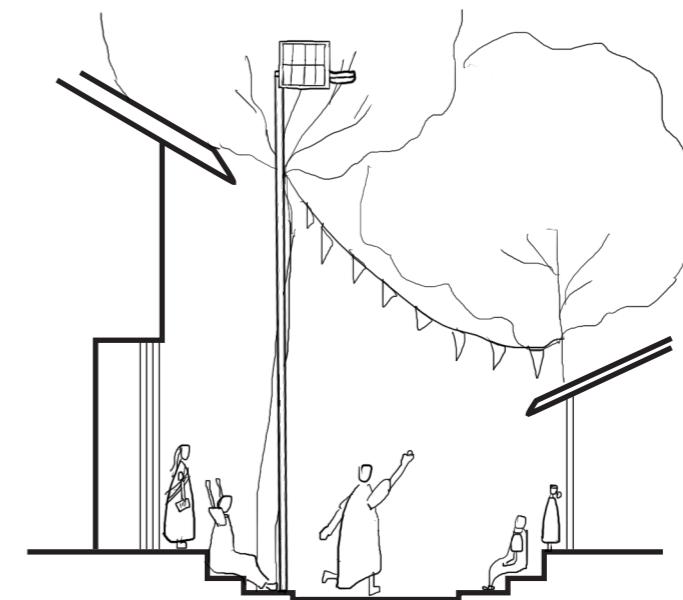
3.5m



3.5m



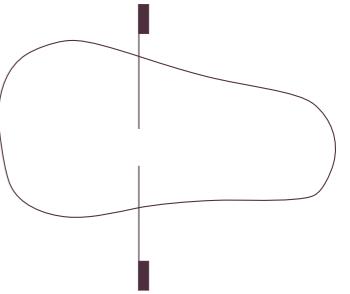
potter's street



cricket street

PADDYFIELD TO RIVER

0 5 15 30m

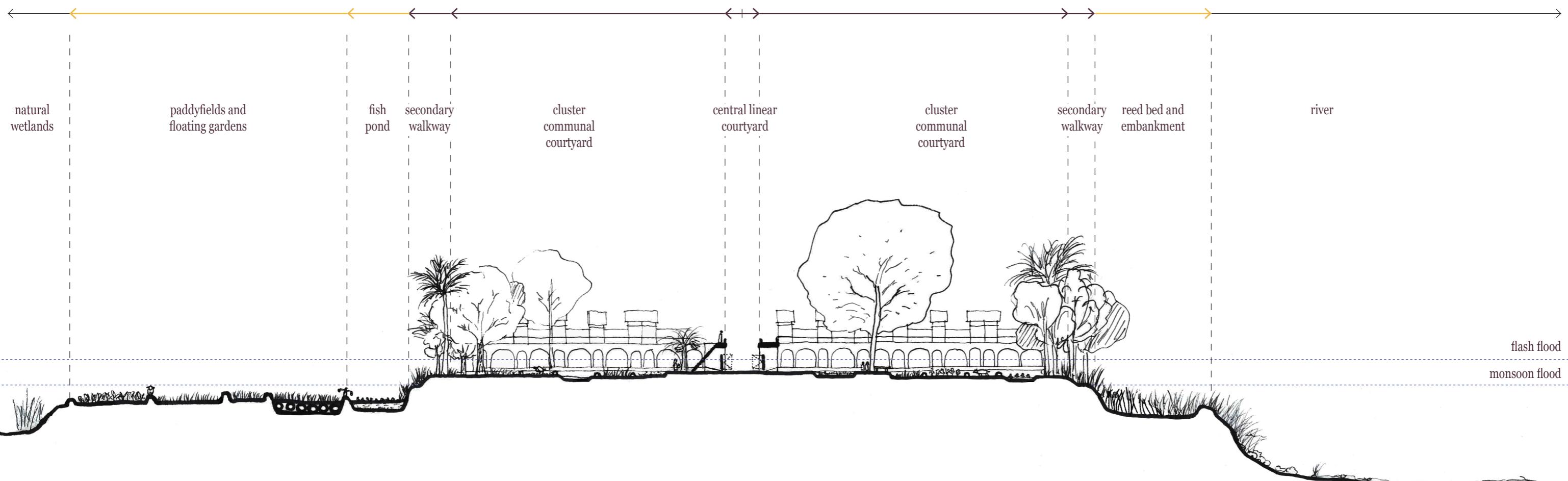


irrigation and
water storage

greywater
purification

surface water
run-off,
drainage

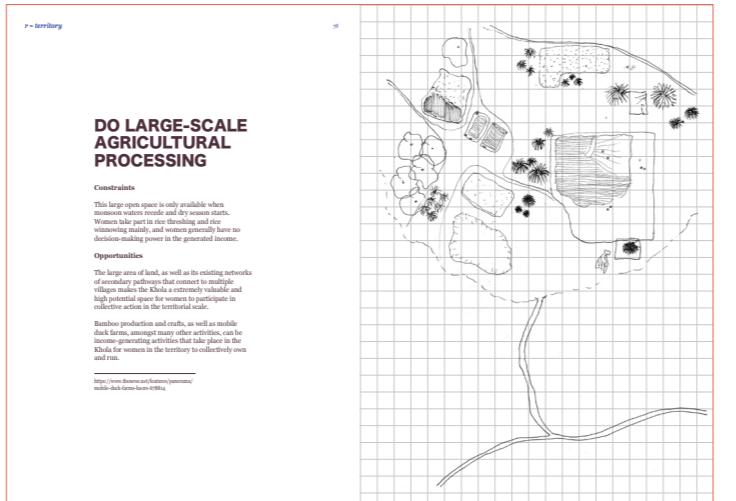
greywater
purification



TERRITORY STRATEGY

NODES TO ACCESS WIDER TERRITORY

scalar binder_territory_do large-scale agricultural processing



spatial

use the existing networks of Khola and secondary walkways to create nodes for social and economic activity

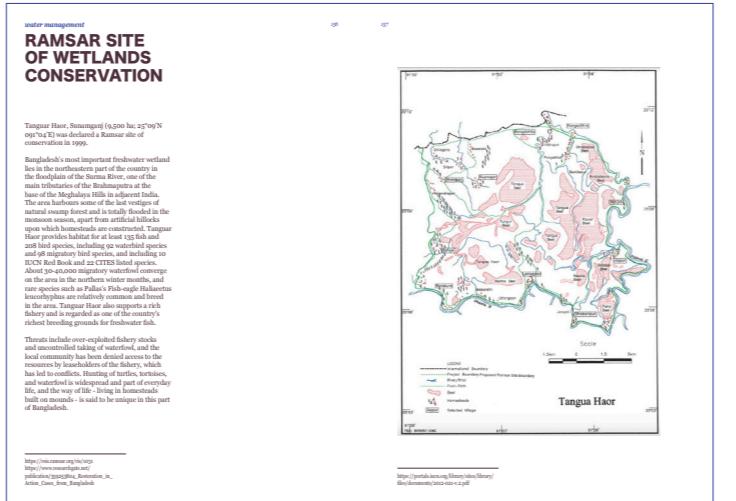
thematic binder_income diversification_women's empowerment through bamboo production



temporal

use the patchwork of paddyfields as a base for income diversification, adapting to external disruptions

thematic binder_water management_ Ramsar site of wetlands conservation



managerial and ecological

protect the natural wetlands, improving diversity and thereby managing flood risks

1:5000

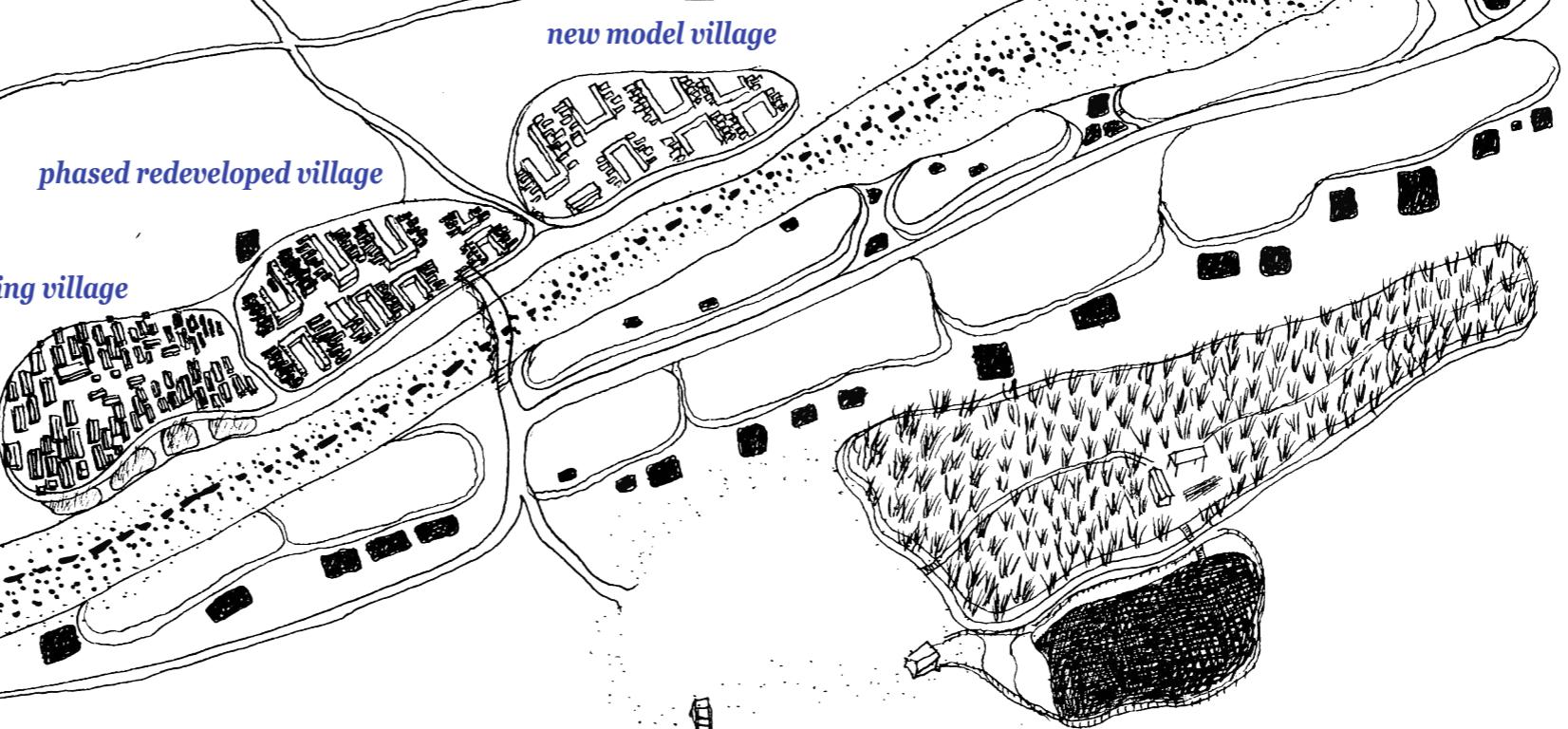
TERRITORY MAP



0 50 150 300m

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TERRITORY MAP



0 50 150 300m

forests

natural wetlands

bamboo plantation

khola

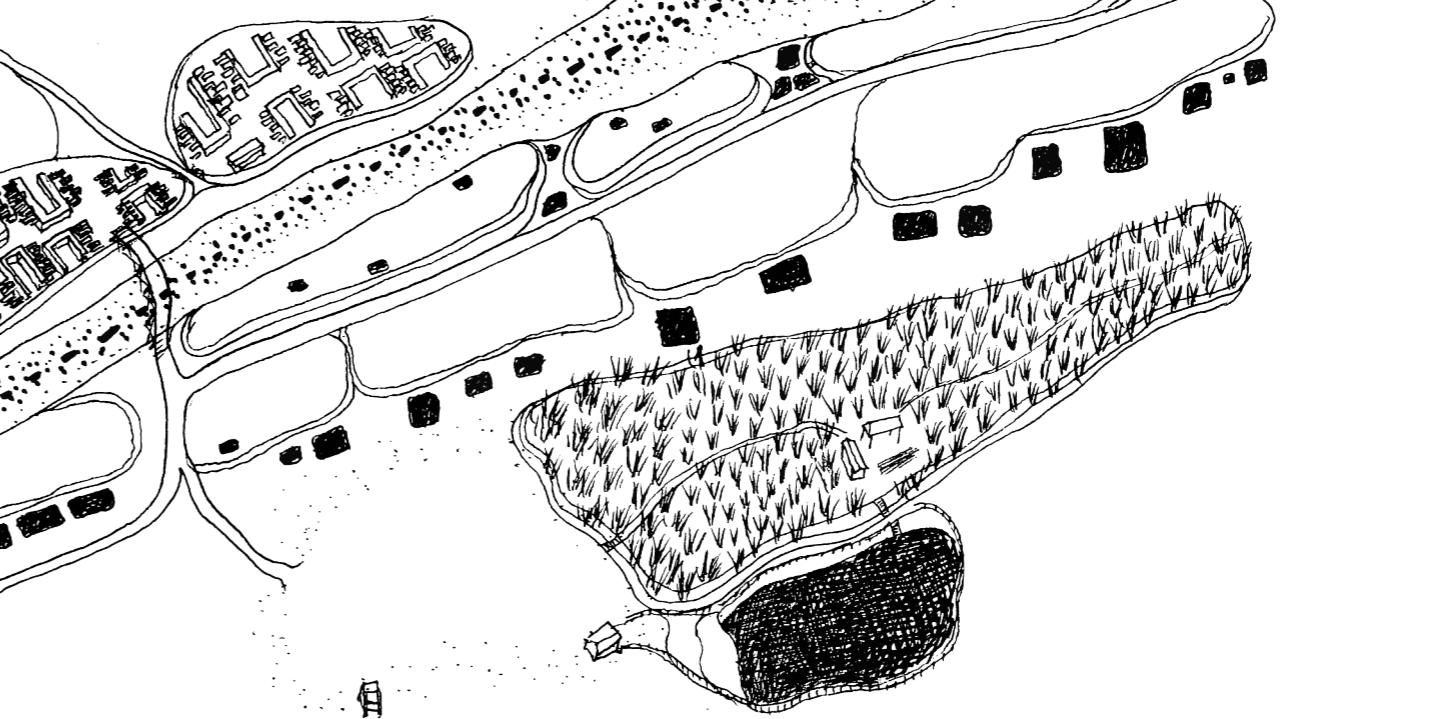
duck pond and shed

storm shelter

paddyfields

main road

secondary walkways



1:5000

TERRITORY MAP



0 50 150 300m

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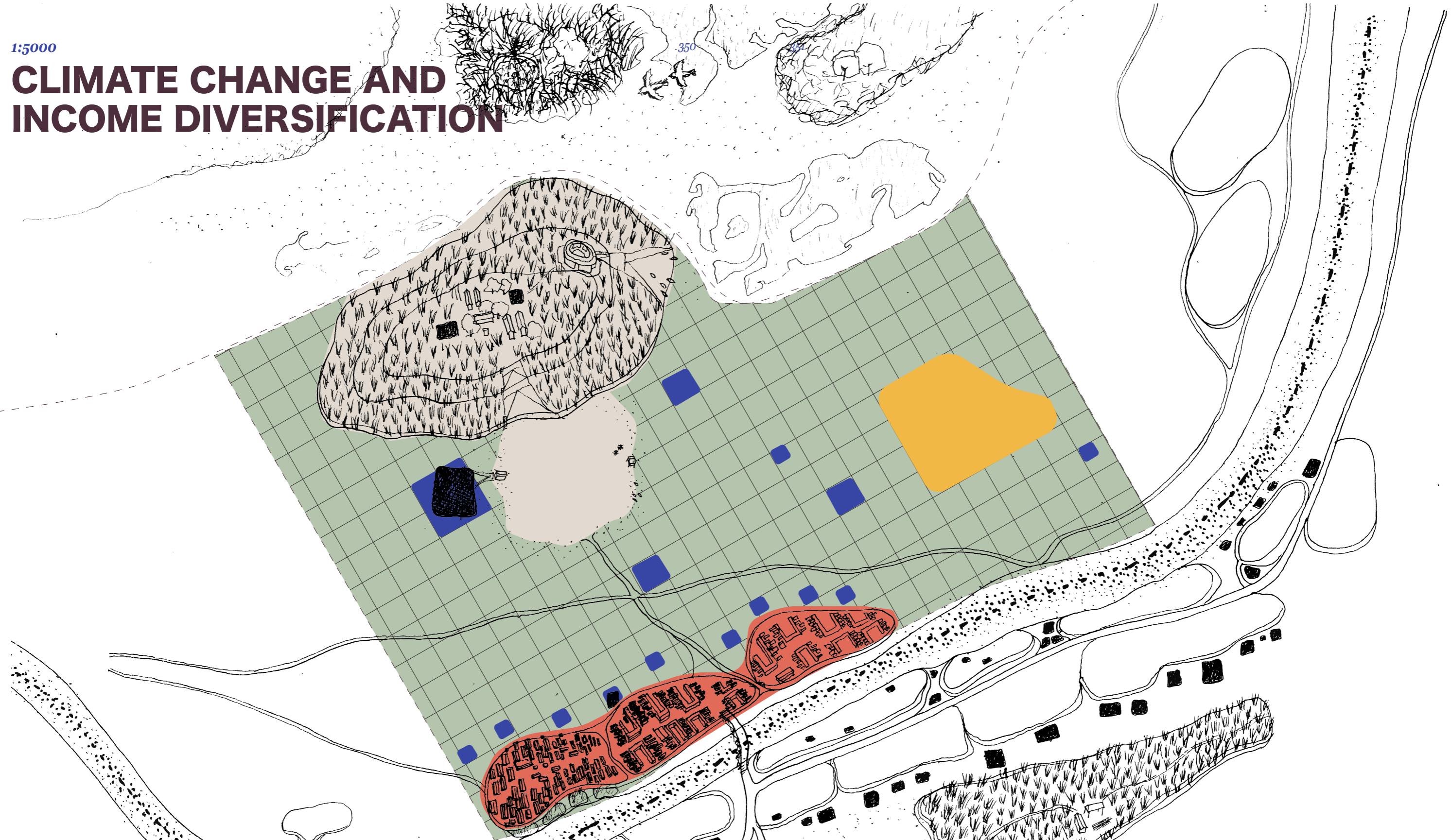
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CLIMATE CHANGE AND INCOME DIVERSIFICATION



Space



Paddyfields



Villages



Ponds



Grazing land



Bamboo plantation and hub

Income source

crops

shops/small businesses, local contracting

fish, duck

cow, chicken, sheep, duck, goat, cheese, silage

prefab panels, bamboo equipment

territory



territory: working at the khola, looking back at the village.



imagining an alternate
feminist future to
increase women's
access to resources

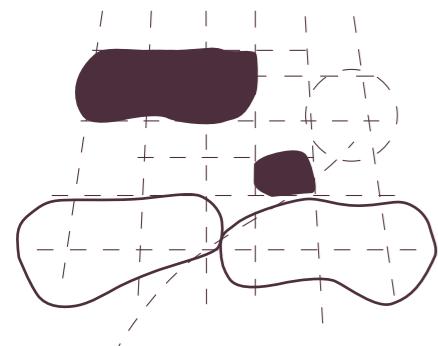
SUSTAINABILITY

THE FEMINIST SYSTEM

housing for the women of haors



Housing for the Women of Haors
the feminist system



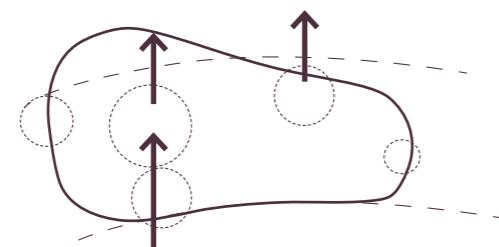
TERRITORY

Nodes to access wider territory

use the existing networks of Khola and secondary walkways to create nodes for social and economic activity

use the patchwork of paddyfields as a base for income diversification, adapting to external disruptions

protect the natural wetlands, improving diversity and thereby managing flood risks



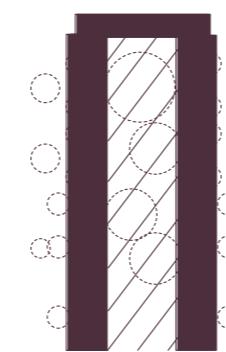
VILLAGE

A responsive system to maximise access for women

increase connectivity to share amenities between nearby villages

shape the village along the river, creating maximum access to both the river of one side and the paddyfields on the other.

create a hierarchy within public space, responding to managerial levels within the village



CLUSTER

Community action groups: safeguarding the collective and the individual

allocate space for women to generate income within the collective cluster and the individual dwellings

safeguard a communal courtyard for women to work in a safe space

create clusters which have clear demarcations for maintenance and ownership, and group finance possibilities



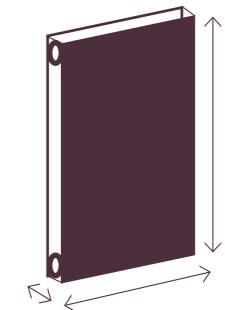
DWELLING

Seeds for women

contrast between front and back | live and work zone | individual and collective | bamboo and earth | ephemeral and monumental | frame structure and load-bearing structure

women's priorities during floods translated into plinth heights for different spatial zones

the collective and individual are delineated clearly, so it is easy to implement cluster groups and infrastructural systems



DETAILS

Shearing layers for women

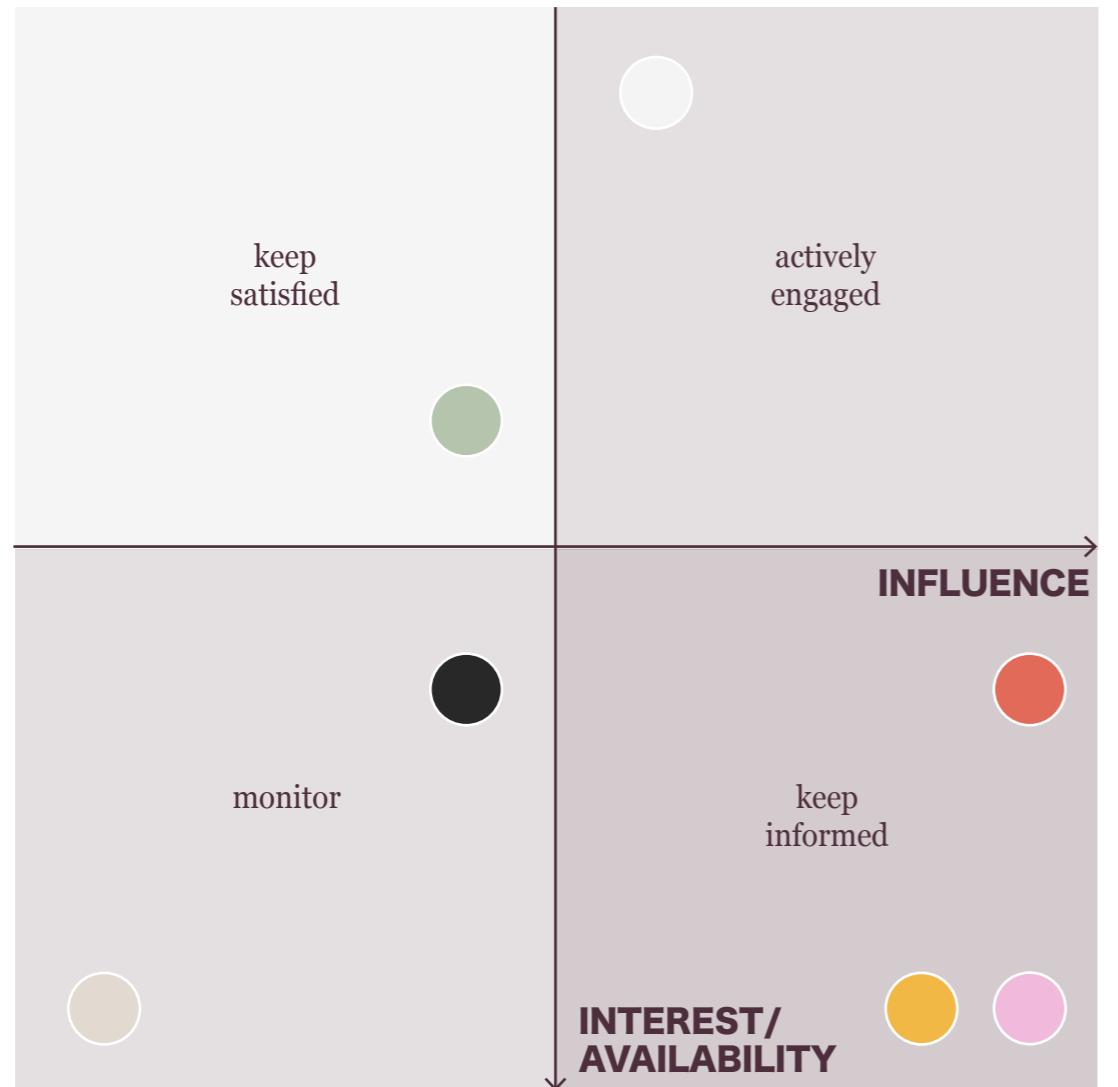
ensure women have access to materials and construction by using a grid (a scale) centred around women

reduce time women spend in building maintenance

close loops as much as possible to allow circularity of construction

MANAGERIAL STRATEGY

STAKEHOLDER ANALYSIS



- Government
- CLT
- Specialists
- Architect

- NGOs
- Residents
- Microfinance bank
- Private investors

GOVERNMENT

Since the Haors region is extremely climate vulnerable, and precautionary measures such as river dredging and embankment maintenance require government funding and management, the government has high influence on the quality of life in the Haors. However, availability is low due to limited resources within the governmental body and the Haors not being highly prioritised.

COMMUNITY LAND TRUST (CLT)

The CLT is a non-profit corporation that holds land on behalf of the territory's communities. This includes agricultural land, a number of village mounds and communal land for social good. 1 leader is appointed from each cluster of dwellings to be part of the CLT board, and the leaders oversee their respective clusters and villages, and the collective territory. The CLT therefore has high interest and high influence.

SPECIALISTS

A few local contractors will be trained and supervise construction within the villages. Additionally, there are bamboo specialists that cultivate and produce bamboo products for the construction of dwellings. Earth plinth specialists also can be hired by residents. These specialists have high interest as it is their main source of income, and they are pertinent to construction.

ARCHITECT

The architect is the designer of the systems - from the dwelling units' grid to the structure of public space, and from the circularity of water and materials to enhancing opportunities for collective action of women.

NON-GOVERNMENTAL ORGANISATIONS (NGO)

Some NGOs like Market 4 Chars (M4C) create market linkages that boost income generation opportunities, especially for women. There are also many educational NGOs that upskill and empower women. Due to funding limitations, their availability is considered low.

RESIDENTS

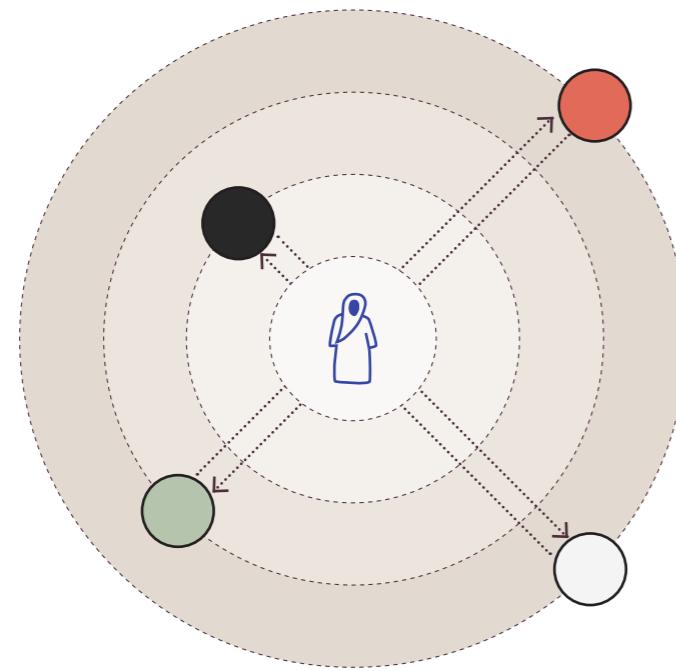
The individual residents have high interest concerning their dwellings and livelihood opportunities. However, as individuals or even households, their influence is low. Through participatory processes, co-production of space is enabled and the residents gain influence over their environment.

MICROFINANCE BANK

The microfinance bank is a community development bank that provides small loans without requiring collateral. One example is the Grameen bank. Women are the main target group, and the loans enable women to start small businesses individually or in groups through solidarity lending. As interest rates are higher than government loans, they should not be considered for construction.

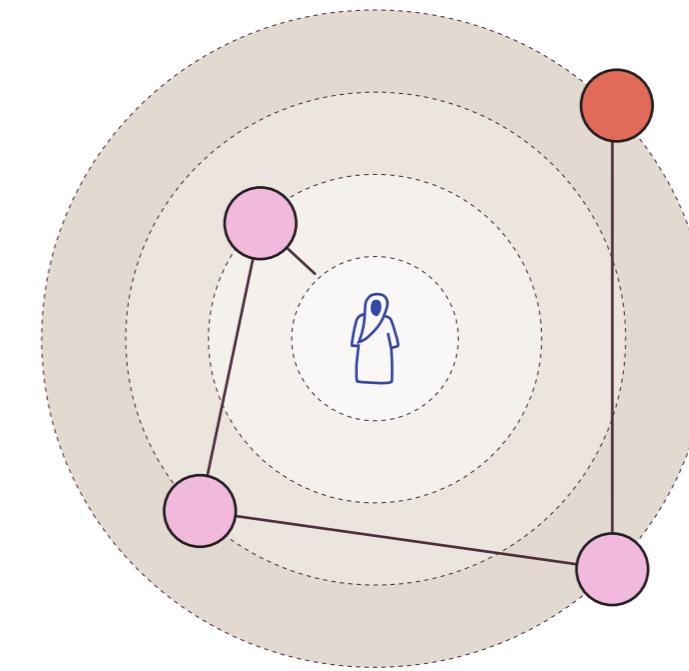
PRIVATE INVESTORS

Some private investors could include renewable energy investors who want to tap into the high potential for solar power generation within the Haors, or bamboo wholesalers who want to use the land and labour available in the Haors. These investors are rare but will have considerable influence in the region.



ECONOMIC SUSTAINABILITY

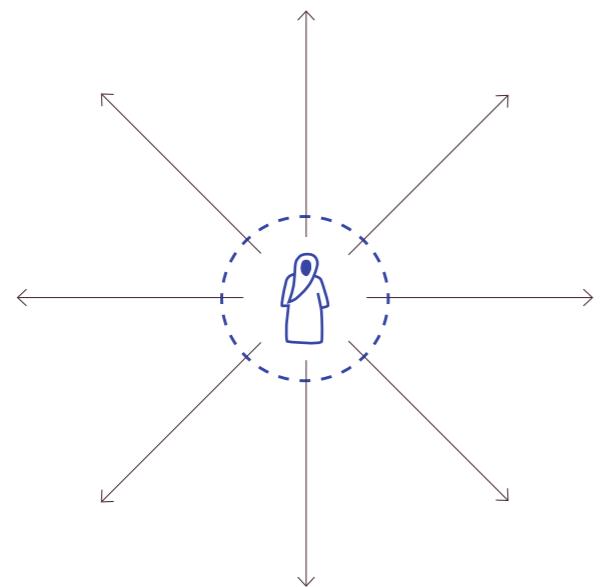
- 1 Many streams of income generation, for climate resilience
- 2 Many scales of possibility for collective action, for income generation in groups
- 3 Income generation > mortgages (no losses or even profit-making for bodies that invest/provide loans)



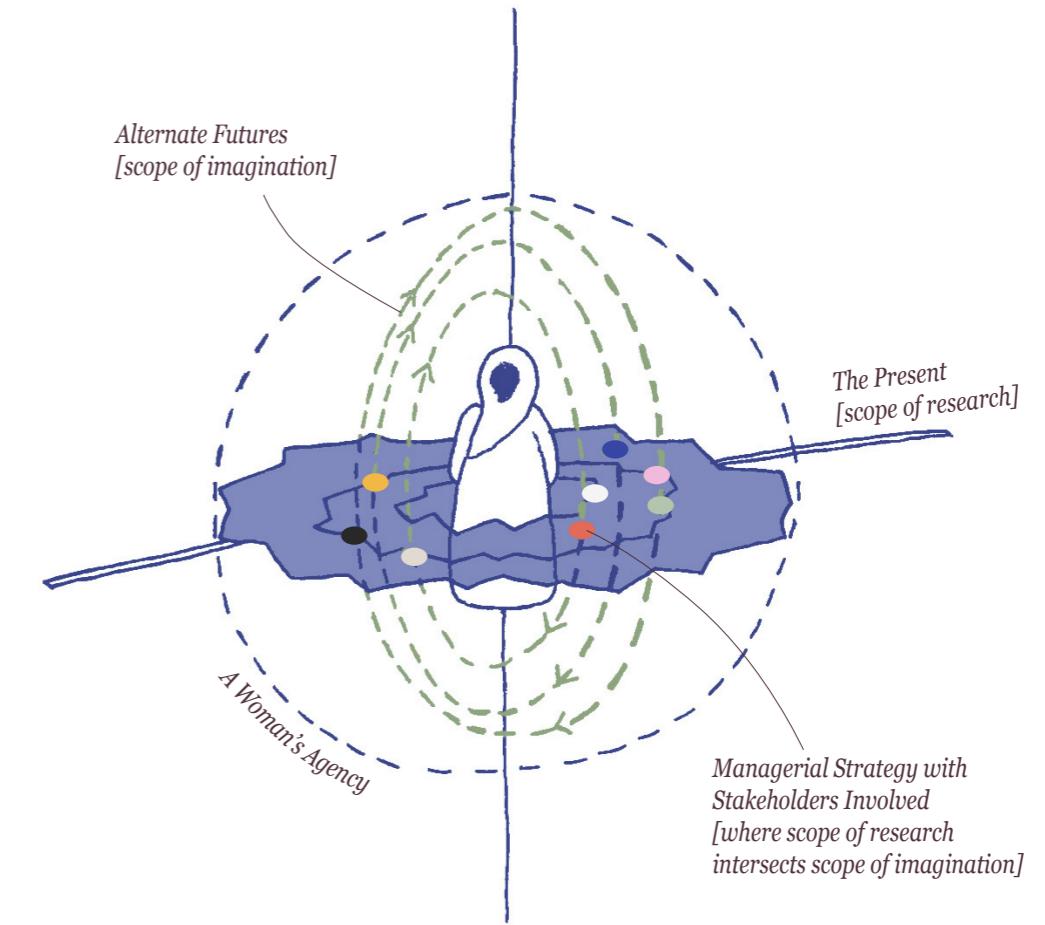
SOCIAL SUSTAINABILITY

- 1 Residents take ownership due to security of tenure of individual and collective spaces
- 2 Shared facilities are necessary and hence maintained
- 3 There is an overseeing and safeguarding board and external body

PRINCIPLES

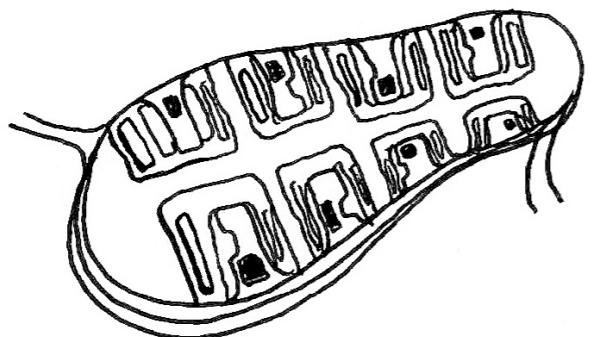


**INCREASING OPPORTUNITIES
FOR COLLECTIVE ACTION**



**EXPANDING
A WOMAN'S SPHERE OF AGENCY
IN THE HAORS**

CONSTRUCTION PHASING

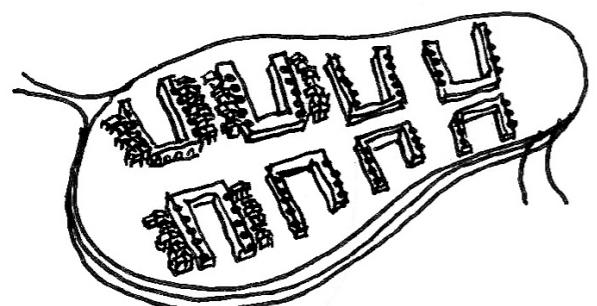


PHASE 1

GROUNDWORK

Government contractors and local villagers employed by the government will shape the village mound, and connect the mound to the existing network (main road, khola, other villages) via secondary roads

Government contractors and local villagers employed by the government will put in brick foundations and (semi-)bury the biogesters and rainwater harvesting tanks and all underground pipes



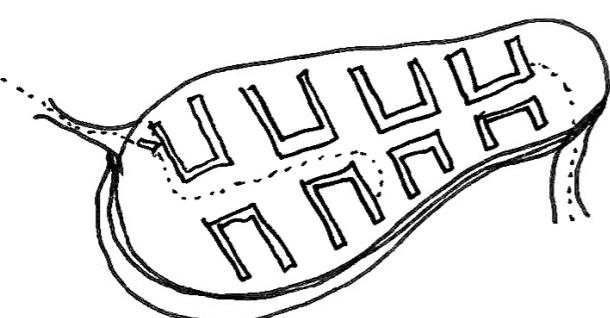
PHASE 2

PRIMARY STRUCTURE

Cluster households will build the communal vaults of the clusters

Individual households will build the bamboo structural frame of their plots and the thatch roof, following the grid of the brick piers, with help from **local contractors**

Village households will build the amenities



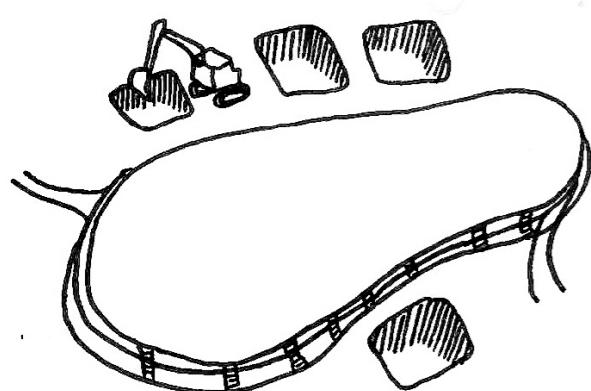
PHASE 3

DWELLING INFILLS AND FIT-OUT

Individual households will purchase prefab panels made by **specialists** in the bamboo production hubs and use the panels to create walls and floors.

Individual households will connect all services for electricity, gas and water

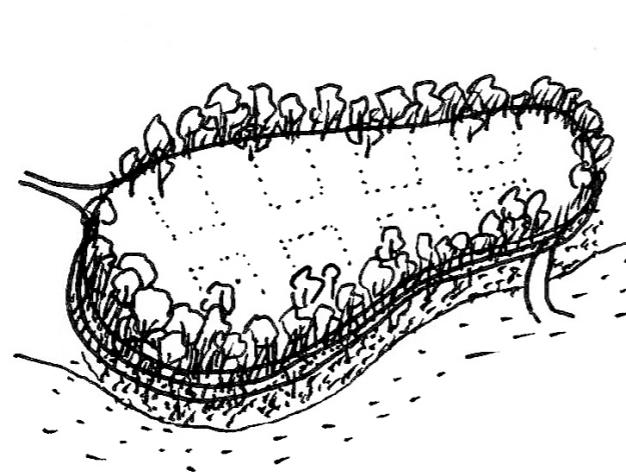
PHASE 1: GROUNDWORK



YEAR 1 DRY SEASON

SEDIMENT + CONNECT MOUNDS

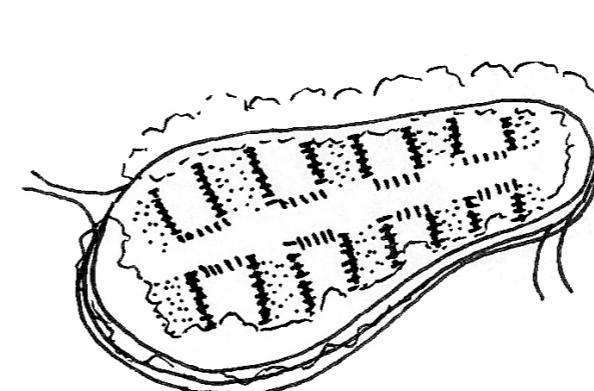
Designated paddyfields get sedimented to create village mounds. Existing networks of main roads and secondary walkways are extended or adapted to connect the new mound, enabling access of machinery and equipment to the site. Large amounts of earth are dug up from nearby ponds or rivers using excavators and trained labourers man the machinery.



YEAR 1 DRY SEASON

SHAPE MOUND

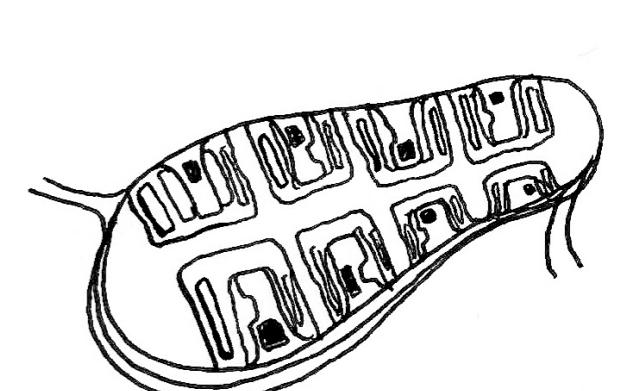
The earth is compacted and rough dimensions of the village are achieved, then the urban plan of the village is marked out on the site, demarcating the clusters. Bamboo, Hijol trees, Vetiver grass and reed beds are planted to strengthen the embankments.



YEAR 1 WET SEASON

BRICK FOUNDATIONS, TANKS AND UNDERGROUND PIPES

Following the cluster plan and dwelling plans, the grids for foundations are marked on site. Governmental contractors bring in the bricks for foundations, and manufacturers bring in the biodigesters and the rainwater tanks. Underground pipes for tank water and greywater are laid.

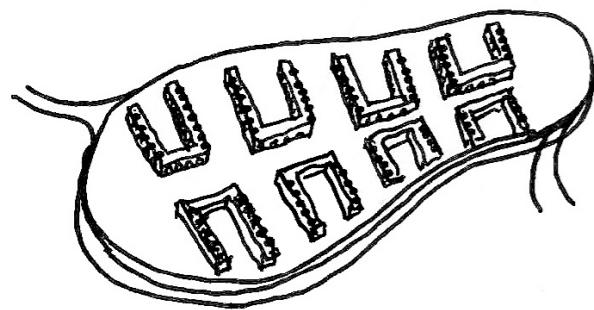


YEAR 2 DRY SEASON

PLINTH AND COMMUNAL POND

The plinth can then be laid, semi-burying the tanks. Governmental contractors assist with excavating and transporting earth for the plinth, as well as compacting it, in the process creating a communal pond for each cluster. Cluster households then cap the shaped plinth with lime-stabilised earth. This will take roughly 12 weeks to cure.

PHASE 2: PRIMARY STRUCTURE



YEAR 2 DRY SEASON

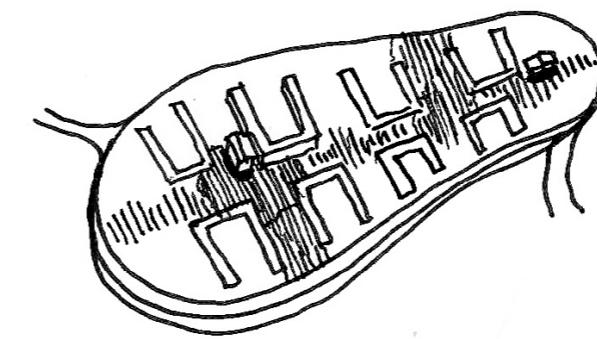
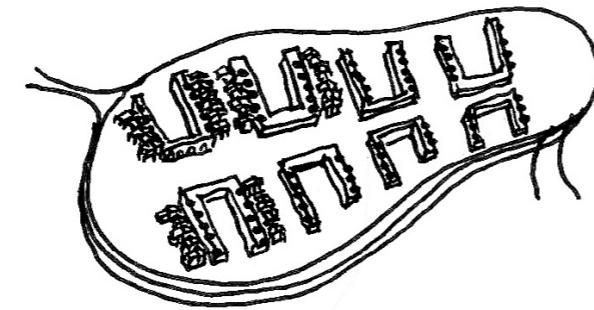
COMMUNAL SPINE

Cluster households will use wood centerings to construct the brick vaults. This will standardise all the vaults throughout the clusters. The brick floor is then constructed, followed by the bamboo structures above, which houses the toilet and shower for each dwelling.

YEAR 2 DRY SEASON

BAMBOO DWELLINGS

Each household will build the primary structure of their living zones according to their needs and financial means. The works are supervised and the thatch roof is completed with the help of local contractors.

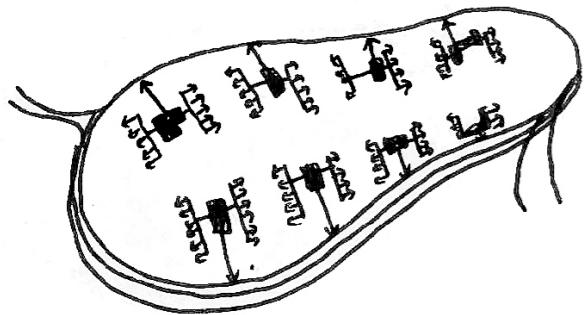


YEAR 2 DRY SEASON

AMENITIES

The village households will construct the amenities of the village. The thatch roof is completed with the help of local contractors.

PHASE 3: DWELLING INFILLS AND FIT-OUT



YEAR 2 WET SEASON

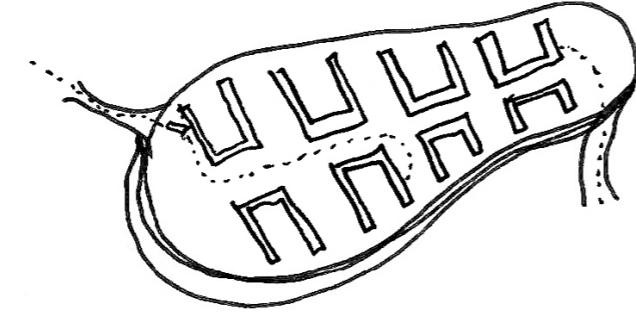
BIODIGESTER AND TANKS RUNNING

Cow dung mixed with water is fed into the biodigester to start the process. Biogas is generated for cooking with biogas stoves. Water is pumped from the communal pond into the rainwater tanks of the dwellings, supplying showers, toilets and sinks.

DRY SEASON

WALL AND FLOOR PANELS

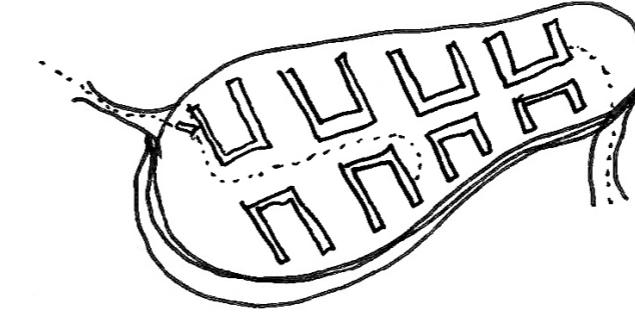
Pre-fabricated bamboo panels can be bought from the bamboo production hubs located at the Kholas. These are connected to villages via secondary roads, allowing women to easily access them. Households determine which types of panels they require based on the orientation of each wall, optimising climate design.



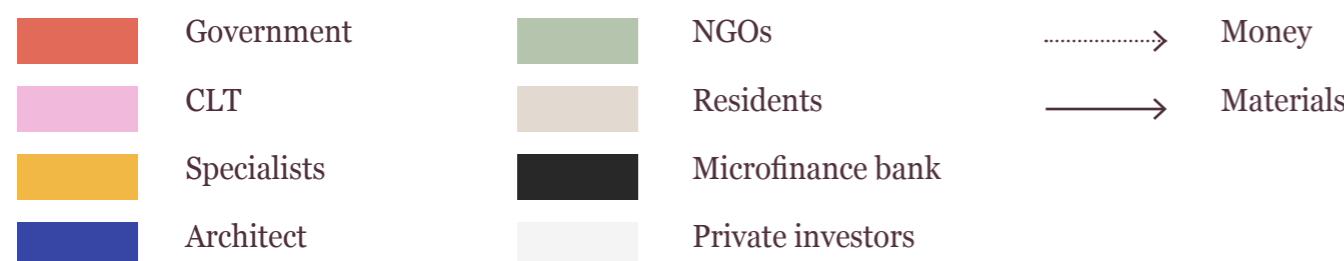
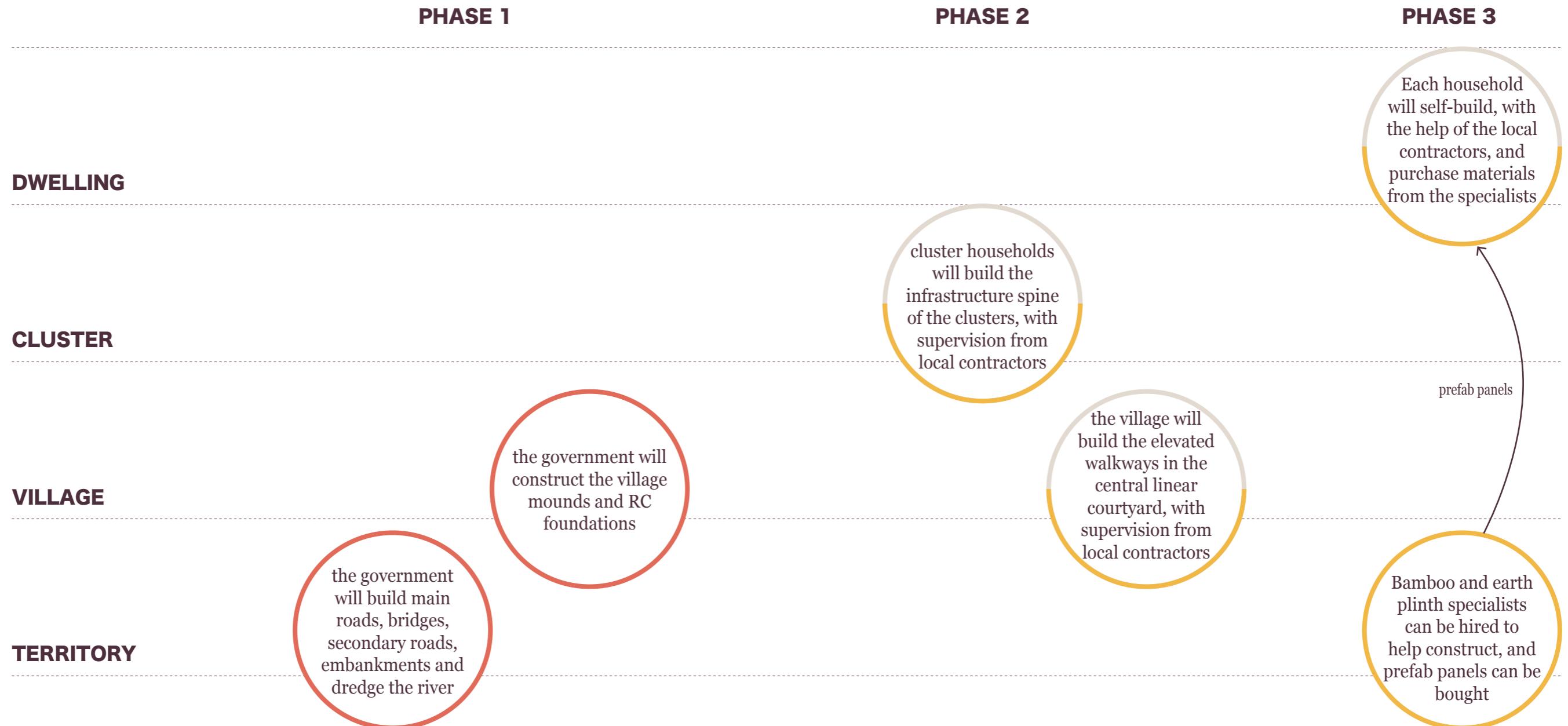
YEAR 2 WET SEASON

FURNITURE

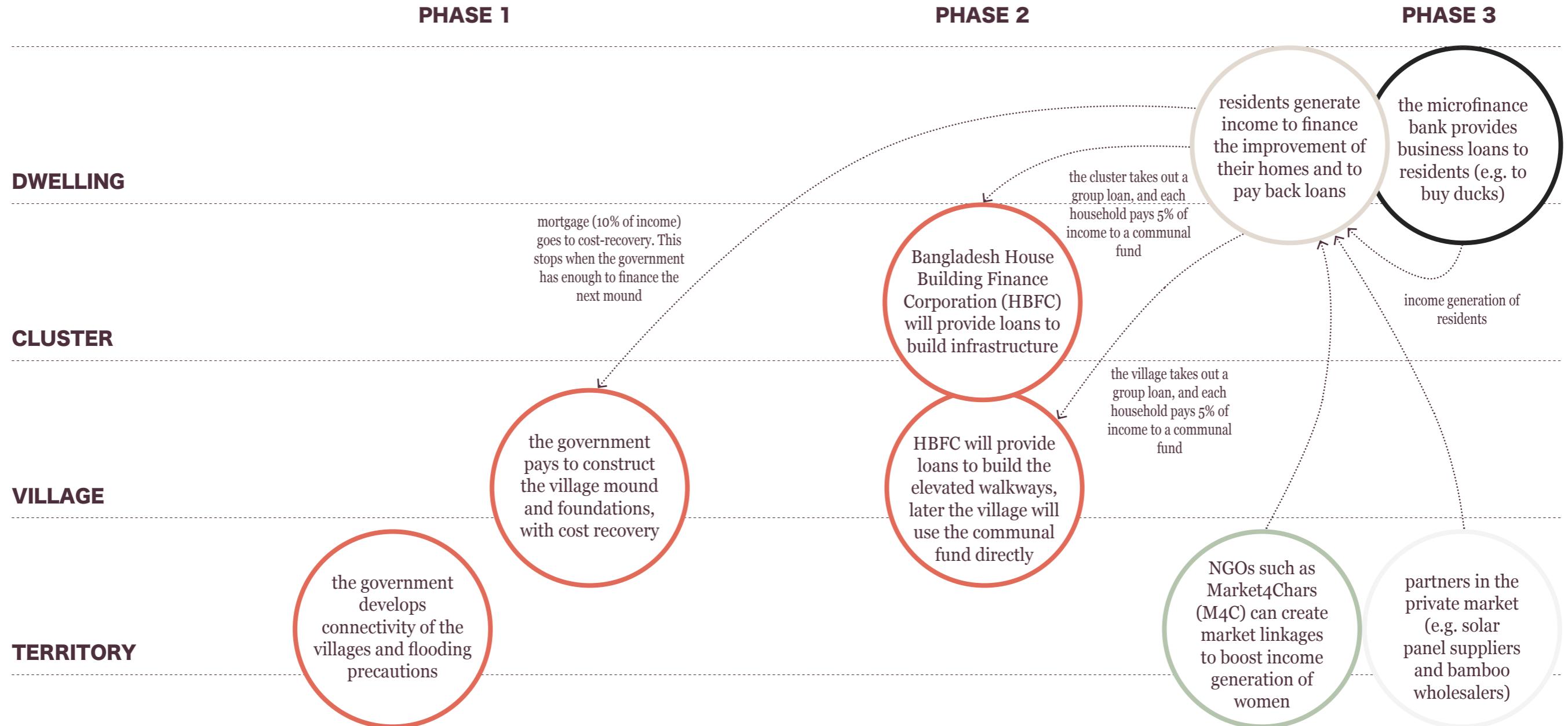
Furniture can be bought from bamboo craftswomen and craftsmen, selling in the village shops or in the local bazars. Bamboo can also be bought and households construct the furniture themselves.



ECONOMIC SUSTAINABILITY: WHO BUILDS?



ECONOMIC SUSTAINABILITY: WHO PAYS?



Government

CLT

Specialists

Architect

NGOs

Residents

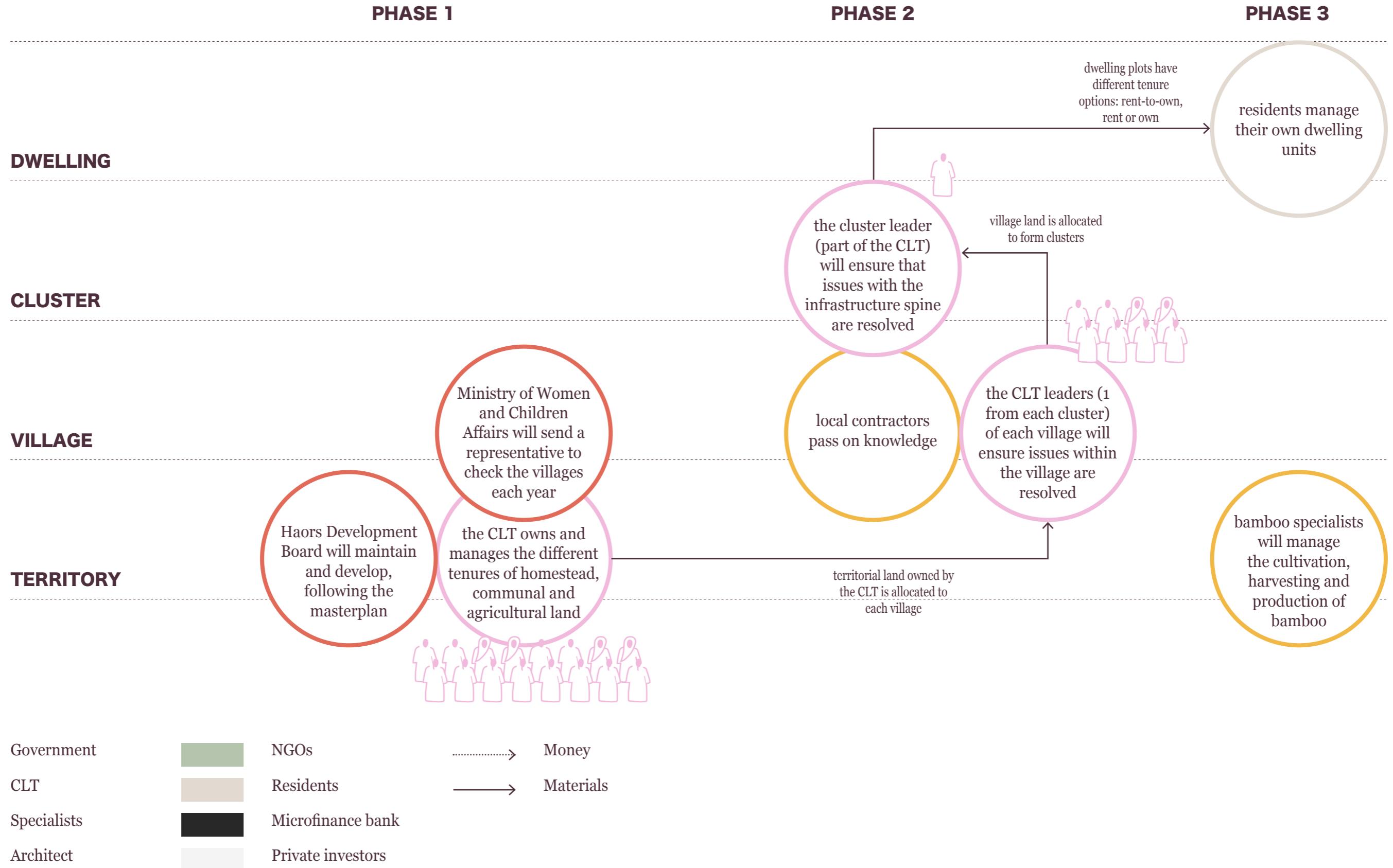
Microfinance bank

Private investors

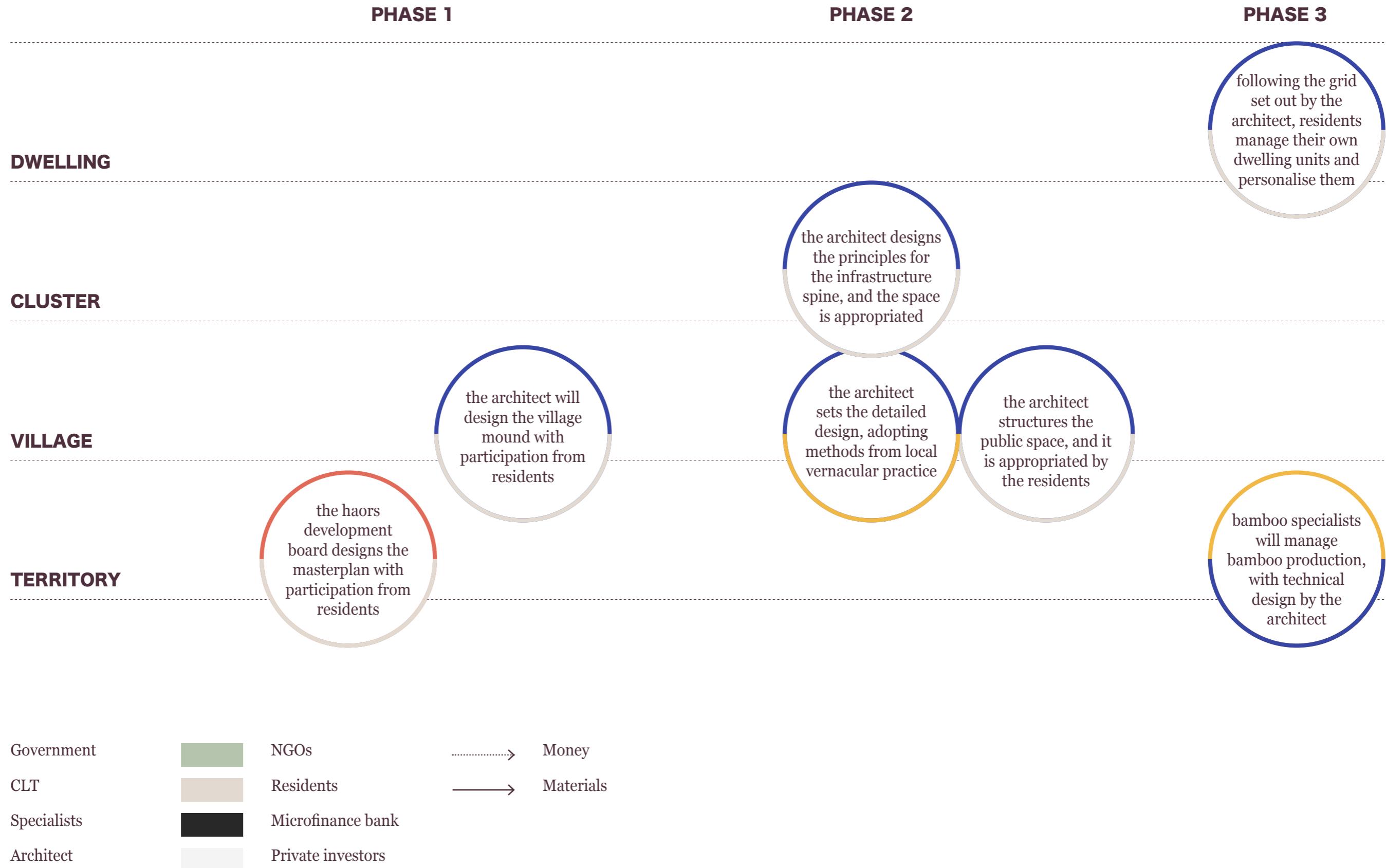
Money

Materials

SOCIAL SUSTAINABILITY: WHO MANAGES?



SOCIAL SUSTAINABILITY: WHO DESIGNS?



COSTING ESTIMATION

MATERIAL COSTS

12tk/brick ¹

250tk/50kg bag of cement

each truckload (5m³) of earth = 500tk ²

ESTIMATED COST OF BRICK

957 brick shear walls x 2 = 1914

322 brick piers x 6 = 1932

strap footing = 741

vaults and brick floor = 4009

No. of bricks = 8596

= **103,000tk**

ESTIMATED COST OF PLINTH

Plinth surface area to be capped 79m² x 0.03m thickness = 2.37m³

Volume of cement required = 0.12m³

Cement is 1440 kg/m³

No. of 50kg bags required = 3.5 bags = **875tk**

Volume of plinth = 49m³

10 truckloads of earth + 3 truckloads extra for wastage and compaction = **6,500tk**

ESTIMATED COST OF BAMBOO STRUCTURE ABOVE

Based on Khudi Bari of 64/100/144 sqft, which costs 400 USD, the two bamboo structures would cost roughly 450 USD = **52,000tk**

ESTIMATED COST OF BUILT-IN AMENITIES

Indian toilet = **210tk**

ATEC Biodigester = **38,000tk**

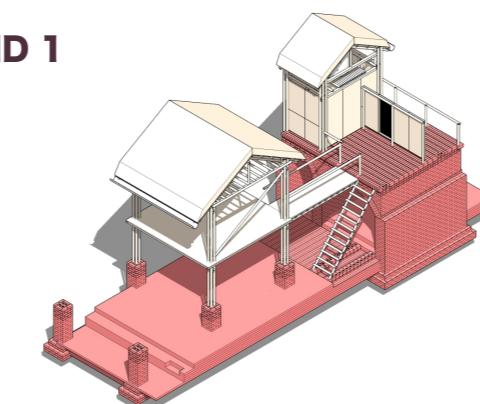
Gazi Rainwater tank = **22,000tk**

Shower = **1,200tk**

ESTIMATED COST OF SITE AND SERVICE AND 1 UPPER FLOOR

220,000tk

= **1865 euros**



HOUSING FOR THE WOMEN OF HAORS: AFFORDABILITY

average yearly wage

46,500 Taka [400 Euros]

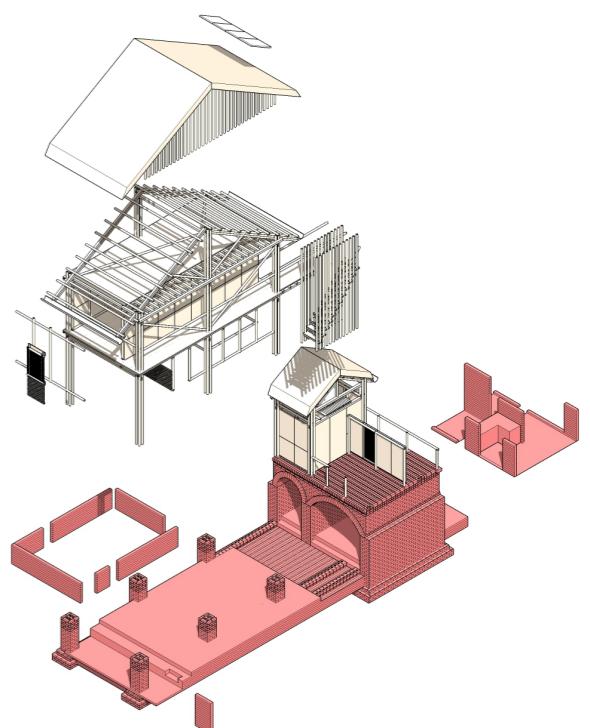
yearly household expenditure estimation

37,000 Taka [310 Euros]

maximum cost for affordability (5x yearly income as rule of thumb)

232,500 Taka [2000 Euros]

Estimated cost is within range of affordability based on average yearly wage.



SOCIO-SPATIAL DATA:

EXISTING

residents per HA
460 people per hectare

dwellings per HA
77 dwellings per hectare

coverage (GSI)
37%

building intensity (FSI)
0.37

village size
100 dwellings
598 people
1.3 hectares

dwelling types
tube house (GF)
courtyard house (GF)

average floor space area
5-9 sqm per room
3-4 people per room

amenities area
30 sqm (school)
+ 10 sqm (shops)
+ 50 sqm (mosque)
= 90 sqm

ratio of amenities per resident
0.15 sqm

ratio of open space per resident
13.7 sqm

PROPOSED

residents per HA
692 people per hectare

dwellings per HA
77 dwellings per hectare

coverage (GSI)
21%

building intensity (FSI)
0.57

village size
100 dwellings
900 people
1.3 hectares

dwelling types
type A (GF+1.5)
type B (GF+1.5)
type C (extended families, GF+1.5)

average floor space area
9 sqm per room
2-3 people per room

amenities area
81 sqm x 2 floors (1 school or 1 mosque and 1 clinic)
+ 90 sqm (shops)
= 360 sqm

ratio of amenities per resident
0.40 sqm

ratio of open space per resident
14.2 sqm

IMPACT

residents per HA
1.5 times more

dwellings per HA
retained existing density with access to large communal streets and courtyards

coverage (GSI)
0.6 times less

building intensity (FSI)
1.5 times more

village size
more people per village

dwelling types
all houses have access to basic services and communal spaces

average floor space area
increased floor space per person by min. 2.4 times

amenities area
4 times more

ratio of amenities per resident
2.6 times more

ratio of open space per resident
slight increase



imagining an alternate
feminist future to
increase women's
access to resources

**PROCESS AND
REFLECTION**

PROCESS TO P1'S INITIAL SKETCHES

POSITIONALITY

QUESTION: How did you choose to conduct research and design, and why?

First, by questioning my positionality. During the studio's weekly 'book club', I still clearly remember asking for the studio's interpretation of Caldeira's quote "to think with an accent". I wanted to dig deep, internally I maybe contested the use of "accent", and I needed everyone to collectively create a clear set of guidelines regarding what it means to design housing for a culture not your own. Safe to say, I did not find an answer for myself. Instead I chose to conduct research and design with an awareness that I am always in the picture and I will never have the clear-cut answers.

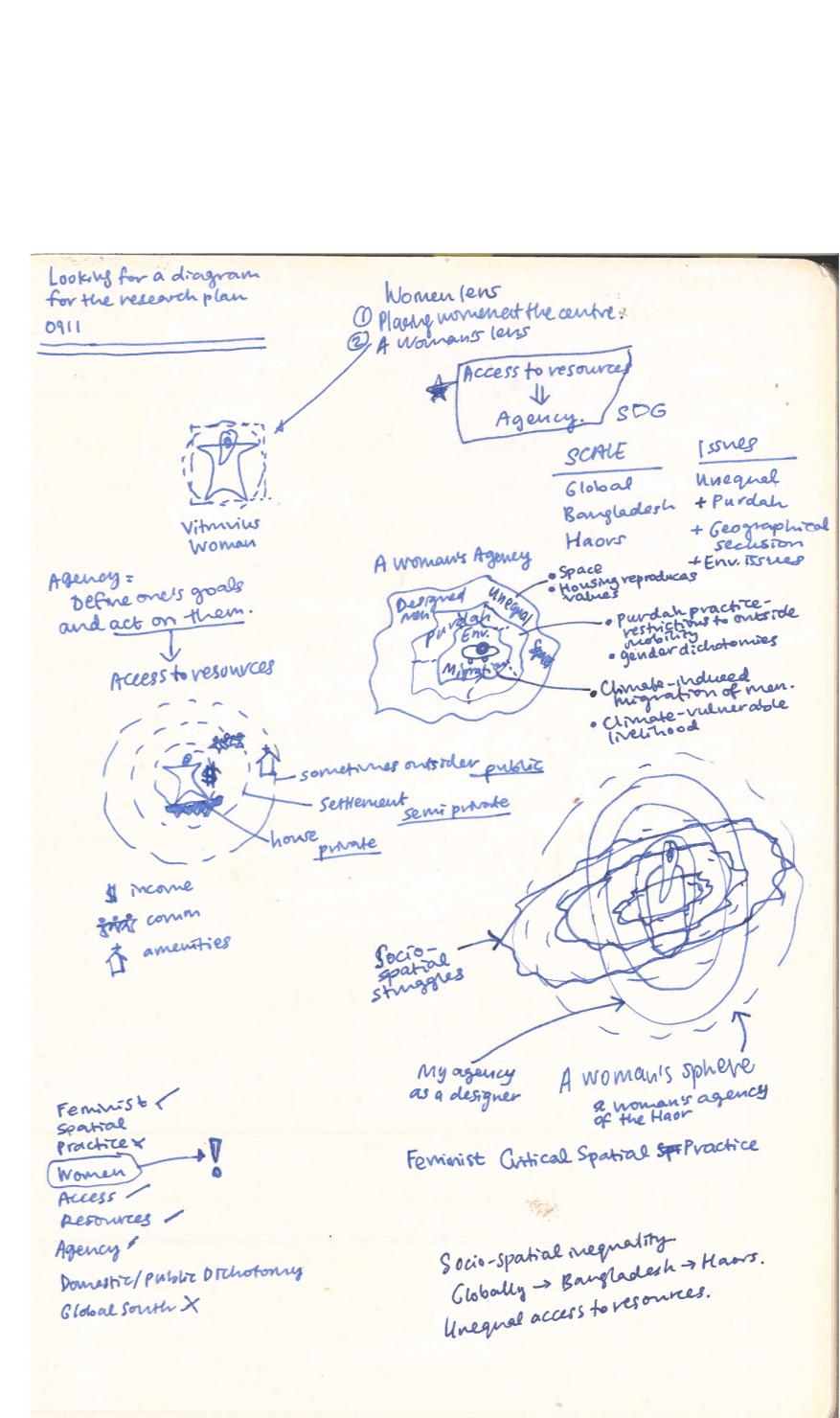
Secondly, by putting women of the Haors at the centre. I was looking to understand, and looking to visualise (my way of understanding) women's struggles in the Haors and the resulting impact. I saw socio-spatial inequalities in all scales, global to country-specific to Haor-specific, as eroding a woman's agency. With future studies and empowerment theories, and putting my agency as a designer within the diagram, the resulting diagram represented a framework in itself that was women centred.

Thirdly, by designing a mixed-mode methodology incorporating methods that together, could combine both qualitative and quantitative information to capture the realities and nuances of the issues and opportunities for women of the Haors. The research was organised in two groups- scalar research comprised of cataloguing and mapping, and thematic (trans-scalar) research comprised of case studies. The methods that feed into both include fieldwork and literature review. In a research-by-design process, with research and design feeding into each other, and the five methods starting and running through different periods, the approach would enable a dynamicity and an extremely holistic and non-linear process that would prevent the project from falling into the tendency of a singular, deterministic view of 'future'.

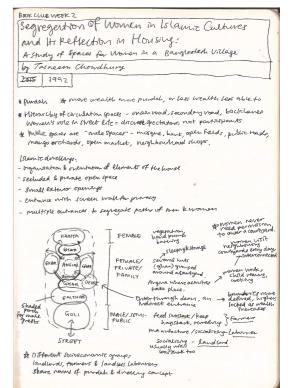
QUESTION: Did your approach work in the process to P1?

Of the five methods, three were carried out in this phase- fieldwork, literature review and case studies. Literature review and case studies were started before the trip to Bangladesh, and a combined studio research booklet was made. Although I expected to be confronted with some deviations from prior research during the fieldtrip, I did not expect to be so confused. With so much subjectivity and sensitivity around the topic of gender inequality, I began to question where to draw the line between religious/cultural practices and inequalities, and who should be able to determine that line.

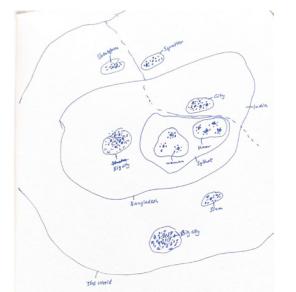
The numbers, figures and icons from prior research that were so figuratively black-and-white suddenly gained so much nuance. I realised that the nuances were not observable in a short span of time. Every household is different. Every woman is different. Therefore, mixed-mode research enabled me to develop a sense of the place and a sense of the issues faced by women, and to respond with 'intuitive' sketches, more responsive to the fuzziness of reality, to be presented at P1.



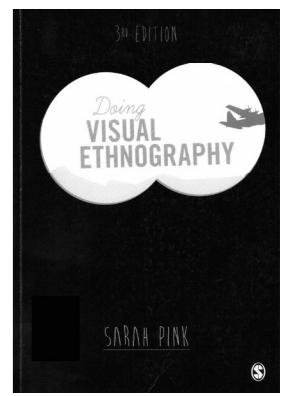
finding the diagram



book club notes



trying to position



a reading from MSc 2

CONTRIBUTION

QUESTION: What is the relation between your graduation project topic, your Architecture master's track, and your master's programme (MSc Architecture, Urbanism and Building Sciences)?

The focus of the Global Housing studio in Sylhet is the provision of adequate housing, situated in the complex phenomena surrounding migration. With mass climate-induced migration out of Sylhet, the studio explores how housing within a secondary city can reduce the negative impacts on both the origin and the destination of migration. Fundamental to this is designing socially, economically and environmentally sustainable housing systems in vulnerable ecosystems of Sylhet. 'Housing for the Women of Haors' aims to tackle this challenge and with an additional feminist lens.

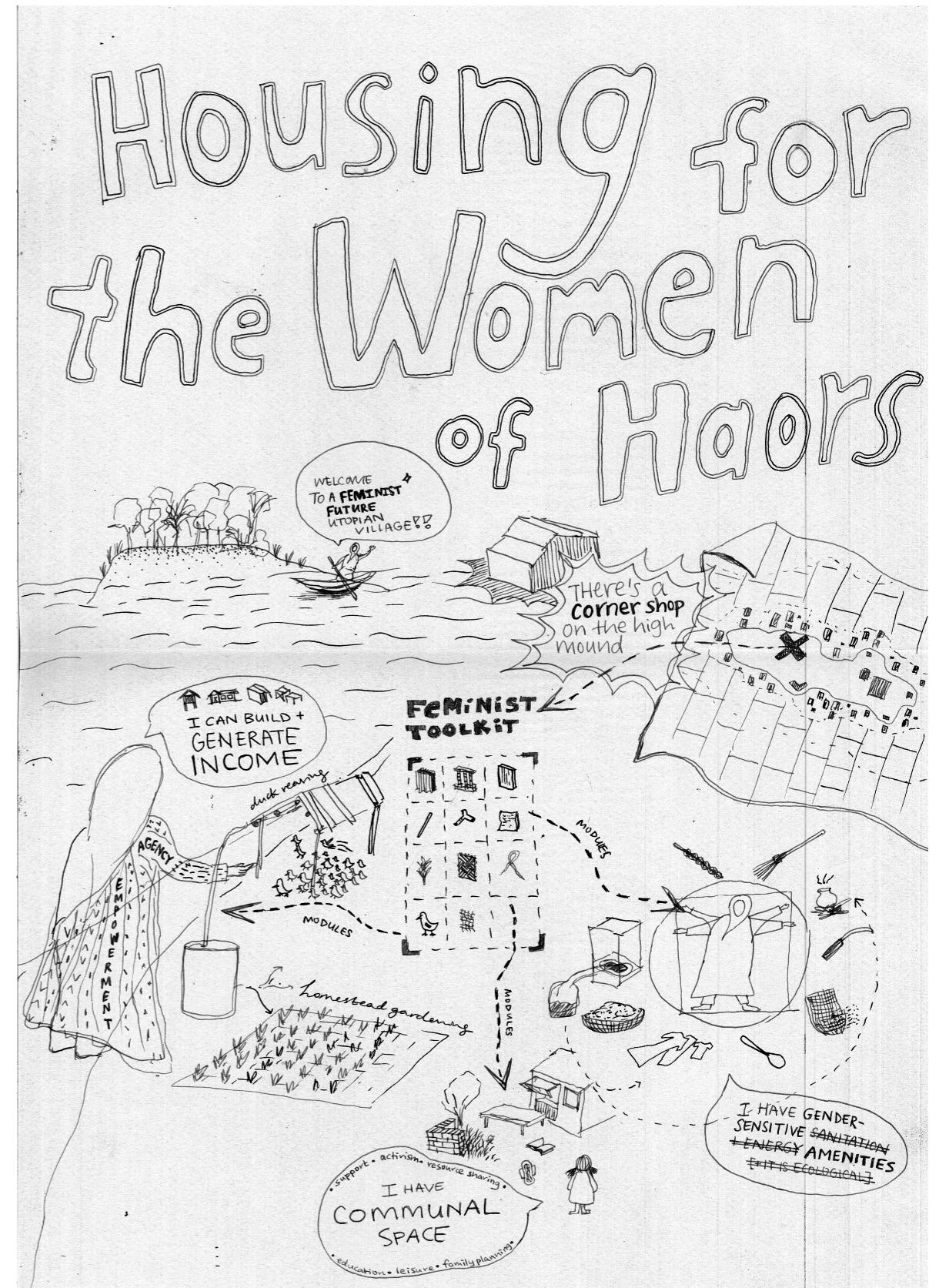
'Housing for the Women of Haors' is essentially about designing out socio-spatial inequalities against women in all scales and aspects of a settlement- from the dwelling unit, to the cluster, the village mound, and the larger positioning within the Haor territory, to the managerial strategy. The Architecture track will be a main means by which the design assignment is achieved, since building designs of housing and amenities are central to the theme of the studio. On the other hand, architecture involves not just the individual buildings, but the smaller building details, structural language, management and construction strategy, and wider integration into context. All scales and many other disciplines are crucial, hence all the tracks of the Master's programme- Architecture, Building Technology, Urban Design, Landscaping and Management- are all relevant to design housing for the women of Haors.

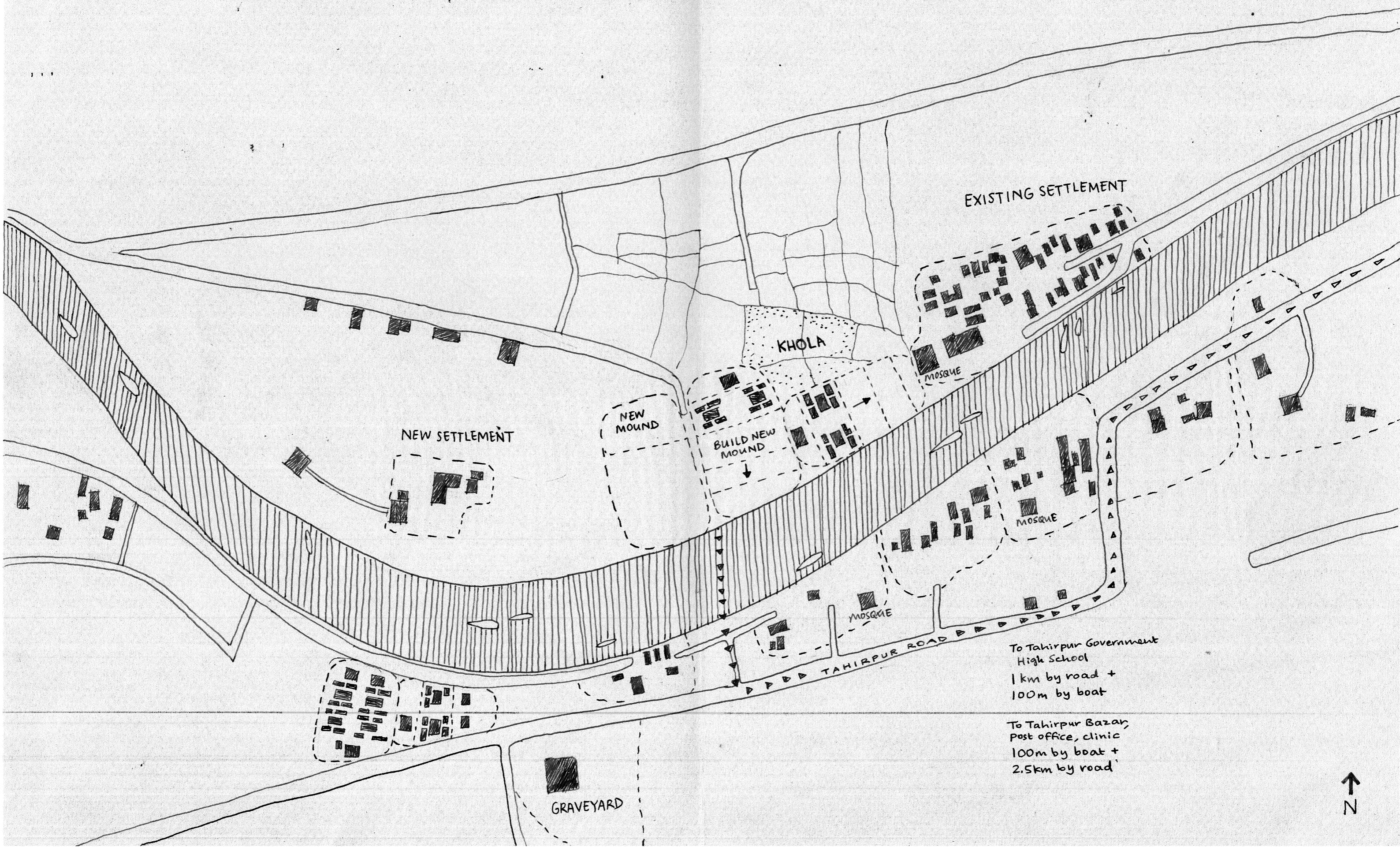
QUESTION: How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

My graduation work is an attempt to imagine an alternate feminist future, and in doing so, diverge from the reproduction of housing typologies that perpetuate socio-spatial inequalities against women of the Haors. It conducts research-by-design and the design outputs aim to be replicable throughout the Haor regions, and act as ideas that, as is the natural catalytic consequence of futures studies, opens up thinking away from a deterministic view of 'the' future.

It fills in a large gap in the knowledge base on socio-spatial inequalities women face in the unique Haor ecosystem. Moreover, the research will build upon existing social science knowledge on gender inequalities, and go beyond into an interdisciplinary approach across architectural design, urban planning and ecology.

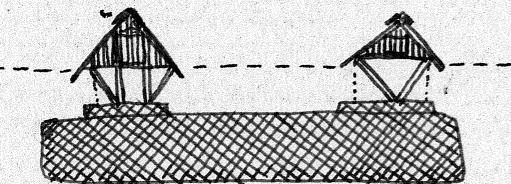
Lastly, since the issue of women's unequal access to resources transgresses through all scales and across borders, the research and design work 'Housing for the Women of Haors' will have implications beyond the Haor regions of Bangladesh.



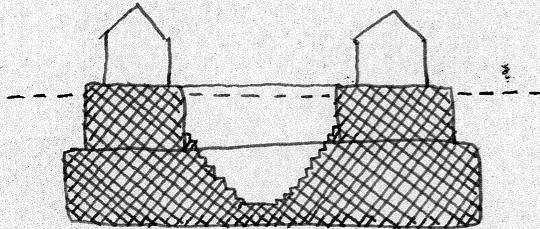


CASE STUDIES

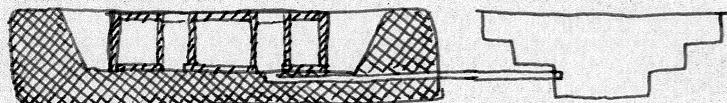
Khudi Bari, MTA, 2022
Tahirpur



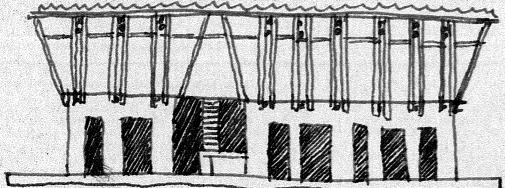
Raised Settlements, Kashif Chowdhury / URBANA, 2013, Jamuna River Network



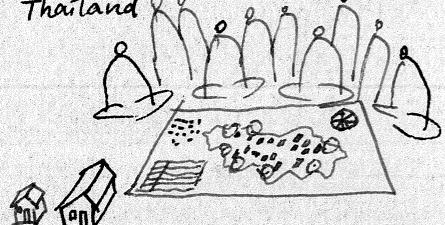
Friendship Centre, Kashif Chowdhury / URBANA, 2011, Gaibandha



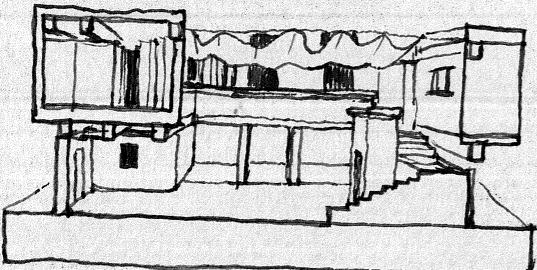
METI School, Anna Heringer, Eike Roswag, 2006
Rudrapur



Baan Mankong Rural Development Programme, Thailand
launched 2003



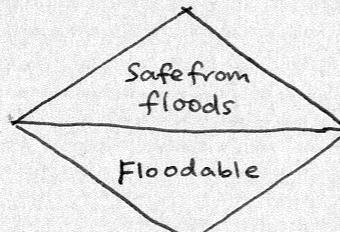
PREVI Housing, Christopher Alexander, 1970, Lima



FOCUS

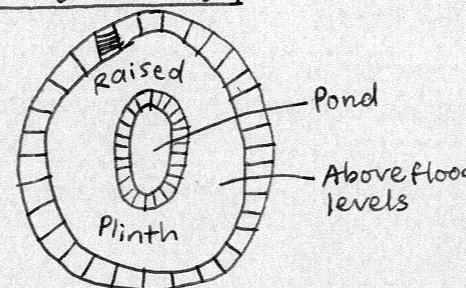
Khudi Bari, MTA, 2022
Tahirpur

Flooding Strategy



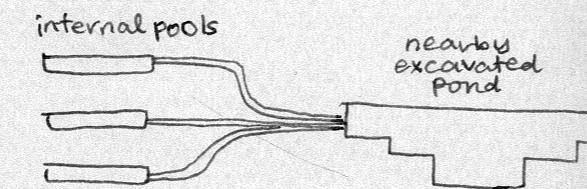
Raised Settlements, Kashif Chowdhury / URBANA, 2013, Jamuna River Network

Flooding Strategy



Friendship Centre, Kashif Chowdhury / URBANA, 2011, Gaibandha

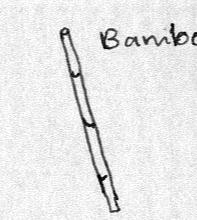
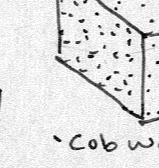
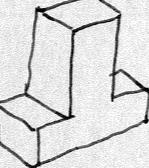
Flooding Strategy



METI School, Anna Heringer, Eike Roswag, 2006
Rudrapur

Materiality

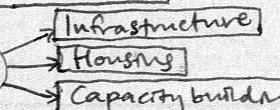
50 cm thick
brick



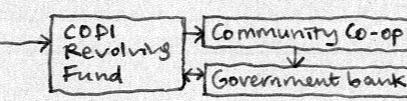
Baan Mankong Rural Development Programme, Thailand
launched 2003

Managerial Strategy

Subsidy



Leans



Pattern Language

FLOWERS ON THE
STREET

CONTEXT

Solution
Problem

PREVI Housing, Christopher Alexander, 1970, Lima

Pattern Language

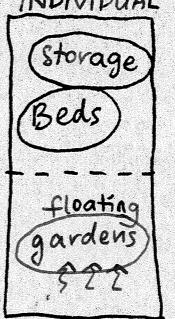
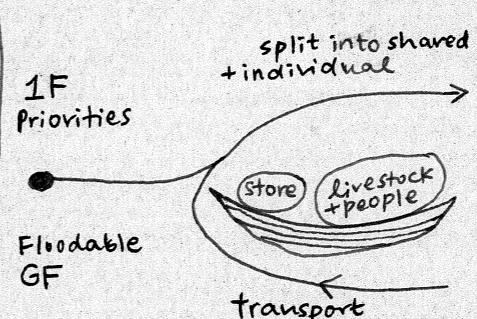
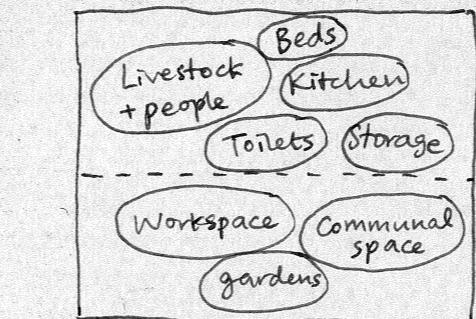
FLOWERS ON THE
STREET

CONTEXT

Solution
Problem

DESIGN DECISIONS

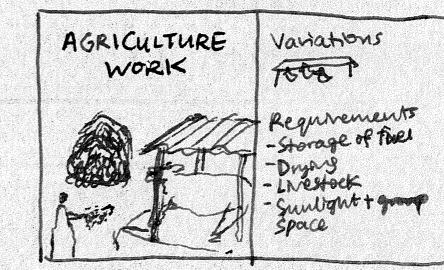
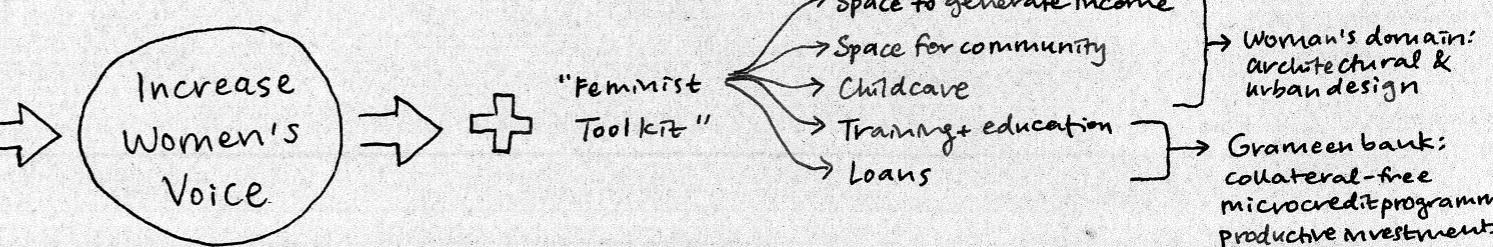
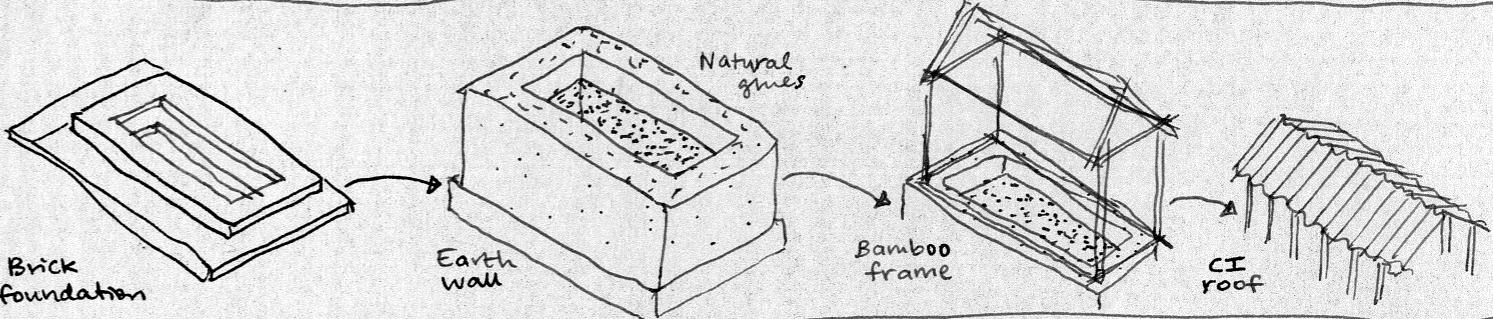
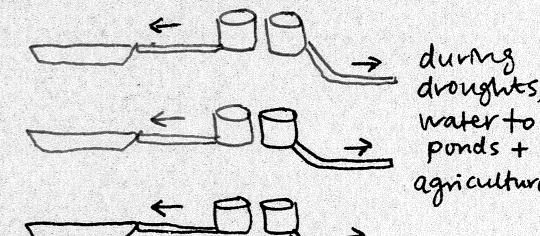
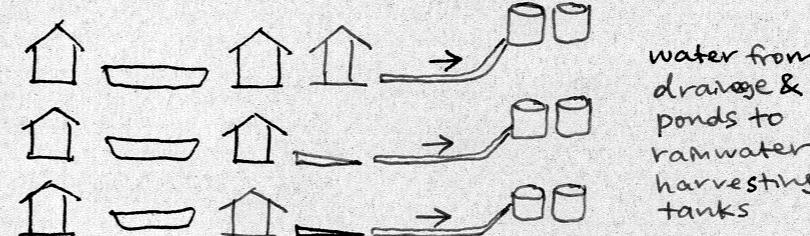
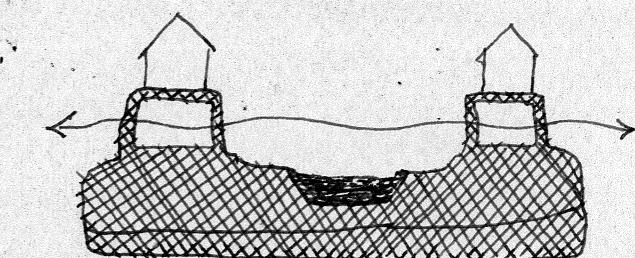
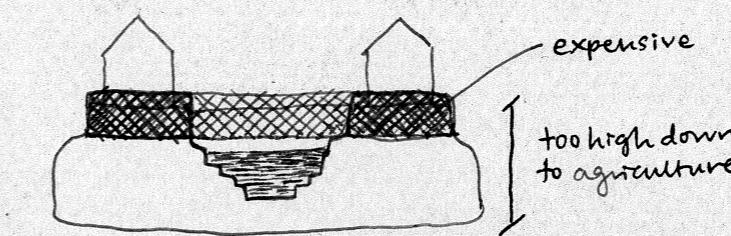
Raised Settlements, Kashif Chowdhury / URBANA, 2013, Jamuna River Network

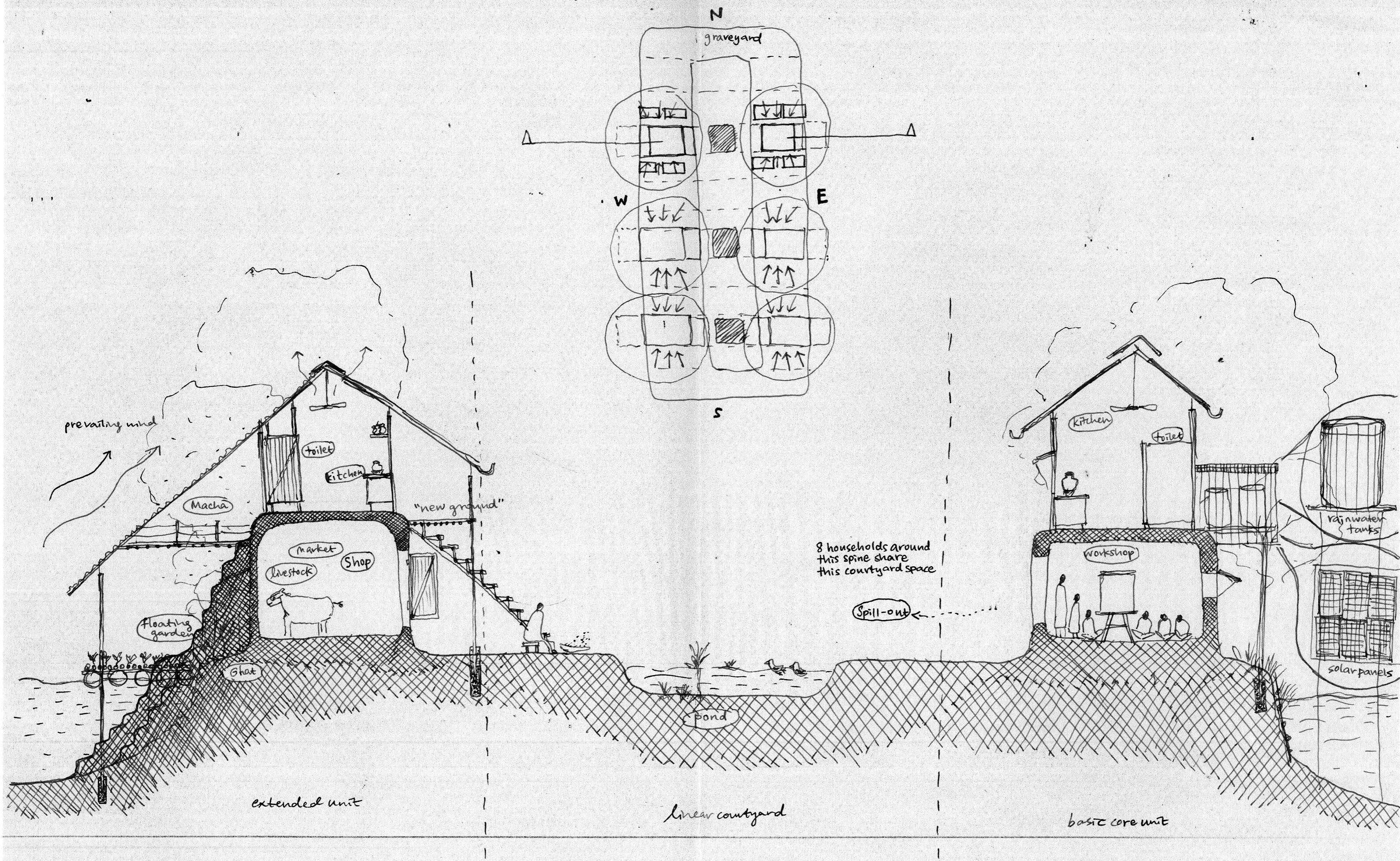


Friendship Centre, Kashif Chowdhury / URBANA, 2011, Gaibandha

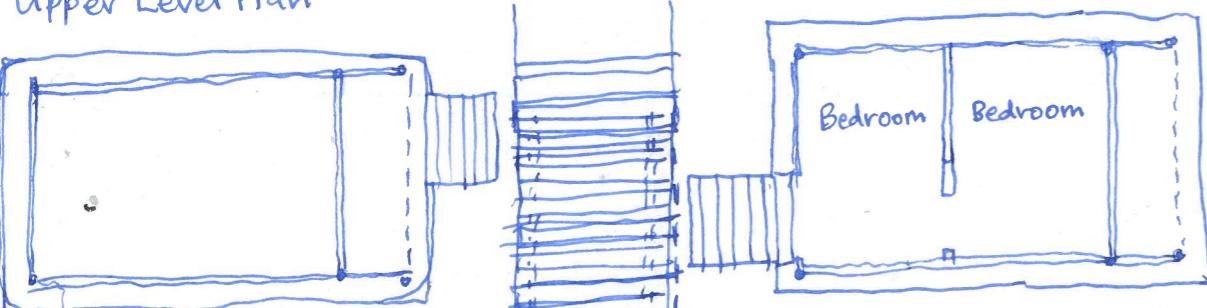
METI School, Anna Heringer, Eike Roswag, 2006
Rudrapur

PREVI Housing, Christopher Alexander, 1970, Lima





Upper Level Plan



Ghat



elevated walkway

drinking water
from filtered
rainwater

floating
gardens

Stored items
above flood
levels

fishing after

EXTREME

WET

PLOT

PLOT

Bamboo
walkway

PLOT

PLOT

rice, wheat,
flour, salt, oil,
spices, vegetables,
fuel

transport by
boat to higher
mound



Floating raft
ducks

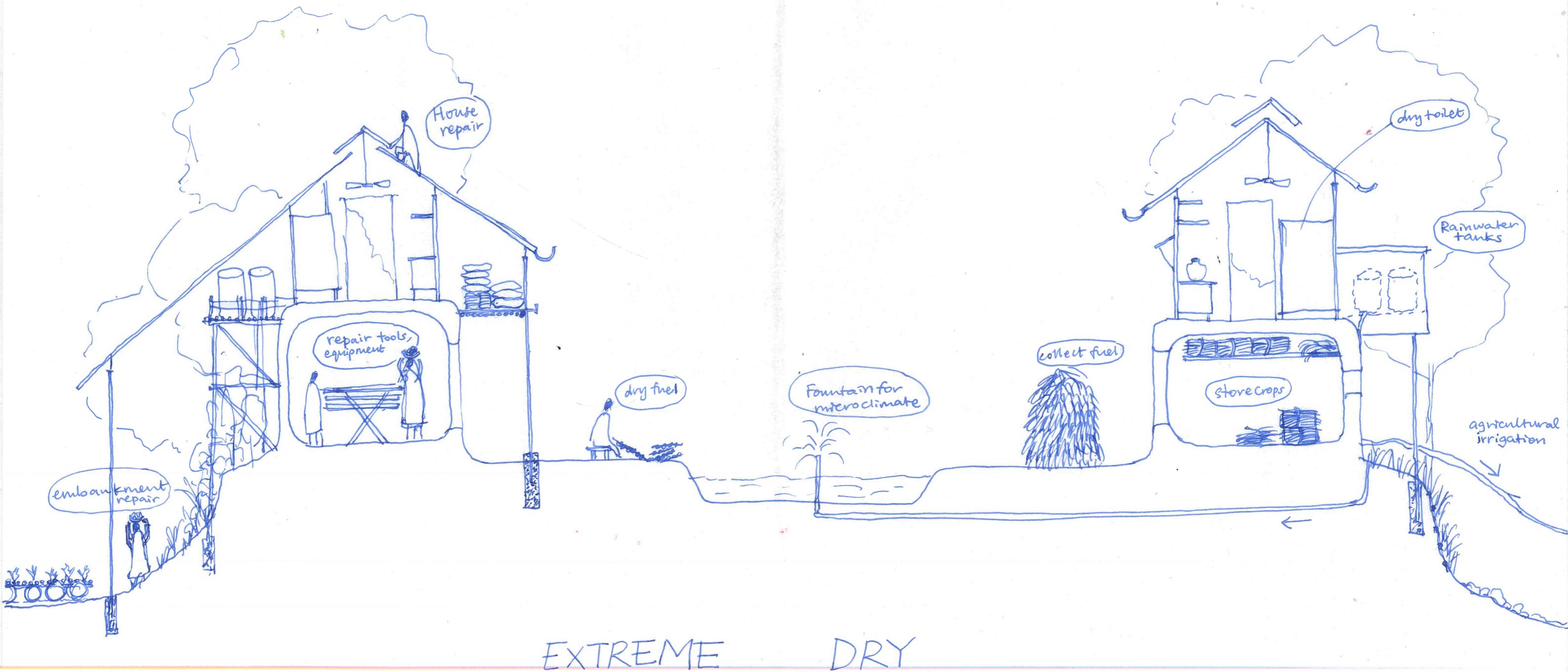
catchment

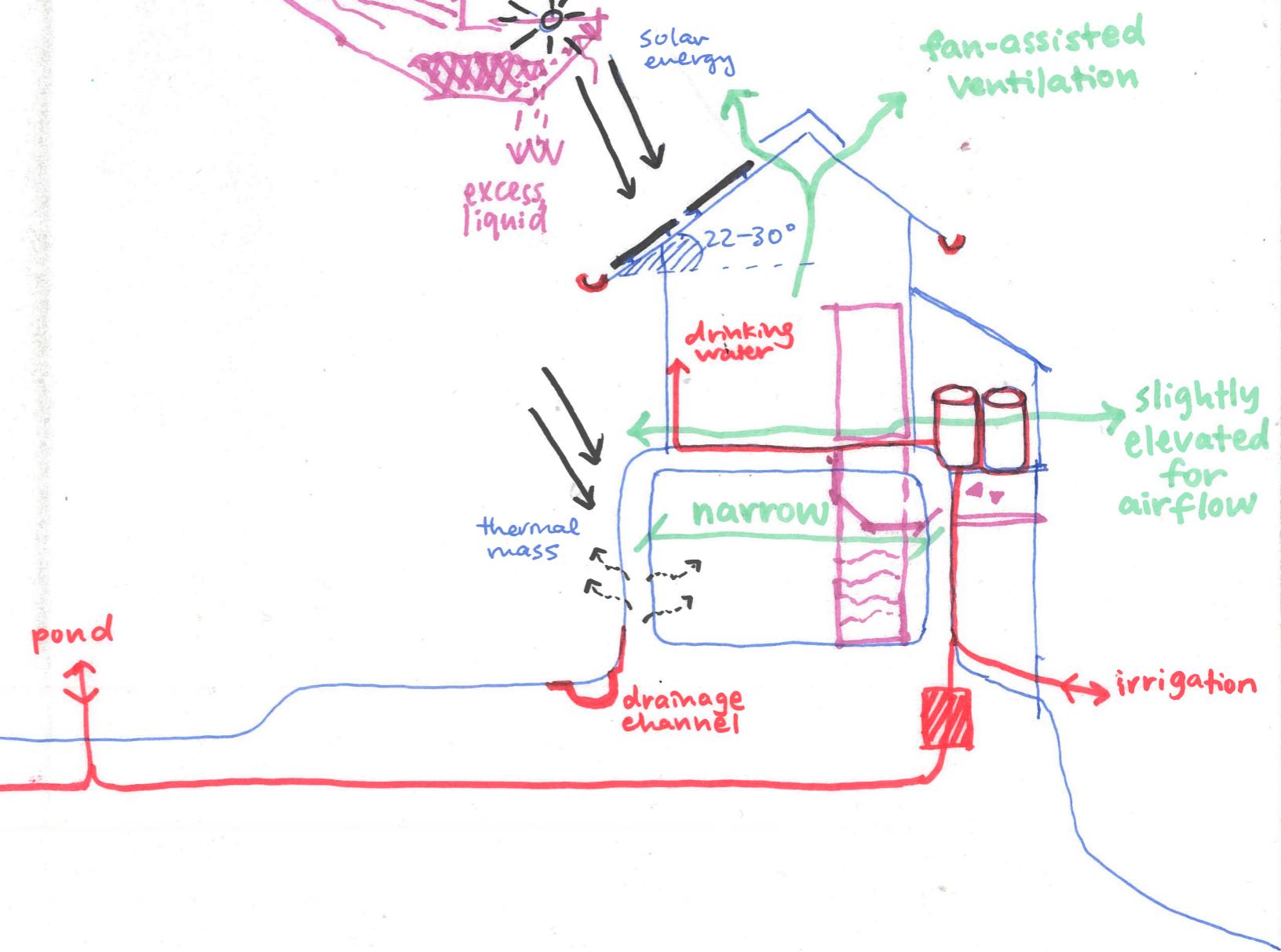
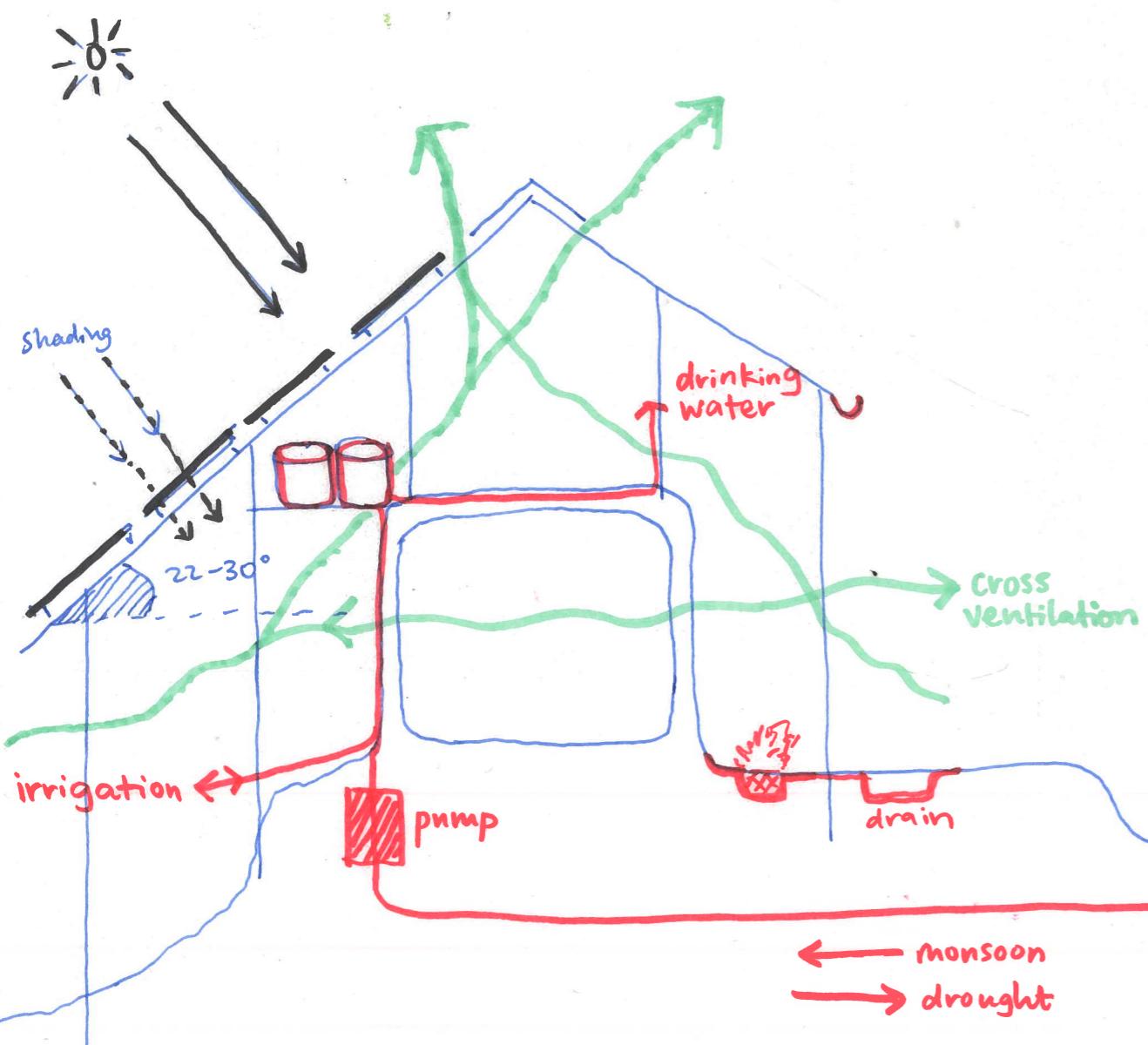
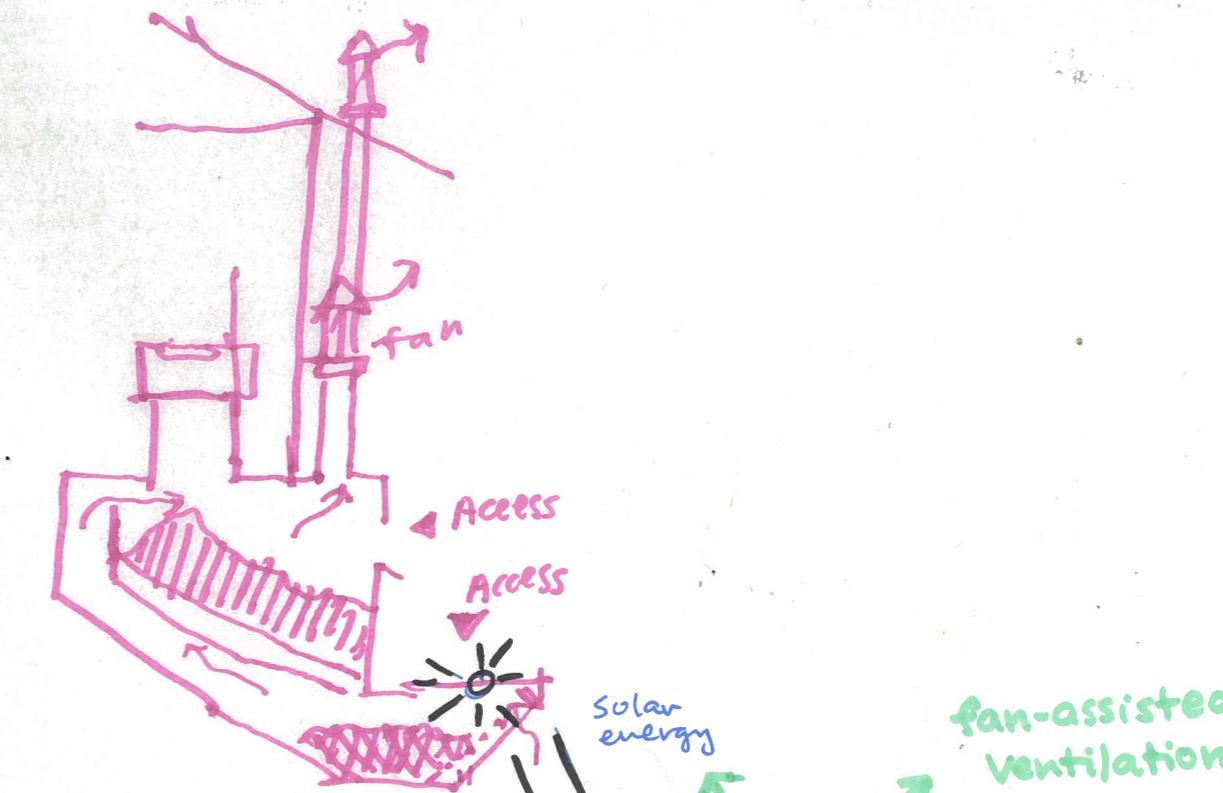
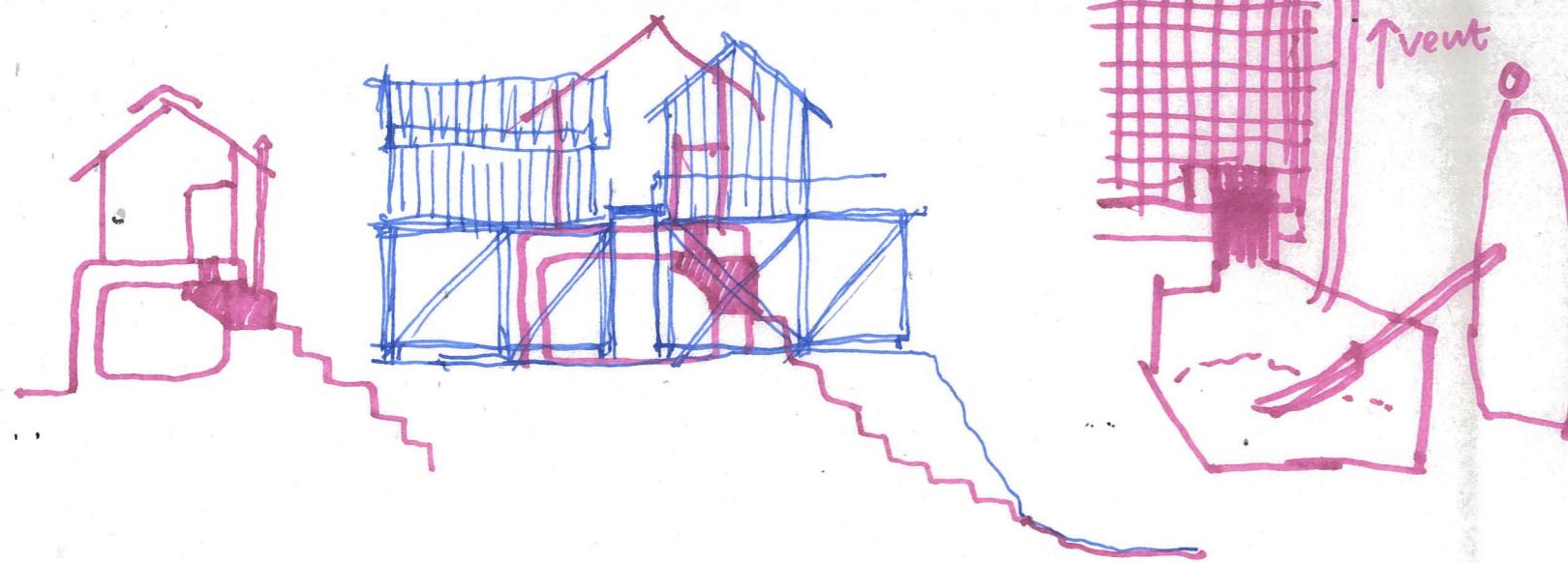
Solar panels
continue
supporting
electricity
+ internet



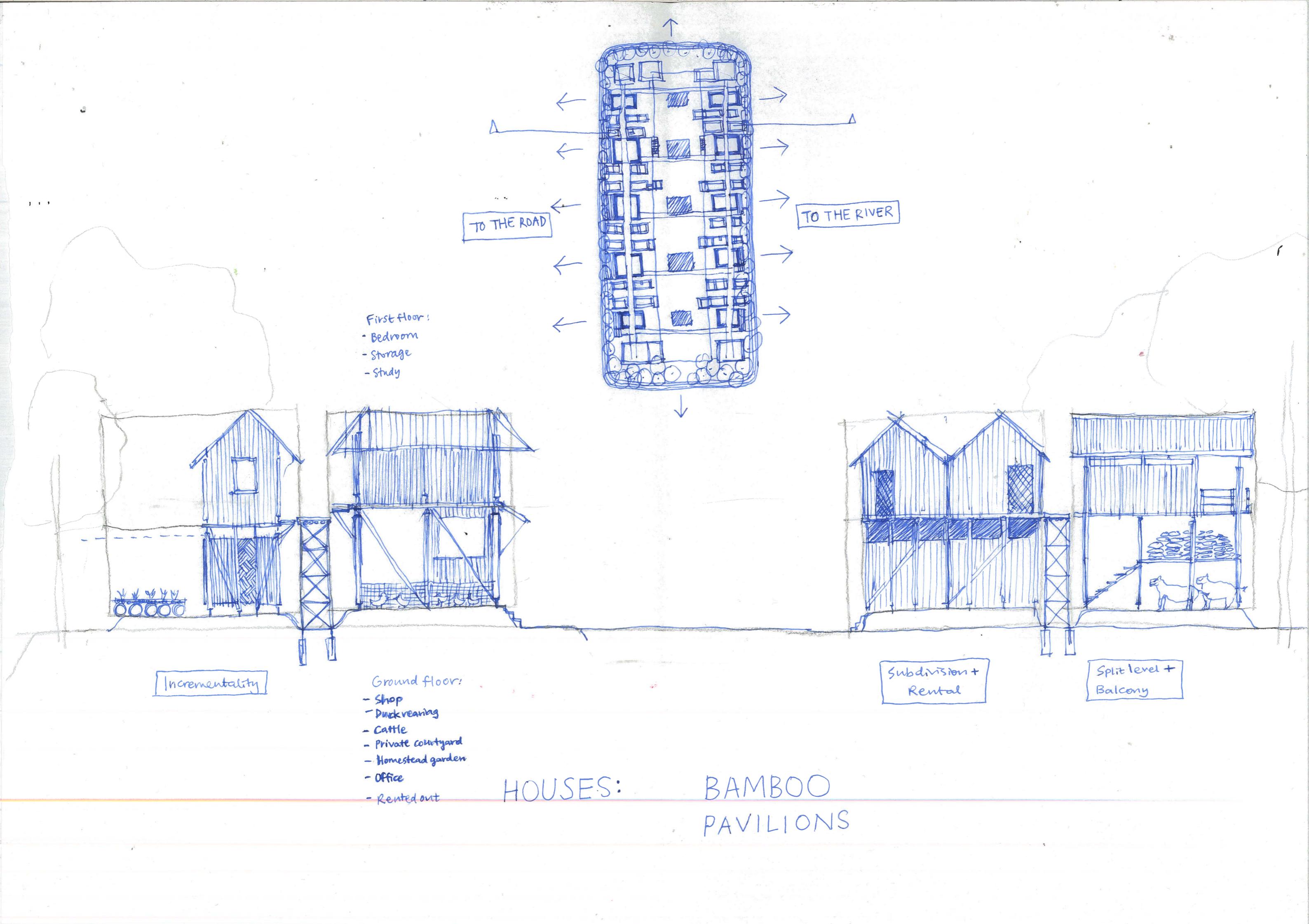
bathing

dry toilets





- Water system
- Solar energy
- Ventilation
- Dry toilet



PROCESS TO P2'S PRELIMINARY DESIGN

PRINCIPLES

NELSON: *Stem and service core*

From P1, a strong theme within the initial sketches that stood out was what Nelson coined the “stem and service core”. I continued to develop this theme through case study research into competition schemes from the “Tondo” competition in 1974, looking specifically into shared amenities between clusters and at how critical it is to structure public space.

In the article “To Be Continued...” by Nelson Mota¹, the relationship between the ephemerality of the dwelling and the permanence of the monument, seen in Malagueira’s plan by Álvaro Siza and previously stated by Aldo Rossi, was a key driving force in my project. The stem and service core developed into the communal earth stem which bamboo houses plug into.

QUESTION: *How did your research influence your design and how did the design influence your research?*

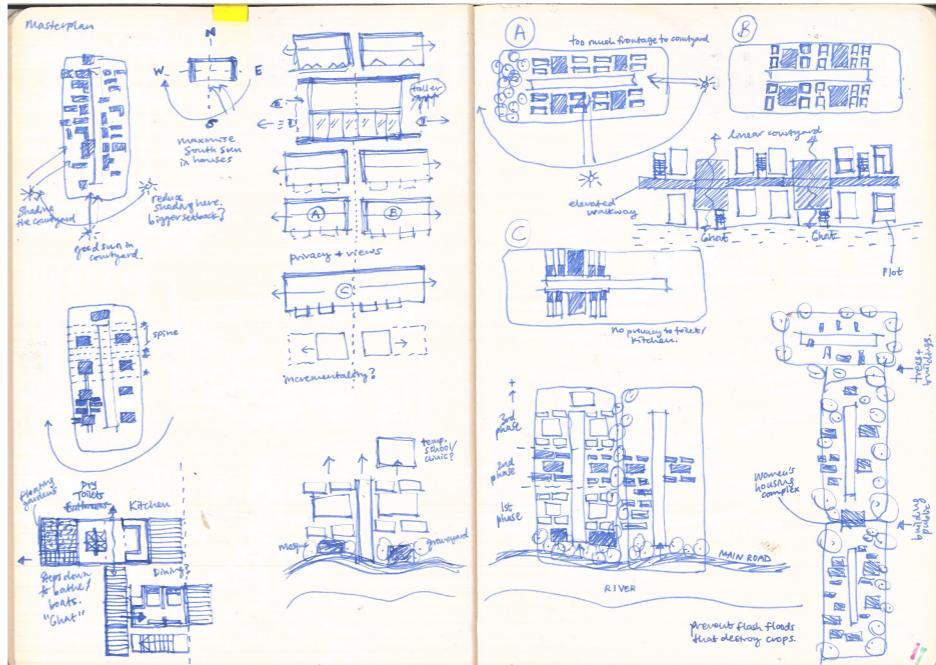
I integrated multiple syntheses of research from various sources to set out key design principles. Then the designs sparked new critical inquiries, and the feedback loop continued.

For example, understanding how important connection to the ground is to the residents of the Haors led to topographical explorations, as well as trying to create ‘new ground’. From analysing how vernacular courtyard homesteads in the Haors evolved into the existing ‘tube’ houses due to land scarcity and increasing density, as well as news articles and surveys on flash flood priorities led to my synthesis of a ‘hierarchy of floodability’. This then shaped the levels of the dwelling plinths and village mound.

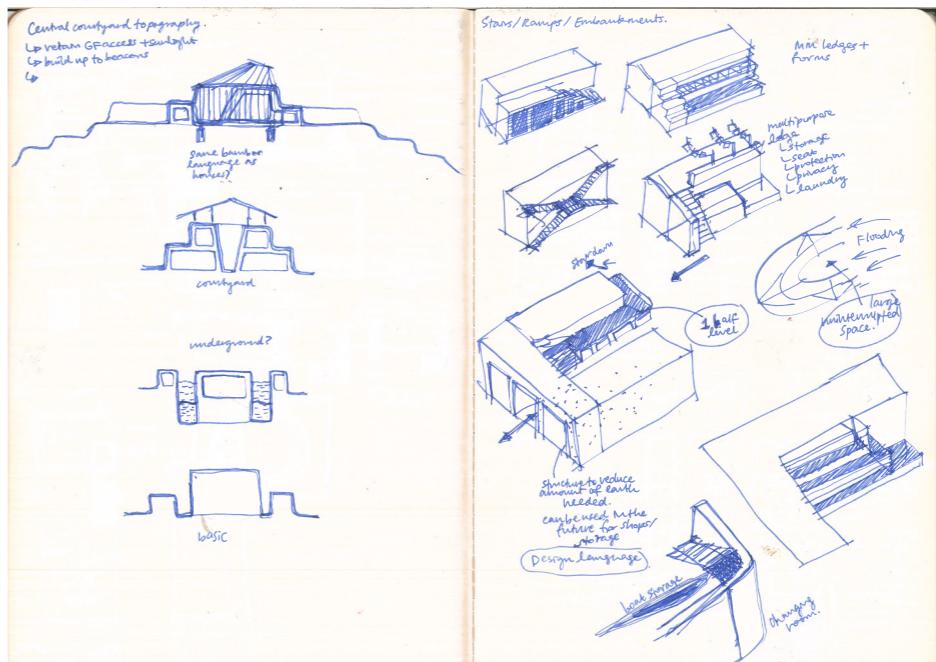
Furthermore, the theory of collective action as a tool for women's empowerment was instrumental during this phase. Combined with research into men's and women's domains, the communal courtyards were formed- safe, gender-sensitive and full of potential for collective action.

QUESTION: *Did your approach work in the process to P2?*

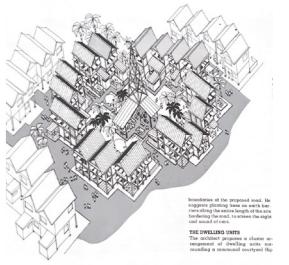
Literature reviews and case studies continued to inform my design and vice-versa. Additionally, I started to map morphological elements that exist in the territory, village, cluster and dwelling scales. These gave me insights in utilising/learning from existing practices. However, the activities of women still needed to be brought into spatial and analytical terms, so I looked at “How the Other Half Builds” as reference. Setting up the re-invented catalogue was by far the most thought-provoking yet least productive of the five methods. On the other hand, what I had not produced in research I had gained surprisingly in design principle- I gained a set of scales based on the temporal-physical measurements of women and could see the implications between scales.



stem and service core

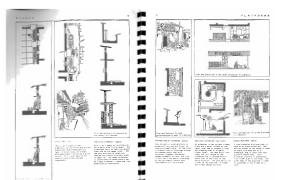


topography



case study

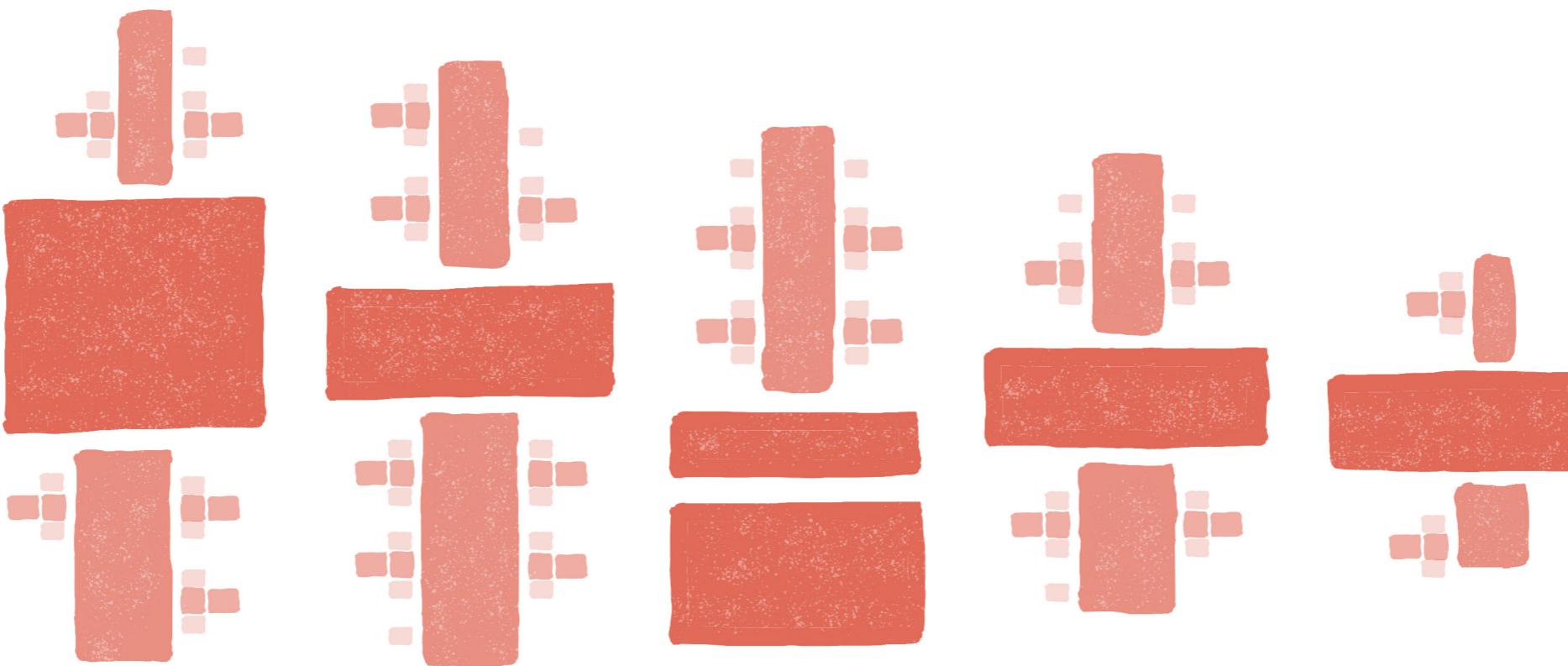
literature review



catalogue reference

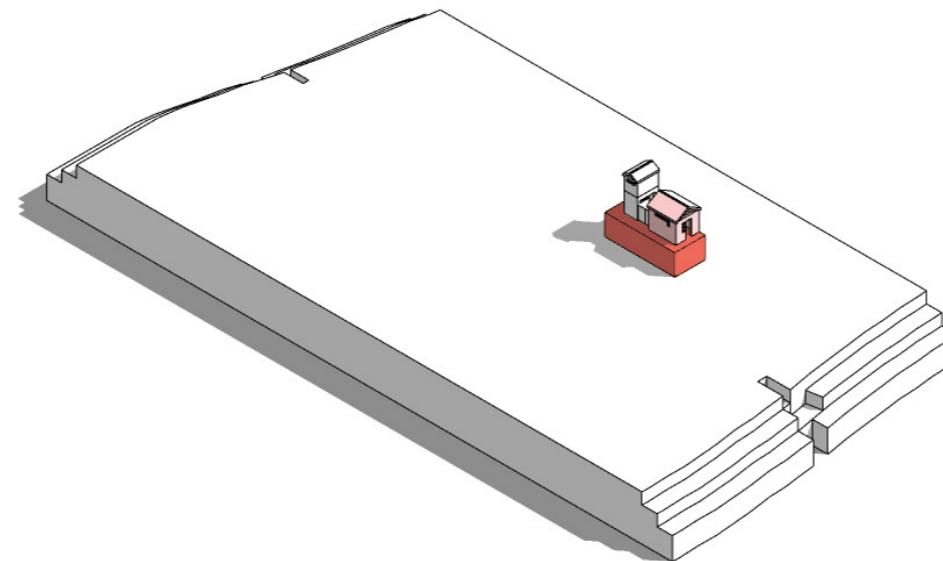
1. Nelson Mota, 'To be Continued . . . ', DASH - Global Housing: Affordable Dwellings for Growing Cities (Rotterdam: Naio10 publishers, 2015), 52-69

The hierarchy of collective action



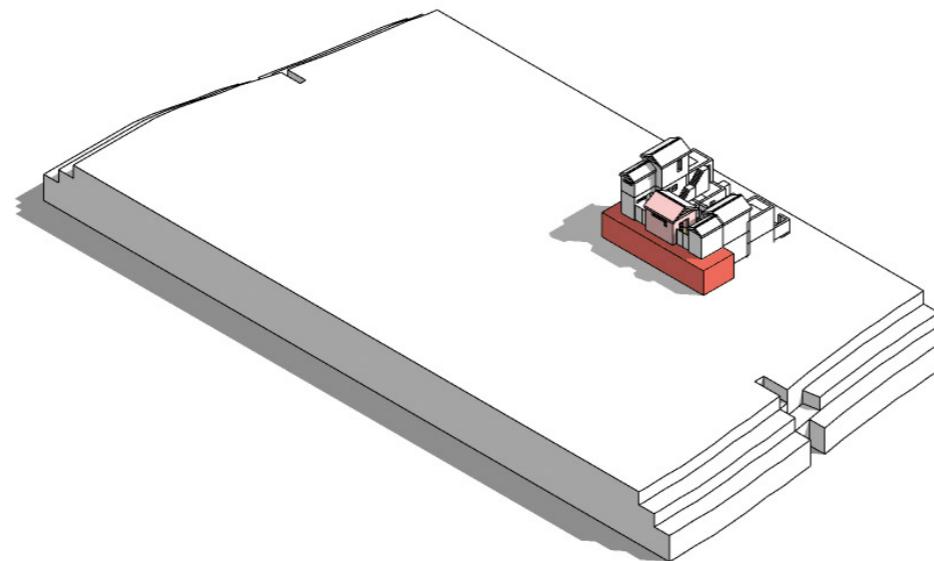
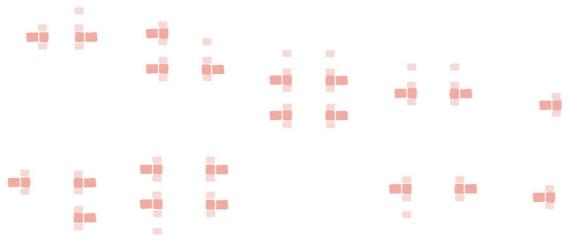
DWELLING

1 Place important amenities for women above flood line: toilet, kitchen and private courtyard (also for livestock and fuel)



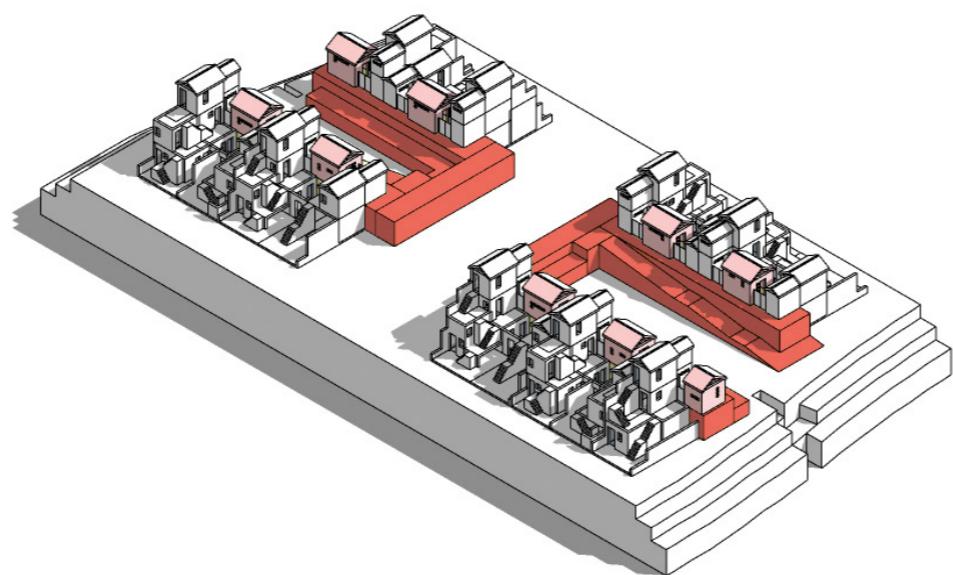
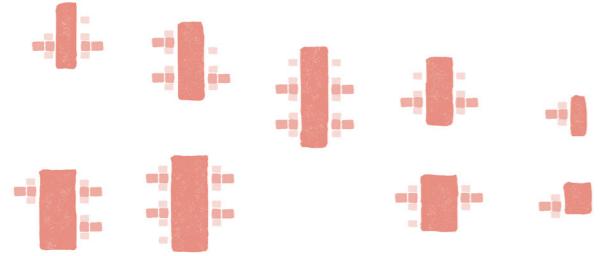
NEIGHBOURS

2 Neighbouring plots share a kitchen for increased space efficiency and opportunity for collective action; and share a lightwell for better indoor quality



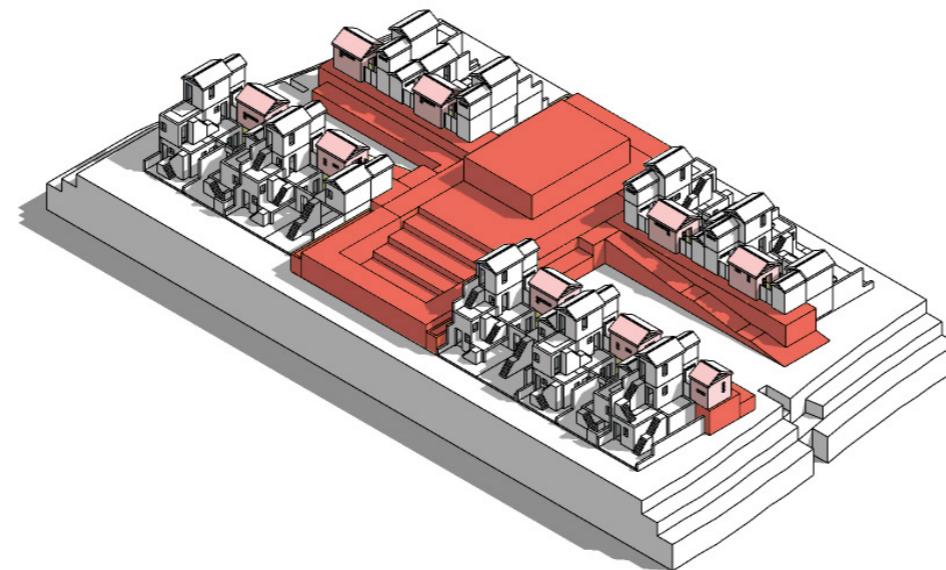
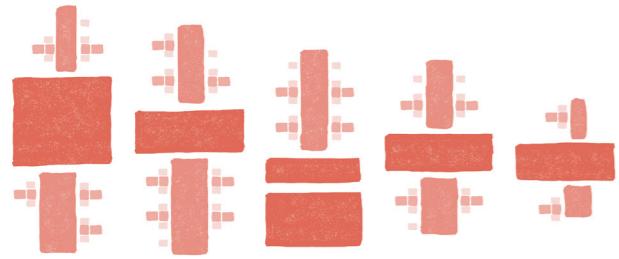
COMMUNAL COURTYARD

3 Create a communal courtyard that has access to the water



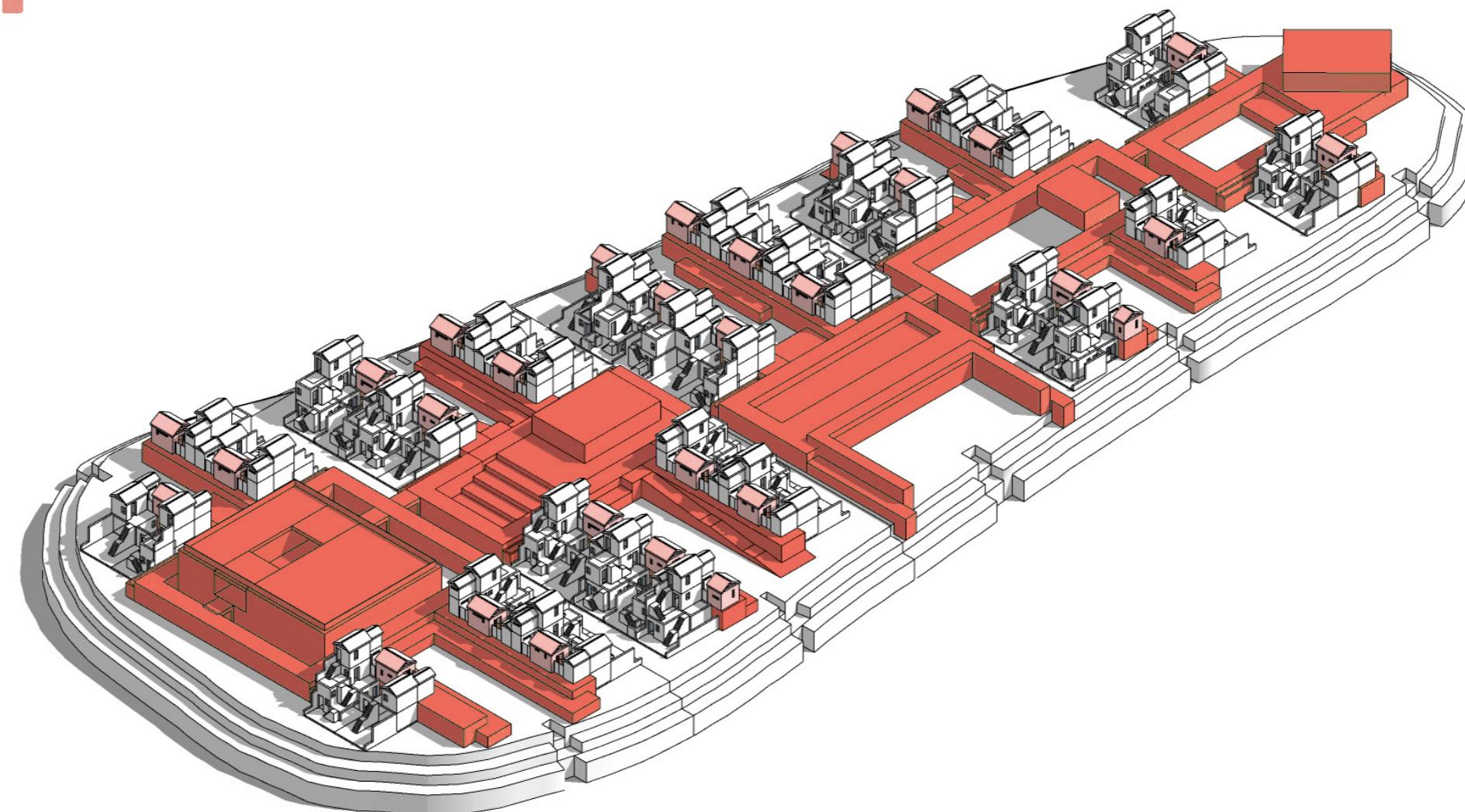
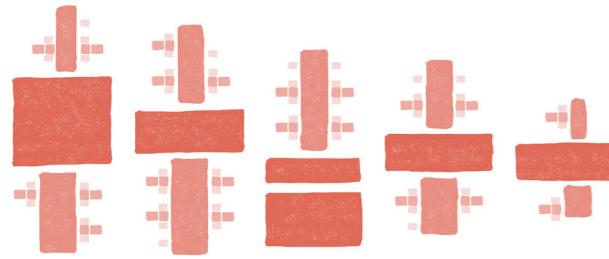
CLUSTER

4 Create a central linear courtyard and elevated walkway down the major axis with public amenities

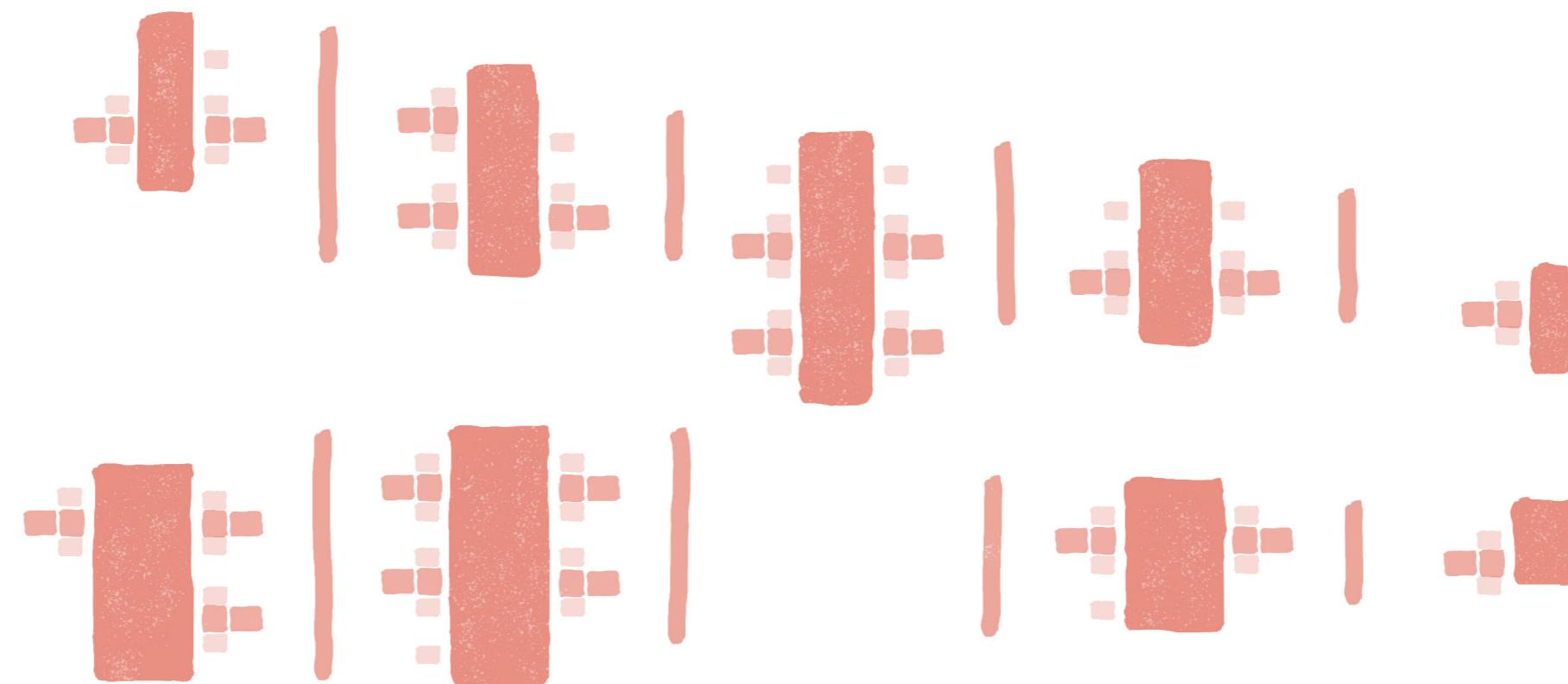


CENTRAL LINEAR COURTYARD

4 Define the character of shared spaces and individual spaces



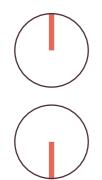
**alternating street and courtyard
(public and semi-private)**



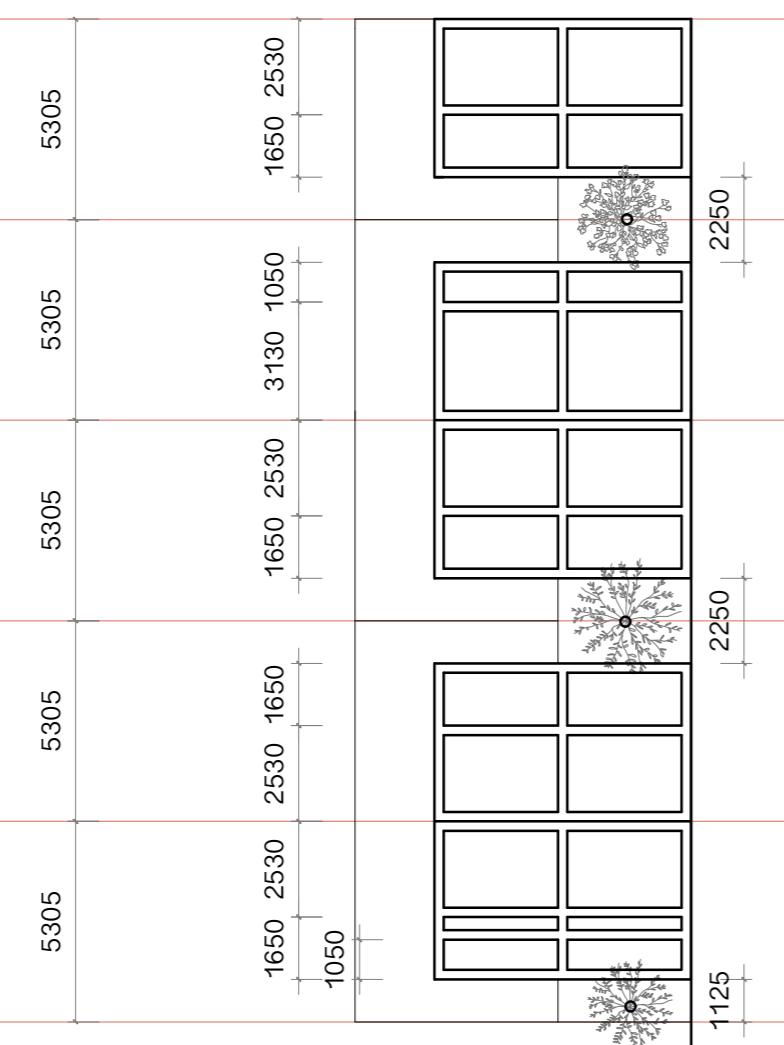
terrace house principles and grid
GF and 1F, 1:200

430

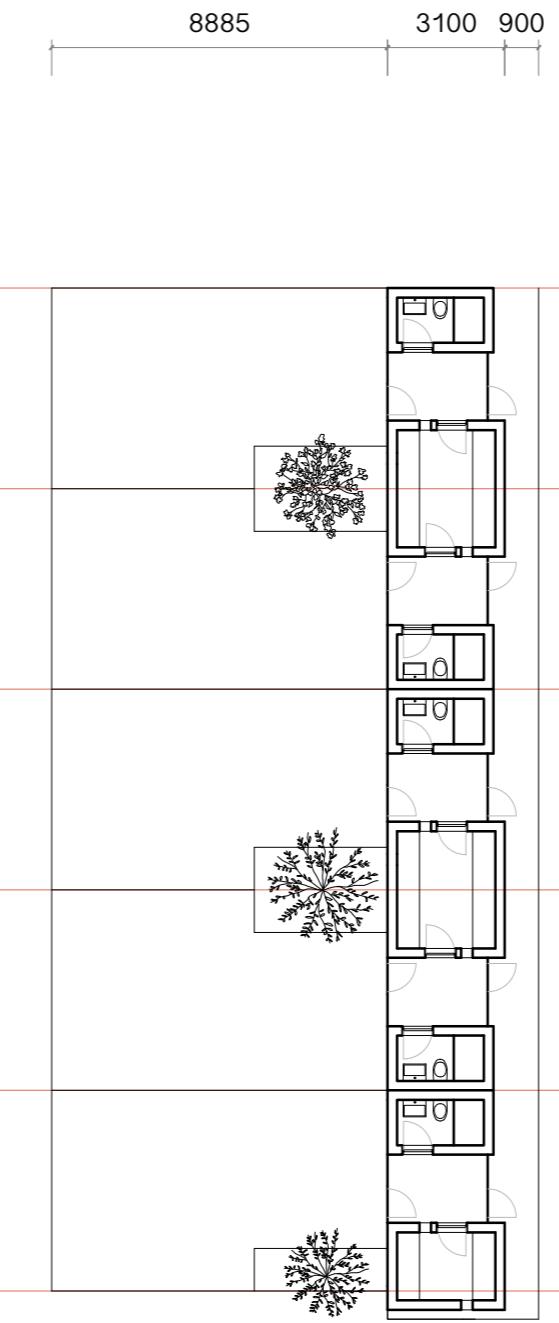
431



PLOT 1



PLOT 2



PLOT 3

PLOT 4

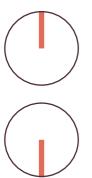
PLOT 5

GF

1F

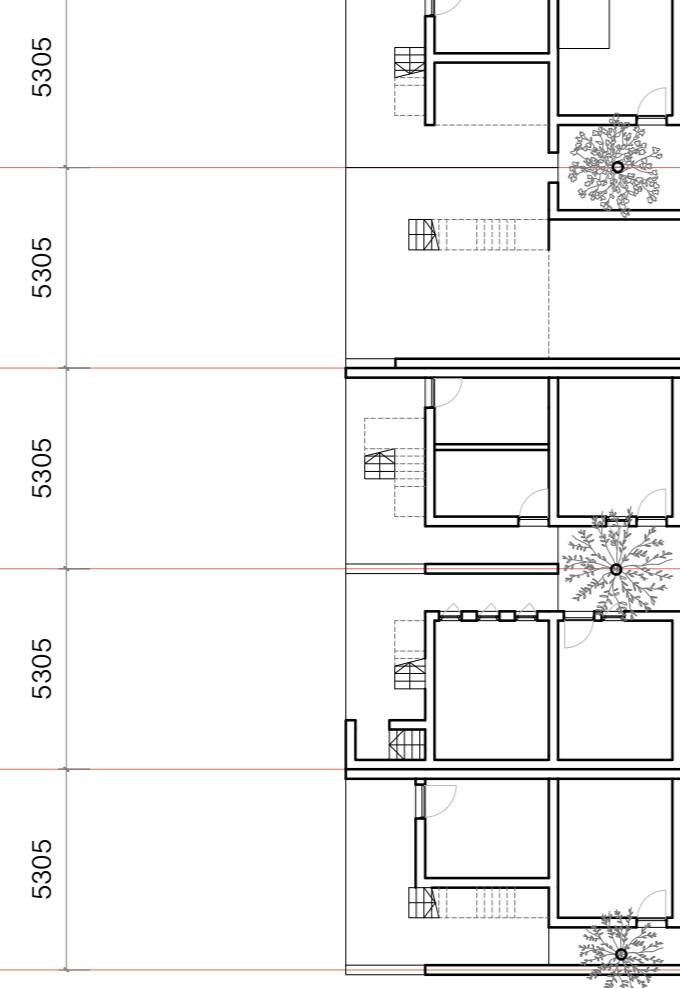
0 2 6 12m



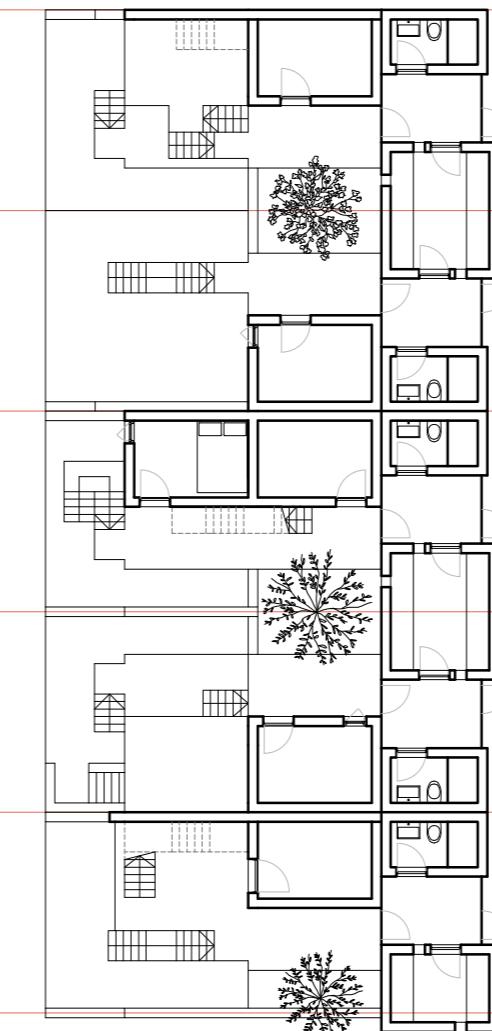


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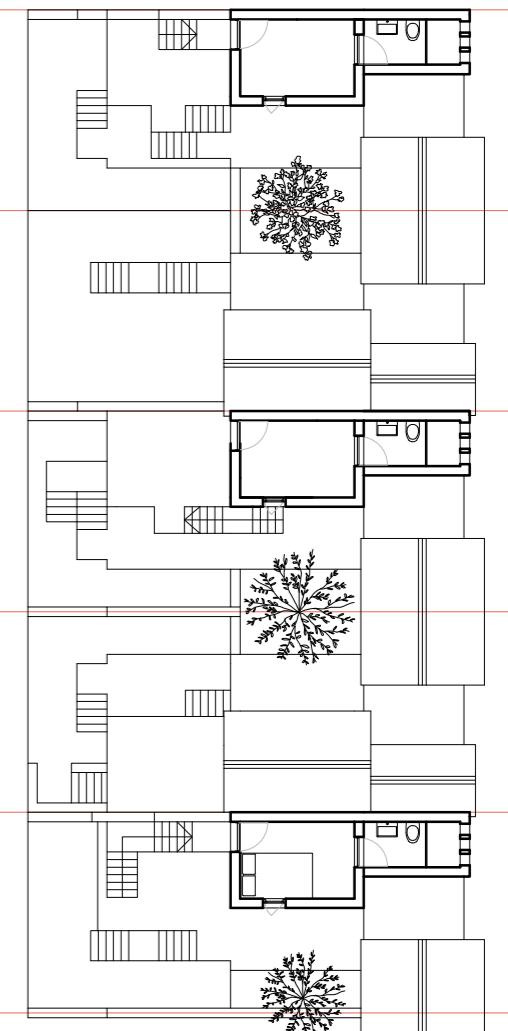
1.5 height living/working space



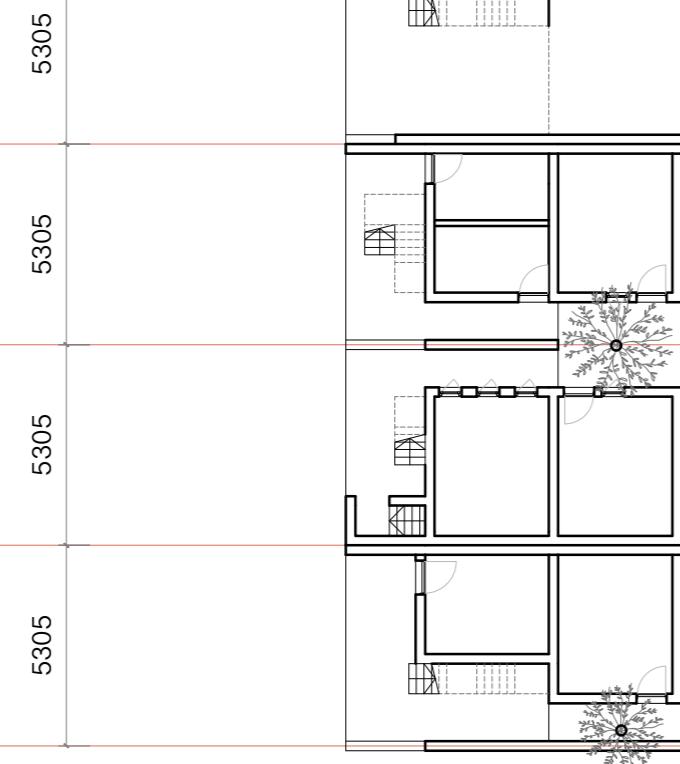
open work space/livestock



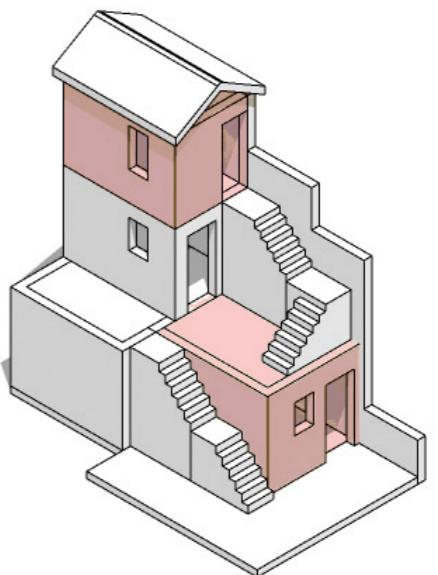
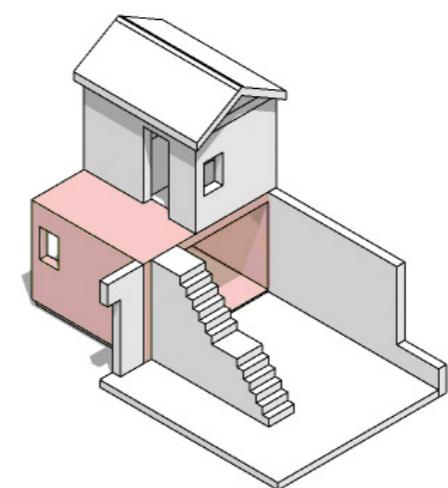
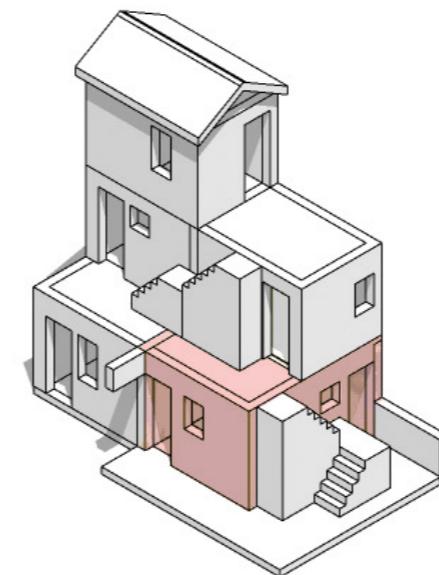
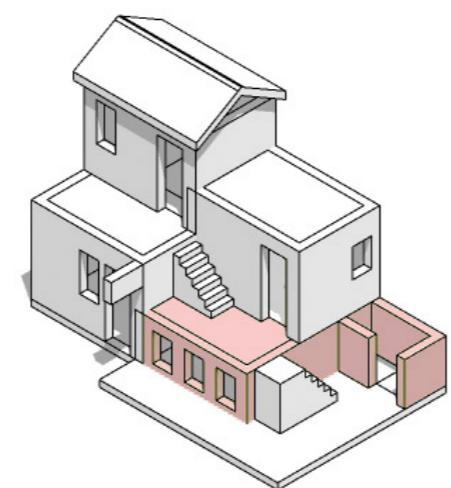
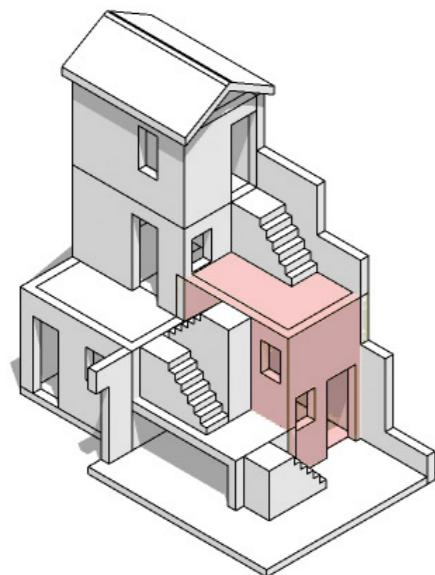
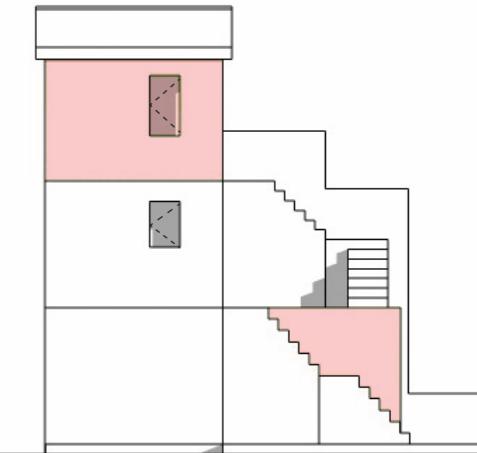
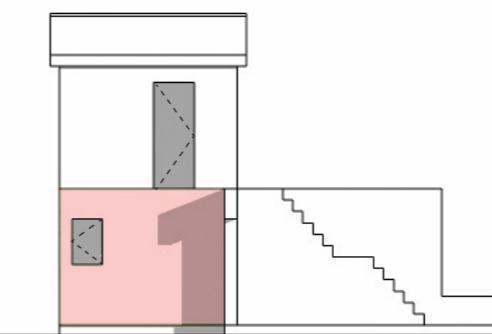
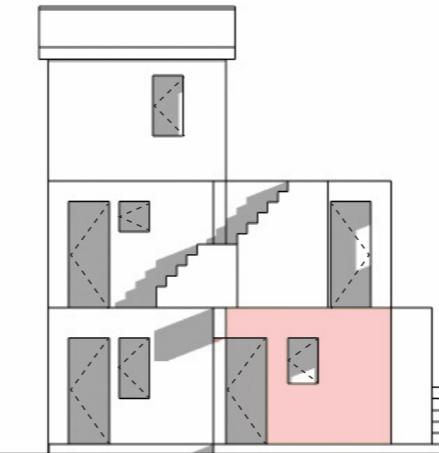
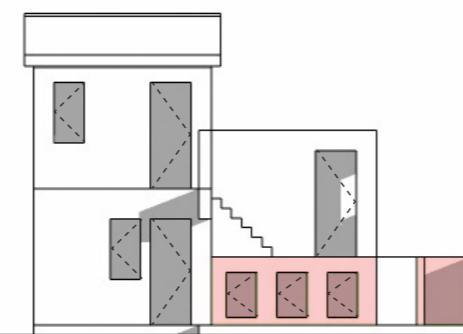
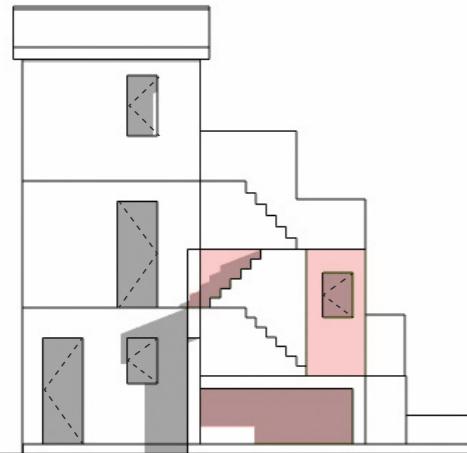
partitioned room



sunken storage



dual-key unit



1.5 height living/working space

sunken storage

partitioned room

open work space/ livestock

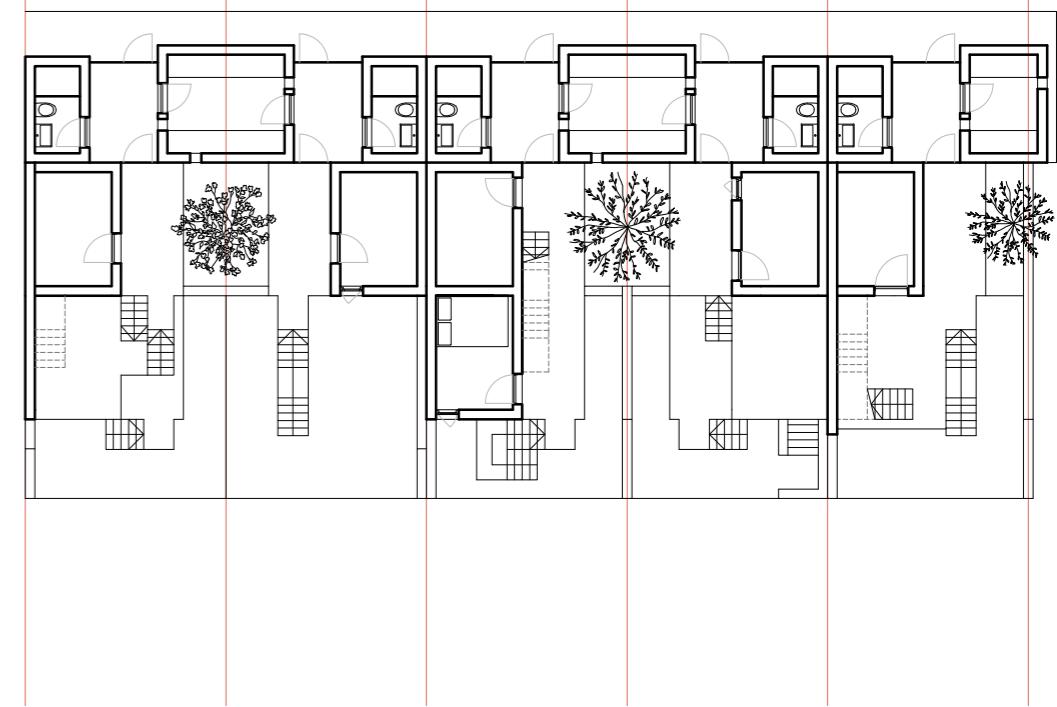
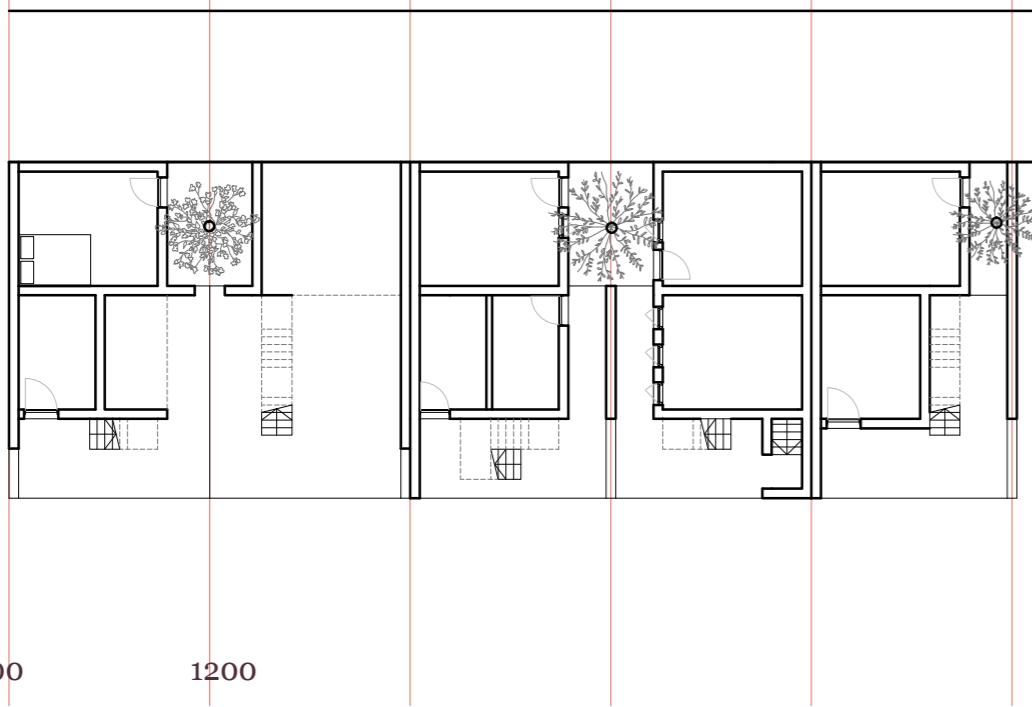
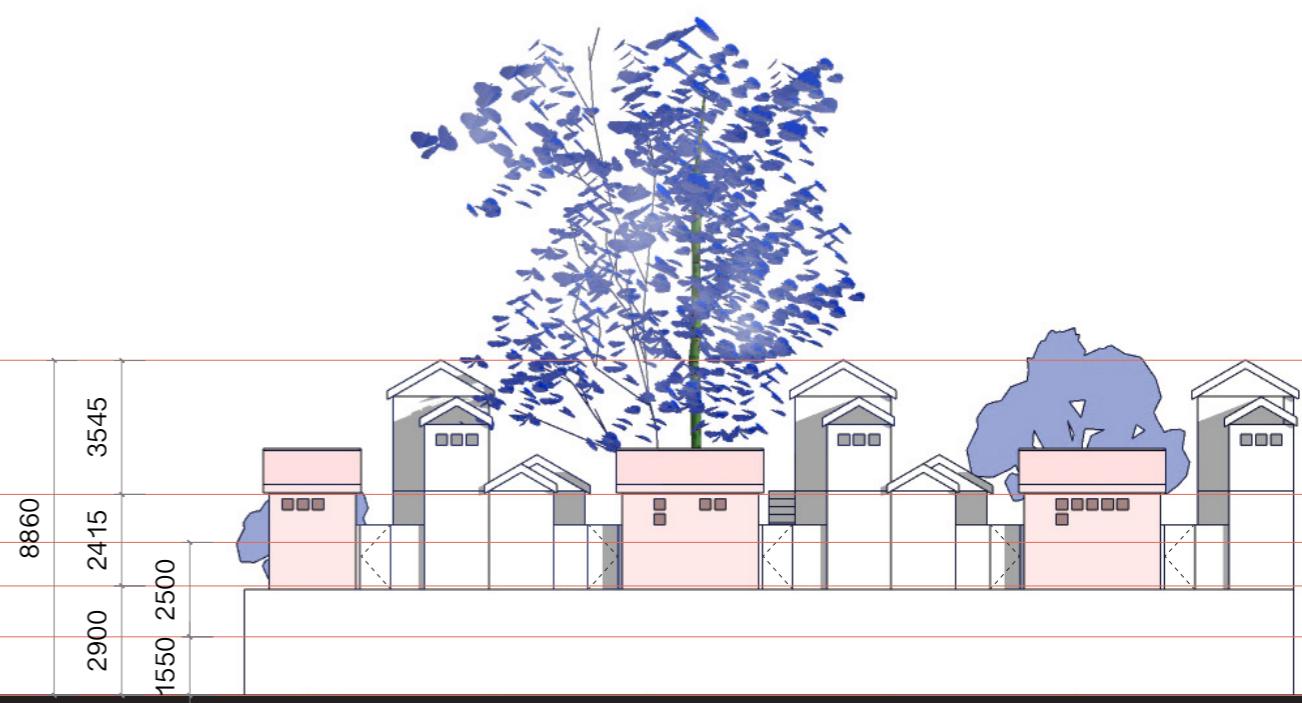
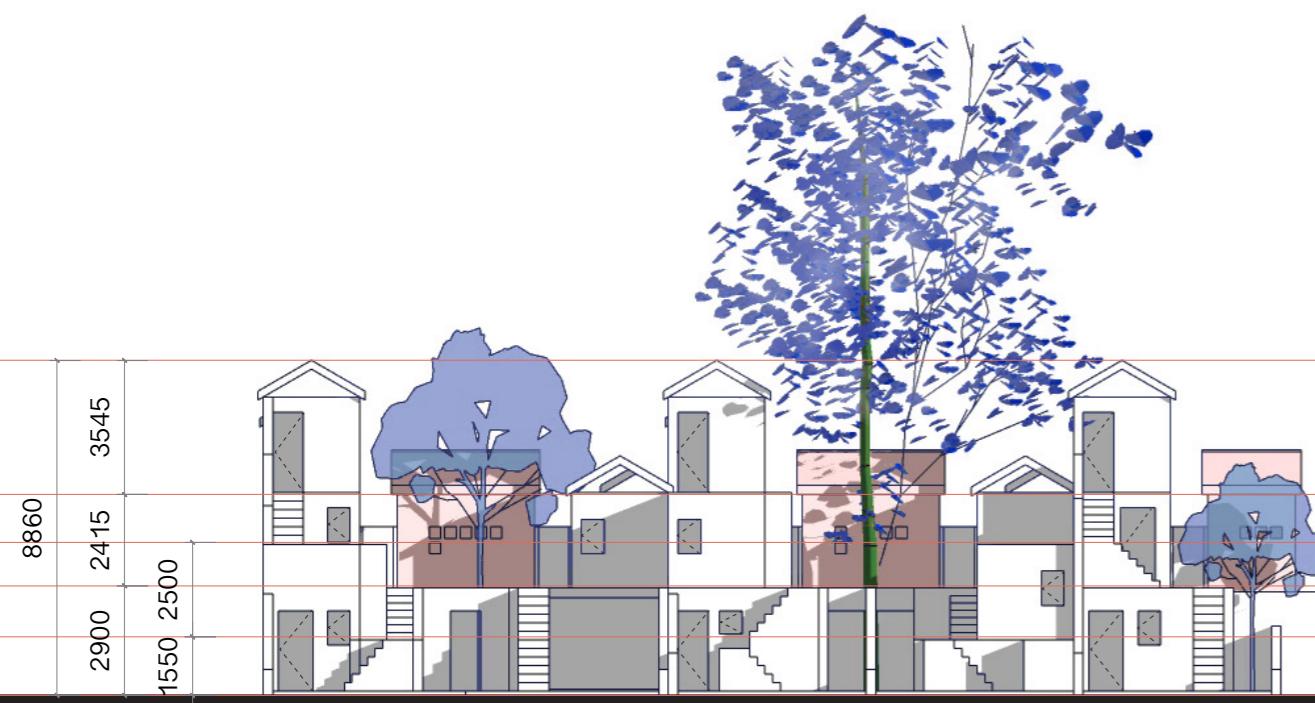
dual-key unit

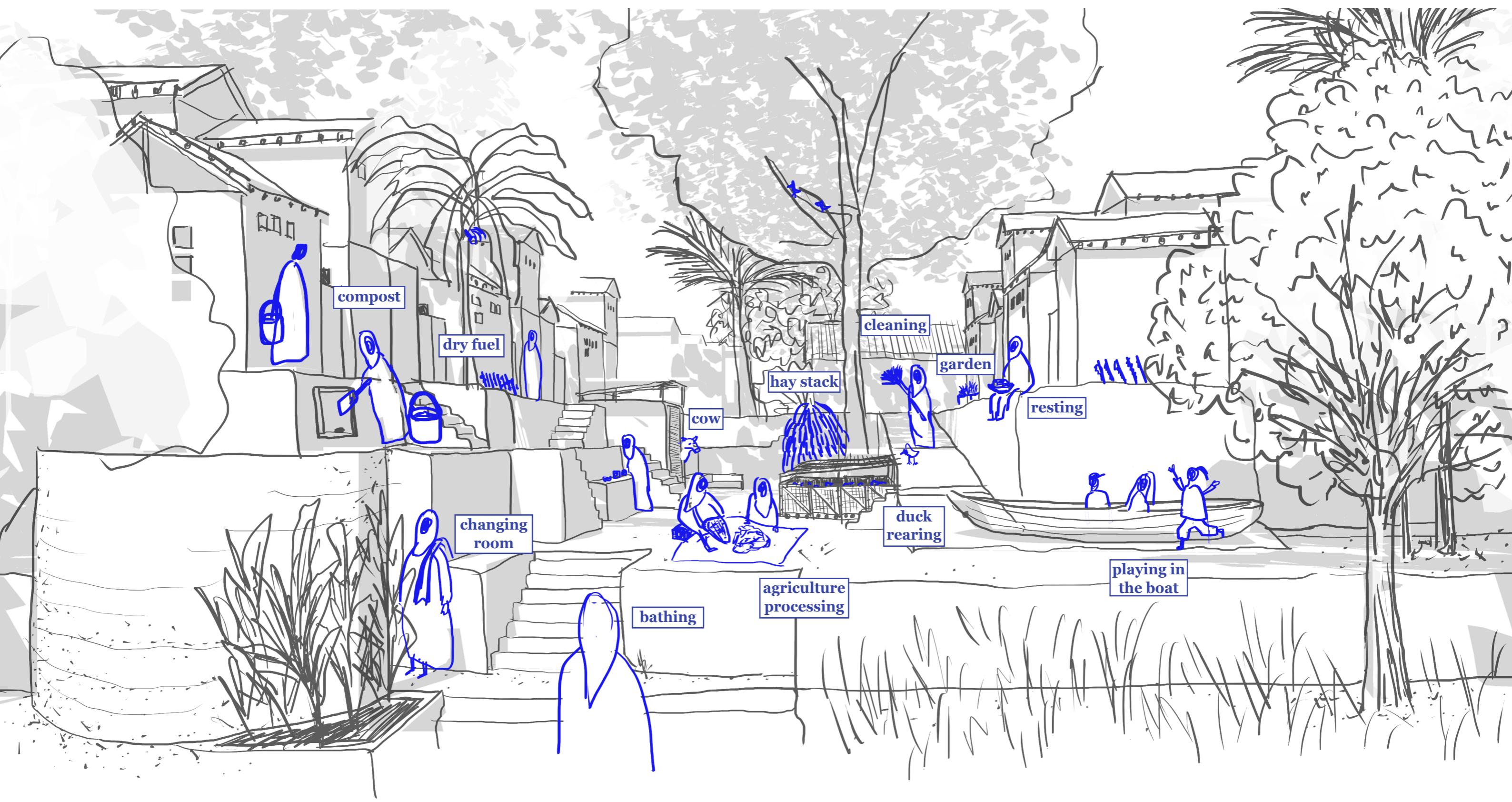
1:200

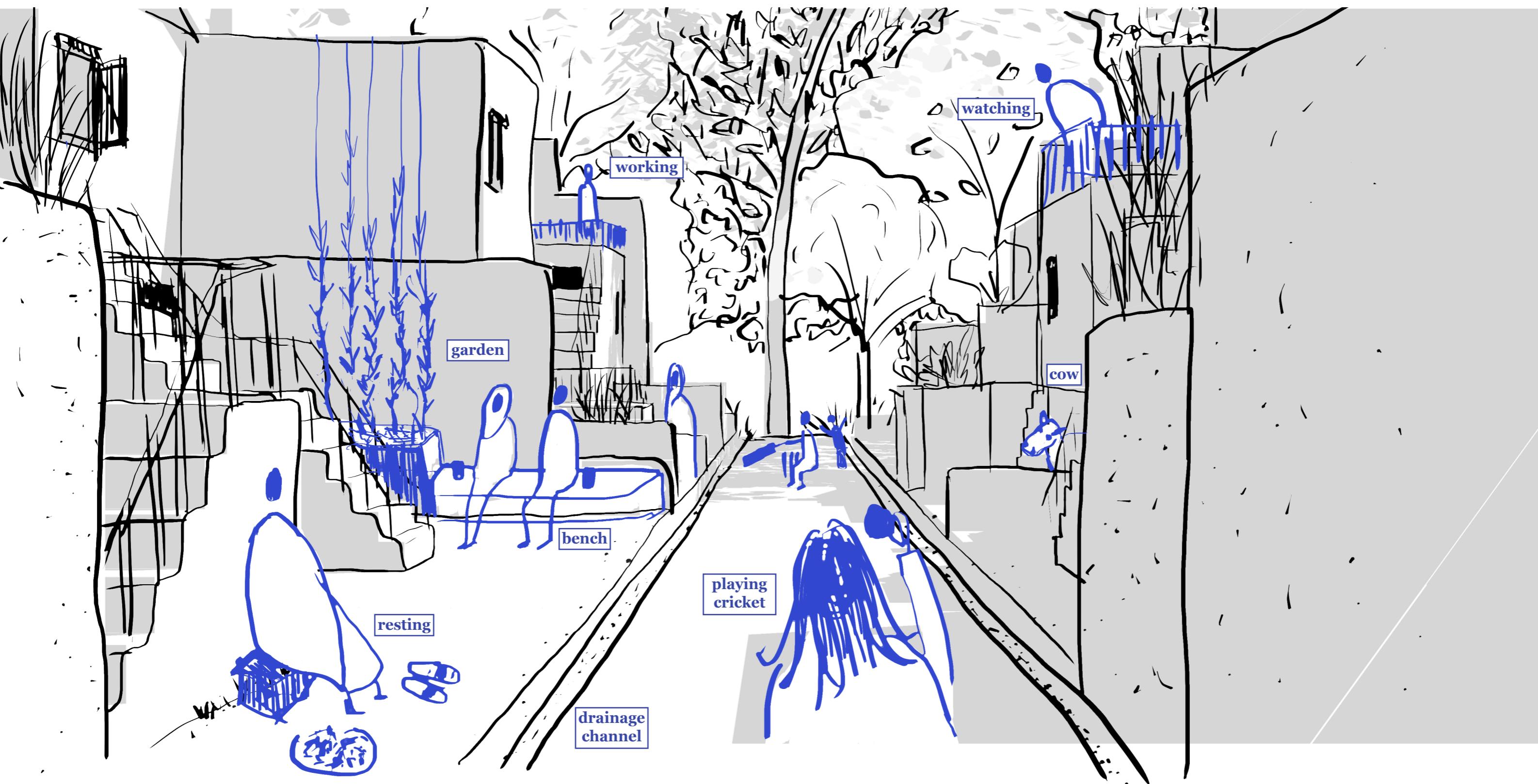
front and back
elevations

436

437



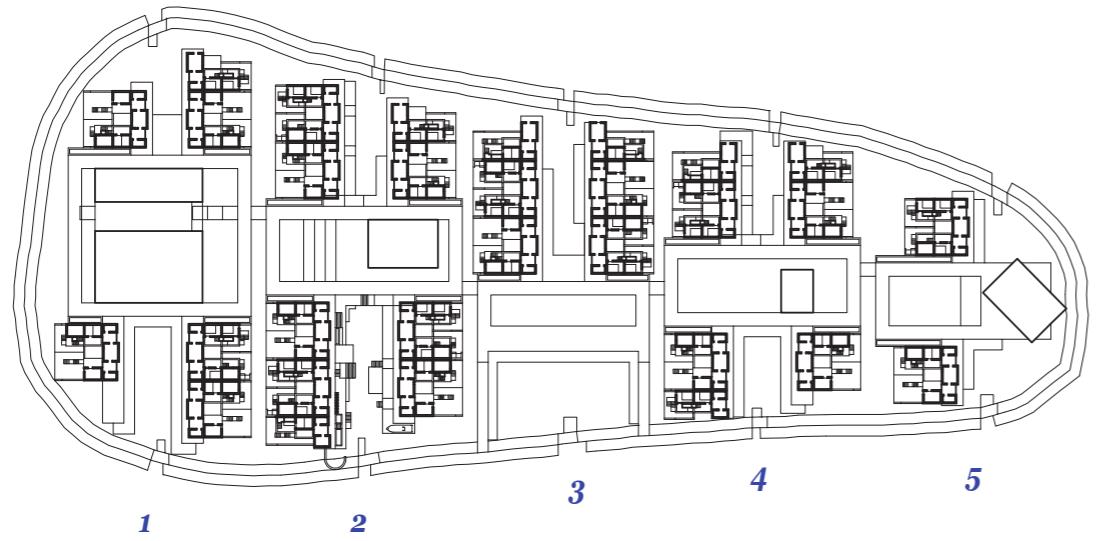






territorial impact

- 1 new mound
- 2 phased redevelopment
- 3 upgrading
- 4 shared amenities
- 5 expansion



1 **community hall**
with rainwater harvesting rooftop

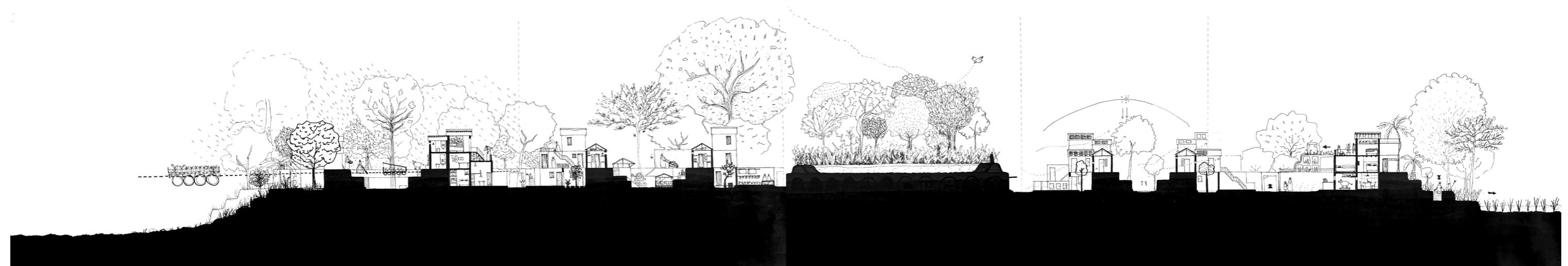
2 **school**
playground and amphitheatre

3 **women's refuge**
with a pond and garden in the central linear
courtyard for privacy

4 **health clinic**
with ground level space for markets

5 **mosque**
a tranquil space surrounded by trees





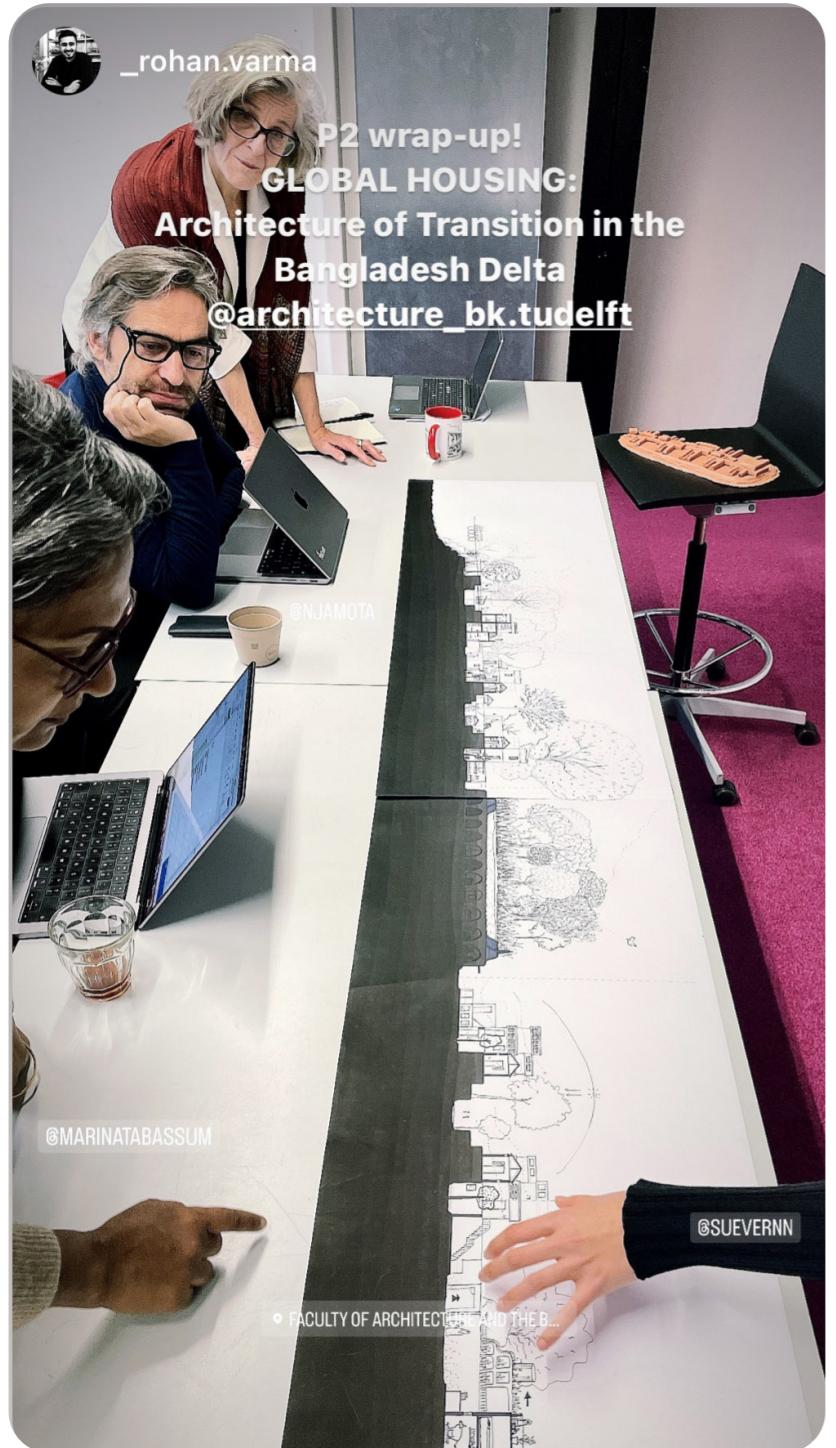
extreme wet

extreme dry

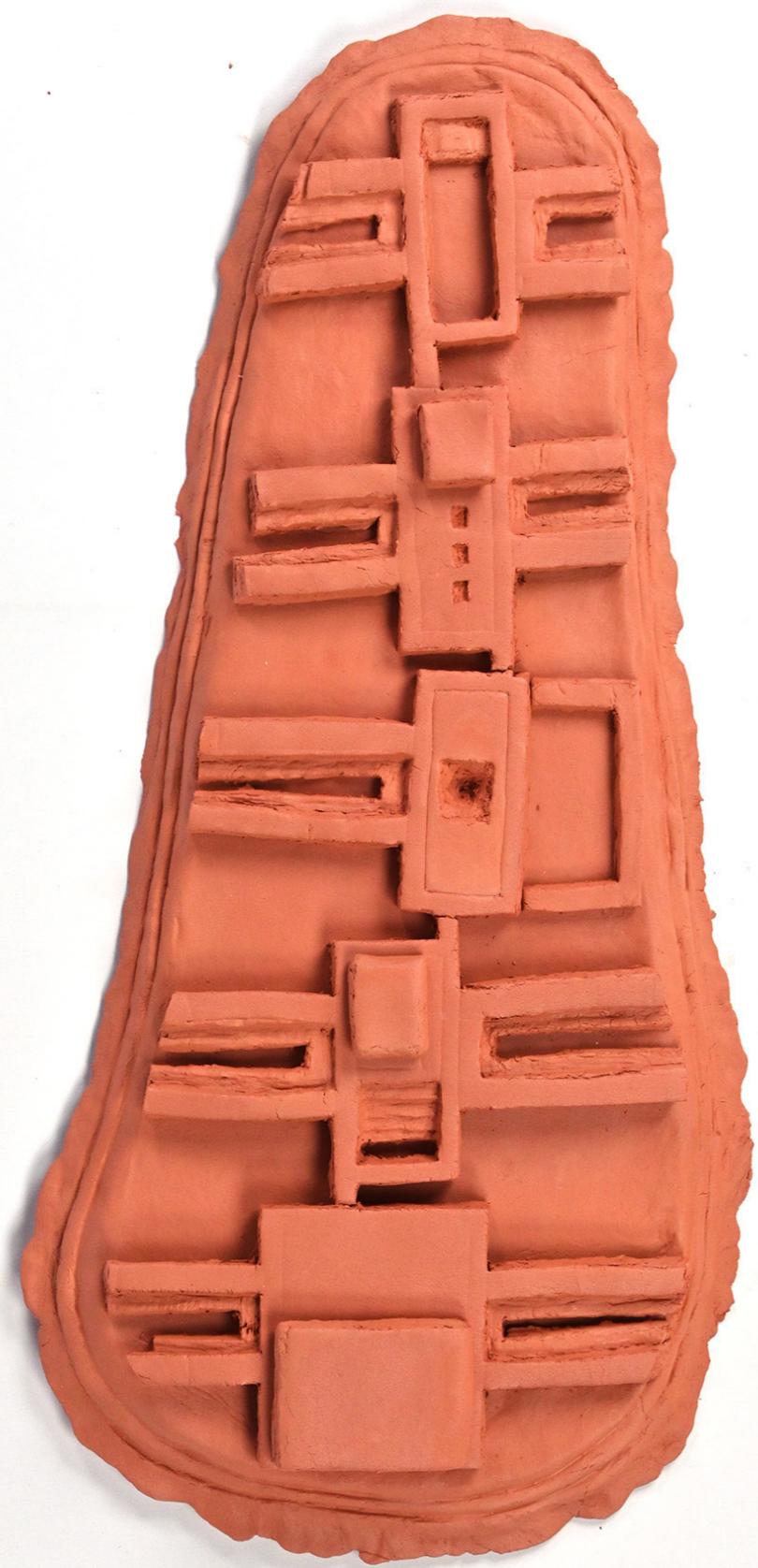
pond and garden

climate design

women's access



448



449



PROCESS TO P3'S DEVELOPED DESIGN

UTOPIAN OR REALISTIC?

QUESTION: How have you translated feedback from your mentors into your work?

In this phase, feedback can be condensed to two schools- too utopian or too realistic. An unfeasible project would defy its purpose. However, I was also extremely ambitious/stubborn, you could say, and did not want to compromise on the quality of spaces. Hence began the push and pull of efficiency and resilience. This was extremely challenging but equally rewarding, as the design consistently improved through every feedback session, and pushed/pulled till the balance got better and better.

DICK: Will shared spaces actually work?

I took a critical look at the shared spaces and decided that kitchens would be per household, and all communal spaces were linked to necessary functions and had sufficient space for activation. All of this spurred additional research.

MARINA: A utopia is realistic with economic and social sustainability

THE CITY MAKERS: SEWA loans and training empower women in India

I utilised my managerial strategy, supported by the SEWA case study, to not only ensure sustainability, but enhance the design.

ROHAN: Too much earth = material and space consumption MO: Enable collective action in the act of building/circularity

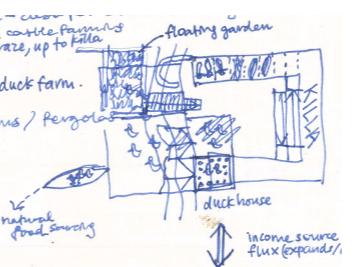
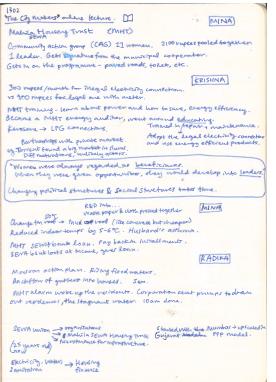
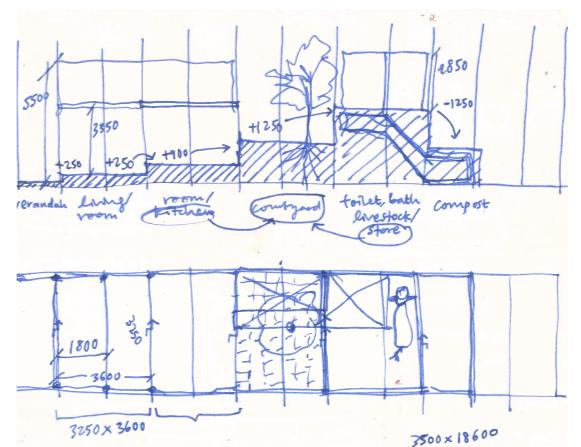
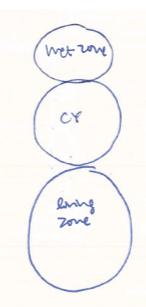
Because the earth mound from P2 was unusable inside, it was replaced by functional bamboo rooms. This, however, lost the initial contrasting characters between the front and back (street and courtyard). So I prioritised this, and forced a structural breakthrough, using brick vaults to create usable and 'earthy' space. Making the earth mounds realistic ended up strengthening the character contrast- not only in the earth vs. bamboo materiality, but in the work vs. living, and collective vs. individual.

NELSON: Plant good seeds

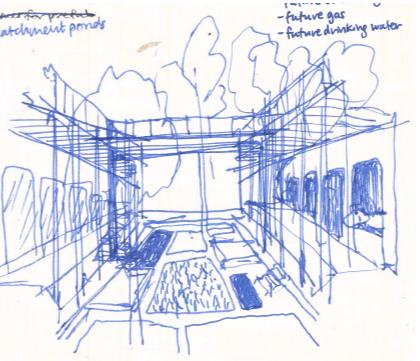
This deepened my previous understanding limited to just defining the grid and public space. Planting the foundations defined the scales for construction and living, the masonry vaults were an investment for durability and hence less maintenance work by women, and the necessary services like rainwater harvesting and biodigesters were the seeds that would assist women in their day-to-day and seasonal activities.

NELSON: Temporalities and agencies

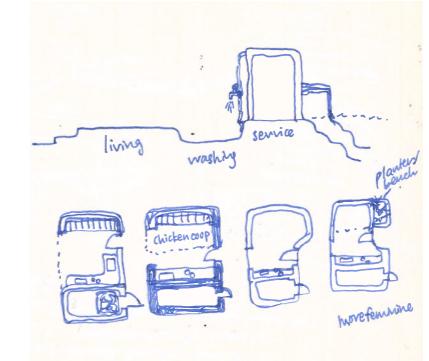
Instead of a communal roof for rainwater harvesting, I prioritised the autonomy of households and ensured separate roofs- this was a lesson in the importance of, ironically, agency. Furthermore, I deepened my awareness of how the growth and appropriation of dwellings are hard to predict.



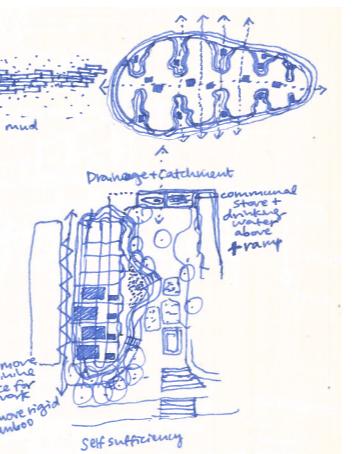
autonomy of units needed



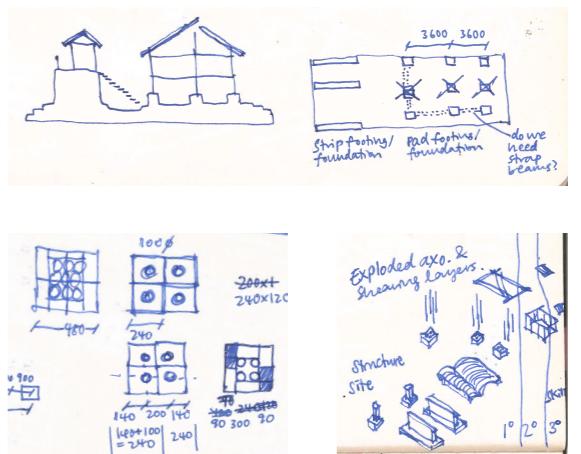
earth only in the workspace



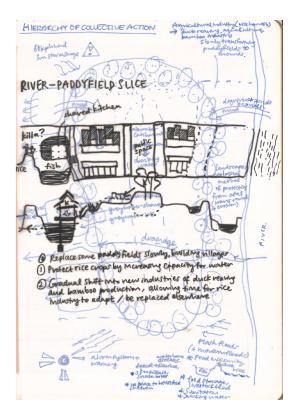
vaulted service core



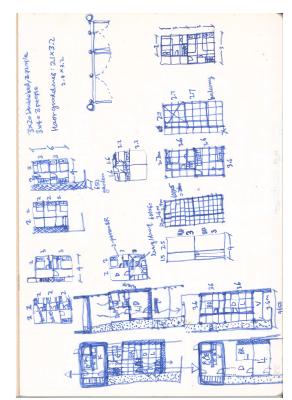
temporalities



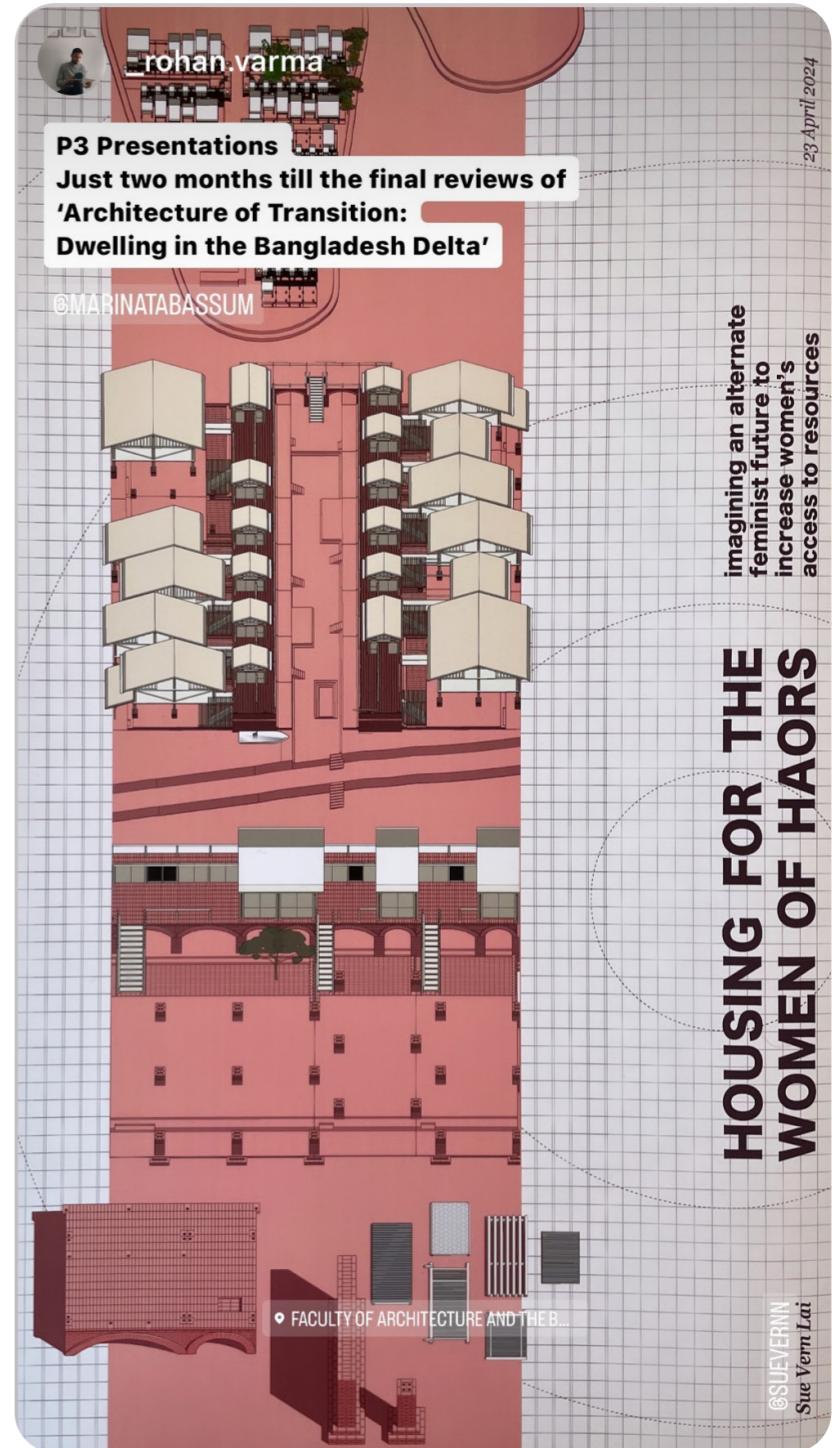
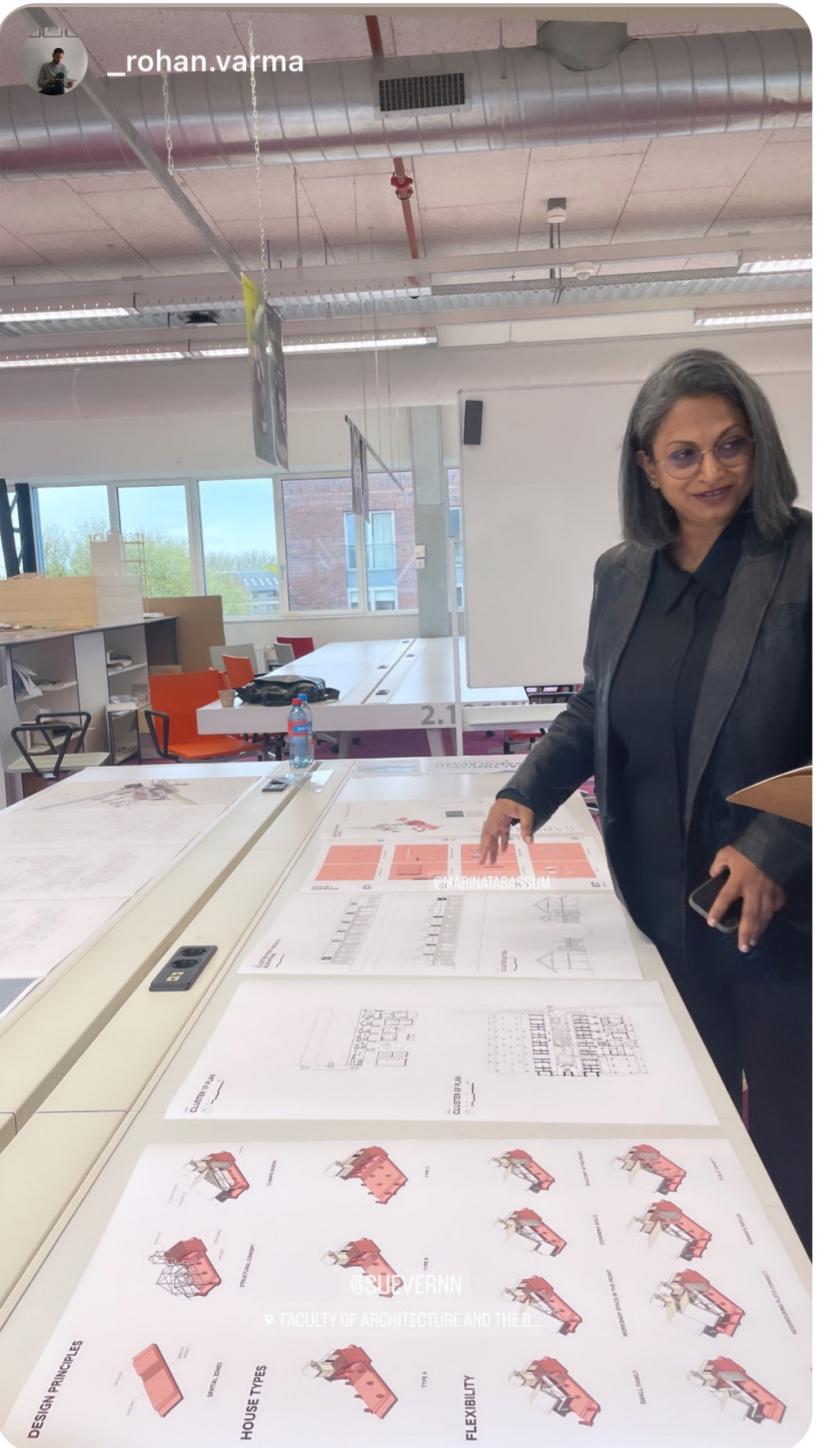
seeds



paddyfield-to-river slice



sizing the grid





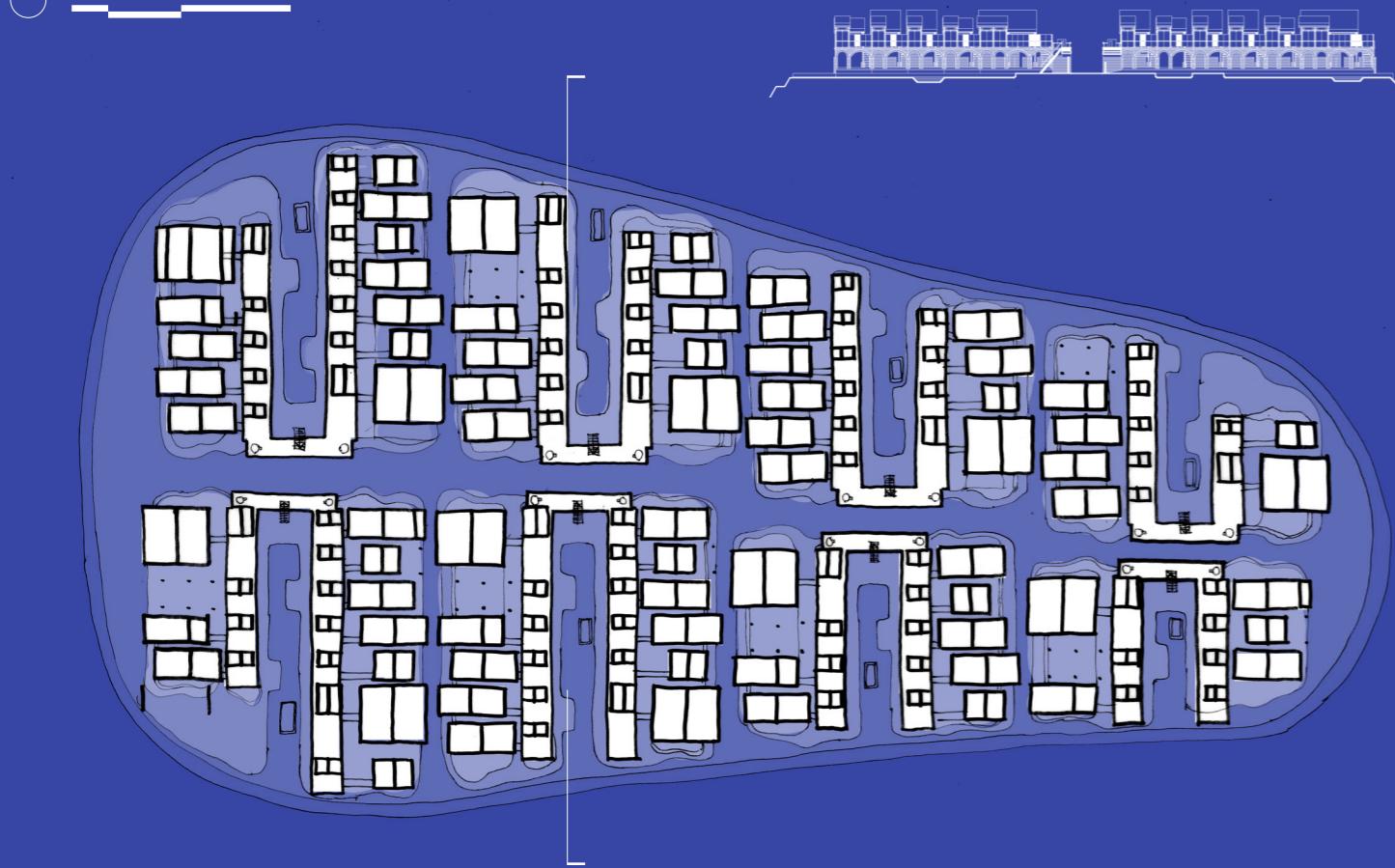
TERRITORY PLAN

1:5000
0 50 150 300m

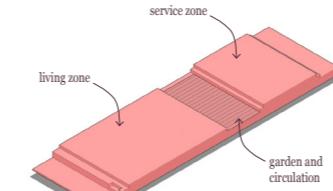


VILLAGE PLAN AND SECTION

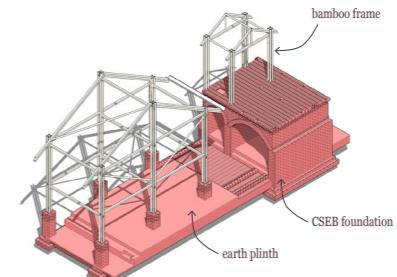
1:500
0 5 15 30m



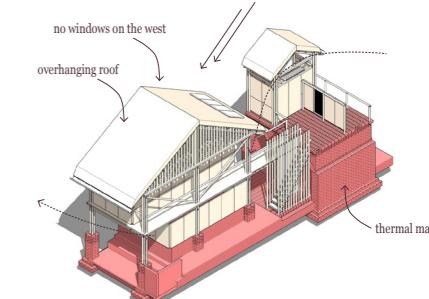
DESIGN PRINCIPLES



SPATIAL ZONES

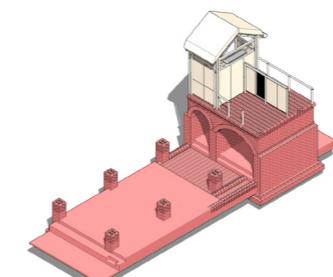


STRUCTURAL CONCEPT

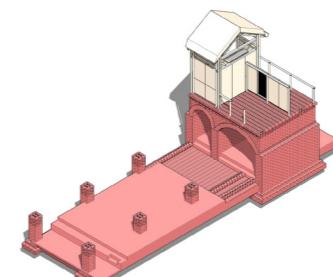


CLIMATE DESIGN

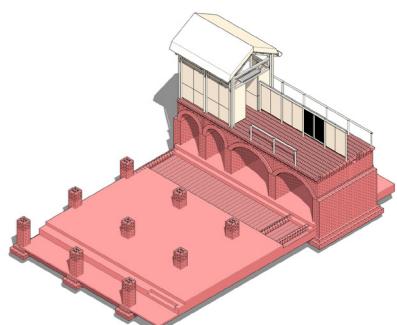
HOUSE TYPES



TYPE A

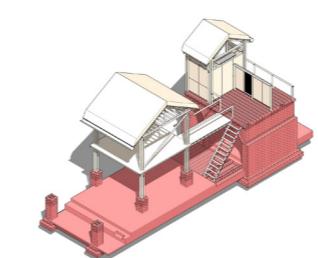


TYPE B

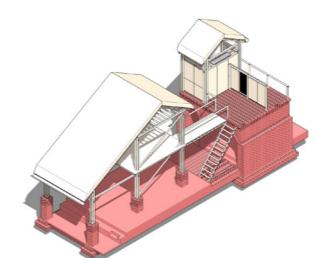


TYPE C

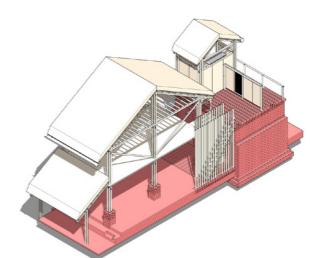
FLEXIBILITY



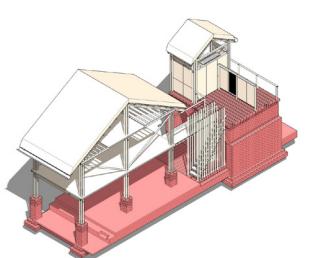
SMALL FAMILY



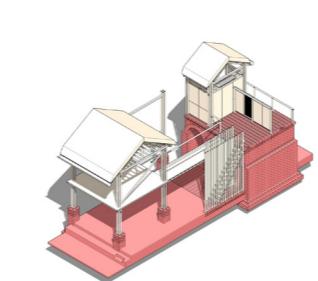
WORKSHOP SPACE IN THE FRONT



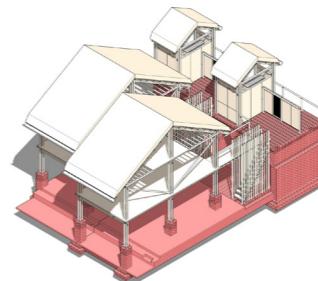
VERANDAH SPACE



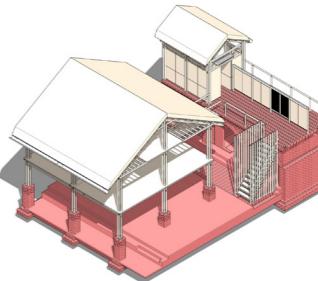
BALCONY IN THE FRONT



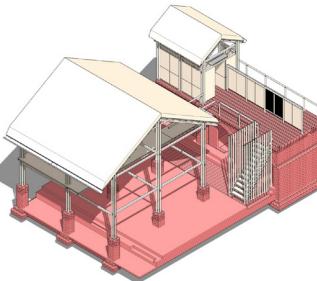
SMALL GF SHOP



NEIGHBOURING PLOTS CONNECT



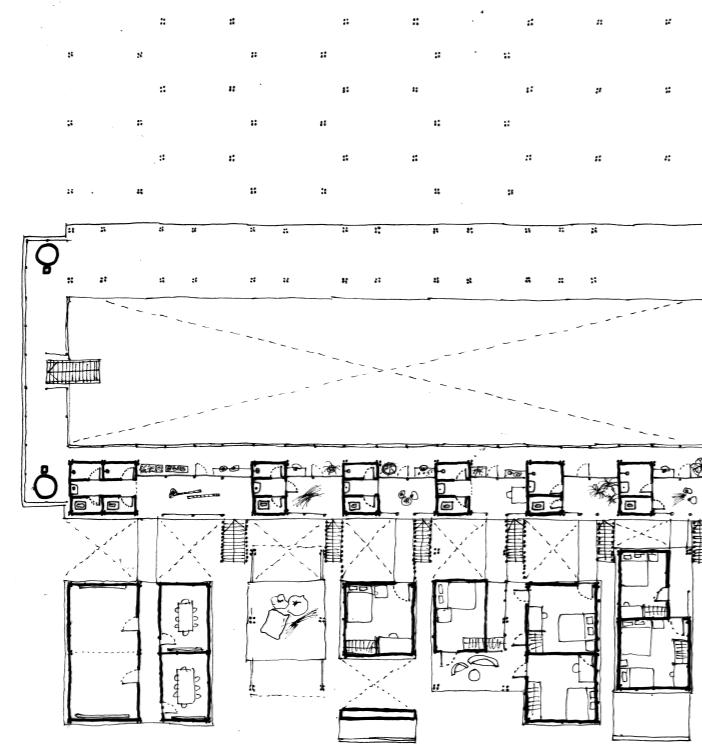
WOMEN'S REFUGE



PUBLIC AMENITY

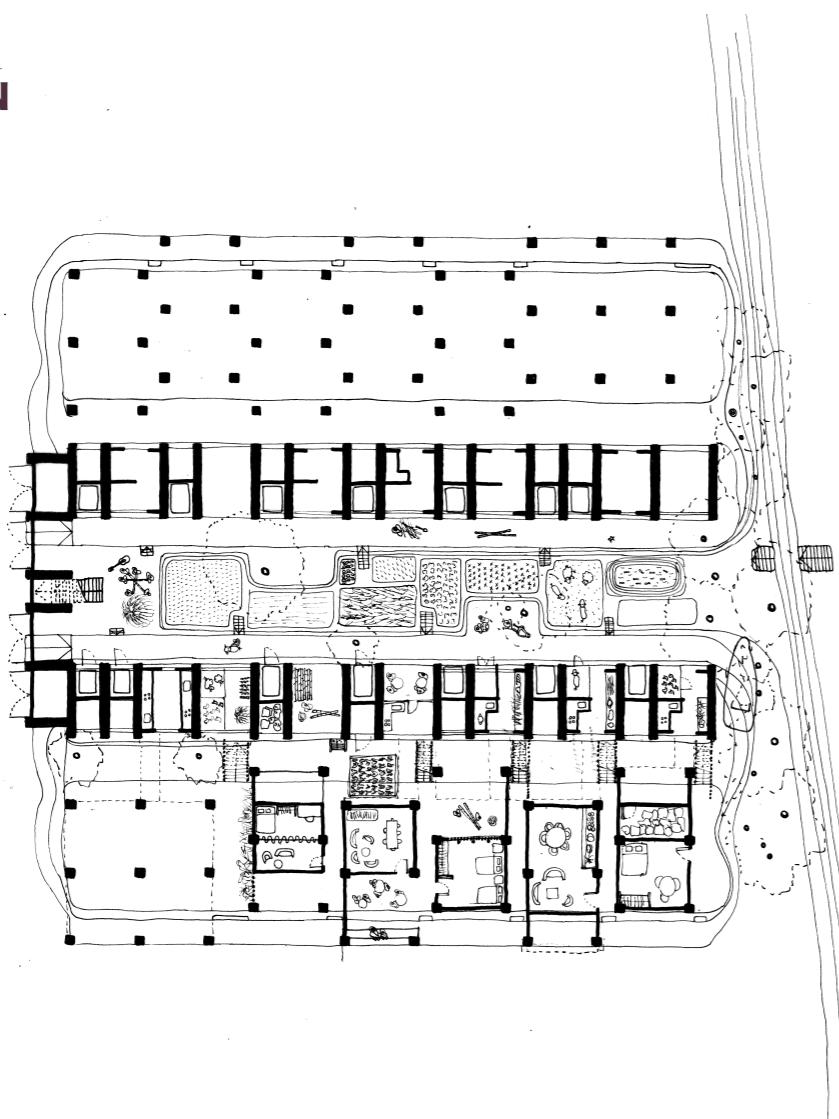
1:200
CLUSTER 1F PLAN

0 2 6 12m



1:200
CLUSTER GF PLAN

0 2 6 12m



462

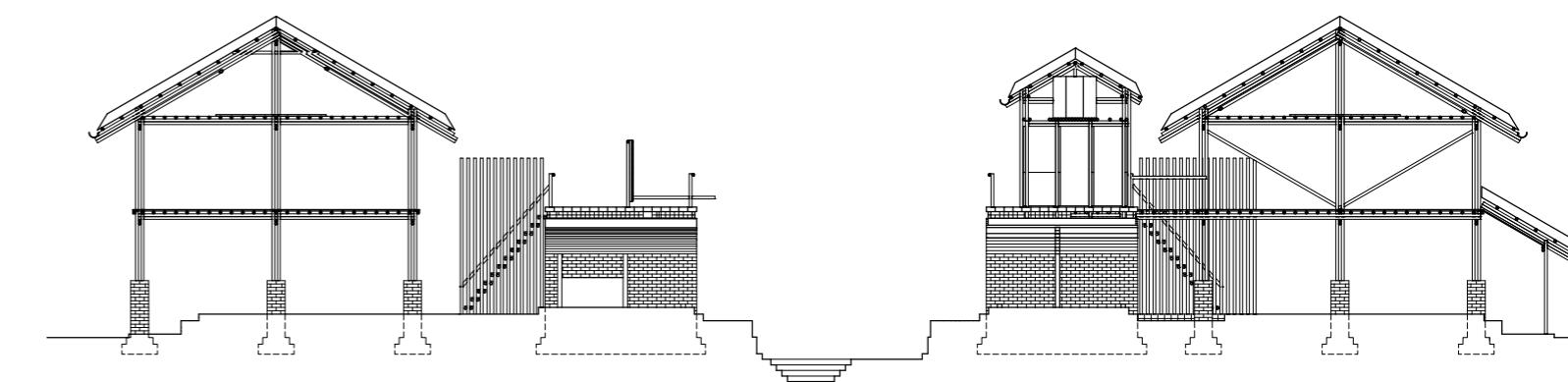
1:100
CLUSTER FRONT AND BACK ELEVATIONS

0 1 3 6m

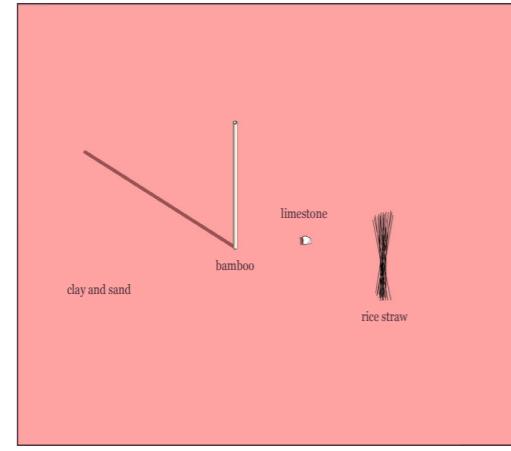


1:100
CLUSTER SECTION

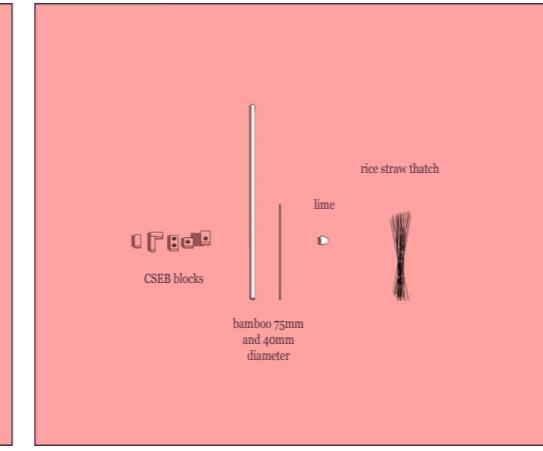
0 1 3 6m



01



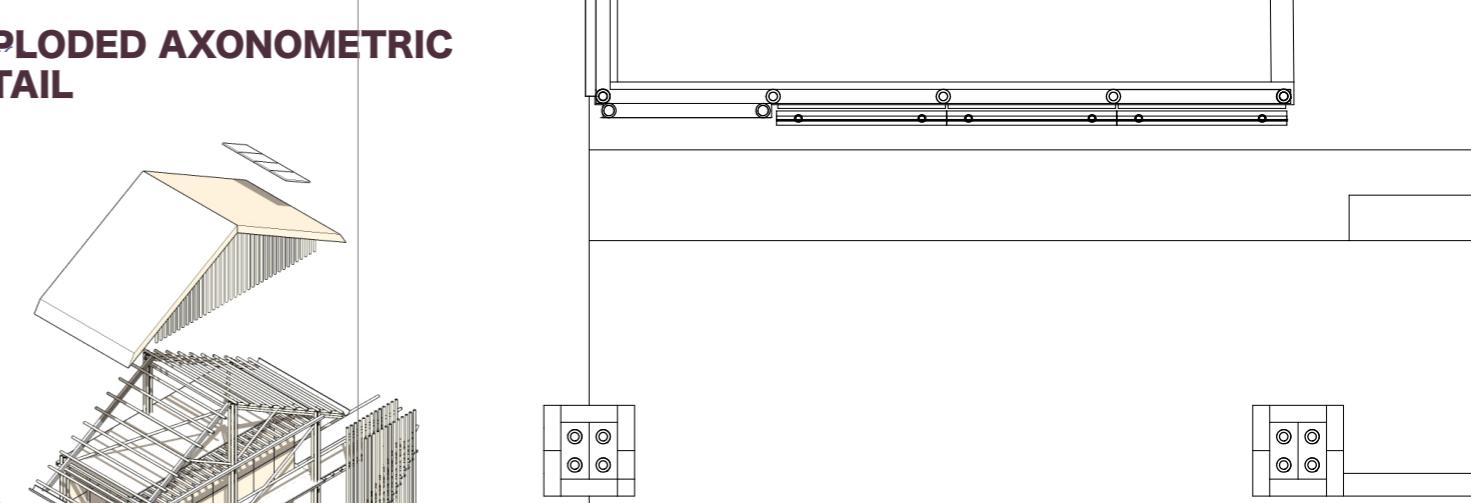
Accessibility of raw materials



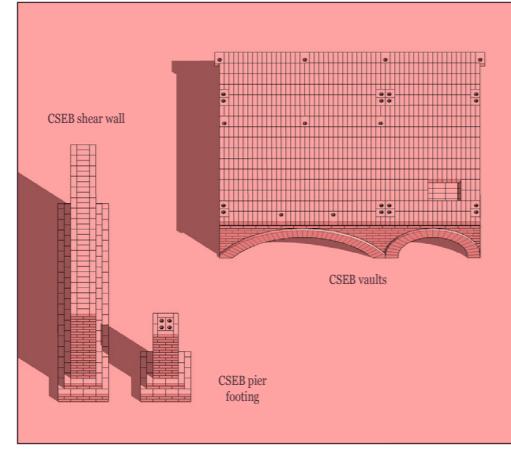
464

1:20 EXPLODED AXONOMETRIC DETAIL

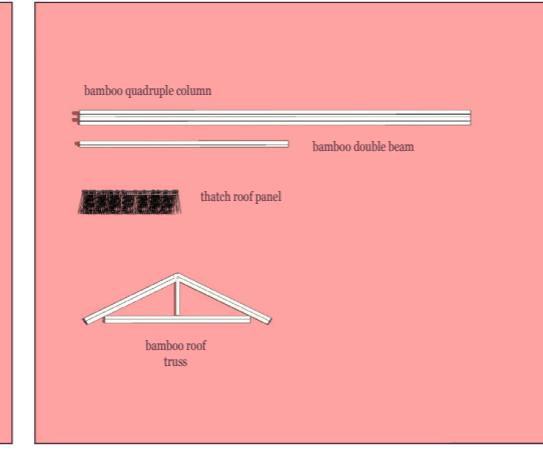
02



03



CSEB primary components

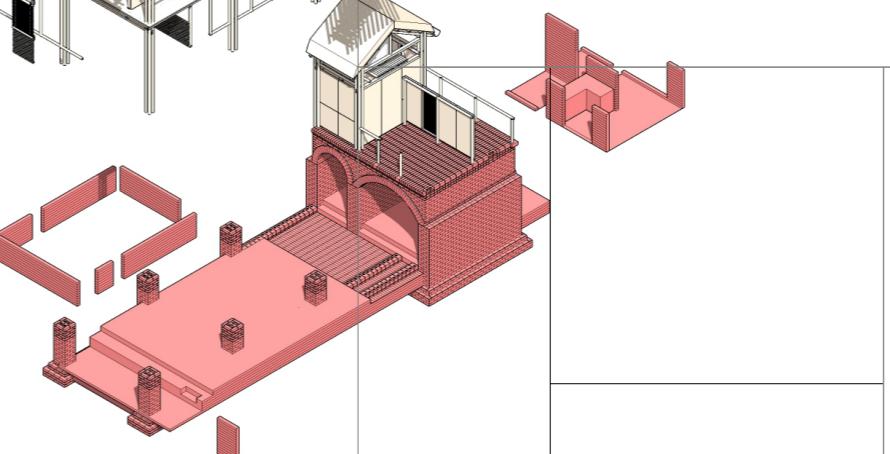


Primary bamboo structure + thatch roof

SITE

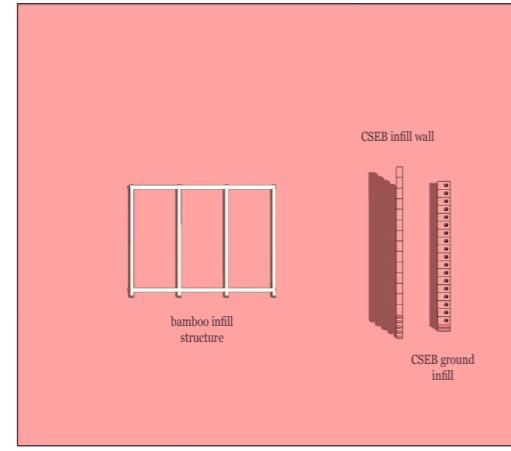
100+ YEARS

04

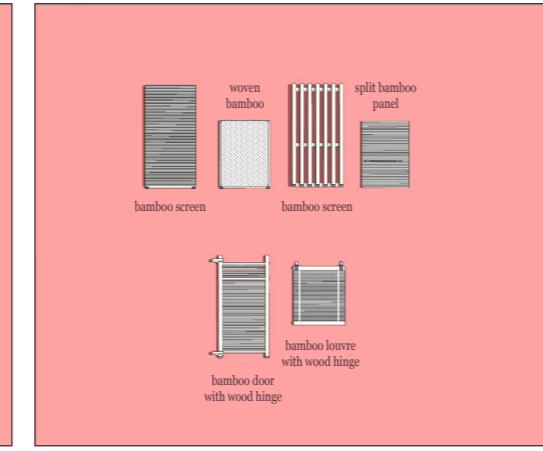
STRUCTURE
30+ YEARS

05

SPACE PLAN



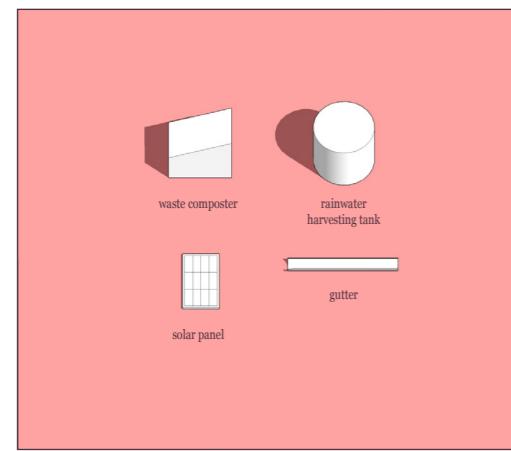
Secondary and tertiary structure



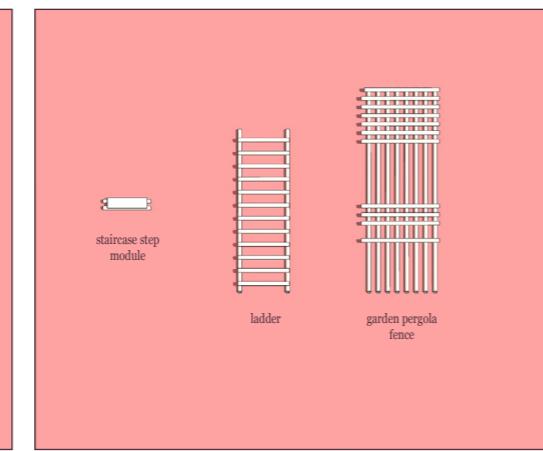
Prefabricated bamboo panels

07

SERVICES



Rain, sun, waste



Furniture and stairs

08

STUFF

Primary structure
CSEB piers 480 x 480mm with strap beams
Quadruple bamboo posts (pre-treated) 75 mm diameter
Bamboo cross-bracing 75 mm diameter
Bamboo double beams 75mm diameter

Secondary structure
Bamboo posts and beams (pre-treated) 75 mm diameter

1 Split bamboo panel 900 x 900 H
40mm diameter split bamboo
75mm diameter bamboo frame

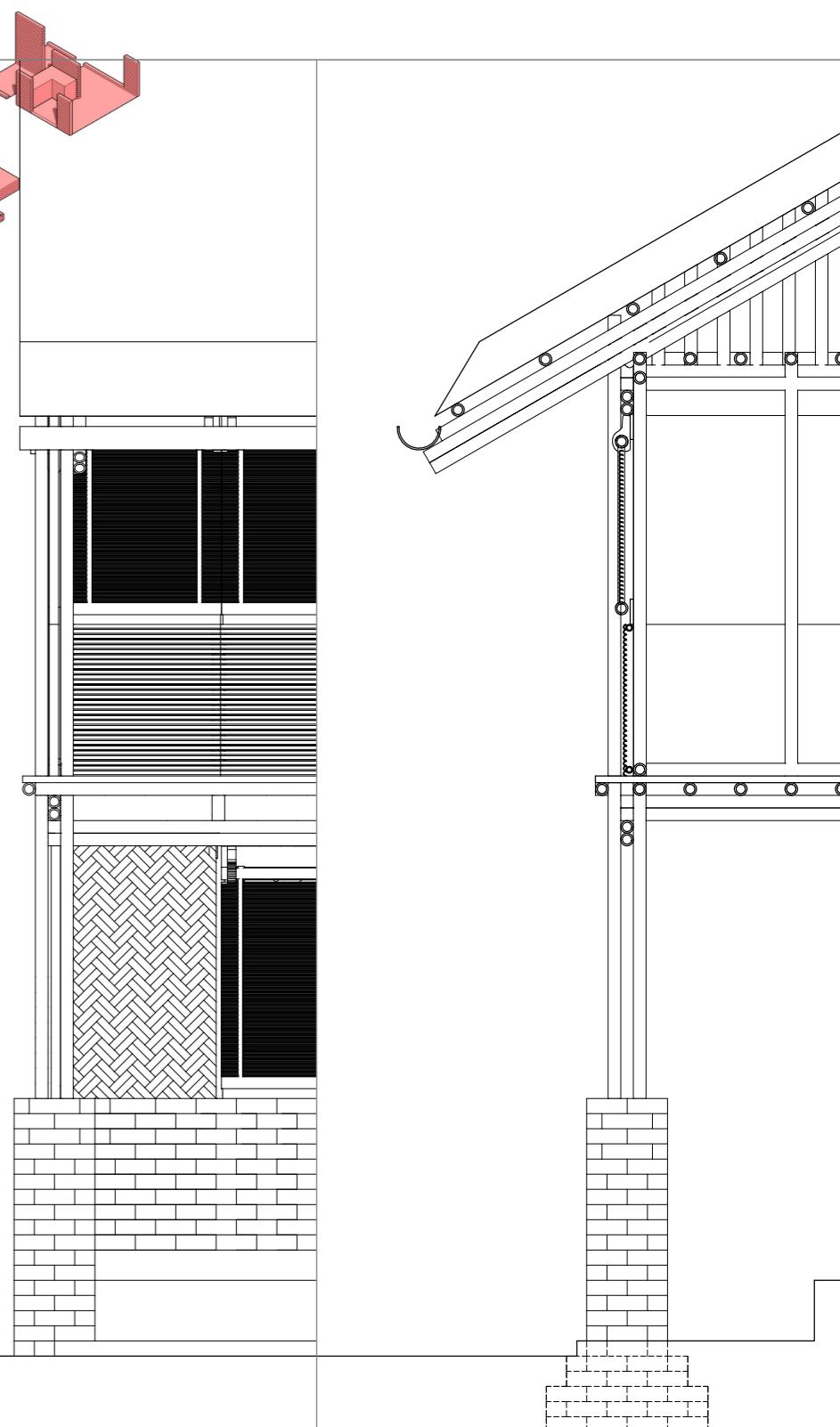
2 Woven bamboo panel 900 x 1500 H
woven bamboo 5mm thick
75mm diameter bamboo frame

3 Louvre window module 900 x 1500 H
40mm diameter split bamboo
angled at 45 degrees
75mm diameter bamboo frame

Roof panel 1200 x 900
thatch (catkin grass, rice, straw)
sewn together onto bamboo strip

Treated bamboo gutter
250 mm diameter

Wooden floor boards
150 mm wide floor boards made locally in the Haors, 40mm thick



PROCESS TO P4'S REFINED DESIGN

COMPROMISES AND ELABORATION

QUESTION: *What was your biggest takeaway during this period?*

The density problem had been one I struggled with throughout the project. Even in Global Housing's managerial strategy game, learning about resilience and efficiency, the idealist in me was not willing to compromise on the quality of life (or space). So coming from P3 with a generous low-income dwelling unit that achieved the number of people per hectare but not dwellings, I decided I want to achieve the number of dwellings per hectare for feasibility, AND retain quality of space. This was definitely ambitious. I had to compromise on the size of the units, and re-iterate the dwelling unit proportions. However, forcing myself to compact the grid and re-questioning the scales of the prefab panels in relation to the women who craft them, actually brought more clarity to the design.

Another decision I needed to make was using burnt bricks instead of CSEB. The choice for CSEB was thoroughly considered and the case for it well-built at that point. However, learning that in India a CSEB wall had to be cement-plastered because the climate was too humid and there was mould growth made me reconsider. Although women would not have access to CSEB production and hence use it for income generation, and the embodied energy would be nearly ten times greater by using burnt brick, having a managerial strategy in place for a one-off construction, and the investment into a durable structure that would not need women's yearly maintenance outweighed the cons, and the choice was made for burnt brick.

In conclusion, my biggest takeaway during this period was learning to compromise. I think I gave my best effort, or rather, my stubbornness tried many ways to achieve the best outcome for women of the Haors, and learning how to make an optimised compromise is always necessary in reality.

QUESTION: How will the final part of the graduation period be filled in?

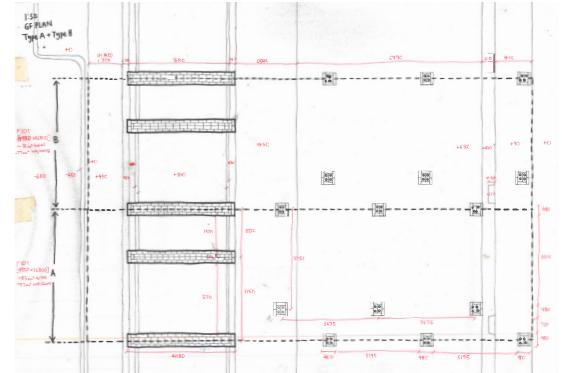
I plan to refine the design further, elaborate on more of the details of each scale, and because it is a research-by-design approach, inevitably conduct more research, and design, and so on.

Furthermore, I plan to make a cluster model to show how at one time, many scenarios can co-exist- land tenures, household sizes, family types, income generation types, financial levels, years of residence, women's refuge, public amenity, etc.

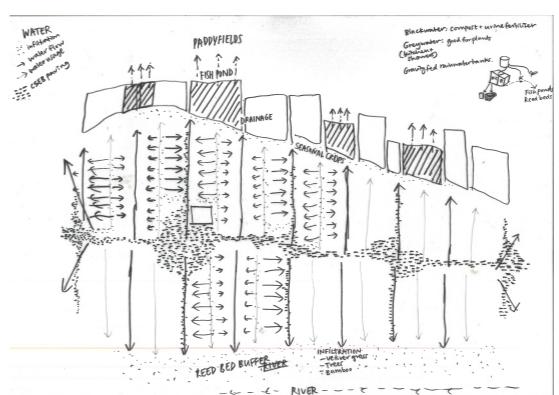
Finally, to make the problem statement video, presentation and drawings as clear as possible because there will be a public audience who do not know the project or the site.



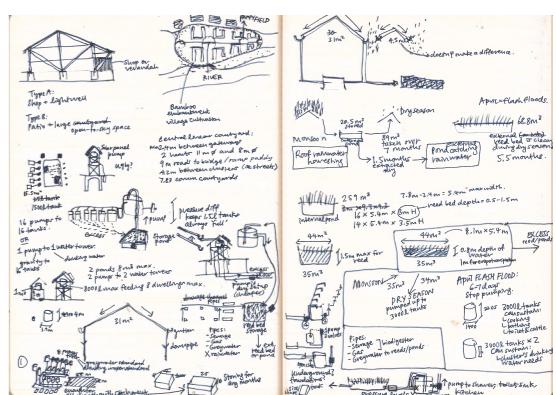
hierarchy in public space



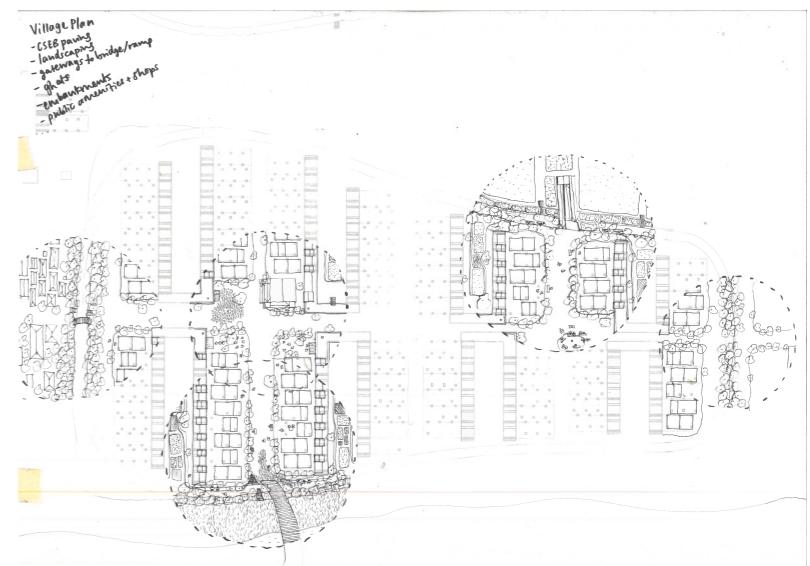
grid and plinth reset



water cycles



rainwater harvesting



placemaking and streetscape

DEFINING THE ESSENCE: SYSTEMS

QUESTION: What is 'Housing for the Women of Haors' about?

Systems. The project is the interaction between an existing landscape system, a building system, different temporalities, and the dynamic nature of life in the Haors. It is not only designed FOR the women of Haors, but enabled BY the women of Haors. It is a feminist social housing system.

Distilling down to the essence of the project was a challenging process. On one hand because the project involves so many aspects and their interrelations, and on the other hand because they all pointed back to my positionality and agency as a designer. And this was personally a constant work in development, of reviewing and revising what housing for women can and/or should be.

GUEST: What if men take over the construction chain?

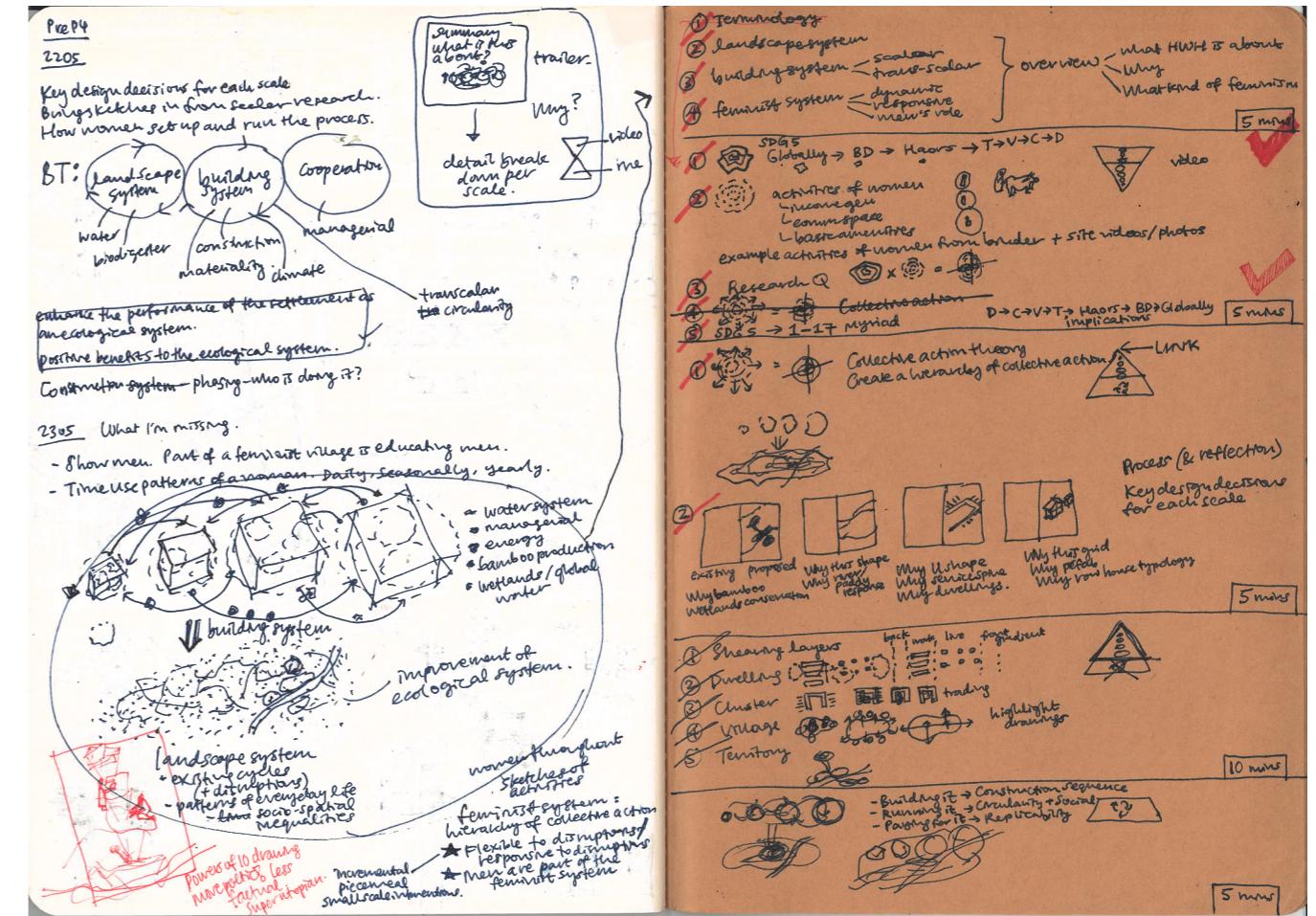
There was a very interesting conversation pre-P4, with Nelson, myself, and a guest from the Manchester School of Architecture. I had skimmed through my presentation to get feedback on the flow of the slides, and this led to some thought-provoking questions from the guest. Not so much on the actual design, but more so on the intent and possible social issues that could arise.

Needless to say, this had me reflecting a lot. I became more steadfast in my convictions:

- 1) The feminist system I design is not antagonistic against anyone or anything except socio-spatial inequalities. Men and women can both take part in the design and construction process. This led me to clarify what feminism means in the project-targeting SDG 5 gender equality, which leads to advancements in all the other SDGs.
- 2) It is not merely women's involvement in construction that empowers them. In fact, this is only a part of the system. Embedded within the spatio-temporal designs, and within the managerial strategy, are principles translated from research that increase women's access to resources, and are effective short and long term.
- 3) 'What if' questions can technically be applied to any scenario, and are important to think about. As a designer, not capable of solving social issues (thankfully?), I recognised the importance of research (e.g. case studies) to make design decisions based on. This led to my approach called "Divergence", a combination of the definition of 'future' by Elizabeth Grosz and the theory of futures studies. In diverging from the status quo, moving away from a deterministic view of 'the future', these 'what if' questions become important tools to assess scenarios and enable more divergences.

QUESTION: What model to make?

1:100 of the cluster. As Nelson likes to put it, the DNA of my project is embedded in the cluster. The essence of the feminist social housing system is captured in the cluster scale. It enables a hierarchy of collective action, independent water management, food security to an extent, individual autonomy and income generation opportunities.



PROCESS TO P5'S FINAL DESIGN

FINAL REFLECTIONS

QUESTION: Did your research and design approach work?

Designing in territory, village, cluster and dwelling (including technical building design) scales, essentially from 1:5000 to 1:5, and using a continuous feedback loop between research and design, has helped the design develop in so many ways. With water management, energy cycle, material cycle, and managerial strategy considerations in addition to existing architectural and urban design ones, issues keep appearing, and solving the issues has consistently made the design better and better, to my surprise. The approach has given the project a holistic-ness to it, a richness. Furthermore, the non-linearity of the research-by-design process has forced constant questioning and refining of the necessities and logic of solutions, and this has only made the concept clearer and stronger.

QUESTION: How do you assess the value of your way of working (your approach, your used methods, used methodology)?

I believe the approach of firstly, questioning your positionality and continuously doing so is useful in every research and/or design scenario. The approach of secondly, placing women at the centre, with a theoretical framework to conduct research and design by, and with your agency as researcher/designer always in the picture, is useful for feminist spatial practices. The approach of thirdly, a mixed-mode methodology organised in scalar and thematic trans-scalar is useful in research/design of similar scalable properties, and in contexts that require understanding more intangible socio-cultural issues/values. Lastly, research methods of literature review and case studies are standard tools and are very valuable; fieldwork is necessary to be confronted with your off-site research; analytical cataloguing and mapping are especially powerful for spatial practices as both a research and a design tool.

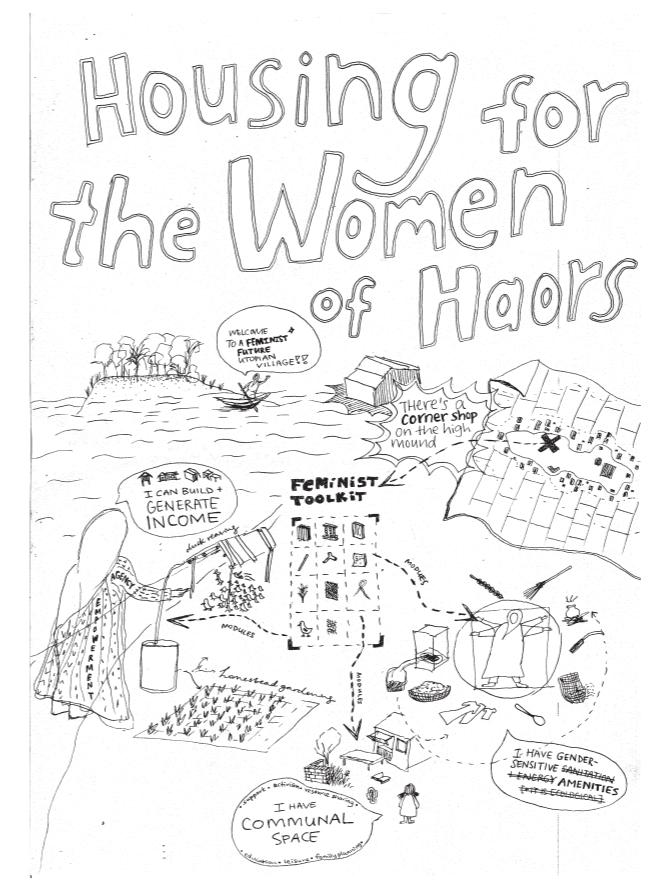
QUESTION: How do you assess the value of the transferability of your project results?

I believe that the results are transferrable throughout the Haors of Bangladesh with nuances, of course. In other wetlands in sub-tropical zones, the framework of research and design, and the design principles are also transferrable. And in contexts of socio-spatial inequalities against women (globally), the project's approach is transferrable.

QUESTION: What have you learnt from your own work?

I realise the responsibility and limitations of an architectural designer. The role of the architect is to plant good seeds, everything else will be and should be appropriated.

I also learnt just how complex social issues are. I can design for women, targeting SDG 5 gender equality, and find my research going into wetlands conservation and income diversification, and that is truly complex, challenging yet beautiful. I see many corners of research and design work all working towards global development, and I can see the part the architect plays, and the importance for interdisciplinary solutions.



manifesto poster



the feminist system



imagining an alternate
feminist future to
increase women's
access to resources

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Figure 1: Women's unequal access to resources on all scales and the metaphorical erosion of agency. Drawing by author.

Figure 2: Map of topography that exists across Bangladesh. Image by Google Earth.

Figure 3: Map of Bangladesh's Northeastern Haor region with part of the mountains in Meghalaya, India. Image by Google Earth.

Figure 4: Map of a part of the Surma River in the Haors of Sunamganj, Bangladesh. Image by Google Earth.

Figure 5: Map of site. Image by Google Earth.

Figure 6: Three resources of private, semi-public and public scales from top to bottom. Drawing by author.

Figure 7: A man and his cow in a Haor settlement. Photograph by author.

Figure 8: Two women in the narrow walkway between houses in a Haor settlement. Photograph by author.

Figure 9: Part of the family living in this Khudi Bari. Photograph by author.

Figure 10: Map of the margins, map by Nishat Awan, "Screenshots from the web interface designed to explore each walk in section with the ability to overlay walks. The elevational photographs at the top and bottom are used as navigation" in Nishat Awan and Phil Langley, "Mapping Migrant Territories as Topological Deformations of Space," *Space and Culture* 16, no. 2 (April 4, 2013): 229–45, <https://doi.org/10.1177/1206331213475746>.

Figure 11: Sketches of architectures of care, drawing by Huda Tayob, "Hanaan's shop, Bellstat Junction, Cape Town." in CCA, "Architectures of Care," accessed October 15, 2023, <https://www.cca.qc.ca/en/articles/issues/30/of-migration/81159/architectures-of-care>.

Figure 12: Example of a publication by WIEGO, cover by WIEGO, in Simeen Mahmud, "Home-Based Workers in Bangladesh: Statistics and Trends" (WIEGO, April 2014).

Figure 13: Women and girls in a Haor settlement. Photograph by author.

Figure 14: "Expanding A Woman's Sphere of Agency". Diagram by author.

Figure 15: Research design diagram by author.

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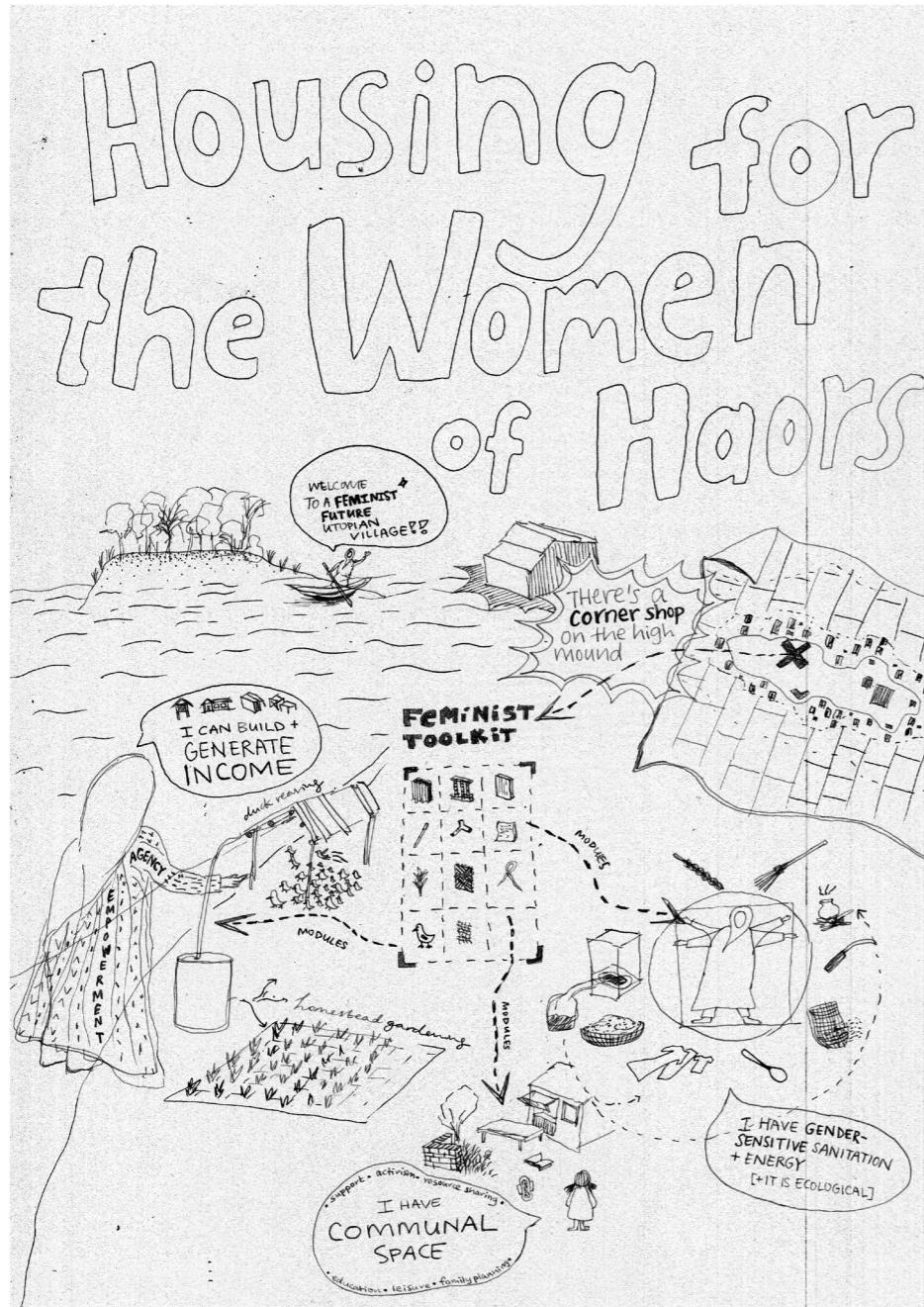
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**HOUSING FOR THE WOMEN OF HAORS,
HOUSING FOR WOMEN,
HOUSING FOR GENDER EQUALITY**