Enjoy the Life

Field

Architecture Design; Product Design; Material Design; UX Design; Service Design

Brief

According to the research, as the economic development in most areas of Africa **is extremely poor,** many people live somewhere too bad to confirm the health, especially in some remote areas. Besides that, they **do not classify living areas clearly;** thus, it causes many healthy problems such as infectious diseases are widely spread. This group of modular buildings design and service design helps Africans who lived in remote original villages to **have a better living environment to keep convenient, cleaning, and healthy life**
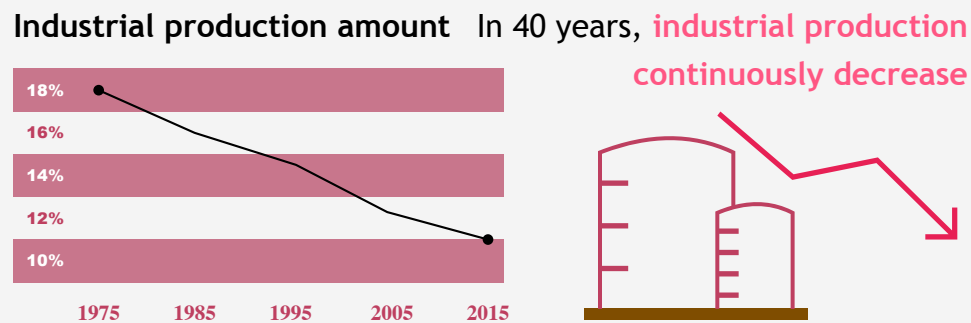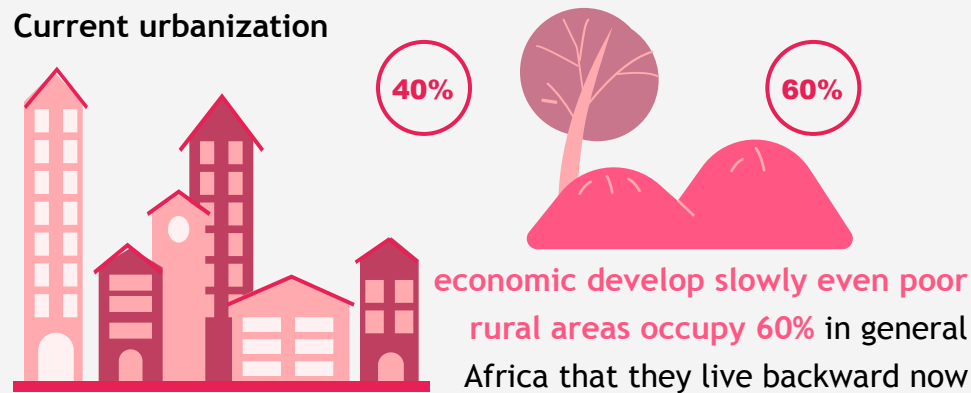
Background Information

Current villages in Africa

In Africa countries especially sub-saharan areas, almost **99% areas are poor villages**

99%

Village areas in sub-saharan areas

Economic development is slow

Industrial production amount   In 40 years, **industrial production continuously decrease**

18%
16%
14%
12%
10%

1975 1985 1995 2005 2015

Current urbanization

40%

60%

economic develop slowly even poor rural areas occupy 60% in general Africa that they live backward now

Demanding Background

Case analysis

In Africa, people's **living conditions are very bad.** Especially in rural area, it almost like primitive society as the economic is poor

Children malnutrition

Schistosomiasis

Food shortage

Poor housing condition

Question raised

Many healthy problems **especially infectious diseases** are widely spread in Africa

Yellow fever | Cholera | Pestis

Malaria | Dengue | Ebola virus

Biharziasis | Hepatitis B | • • • •

Disease spread in Africa

Reason analysis

There have **not clean and high quality of facilities** which are also because of they are hardly to support them

Most of them are **unprocessed materials** to build living areas so they cannot **protect health and safety well**

Defining the Product

Product objective

I divide **functional improvements of the house** because it is mostly and directly related to people's lives as a pointcut

Convinient — People can use facilities of community simply like easily building and moving

Healthy

Clean — Make sure about safety of habitants & Minimize spread of germs

Interview of user demands

I interviewed my **African American friends** to get more local information as **they know more** about their hometowns than me

Rondell Romeo
Student live and study in New York now and originally came from Ghana

■ **Knowledge of dwellings of inhabitants**
"I've ever gone to rural area in my original city one time. Also, I usually read news of exploring African village life."

■ **Original lived way**
"In rural area, they mostly live as group community included someone dwells with their family members."

■ **What do you think need to improve?**
"Living place is simple and crude even many built with branches and grass; clean water is also severe problem."

■ **How would you improve their living areas?**
"Firstly, I need large amount of money. Then, I want to design a modern appearance of house could be cleaner than before. Moreover, I need more pipes to run the water to the home to keep their healthy safety."

Jeremiah August
African American studies and works in New York currently

■ **Knowledge of dwellings of original**
"Although I have never come back to Uganda, I know some basic problems of village life in that place."

■ **Original lived way**
"Most of them live with family members and several houses separately located in that area and usually have group acitivies."

■ **What do you think need to improve?**
"The environment is poor and disease spread in Africa. And clean water and modern medicine should be solved."

■ **How would you improve their living areas?**
"I want to solve healthy safety of people to prevent spread of disease. For example, setting different using areas in that location such as living, cleaning and drinking so everyone has not close contact and keep health."

Specific analysis

Generally they live at the primitively rural areas in Africa **do not classify clearly** in their lives that even everything **just work together**
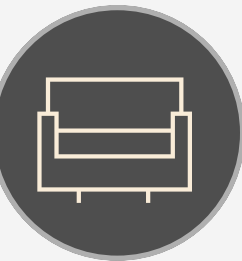

Dry rural area

Live with livestocks

Living and cooking together

Poor sanitation

Pain points summary

Currently Africans in rural area **only have two community plate**

Living area
- Sleeping
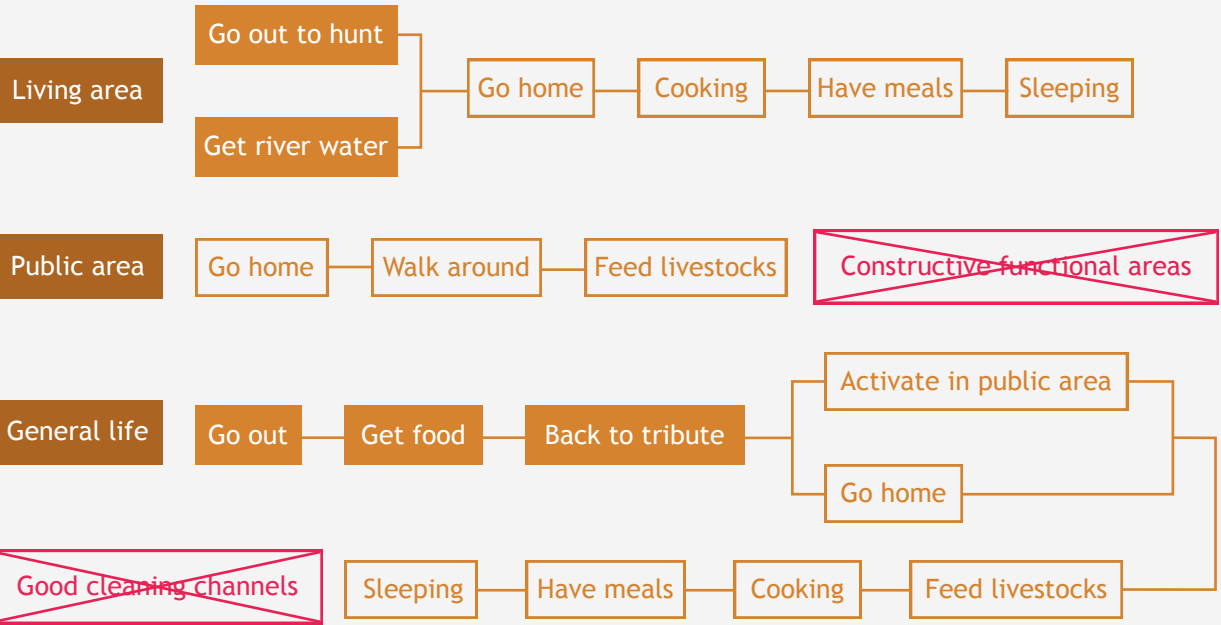- Cooking
- Feeding

Public area
- Walking
- Enjoying
- Feeding

Their current living plates could be classified into just **"living area" and "public area".** Besides that, they do many activities mixed **in only plates** so their **health and saftey are under the great threat**

User flow

Current situation

I split their plates to **analyze the pain points** through every situation they would meet to find **how to improve on the certain contacting points** to solve their problems

Living area: Go out to hunt / Get river water → Go home → Cooking → Have meals → Sleeping

Public area: Go home → Walk around → Feed livestocks → ~~Constructive functional areas~~

General life: Go out → Get food → Back to tribute → Activate in public area / Go home

~~Good cleaning channels~~ → Sleeping → Have meals → Cooking → Feed livestocks

Africans' life almost **mixes all kinds of works** in only living plates. The most serious problems are **loss of constructive functional areas** and **origins of cleaning habits**

Expectable user flow

Go out to hunt / Get river water → Come back to tribute → Deal with prey / Deal with water → Cooking
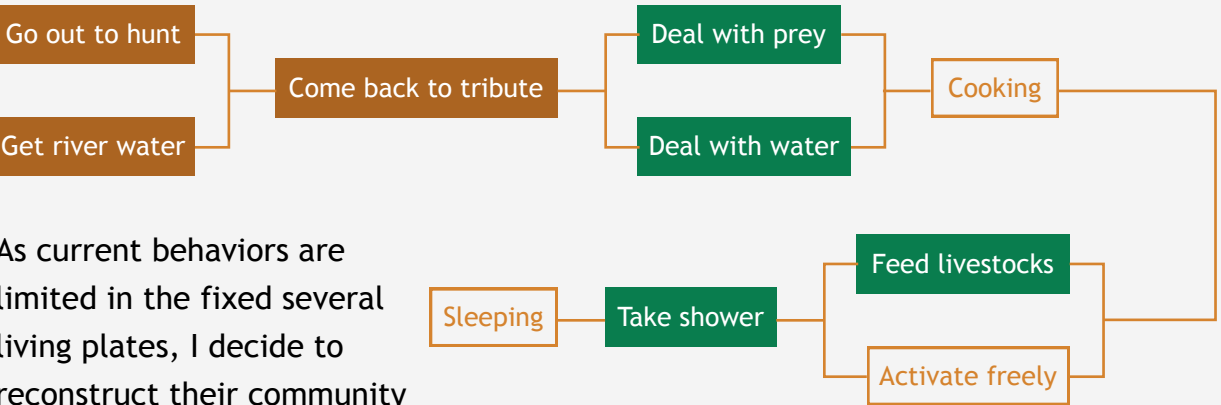
As current behaviors are limited in the fixed several living plates, I decide to reconstruct their community

Sleeping → Take shower → Feed livestocks / Activate freely

User journey

If we improve **the service design** of community, the experience of lives would get a higher equality. I analyze them according to the **As-is** and the **To-be user journey**
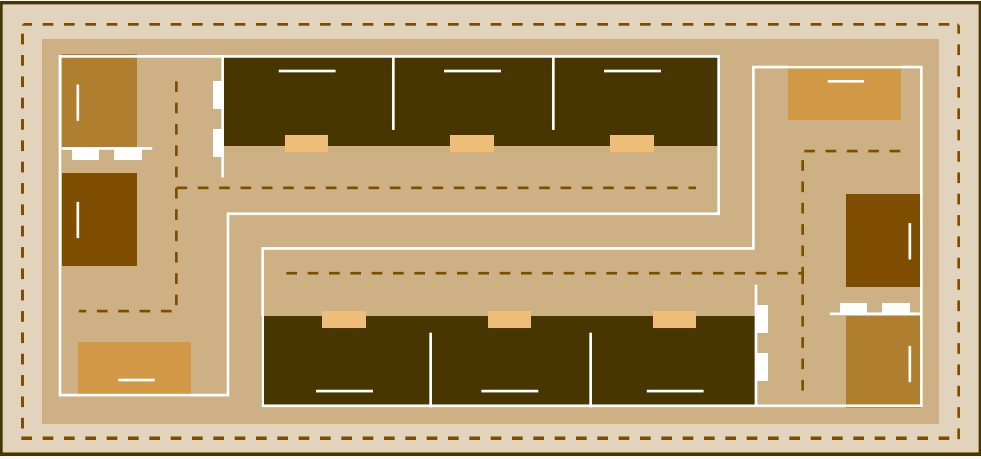
As-is user journey

Go out	Back tribute	Feed livestocks	Back home	Eat & drink
• Hunt animals as food • Get water from river	• Walk around at public area and talk with each other	• Get food fed livestocks • Let all livestocks eat	• Come back to home	• Deal with hunted meals • Drink water of river • Go to sleep after eating

- It is so excited to get food
- Hanging in tribute and talking with other make life happy
- Maybe not convinient to "live" with them especially no cleaning
- Go home to start own life
- How to clean meals and body better to prevent bacteria before sleeping?

To-be user journey

Go out	Back tribute	Feed livestocks	Eat & drink	Back home
• Hunt animals as food • Get water from river	• Walk around at public area and talk with each other	• Get food fed livestocks • Let all livestocks eat	• Deal with hunted meals • Drink water of river	• Cook meals • Go to showering area • Back home and sleep

- It is so excited to get food
- Hanging in tribute and talking with other make life happy
- Isolation makes feeding more convinient and cleaner
- Cleaner food and water may decrease unnecessary concerns
- Feeling better after cleaning especially in end of day

- 🟩 Living room
- 🟫 Water room
- 🟧 Shower room
- 🟨 Cooking area
- 🟧 Feeding room
- - - - Walking space

"Enjoy the Life" includes **4 different functional areas.** And **every 3 families** share a group of **feeding, watering, and showering rooms**

Simple
Satisfy daily needs
Effective layout

Clean
Strengthen the cleaning facility

Healthy
Classify functional areas & Include rooms to clean

The regional test

As I **tested the community** layout with boxes to mock the building, it is highly possible to **move easily** and set them near the river

🟫 Develop Product

🟫 Design direction

I referenced many living constructures to find the suitable structures to build the **community for human and livestocks.** The key points are **"easy to move and to build"**

- Give various living space and zoning
- Convinient to carry
- Easy to restore and tidy when moving
- Strong and stable
- Easy to build and assemble
- Provide space of breathing for animals

The building lived by humen is inspired by container building convinient to be built and moved

Combining with Dai Tulou in China, a hollow cylindrical building in rural area

Stretched from two sides and round into a hollow building

Livestocks' space stretches flexibly so easily to move and people can choose to build it everywhere

But single piece of tablet is shaky so I reference interspersed structure of blocks

The interspersed structure of building blocks to livestocks

🟫 Material research

I tried to find the most **suitable materials** to build the architectures in communities that let inhabitants more convinient to construct and I used them to **experiment to test** whether it could be worked on building

- Coconut
- Cotton
- Corn
- Pineapple
- Peanut
- Palm

Cannot live without it
"In Uganda in Africa, banana is one of the main meals to people even they always host visitors with bananas"
Banana

Source of stapple food
"Africans often eat starch as stapple food and they get it mostly from cassava; also, it is one of the main crops"
Cassava

The main crop
"Occupies 90% of cultivation in Africa especially in Mauritius and it is pillar of economy to people"
Sugarcane

Africa is the hometown
"The largest coffee producer in the world is in Ethiopia in Africa that here is perfect environment for it"
Coffee

Development trend

Add demands of "green architecture"
Decrease the emission of carbon dioxide

Composite materials
Highly effective management

Modular Building

Modular construction (called "box building" buildings are expected to rise 6% globally **by 2022**

Why modular
Modular building is highly suitable to current concepts of "green" and "sustainable" and has infinite space for people to search its possibility

Cost

Effective

Green issue

Trend

1st testing of modular **"Dymaxion House" (1930s)**

These modular materials were delivered to U.S. military in **World War II**

But Dymaxion was **lack of budget.** So the original plan cannot be achieved

Thus, we completely have possibility to create **new materials** as the trend in the world and many people have started

These building was constructed by "Cemesto". It is a new material made from **sugarcane**

Material experiments & testings

I tried many experiments to find whether **something new could be used** to build that referenced from **what Africa abound with.** Thus, it may develop in future

Group 1 Banana 10g, tapioca starch 20g

| 1 Bake dried banana peels | 2 Mash dried banan peels | 3 Pour tapioca starch | 4 Add water to mix them |
| 5 Boil with large fire | 6 Boil until becomes paste | 7 Check every 20min | 8 Cool it after baking |

Group 2 Sugar 15g, agar 10g, biochar 60g , calcium propionate 3g

| 1 Prepare 3 groups materials: sugar, agar, biochar and calcium propionate separately mix with water | 2 Boil sugar water and agar water with heavy fire | 3 Add biochar and calcium propionate as bubbling | 4 Cool it as 2nd bubbling |

Group 3 Tapioca starch 15g, sodium bicarbonate 10g

| 1 Boil the tapioca and sodiumbicarbonate mixture with heavy fire | 2 Cool it about 5min | 3 Bake with 150 degree and check every 20min | 4 Put out when it is matte |
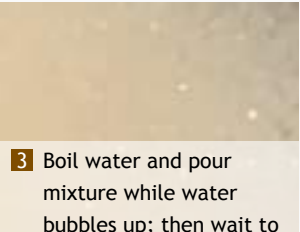
Group 4 Eggshell 10g, gelatin 5g
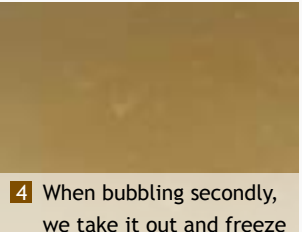
| 1 Collect some eggshells | 2 Pour some gelatin with it together; gelain occupies 1/2 of eggshells | 3 Boil water and pour mixture while water bubbles up; then wait to the second bubbling | 4 When bubbling secondly, we take it out and freeze for 2 hours and cool it |

Then, I researched some properties of architectural materials must have and used the certain tools and ask student to help testing whether materials **satisfy properties**

Group 1 Banana, tapioca starch
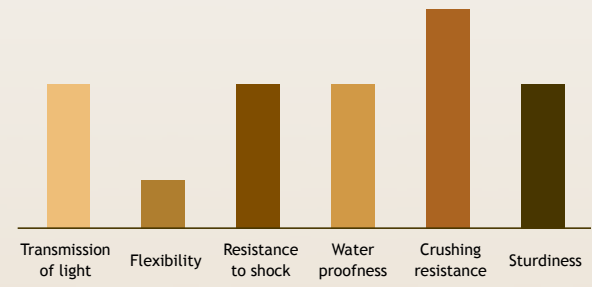
Group 2 Sugar, agar, biochar, calcium propionate
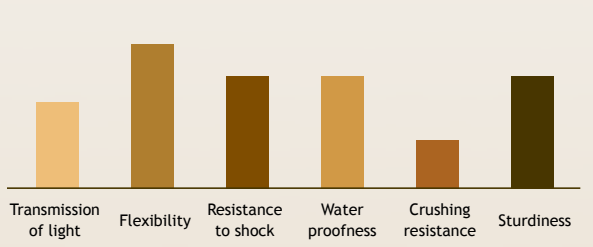
Group 3 Tapioca starch, sodium bicarbonate
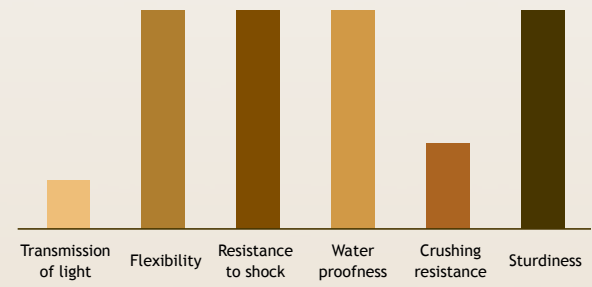
Group 4 Gelatin, eggshell

(Bar charts for each group with axes: Transmission of light, Flexibility, Resistance to shock, Water proofness, Crushing resistance, Sturdiness)

Tapioca brick
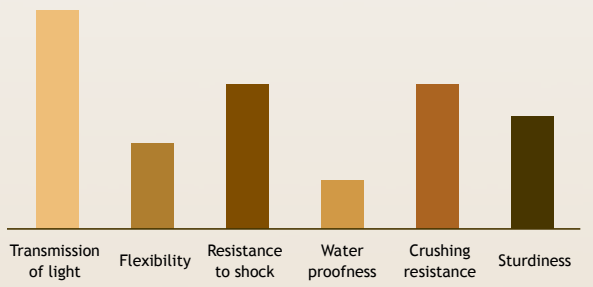
After testings, I found that **Group 3** is the most suitable matarial to be used in architectural building development which have **general good properties.** Thus, it could **be expected to** be adpated in local architectural materials with more specific testings

Process of testing

Transmission of light

Group 1	Group 2	Group 3	Group 4
Edges is becoming slightly transparent	Texture is not impacted by light	Texture and color have not changed	Most of it become transparent

Waterproofness

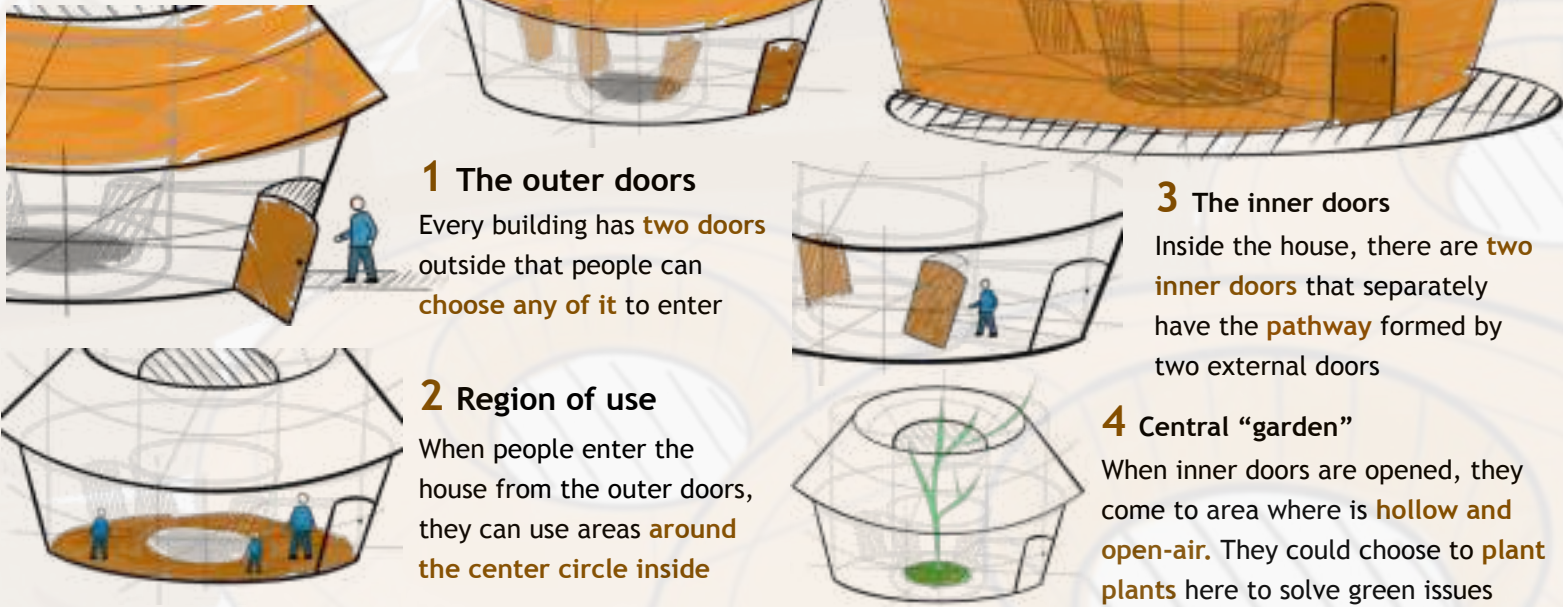| Group 1	Group 2	Group 3	Group 4
Little bit of banana peels separate	Debris keep desintegrating	Material has not changed at all	Eggshell debris desintegrate strongly

Flexibility

Group 1	Group 2	Group 3	Group 4
Broken by dragged in 2 seconds	People cannot break by dragging	People cannot break by dragging	Some debris will be dragged out

Crushing resistance

Group 1	Group 2	Group 3	Group 4
Not influenced by beating with stick	Broken after beating three times	Slightly broken after stick beating	Not influenced by beating with stick

Resistance to shock

Group 1	Group 2	Group 3	Group 4
Intact although dropping from air	Intact although dropping from air	Intact although dropping from air	Part of it is broken when dropping

Sturdiness

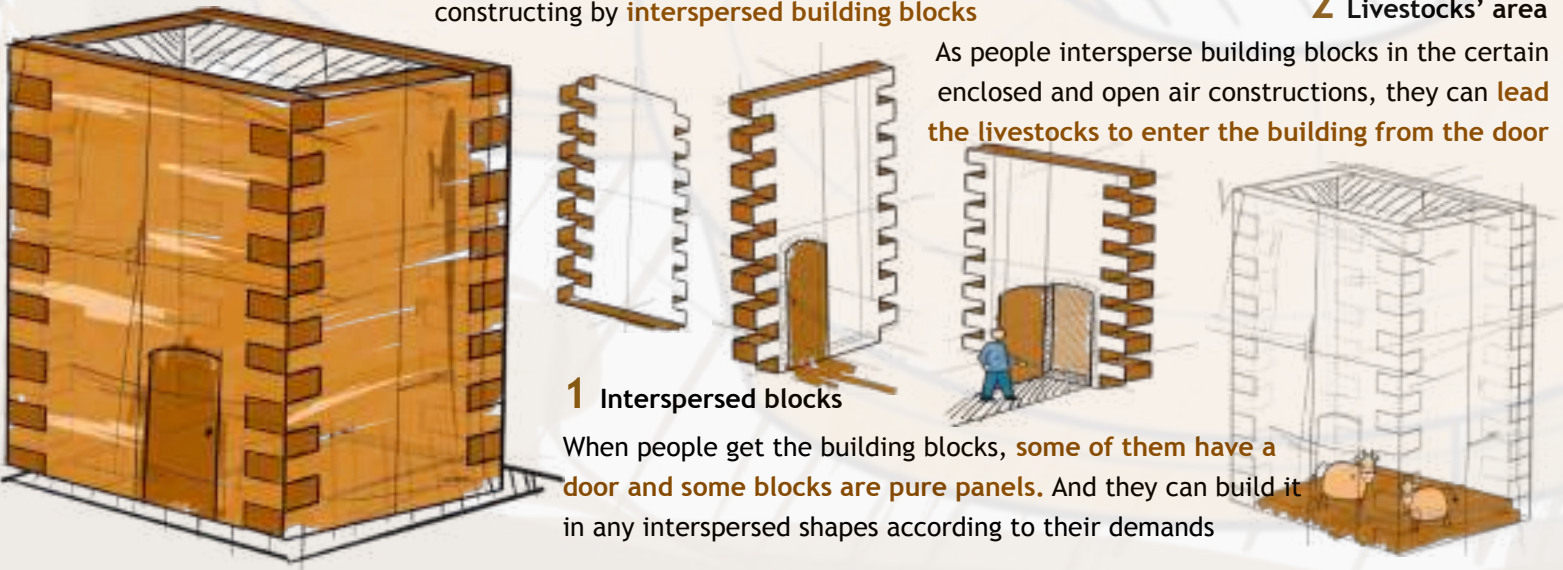| Group 1	Group 2	Group 3	Group 4
No deformation while sitting on it	No deformation while sitting on it	No deformation while sitting on it	No deformation while sitting on it

Function points

Building lived by people

People's house is a **hollow and toroidal** constructure after residents stretching and turning in a circle

1 The outer doors

Every building has **two doors** outside that people can **choose any of it** to enter

2 Region of use

When people enter the house from the outer doors, they can use areas **around the center circle inside**

3 The inner doors

Inside the house, there are **two inner doors** that separately have the **pathway** formed by two external doors

4 Central "garden"

When inner doors are opened, they come to area where is **hollow and open-air.** They could choose to **plant plants** here to solve green issues

Building lived by livestocks

Livestocks' house is an **open cube** with people constructing by **interspersed building blocks**

1 Interspersed blocks

When people get the building blocks, **some of them have a door and some blocks are pure panels.** And they can build it in any interspersed shapes according to their demands

2 Livestocks' area

As people intersperse building blocks in the certain enclosed and open air constructions, they can **lead the livestocks to enter the building from the door**
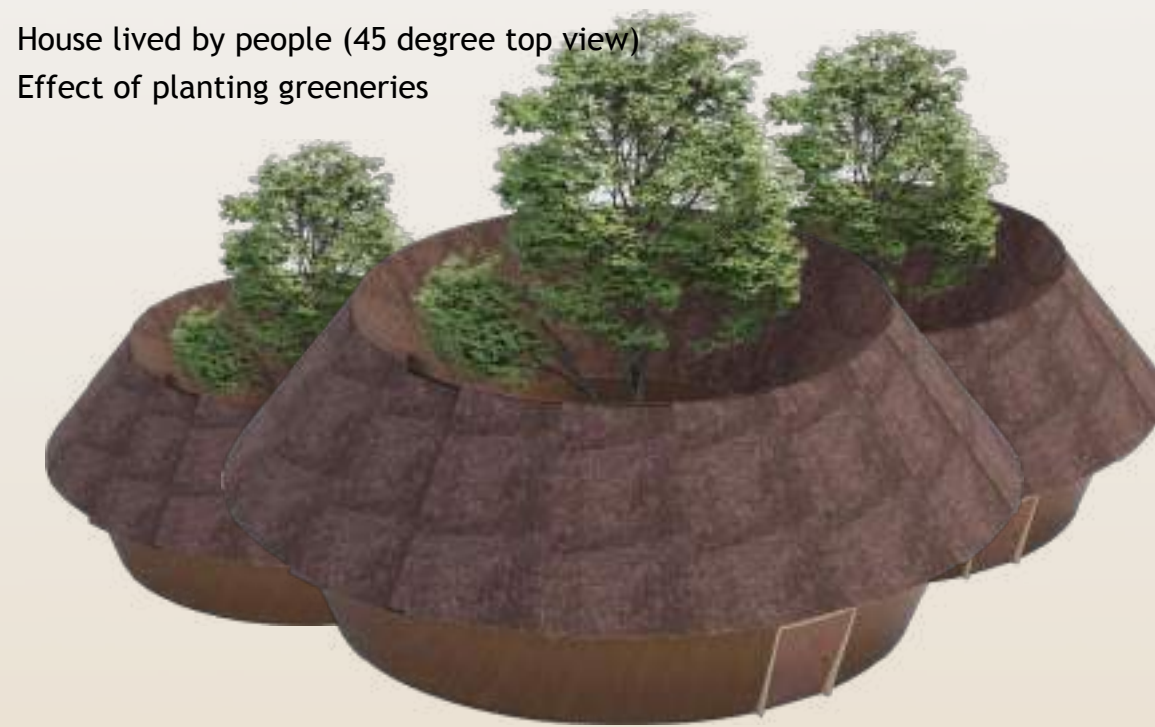
Final design

House lived by people
(front view)

House lived by people (45 degree top view)
Effect of planting greeneries

House lived by livestocks
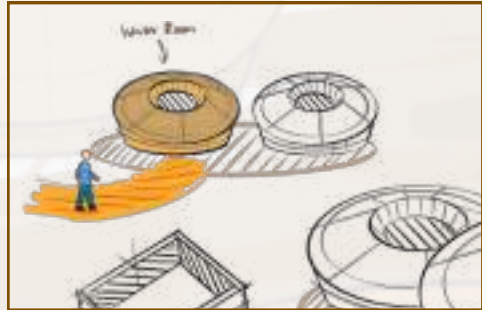(30 degree top view)

House lived by livestocks (45 degree top view)
Effect of raising livestocks

User scenario

Storyboard

These services mainly pay attention on daily specific living demands to solve the cleanning and healthy problems. Thus, people can decide how to use or sequance of using every area **according to their different situations**
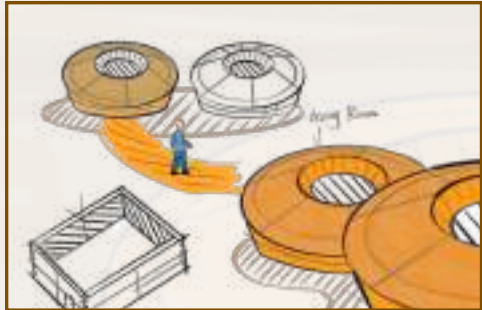
Water room

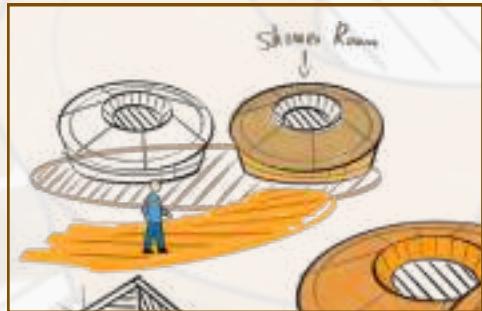When people go outside then come back, they can go to the **water room**

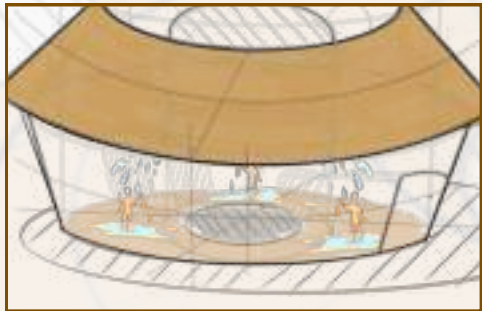In the water room, they can **wash the food** or **filter the water** to drink

Then, they can take food handle well to **living room and cook** them to eat
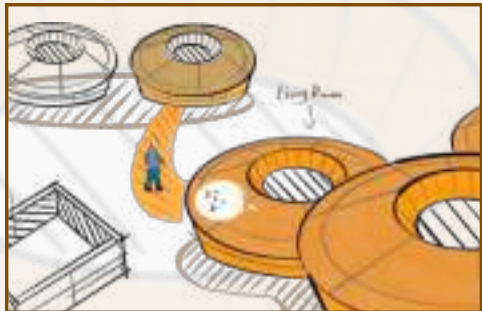
Shower room

Shower room is for **cleaning bodies** as they lack of the cleanning management

As people having the meals or back home, they can go here to **take shower**
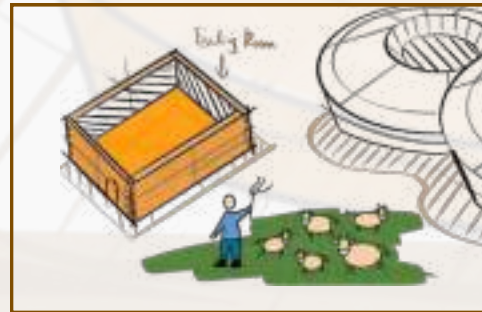
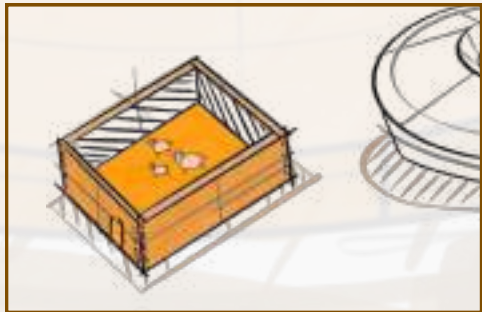After that, they can do something **personally** or go home to **sleep**

Feeding room

Firstly, they may go to **hunt animals or lead their raised livestocks** to graze

Feeding room provides a **concentration area** for livestocks to live in

People **feed livestocks** here and **classify the place** between people and animals