The main focus of the architectural part of my graduation evolves around the current construction culture in the area. For centuries this low cost and easy technique has been used by the local inhabitants and is the key to a sustainable development in the area.

The problems that occur in the current development in the area are mainly due to the western influence. Materials are expensive and the inhabitants need masonaries to construct their dwelling. The design of dwellings doesn’t fit the needs and most of the times these houses ignore climate and culture which are important values to the current dwellings.

For this reasons I will formulate an answer to these problems by using local materials and methods so that the construction culture will be improved and the inhabitants can make their own “designed” dwelling.
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How to Develop Context Sensitive

Most of the current problems of the projects that are being realized are based on the same idea. The owners of the farm decide what will be developed for the inhabitants of their camps. Although they have the best intentions for the inhabitants they often ignore the cultural background and the context of the inhabitants.

It is extremely important that the local community develops themselves. In this way they take the initiative themselves and the will solution suit the needs of the demand.

Another important issue also described in the technical booklet is the technique and materials used by the developers. These are often unknown to the locals and will the developer need to find skilled labour to construct their projects. In this way there is no transfer of knowledge to the inhabitants and is their no actual development going on. The most important aim of this graduation project is to support the inhabitants to develop themselves.
LACK OF COMMUNICATION BETWEEN DEVELOPERS & INHABITANTS

The research is intended to track down problems and points of friction between developer and inhabitants to eventually prevent projects to be realized that don't fit the context at all. For this reason I analysed the opinion of the developers as well as the inhabitants.

During the field research one of the main causes of current problems inside the camps and the new development seemed to be the poor communication between developer and inhabitants. The developers decide where, why and how the area will be developed. In this process the opinion of the inhabitants is ignored and causes uncertainty about the future. This should be solved to construct a durable and sustainable development for the workers of Mount Elgon.
Both developers and inhabitants could help in the benefit of the future of the area. The inhabitants understand the past and the developers the future. For this reason the research tries to understand both sides and let them communicate to each other.

Although the research is really specific for this location and its cultural background it tries to function as an example for other developers. Mainly to show how can the research be approached but certainly also how it shouldn’t. Hopefully giving other developers a way of dealing in such a situation.

In case of the inhabitants I only have great hopes that this research gives other camp inhabitants an example to show to their employees how another farm owner is dealing with his workers.
The research is built on two years of living, working and analysing the context. To build up strong arguments for example why, where and how certain things of the development process are being done, I used numerous of research methods to grasp the context. All of these are explained in the research booklet.

The image that you see on the left is the analysis from a 24 hour observation of a family that lives inside the camps. It shows how the compound inhabitants move and communicate through the day.
From working with the developers of Mount Elgon I gained insight on their “western” aim and perspective for the inhabitants. At the moment they are responsible for the realization of 110 new houses and with it the resettlement of 110 households, and the realization of public health facilities and schools. Although they are doing a great amount of work, in my point of view they ignore or on purpose obstruct the cultural background of the inhabitants. That is the reason why in the first part of the research a critique towards the way they operate will be formulated. Primarily it will describe their perspective on why, where and how they want to “develop” the area (diagram 1). As a conclusion for this Part I some of the main consequences that will most probably happen if they ignore the cultural context of the area will be formulated, next to the overall positive and negative values they put into the development projects.
By working for a couple of years with the developers of Mount Elgon I gained insight on their aim and perspective for the inhabitants described in the first part of this research. More important of course, is what the inhabitants of the camps and the new camp think of their living situation. This second part of the research will convey insight on their perspective of life, future habitation and the possible preservation of customs and traditions. Based on several different types of research like interviews, observations and different types of analysis I’m trying to get as close as possible to the inhabitant’s perspective. More important for this research is that I’m not trying to prove in this part what, where and how they would like to develop. It intends more to show that their perspective is rather in contrast with the developer. This effect called “friction” is explained and analysed in the third part of the research.
The last part of the research is an comparison between the contradictions and similarities between the issues that were stated by the developers and inhabitants. In the current development a lot of restrictions and rules are formulated to organize the inhabitants. This will cause major friction and problems in the future and should be prevented. As this research is meant to function as an communicator between inhabitants and developers, guidelines will have to be formulated. Guidelines that will help during the upcoming years of development on Mount Elgon.
In order to extract guidelines from the research we need to compare the perspectives with each other. To make this possible the opinion of the developer is translated into values. In the examples that you see on the left side the developers see the durability, cooking on open fire and housing relatives and friends as a negative issue. Ownership is a positive issue.
In the examples on the right side you can notice that they are the same as on the past page. These are the same issues only explained from the inhabitants' point of view. When we take a look at durability and ownership are the same as the developer. But outdoor cooking and housing relatives is seen as a positive issue.
So when we put them above each other it becomes clear that the developer and inhabitants agree on certain issues and disagree on others. In this way we can choose which issues could directly be used as development guidelines. The issues that they don't agree on are issues that are left to be solved.

In most of the issues they don't agree because the developers want to prohibit the inhabitants. But most of these issues are a part of the cultural background of the inhabitants. All the problematic issues have another reason and in the research these are explained and solved by a possible way of developing or organizing.
"The quality of living quality depends greatly on how much the community takes care of their village, this is one of the major reasons that the camps are in such poor condition. The fact that inhabitants don’t own their own land, and thus not take their own responsibility, is one of the most important causes of this problem."

"Materialisation should be tuned to what’s available in the area and the price. If not, even small maintenance will cause major problems and will decrease the lifespan of even the most durable dwelling."

The goal of the research was to translate possible solution into guidelines for future development.

As you can see on the left issues that the developer and inhabitant agree on are also translated into guidelines and should be used in future development.
As mentioned before on most of the issues mentioned in the research, inhabitants and developers disagree. In the development rules on the left, I'm trying to solve the problems that the developers have without prohibiting the inhabitants from doing certain activities.

- “Cooking outside is part of the culture and should not be changed to an internal program. Providing people with a proper chimney will prevent fire hazards, which is the main argument to change position of the kitchen, for the developer.”

- “Housing relatives and friends is one of the major causes for the urban sprawl inside the camps. In past conditions, the community would prevent this sprawl to occur. In the new camp, this form of self-regulation should be reinstated by creating communities with their own board of control.”

GUIDELINES

AGREE  DON'T AGREE  UNMENTIONED

POSITIVE  NEGATIVE  POSITIVE  NEGATIVE
- “Inside the main family house there are almost no separations between the different functions, which implies the importance of inner family communication.”

- “There should be searched for an archetype that has a new look and higher durability, also we should be constructing it with local materials and based on the local identity that has created the local vernacular archetype.”

From all the issues set at the start of the research some are left unmentioned by developer or inhabitants. That doesn’t mean they don’t have great importance in the development process. On the left two of the many issues are explained as guidelines.
As stated before the main problem in current development is the lack of communication between inhabitants and developers. The developers make decisions on their own motives and the inhabitants are left to figure out what is going on.

Most of the customs and cultural background are ignored or restricted by the developers and in the long term this will cause major problems between the developers and inhabitants.
To improve communication between developers and inhabitants there should be a central place for inhabitants to meet. In past habitation the village gatherings would occur under a tree in a central place within the community (Right image).

Because the new development area will contain round 100 households this will be rather difficult to fit under a tree. For this reason a light roof should be created to provide shelter from sun and rain.

In Nairobi a successful project was realized by starting with a community centre to develop a part of slums. Over a period of 2,5 years inhabitants had the chance to discuss plans and developers met with inhabitants to support their ideas. This project proves that when the initiative is taken by the inhabitants themselves a strong community may be created. But more important that it starts with a meeting place!
Due to the location of the farm the new development has a great potential for the region. The farm lays next to the road that is the first opportunity to cross the border with Uganda on the northern side of Mount Elgon. Besides, the farm is the largest employer of the region and has the best schools and healthcare. For many people this is the reason to migrate to the area to start live and work there.*^  

In the camps there is at the moment a central meeting place for inhabitants were also celebrations take place. This field is also used as a soccer pitch by the children. From this reference we can see that a large meeting place is needed for all inhabitants to come together and more importantly that it lays the centre of the camps.

**REFERENCE MEETING NEIGHBOURING GOUVERNEMENT MANAGER**

**IMPROVE COMMUNICATION**

Due to the location of the farm the new development has a great potential for the region. The farm lays next to the road that is the first opportunity to cross the border with Uganda on the northern side of Mount Elgon. Besides, the farm is the largest employer of the region and has the best schools and healthcare. For many people this is the reason to migrate to the area to start live and work there.*^  

**REFERENCE COMMUNITY CENTRE AREA CAMPS**

Of all areas that are close to the current constructed new development phase will most likely be the first area to be developed. Because this land is the only one already owned by the farm. It will take years to buy the other possible pieces of land because they are owned by the government of Kenya.*^
IMPROVE COMMUNICATION

Because the design of the community centre is not the aim of this project I will only want to make an estimation on what is roughly needed for the community centre. In the future this will provide the first steps towards the development phase of the community centre. This is an example project that should be taken into consideration when realizing the community centre. In this reference they had a large capacity of sun and wind energy. If there was not enough power they used a generator. (on Mount Elgon the electricity net will be used)

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<th>ELECTRICITY DISTRIBUTION</th>
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<tr>
<td>CAPACITY 500-750 PEOPLE 2000M2^</td>
<td>CAPACITY 2 PEOPLE 10M2*</td>
<td>CAPACITY 8M2 SMART GRID SYSTEM* (MICRO POWER ECONOMY)</td>
<td>2 X WELL*</td>
<td>30 X TOILETS*</td>
<td>500 PEOPLE 1500M2#</td>
<td>HALF SIZE 2700M2#</td>
<td>6 SHOPS#</td>
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Structural enigneer L. Hoogduin made a report on water management and sanitation for the developers. This report is directly used in the project.

REFERENCES

PROJECT HURUMA*

PROJECT SINE MOUSSA ABDOU*

RESEARCH SANITATION & WATER MANAGEMENT*

SAME AS IN CURRENT SITUATION CAMPS#

REFERENCES

PROJECT HURUMA*

PROJECT SINE MOUSSA ABDOU*

RESEARCH SANITATION & WATER MANAGEMENT*

SAME AS IN CURRENT SITUATION CAMPS#

22

DESIGN

AREA

WHY

HOW

WHERE

PROGRAM

WHO

ORGANIZATION

DESIGN

CURRENT/FUTURE
According to different sources the minimum amount of horticulture needed to grow enough food for a family is set round 700m² in order to provide every family now and in the future. We have to limit the amount of families and plots. This will be organized by the community itself but means that about 105 plots can be created with a maximum of 30 inhabitants (when two stories high build).

An average family in the Pokot has between 10-15 families living inside their village. As a consequence, this means that if we want to create a community that fits current occupation, we should divide the entire area in 7 districts.
All parts in the development process are performed by either developer of inhabitants. To make sure that the inhabitants are self-reliant the responsibilities of the developers should decrease over time (blue line). In relation to the inhabitants these responsibilities should increase over time in order to make them self-reliant. The diagram on the right gives an idea from start to finish how responsibilities should lay.
COMMUNITY ACTION PLANNING

As a communicator a community action plan should be written for the entire project.Basically who has responsibilities and how steps will be taken by the developers or inhabitants. In the appendix of this document you can find a sketch proposal for a community action plan for Mount Elgon.
The first task that needs to be taken care of is water. To make any construction possible or to let people gather water plays an crucial role. This close furrow system is advised in the report of L. Hoogduin. The main pipe provides the smaller sub pipes that run to the community wells with water. At the end the main pipe bends of to the Kaptega river to loose excess water.

This will become the central community area and will also be the starting point for development in this area. The program is described before so only community building and soccer pitch are drawn. It is all left for the community and developer to the decide final position.

There will be a main electricity line to the farm within a year so this could provide the inhabitants. A station will need to be made from where the electricity is distributed to the communities. Every community will have to collect the money to pay the electricity every month. This will be collected at the central station and will be paid to the electricity company.
**CURRENT**

**NO CENTRAL REGULATION**
The largest problem in the current camps is the missing form of regulation. There is one chairman but this proved not to be working.

**INHABITANTS NOT INVOLVED IN DEVELOPMENT**
In the current development inhabitants are not included and cultural organization and orientation of houses is completely ignored.

**NO CENTRAL WATER SUPPLY**
At the moment women have to walk often long distances to fetch water.

**NO SELF FORMED ROADS**
At the moment all roads in the new development are designed and paved. This doesn’t relate to the roads in the camps where the inhabitants form their own roads.

**BEING REMOVED FROM THE LAND THEY LIVE ON**
The owner decided that people are not allowed to maintain the current dwellings. There is an area set by the owners where these inhabitants will have to reposition themselves. Basically moving the problem to another area where conditions might even further deteriorate.

**INCREASING AMOUNT OF INHABITANTS COMING FROM OUTSIDE THE CAMPS**
There is a constant incoming flow of new people into the camps. Most of the times people that rent a dwelling in search of a better future. But this also attracts people who try to steal from the inhabitants.

**THEFT & ROBBERY**
There is almost no social control so theft and robbery are occurring often inside the camps.

**FUTURE**

**CENTRAL REGULATION REINSTATED**
With this new habitation area and its community centre there will be a gathering point for the different community boards and chairmen to come together and take decisions.

**INHABITANTS WILL BE INVOLVED IN THE DEVELOPMENT**
With the development plan I set up I’m giving the inhabitants the opportunity to take actions into own hands once again.

**CENTRAL WATER SUPPLY**
With the new introduced central water pipe we can provide the centre of each community with a water source.

**SELF FORMED ROADS**
Giving small informal roads where needed or large fast roads, if needed
In the past villages organized themselves by instating community board and appointing a chairman. From the research I’ve made the main reason for the high density and other problems to occur is the lack of inner organization of the community. There is no control who lives where and why. So to improve this problem is the main aim on the community scale.
Thus to solve the problems of regulation we need to reinstate the community board and chairman. They will have meetings with their fellow inhabitants in order to make everybody agree on decisions to be made.

Again the pokot village shows us with an example how well communal organization works.
Just as for the whole district the principle is the same for the community scale. From tradition the centre of the community is used as a place for gathering and celebrations. Most tribes have a tree or small structure for meetings and celebrations and should also be realized as a starting point for the community. The inhabitants will construct their community together to improve the homogeneity of the community.

The community centre needs to be measured and registered by the area community centre. Each community can set out a maximum of 15 plots. By doing so it shouldn't exceed the amount of a third of the total community area.
Every community centre will have additional structures to get the construction started. Which is the community building. Other facilities are also important like water and sanitation.
As a communicator a community action plan should be written for the entire project. Basically who has responsibilities and how steps will be taken by the developers or inhabitants. In the appendix of this document you can find a sketch proposal for a community action plan for Mount Elgon. Of course is the election of a community board, chairman and the organization of meetings essential for the inner organization.
Although designs have been made for all scales it is important to note that these are only meant as possible scenario’s for the inhabitants and developers. To give an idea how the community possibly could take shape.

As said before the community central area and centre will be developed first. They will need to register their plan and position at the registration office of the area.

After setting out the communal area the inhabitants can start setting out their plots of 350m2 together with other inhabitants.

From the plots the next step for the inhabitants is to set out their dwellings and grow fences.
WATER PIPE
The sub pipe that is connected to the main furrow runs to the central well in the community area. From here every household can get water in a maximum distance of 50 meters.

WASH SPOTS
Just next to the well there are washing spots. This is a central place where the inhabitants can wash together with enough water straight from the well.

CATCHMENT AREA'S
Next to the washing spots and on every plots catchment area's should be made. Here excess water can be stored in the ground to grow vegetables and bamboo.

WATER RESERVOIRS
The community center has a large reservoir to catch rain water. Also in perimeter of the community resorvios should be contructed for catching irrigation water.

GUTTERS & IRRIGATION
If a catchment area is full there is a central bamboo gutter leading to the horticulture ground. Here a serie of small pipes can be used to irrigate the land. If also this land will have enough water there are central pipes leading to the main street gutter to transport excess water down the hill.
ELECTRICITY

From the main community centre a powerline will run to the community distribution unit localized inside the community centre. From here electricity cables will run to the individual dwelling. At the dwelling there will be a sub-meter to measure the household usage. Every month someone from the village will need to check the figures and receive payment from the inhabitants. An advisor of Green Spark advised me to use a smart grid system which is also named earlier.
ROADS
Just as in the camps the position and directions of the roads will be formed by the inhabitants themselves. Based on the scenario I sketched the roads will most probably run in these directions.

The main road will always be the shortest and fastest leading to the farm. Subroads are smaller in profile and give the shortest way to another community. And the small paths are leading to the family compound.
As mentioned before every plot will be around 350m² which will be set out by the community. Inside the camps there are no fences around the family plots only around the family compound. My design also follows this rule.

On the next pages will be shown that over time with a higher density this border will shift to the plot line of the family.

ALTITUDE
As you can see in the design the terrain is sloping slightly towards the south-west. The water catchment area's are always positioned 500mm lower then the rest of the plot to prevent water entering the living area of the families.
HORTICULTURE
As mentioned before every community will have around 16,000m² of land for horticulture. In this way they can work on the together and by doing so spreading the amount of work over multiple people. Even possible relatives or friends could work on the land and get some little money in return.

BUSH SHOPS
The ever famous bush shops positioned on every road or corner in the current camps and is also something that will be done inside the community. For this reason I put small structures in the centre of the community just next to the main road where the inhabitants can sell some quantities of products.
COMMUNITY

WHY  HOW  WHERE  PROGRAM  ORGANIZATION  DESIGN  VISUALISATIONS  CURRENT/FUTURE
ISSUES

NO CENTRAL REGULATION
On community scale there is currently no form of cultural regulation. The inhabitants have all freedom but this has no limitation. Because of this problems as density occur.

INHABITANTS NOT INVOLVED IN DEVELOPMENT
In the current development inhabitants are not included. They have no control over the position and size of their community.

NO CENTRAL WATER SUPPLY
At the moment women have to walk often long distances to fetch water.

NOT ENOUGH SPACE TO GROW OWN CROPS
Most of the inhabitants have only space for a few banana trees and because of that can't provide enough food to feed the family.

NO SELF FORMED ROADS
At the moment all roads in the new development are designed and paved. This doesn't relate to the roads in the camps where the inhabitants form their own roads.

NO COMMUNITY CENTRE
There is at the moment inside the camps not a roofed place for the inhabitants to meet and initiate celebrations.

NO CHURCH IN THE COMMUNITY

SOLVED ISSUES

CENTRAL REGULATION REINSTATED
With this new habitation area and its community centre there will be a gathering point for the inhabitants, community and chairman to come together and meet.

INHABITANTS WILL BE INVOLVED IN THE DEVELOPMENT
With the development plan I set up I'm giving the inhabitants the opportunity to take actions into own hands.

CENTRAL WATER SUPPLY
The community will have a water well for their own inhabitants that is constant being filled by the main waterpipe.

SELF FORMED ROADS
In the plan I'm giving the freedom to let the inhabitants form their own best possible roads.

COMMUNITY CENTRE
In the heart of every community the first project that will be developed will be the community centre. This place will provide the whole community with a roofed place where they can meet, organize meetings and celebrations or just come and talk.
REINSTATE & IMPROVE CONSTRUCTION CULTURE

LET THE INHABITANTS DEVELOP THEMSELVES^
MAKE THE INHABITANTS SELF-RELIANT^
CREATE LOW BUDGET HOUSES^
SUITS THE INDIVIDUAL NEED^
IMPROVES INNER COMMUNITY COMMUNICATION^
MAKES THE INHABITANTS PROUD^
CONTINUES IN THE LINE OF THE LOCAL CULTURE^
Many aspects made the owners decide to take control into their own hands. Now they decide everything for the inhabitants of the farm. But the inhabitants have been doing fine for centuries. What has been going wrong in organization has been described in the last two parts. Now what is left is to show to developer and inhabitants that together they can develop a format where everything is back to normal and where the relation is set on communication.

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<td>HIGH MAINTENANCE ON THE CURRENT DWELLING#</td>
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<td>HABITAT DWELLINGS ARE TO EXPENSIVE COMPARED WITH CURRENT#</td>
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<td>HABITAT DWELLINGS ARE POORLY DESIGNED ON ENVIROMENT AND CONTEXT#</td>
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<td>NOT INVOLVED IN NEW DEVELOPMENT#</td>
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<tr>
<td>NOT ALLOWED TO MAKE OWN DECISIONS#</td>
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<tr>
<td>RESTRICTED AMOUNT OF HABITANTS PER COMPOUND#</td>
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<tr>
<td>RESTRICTED TO HAVE CERTAIN CULTURAL EVENTS#</td>
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</table>
The program is for the major part formed by the calculations made in previous chapters. This doesn't mean that they have to be exact. But for the current situation this amount of people and surface of horticulture will provide everybody with enough food. Most of the figure are based on the average of people per family living inside the camps.

If a community decides that they need more space it's up to them to decide and communicate this decision towards the registration office.
The research on typology, orientation and other indicators was used as the foundation of the graduation project. We could only improve the current construction culture if we understand the methods, materials and typologies being realized till now.

From this analysis it became clear that although the sizes of dwellings are close to each other the amount and orientation often differs. Which means that there is not one suitable typology or serie to develop. The development lays at the core of the dwellings and that is the way that the inhabitants construct their dwellings from natural materials. Another important issue is that constructing is a communal happening and extremely important for the cohesion of the community. These are the recepies for a succesfull development.
To grasp everyday life I had to start understanding how the inhabitants live and how I could translate this into program and design. Because of them I could take a look on the complex relations and activities during a normal day for them. Which is shown in the image on the right.
Based on the 24 hour observation and the amount of children in that family I made a cycle based on the birth, adulthood and death of the inhabitant and dwelling. In the rural areas of Africa it is normal that the dwelling dies with its inhabitant. Therefore I made a calculation on how long this would actually take and how this relates to the inner family compound growth (dwellings). Over a period of 80 years such a compound grows and shrinks over a certain period of time.
But some parts of the program remained unclear such as how they would develop in the future. Parts like position of the kitchen, amount of children, type of sanitation, etc. had to be explained in order to make a suitable typology for the future use. Basically this means that part of the program as decrease of children won't mean that the amount of inhabitants per plot will decrease too. For this reason I made it possible that multiple families could live on one plot. Another example: the kitchen is capable of being constructed on the inside. So in this manner I could set up different trends for the program.

70% still uses non-improved toilet facilities in urban areas  > the demand of pit latrines remains
50% of the population is younger then 20 years old  > increase demand of family plots
Although fast growth only 21% of population live in urban areas*  > increase demand of dwellings in rural areas^*

In the urban area’s families have fewer children than families that live in rural area’s*  > amount of children will decrease
Most used material urban: cement/rural: earth & urban kitchen: in the house/rural kitchen: in a separate building*
> increase of stronger and longer lasting materials^*
> in the future need of a kitchen inside the dwelling^*

Agriculture is most important source of income  > agriculture will remain main source of income in the future^*

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From the basic family analysis and life cycle I knew what my basic family compound layout should be. What remained unclear is how this would evolve in the upcoming years that the project would need to adapt itself to the new needs of every family. In the left image you can see current statistics compared to the current situation on Mount Elgon. I marked this area as now. From there I was able to make assumptions on where the points that I set from my research would go to in the upcoming 100 years.
So as a conclusion I made the upcoming pages as a red wire for my sketch design. In here trends of everyday life are explained and visualized how they occur now and in the future.
## EVERYDAY LIFE

### NOW

- **INHABITANTS:** 5-9
- **SHELTER:** SELF PRODUCED, LOCAL MATERIALS
- **FIRE:** FIREWOOD (FAR)
- **LIGHT:** SUN (13 HOURS PER DAY) & FIRE
- **WATER:** RIVER WATER (FAR)
- **FOOD:** MAINLY SELF PRODUCED, SOME BOUGHT

### SOON

- **INHABITANTS:** 4-7
- **SHELTER:** SELF PRODUCED, LOCAL & MECHANICALLY PRODUCED MATERIALS
- **FIRE:** FIREWOOD (CLOSE, BOUGHT)
- **LIGHT:** SUN, SOME ELECTRICAL
- **WATER:** CLOSE (WELL OR RESERVOIR)
- **FOOD:** SOME SELF PRODUCED MAINLY BOUGHT

### FUTURE

- **INHABITANTS:** 2-5
- **SHELTER:** CONSTRUCTED BY COMPANY, & MECHANICALLY PRODUCED MATERIALS
- **FIRE:** FIREWOOD (CLOSE, BOUGHT)
- **LIGHT:** NATURAL, SOME ELECTRICAL
- **WATER:** CLOSE (WELL OR RESERVOIR)
- **FOOD:** SOME SELF PRODUCED MAINLY BOUGHT

---

## ACTIONS

I: BALANCE THE AMOUNT OF FREE TIME & AMOUNT OF CAPITAL WITH THE AMOUNT OF UNPLANNED MEETING
II: HIGH LIGHT THE IMPORTANCE OF COMMUNICATION WITH SURROUNDING AND TRY TO KEEP THIS COMMUNICATION AS MUCH A POSSIBLE
III: BALANCE THE DEGREE THAT PEOPLE WILL BE DEPENDENT ON MONEY WITH THE AMOUNT THEY CAN PROVIDE THEMSELVES AND SO INCREASING INDEPENDENCY

## ACTIONS INTO PRACTICE

I & II: PROVIDE THE FAMILIES WITH ENOUGH SPACE TO PRODUCE THEIR OWN FOOD AND BY DOING SO INCREASING THEIR SELF DEPENDENCY AND DECREASING THE AMOUNT OF MONEY NEEDED
II: ALTHOUGH MORE ACTIVITIES WILL TAKE PLACE INDOOR ORIENTATE THE FUNCTIONS THAT TRADITIONALLY WERE SEMI-PUBLIC TOWARDS THE PUBLIC AREA AND ADAPT DOOR AND WINDOWS TO SUPPORT COMMUNICATION

---

## COMPOUND

### WHY

- LIGHT
- WATER
- FOOD

### PROBLEMS

### PROGRAM

### RESEARCH

### DESIGN

### CURRENT/FUTURE
**DWELLING**

**NOW**

<table>
<thead>
<tr>
<th><strong>LIVINGROOM</strong></th>
<th>MAINLY OUTSIDE, SMALL INTERIOR FOR DURING RAINS#</th>
<th><strong>BEDROOM</strong></th>
<th>SEPERATED (BOYS/GIRLS)#</th>
<th><strong>KITCHEN</strong></th>
<th>OUTSIDE, PREPERATION OUTSIDE#</th>
<th><strong>STORAGE</strong></th>
<th>SPREAD OVER THE WHOLE PROGRAM#</th>
<th><strong>BATHROOM</strong></th>
<th>OUTSIDE (BEHIND HOUSE OR SHRUB)#</th>
<th><strong>TOILET</strong></th>
<th>OUTSIDE OR LATRINE#</th>
<th><strong>MOVING SPACE</strong></th>
<th>ALMOST ALL OUTSIDE#</th>
</tr>
</thead>
</table>

**BEDROOM**

| SEPERATED (BOYS/GIRLS)# | | | | | | | | | | | | | | |

**KITCHEN**

| OUTSIDE, PREPERATION OUTSIDE# | | | | | | | | | | | | | | |

**STORAGE**

| SPREAD OVER THE WHOLE PROGRAM# | | | | | | | | | | | | | | |

**BATHROOM**

| OUTSIDE (BEHIND HOUSE OR SHRUB)# | | | | | | | | | | | | | | |

**TOILET**

| OUTSIDE OR LATRINE# | | | | | | | | | | | | | | |

**MOVING SPACE**

| ALMOST ALL OUTSIDE# | | | | | | | | | | | | | | |

**50 YEARS**

<table>
<thead>
<tr>
<th><strong>LIVINGROOM</strong></th>
<th>MAINLY INSIDE, UNDEFINED EXTERIOR FOR CELEBRATIONS#</th>
<th><strong>BEDROOM</strong></th>
<th>SEPERATED (BOYS/GIRLS) SHARED UP TO A CERTAIN AGE#</th>
<th><strong>KITCHEN</strong></th>
<th>INSIDE, PREPERATION OUTSIDE#</th>
<th><strong>STORAGE</strong></th>
<th>SPEREATE ROOM FOR STORARGE#</th>
<th><strong>BATHROOM</strong></th>
<th>INSIDE(SEPERATE STRUCTURE)#</th>
<th><strong>TOILET</strong></th>
<th>LATRINE, SEPERATE STRUCTURE#</th>
<th><strong>MOVING SPACE</strong></th>
<th>MAINLY INSIDE#</th>
</tr>
</thead>
</table>

**BEDROOM**

| SEPERATED (BOYS/GIRLS) SHARED UP TO A CERTAIN AGE# | | | | | | | | | | | | | | |

**KITCHEN**

| INSIDE, PREPERATION OUTSIDE# | | | | | | | | | | | | | | |

**STORAGE**

| SPEREATE ROOM FOR STORARGE# | | | | | | | | | | | | | | |

**BATHROOM**

| INSIDE(SEPERATE STRUCTURE)# | | | | | | | | | | | | | | |

**TOILET**

| LATRINE, SEPERATE STRUCTURE# | | | | | | | | | | | | | | |

**MOVING SPACE**

| MAINLY INSIDE# | | | | | | | | | | | | | | |

**100 YEARS**

<table>
<thead>
<tr>
<th><strong>LIVINGROOM</strong></th>
<th>COMPLETELY INDOR#</th>
<th><strong>BEDROOM</strong></th>
<th>ALL ARE SHARED#</th>
<th><strong>KITCHEN</strong></th>
<th>COMPLETELY INDOR#</th>
<th><strong>STORAGE</strong></th>
<th>INTEGRATED IN PROGRAM (CLOSETS)#</th>
<th><strong>BATHROOM</strong></th>
<th>COMPLETELY INDOR#</th>
<th><strong>TOILET</strong></th>
<th>LATRINE, SEPERATE STRUCTURE#</th>
<th><strong>MOVING SPACE</strong></th>
<th>COMPLETELY INDOR#</th>
</tr>
</thead>
</table>

**BEDROOM**

| ALL ARE SHARED# | | | | | | | | | | | | | | |

**KITCHEN**

| COMPLETELY INDOR# | | | | | | | | | | | | | | |

**STORAGE**

| INTEGRATED IN PROGRAM (CLOSETS)# | | | | | | | | | | | | | | |

**BATHROOM**

| COMPLETELY INDOR# | | | | | | | | | | | | | | |

**TOILET**

| LATRINE, SEPERATE STRUCTURE# | | | | | | | | | | | | | | |

**MOVING SPACE**

| COMPLETELY INDOR# | | | | | | | | | | | | | | |

**POSITIVE TRENDS**

LIVINGROOM: FULLY PROTECTED FROM NATURAL FORCES*
KITCHEN: COMFORT OF HAVING COOKING AND EATING CLOSE*
STORAGE: CLOSE TO FUNCTION MORE CONVINIENT*
BATHROOM: CLOSE TO LIVING SPACE, MORE CONVINIENT*
MOVING SPACE: LIVING SPACE IS LESS CONGESTED AND FEELS MORE SPACIOUS*

**NEGATIVE TRENDS**

LIVINGROOM: LACK OF COMMUNICATION WITH THE SURROUNDING*
BEDROOM: MORE INTERIOR SPACE NEEDED, DECREASE INNER FAMILY COMMUNICATION*
KITCHEN: MORE INTERIOR SPACE NEEDED, CULTURALLY QUESTIONABLE*
STORAGE, BATHROOM, TOILET _ MOVING SPACE : MORE INTERIOR SPACE NEEDED AND SHOWS LESS OF THE FAMILY LIFE TOWARDS THE SURROUNDING*

**56**

**ACTIONS INTO PRACTICE**

LIVINGROOM: SHOULD BE POSITIONED AND COMMUNICATE TOWARDS THE PUBLIC SPACE TO KEEP COMMUNICATION BETWEEN THE FAMILY AND ITS SURROUNDING#
BEDROOM: SHOULD PROVIDE SHARED POSIBILITIES UP TO THE CHILDREN LEAVE THE HOUSE EXTENSIONS SHOULD PROVIDE WITH A MAXIMUM OF 3 CHILDREN PER UNIT.#
KITCHEN: SHOULD ALWAYS BE POSITIONED OUTSIDE AND ALSO SHOULD BE PREPARED OUTSIDE, THEREFORE CHIMNEY, SMALL WORKTOP AND SMALL ROOF SHOULD BE PROVIDED.#
STORAGE: ALTHOUGH IT TAKES MORE INTERIOR SPACE OVERTIME PROGRAM BASED STORAGE SHOULD BE PROVIDED.#
BATHROOM: FOR THE FAMILIES THERE IS NO REASON TO WASH THEMSELVES INSIDE, THEREFORE A SMALL FLEXIBLE WASHING AREA OUTSIDE THE DWELLING SHOULD BE PROVIDED TO ENABLE TRANSPARANCY TOWARDS THE SURROUNDING.#
TOILET: A DECENT EXTERNAL PITLATRINE WOULD SHOULD BE PROVIDED AND AGAIN INCREASES COMMUNICATION WITH THE SURROUNDING#.
MOVING SPACE: SHOULD BE LIMITED AS MUCH BECAUSE ITS COSTLY, TO PUSH INNER MOVEMENT OUTSIDE WOULD ALSO INCREASE COMMUNICATION WITH THE SURROUNDING#

**If the everyday life is going to change, how does this will affect the dwelling? In this part the trends are being placed in the program to make an effective assumption on changes of the way on inhabiting a dwelling in the future and possible changes that have to be made on the concept for the current situation.**

**COMPOUND**

<table>
<thead>
<tr>
<th>WHY</th>
<th>PROBLEMS</th>
<th>PROGRAM</th>
<th>RESEARCH</th>
<th>DESIGN</th>
<th>CURRENT/FUTURE</th>
</tr>
</thead>
</table>

---

**POSITIVETRENDS**

LIVINGROOM: FULLY PROTECTED FROM NATURAL FORCES*
KITCHEN: COMFORT OF HAVING COOKING AND EATING CLOSE*
STORAGE: CLOSE TO FUNCTION MORE CONVINIENT*
BATHROOM: CLOSE TO LIVING SPACE, MORE CONVINIENT*
MOVING SPACE: LIVING SPACE IS LESS CONGESTED AND FEELS MORE SPACIOUS*

**NEGATIVE TRENDS**

LIVINGROOM: LACK OF COMMUNICATION WITH THE SURROUNDING*
BEDROOM: MORE INTERIOR SPACE NEEDED, DECREASE INNER FAMILY COMMUNICATION*
KITCHEN: MORE INTERIOR SPACE NEEDED, CULTURALLY QUESTIONABLE*
STORAGE, BATHROOM, TOILET _ MOVING SPACE : MORE INTERIOR SPACE NEEDED AND SHOWS LESS OF THE FAMILY LIFE TOWARDS THE SURROUNDING*
Based on the lifecycle analysis I made a possible scenario for the family compound. Not only do I want to introduce a system that suits the current situation and construction culture but also the possible future. For this reason I'm showing the compound from the first structure (marked in red) till it's final stage which is in 20-25 years (marked in red on next page). This is meant to show how much living space is needed when an average family is full grown (all children have become adult) in the current social and economical state.

As you can see the structures are slowly enclosing an outdoor space. It's important to understand that in the region (and in most tribes) it is common to have an outdoor living space. Which is semi-public and allows the family to communicate to neighbours or people that pass by.
DENSITY

The growth scenario shown on the last pages tries to show how this community could possibly grow in 60 to 100 years. For this reason I formulated an urban scenario where the density will become higher, the families will have less children but every compound will house multiple families. In the example on the right the compound will hold 3 families. All with their own garden and sanitation unit. Slowly the plot of the family compound will get to its maximum capacity.

To prevent a poor living quality due to the lack of green around the house in the future we had to look at alternatives that you can see in small towns in the region. Here you can see that height is searched to reduce the amount of land used. For this reason I wanted to introduce a system that can also be constructed two floors high and in the future cope with this problem.
This is the basic family unit which is in size the average family dwelling currently inhabited in the camps. The concept has the ability to put windows and door wherever the inhabitants want them to be. The technical booklet gives an explanation for the openings not to be positioned on north or east because of extreme heat during day and cold during night. Which is also done in the current habitation.
The basic family dwelling is almost 3.5 by 4.5 meter and is compared to the current habitation in the camps almost the same size. The nice aspect was that there was almost no dwelling the same as the other. With the introduced system I'm trying to give the inhabitants the same freedom. I tried to prove that with the sequence shown before. The chimney is a new element for the inhabitants. But it tries to deal with the problem of the fire hazard caused by open fire cooking. But it does not only protect it also stores the heat of the fire in the mass of the house and radiates through the night.
As you can see there is not that much space inside the basic family dwelling. But because there are no interior walls the dwelling has great flexibility in program. During night a couple of cloths create a couple compartments to provide sleeping space for parents and children. I kept the open layout in this typology because it suits current family life best. The selected window height and size is the same as the windows used in the camps.
As you can see additional structures are surrounding the basic family dwelling (marked in red) creating the general outdoor living space of the family. To prevent over population the inhabitants are allowed to make 6 additional structures to their family house. Every additional unit of 3,4 by 3,2 meter is the average unit added in the camps. Most of times these are made to create separate structures for children who have become adults.
Visualizations try to show the difference between inside and outside the family compound. Inside is a semi closed safe living space for the family. Just outside the dwellings is where communal life takes place. People are used to live close to each other and is one of the most important values why the traditional communities worked so well.
Up to 10 years finding firewood and grow vegetables were not a problem. Since the population grew so fast it has started to be difficult to produce enough for everybody. Often people don’t own any land so they are incapable of growing their own vegetables. In the compounds everybody will grow his own bamboo to provide with enough firewood.
<table>
<thead>
<tr>
<th>COMPOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHY</td>
</tr>
<tr>
<td>PROBLEMS</td>
</tr>
<tr>
<td>PROGRAM</td>
</tr>
<tr>
<td>RESEARCH</td>
</tr>
<tr>
<td>DESIGN</td>
</tr>
<tr>
<td>CURRENT/FUTURE</td>
</tr>
<tr>
<td>SOLVED</td>
</tr>
<tr>
<td>GENERAL DURABILITY OF THE DwELLING</td>
</tr>
<tr>
<td>HIGH AMOUNT OF MAINTENANCE ON THE DwELLING</td>
</tr>
<tr>
<td>CURRENT SURFACES DIFFICULT TO CLEAN</td>
</tr>
<tr>
<td>HIGH AMOUNT OF HARDWOOD USED</td>
</tr>
<tr>
<td>COLLECTING FIREWOOD TAKES A LONG TIME</td>
</tr>
<tr>
<td>LACK OF SANITATION</td>
</tr>
<tr>
<td>BECOMING INCREASINGLY DIFFICULT TO FIND CONSTRUCTION MATERIALS.</td>
</tr>
<tr>
<td>TAKES A LOT OF TIME TO FETCH WATER</td>
</tr>
<tr>
<td>NOT ALLOWED TO BUILD OWN DwELLING</td>
</tr>
<tr>
<td>HABITAT DwELLING ONE SIZE DOESN'T FIT ALL</td>
</tr>
<tr>
<td>HABITAT HOUSES ARE EXPENSIVE</td>
</tr>
<tr>
<td>HABITAT HOUSES DON'T GIVE ANY FREEDOM IN TYPOLOGY</td>
</tr>
<tr>
<td>ARE POORLY ADAPTEBLE TO CHANGING FAMILY SITUATION</td>
</tr>
<tr>
<td>NOT ALLOWED TO OFFER HABITATION TO RELATIVES AND FRIENDS</td>
</tr>
<tr>
<td>NOT ALLOWED TO CONSTRUCT SHOWER UNITS OUTSIDE DwELLING</td>
</tr>
<tr>
<td>CAN'T COOK OUTSIDE</td>
</tr>
<tr>
<td>CHILDREN AND PARENTS CAN'T SLEEP TOGETHER IN ONE ROOM ANY MORE.</td>
</tr>
<tr>
<td>NO TRADITIONAL SEMI PUBLIC LIVING AREA</td>
</tr>
<tr>
<td>HABITAT HOUSE HAVE NO INNER FLEXIBILITY</td>
</tr>
<tr>
<td>NO INFLUENCE ON POSITION AND ORIENTATION OF THE HABITAT DwELLING.</td>
</tr>
<tr>
<td>NO MATERIALS WITH REPELLENT FUNCTION</td>
</tr>
<tr>
<td>DIFFICULT AND EXPENSIVE TO GET MAINTENANCE MATERIALS</td>
</tr>
<tr>
<td>NO COMMUNAL BOUNDING BY CONSTRUCTING HOUSES</td>
</tr>
</tbody>
</table>
As the inhabitants said during my investigations in the camps they only wanted some minor changes for future development. They do prefer the current construction system because they know how to construct themselves and all materials are found in the surrounding. These were also the main aims for my design. Almost all materials are found in the surrounding and because of the stacking principle they can easily construct the dwellings themselves. Materials used last longer than the traditional way of constructing houses. And because of adding lime to the plaster mixtures these will be increasingly stronger than the traditional mixtures made with primarily cow feaces, mud and water.
For the design I decided to change the use of hardwood with a fast growing materials with also great strength. Bamboo seemed to be the best alternative for hardwood in the region and the inhabitants can grow it themselves. Because the design has a basin in the back of the plot where the inhabitants can grow their own firewood and construction wood available they will have them close to their dwelling. As you can see on the right image every compound will have at least one reservoir to store raining water. If it overflows the water will run into the main basin. This will make the inhabitants less reliable on the main water supply in the centre of the community.

<table>
<thead>
<tr>
<th>CURRENT/FUTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH AMOUNT OF HARDWOOD USED</td>
</tr>
<tr>
<td>COLLECTING FIREWOOD TAKES A LONG TIME</td>
</tr>
<tr>
<td>BECOMING INCREASINGLY DIFFICULT TO FIND CONSTRUCTION MATERIALS.</td>
</tr>
<tr>
<td>TAKES A LOT OF TIME TO FETCH WATER</td>
</tr>
</tbody>
</table>
In the project there are many cultural issues that needed to be solved. One of them was to restrict the size of dwelling so the inhabitants can only house their own family. But in African culture it is really important to give living space to family and friends when they need it. With the possibility to construct 6 extensions to the house they will have enough space to house family and friends. With the introduced system the inhabitants will be capable of constructing their own houses together. They decide if they want to make interior walls or not. In this way the inhabitants take the development into their own hands and can adapt the dwelling to their needs.

NOT ALLOWED TO OFFER HABITATION TO RELATIVES AND FRIENDS

NOT ALLOWED TO BUILD OWN DWELLING

CHILDREN AND PARENTS CAN’T SLEEP TOGETHER IN ONE ROOM ANY MORE.
Most of the households have no sanitation and the inhabitants need to go to the bush or one of the public toilets. In the design every household will have their own toilet and shower unit. If the pit is full they can move the toilet to a new spot on their compound. In the camps people make their own washing spots (bathing) made of mays and branches. With this bamboo construction they can continue making their own shower units made of natural materials.

LACK OF SANITATION

NOT ALLOWED TO CONSTRUCT SHOWER UNITS OUTSIDE DWELLING

CURRENT/FUTURE
As mentioned before this design gives the same flexibility and possibilities as the current camp situation. Compared to the single small unit from Habitat for Humanity this dwelling can grow with the family. Because they are almost completely made of natural materials the costs are around 74,000 Kenyan shillings (see appendix) which is almost a fourth compared to the price of the habitat dwelling. Which makes it more suitable for every inhabitant of the current camps. Because the Habitat for Humanity project only focuses on the people that work on the farm or people that have enough money to pay the dwelling at once.

HABITAT DWELLING OF ONE SIZE DOESN’T FIT ALL
HABITAT HOUSES ARE EXPENSIVE
HABITAT HOUSES DON’T GIVE ANY FREEDOM IN TYPOLOGY
ARE POORLY ADAPTABLE TO CHANGING FAMILY SITUATION

CURRENT/FUTURE
UNSOLVED

NOT ALLOWED TO MAINTAIN CURRENT STRUCTURES

NOT ALLOWED TO BUILD ANY NEW STRUCTURES INSIDE THE CAMPS

NO CIRCULAR BUILDINGS POSSIBLE

POOR EXPRESSION POSSIBILITIES ON OUTSIDE OF THE DWELLING

NEW INTRODUCED SYSTEM DOES NOT ADAPT WELL TO THE LIFECYCLE OF THE FAMILY (DETORIORIATION OF CHILDRENS COMPOUND.

FEED THE STRIVE FOR STATUS
Compressed earth brick house size 4,5 x 3,5 meter

Costing Schedule

A: FOUNDATION - 2 days 1 skilled 2 unskilled labourors

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QTY</th>
<th>RATE</th>
<th>AMOUNT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td>Bags</td>
<td>9</td>
<td>250</td>
<td>2.250</td>
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<tr>
<td>Sand</td>
<td>Ton</td>
<td>3</td>
<td>715</td>
<td>2.145</td>
<td>2.145</td>
</tr>
<tr>
<td>Ballast</td>
<td>Ton</td>
<td>2</td>
<td>1000</td>
<td>2.000</td>
<td>2.000</td>
</tr>
<tr>
<td>CEB No. 160</td>
<td>No.</td>
<td>6</td>
<td>960</td>
<td>960</td>
<td>960</td>
</tr>
<tr>
<td>Labor</td>
<td>Item</td>
<td>1</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

AMOUNT

7.755     0

B: FLOOR (2 DAYS) - 1 skilled 2 unskilled

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QTY</th>
<th>RATE</th>
<th>AMOUNT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td>Bags</td>
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<td>250</td>
<td>2.750</td>
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<tr>
<td>Sand</td>
<td>Ton</td>
<td>3</td>
<td>715</td>
<td>2.145</td>
<td>2.145</td>
</tr>
<tr>
<td>Ballast</td>
<td>Ton</td>
<td>3</td>
<td>1000</td>
<td>3.000</td>
<td>3.000</td>
</tr>
<tr>
<td>Hardcore</td>
<td>Ton</td>
<td>7</td>
<td>400</td>
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<td>2.800</td>
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<tr>
<td>Labor</td>
<td>Item</td>
<td>1</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

AMOUNT

11.095     0

C: WALLS 4 days 2 skilled 2 unskilled labourors

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QTY</th>
<th>RATE</th>
<th>AMOUNT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walling lime</td>
<td>Bags</td>
<td>10</td>
<td>200</td>
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<td>2.000</td>
</tr>
<tr>
<td>Lintel lime</td>
<td>Bags</td>
<td>1</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Sand</td>
<td>Ton</td>
<td>6</td>
<td>715</td>
<td>4.290</td>
<td>4.290</td>
</tr>
<tr>
<td>DPC Roll</td>
<td>Roll</td>
<td>1</td>
<td>1500</td>
<td>1.500</td>
<td>1.500</td>
</tr>
<tr>
<td>Lintel ballast</td>
<td>Ton</td>
<td>0,25</td>
<td>1000</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>CEB No. 1.040</td>
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<td>6.240</td>
<td>6.240</td>
<td>6.240</td>
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<tr>
<td>Labor</td>
<td>Item</td>
<td>1</td>
<td>800</td>
<td>800</td>
<td>800</td>
</tr>
</tbody>
</table>

AMOUNT

15.330     15.330

D: ROOF 1 days 2 skilled 2 unskilled

<table>
<thead>
<tr>
<th>ITEM</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamboo Timber</td>
<td></td>
</tr>
<tr>
<td>Thatch</td>
<td></td>
</tr>
<tr>
<td>Bamboo Ridge covers</td>
<td></td>
</tr>
<tr>
<td>Bark for tying bamboo constr</td>
<td></td>
</tr>
<tr>
<td>Bark for Roofing</td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td></td>
</tr>
</tbody>
</table>

E: LATRINE ONLY 4 days 1 skilled 1 unskilled

<table>
<thead>
<tr>
<th>ITEM</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td></td>
</tr>
<tr>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td>Ballast</td>
<td></td>
</tr>
<tr>
<td>CEB</td>
<td></td>
</tr>
<tr>
<td>Thatch</td>
<td></td>
</tr>
<tr>
<td>Bark for tying bamboo constr</td>
<td></td>
</tr>
<tr>
<td>Bark for Roofing</td>
<td></td>
</tr>
<tr>
<td>Vent pipe (bamboo?)</td>
<td></td>
</tr>
<tr>
<td>Bamboo Timbers</td>
<td></td>
</tr>
<tr>
<td>Door (complete)</td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td></td>
</tr>
</tbody>
</table>

Rate for skilled labour Kshs. 400 per day
Rate for unskilled labour Kshs. 200 per day

Total number of days 18 days this can reduce to 14 days considering that there are mutually exclusive activities i.e. the latrine and the house can be done at the same time.

H: TOTAL HOUSE COST

<table>
<thead>
<tr>
<th>ITEM</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>69.590</td>
</tr>
<tr>
<td>Labour</td>
<td>15.200</td>
</tr>
</tbody>
</table>

AMOUNT

73.190     0

APPENDIX

TIME & COST CALCULATION
# Compressed earth brick house size 4.5 x 3.5 meter
## Costing Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Qty</th>
<th>Rate</th>
<th>Amount</th>
<th>Total</th>
</tr>
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<tr>
<td></td>
<td></td>
<td></td>
<td>HFH</td>
<td>HO</td>
<td>AMOUNT</td>
</tr>
<tr>
<td><strong>A: FOUNDATION</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Lime Bags</td>
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<td>250</td>
<td>2.250</td>
<td>2.250</td>
<td>2.250</td>
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<tr>
<td>Sand Ton</td>
<td>3</td>
<td>715</td>
<td>2.145</td>
<td>2.145</td>
<td>2.145</td>
</tr>
<tr>
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<td>2.000</td>
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<tr>
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<td>960</td>
<td>960</td>
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<td>1</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
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<td></td>
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<td></td>
<td></td>
<td>7.755</td>
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<tr>
<td><strong>B: FLOOR (2DAYS)</strong></td>
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<td></td>
</tr>
<tr>
<td>Lime Bags</td>
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<td>Sand Ton</td>
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<td>2.145</td>
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</tr>
<tr>
<td>Ballast Ton</td>
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<tr>
<td>Hardcore Ton</td>
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<td></td>
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<td><strong>C: WALLS 4days 2skilled 2unskilled labourors</strong></td>
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<td></td>
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<tr>
<td>Walling lime Bags</td>
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<td></td>
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</tr>
<tr>
<td><strong>D: ROOF 1days 2skilled 2 unskilled labourors</strong></td>
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<tr>
<td>Bamboo Timber Ft.</td>
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<tr>
<td><strong>E: LATRINE ONLY 4days 1skilled 1unskilled labourors</strong></td>
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<td></td>
</tr>
<tr>
<td>Lime Bags</td>
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<td>750</td>
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</tr>
<tr>
<td>Sand Ton</td>
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<td>715</td>
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<tr>
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</tr>
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<tr>
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<td>Plaster sand (interior)</td>
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<td>2.145</td>
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<td>Labor (int. plaster and finishes)</td>
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<td><strong>Total</strong></td>
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</tr>
<tr>
<td>Rate for skilled labour Kshs. 400 per day</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate for unskilled labour Kshs. 200 per day</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
| Total number of days 18days this can reduce to 14days considering that there are mutually exclusive activities i.e. the latrine and the house can be done at the same time.

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Qty</th>
<th>Rate</th>
<th>Amount</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td>HFH</td>
<td>HO</td>
<td>AMOUNT</td>
</tr>
<tr>
<td><strong>H: TOTAL HOUSE COST</strong></td>
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</tr>
<tr>
<td>Materials</td>
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<tr>
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<td>15.200</td>
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<td></td>
<td></td>
<td>73.190</td>
<td>0</td>
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</table>
COMMUNITY ACTION PLAN MOUNT ELGON

OUTCOMES

The resettlement of 180 households within 5 years

At the moment 1000 households are living in the perimeter of the farm. This ground is owned by the farmer and is unsuited as living quarters. The farmer wants to point out other areas where the inhabitants are allowed to settle themselves. On these new quarters the inhabitants will be able to purchase their own piece of land. Problem statement from the camps is the deteriorating conditions because of the urban sprawl. Main cause is the deregulating of this society by cultural and social segregation. By reintroducing the communal regulation the state of chaos between inhabitants should disappear in the new quarters. The plan I want to introduce will cover the resettlement of 180 households from the current camps to a new quarter.

In this plan reinstatement of cultural practice and regulation by a group of inhabitants is targeted. To create a new living area based on the opinion and wishes of the inhabitants that will start to live there. To support the initiative of a group of people that want to live together and will make their own decisions to create their own community.

GOALS

Who will participate in different projects or activities?

Inhabitants
- Election community inhabitants
- Community resident gatherings
- Community organizing
- Position community
- Coalition building
- Water and storage
- Skills-building among residents
- Constructing houses
- Additional structures, relatives & inhabitants
Owner
- Initiative
- Central coalition building
- Election community inhabitants
- Position community
- Additional structures, relatives & inhabitants

Habitat for Humanity
- Central coalition building
- Election community inhabitants
- Community organizing
- Position community
- Coalition building
- Water and storage
- Skills-building among residents
- Constructing houses
- Additional structures, relatives & inhabitants

Back2africa
- Position community
- Coalition building
- Constructing houses

Who will be responsible for carrying activities?

Inhabitants
In general the inhabitants are primary responsible for every single decision that they make. Eventually the inhabitants have to improve their living situation themselves in order to make a cohesive community. That doesn’t mean that they don’t have any responsibilities towards the owner of the farm and the management of the development, appointed to habitat for humanity. Decisions that they make have to be communicated to the management. If necessary they are available to advise the community on decisions.

Owner
The owners are taking the initiative to resettle the inhabitants and instated habitat to arrange the entire management body of the project. The management only has periodical meetings with the owners to inform them about the decisions of the different communities. Besides that are the owners responsible with screening possible workers for the farm. This screening is necessary to make sure who of their workers is going to be resettled. Eventually their aim is to resettle their workers and in second case all the non-workers that live in the camps.

Habitat for Humanity
Habitat is appointed to communicate between the inhabitants and the owners so eventually they are primarily responsible for the realization of the housing projects. Second of all they are experts in constructing houses together with inhabitants. They will be responsible for introducing the new construction method and all the side projects that are needed for the development of the village. Habitat also has a responsibility for screening new inhabitants but in this case for the ones that do not work for the farm.

Back2africa
Is the developer of the construction system and acts as an advisor to habitat for humanity and the inhabitants. The introduced system is a prototype and will need a lot of modifications, although the knowledge of habitat for humanity they will still need an advisor. The foundation will also continue being an objective in depended advisor between developer and inhabitants. The foundation will continue taking interviews and observations to improve system and communication.

What does the project want to accomplish?
Improve the living conditions of 180 household on Mount Elgon by mobilizing a community and let them develop their own community within a given framework.
How much time does your group expect will be required to complete the work (timeline)?

- Election community inhabitants: 2 months
- Community organizing: 3 months
- Position community: 1 month
- Coalition building: 4 months
- Water and storage: 4 months
- Coalition building (for individual community): 4 months
- Skills-building among residents: 2 months (per community)
- Constructing houses: 14 days x 15 = 7 months (first phase)
  14 days x 10 = 4.5 months (second phase)

Total: 31.5 months = 2.5 years. So it should meet its target of 5 years.

**PROCESS OBJECTIVE**
Within 2.5 years each community of a maximum of 25 households will have their own self-sufficient and self-regulating community.

**OUTCOME OBJECTIVE**
By the end of a 5 year period 180 household will have been resettled and at least 80% of the inhabitants will report that they proud that they improved their own living situation.
COMMUNITY ACTION PLAN

STRATEGIES
1. Central coalition building
2. Election community inhabitants
3. Community resident gatherings
4. Community organizing
5. Position community
6. Coalition building
7. Water and storage
8. Skills-building among residents
9. Constructing houses
10. Additional structures, relatives & inhabitants
11. Maintenance

ACTIVITIES
1. Realize a central community post where inhabitants can subscribe together (minimum of 15 households & everybody must be financial liable).
2. Community board meetings to talk about land distribution and build there communal structures.
3. There should be a community board that is being trained together with the other community board members how to organize their community and realize objectives and goals.
4. The whole community has to decide on a position of their community on the furrow line (for water collection possibility)
5. When the heart of the community is defined they have to mark an area that is meant as communal area. To establish a weekly meeting point the communal building is erected by all the members of the community.(the more they spend on communal ground the less they will have for horticulture, also )
6. Together they started up a communal fund to pay for communal projects. The first structure to be erected will be guided by habitat for humanity and will supply the community with a meeting point.
7. The community will start planting crops as soon as they can so there is a direct need of water and storage space on the communal terrain. Because they localized their community on the furrow only a well has to excavated.
8. Habitat will need to explain the new construction principle and its benefits. On community level people have to be trained to build their own house. A teaching crew will build the first houses together with locals, they will be on their turn responsible to help and teach others within their community. Money could be earned from the community fund.
9. This is the actual construction process. Here the theory of requesting a new house at the central point and start construction will be tested and will need to be checked. This is in charge of habitat for humanity.
10. Primarily this is the same scenario as any other structure to be build. Only difference is that the maximum amount of structures is set per compound. So again a request has to be send to add a structure.
11. Plasterwork and roofs will need maintenance during their lifecycle. This maintenance is organized by the community itself.
GUIDELINES
Urban:

GEOGRAPHY POSITION
- Through centuries farm workers placed themselves on the farm which was approved by the former owners. Some of the families that live on farm ground now aren't working for the farm anymore but still originate from the first families. Although the ground belongs to the farm these people and settlements can't be just removed and can only be asked to move overtime to a more suitable area for the farmer.
- The flow of new people to the camps should be stopped, which can only be done when the inhabitants start to understand the problem and will act together to stop the flow.
- A new piece of land should be given to the people by the owners as compensation. This community should also get its own community board and chairman. But more importantly also remain communicating with the developers.

GEOGRAPHY (infrastructure)
- Leave the formation of main roads to the inhabitants or make a case study on the most obviously routes that will established by the inhabitants in the camps.
- The informal infrastructure inside the communities should be formed by the communities themselves, based on agreements they make with each other.

ORGANIZATION (village)
- Every household should have one representative in the community board meeting
- Within every community there should be three people elected every 5 years to communicate development to the developers.
- A chairman should be appointed as ceremony leader, although he will be the advisor of the community decisions are made by the community as a whole. (to prevent the misuse of power which is seen in the current camps)

ORGANISATION (density)
- Set maximum amount of extensions to a family house (should not exceed the norm of 20-25%, based on plot seize and the amount of horticulture needed per person)
- Set a border for development area on plot (the rest is meant as horticulture ground)
- Reinstate community principle to communicate additions to developers.

COSTS (amount)
- Community should build the houses themselves to press the costs
- Usage of only local materials
GUIDELINES

Urban:

GEOGRAPHY POSITION
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COSTS (amount)
- Community should build the houses themselves to press the costs
- Usage of only local materials
HABIT WALKING TO WORK AND SCHOOL TOGETHER
- An informal infrastructure should be formed with one main road leading to the farm and Chepchoina. (this is currently the main direction of the main road inside the camps)
- Motorized vehicles should be restricted from this internal main infrastructure.

HABIT( fetching water)
- This point is close the point mentioned by washing. A central water source should be provided to collect water in the centre of every community.

SOCIAL CULTURAL ACTIVITIES NATIONAL CELEBRATIONS
- In the community centre there should be a place covered which is large enough for all the inhabitants of the community. (most celebrations are currently celebrated in schools or churches because the lack of such place inside the camps)

SOCIAL CULTURAL ACTIVITIES CIRCUMCISION
- The community should be able to decide where the chairman should live and how the route for procession should be.
- In the community centre there should be a covered place which is large enough to give place to all the inhabitants of the community.

SOCIAL CULTURAL ACTIVITIES BIRTH, DOWRY&MARRIAGE
- There should be a small church in the centre of the communities be provided where these official Christian ceremonies can be performed.
- In the community centre there should be a covered place which is large enough for all the inhabitants of the community for these activities (for 25 families maximum of 150).

ACTIVITY (meeting)
- Keep the open central living space in future development which is a meeting place for the different family members but also for people that shortly stop by.
- In the planning of water points and at the position of cultural ground is that these places are also used as meeting points and should have shady places to sit and talk.
  Create activity places where children can play soccer or other sorts of activity.

ACTIVITY (religion)
- Reserve a central space in de community for celebrations and rituals
- Provide communal places and spaces that are funded from communal funding.
ACTIVITY (cleaning)
- The finish of floor and walls should be easy to clean but still have the characteristics of the old materials (repellent, soft surface, easy to apply, etc.)

ACTIVITY (washing clothes)
- Create a central washing location per community should be created that is close to the dwellings but is still a place to gather around for young and old.
- Provide a small washing place in the back of the family compound to make sure that the families can also wash a few clothes at the end of the day.

FORM (single multiple)
- Set maximum amount of extensions to a compound.
- Set a border for development area on plot (the rest is meant as horticulture ground)
- Reinstate community principle to communicate additions to developers.

HABIT (relative)
- Reinstate community principle (community board and chairman) to regulate the flow of inhabitants and their relatives.

RELATIONSHIPS (family, friends, church, etc.)
- In general I would like to state that the developers shouldn't make any decisions in cultural and social sense for the inhabitants. These complex relations and ways of interaction are different for everybody and there is not one way of organizing them. Social space should be calculated as an amount to leave open for the community to fill in for themselves.

Architectural:
PROGRAM
- Boys and girls sleep separated after their 5-6th year.
- Around their 20s most of the children get married and move out of the family compound. So any development of structures for the children wouldn't have to last longer than 20 years.
- A method should be searched to still provide adult children with their own dwelling and to have a central living area for the whole family that has a semi enclosed communication to the surroundings.
- Entrance of the family dwelling should be positioned towards the general living space and from the public areas.
- Construction culture is an important feature of the communal identity.
- Any intervention or other types of decision by the developers should be avoided at any level.
- Because the internal organization and situation of every family is different there is not one suitable program or organization for everybody. The archetype should be adapted and organized by the inhabitants themselves.
PROGRAM (bathroom)
- Allow the temporary shower units (there is no possible objection to the units)
- Provide the new habitation with the possibility to have a shower inside the house.
- Position the shower or drainage tube close to a possible vegetable garden or if not possible to main drainage pipe of the village.

PROGRAM (toilet)
- The toilet should be placed outside the house
- The community has to decide where the sanitations should be placed per household
- Pit latrines should be positioned near vegetable garden so it can act as a fertilizer.

PROGRAM (bedroom)
- Providing an alternative separator inside the dwellings that improves privacy
- Develop a building system for walls that is also flexible and offers connectivity on outside wall at any given position.

PROGRAM (living room)
- Offer the possibility of an indoor living room but that can easily be opened towards the central outdoor living area.
- The central outdoor living area should only be partly enclosed to offer communication to the surroundings.

SPACE
- Inside the main family house there is almost no separation between the different functions and has much to say about the importance of inner family communication.
- Space enclosure and dwelling position are extremely important how the family communicates with each other and the surrounding families. Right now living rooms are more and more being included inside the family home, but it also decreases communication to the surrounding. In any way the family should be given the chance to organize their own family and the way they would like to communicate.

FORM (single multiple)
- Set maximum amount of extensions to a family house (should not exceed the norm of 20-25%, based on plot seize and the amount of horticulture needed per person)
- Set a border for development area on plot (the rest is meant as horticulture ground)
- Reinstate community principle to communicate additions to developers.

FORM (size&shape)

APPENDIX

GUIDELINES
- Introduce a dwelling typology that can be built by the inhabitants themselves
- Develop a circular and rectangular modular brick that has a large amount of different dwelling sizes and shapes, which gives the inhabitants the freedom to create their own dwelling typology.

**FAMILY SIZE**
- The dwellings should be able to adapt to the family size
- The inhabitants should decide for themselves how many children they want and how much this can fit in the budget of the family. The developers can only explain consequences through education, the dwelling size shouldn’t be restricted in order to make families smaller.

**HABIT (relative)**
- Reinstate community principle (community board and chairman) to regulate the flow of inhabitants and their relatives.

**HABIT SLEEPING TOGETHER**
- Sleeping together in the main family house should be integrated in the new development.
- Separation between the different sleeping places should be made of a light flexible material but that still gives enough privacy.

**ACTIVITY (religion)**
- Developed a dwelling extension as chapel

**ACTIVITY (cooking)**
- Provide a chimney system that is easy and cheap to build and also offers a low use of firewood and might also be used for internal heating.
- Make a proposal of different types and sizes of chimney and show possible positions on the compound.

**COST LIFECYCLE**
- A lifecycle analysis of current families should be placed to the future prediction in order to make an accurate calculation how long the dwelling should last.

**MATERIALS**
- Individual expression on external use of the dwelling should be as much as possible restricted to only decorative elements and no longer to status related objects. What should mean that the community has a standard archetype which functions as a white canvas. On this white canvas people can only make little decorative differentiation between them and other members of the community.
- Finishes and materials should be analysed on the function that they have in the dwelling. Some of the used materials increase the living quality of functions of the dwelling. By removing these traditional materials the softness of certain surfaces is lost and are there no
elements left that could work as a repellent. For every material that you replace the functions
- Materials used on the outside give the inhabitants their identity. When applied among different inhabitants it increases the communal identity. Even finishes with a very low durability can be extremely durable when finished with a coating of paint or lime.
- For every part of the dwelling we should search for materials and construction methods that come from the direct surrounding of the community. The best way to improve the average living quality of the dwelling we should only improve local constructions methods and materials.

MATERIAL: organic
- Create construction materials that are based on local products but have an enhanced durability and have a surface that is cleaned easily.

MATERIAL (durability)
- A more durable material is wanted and needed but a mechanical made product is not the solution. New local made products should be searched or stimulated to develop.
- The family dwelling will not have to be able to last longer than 80 years.
- Materials should be searched that do not need a lot of maintenance and are easy to clean.

MATERIAL FABRICATED
- Create construction materials that are based on local products and have innovative look.
  (in this way status and progress is not translated to money but the development of construction products and finishes)

SUSTAINABILITY
- Materialisation should be tuned to the availability in the area and the price. If not maintenance even small will cause major problems and will decrease the lifespan of even the most durable dwelling.
- I should be looking for an archetype that has a new look and higher durability, but we should build it on local materials and based on the local identity that is created by the local vernacular archetype.
- The dwellings should only be constructed from natural local materials that breathe the local cultural identity.
- The sustainability of both material and method is reliant on the integrity of use of material and the way that construction is organized by the community. Because as long the community build themselves they will never need mechanically produced construction or materials.
FABRICATION
- Individual expression should be motivated to use decorative elements as much as possible and hopefully make the use of status related objects unnecessary. What should mean that the community has a standard archetype which functions as a white canvas. On this white canvas people can only make little decorative differentiation between them and other members of the community.
- Finishes and materials should be analysed on the function that they have in the dwelling. Some of the used materials decrease the living quality of functions of the dwelling. By removing these traditional materials the softness of certain surfaces is lost and are there no elements left that could work as a repellent. For every material that you replace the functions and characteristics should be copied as much as possible.
- Materials used on the outside give the inhabitants their identity. When applied among different inhabitants it increases the communal identity. Even finishes with a very low durability can be extremely durable when finished with a coating of paint or lime.
- For every part of the dwelling we should search for materials and construction methods that come from the direct surrounding of the community. The best way to improve the average living quality of the dwelling is by improving local constructions methods and materials.

CONSTRUCTION
- The process of constructing house is a tradition transferred over generations. It has made the rural villages to what they are unique, adapted and one. This should supported in any new development. It establishes community and identity but also keeps the construction culture.
- In the project the durability of the dwelling should remain the same because for most structures there is not really a reason that they should last longer. Most important fact is that the dwellings should take just a small amount of maintenance and are easy to clean.

CONSTRUCTION: mechanical
- Mechanical produced dwellings are wanted by the developers but doesn’t suit the question of the inhabitants. The inhabitants developed a construction system over centuries and still breathes the identity of former generations. This is transferred from father to son and from mother to daughter. Aim should be to develop a system that only tries to enhance the use of the dwellings and decreases the amount of maintenance.
- Local constructions methods should be analysed and reused in the new proposed development.

CONSTRUCTION (manual)
- Let the community built themselves
- Use a method that is close to the traditional used one

APPENDIX
GUIDELINES