FORM FOLLOWS TRADITION

A TALE of CRAFTSMANSHIP in EAST AFRICA

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Title paper

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Abstract

This Master's Thesis investigates the intersection of traditional craftsmanship and contemporary architecture, driven by a concern for the loss of artisan knowledge in modern industrialized societies. Inspired by a study trip to Tanzania in 2023, the research highlights parallels between the development trajectory in East Africa and the West's post-Industrial Revolution shift toward carbon-intensive construction methods. The proliferation of concrete and steel in urban architecture, as seen in the Global South, reflects emerging wealth but often disregards environmental sustainability and local cultural identity.

The project is a design proposal for Nyange Farm Lodge, located at the foot of Mount Kilimanjaro in Tanzania. The lodge is envisioned as sustainable and culturally rooted architecture that blends traditional building practices with modern innovations. Utilizing locally available materials such as unburned clay bricks and reinterpreting traditional weaving techniques into structural systems, the design promotes energy efficiency, environmental awareness, and community participation.

Through pathways connecting key areas of the farm and lodge, the design fosters interactions between tourists and locals, encouraging cultural exchange and a deeper understanding of traditional practices. The addition of community-oriented features, such as fresh water access and spaces for shared meals, strengthens the local community, while supporting sustainable tourism and local livelihoods.

By proposing a contemporary design deeply rooted in local resources and traditions, the thesis challenges the prevailing reliance on carbon-intensive construction. It aims to inspire a broader shift in architectural practice, proving that sustainable, affordable, and aesthetically enriching structures can emerge from the fusion of ancient wisdom and modern technology.

Craftsmanship is an ability inherited from our ancestors resembeling tradition and cultural heritage. Let's perserve it and cultivate it.

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“A craftsman is the one who masters the skill of creating.”

(Dictionary, Merriam-Webster)

Reading Guide

This master thesis is divided into 6 chapters, beginning with the program, introducing the theoretical framework of the project as well as thematic studies. Next follows the framework defining the extent of the design proposal, and providing insights on the site, user group, materials and more. The design process will be presented hereafter, followed by the presentation of the design proposal. Finally, the thesis will be concluded in the epilogue.
Throughout the thesis, the authors will assess personal experience based on an anthropological approach of the design process. In these cases, the authors will be referred to as the ‘group members’ or ‘project group’.
The thesis includes illustrations, photographs, sketches and diagrams. All the listed will be referred to as figures and will be collected in a list of figures in the epilogue. Desktop research including literature studies, data and more will likewise be listed in the epilogue and referenced using Harvard Style. The foundation of the project is based on numerous interviews and field trips that all will be presented in the Appendix.

Motivation

Towards the concrete legacy

Through years of studying architectural history and being immersed in the ongoing building industry, one cannot help but wonder: have we already lost generations of craftsmanship to modern, industrialized society? Since the industrial revolution, materials such as concrete, steel and glass have come to dominate western architecture, transforming the way we build and design. Today, it is difficult to find a building constructed within the past 80 years that is not heavily reliant on concrete. However, in Denmark, this approach is beginning to shift. New regulations related to environmental sustainability are forcing architects to reconsider the excessive use of concrete and steel, leading to a revaluation of building practices. Biobased materials and natural resources have gained prominence on the green agenda, yet it could be argued that in the pursuit of the 'international style', traditional craftsmanship has been sacrificed.

This Master Thesis is inspired by this very concern. A study trip to Tanzania in 2023 supported by the International HFO-foundation led the research group to believe that the development trajectory in East Africa—like much of the Global South—mirrors the path taken by the Western countries decades ago. The construction of large concrete skyscrapers and urban housing with glass façades is causing rooms within these buildings to overheat, resulting in massive energy consumption both during the construction process and in operation, due to extensive use of air conditioning systems. This new aesthetic reflects the emerging wealth of the upper and middle classes in society.
The aim of this Master Thesis is to challenge this carbon-intensive and aesthetically driven development by proposing a contemporary design deeply rooted in local resources and traditional building practices.
The aim of this master thesis will not be the pursuit of creating a revolutionary design proposal, but rather inspire for cultural appreciation and exploration of the inherent potential of local and traditional building tradition. The purpose is to unfold an architecture that is available to all, rich or poor.

"Is cultural heritage and craftsmanship being forgotten in the pursuit of the concrete legacy? Knowledge that has been passed down, refined and developed through generations..."

What and where?

At the foot of Mount Kilimanjaro, near the city of Moshi in Tanzania, a remote farm provides food for mountaineers embarking on the ascent to Africa's highest peak. Driven by a local tour operator; Nyange Adventures, the farm offers employment to local farmers and craftsmen from nearby villages. The farm spans 10 hectares cultivating crops such as tomatoes, beans, chilli peppers, corn and bananas, which are either sold at the local market or consumed on expeditions during the climbing season. Some crops, like papaya, avocado, passion fruit and chickpea are grown for local substenance for the employees at the farm. In addition to crops, the farm raises small livestock, including goats, chickens, ducks and turkeys.

In the future, the owner of Nyange Adventures, Praise Nyange, wishes to convert a quarter of the land into a lodge, offering tourists a unique experience before embarking on their Kilimanjaro ascent or wildlife safari. While visitors seek an authentic African experience, the lodge must meet basic requirements for accessibility, safety and cleanliness to match prevailing tourism standards. The new lodge will consist of 12 lodge units, a staff area with an industrial kitchen and sleeping quarters. Additionally, the lodge will feature a reception area, a restaurant, parking and a pool area. The new office of Nyange Adventure will also be situated on the farm.

Nyange Adventures collaborates with several international partners, among them being the Danish travel agency, Vores Afrika. In aim of a more sustainable world the design proposal will therefore also address the issue of sustainable tourism.

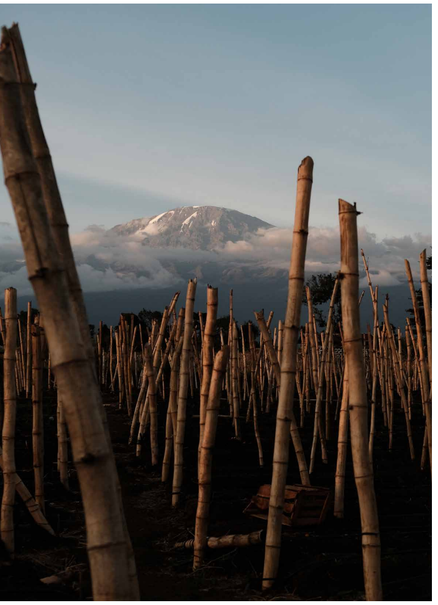


Figure 1: Private picture - Mount Kilimanjaro rising above the cloud cover just before sunset on the farm.

2023 - 3 month

Field trip

In 2023 we visited Tanzania with the aim of understanding cultural heritage, including the indigenous tribes in the country. During our travels, we launched a lodge prototype and worked alongside skilled local craftsmen which fostered sustainable development and led us to a deep appreciation of traditional knowledge and craftsmanship.
The trip was funded by the International HFO Travel Fond.

2024 - 3 weeks

Field trip

In September 2024 we revisited the site as part of our Master Thesis project in order to document the prototype development as well as conducting empirical studies such as interviews and ethnographic surveying.

Figure 2: Private picture - in process of building the roof construction on the prototype.



Figure 3: Private picture - natural stones were used for the foundation of the prototype building.

Methodology

The methodological framework most suited for this project is the Integrated Design Process (IDP), as this procedural framework encourages early-stage engagement of all stakeholders including architects, contractors, users, engineers, and clients. The decision-making process favours individual collaborators' inputs rather than a top-down approach lead by a single entity. The couples with the Participatory Design method, that will be introduced on page 13. The iterative nature of IDP stimulates community engagement and ensures that most possible disciplines and people are engaged in the project. This would yield a much more comprehensive framework, however more innovative and sustainable project.
In contrast to a classic perception of progress being linear, the IDP supports a more modern and holistic trend, taking ethics, indoor environment, material production, end of building life etc. into consideration. This is ensured by establishing feedback loops, where synthesized solutions have to go through numerous iterations of analysis. This provides an integrated design, where proposed solutions are durable. By this is understood; the ability to endure wear and tear, flexible user scenarios, fostering community growth and ability to be returned to nature without doing significant harm. The IDP methodology is appropriate as this methodology nurtures a systems approach over an entity approach. In the IDP methodology the synthesis is understood as the product or design proposal, however this is only one component out of five. Reviewing the other four components remains equally important. With reference to project's definition of sustainability, that will be presented in the next chapter, having a systemic approach over an entity approach is crucial to understand the prevailing crisis and mitigating the consequences it may inflict on regional as well as global scale.

The illustration (Figure 4) cannot be perceived as a chronologically aligned progression from Problem to Presentation nor from the first to the last problem statement. Several analyses convey information directly to the final design proposal. Figure 4 is simply addressing thematic simultaneous processes that all feed into the design proposal.

Problem	Analysis	Sketching	Synthesis	Presentation
Initiating the overall problem statement: how to develop low-cost sustainable architecture in East Africa, expressed via architecture that supports tourism?	Literature studies Ethnographic studies Field excursions Interview Assimilation with tourists' perspective	Recording the regional inherent building typologies.	Program	
Research question: What are the local and global deployed passive design strategies in semi-arid climates such as northern Tanzania?	Climate and site analysis using simulation software. Literature studies. Field excursions. Litterature studies on vernacular architecture. Ethnographic studies of tribal architecture Case studies	Recording design strategies and suggesting solutions for the design proposal.	Program Framework	
Research question: How do local tribes design dwellings, and what is an extension of their identity?	Literature studies on vernacular architecture. Ethnographic studies of tribal architecture. Case studies. Sketching	Recording tribal building technology as well putting this into context of design solutions.	Program	
Research question: How can we develop a low-cost building system using local building materials and labor?	Participatory design workshop on site. Immersive experience on-site for 4 months. Field excursions. Interview. Material testing. Static calculations. Challenge identification.	Sketching overall framework for the prototype construction. Back of the envelope designing proposals as the building phase progressed. BIM-modelling.	Prototyping 1:1 scale Design procedures Construction procedures	Lodge unit Reception Area Masterplan
Final problem statement: In the light of the challenges posed by the Triple Crisis, how can architecture serve as a catalyst to inspire a shift towards the cultivation of craftsmanship and celebration of cultural heritage and tradition?"	Literature studies. Case studies. Prototyping. BEM-simulation. FE-Simulation. Interviews.	Deploying principles from tribal architecture into sketches for detailing design proposal. BIM-modelling to reiterate over BEM and FE simulation. In depth graphical content displaying design proposal.	Design proposal Design manual for low-cost-buildings that are inclusive to local citizens.	Communicating design proposal in technically and aesthetically appropriate formats.

Figure 4: Diagram - Integrated Design Process chart methodology.

Methods

Ethnography

Ethnographic method

The thesis is supported by a series of ethnographic studies performed over the course of two immersive field studies.
The ethnographic aspects of this project have played an important role due to the fact that the site is located in a context none of the group members had previous experience with. Therefore, the ethnographic methods of exploring and investigating social and cultural phenomena within the context has been crucial in developing an architecture that draws on local traditions and affords the ways of life in Tanzania.
The methods used take its point of departure in the book “Ethnographic Fieldwork” by the Dutch professor Jan Blommaert and anthropologist Dong Jie, following the three sequences: prior to the fieldwork, in the field, after fieldwork. Each of the sequences can be describes as illustrated in Figure 5. The anthropological study has its foundation in a large research field on macro-contexts, such as historical development or political situation. This research is often performed *prior to field work*. During the field work, analysis on micro-contexts as well as the actual subject is performed. (Blommaert, 2010)

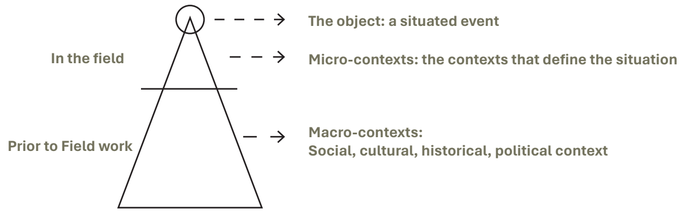


Figure 5: Diagram - The ethnographic method, divided into situations. (Blommaert, 2010)



Prior to the field work, the main focus is “to understand and study the possible contexts in which your object will occur” (Blommaert, 2010, p. 19). This part of the study is typically explored through desktop studies, and includes analysis on the historical context, the social and cultural heritage, politics and more. The aim to increase the number of recognizable elements when being in the field and provides the researcher with a solid foundation for asking relevant questions and acknowledging applicable observations. (Blommaert, 2010).

This part of the study is where data is collected. An intense process where chaos becomes order, and the qualitative data of events and observation is gathered – either as a raw format or half-processed. The importance is that “the field work should not just be reduced to data collection, because essentially it is a learning process.” (Blommaert, 2010, p. 28). The research prior to the field work and the collected data will only to some extent satisfy, but to really understand the subject of a study, learning the informal codes of conduct and unspoken routines will only belong to the researcher who explored the learning process. Including this latent knowledge in a project will help inform the design process on a deeper level. (Blommaert, 2010).
This sequence of the ethnographic study involves three themes: observation and field notes, interviews and collecting artefacts, where all can be sorted into personal interpretations, semi-personal interpretations and facts.

This sequence is about making use of the data collected as a scientific product, including acknowledging that “They [the data] offer a subjective representation of facts and events ‘out there’, and the analysis of such data is an interpretive analysis that necessarily draws on an interdisciplinary set of methods.” (Blommaert, 2010, p. 63). This sequence is also the process of bringing the collected data into use. (Blommaert, 2010).

Prior to the field studies performed by the research group, different ethnographic approaches were applied.
During 2023 only minor macro-context research was made, which provided the group with a non-biased privilege when meeting unique tribal communities. This allowed the group to obtain non-influenced impressions and perceptions of the experiences and events gathered. These experiences was recorded using photography as well as using a personal journal, where observations, thoughts and perceptions were qualitatively collected. The nature of this field trip was very chaotic, without an exact purpose or problem statement. This allowed the group to approach the master thesis with an open mind, really allowing inputs and potential to unfold naturally. This insight lied the foundation for the next field trip performed in 2024. Here, a substantial research on historical, economical, environmental and cultural aspects was made, in order to structure the aim of the trip. Interviews, observations and participatory design mas documented in videos, photos and personal journal.
After each of the field trips, the data collected was categorized through desktop research and literature studies, and now lies the foundation for many of the chapters presented in the next chapters, especially including Cultural Heritage(page 22 - page 29), Tanzanian Architecture Today (page 30 - page 33), The Prototype, material chapters and social sustainability.

Participatory Design

The practice of responsible architecture

For a long time, architectural disciplines have predominantly followed a top-down approach to shaping our built environment, relying more on technical data and following hierarchical norms based on professional experience. Participatory Design or Participatory Architecture aims on the other hand, for a design process that demonstrates a shared enterprise fostering user involvement and co-design.
By exploring Participatory Design in an architectural practice, the process can be re-focused on the actual user group and thereby address the challenges and demands in eyesight. This approach can generate alternative solutions within architecture that affords shared responsibility amongst the communities. The method of Participatory Design reflects a bottom-up approach and requires a flexible, and sometimes even temporary, design approach that allows the architect to adapt to specific circumstances. In many cases, the role of the architects shifts from being the expert to being the facilitator, identifying collective ideas and creating design objectives on behalf of the community.
In the research paper, Strategies and tactics of participatory architecture, the author and professor in architecture, Mirian Calvo, explains the phenomena of Participatory Design as moving away from viewing spaces as static or finite, and instead emphasizing that Participatory Design understands spaces as “transitional, changeable, evolving, and dynamic.“ (Calvo, 2022, p.2).

Co-design

The foundation of the participatory design practice is reliant on the “Do-it-together” mentality. Co-design is reliant on workshops where a diverse group of participants engage collectively to provide knowledge and insights into the development of solutions. The method of co-design enables a creative and more flexible response to the involvement of the environment and everyday life of the user group. The aim is to create democratic and relatable architecture; “PA [Participatory Architecture] practices work together with people, and involve them in the phases of ideation, design, and even in the construction stage, rather than excluding people, which has made cities unrelatable, unproductive and more dependent on capitalist practices.” (Calvo, 2022 p.3)

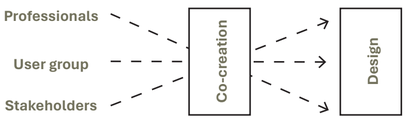


Figure 6: Diagram - The co-creation approach in participatory design, showing a flat hierarchy between participants..



Figure 7: Private picture - The process of building the prototype. Exemplifying how problem solving within the method of participatory design is based on multiple experiences and expertises.



Prototype

During our excursion to Tanzania in 2023 and later in 2024 the group members were given the resources and the opportunity to erect a building that reflects the local typology and integrates concerns of affordable housing while providing an immersive and original experience for tourists using this unit. The underlying framework consisted of carefully selected materials, plan and morphology.
However, during the building process it became evident that the group members had to be able to adjust and reconsider numerous design solutions, due to material availability, construction techniques, craftsmen etc. The full-scale prototype enabled invaluable lessons on material sourcing, project management and community engagement.

Before the prototype

After engaging with the landowner, the group members immersed in the environment in Moshi. By studying local architecture and contemporary architecture design with tourist in mind, we were able to compile knowledge and aesthetic aspirations to produce a design the was regionally appropriate and was composed of materials that were seemingly locally available. Due to the differentiated regulations from urban area to rural area, applying for building permit was averted. The building plot was appointed, and the building process was initiated. The design stage was swift, and the plans were confirmed with the landowner. Static concerns as well as energy and indoor climate measures were performed.

Building process

Building the prototype proved to be challenging as material sourcing was not as easy as it had appeared at first glance. One part was obviously latency of delivery, as well as quantities not matching the orders. Another was the craftsmen's preference was not aligned with the architects' intentions. Instead of rejecting advice the group changed the modus operandi of the building process to be highly participatory in its' nature. The progression became evident by the vertical advancement of the building as well as how the craftsmen and the architects changed their standpoint. It was our suggestion to build with mud bricks and hydrated lime, which was only barely in the masons' knowledge, but certainly not their preferred choice of material for anything but simple sheds for poor people or life stock. As we explained the properties of these materials, the craftsmen and later citizens became fond of participating in developing knowledge and skills of this building technology. When it came to the roof construction, we had no chance but to abide with the technology available and the carpenter's craftsmanship. It became evident that corrugated sheet roofing was the only available or monetarily viable for the scope of this project.
Concluding that participatory design was not simply about designing with high regards to the user and owner. It was indeed the material supply, craftsmanship and community that shaped building process.

When the architect leaves

This chapter is not meant to stipulate the acute need of architects on site. Rather it is the purpose to address the challenges that may arise if the knowledge and recording of building techniques lie with individuals that occasionally leave the site. As the crew consisted of numerous individuals each taking care of their respective tasks the mutual understanding of building procedure was mainly recorded by the authors of this paper. This means that most likely, when the skills and knowledge is not distributed thoroughly the building process is likely to stall.



Figure 8: Private picture - working on the gable wall of the prototype. Here using locally harvested eucalyptus twigs.

Figure 9: Private picture - the gable wall of the prototype providing ventilation into the building.

This chapter delves into the theoretical background of the master thesis by exploring themes including chapters on economical and historical development, vernacular architecture and cultural heritage, sustainability and circular economics, as well as an introduction on indoor climate. Thematic topics such as: how to build timber, and clay are also introduced. This chapter also includes an introduction to East African architecture today.

02 Background

Africa - resources and development

The entire African continent is undergoing massive economic development these years. Out of twenty of the fastest-growing economies worldwide nine are in Africa. Honourable mentions are Rwanda, Djibouti and Ethiopia all located in the East-African region (IMF, 2024) (AFDB, 2024). A substantial part of this growth is sourced within the East African region. Home to some of the most famous national parks in the world like the Serengeti, Victoria Falls and Kilimanjaro in Kenya and Tanzania. These nations make great financial products of their national parks and the tourism they generate.
Of the national economy of Tanzania, tourism accounts for a substantial part of GNP of 17,2% (TIC, n.d.). Though most of the contribution to GNP is still found in the export of agricultural products. Kenya and Tanzania's main export goods are tea and coffee that are shipped from international seaports like Kilindini and Dar es Salaam.

East Africa is composed by three countries: Tanzania, Kenya and Uganda. This part of Africa contains nearly 1.765.400 square kilometres of land and represents an extremely diverse landscape and topography, including the arid lands of northern Kenya characterized by minimal precipitation and vegetation diversity, the humid rain forests of Uganda, the white sand beaches of Zanzibar as well as the very top of Africa, Mount Kilimanjaro, and its ice-cold glacial zone. The East African boarders are defined by the natural phenomenons defined by the coast of the Indian Ocean to the east, the great cracks of the Rift Valley to the west and crossing of the Ruvuma River to the south.

Besides the diversity of landscape, the social formations of East African countries also reflect a large diversity in culture, language and financial systems as a product of its ancient tribal history and later colonial history (Maxon, 2009).



Figure 10: Diagram - map of East Africa



Figure 11: Private picture - One of the women from the village in the process of harvesting tomatoes for the market.

Historical development in East Africa

The historical development of East Africa traces the origins of Homo Sapiens, the migration of people, the influence of nomadic tribes, the impact of colonialism and the eventually the journey to independence and the formation of modern East Africa. As a result, contemporary East Africa is characterized by a diverse social fabric, encompassing a wide range of religious, political, and tribal beliefs that shape its unique coexistence (Maxon, 2009).

2-3 million years ago

The anatomical origin of the modern human, Homo Sapiens, is found in East Africa (early hominins) (Willerslev, 2022). This theory is the predominantly held belief among archaeologists, and known as 'Cradle of Mankind". (Nature news (n.d.))

4.000 years ago

The Cushitic people migrate from Ethiopia and Somalia to East Africa. The Cushitic people are ancestral to the Iraqw, Gorowa and Burunge people.

3.000 years ago

The Bantu people migrate from West Africa to East Africa, introducing the west African planting tradition.

1.500 years ago

The sub-Saharan people, including the Maasai tribe, migrates from South Sudan.



Figure 13: Private picture - a world map painted on the wall in a primary school between Kibosho and Moshi.

1840 - Oman Colony

Islamic Oman rules Tanzania and the East African slave trade with Zanzibar as capital. Coastal areas thrive due to trade with the Middle East, India and China.

1888 - German Colony

European powers divide Africa. Tanganyika (mainland Tanzania) and most of East Africa is allocated to Germany, creating the colonial German East Africa, GEA. Introduction of the Church Missionary Society to East Africa.

1919 - British Colony

All of GEA is now ruled by the British Empire.

1961 - Independence

Tanganyika gains independence

1963 - Independence

Kenya's independence

1964 - United Republic of Tanzania

Zanzibar unites with Tanganyika to form the United Republic of Tanzania.

2005 - New constitution

Tanzania adopts a new constitution expanding multi-party democracy.

2020

Mama Samia Suluhu Hassan, becomes the first female President of Tanzania.

Figure 12: History of East Africa (History of Tanzania (n.d.)) (Timeline of Kenya (2024)

Vernacular architecture

Vernacular architecture is a testament to the ingenuity of human adaptation to environmental, cultural and social contexts. In the book 'Sustainable Vernacular Architecture: How the Past Can Enrich the Future', compiled and edited by Ali Sayigh, professor and founder of the World Renewable Energy Congress, the main purpose is on understanding the comprehensiveness of the term 'vernacular architecture' and how this architectural practice offers valuable insights on creating sustainable and resilient buildings in today's environments accommodating social values of its inhabitants. (Sayigh, 2022)
In the book, it is argued that in most of the globalized world, the International Style of the Modernism has provided its inhabitants with a universal architecture, that has forced people to adapt to the building envelope, rather than opposite. This has led to a severe loss of building heritage and failed to include sociocultural values. The new style also came with indoor climate technologies, claiming ancient methods of ensuring thermal comfort inadequate. (Sayigh, 2022)
Today, the matter of highly technology lead approach has started to shift, as a sustainable building industry has become increasingly requested. By learning from vernacular architecture, especially celebrated in the African continent where the built environment is still largely reflected upon environmental adaptability is present, valuable insights on low-cost building techniques may be obtained.
In absence of stable energy supply and rural nature of the civilizations in Africa, architecture in many places has been developed naturally to facilitate energy efficiency, indoor climate comfort and cultural expression, whilst taking into consideration the scarcity of materials. These are qualities that are sought after in the building industry today. (Santos, 2023)
Professor Khaled Al-Sallad studied examples of vernacular architecture in east Asia arguing that "Vernacular architecture in many parts of the world has proven to satisfy the needs of human functions, which is guided by the sociocultural values of the inhabitants, along with high levels of thermal comfort based on least energy costs. The performance of vernacular architecture is mainly attributed to the smart strategies that indigenous people adopted to cope with harsh climatic conditions when technologies are not yet introduced" (Sayigh, 2022, p.2). The notions of these are very much aligned with thought from passive buildings design that serve to be net zero by balancing energy losses and gains. With the urgent need to reduce energy consumption, the exploration of architectural archetypes that have historically adapted to local climatic conditions related to specific climate regionalism of a specific location, proves to contain valid solutions on passive strategies. (Sayigh, 2022)
The vernacular approach to architecture is characterized by the use of locally available materials, climate-responsive designs, and methods passed down through generations. The book emphasizes that these structures are not merely artefacts of the past but are critical to addressing modern challenges such as climate change, resource scarcity, and cultural homogenization. (Santos, 2023)
Ali Sayigh explores how integrating the principles of vernacular architecture with modern technology can inspire innovative solutions that are environmentally responsible and culturally meaningful. The contemporary architecture is facing challenges in the compromise between modern technology and heritable values; "The challenge appears in the attempt to respond to local climate and in the process of blending and obtaining the balance between advanced generalities in the universal and the local or traditional aspects from the ancestors" (Sayigh, 2022, p. 3). (Sayigh, 2022)

Materials

The primitive forms of vernacular architecture have its basis of fulfilling basic needs of shelter and protection. In the very beginning, these needs were found in natural shelters and caves, allowing humans to inhabit them without major modifications. Later, primitive architecture was employed in terms of small constructions and undertook thereby the purpose of caves, allowing human to inhabit areas more freely. The materials used were solely based on local assessment, and largely depended on climatic conditions in the area, either of mineral or organic origin. The mineral materials, such as clay, sand and stone, provide a strong geological characteristic of the place. These materials have been adapted through time to the environment, altering durability and mechanical properties. The organic materials, including all types of vegetation, are dependent on atmospheric parameters, like wind, air temperature, sun and rain exposure and have a direct correlation with the climatic conditions at the building site. Most often, both materials of mineral and organic origin have been used in vernacular design, due to the different properties of the material types and their capacity to perform specific structural functions.The use of natural material requires regular maintenance due to its sensibility to the surrounding environment and low durability. Therefore, natural material faces the challenge of being long-lasting building envelopes. (Besora, 2019)

Culture

Across the globe different cultures have developed their own vernacular architecture reflected in knowledge of construction passed down through generations. The traditional buildings act as a window to social patterns and cultural needs and traditions, all adapted to specific climatic conditions and location. This is reflected in the differentiation of traditional dwellings. Nevertheless, despite no cultural or commercial link, ancient dwellings in similar climatic zones appear to contain similar architectural elements, leading to an understanding that vernacular design reached beyond social traditions and patterns. (Besora, 2019)



Figure 14: Private Picture - An example of how vernacular buildings on Zanzibar, Tanzania, relied on local and available construction materials, here using coral stone deposited at sea. In the historical capital, Stone Town, most of the dense urban landscape are constructed using coral stone.

"Vernacular architecture can typically be understood to be a region's indigenous local building customs, materiality and the milieu in which it arises. Vernacular architecture is an architectural style that is designed based on **local needs, availability of construction materials and reflecting local traditions**.
At least originally, vernacular architecture did not use formally schooled architects, but **relied on the design skills and tradition** of local builders"

Norman Foster (Sayigh, 2022)

Wall construction

In the paper 'Review of Bioclimatic Strategies and Analysis of Case Studies' architect and author explores vernacular examples on natural sources of coolness in hot regions. Relevant strategies in relation to wall construction includes:



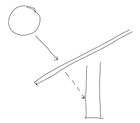
1. "Building with thick adobe walls: Using building materials with high thermal mass capacity such as adobe helps to store night coolness for several hours then release the stored coolness to the interior space during the hot daytime hours when it is needed."

(Al-Sallal, K. A. et al. (2019) p.33)



2. "Adapting the climate with sensible traditions: Indigenous people learned throughout history how to adapt their lifestyle to match climatic conditions/cycles. For example, the people in the harsh hot dry regions sleep on the roof of their houses when the outdoor ambient temperatures cool down while they move to the cool basements during the extreme hot daytime hours to feel more comfortable."

(Al-Sallal, K. A. et al. (2019) p.33)



3. "A self-shading form helps to reduce exposure to the solar radiation. In hot dry climates, it is recommended to adopt compact forms since they have smaller areas of exposed surfaces to the outdoor conditions (high solar radiation and high ambient temperature) and as a result can minimize heat gains"

(Al-Sallal, K. A. et al. (2019) p.33)

Roof construction

The roof is an architectural element that serves as an intermediation between the ground and the sky above, with the main function of providing shelter from climatic conditions. The roof also has a psychological function due to its ability to create and transform the space below it.
The roof provides a sense of security, both a physical and psychological sense of security. This proves both to be right in terms of individual and collective cases. A large roof can also provide a sense of community between people and has the possibility to sustain the feeling of belonging.

Vernacular roof constructions in wet and warm climates characterized by high average temperatures, little seasonal variations, heavy rainfalls and high humidity, are defined by the urgent requirements of rainwater expulsion outside the building perimeter as well as providing a large amount of ventilation. The most common solution is "steep pitch roofs with long eaves and a ventilated chamber" (Besora, 201, p. 367). The roof accommodates large overhangs that also acts as solar shading, while providing the building with intermediate areas around the exterior walls, such as verandas. Roofing materials is predominantly of organic origin, due to the lush ecological conditions, though being permeable. Therefore, a steep and thick roof has been adapted in these areas, to quickly remove surface water. (Besora, 2019)

In terms of roof constructions in hot climates, several papers underline that by investigating vernacular architecture in hot regions a double-layered pitched roof is coherent across case studies. The double layered construction will act as a buffer zone reducing solar heat gains through the roof and allow natural ventilation. (Aboulnaga, et al., 2019)



Figure 15: Sketch - how the roof affords several important psychological and physical functions.

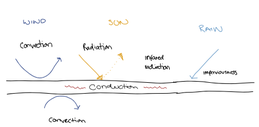


Figure 16: Sketch - properties of a roof

Low-tech

A concept often associated with Vernacular-architecture is Low-Tech. The term refers to deliberate rejection of technologically advanced solutions and prioritized use of natural or simple methods, that withstand the test of time. This affords simple and cheap construction methods that can be constructed in rural conditions. Notably Low-tech does often require consulting skilled craftsman and specific experts with knowledge of labor intensive techniques, local materials, local climate and construction methods. Amongst low-tech building solutions are numerous passive design strategies like natural ventilation, passive heating and cooling. (Widera, 2021)

Cultural heritage

Tribal architecture

Most people in East Africa still identify with tribal kinship, and while many ancient tribal societies have modernized, others continue to live and practice the traditional lifestyles as passed down from their ancestors. However, with rapid economic growth and increased availability of materials, traditional building techniques are being replaced by standardized solutions, such as concrete blocks and steel sheet roofing. To preserve and honour the region's building traditions and cultural heritage, it is essential to understand the way of life that these practices support, as well as to incorporate and understand cultural functionalities.

Hadzabe tribe

Way of life

The hilly land of northern Tanzania, Eyasi Valley is home to the indigenous Hadza people, - one of the very last hunter-gatherer communities on Earth. Their remote position makes them dependent on natural sources of food, building materials and herbal medicines, making them exceptionally knowledgeable on survival in rural areas. The Hadza people live in smaller communities with a strong social hierarchy, including a chief representing the head of each community. The hunting lifestyle of the tribe requires them to be nomadic in order to follow the natural movement of wildlife.
Their unique language and religion have been passed on through generations and includes natural symbols and artefacts, for instance are the massive Baobab tree the root of all life.

Local building resources

Located in the savannah biome the Hadzabe has a limited variety of building material at hand, mostly consisting of grasses and smaller twigs. For joinery peeled bark is used to tie building elements together.
Being a nomadic people, the Hadzabe creates temporary shelters for each family within the community. A shelter consists of a main room for cooking, and a shared bedroom for both children and parents, as presented in Figure 21.

Technique

Using materials at hand, the load bearing structure consists of twigs tied together. For the building envelope layers of grasses are being intertwined within the structural elements providing a waterproof cover. In addition, the steep roof structure allows water to flow quickly and leave the building envelope.



Figure 17: Private picture - The hadzabe women in the early morning staying warm by the bonfire wearing homemade jewellery and gowns.

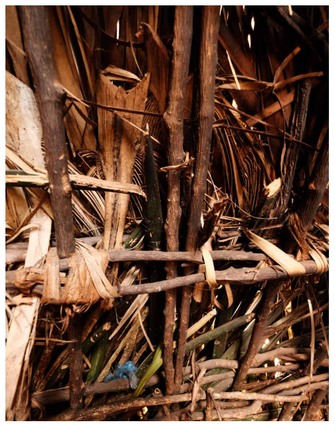


Figure 18: Private picture - The Hadzabe tribe uses bark tying as a building technique.



Figure 19: Private picture - The Hadzabe chief in front of the double dwelling wearing the hides of his most spectacular kills, including the leopard.



Figure 20: Private picture - a Hadzabe man hunting for wildlife with bow and arrow. The wildlife is defined by the seasons, making the Hadzabe altering their own diet depending on what they catch and gather.



Figure 21: Sketch - The Hadzabe tribe masterplan layout. The buildings are places according to the terrain rather than an hierarchical order.

Figure 22: Private picture - The hadzabe dwelling consisting of twigs as the load bearing structure and grasses as the building envelope.

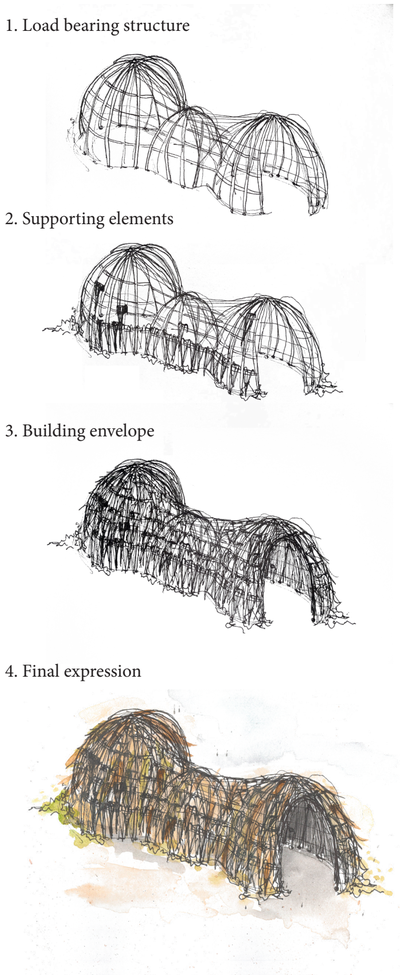


Figure 23: Sketch - A conceptual drawing of the Hadzabe hut construction.



Figure 27: Private picture - The Maasai lifestyle is expressed by the means of rhythmical music, jewellery, gowns and a unique dance performance.



Maasai tribe

Way of life

The Maasai are among the oldest nomadic people in Africa. Historians assert that the Maasai originated from the arid regions of North Africa, migrating alongside the Nile River to their present location in the highlands of Kenya and Tanzania. Traditionally, the Maasai are pastoralists, with cattle serving as their primary occupation, source of wealth and sustenance. Despite some modernization, the Maasai settlement patterns have undergone minimal change, preserving the traditional structure of their dwellings. The nomadic lifestyle of the Maasai is closely tied to the seasonal movement of their cattle, as they migrate to find lush grazing lands. Consequently, their shelters are temporary and constructed with simplicity to accommodate this mobility. (Rukwaro, et al., 2001)
In an interview mr. Ngaiseleki Laizer, a Maasai from the Ngorogoro area, explains that the settlements of the Maasais are structured within a "boma". The boma constitutes a man's household, including a hut for each of his wives, his first son, his other sons and daughters and his mother. The order of each unit is well sorted in a social hierarchy and for security matter organized in a circle. In the centre of the boma, the cattle enclosure is the located and expresses the wealth of the man and needs protection. Other enclosures for goats and sheep are located towards the sides of the boma.

Today, the lifestyle of the Maasai has changed from nomadic to permanent settlements, but the importance of the cattle remains the same. The herdsman continues to preserve the nomadic lifestyle by walking the cattle to plains with more grass to feed the animal. Depending on the season, the herdsman will walk for many days or even month, before returning to the rest of the family in the boma.
The ancient tradition of using natural medicines, wearing the Maasai shawl and jewellery as well as religious beliefs remains. For instance, circumcision is still performed at the age of 15 performed by local doctors (using only natural medicine in traditional ways) and is attached to ancient rituals. The diet includes fresh blood from the cattle to improve the immune system.

Material

The area of the Maasai is generally a semi-arid to arid biome, meaning that the local building components consists of grasses, bushes, smaller trees and material of mineral origin. The cattle always accompanying the tribe, provides the village with cow dung which then is a reliant source of building material too. The Maasai also use the ash from the fire as an antibacterial component in the building construction. (Rukwaro, et al., 2001)

Technique

Based on a field trip to a Maasai boma first-hand knowledge were gathered. Using materials at hand, the Maasai are creating the load bearing structure from of rafters rammed into the ground, while horizontal members are placed to stabilize structurally. Smaller twigs are weaved into the structure in a vertical and horizontal direction creating the walls of the dwelling. Hereafter, at mass of mud, water, cow dung and ash from the fireplace are mixed and applied with a throwing technique to create a plaster. Once applied, the surface is then smoothened by hand creating an even surface. The roof construction is generally flat, constructed much like the wall structure.
A tiny hole in the roof acts as the only source of natural light in the hut.



Figure 24: Sketch - the plan of a Maasai settlement known as a "Boma".



Figure 26: Private picture - The wall construction of the Maasai dwelling is done by wattle and daub.



Figure 25: Private picture - The Maasai village in the Ngorongoro Conservation area near the crater. The planning is programmed to keep the most valuable asset, the cattle, protected in the middle of the boma.



Figure 28: Private picture - As a facade cladding, the Maasai people mixes water, clay, ash and cow dung into a mass that can be plastered onto the wooden wattle. The fibres in the cow dung acts as rebar in the construction.

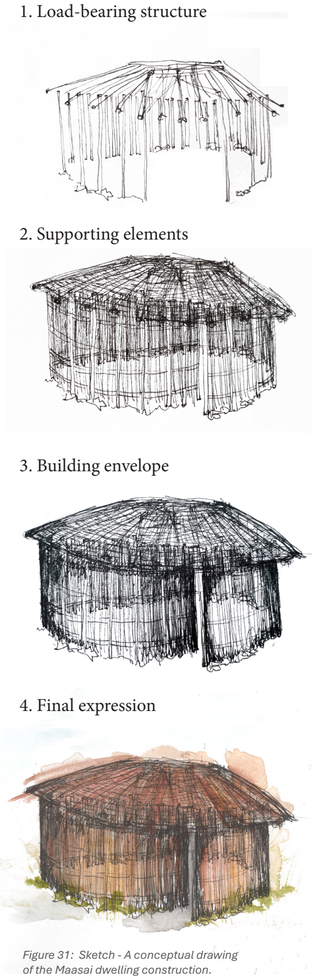


Figure 31: Sketch - A conceptual drawing of the Maasai dwelling construction.



Figure 30: Private picture - The roof construction on a Maasai dwelling, made from small twigs. The Boma is enclosed by a fence of pointy sticks to keep wildlife out of the community.



Figure 29: Private picture - The Maasai chief in front of his main wife's home.

Chagga tribe

Way of life

According to a Chagga elderly and cultural professor from the Village of Marangu, the name Chagga is derived from the Maasai language, meaning the ones who lives in the bush (Appendix 1 on page 168). The Chagga people fought the Maasai in the Kilimanjaro-region and have ever since then occupied the land by placing permanent dwellings. Like the Maasai, the Chagga tribe has held livestock as a fortune and source of food. This practice has been the reason for long term fights between the two tribes, and many traditional norms has been developed due to this. For instance, the plan layout of the Chagga dwellings is ordered to keep the livestock safe from theft by the Maasai, by keeping the animals inside the building. Another example is the low door and the placement of the father's bed next to the door on the left (Figure 38). When the tall Maasai came to the cottage whey would have to bend to enter. When entering the father of the house would be ready to hit the Maasai in the back of the head with a club.
The slave trade has also had an impact on the traditional Chagga housing. During this time, the Chagga people dug long cave-systems underneath their village, to prevent the young men and women to be captured and bought Bagamoyo before shipped off for slavery. The caves could be accessed within each dwelling and the entry was hidden underneath the cow enclosure. The massive underground system was planned as a maze, so that intruders would get lost. (Appendix 1 on page 168).
Early on, the Chagga introduced land rights and boundaries within each village, and today, the ancient belief that Chagga people are good tradesmen are still standing strong where they are heavily represented in businesses. Today, only few traditional houses as seen on the picture(Figure 34) remains, due to a poor reputation, even though the Chagga representative argues, that the indoor environment is much better within the traditional dwellings. Today most Chagga people live in concrete buildings. (Appendix 1 on page 168).

Figure 36: QR-code: Have a look inside the Chagga dwelling.

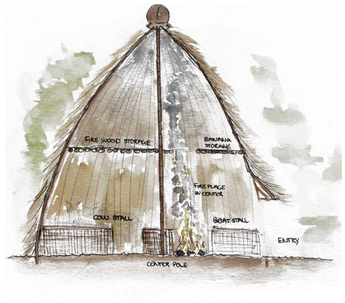


Figure 33: Sketch - a section of the Chagga dwelling, showcasing the attic above used for storing food and firewood.

Figure 34: Private picture - the entrance of a Chagga dwelling. The small overhang creates a mediator from interior to exterior, and together with the small soil barrier on the ground, it enables rain water to enter the dwelling .

Material

Being located at an elevation of 2000 meters above sea level, the cooler climate during cold season and warm weather during hot season calls for thermal insulation. The chagga used a thick layer of dry-grass gathered in the lowlands for their building envelope. A permanent small fire was kept inside the dwelling to keep the grass dry in order to avoid mold, due to the humid conditions in the area. For the structural elements long sticks of eucalyptus was used while joints were tied using vinous plants in the area. The Yucca tree was planted around the land boundary and graves to indicate, not to build or intrude. (Appendix 1 on page 168).

Figure 35: Sketch - the dimensioning of a traditional Chagga hut

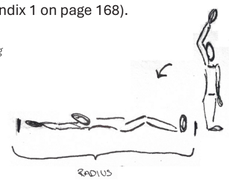
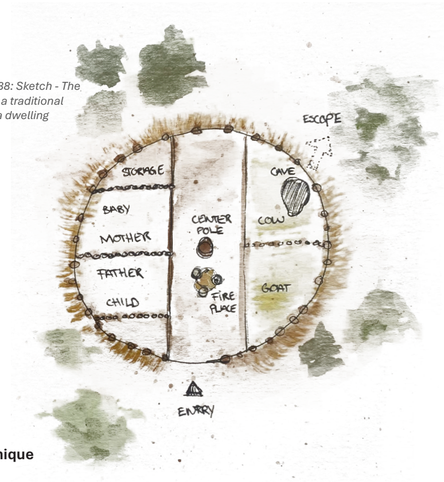


Figure 32: Private picture - a beautiful weaving technique is found at the Chagga settlement.





Figure 38: Sketch - The plan of a traditional Chagga dwelling



Technique

The traditional housing was constructed to be permanent housing, and therefore the building process was well organized. For every dwelling a method of measuring was used. The main senior craftsman would use his heel to indicate the centre of the hut. Then, using his own length by lying down, the radius of the dwelling would be determined of X number of the contractor's length (Figure 35). At the boundary of the circle, the senior craftsman would use his heel and toe to create a circular hole in the ground, indicating where each structural timber should be placed. Each timber pole is tied together in the top, creating the wall and roof in one. The construction is supported by horizontally placed twigs.
The steep angle of the roof prevents the building envelope to leak in the rainy season, and allows the dwelling to have a small attic within the building, used for drying bananas and firewood storage. At the top of the roof, a clay pot was placed to cover the joinery of the structural sticks (Figure 37).

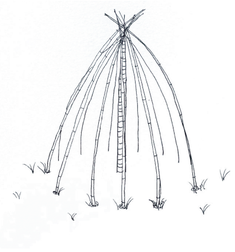
Figure 41: QR-code: Interview with Chagga representative.

Figure 39: Private picture - woman cooking the traditional dish, Ugali, on the tree-stone-stove.

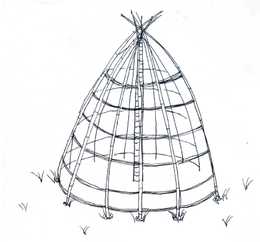




1. Load bearing structure



2. Supporting elements



3. Building envelope



4. Final expression



Figure 37: Private picture - the building envelope consists of dried grasses readily available. Mold and insects are avoided by keeping the central fire lit at all times. A traditional clay pot, called Chungu, is placed on top shelter the dwelling from rain through the joinery.

Figure 40: Sketch - a concept drawing of the Chagga dwelling construction.

Datoga tribe

Way of life

The Datoga tribe is an ethnic group mainly located in the Singida and Manyara region, particularly in the area around Lake Eyasi and the Rift Valley in north Tanzania. The Datoga people speaks the Nilotic language, originated from South Sudan, and their main culture is built around being semi-nomadic and with a pastoralist purpose. The livestock plays a central role in the life of the tribe, and their settlements consists of an enclosed area where both the dwellings and livestock are located, reflecting the importance of the animal. (Datoga, 2024). The main livestock consists of goats, sheep, donkeys and cattle. The cattle are believed to have a higher status and are mainly used for milk. Sheep and goats are serving the purpose of being the source of meat, while the donkeys are used for transportation. (Bihariová, 2015)
Besides livestock, the Datogas are known as being good black smiths, trading arrow points and jewellery. The women of the Datoga are scared with facial marks, often forming two circles around the eyes as seen on Figure 44. The tattoos and jewelry provide the women with identity related to tribal status and cultural pride.

The settlements, known as “gheda”, is usually a family unit dominated by a married man and his close related family. The tribe is polygynous and patrilineal, with the male being the main leader in terms of politics and social life. The women of the Datoga are believed to lead the spiritual life of the family, and her main function is household and children.
The people of Datoga were given the name Mang’ati, meaning ‘the enemy’, by the Maasai tribe, due to the Datoga’s reputation as being strong worriers. Today, the ethnic group are among the most vulnerable populations in East Africa due to national governance interference since the 1970’ies, and the tribe is struggling to retain their traditional way of living. They live in deserted areas far from modern society and other tribes. The Datogas’ long traditional rituals of gaining honour by killing lions and men of the Bantu-tribes, has made the tribe secluded as well as their lack of education and by remaining illiterate. (Bihariová, 2015)

Material

The people of Datoga are settling in a semi-arid to arid biome, meaning that the main source of materials are from mineral origin, supplemented by smaller bushes, grasslands and dry climate trees, like the Acacia. (Rukwaro, et al., 2001)

Technique

Based on a field trip to a Datoga gheda firsthand knowledge was gathered. The main building technique is based on a mud-and-wattle method, utilizing the argilliferous soil to create a building envelope. Single-story dwellings are built using branches as the main load-bearing structure. A flat roof is preferred to avoid the mud-plaster to run off during rain. There is a high maintenance on the structures during the rainy season, mainly performed by the women in the gheda. Unlike the Maasai, Hadzabe and Chagga tribe, the dwellings of the Datoga are a rectangular shape, often larger to accommodate several family members (Figure 49). The larger structural span is supported by columns of twigs, supporting the roof as seen on Figure 43. Elements are joint by using grasses or bark.
The situational plan layout of the dwellings is creating a shared plaza between the structures. The black smith workshop is located underneath a shading tree and is essential in the placement of the gheda. Surrounding the settlement is a fence of acacia thorn, to avoid hyenas and other predators to enter.



Figure 42: Private picture - The datoga hut is constructed by using wattle-and-daub. Vertical wooden wattles are load bearing, while horizontal twigs are holding the daubed mud.

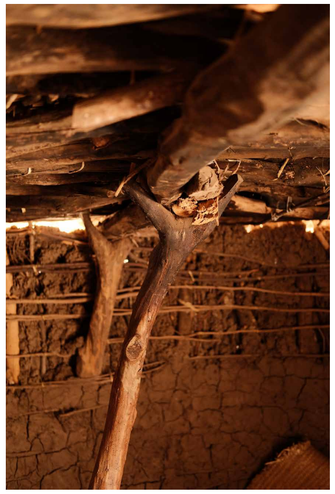


Figure 43: Private picture - Longer beam spans are supported by larger wattles.



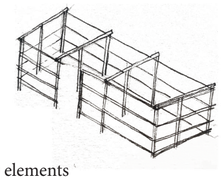
Figure 44: Private picture - The women of the Datoga Tribe sitting in the large hut of the tribe cheif. Jewellery represents the status of the woman.



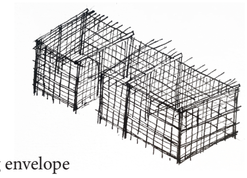
Figure 45: Skëtch - the plan layout of the Datoga tribal community

Figure 46: Sketch - Datoga dwelling

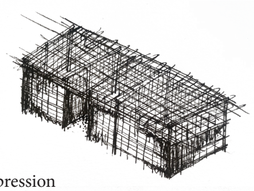
1. Load bearing structure



2. Supporting elements



3. Building envelope



4. Final expression

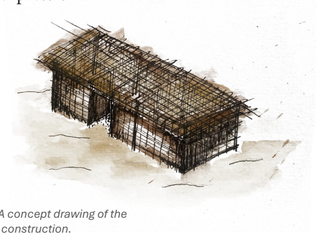


Figure 47: A concept drawing of the Datoga hut construction.

Figure 48: Private picture - The Datoga Tribe is know for their blacksmith profession. Here, jewellery and arrow heads are recycled from old scrap metal.

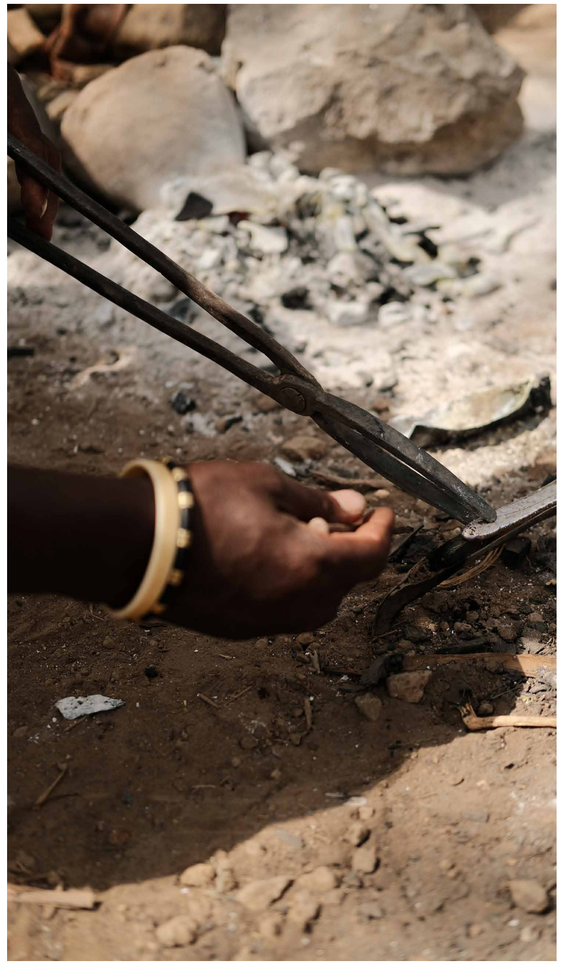


Figure 49: Private picture - The Datoga community is made up of several closely located huts, the boma, surrounded by a fence of pointy twigs and thorn bushes to keep wildlife out.



Tanzanian architecture today

Typologies today

The following study takes its point of view from the ethnographic studies performed during the field trips in 2023 and 2024. The analysis is based on personal observations as well as informal interviews with many different local entrants, including farmers, craftsmen, artisans, tour guides and structural engineers.

In today's East Africa there is a large span between the infrastructure and building masses found in the larger cities compared to the rural areas. Though a large difference, one can still find tendencies towards a specific building culture across the countries. The tendency towards concrete housing and steel roofing is unsurprisingly the most used material across the world, and so is the case of East Africa. Due to the fact, that the concrete and steel sheet roofing is the readily available material, the local architecture is defined by this.
Modern building preferences it often leads to more expensive building materials, which is reflected in very long building processes.
Often, local building owners will invest in one brick at the time, over the course of several years as expressed in Figure 50. The building process will also occur in several stages, often starting with a building or room for the elders in the family.
In terms of security, private compounds in better neighbourhoods are commonly equipped with large electrical or barbed wired fences, while bars on windows are used most places.

Rural typologies

The typology in rural areas reflects the desired aesthetics given by concrete, as we see it in the townscape. Though, the materials used in these detached areas are based on natural and available material, such as stone, mud as well as leaves and grasses. The buildings have high maintenance cost in terms of workload and is often associated with low social status in communities. Figure 54 illustrates a typical rural typology and showcase how erosion has affected the lower parts of the clay wall structure.

Town typologies

The typology seen in town areas are mostly one-story building with a high-pitched roof, as illustrated on Figure 52. The walls are constructed in concrete blocks with small openings and little daylight due to a very compact form and large overhangs. The scale of the building may be closely related to the seismic concern in the area.
In areas of richer social layers, one will find that all buildings are enclosed by a large fence, due to security issues. Figure 51 illustrates a low-cost fence option consisting of steel wires, while Figure 138 is showcasing a large concrete block option. The last mentioned is an expensive option related to status and wealth, and is therefore preferred.

Low investment design

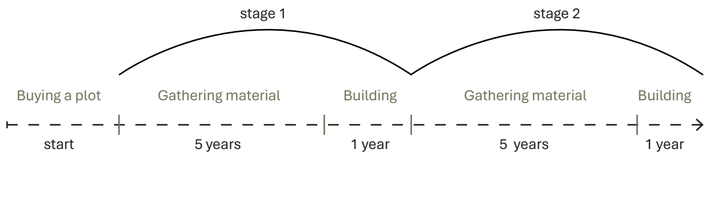


Figure 50: Diagram - expressing the financial situation during building process. Running investment in building material with the goal of building a family home. Building projects are often divided into many stages due to low salaries.



Figure 53: Private picture - fences around compounds is more common than not due to security issues.

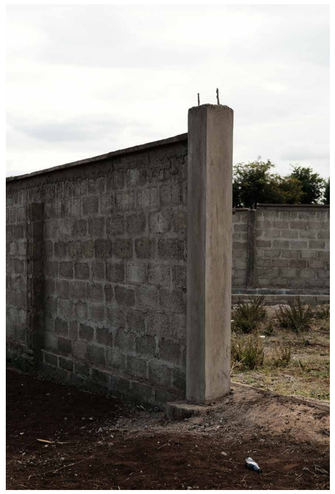


Figure 51: Private picture - a concrete brick wall is symbolising wealth, but often the wall is left undone due to material cost.



Figure 52: Private picture - a typical building aesthetic in town scapes.



Figure 54: Private picture - mud brick wall in the rural areas near Lake Eyasi in Tanzania. The picture shows how the lower part of the wall has been subject of erosion.

Urban typologies

In an urban context the group members found very little architectural relation to the previous experienced cultural tradition in the country. The large building, as seen of Figure 55, Figure 56 and Figure 57, are reflecting a global aesthetic, using primarily concrete and steel as structural elements, while façades are mainly unshaded coated glazing. As a local structural engineer explains in an interview, the western aesthetic has been a source of inspiration for many years and is now seen in terms of material usage and form giving (Appendix 7 on page 180).
The architecture forces a high energy consumption, due to very high solar radiation, and lack of incorporating passive design strategies. This tendency rises a concern on the reminiscence of cultural heritage, as well as concern on environmental impact.

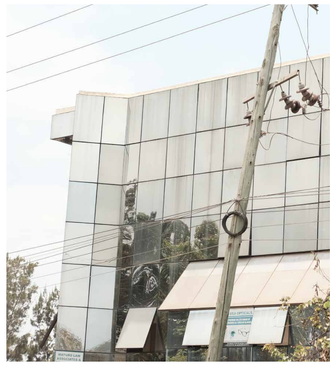
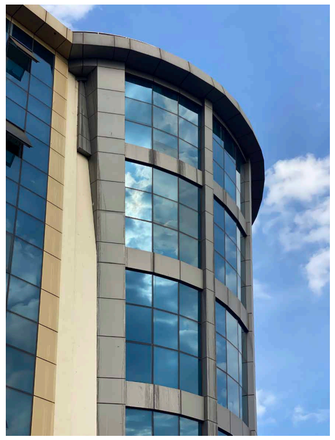


Figure 57: Private picture - Office complex in Arusha, Tanzania. Showcasing large glazing façades with no solar shading to avoid overheating

Figure 55: Private picture - Bank in Moshi, Tanzania, showcasing large window-to-wall area using reflective window screening





Challenges of the structural system

During the field studies in Tanzania in 2023, the project group found that in the construction phase of building projects mainly using solid concrete blocks, there were many health-related challenges.
First and foremost, the group found that due to lack of equipment, the local contractors have to move the blocks manually, often performed by carrying the load on one shoulder. This method leaves the craftsmen in an alarming body posture, and often with smaller wounds and soreness as a result.
Another challenge is the lack of knowledge on the cement-based substances used for plastering the concrete blocks. During the field study in 2024, the project group found, that in the some of the cement-based plasters, asbestos was added in the mixtures used for interior finishing. Furthermore, the mixing of concrete is often performed without respiratory protection.

In the long run, the risk of early retirement caused by health issues are extensive. In these cases, the family of the contractor are left with no financial support due to the lack of health insurance in the society.

Figure 56: Private picture - Office complex in Moshi, Tanzania.

A perspective on the future

Triple ‘A’ Architects

Within the larger cities of East Africa, a rather new aesthetic is dominating the skyline of the cityscapes. As a structural engineer explains in an interview, the western aesthetic has been a source of inspiration for many years and is now seen in most places in terms of material usage and form giving (Appendix 7 on page 180).
An example of this is the bank of Moshi pictures in Figure 55, where a large glass façade is acting as a landmark in the city. The glass façades seem to be a desirable aesthetic, though one is left to wonder about the indoor climate within the building, being so close to the equator with temperatures hitting 35 degrees Celsius during warm season (Betti, et al., 2023). The building volume uses an extensive energy consumption only for cooling. And even though this aesthetic may be here to stay, some local architectural firms pursue an opposite way, inspired by local traditions and cultural heritage.

To acquire a view into the future of East African architecture, it is essential to gain insight through the local architects working with the topic on a daily basis. On of the major architectural firms in Tanzania is the Triple ‘A’ Architects, who has almost 40 years of experience in the building industry. The firm is mainly occupied with designing private dwellings as well as educational projects, and their office is based in Arusha, Tanzania. The architectural firm markets themselves as a sustainable architectural firm, and in an article they elaborate on vernacular architecture. Therefore, the topic

Tourism architecture

The tourism sector is one of the largest industries in East Africa, making architecture a key element within this context. In Tanzania, much of the economy is fuelled by tourism, providing a unique opportunity for architecture to reflect and introduce contemporary ideas and aesthetics. While many tourist hubs often prioritize extravagance, this project seeks to inspire locals by leveraging tourism resources—specifically the revenue generated by the sector—to encourage a reconsideration of building techniques and aesthetics, particularly in town and rural areas where the project site is located. Through this approach, the project may promote sustainable, innovative design solutions that resonate with local culture and address the evolving needs of less carbon emissive materials.

“Our primary objective is to enrich people’s interactions with the spaces where they devote a significant portion of their lives, be it private residences or public establishments, while prioritizing environmental sustainability”

(Triple ‘A’ Architects 2024)

on sustainability was explored in an interview with the Director, Baraka Sikawa, and managing director, Beatrice Loishiy.

From the conversation, it became clear that while there is a desire for sustainable architectural practices within the firm, pursuing such initiatives remains challenging. One major obstacle is the lack of education on sustainability—not only within architectural schools but also among the general public. Furthermore, sustainable building practices lack formal certification or assessment, as no official standards or systems currently exist.

Additionally, there are widespread assumptions and aesthetic preferences in East Africa that tend to discourage the use of natural materials, such as clay or mud. Baraka Sikawa elaborated on this by stating that only a few clients are willing to consider alternative materials. He explained, “We came from mud-houses. You can’t build that. Even though you explain that mud has much better thermal comfort, they [clients] see it as going backwards.”(Appendix 2 on page 171).
This sentiment reflects how public opinion is hindering the adoption of environmentally sustainable building methods. In conclusion, it can be said that overcoming societal perceptions and increasing education on sustainability are critical for advancing sustainable architecture in East Africa. (Appendix 2 on page 171)



Figure 58: Private picture - meeting with Triple A Architects. Inspecting rammed earth samples.

Rules and regulations

In Tanzania there is currently no fully deployed building codes (ICC, n.d.). Actions to establish building codes are frequently initiated. Especially Architects Association of Tanzania (AAT) is pushing the government to adopt codes that the AAT developed in 2003 (The Citizen, 2021). In 2013 a 16-storey residential building in Dar es Salaam collapsed and killed 36 people, which gave momentum for adoption of proper nation-wide building regulations ensuring health, safety, welfare and security (Kiganda, 2017). It relies on the municipality councils to conduct inspections of construction sites and permit a final certificate of compliance after the building is finished. A survey conducted by The Citizen across three municipal councils found the most prevailing violations of construction codes are that most buildings are built too close to one another, lacking parking spaces, poor drainage and not providing adequate accessibility to people with disabilities (The Citizen, 2021).

The existing policies that apply to the built environment are (The Citizen, 2021):

Urban Planning Act (2007) and Urban Planning and Space Standards Regulations (2011): Establishes a framework for land use, zoning, and urban development, including approval processes for land subdivision, building permits, and urban plans.

Environmental Management Act (2004): Requires Environmental Impact Assessments (EIA) for projects that impact the environment and defines environmental protection and sustainability measures.

Occupational Health and Safety Act (2003): Ensures safety at construction sites, regulates worker protection, and mandates safety inspections and risk assessments.

National Human Settlements Policy (2000): Focuses on housing and urban settlement planning, addressing sustainable urban development, affordable housing, and infrastructure needs.
The AAT criticizes the lack of the laws and codes of being inadequately specific for constructions and do not stipulate human safety measures (The Citizen 2021).

There are several relevant authorities that are relevant to the building industry, that make sure acts and standards are conformed:
National Environmental Management Council (NEMC): Oversees compliance with environmental laws, including Environmental Impact Assessments (EIA).

Tanzania Bureau of Standards (TBS): Regulates building materials and construction standards.

Municipal and District Councils: Responsible for issuing building permits, inspecting construction sites, and enforcing zoning and urban planning regulations.

Occupational Safety and Health Authority (OSHA): Monitors safety at construction sites.



Figure 59: Private picture - The ring beam of the prototype is being cast.

Tanzania based British architect Russel M. Henderson describes in his blog how to obtain a building permit in Tanzania. The landowner (and consultant) must submit architectural and structural plans. The architectural plans include masterplan, general arrangement plans of rooms, elevations and sections. However, the technical details such as reinforcement of joints, foundation, slabs etc. should be thoroughly detailed even at an early stage in the design process. Next the submission should include an Environmental Impact Assessment (EIA). This documents the effects that the proposal inflicts on the local environment, sustainability and water management. The EIA is conducted by an environmental consultant. Finally, the submission must include the title deed, proving that the land owner legally owns the property. The submission should be approved by the local relevant authority and construction may begin after this. (Henderson, 2024)

Figure 60: Private picture - A school in Zanzibar, Tanzania.



Sustainability

“What is abundantly clear is that nature must become a priority issue as we transition towards a re-generative built environment that balances growth with human and societal well-being for long-term prosperity.”

Jerome Frost, Chair of Arup Group
(Ellen McArthur Foundation 2024, p. 9)

A term that is receiving more and more attention in the dialogue on sustainability is “prosperity”. The Ellen McArthur foundation published the report “Building Prosperity: Unlocking the potential of a nature-positive, circular economy for Europe” in July this year. The report suggests different strategies that would decouple material extraction with economic growth and move towards a circular economy. According to the Ellen McArthur Foundation, prosperity is an alternative understanding of growth. Where economic growth today is defined by a continuously increasing material portfolio and economic wealth, leading to resource depletion, social inequality, immense waste and climate change, the growth of the future is the contrary. Prosperity is the growth that supports social equality, nature-positive initiatives, regeneration of resources and fosters resilience. This is the distinction of the linear economy that is prevailing nowadays, and the circular economy that many stakeholders envision is the economy of the future. (Ellen McArthur Foundation, 2024)

To understand the current state of our planet we must take a systemic point of view instead of focusing on limited definitions of individual components (Webster, 2016). System thinking is a way to understand the complexity of ecological, social, organizational systems, where even a small action may have great derived effects that may not be identified if we do not observe the underlying systems. (Meadows, 2009)
The crisis that we are facing across the globe is a very complex problem, that has many causes and effects, that vary greatly across geographical location. A trending term these years is the Triple Planetary Crisis concept described by the United Nations Framework Convention on Climate Change (UNFCCC, 2022), which refers to climate change, pollution and biodiversity loss. These crises are interlinked and must be approached in a holistic and cooperative way. As the UNFCCC describes, the most pressing issue is climate change. Climate change is the shifts in temperature and weather systems due to greenhouse gasses emitted to the atmosphere from energy production, industrial activity, transport, building, agriculture etc. The effects are devastating and however distinctly experienced across the globe, where some regions experience more drought and wildfires, other regions experience more flooding, storms and rising sea levels. This hits human civilization as well as biodiversity.

The biodiversity crisis refers to the loss of biological stock and diversity. Due to overfishing, deforestation, mono-cultural farming, soildegradation etc. The effects are believed to be even worse than the effects of climate change, as lack of biodiversity will make future pollination of crops impossible, thus leading to immense hunger worldwide. This is not something that is experience particularly pressing in Denmark, as this have limited impact on our livelihood. However, many low-income countries across the world experience serious malnutrition issues due to this crisis. (UNFCCC, 2022)
The last crisis is pollution. Air pollution is the cause of 7 million deaths worldwide every year. This is due to wildfires, traffic, industrial activity and mold. It also includes cooking using dirty stoves and fuels, something very common in the global south, causing about 3.8 million annual deaths. (UNFCCC, 2022)

Regenerative Design

The idea of regenerative production was initially introduced as a concept in agriculture. Acknowledging that the way agricultural production is carried out by extensive use of pesticides and NPK fertilizers the soils lose its ability to store carbon and thereby also water. Regenerative agriculture focuses on carbon sequestration by accumulating organic matter in the top-soil layer and avoid disturbing the complex biome in the soil and on the ground, hence promotion of biodiversity is key in regenerative agriculture (Ellen McArthur Foundation, 2016).

The soil around the world has a huge potential to avert the climate crisis from too much emitted CO2. According to Hunter Lovins, President of Natural Capital Solution, increasing carbon contents of the soil in agricultural land by just 2% would be equivalent of all anthropogenic carbon emitted into the atmosphere. The soil provides the second largest carbon sink after the oceans. (Ellen McArthur Foundation, 2016)

The concept of regenerative development has been adopted by numerous branches. The British based architectural practice Studio Bark’s Breach House is a brilliant example of this. The restoration of an historic farmhouse yielded an exceptional 60% net gain of biodiversity, in-house water collection and purification system to provide potable water as well as irrigation. It even integrates hydro-power as well as clever flood mitigation. (Studio Bark, n.d.)



Figure 61: Private picture - Waste whether organic or inorganic is burned on site.

The United Nations’ Sustainable Development Goals

There are numerous frameworks that have quantified the crises over the years. The most trusted and widely recognized framework is the United Nations’ Sustainability Development Goals, SGDs. 193 member states adopted the 17 SDGs in 2015 to be achieved by 2030 (UN, n.d.). Many countries have interpreted the strategies into local sets of regulations, as signees of the Paris-agreement are obliged to, and numerous industry organizations such as the Danish Green Building Counsel (Rådet for Bæredygtig Byggeri) verify compliance with the SGDs, EU-taxonomy, certifications systems etc.

However, as these organizations are unrepresented in East Africa the underlying targets of the SDGs and appropriate learning hubs remain the best option to establish a framework in this project.

Amongst 17 SDGs the project group has identified the following goals, to be pursued in this project

Criterion



Targets

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

7.5 By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support.

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

9.6 Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.

9.7 Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for industrial diversification and value addition to commodities.

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

11.4 Strengthen efforts to protect and safeguard the world’s cultural and natural heritage.

11.9 By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters,

11.A Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Figure 62: (UN, n.d.) Sustainable Development Goals that are to be pursued in this project.

Social sustainability

Social sustainability can indeed be approached from various perspectives. In this project we seek to pursue the development of the UN SDGs as they are constituted of an extensive framework including a UN report from 1994 stipulating the seven categories of human security (UNDP, 1994).
Although it is not the purpose to state that security is always segmented in this manner, as these are highly interlinked, it serves the purpose of distinguishing that there are securities concerning the individual and securities concerning a system. The first four of the seven SDGs have direct and acute impact on the individual whereas environmental, community and political security have a systemic character that may inflict compromises to the first four. Chances are that if we are able to ensure the first four, we are on a trajectory of empowerment leading to systemic changes that can increase resilient communities and thereby reducing vulnerability.

"...a concern regarding the protection of human life from threats to its core but also regarding the em-empowerment of people so that they can contribute to their own protection " (Asaka, 2020, p. 78)

To comprehend why security is an important term the project group are looking at the findings of assistant professor, Jeremiah O. Asaka, in his book Human Security and Sustainable Development in East Africa and how the author unfolds the term Security. It is not a universally understood concept and is constantly developed from a theoretical point of view. Though, the latest and most recognized definition is coined by USA president, Franklin D. Roosevelt, at his State of the Union Speech in 1941, later referred to as the "Four Freedoms Speech" (National Archives and Records Administration, n.d.). More recently updated and manifested in the Human Development Report by the UN in 1994 (UNDP, 1994). Asaka unfolds the three concepts of Human Security obtained from its' theoretical framework to an executable definition and classification of threats and responses. (Asaka, et al. 2022)

Freedom from fear

Threats: Natural hazards, disasters, violence including genocide, civil war, inter-ethnic tensions/clashes, domestic violence, and other threats that could bring about physical bodily harm or, worse, loss of life.

Response: Humanitarian intervention, conflict resolution, and peace building.

Freedom from want

Threats: Poverty and other threats that negatively affect a person's ability to achieve his/her basic material needs.

Response: Promotion of good governance, sustainable development, human development, and human rights.

Freedom to live a dignified life

Threats: Poverty, human trafficking, sex trafficking, racism, slavery, child labor, torture, and other threats that deprives a person of his/her human dignity.

Response: Promotion of good governance, sustainable development, human development, and human rights.
(Asaka et al. 2022)

Sustainable Development Goals identified:

Food security: Sufficient and adequate access to healthy, safe and nutritious food.

Economic security: Stable and dignified income usually from safe and just employment or if this is not the case a publicly financed safety net.

Health Security: Absence of infectious circulatory diseases and parasitical diseases

Personal security: Violence that causes bodily damage. Physical torture, war, ethnic conflict, ideological conflict, rape, domestic violence, crime, abuse, suicide and drug abuse. Moreover J. O. Asaka mentions in his Ph.D. wildlife attacks apply to regional areas in Kenya for instance (Asaka 2018)

Environmental security: Climate change, loss of biodiversity, land degradation, air pollution, natural disasters

Community security: Communities with strong beliefs and social codes often protect the ones within ancestral or alternative belonging to a community. Unfortunately, this can cause rivalry amongst clans, tribes, gangs etc.

Political security: Absence of human rights or absence of neutral parties observing and reporting absence of human rights.
(UNDP 1994).



Figure 63: Private picture - washing clothes is a social gathering on Sundays.

By proactively addressing how to meet the criterion stipulated by the UN report from 1994 and Jeremiah O. Asaka three concepts it becomes evident that social sustainability is interlinked with security. By building security for the individual, we can build resilient communities.

Resilience

We are establishing the term resilience as term, that extends above the individual to communities or even a global crisis mitigation system, as articulated by the founder of ClimateAi, Himanshu Gupta, to Times Magazine this year.

> "[...] this global challenge requires a global solution: a collective, cooperative effort that is proactive rather than reactive from governments and companies on an international supply chain level to build resilience in the face of climate change."
>
> (Gupta 2024)

Food security

Himanshu Gupta uses the Russian invasion as an example on food security. After the Russian invasion of Ukraine in 2022 it became evident to most people in Europe that sudden local impacts send chock waves penetrating deeply into the global economy and resilience. Global wheat prices increased by 28% (Stein, 2024). Together with rice, wheat is the most consumed food on a global scale. When the global market is hit, the most vulnerable people are the people living in poverty and rural areas who are not net-consumers, meaning that they are relying on imports of food. This has lesser impact in Europe with high living standards and more economic reserve. A household may need to buy other foods if certain products are becoming more expensive or simply eat less varied. But in areas of the world where poverty is predominant this can force families to take children out of their school to be able to feed the household. (Gupta, 2024).
Global food security is becoming increasingly volatile because of increasing protectionist measures deployed by governments all over the world because of war and conflict, affecting global supply chains of foods. At the same time climate change is affecting land use globally. This leads to greater fluctuations of agricultural products from season to season. (Gupta, 2024)
To ensure global food security the governments and international organizations must deploy initiatives to ensure supply chains and slow down pollution of the oceans and atmosphere. The Ethiopian government invested in drought-resistant crop and water management leading to increased yields by 40% and thereby increasing food security as well as economic security. (Gupta, 2024)

Gender enequality due to poor energy supply

In rural civilizations all over the world the primary energy source has for many years back - and in some cases still is - biomass, primarily used for heating and cooking. This is still the case in Tanzania, but in town areas this has gradually been substituted or replaced with fossil fuels, like coal and gas. A pressing issue is that cooking usually takes place indoors with low quality biomass, poorly controlled combustion and poor ventilation. This is a major issue on gender inequality since often women and girls are cooking. Studies shows that toxic indoor smoke is the second biggest cause of premature death in the African continent caused by cardiovascular and respiratory diseases, predominantly caused to women and girls (Makoye, 2024). On the Summit on Clean Cooking in Africa, Tanzanian President, Samia Suluhu Hassan, expressed on a conference in Paris in 2024 the following statement;

"Successfully advancing the clean cooking agenda would contribute toward protecting the environment, climate, health, and ensuring gender equality," Tanzanian President Samia Suluhu Hassan (Makoye, 2024).

The lack of stable energy supply in many rural areas of the African continent is partly the cause why many citizens do not have any alternative to polluting cooking stoves (Widera, 2021).



Figure 64: Private Picture - African women from the Maasai Tribe.

Environmental sustainability

The environmental part of the sustainability definition is largely to ensure a balance between human activity and natural systems. When material exploitation is high, we must make sure to balance this behaviour by making sure that the positive impact makes up for the negative impacts on emission, lost biodiversity etc.
For this project the project group will pursue passive design strategies. This almost diminishes the energy required for operation, and therefore the balance is more easily maintained additionally adding resilience to the system, as the passive design strategies are not prone to failing during black outs.
The project is situated on farmland, which also serves the purpose of producing food for the accommodation as well as additional revenue from market sales. The methods of farming are restorative to the soil. In the chapter on Social Sustainability, it was established that the remaining seasons of harvest are acutely few (Phillips, 2024). In the future, farming will shift from solely a yields perspective to a soil perspective. This will not only increase the yield but also the biodiversity and carbon sequestration potential, as well as mitigate soil erosion which is key to ensure desertification (Webster, 2023). This has the potential to ensure long term viable crop production and sustain resilient communities.
Likewise, the building materials should be sourced in a manner that will have a positive impact on the environment. Biogenic materials are preferred as these are carbon sinks, therefore structural members like roof trusses are preferably made from timber. If the manufacturing of timber remains low and non-toxic it becomes a valuable resource with low environmental impact, that can be released into the carbon cycle after ended lifetime. The tribes in East Africa have a strong connection with indigenous plants and know where to find timber members that are suitable for structures, canes even weapons. The sourcing and preparing of these are usually time consuming which makes the material very valuable and sometimes conveys strong spiritual value. This paper seeks to understand what it takes to build value into the materials and thereby adding value and affecting to the resource.

Figure 65: QR-code: Video of Praise Nyange unfolding the potential of indigenous plants.

Land right distruputes

Many agrarian societies all over the world rely immensely on possessing land or access to fertile land for food production and economic gain. In some cases, the designated lands also have great cultural importance.
After the cold war the many sub-Saharan nations changed from a predominantly centralized economic system to a more liberalized system. This meant that land possession changed from being a necessity became a commodity (Sassen, 2013). In many African countries the strategy since 1990's has been to privatize land ownership to ensure private and central capital. Unfortunately, the only accepted currency is the monetary revenue, the rural societies that held great cultural value are forces away from their lands because the specific lands have been sold off to investors, that are often larger property owners or foreign investors. In many cases this results in increased poverty. (Pearce, 2012)
It is the analysis of Francis Semwaza that across many nations in Africa where the state is ultimately the owner of the land and the citizen is only given the right to use the land, the respect of citizens rights for use the land is often compromised by more commercial incentives. (Asaka, et al. 2022)
In recent years a lot of land is reserved for conversational purposes to improve biodiversity and natural rehabilitation. Since the citizens have no knowledge of the suppression of biodiversity that they may or may not inflict and finally will not gain financially from the land transfer, they share little compassion with the government's agenda. The result being that the citizens must migrate and observe how few organizations now gain substantial revenue from tourism activities associated with the conservation. The disadvantaged citizens may legally participate in the negotiations but may not affect the government judgement on whether to grant the land for investors or conservation. (Asaka, et al. 2022)
Currently 30% percent of Tanzanian total territory is registered under conservation protection. The Tanzanian government plans to expand to 50%. The conservation laws states that no people can inhabit the natural conservation areas. The only permitted activity is tourism. When Tanzania's government publishes a bid for expanding national parks it immediately attracts foreign investors. China and United Arab Emirates have in recent years invested in lodges and an airstrip leading to displacements of settlements by the people of the Maasai Tribe near Ngorongoro National Park. The Maasai Tribe is a nomadic people that go where the lands are fertile to support their livestock. The German KfW Development Bank has invested nearly €30 million leading to discussions of completely relocating of more than 300,000 Maasai 600 kilometres east from Ngororo to Msomera. During the first half of 2024 the World Bank and the European Commission has suspended more than €150 million in tourism related investments in Tanzania because of human rights concerns. (Schlindwein, 2024)

"Instead of oil rigs and coal mines, we can generate energy on the roofs of our own houses, or through community owned wind turbines."

(Raworth, 2019, p. 5)

Economical sustainability

In the previous chapters, it has already been established that there is no real distinction between economic, social and environmental sustainability. This chapter seeks to present a contemporary economic framework that integrates the three terms into one economic model.
The current global market is reliant on economic growth depending on resource depletion being linear. This means that economic growth is independent of climate change, biodiversity loss and pollution often referred to as the Triple Crisis. The current system is in its' nature a Make-use-dispose system. This means that materials have a linear path from production/excavation to usage until they are disposed (Zuo, 2024).
An alternative model is the Circular Economy model.

Circular Economy

Circular Economy (CE) has numerous definitions, and amongst the highly regarded once are the Ellen MacArthur Foundation explaining the concept as: "The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources." (Ellen McArthur Foundation, n.d.) The Ellen McArthur Foundation is an NGO established in 2010 that has the single purpose of changing the market towards circular economy. (Ellen McArthur Foundation, n.d.)
Circular economy is an economic concept that is widely regarded as a concept that makes sustainability operational by affording a more efficient and sustainable production (Mhlanga, 2024). The purpose is to keep the materials' value at the highest throughout the value chain. Initially material production should be carefully reduced by design, and also refusing to consume certain products or decrease frequency of consumption. This leads to and increases incentive for reusing products. If products are broken or defective the user engages with the local market to repair the product, or increases its value by refurbishing, or currently less common, re-manufacturing it by industrially improving the state of the product to be as-new again. At the end of the use-phase consumers can extend the duration of the products lifetime by re-purposing the use meaning that with minimal modifications the product serves a new purpose. Alternatively, the user hands the product over to a manufacturing company that industrially recycles the product by manipulating the compounds to be able to create new products again. It is necessary that the products are designed with minimal material production in mind and with optimal conditions for disassembly and reusing. (UNEP, n.d.)
All though CE-practices are becoming increasingly evident in the building industry and most importantly in the academic discussion of the built environment, a bibliometric analysis shows that the African continent significantly lower academic publications or contributions to the CE-debate than other continents (Mhlanga, 2024). The same study concludes that the most published and discussed topic in CE is "measurement strategies and models" (Mhlanga, 2024 p. 616). With BIM modeling practices being generally minimal, the potential of CE-concepts being deployed in Africa has not yet proved a significant presence. Ignoring adaptation of CE-principles in a rapidly expanding African building industry could lead to serious lack of contribution to the SDGs (Delgado, 2020).

Distributed economy

The British economist and accredited author of Donut Economy theory, Kate Raworth, has gained a lot of attention during the last decade as she proposes an economic system, in line with CE, that is integrating the Triple Crisis and six other planetary ceilings as well as twelve social thresholds into the economic model. It is crucial to understand that economic currency is not solely monetary possession, exemplified by voluntary work or the effort that a parent puts into giving a child a proper upbringing which is of great benefit to society, but invisible on the conventional market (Pillips, 2023).

Kate Raworth expresses how it is not a natural progression of economic growth to be unequal. This is derived from historical ownership patterns; thus, this is why we see huge gaps between the wealthiest citizens and the citizens living in poverty (Raworth, 2019). The quote (page 40) articulates how modern energy technology has the potential to re-distribute economy from a few companies owning the fossil fuel infrastructure to individuals producing energy on their own land (Raworth, 2019).

This paper pursues the potential of distribution of economic assets. By assets we understand cultural value, historic and contemporary craftsmanship, social engagement, voluntary participation, spiritual expression, diversity, regeneration of nature etc. By insisting on a building system that is rudimentary and inclusive by design as well as construction, the engagement of local craftsmen as well as neighbours and local material suppliers is a prerequisite. When promoting regional identity and spiritual traits there are indications that this foster belonging to architecture and satisfies the inhabitants more so than if it was a generic architecture (Widera, 2021).



Figure 66: Private picture - Local women on the way back from the market.

Figure 67: Private picture - A Maasai man, wearing the traditional Maasai shoka, posing proudly in front of his home. An example of mud-based vernacular dwellings in East Africa.

Tourism

The tourism industry is accountable for the vast overspending of the planet's resources. Meanwhile, in some areas it also increases awareness of the inherent cultural value of traditional architecture, culture, traditions etc. that is beneficial to local communities that can make a living from providing tourism related services like cooking, transport, guided tours etc. This is not always the case in East Africa, where natural conservation serves the purpose of satisfying tourists, it does not produce an evenly distributed economy - in some cases the contrary.
A study by the UN shows that CO2 emissions from tourism are forecasted to increase by 25% by 2030 from 2016. Transport covers 75% percent of the tourism industry's emissions (UNWTO, 2019). This is unfortunate because tourism is vulnerable to climate-related change, as is the case with tourism that revolves around nature. The extinction of species can affect the income for certain destinations.

More tourists and operators request sustainable tourism initiatives. Politics are influencing tourism on a global scale and interested parties like the UN encourage more sustainable tourism activities. The UN tourism organization UNWTO states the following on tourism development.

1.

Make optimal use of environmental resources that constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.

2.

Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to inter-cultural understanding and tolerance.

3.

Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation.

(UNWTO, 2019)

Global Sustainable Tourism Counsil (GSTC)

Like most other industries the certifications play a big role in disclosing sustainability performance, like for instance DGNB and LEED in the building industry, Energy Star in the technical and industrial sector or Fairtrade within consumer goods and food. These certifications indicate that a company is committed to sustainable development as these certificates are hardly obtained easily nor free of charge. Most certification programs oblige the companies to continuously improve their performance to keep the certificate. Within tourism the most trusted certification program is the Global Sustainable Tourism Counsil (GSTC). It was founded by the UN and Rainforest Alliance as an independent and neutral NGO that has staff and volunteers situated across all populated continents.

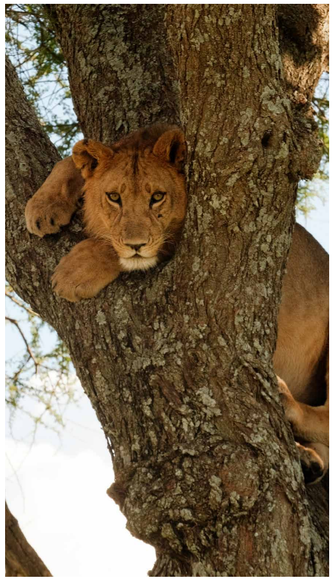
The four pillars:
- Management
- Social and economic practices
- Culture and community
- Natural environment

Being one of the golden standards in sustainable tourism, the certificate is recognized by many. Numerous alternative certificates are aligned with the criteria of GSTC. In the end this means that companies that achieve this certificate or other aligned certificates are aligned the UN's Sustainability Development Goals (SDGs).



Figure 68: Private picture - Safari vehicle in the beautiful, lush landscape of the national park Ngorongoro, Tanzania.

Figure 69: Private picture - The Serengeti National Park is one of the most well known wildlife conservation areas in the world.



"...responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education"

(TIES, 2015)

Eco-tourism

A common word that is used extensively about certain destinations is "Ecotourism". UN defines Ecotourism as "All nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas." (UNWTO, n.d.)
The International Ecotourism Society (TIES) describes:
"responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education" (TIES, 2015)
Ecotourism is becoming a sought-after type of travel. Due to the abstract nature of the term, destinations can more easily declare themselves as an Ecotourism destination. Meanwhile visitors can also more easily request this type of travel. In 2023 the global market size was valued at 216,49 Bn USD and is expected to grow 759,93 Bn USD by 2032 (Fortune Business Insights, 2024).
The principles of Ecotourism defined by the TIES are:

- Minimize physical, social, behavioural, and psychological impacts.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.
- Deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries' political, environmental, and social climates.
- Design, construct and operate low-impact facilities.
- Recognize the rights and spiritual beliefs of the Indigenous People in your community and work in partnership with them to create empowerment.

Agri-tourism

A significant market trend in tourism is the creating experiences that relate to agricultural produce, locally produced foods and sustainable farming. Agritourism or Agrotourism has emerging prospects, the projected market size by 2032 is 197.37 Bn USD from 69.24 Bn USD in 2019 (Fortune Business Insights, 2024).
A great potential of agritourism is the rural nature of the farms. Where traditional tourism is often times centred around the biggest cities, agritourism effectively distributes earnings to local people in the rural areas.

Figure 71: QR-code: See how Praise Nyange, the owner of the farm addresses mutual benefits of agritourism.



Figure 70: Private picture - Local mamas in the farming fields carrying tomatoes .

Hotels

Tour Operators

GSTC

Industry

Destinations

Criterion	Relevant Indicators	UN SDGs
Demonstrate effective sustainable management		
A1 Sustainability management system		
A2 Legal compliance		
A3 Reporting and communication		
A4 Staff engagement		
A5 Customer experience		
A6 Accurate promotion		
A7 Buildings and infrastructure		
A7.1 Compliance	A.7.1.1 Awareness of, and compliance with, laws relating to land use and activities in the local area is demonstrated. A.7.1.3 Awareness of, and compliance with, non-statutory area management plans and guidance (e.g. for particular zones, design, etc.), is demonstrated.	11 SUSTAINABLE CITIES AND COMMUNITIES 15 LIFE ON LAND
A7.2 Impact and integrity	A.7.2.1 Site selection, design and access have taken account of visual amenity, landscape, cultural and natural heritage. A.7.2.4 The integrity and connectivity of natural sites and protected areas has been preserved. A.7.2.5 Threatened or protected species have not been displaced and impact on all wildlife habitats has been minimized and mitigated. A.7.2.6 Water courses/catchments/wetlands have not been altered and run-off is reduced where possible and any residue is captured or channeled and filtered. A.7.2.7 Risk factors (including climate change, natural phenomena, and visitor safety) have been assessed and addressed.	11 SUSTAINABLE CITIES AND COMMUNITIES
A7.3 Sustainable practices and materials	A.7.3.1 Local materials, practices and crafts have been used in buildings and design where practicable and appropriate. A.7.3.2 Native and endemic plants obtained from sustainable sources have been used in landscaping and decoration, avoiding exotic and invasive species. A.7.3.4 Sustainable design, materials and construction practices have been used in buildings, with appropriate certification where possible. A.7.3.5 Waste from construction is sorted and disposed of in an environmentally sound manner.	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 11 SUSTAINABLE CITIES AND COMMUNITIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
A7.4 Access for all	A.7.4.1 Sites, buildings and activities are accessible to persons with physical disabilities and other special needs, as appropriate to the nature of the operation.	10 REDUCED INEQUALITIES
A8 Land water and property rights	A.8.1 Land ownership and tenure rights are documented. A.8.3 There is documentary evidence of communication, consultation and engagement with local and indigenous communities. A.8.4 Evidence of free, prior and informed consent of local communities is documented, where relevant (showing no involuntary resettlement or land acquisition).	1 NO POVERTY 11 SUSTAINABLE CITIES AND COMMUNITIES
A9 Information and interpretation		
A10 Destination engagement		
Social and economic benefits to the local community		
B1 Community support		
B2 Local employment	B.2..1 The proportion of total employment from persons already residing in the local community is measured and managed. B.2.2 The proportion of employment in management positions from persons already residing in the local community is measured and managed. B.2.3 Training is offered to local residents to enhance their employment opportunities.	8 DECENT WORK AND ECONOMIC GROWTH 10 REDUCED INEQUALITIES
B3 Local purchasing	B.3.2 The proportion of goods and services purchased from locally owned and operated businesses is measured and managed.	8 DECENT WORK AND ECONOMIC GROWTH
B4 Local entrepreneurs		
B5 Exploitation and harassment		
B6 Equal opportunity		
B7 Decent work		
B8 Community services		
B9 Local livelihoods		
Cultural heritage		
C1 Cultural interactions		
C2 Protecting cultural heritage		
C3 Presenting culture and heritage	C.3.1 Local art/craft is reflected in design and furnishings. C.3.2 Living cultural heritage and traditions are evident in cuisine, retail, events and other services offered. C.3.3 Copyright and intellectual property rights have been observed and necessary permissions obtained. C.3.4 The views of the local community have been sought on the presentation of local cultural heritage.	11 SUSTAINABLE CITIES AND COMMUNITIES 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
C4 Artefacts		
Benefits to the environment		
D1 Conserving resources		
D1.1 Environmentally preferable purchasing		
D1.2 Efficient purchasing		
D1.3 Energy conservation	D.1.3.1 Total energy used is monitored and managed. D.1.3.3 Renewable sources are favoured and the share of renewable energy in total energy supply is monitored and managed. D.1.3.4 Equipment and practices are used that minimize energy use. D.1.3.5 Goals for reducing energy consumption are in place. D.1.3.6 Staff and guests are given guidance on minimizing energy use.	7 AFFORDABLE AND CLEAN ENERGY
D1.4 Water conservation	D.1.4.4 Equipment and practices are used that minimize water consumption. D.1.4.7 Goals for reducing water consumption are in place.	6 CLEAN WATER AND SANITATION
D2 Reducing pollution		
D2.1 Greenhouse gas emissions	D.2.1.1 Total direct and indirect greenhouse gas emissions are monitored and managed. D.2.1.3 Actions are taken to avoid and reduce significant annual emissions from all sources controlled by the organization.	13 CLIMATE ACTION
D2.2 Transport		
D2.3 Wastewater	D.2.3.2 There is a system in place on site to treat wastewater (that meets international wastewater quality requirements) and ensures no adverse effects on the local population and the environment.	3 GOOD HEALTH AND WELL-BEING 6 CLEAN WATER AND SANITATION
D2.4 Solid waste		
D2.5 Harmful substances	D.2.5.2 Action has been taken to source more environmentally friendly alternatives.	3 GOOD HEALTH AND WELL-BEING 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
D2.6 Minimize pollution	D.2.6.3 Action is taken to minimize and where possible eliminate pollution from noise, light, runoff, erosion, ozone-depleting substances, and air, water and soil contaminants.	
D3 Conserving biodiversity, ecosystems and landscapes		
D3.1 Biodiversity conservation		
D3.2 Invasive species		
D3.3 Visits to natural sites		
D3.4 Wildlife interactions		
D3.5 Animal welfare		
D3.6 Wildlife harvesting and trade		

Figure 72: Diagram on how the selected GSTC's and SDG's can be compiled with the aim of simplifying the application method in the design proposal.

Indoor climate

Bioclimatic design

Bioclimatic design refers to an intricate combination of local climate and architectural design. This is often accompanied by passive design strategies, energy efficiency, indoor climate comfort and strong relationships with natural surroundings. As elaborated in the chapter on Vernacular Architecture page 6, the African continent there is an abundance of bioclimatic designs that each have utilized regionally available materials and carefully designed layouts to conserve the limited energy available. Principles have emerged through deep understanding of local climate often acquired through numerous generations (Santos, 2023). The concept of bioclimatic design is currently trending due to the emerging knowledge of the Triple Crisis. Especially since the African continent is on trajectory of increased resource depletion, energy consumption and pollution, this design concept is more important than ever (Nematchoua, et al. 2021).
A study performed in western sub-Saharan countries famous for mud structures suggests that traditional vernacular buildings with mud walls (Cob, and wattle and daub type) and thatch roofs have significant indoor climate comfort improvements over the modern architecture (adobe and corrugated steel sheet roof) being erected in the same region. In the dry season 60% of occupants felt comfortable. Compared with the modern architecture only 20% of the occupants felt comfortable in the warm season. The modern homes would in the warm season be significantly hotter inside than outside reaching 39ºC causing serious thermal discomfort to the 95% of the inhabitants. (Widera, 2021)
The study observed that the occupants denoted a greater sense of spiritual attachment with the traditional vernacular homes. Another observed benefit is that civilizations with archetypical homes would profit more due to increased tourist activity. This is for instance the case with Koutammakou's Tower Houses in Togo that was enlisted on the UNESCO Heritage program in 2004 (Widera, 2021).
The study points to several possible improvements to the indoor environment in the modern typology, limiting heat radiation emitted from beneath corrugated steel sheets roofs, insufficient ventilation in the night-time, and very limited natural light - sometimes below 1 lux. (Widera, 2021)
To assess the indoor climate a study on the prototype on the site is performed. Variations over this prototype are performed using energy modelling. This chapter will unfold the parameters explored and the assessment criteria.

Adaptive Thermal comfort

To assess whether integration of passive design strategies has an impact on indoor thermal comfort, selecting an assessment methodology is crucial.
The most used model is the Predicted Mean Vote (PMV-model) aligned with ASHRAE 55 and EU-16798 standards. This model has a narrow comfort span, that affords the use of mechanical systems. As an alternative the Adaptive Thermal Comfort Model was developed by Dear and Brager as a complementary model to the ASHRAE 55(ASHRAE RP884 at the time) standard. Although the scope of the ASHRAE 55 was not initially designed to promote use of mechanically controlled indoor environment over user-based controls, years of practice pointed towards this practice. Due to limited comfort range categories from the laboratory based PMV-model, compliance with ASHRAE 55 was more complicated without the use of mechanical systems such as HVAC systems. This has to do with the parameters of the PMV-model being solely; Environmental factors: temperature, thermal radiation, humidity and air speed, Personal factors: activity and clothing. Whereas the Adaptive Thermal Comfort Model added physiological factors such as: Temperature expectation, thermal preferences, interaction between indoor and outdoor temperature og finally behavioral adaptation such as changing amount of clothes and adjusting ventilation air velocity. (Brager, et al. 2001)

The Adaptive Thermal Comfort Model was adapted by ASHRAE 55 standard in 2004. This was the first standard to include an adaptive thermal model. A similar model was introduced to the EN-16798(previously EN-15251) in 2007 based on a model developed for European context by McCartney and Nicol (McCartney, et al. 2002). (Berger, et al. 2023)

The Adaptive Thermal Comfort Model by Dear and Brager is regarded appropriate in this context as it takes interaction with the indoor climate into account. As it can under no circumstances be acceptable to depend on a mechanical climate control system due to the inconsistency of power and complexity of technology. However, there can be installed as a supplementary system exemplified by ceiling fans. Thus, providing a little more flexibility to the comfort ranges is desired. The comfort ranges in the adaptive thermal comfort model are defined by the Outdoor Running Mean Temperature (ORMT). The Outdoor Running Mean Temperature is unfolded in the design process (xx). The effect of establishing a running mean temperature are the comfort ranges shift over the course of the year. Below (XX) are examples of the classes defined by ORMT on a day with 25ºC and 20ºC Celsius (Betti, et al. 2023).

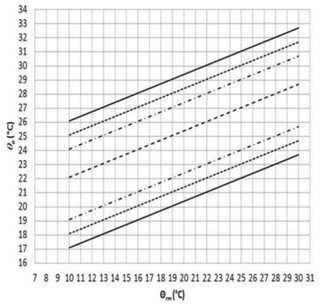


Figure 73: Figure showing categories I, II, III acceptability limits. y-axis indicates indoor operative temperature ºC, x-axis indicates running mean outdoor temperature ºC (DS/EN 16798-1:2019). Below are examples of ranges at Outdoor Running Mean temperature 25ºC and 20ºC. (Betti, et al., 2023)

Class III acceptability limits (ORMT = 25ºC) = Operative temperature: 22.1 to 31.1 ºC

Class II acceptability limits (ORMT = 25ºC) = Operative temperature: 23.1 to 30.1 ºC

Class I acceptability limits (ORMT = 25ºC) = Operative temperature: 24.1 to 29.1ºC

Class III acceptability limits (ORMT = 20ºC) = Operative temperature: 20.4 to 29.4 ºC

Class II acceptability limits (ORMT = 20ºC) = Operative temperature: 21.4 to 28.4 ºC

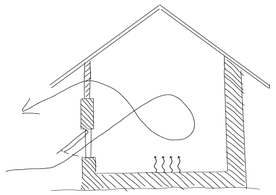
Class I acceptability limits (ORMT = 20ºC) = Operative temperature: 22.4 to 27.4 ºC

For this study we rule out Class I as it serves the purpose of satisfying mechanically controlled indoor climate. In line with the recommendations of the Danish Building regulations the criteria of 100 hours excessively hot hours outside comfort range are acceptable (BR18, 2024)

Figure 74: Private picture - In Serengeti national park air circulation is crucial. In this permanent camp site, the walls are composed of large eucalyptus logs suspending a durable fabric and mosquito mesh. Over the doors are permanently open vents that promote air circulation.

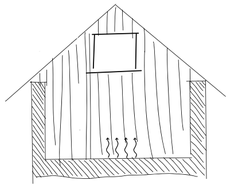
Passive design strategies

The analysis examine the effects of passive design strategies that are articulated in vernacular typologies. These are properties of the building materials as well as features of the building envelope that enable certain ventilation principles that use natural driving forces. Operability is considered important in line with the Adaptive Thermal Comfort model stating that individuals interact with the environment to obtain thermal comfort. Windows, latches and adaptable shading are also important measures to consider.



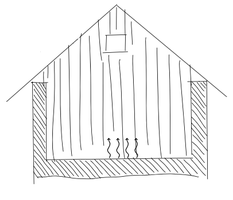
Single sided natural ventilation

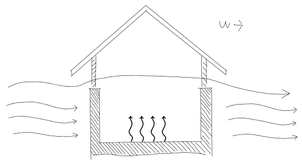
The concept of single sided ventilation is a method to add a small amount of air movement by using the wind pressure as a driving force. The windows and vent should be positioned towards the main wind direction. If only a single window or vent is opened to use single sided ventilation, the air movement is most likely insufficient, in the climate Tanzania. However, in combination with an additional vent positioned significantly higher or lower in the same façade the ventilation is aided by the driving force of thermal buoyancy increasing the airflow. Single sided ventilation concepts should utilize the rule of thumb that the width of the room should not be greater than 2.5 times the room height (CIBSE 2005).



Window to Wall (Parameter):

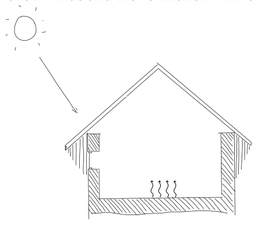
Determining the proper window sizes comes down to a compromise between architectural expression and indoor climate (In buildings with active systems also energy optimization). A study on the building stock in Algeria suggest that the most effective distribution of window area is 60% WWR. Compared to the baseline the energy savings are nearly 7% and the effects positively improve indoor climate comfort. The study explores the potential og harvesting energy when cold and shading the solar radiation when it is warm. (Cherier 2024)





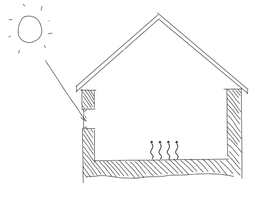
Cross ventilation

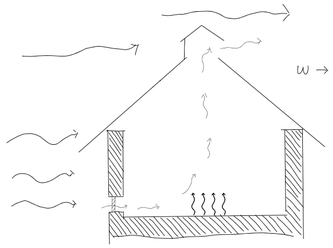
This is an effective method to achieve higher air exchange rates across a room by utilizing the different wind pressure on the windward and leeward side of the building. By positioning inlets on the eastern façade and outlets on the western façade the method is highly effective. Especially if the inlets are low and outlets are high, the thermal buoyancy will aid the ventilation. Cross ventilation concepts should utilize the rule of thumb that the width of the room should not be greater than 5 times the room height (CIBSE 2005). The challenge with ventilation strategies that draw on wind pressure is that they are relying on the presence of wind. Occupants may experience days with in-tense heat discomfort and low winds and the ventilation will not work.



Shading (Parameter):

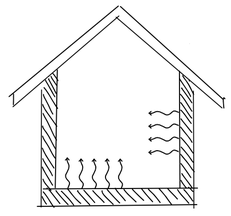
As suggested by previously examined studies, the shading component is very relevant to ensure good indoor thermal comfort. When glazed area receive direct solar radiation it leads to heated indoor air temperature. Permanent or operable shading is therefore a design strategy to effectively minimize radiation when it is too hot, and allowing it when it is too cold. Shading or exposing the opaque walls, however, is another method manipulate the indoor thermal comfort. For climates where heat is pre-dominant the so called Trombe wall is typical passive solar gain concept that is relying on thermal mass and solar radiation. A general rule of thumb for Trombe walls is that the heat will travel through a masonry wall at the rate of one inch per hour (Gromicko n.d.). A wall 12 inch(304.8 mm) thick will release heat from radiation on the outside twelve hours later on the inside.





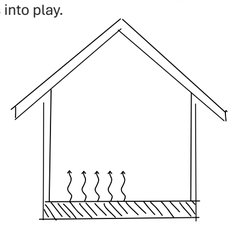
Stack ventilation

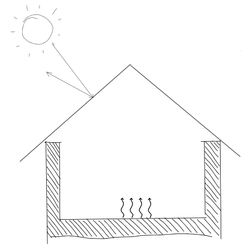
This concept draws exclusively on the driving force of thermal buoyancy. Hot air is less dense and will rise whereas cool air is denser and will fall. By positioning inlets in the lower part of the façades and outlets significantly higher in the roof for instance the pressure difference will move air vertically through the building. The benefit of using this strategy is that it works even when there is no wind and the warmer the air temperature the more effective the strategy is. Especially when high thermal capacity is maintaining lower inside temperatures.



Thermal Mass (Parameter):

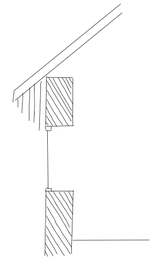
As proposed by the study by Barbara Widera suggests thermal mass is a tested and tried building concept for tropical conditions. Given the fact that temperatures change more than 10°C from day to night the great heat storage properties of mud bricks are invaluable. Mud brick walls have high thermal capacity (1000 J(kg*K)) and thermal conductivity (0,9 W/(mK)). Likewise, the potential of using heavy floors such as terrazzo, concrete, tiles etc. have similar thermal capacity and slightly higher thermal conductivity of 1,4 W/(mK) (Concrete).
The potential of harvesting energy from thermal mass is beneficial for passive heating and cooling. In the morning the heavy surfaces are cool and to counter heat discomfort. As the surfaces heat up from short wave solar radiation during the day they emit long wave heat radiation in the evening and night.
This system does not balance every day, due to numerous parameters such as radiation intensity, temperature difference, heat conductivity etc. This is why additional measures must be taken to control how much heat is stored. This is why shading and night flushing comes into play.





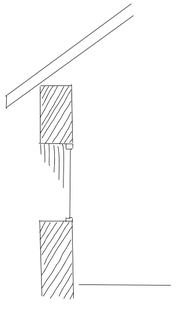
Heat reflection (Parameter):

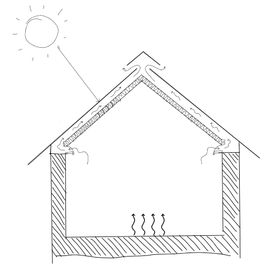
It is proven that by changing the colours of the roofs to a bright reflective colour over dark colours, can have beneficial impact on temperature in urban environments to minimize the heat island effect (Pearce 2018). A previously mentioned study indicates that using roofing sheets that have a white colour can reduce cooling loads by 35%. The solution is considered cheaper than thermal insulation for instance in the given context of East Africa. The design strategies also have a great positive contribution to indoor climate comfort (One Planet 2018).



Self shading

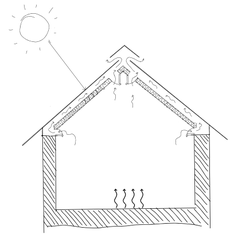
The positioning of shading elements in the exterior building envelope can promote shading to windows or thermal mass. Positioning windows towards the interior part of the sill will reduce the amount of radiation during a day but allowing almost the same view through the windows. Shading the thermal mass by extending overhangs can have a cooling effect on the thermal mass.





Solar chimney

The solar chimney is using thermal buoyancy as a driving force. It distinguishes itself from stack ventilation by harvesting the driving force in a secluded chamber. The chamber is heated by sun often much warmer than comfortable indoor temperature to increase pressure difference.
If the chamber is insulated, it will have limited heat leakage to the thermal zone. The benefit is that the system is sensitive to solar radiation so when the occupants are likely to feel thermal discomfort, the system will start.



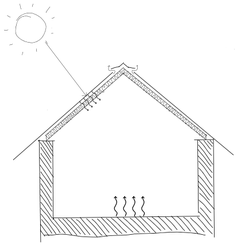
Vents and latches

Vents and latches serve the purpose of allowing natural driving forces to create air exchange. Some inlets are preferably permanently open so-called vents, were as some should be operable for the user to interact with, these are the latches. The latches distinguish from windows as they do not create view nor daylight. Most importantly the latches should be carefully designed so the user intuitively understand how to control the indoor climate.



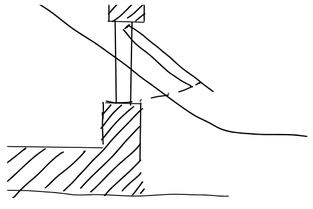
Adaptive shading

Adding curtains inside gives the user an intuitive way to control the amount of daylight and heat radiation penetrating the building envelope. When it is particularly hot outside, they reduce the heating load, however if positioned behind a glazed area, the heat is already within the envelope. Thus, making them less effective than exterior shading. Curtain can also have a heating effect in the night by reducing emitted heat radiation escaping trough glazed areas.



Insulation (Parameter):

A UN organization published study indicates that in a modern common detached family housing in Kenya, that utilizes air conditioning for cooling, certain design modifications can have positive de-crease in cooling loads, reducing the load to less than half of the baseline. By adding just 25mm of roof insulation (R=0.83m2K/W) reduction of cooling loads are 42%. With 75mm roof insulation (R=2.5 m2K/W) the reduction is 51%. Interestingly by painting the steel roofing sheets in reflective white colour the cooling loads are reduced by 35%. The later being considered cheaper in the given context of Kenya. The design strategies also have a great positive contribution to indoor climate comfort. When modelled in Energy Plus simulation software the baseline model shows 30% percentage frequency of hours above 28°C. When using 25mm of insulation or white roof paint this is only 12%. When using 75mm insulation this is only 5%. (One Planet 2018)



Doors, windows and screens

The Adaptive Thermal Comfort Model is based on a principle that individuals are likely to act and change behaviour, when exposed to thermal discomfort. Intuitively we know that windows can promote ventilation if opened and maintain the heat inside if closed. The windows and doors should most importantly be positioned in a way that they produce a desirable view and illuminate the indoor environment, whilst not sacrificing privacy. Secondly, they should promote efficient cross ventilation. As well as passive cooling the windows also enable passive heating from allowing solar radiation into the building. If the latter is not desirable an opaque screen or shutter can be added in combination with the glazed windows or entire replace the glazed windows.

Figure 75: Sketch - Passive design strategies

The potential of timber

From readily available materials, to highly advanced requirements

As previously mentioned, timber and forestry in Tanzania are industries subject to strict regulation due to their environmental and economic significance. Therefore, it is relevant to carefully consider the usage of large construction timber elements in any building design.
Historically, smaller twigs and branches were integral to construction practices, as exemplified on Figure 76 as well as in the chapter on Cultural heritage on page 22.
These materials were favoured because they were readily available, easy to manage manually and suited for simple and practical building techniques. This approach not only utilized locally accessible resources but also reflected the ingenuity of traditional construction methods that prioritized efficiency, hence also environmental sustainability. (Bukauskas, 2019).

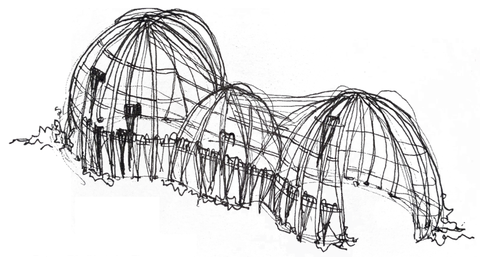


Figure 76: Sketch - The weaving technique used by the Hadzabe Tribe

In the paper "Whole timber construction: A state-of-the-art review", engineer and author, Aurimas Bukauskas, argues that in contrast to the traditional building systems, contemporary construction trends have shifted dramatically. Across the globe, there is a growing preference for large, sawn timber production. These materials are praised for their monotony, making them ideal for modern architectural designs. However, their use often relies on advanced technologies, such as mechanical lifts for handling heavy loads and intricate joinery systems to ensure structural integrity. (Bukauskas, 2019) In East Africa, and many other regions in the Global South, affordable housing is still a shortage, and therefore, it is very prevalent to consider other building elements that can serve as low-cost and as an abundant resource, in order to enhance economic and social sustainability in developing countries, as described previously in the paper.

As a result, the structural applications of small-diameter timber have largely been forgotten in modern practices. This shift has led to a significant undervaluation of whole timber, which are now often considered biproducts rather than primary resources. Instead of being used for construction, small twigs and branches are typically degraded to alternative purposes, including conversion into biogas, paper pulp or fibre manufactured into strand boards, or simply being downgraded to firewood. (Bukauskas, 2019)
This evolution in timber usage highlights the intersection of technological advancement and material preference, raising important questions about resource efficiency, sustainability and the potential for reintroducing small-diameter timber into modern construction.

In the paper, Bukauskas argues that the sawn timber production requires larger, uniform logs in order to secure straight cuts in the procession phase, leading to a large loss of resource in comparison with whole timer. It is also argued that, by sawing the timber, the structural properties are degraded drastically. The decreased strength is mainly caused by broken fibre continuity as well as a less favourable geometric cross section (square) compared with a circular shape.
By reexamining traditional practices and exploring innovative ways to incorporate these materials, there may be an opportunity to create a more sustainable and balanced approach to timber utilization.



Figure 77: Private picture - an example of small diameter trees.

Properties of whole timber

In the paper Bukauskas argues that the unsawn timbers proves to be stronger in bending strengths in comparison to sawn timber. "[...] Samples with circular cross-sections exhibited average bending strengths approximately 1.15 times that of square sections of equivalent area" (Bukauskas, 2019, p. 751).

Sawn timber

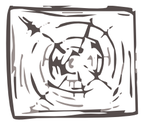


Figure 78: Sketch - section of sawn timber

Whole timber

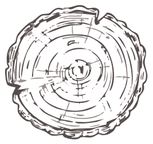


Figure 79: Sketch - section of whole timber

Structures using small-diameter timber

During the field studies, the project group found that large construction timber was exceedingly expensive, and often in an poor state due to unorganized drying methods (if not delivered wet). This is due to lacking economic insurance for local sales vendors. They simply cannot afford to financially invest, firstly, in large lots of freshly cut timber, secondly, the time prospect of drying the timber adequately.
This means, that the craftsman must first achieve the order and payment, and then chop / buy the freshly cut timber. As a result, the provided timber lacks drying.
On the other hand, the group found, that small diameter wood and branches we readily available, but unfortunately one used for aesthetically purposes, except in rural areas. The group used eucalyptus twigs in the prototype as demonstrated on Figure 77.



Figure 80: Private picture - chiselling performed by local craftsmen in the creation of the door frames for the prototype

Figure 81: Private picture - school building constructed by using small-diameter-timber. The exposed structure created a beautiful atmospheric experience.



Joints for timber

From the field excursion to the tribal settlements, a significant building attribute became evident. From examining the inherent methods of using small diameter twigs in a combination with simple tied joints, it became clear that redundancy in from of static point of view is evident. In comparison to modern joinery techniques that are durable due to the use of steel or traditional carpentry joinery where precise manipulation of the material is required, the traditional east African settlements were built using shifting member sizes and tying these together with fibrous materials like bark, textiles, cords etc. Due to the low consistency in the building materials and joints, redundancy is required to maintain the building structure. This building practice is also evident on construction sites in other areas, where nails are the preferred joinery technique. Regardless, this method produces low quality joints, as long as there is redundancy of joints, the group members found, that there would be no problems regarding stability in the dwellings evaluated.
These findings proved to be very inspiring in the further development of the project, due to the aim of the thesis, pursuing the simple, well known and cheap building methods.

> “[...] least-tech connection which can be produced very cheap and assembled by unskilled workers.”
>
> (Construction with Bamboo, 2002, p. 2)

Traditionally, numerous natural fibrous materials can produce safe and durable hinged joints, such as fibres from coconut palm, sago palm, bast, bamboo strips and rattan (Construction with Bamboo, 2002). The rope makes a friction tight joint that can be tightened in numerous ways. A traditionally durable way is performed by soaking plait strips from bamboo or rattan in water before tying. During the drying process, the fibres contract and tighten the joint naturally due to the properties of organic fibres. Another effective joint is the traditional scaffolding joint (Figure 85). This joint uses a wrench stick to mechanically tighten the joint (Construction with Bamboo, 2002). The wrench stick stays in place, making the joint very easy to disassemble and articulates the basis of the craftsmanship performed.



Figure 85: Traditional joint using a stick to tighten the joint. Source: Soorachet Kheawhom



Figure 82: Private picture - Bamboo being decomposed by termites. The bamboo sticks are used in the farm as trellis for tomato production. The bamboos are rammed directly into the soil and lasts around a half to a whole year before having to be replaced due to decomposition.

Avoiding termites

Due to the beneficial climatic conditions in many areas in East Africa, termites is a large problem when building with organic materials. Historically, the native people of East Africa were nomadic. Therefore, the necessity of preserving long term timber structures were non-existing. In contrast, today’s buildings must be long term due to a different lifestyle, and therefore it is important to address the problem.
Based on an interview with a local structural engineer (Appendix 7 on page 182), the group found, that by incorporating simple prevention methods, timber structures can avoid termite attacks

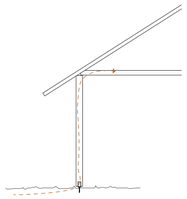


Figure 83: Illustration - how a timber column acts a bridge for termites to acces the roof construction.

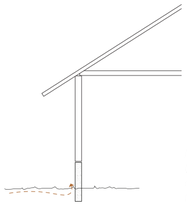


Figure 84: Illustration - how by simply lifting the timber column off ground avoids termite attacks.

Aim of the timber structures in order to celebrate local craftsmanship

1. Translating the ancient weaving technique, as found in tribal communities, into a long-lasting structure utilizing small-diameter members.

2. Interpret the tied-bark joinery as seen in the tribal structures into modern method without conflicting with the tectonic quality of the detail.

3. Pursue the pitched roofing as seen in the Hadzabe tribe to accommodate a good indoor climate as well as plan layout purposes.

4. Ensure that the requirements of the building system is minimal in construction phase and meets safety measures.

Figure 87: Private picture - Eucalyptus twigs mounted with a secure distance to the ground to avoid termite attack. The picture is of the prototype.



Figure 86: Private picture - small-diameter-timber used for the gable in the prototype.



The potential of earth

Mud as a universal resource

As previously introduced in the chapter on Cultural Heritage, many of the analysed tribal communities and settlements in rural areas of East Africa, is still to this day utilizing mud as a building material. Therefore, the potential of earth is explored in this chapter, to gain a greater understanding of this resource.

Dating back 10,000 years the evidence of mud brick production is visible in Egypt and Jericho (Rosenberg, et al., 2020). Throughout history numerous examples of extraordinary clay buildings have been made by civilizations be it Timbuktu in Mali, Yadz in Iran or Taos Pueblo in Mexico. They all have in common to use readily available materials with very limited manufacturing processes to build long lasting dwellings.
The most common methods for making clay structures are mud bricks (also known as adobe), Cob, wattle and daub, as well as rammed earth. In Tanzania mud bricks are readily available, due to its' presence in the common production of burned clay bricks. Wattle and daub is also present in the area, and is the main method used by the Datoga and Maasai tribes, as presented in the chapter on Cultural heritage on page 22.
In the following, the method of using mud bricks will be examined.
Building with mud bricks is basically a masonry wall with sun dried mud bricks instead of a burnt clay brick, that is common in most parts of the world. The benefit over burnt bricks is that they can be produced by the soil readily available on the site, if clay is present, and without further processing such as baking. Most soils are constituted of sand, silt and clay (Figure 94).

Mortar

The same soil used for making the brick can be used to make the mortar. To improve compressive strength sand can be added. Studies suggests that adding volumetric ratio of 1 soil and 0.75 sand has the highest compressive strength. (Rodriguez-Díaz, 2014)
To further increase bonding ability and especially bonding mud bricks to concrete hydrated lime can be added substitute the sand. Ratio of 1 lime 3 sand shows good adherence on mud brick to concrete and burnt bricks (Rodriguez-Díaz, 2014).



Figure 90: Sketch - cob technique.



Figure 88: Sketch - rammed earth.

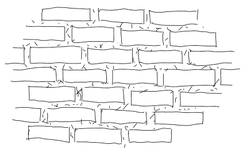


Figure 91: Sketch - mud bricks.

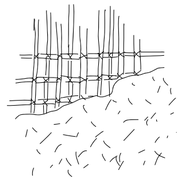


Figure 89: Sketch - wattle and daub technique.



Figure 92: Illustration - the process of drying clay bricks in the sun. When the brick is completely dry after a few days, you can bake them in a large production oven to become burned clay bricks. Alternatively leave them another couple of weeks in the sun to produce mud bricks ready for wall building.

Figure 93: Private picture - the photograph is demonstrating how the lower part of the wall has been exposed to erosion. It also demonstrates how the mortar and the brick it self is based on the same mud mix, to ensure a strong bond.



Building speed

When building with mud bricks the setting speed of the mortar is slow. As the building material is relatively heavy the joints are prone to settlement before it dries. This means that vertical progression should be less than 50 cm per day. (Rodriguez-Díaz, 2014)

Wall Length

The rule of thumb stipulated by the Habiterra Network is that the continuous length mud brick walls should not exceed 2.5 times its' height. This is due to the horizontal drying stress of the material causing vertical cracks to happen in the walls. (Habiterra Network, 1995)

Columns, ring beams and lintels

Addition of columns has it purpose for larger buildings, where the load bearing capabilities are not solely relying on the mud bricks, or the wall length exceeds 2.5 times the height. Ring beams made from in-situ cast concrete can be used for stabilizing tall wall structures as well helping to securely fix the roof construction. Concrete, stone or timber lintels are used over opening if arches are not desired. (Rodriguez-Díaz, 2014)
If vertical elements, i.e. columns made from alternative materials, the joint must be very carefully made. Stress caused by contraction, temperature or moisture is likely to produce cracks around the changes in materials. For smaller buildings it is advised to avoid columns. This makes the casting of ring beams in concrete much easier, as the further loads are distributed evenly across the mud brick wall. (Rodriguez-Díaz, 2014)

Seismic resilience

Due to seismic activity in the area the building must be resilient to lateral movement. Methods of improving the walls resilience to earthquakes are first of all sourcing soil with adequate clay content. Structural bracing such as frequent perpendicular walls as well as a ring beam will increase stability. Additional measures are addition of wire or polymer mesh in the mortar or before plastering the bricks. (Blondet, et al. 2011)

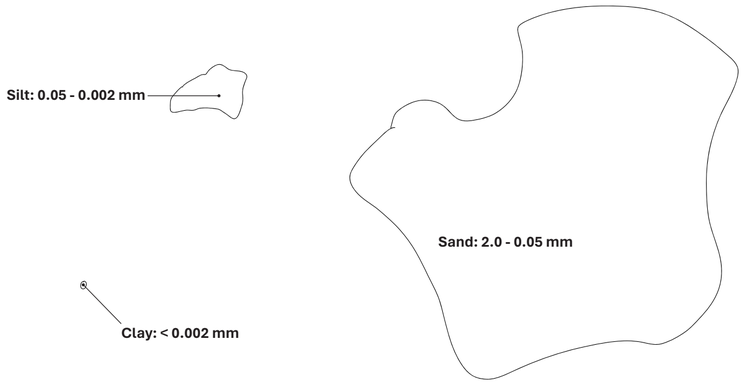


Figure 94: Illustration of particle sizes of components of soil (Appendix 6 on page 182).

10 months ago 4.7 magnitude, 10 km depth
Magugu, Manyara, Tanzania

1 year ago 5.5 magnitude, 10 km depth
Ikungi, Singida, Tanzania

1 year ago 4.7 magnitude, 10 km depth
Konde, Pemba North, Tanzania

2 years ago 4.6 magnitude, 10 km depth
Mto wa Mbu, Arusha, Tanzania

2 years ago 4.6 magnitude, 10 km depth
Mbulu, Manyara, Tanzania

Figure 96: USGS Earthquake Track report Moshi. Full 15 year report see (Appendix 13 on page 197). (USGS n.d.)

Figure 95: Kassena tribe in Tiébélé, Burkina Faso. (jalvarezg, n.d.)

Finishing

The finishing of the wall must mitigate erosion from environmental causes, most importantly on the outside façades. Plastering is the most used technique. Plastering is done successfully by applying at least two coats where the first one is known as the scratch coat, because it provides a coarse surface with great adhesion for the next finish coat. For these coats it is advised to use a mix of hydrated lime and sharp sand ratio 1:3 (Rodriguez-Díaz, 2014).
Some manufacturers suggest using cement plaster, but this has poor long-term adhesion to mud bricks. Additionally, it will diminish the hygroscopic properties of the mud bricks, which will negatively affect the indoor climate.

Many historic civilisations made a great effort to decorate their homes even in environments with scarce materials. Perhaps most impressing is the Kassena tribe in Tiébélé, Burkina Faso. Their homes known as Sukhalas are made from mud using the cob technique. Finally, they are beautifully decorated using mineral pigments available in the local soils (Figure 95). Laterite is producing a red colour, kaolin produces white, and graphite produces black. The great think about the mineral paints is that the protect the mud walls from eroding, and they are an expression of their cultural values and traits. (Yakubu, 2023)
The finished clay wall will benefit greatly from large overhangs and high footing in particularly humid areas, as erosion is inevitable. Historically maintenance of clay building is a reoccurring ritual.

Figure 97: Private picture - Historical building at the Jane Goodall Museum in Arusha , Tanzania.



The program acts as an introduction to the specific location and functional requirements of the design proposal. The presented analysis is employed by utilizing phenomenological methods performed during extensive field studies, and is based on observations and informal conversations with the locals living and working at the farm, as well as structured interview with key persons. Additionally, the program will also provide a basic understanding on building requisite in Tanzania and offer a perspective on accessible materials.

03 Program

Functions

Nyange Farm Lodge

The site location is currently a 10-hectare farmland with the scenic view towards Mount Kilimanjaro. Being located at the foot of Kilimanjaro the land is very fertile given volcanic minerals within the soil and is therefore very favourable towards farming activities. The main plan of the building owner is to operate two companies within two major sectors in Tanzania; one being a travel agency related to the tourist sector, and the other one being the farming sector. By doing so, the two companies have the opportunity to support one another creating a diversified of revenue stream. The strategy also provides security in terms employment in case of worldwide catastrophe, such as the case of the COVID-19 Pandemic that damaged the entire tourist sector worldwide.

Reception

The reception area is the point of greeting new guest to Nyange Farm, including both one-day-tourists and tourist that will utilize the accommodation. The reception area should include a desk for check-in, waiting area and a small luggage storage. Reception should be in visible contact to the Nyange Adventure office, in order to provide tourist functions and tour-booking services.

Accommodation

The accommodation should enhance the feeling of being off-grid, while still comply with tourist standards as provided in the interview with Vores Afrika (Appendix 4 on page 179). This includes requirements towards toilet facilities as well as security from insects.
The accommodation should include typologies that favour different tourist combinations.

Restaurant and Kitchen

The kitchen should be in visual connection with the restaurant. The kitchen should act as a social driver and centre for entertainment, including cooking classes and have the expression of an open kitchen. This is to ensure social activity within the restaurant, and to express hygienic purposes.

Staff quarters

The staff quarters should include a large community kitchen and dormitory for the employees living on the farm.

Farmland

The farmland is where the tourists have the possibility to interact with the local culture and learn about indigenous species as well as getting an insight towards the organic crops used in the restaurant.

Livestock

The farmland is where the tourists have the possibility to interact with the local culture and learn about indigenous species as well as getting an insight towards the organic crops used in the restaurant. A pathway around the farmland should be included in the masterplan, including smaller zones for short stays, providing a shelter from climatic changes; the sun during hot season, and the rain during wet season.

Shared space

The shared space should act as the hearth of Nyange Farm, were social events takes place. The functions should accommodate bonfire, story-telling, pool area, resting area as well as toilet facilities.

Office

The office area accommodates the administration of the travel agency, Nyange Adventures. The office should include a room for meetings and an open landscape office. The office should also be visibly connected to the reception, for tourist in need for tour booking and alike. The office also requires a storage room for mountain gear.



Figure 99: Private picture - Chilli peppers being sorted before sold at the market.



Figure 98: Private picture - School children walking home along the small track west of the site. Mt. Kilimanjaro in the background and the farmland to the left.

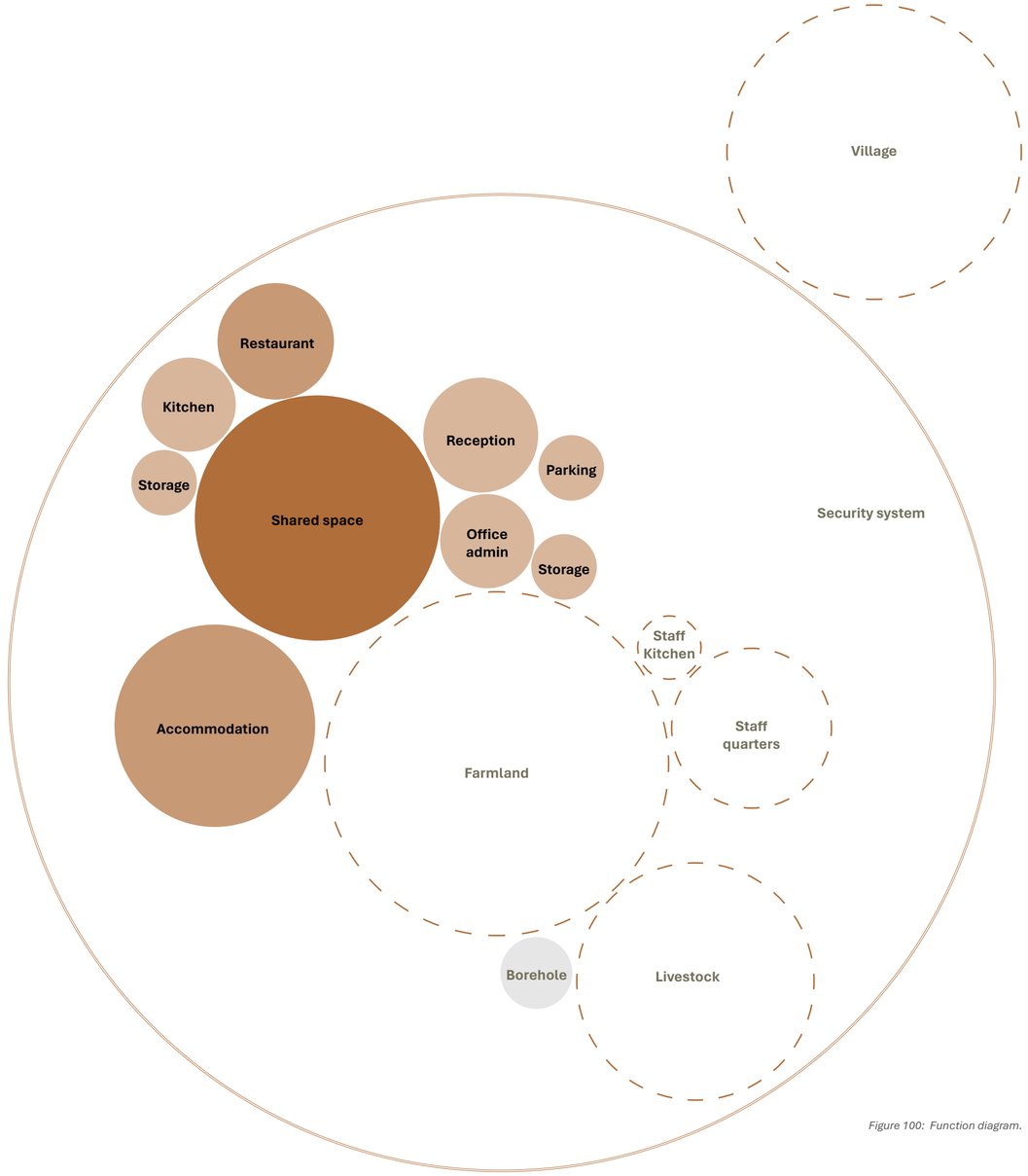


Figure 100: Function diagram.

Master plan

The design proposal will include a strategic plan layout of the entire site, architectural elements, such as flow, proximities and function etc.

Design proposal

The primary focus of the design proposal will lie within the detailing of the tourist accommodation, the detailing of a common area including the reception, parking area, restaurant and the office administration.

Conceptual proposal

Functionalities such as the organisation of the livestock and farmland will be included on a conceptual level within the master plan of the site. The organizational structure of these areas will support the overall flow on the site, where as detailing crop rotation etc. lies outside the knowledge of the group.

Site

Map

The project site is located by the foot of Mount Kilimanjaro in northern Tanzania, Africa. The site is placed within the municipality of Moshi (smoke or fog in Swahili), named after the fog often surrounding the volcano. The municipality population is 221,733 people, and is the capital city of Kilimanjaro region. (Wikipedia, 2024)



Figure 102: Map of Tanzania highlighting the project location, Moshi.

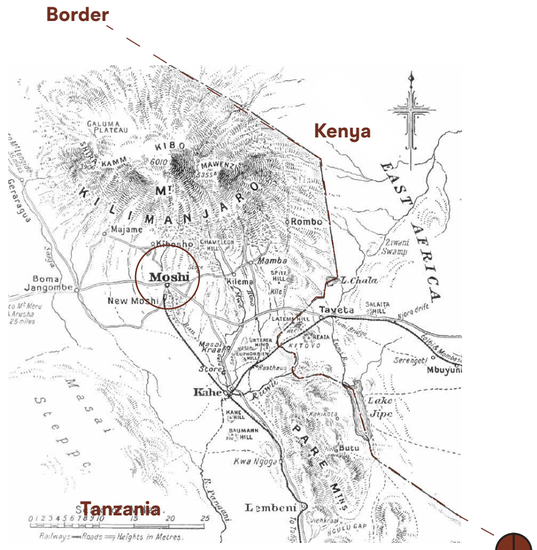


Figure 101: Map of the Kilimanjaro region in northern Tanzania, highlighting Moshi.

Project site

In the country side north of Moshi is the project location, primarily being used as farmland as the map (Figure 103) indicates. Currently, the majority of the area is occupied by local farmers working with agriculture. The southern side of the site is gated and used partially for farming, partially for livestock. This is also where the full-time employees are living, and where the water bore hole as well as water tanks are placed. The north part of the site is solely used as farmland. The terrain of the project site primarily flat.

Within the last year, several building preparations has been made to accommodate the envisioned Nyange Farm Lodge. Eight new concrete platforms have been developed and has therefore been the point of departure of the final design proposal of the Master Thesis. On Figure 103, the new platforms are marked with white fill, and the prototype has been marked with white fill and black stroke.

Kibo view

Besides the beautiful surrounding landscape of the project site, the main quality is the undisturbed view toward Mount Kilimanjaro, in Swahili Kibo, north of the site (Figure 103). The breathtaking view has been one of the main design drivers in architectural development of the lodges.



Figure 103: Map of the project site. New platforms are marked white, while the prototype is marked with a black stroke.

Climatic conditions

The climatic conditions on the site location provide essential information about the context we are designing for. A substantial analysis has been made in order to fully understand the conditions, being so different from the Danish context. The analysis takes its point of departure based on weather data from Moshi, Tanzania.

Climate summary

Longitude: 37.333
Latitude: -3.35
Elevation above sea level: 831.0 m

Average yearly temperature: 20.3 °C
Hottest yearly temperature: 30.1 °C
Coldest yearly temperature: 12.4 °C
Annual cumulative horizontal solar radiation: 1979.35 kWh/m2

Percentage of diffuse horizontal solar radiation: 30.6 %

Figure 108: Climate Summery for Moshi, Tanzania based on EPW 2009-2023 (CBE Clima Tool, 2024)

Sun path

Located at approximately 3° S latitude, Moshi experiences a close to orthogonal sun position midday throughout the year.
The solar path on Figure 105, show that during the equinox, the sun rises due east (90° azimuth) and sets due west (270° azimuth) (altitude midday: approx. 86°), resulting in higher solar intensity. In the December solstice, the sun's azimuth shifts slightly, rising (about 105° azimuth) in the southeast and setting southwest (about 255° azimuth). During the June solstice, and the sun is rising to the northeast (about 75° azimuth) and setting northwest (about 285° azimuth). (CBE Clima Tool (2023))



Figure 109: Private picture - Flooding in the streets in the urban area in Tanzania.

Wind directions

The wind rose, as seen on Figure 104, displays that the annual wind direction is coming from a southwest orientation. This information will inform the integration of passive ventilation systems.
Additional seasonal wind roses can be studied in Figure 250 on page 117.

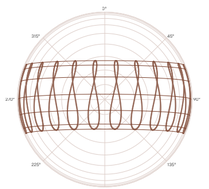


Figure 105: Sun path for Moshi, Tanzania based on EPW (CBE Clima Tool, 2024)

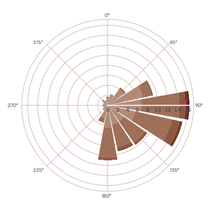


Figure 104: Annual Wind Rose for Moshi, Tanzania based on EPW (CBE Clima Tool, 2024)

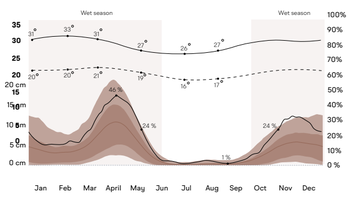


Figure 106: Annual rain fall in Moshi, Tanzania (Weather Spark, 2024)

Seasons

As illustrated on Figure 106 on page 63, the seasons of Moshi is divided into wet and dry season, in relation to annual rain fall. At the peak of rainy season, the chance of rain is more than 46 %, and the amount can be as high as 20 mm pr. day. In contrast, the dry season running from June to September the risk of draught is high, with only around 1% chance of rain.
The annual dry bulb temperature for Moshi, Tanzania, is shown in Figure 107. As illustrated, the daily temperature fluctuates significantly between day and night, often varying by more than 10°C.

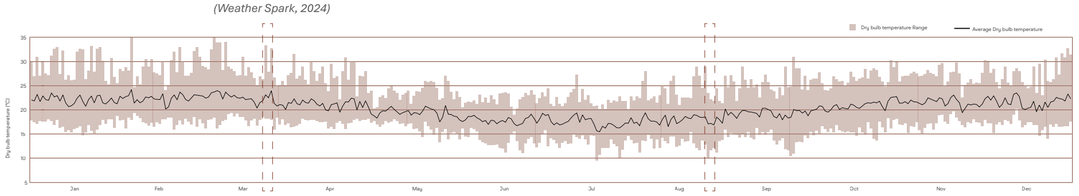


Figure 107: Dry Bulb Temperatures for Moshi, Tanzania. Hottest and coldest weeks are marked (CBE Clima Tool, 2024)

Material catalogue

Figure 110: Private pictures - A material catalogue gathered during field studies in 2023 and 2024.

The material catalogue explores the materials found during the field expeditions that took place in 2023 and 2024. The catalogue includes common building materials, such as concrete and steel sheet roofing, but the catalogue also examines more alternative building materials.



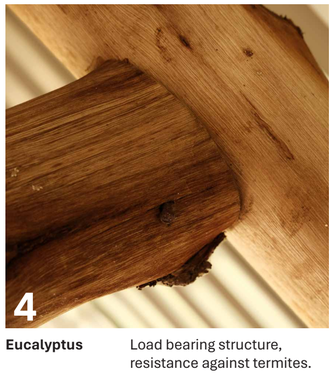
Banana leaves Used for roofing and wall surface.



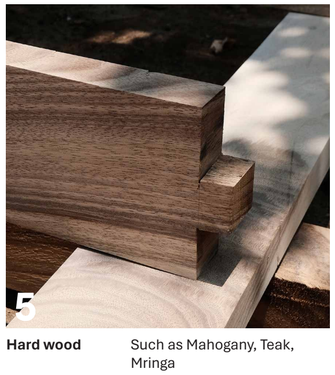
Concrete Used for foundation, load bearing structure and walls.



Clay Used previously for wall surface and roofing.



Eucalyptus Load bearing structure, resistance against termites.



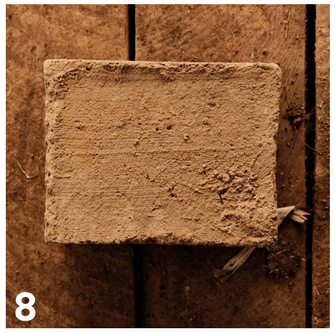
Hard wood Such as Mahogany, Teak, Mringa



Mirunda (Wattle) Used previously for load bearing structures.



Mzinga Nyumbu Used for thermal insulation and decoration



Unburned brick Used for wall structures in rural areas.



Wattle-and-daub Used for wall surface and roofing in rural areas.



Steel sheets Used for roofing and wall surface.



Dry grass Used for roofing in rural areas.



Glass Used for visibility and daylight.



Terrazzo aggregate Used for floors and pavement.



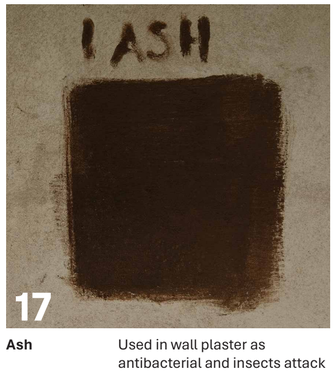
Burned brick Used as load bearing structures.



Soil Used previously for wall surface.



Textiles Maasai shoka used for tribal identification.



Ash Used in wall plaster as antibacterial and insects attack



Bamboo Used in farming.



Sandstone Used for masonry



Cement Used for foundation, load bearing structure and walls.



Lime Used for agricultural purposes.



Textiles Used for personal and / or tribal identifications.



Miwale Used for thermal insulation and decoration

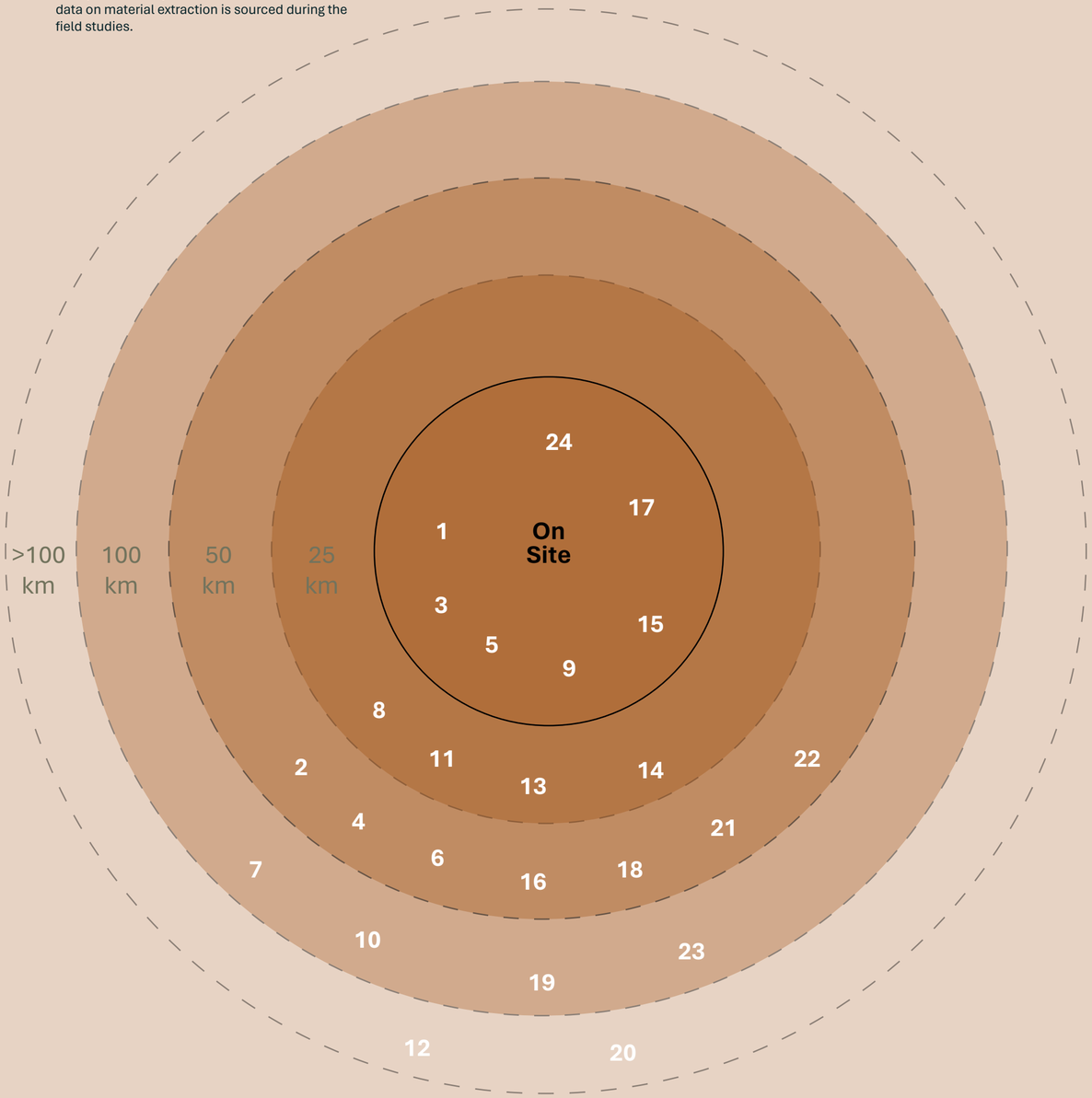


Wood Different types of exotic timber, including teak, mahogany.

Material excavation

Extraction

The chapter on environmental sustainability highlights the significance of utilizing local materials whenever feasible. To support these initiatives, materials listed in the material catalogue have been systematically mapped in the diagram below, showcasing the transportation required for each materials. The data on material extraction is sourced during the field studies.



1. Banana leaves
2. Concrete block
3. Clay
4. Eucalyptus
5. Hard wood
6. Mirunda
7. Mzinga Nyumbu
8. Unburned clay brick
9. Wattle-and-daub
10. Steel sheets
11. Dry grass
12. Glass
13. Terrazzo stones
14. Burned clay brick
15. Soil
16. Textiles, maasai
17. Ash
18. Bamboo
19. Sandstone
20. Cement
21. Hydrated lime
22. Textiles
23. Miwale
24. Wood



Building requisite

Basic building methods

The construction of the prototype provided the team with practical experience and a deeper understanding of essential construction methods and utilities. These insights will inform the design proposal, particularly regarding structural systems and material requirements.

Timber Joinery
Timber joinery is commonly executed using nails, and tongue-and-groove connections. While bolts and nuts are available the are rarely utilized due to costs. Screws, though reliable, are typically applied using a manual driver, making them more time-intensive compared to nails.
For connections between timber and masonry, large concrete nails are frequently used.
Larger components, such as the ring beam in the prototype (Timber lintel on page 95), are secured using steel wire. These methods revealed a strong tradition of local expertise that have not adopted electrical machinery.

Foundations
Foundations often rely on large natural stones, which are split manually using sledgehammers, as illustrated on Figure 111. Concrete is mixed on-site using shovels, with measurements typically based on informal practices, such as the use of buckets or shovels. This approach results in variability in concrete quality, often leading to lower-grade foundations and slabs.

Levelling
Levelling techniques primarily utilize simple, analogue tools such as water levels and “kubiro” (plumb level), as illustrated on Figure 112. These methods have proven highly effective for small-scale building projects, offering practical and accessible solutions.

Scaffolding
Scaffolding is often improvised on-site using excess construction materials (See Figure 126), reflecting the limited financial capacity of small contractor firms. While this approach is effective for single-story buildings, it poses significant challenges for the construction of structures with three or more masonry stories. Materials are typically transported manually, as construction sites generally lack access to cranes or other mechanized lifting equipment.



Figure 111: Private picture - natural stones are split using a sledgehammer.

Figure 112: Private picture - The craftsman Mr. Olomi teaching how to use the traditional plumb level called “Kubiro” during the construction of the adobe wall.



Subconclusion

The design proposal should prioritize the use of straightforward structural methods that align with the available local skills and resources. By incorporating traditional construction knowledge and techniques. This approach ensures that the design enhances local building practices and keeps the investment minimal.

Most buildings can be completed using the materials outlined in the previous pages. When weighted against the distance of transportation it remains straight forward and clear to determine which materials should be used more and which should be used less.
The combination of wood trunks, twigs and clay make up the underlying majority of materials. As these are available from local sources.
Due to weather conditions and energy concerns these materials are best designed in conjunction with passive design strategies and constructional material protection such as overhangs, that control erosion as well as solar radiation.

Figure 113: Private picture - Retaining rebar for the top concrete ring beam are made on site manually.

Users

First an foremost we must understand the desires, values and requirements of the users of the site to ensure that the design proposal integrates well with the intended purpose. By understanding the values of the users we learn that sustainability may be important for a tourist, whereas fair conditions and salary is more important for a local employee. The quantities and schedules of the users are displayed in this chapter, lay the foundation for room sizes, indoor climate comfort and flow patterns, which will be unfolded later.

“Vores Afrika” - a Danish travel agency

Vores Afrika is a small family-owned travel agency in Denmark, that has offered cultural and adventure tours to most of Africa since 2014.
In an interview with the co-founder Nana Munk Christensen the group members gained useful information about the type of tourists coming to visit Moshi, Tanzania, and an insight into the tourism industry. This interview, supplemented with personal experience and informal talk with tourists during the field studies in 2023 and 2024, acts as the foundation for defining the user group analysis in the following chapter.
In the interview, Nana debates that sustainability is a complicated matter, when focusing on environmental emissions. The travel agency gained the Travel Life-certificate in 2023, meaning that low-emission initiatives had to be implemented in the office facilities as well as local business partners. In terms of social sustainability, Nana sees a large potential of improving the lives of the local communities Vores Africa supports, when they organise tours. For instance, every time one mountaineer is sent on Mount Kilimanjaro, more than 10 local porters and guides are employed. They are reliant on income from the tourist industry to sustain their families. (Appendix 4 on page 179)
In order to ensure the best conditions for local employees, Vores Africa is one of only two agencies in Denmark being part of the Kilimanjaro Porters Assistance Project, KPAP, that ensures ethical mountaineering (Partners responsible travel, 2024). This includes requirements to a minimum wage for the crew, maximum of 20 kg loads for porters, 3 meals a day, adequate gear for crew and more. (Partners responsible travel, 2024)

Figure 114: Vores Afrika logo (voresafrika.dk)

Nyange Adventures - a local travel agency

Figure 115: QR-code - Interview with Praise Nyange in the banana field on site location.

Praise Nyange, the founder of Nyange Adventures, serves as the proprietor of the project site detailed in this Master’s thesis, Nyange Farm lodge. Through observation and active engagement with Nyange during the group’s field trips to Tanzania, members have acquired nuanced and comprehensive insights into the business structures, staff dynamics, organizational vision, and operational procedures of Nyange Adventures, as well as the current state of Nyange Farm.
An in-depth interview with Nyange has provided essential information that forms the foundation for understanding the envisioned development of Nyange Farm lodge. Additionally, the interview has offered valuable perspectives on the tourism industry in East Africa, enriching the group’s analysis of target user groups. (Appendix 3 on page 176).
Nyange Adventures, established in 2012, has primarily offered tours centred around Mount Kilimanjaro, safaris, and Zanzibar island. In line with a growing interest in eco-tourism and a personal passion for farming, Praise Nyange has, over the past seven years, gradually developed a 10 hectare farming land (Figure 103 on page 62). This initiative is part of a broader vision to integrate the operations of Nyange Adventures and Nyange Farm, enabling the two companies to mutually support one another and foster financial stability for employees during crises. For instance, during the COVID-19 pandemic, when a significant decline in tourism left many families economically vulnerable, food self-sufficiency became a critical resource.
In the interview, Nyange emphasized the social and financial importance of fostering a sense of community with neighbouring villages. By employing local families, he aims to promote social well-being and economic stability within the local community. Moreover, he noted that cultivating strong relationships with the local community reduces the likelihood of theft and violence, thereby enhancing the overall security of the area.(Appendix 3 on page 176)



Figure 116: Private picture - Praise Nyange giving an interview in the banana field on the site location.

Figure 117: Private picture - Trunk of a safari vehicle of the Nyange Adventures. The spare tire cover displays the companies slogan. “Come as a client, leave as a friend”

Observation and personal experience

In addition to interviews with Praise Nyange and Nana Munk Christensen, the project group gathered insights into the user groups by employing ethnographic methods, as outlined in the methodology chapter (page 11), during field trips conducted in 2023 and 2024. These methods included numerous informal interviews with a diverse range of individuals occupying various roles, such as local craftsmen, chefs, farmers, tourists, tour guides, office staff, porters, neighbours, and others. During the field trips the group were also able of track the days of all of the above mentioned, allowing the group the obtain substantial data. These studies serve as the foundation for the subsequent definitions and analyses of the identified user groups.

> “I can make sure my client have good food. Which we have grown at the farm. Food that can feed my client to climb the mountain or during the safari”
>
> Praise Nyange on how he ensures healthy food for his clients without being depended on an expensive supply chain. (Appendix 3 on page 176)



The tourist

The tourists of Nyange Adventure are mainly based in North America, northern and eastern Europe, as well as Russia. The tourist often come in groups ranging from two to twenty people at a time, often directed from local travel agencies, like Vores Africa. The larger group is usually a mixed user group travelling solo or in pairs. The smaller group is usually friend groups planning directly with Nyange Adventures. (Appendix 3 on page 176)
A rising interest in social and environmental sustainability amongst tourist is defining the choice of tour company and is therefore playing a major role when operating in tourism.

Values of the tourist

- Values cultural experiences
- Values contact to nature
- Values environmental sustainability
- Values health and well being of employees
- Values hygiene and sanitary conditions
- Values security
- Values social encounters
- Values privacy
- Values local cuisine
- Values western cuisine
- Values comfort

Day at Nyange Farm

09:00 breakfast
10:00 excursion
12:30 lunch
14:00 excursion
15:30 relaxing at the pool or garden
19:00 dinner
20:00 story telling at the fireplace
22:00 bed time

The tourists in the area of North Tanzania are primarily coming to northern Tanzania to climb Mount Kilimanjaro and experience wildlife safari in the national parks. According to Vores Africa, experiences of cultural character is often down prioritized by the tourists in the process of planning, but does in fact prove to be amongst the most valuable experiences during and after the vacation (Appendix 4 on page 179).
The cultural and social encounters between destinations are priceless and allows the tourists to gain insight to local tradition, language and cuisine. Despite the interest cultural experience, Vores Africa also argues, that tourist staying for several days often request western living standards, including sanitary conditions, comfort, indoor climate control as well as western cuisine.

During the daytime, the tourist will often be on excursions returning to the hotel around 15:30 to relax and enjoy the natural environment of the farm or residing in their lodge enjoying a refreshing drink, until the dinner is served.
If the tourist attend a Kilimanjaro trek they are in for a strenuous 8 days trip culminating at the return to the lodges deserving a proper restocking of mental as well as physiological resources.

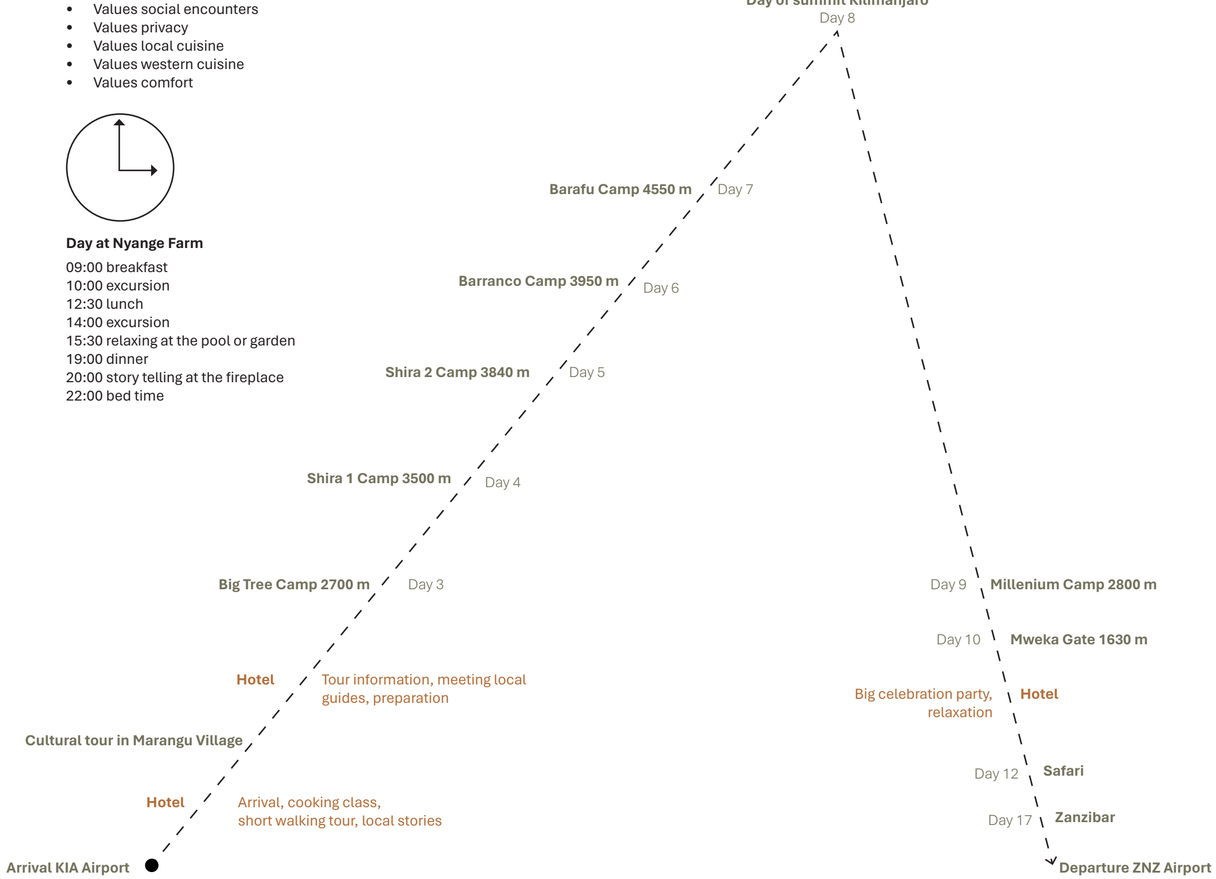


Figure 118: Showcasing a typical travel to Tanzania based on interview with Vores Afrika (Appendix 4 on page 179)



Figure 119: Private picture - Ceremonial dancing and chanting on a Kilimanjaro trek.

“There should be some local cuisine. But the tourist don’t want to eat that for a week, so the chef also need to cook European food. “

Nana Munk, Vores Afrika
(Appendix 4 on page 179)

The staff

The staff servicing to the lodge currently includes two waiters and two chefs, as well as 2 housekeepers. The administration of the travel agency includes two full time booking assistants, an office manager as well as the CEO.

Values
- Values cultural exchange
- Values professionalism and social status
- Values community
- Values financial gain
- Values education

Monday-to-Saturday
08:00 starting work
10:00 tea time
10:30 returning to work
12:00 lunch
13:00 returning to work
16:00 relaxing
19:00 dinner
20:00 storytelling at the fire
22:00 bed time

Figure 121: QR-Code - The chef, Irene, giving an interview on the current state of the kitchen equipment and what she wishes for the future.

The administration of Nyange Adventures are mainly in charge of organizing trips, including tour guides and transport, for the tourists, and acting as the main contract in the country. They are providing tourists with cultural insights and gives information on tour and activities around the area, with a high level of English qualifications.

The chef and the waiter at the farm are working closely together in giving the tourist the best experience on the farm, being the main mediator between the tourist and the farmers. Their working hours are closely related to the tourist activities, and therefore the staff of the kitchen is provided with accommodation on the farm. Often times, the chef will also be making tea and cooking lunch for the employees at the farm. During this time the staff and craftsmen will be dining together.
As Figure 120 illustrates, the current state of the kitchen is at a bare minimum, and the chef is limited to using either a simple gas-burner or a 3-stone-stove, lacking basic requirements like a freezer, fridge and oven. The kitchen is also exposed to outdoor elements like mosquito, flies and rats, compromising the hygienic state of the kitchen.
Despite respiratory health hazards, many locals express gratitude towards the 3-stone-stove due to cuisine preferences, like smoked taste.



Figure 120: Private picture - The chef, Asia, cooking the national dish, ugali, on a 3-stone-stove.

The fundis and farmers

The employees at the farm are local people coming from the nearby villages. Together they are responsible for the maintenance of the crops and building volumes at the farm. The employees can be parted into two; the mamas and the fundis. The Mama’s are the women working at the farm, mostly involved with crop rotation and harvesting. The fundis are the craftsmen whom are responsible for the aggregation of the crops, as well as watering systems. They are also responsible for maintaining garden and pathways.

Mama’s - approx. 20 people
- Values financial gain
- Values security
- Values community
- Values social status
- Values family relations

Monday-to-Saturday
08:00 starting work
10:00 tea time
10:30 returning to work
12:00 lunch
13:00 returning to work
16:00 going home

Fundis - approx. 12 people
- Values cultural exchange
- Values education
- Values community
- Values skill sharing

Monday-to-Saturday
08:00 starting work
10:00 tea time
10:30 returning to work
12:00 lunch
13:00 returning to work
16:00 relaxing
19:00 dinner
20:00 storytelling at the fire
22:00 bed time

“The young people know how to run, but they don’t know the way.“

Interview with Praise Nyange
(Appendix 3 on page 176)

The fundis on the farm are often young men seeking direction in life. Many stay long-term to gain agricultural skills and save money to build a home for their future families. Nyange Farm supports these individuals by providing jobs, food, and lodging while promoting education in agriculture and farming. Some fundis are skilled craftsmen, working with timber and furniture, who mentor younger fundis in both practical methods and life skill.
Others come to stay short term during school holidays to gain insights on tourism, often aspiring to become wildlife guides in the national parks.

The mama’s on the farm are women between 18-60 years old. They live in nearby villages, working to provide a financial income for their families. They are mainly working in the farmland.

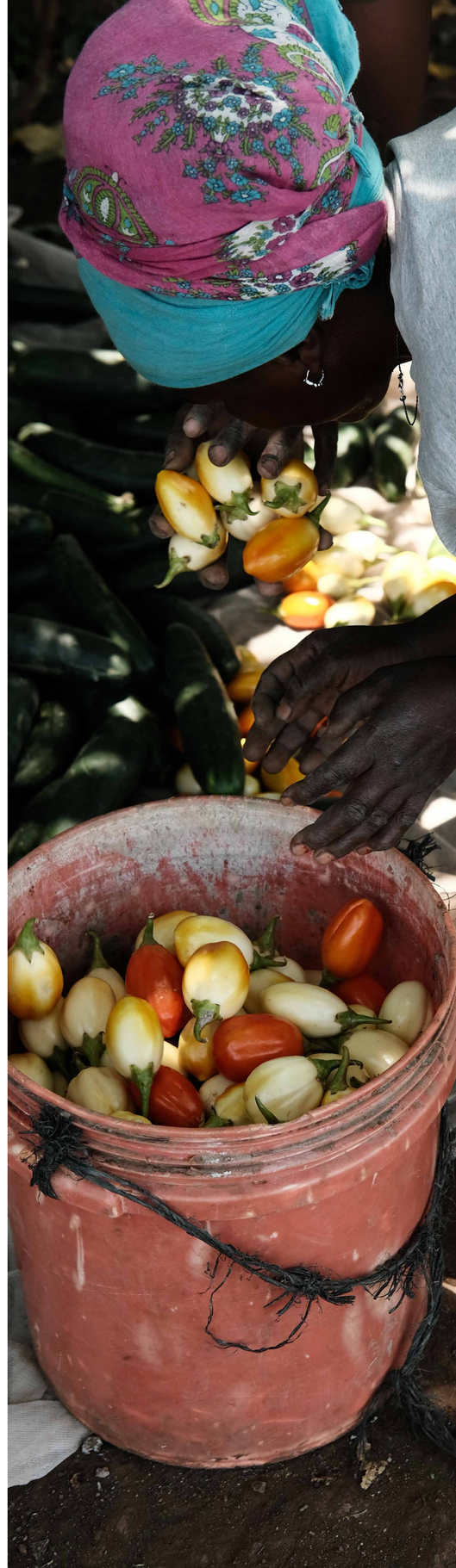
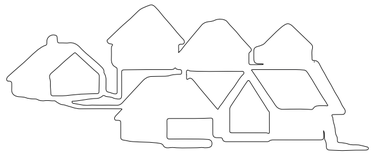


Figure 122: Private picture - chilli peppers are prepared to be sold at the local market.

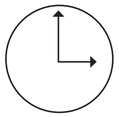
Figure 123: Private picture - four generations living together in a house.



The village

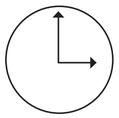
Around Nyange Farm, houses and villages are sporadically spread across the landscape.
The village is not directly related to the farm but is non the less very important in creating a sustainable environment and neighbourhood.

- Employment of local people
- Teaching and skill enhancement
- Security against violence and theft
- Health and well-being



Monday-to-Saturday

08:00 passing the site to go to work / school
16:00 passing the site to return to home



Sunday

08:00 - 22:00 day off for school children and most employees
10:00 church

"The kids will come to work here. And that's my future. That's my wish. So that I can see how Nyange Farm can generate more employment to the community. [...] We can help even the kids or the community in this area, to train them on the hospitality and the farming and the other things, because even the guys here, maybe one day they'll have a family.."

Praise Nyange
(Appendix 3 on page 176)

Figure 124: Private picture - The bore hole on the farm is essential. It provides fresh water for staff and ensures enough water for the agriculture during dry season. Even though it is every essential, it is only the minority of farmers who can make this investment.

The community is a large part of the vision for the Nyange Farm Lodge.
The neighbouring families has often inherited the family land and has an unstable financial situation, mostly reliant on time limited jobs, agriculture and a few livestock animals. Most families do not have a bore hole to supply fresh water. The government finance education from age 6-18, ensuring most children go to school. Every day neighbours passes by Nyange Farm following the small track near the staff building west from the site.



"A thief can come to your place anytime if they want. Even if you put an electrical fence, still, they can break your house. It's how you build the relationship to the neighbours and the whole community. The community could be your security guard."

Praise Nyange
(Appendix 3 on page 176)

Figure 125: QR-code: interview with Praise Nyange stating how important the borehole is.

The design brief presents the synthesis of the master thesis based on the theoretical studies, the themes and the analysis. The brief specifies the vision for the design proposal supplemented by a manifesto. The problem statement is defined and followed by design criteria. Collectively, these elements will guide the design process.

04 Brief



Problem statement

“In the light of the challenges posed by the Triple Crisis, how can architecture serve as a catalyst to inspire a shift towards the cultivation of craftsmanship and celebration of cultural heritage and tradition?”

We are facing Triple Planetary Crisis, marked by failing climate action and overuse of resources. Excessive farmland fertilization accelerates water eutrophication, harming biodiversity, eroding soils, reducing pollination, and worsening malnutrition, while also driving economic costs. Greenhouse gas emissions from industries, buildings, and energy production accelerate climate change, altering weather patterns and raising global temperatures. Poor air quality, caused by industrial pollution and rural stove use, further endangers public health.

This crisis is compounded by global inequality: while some nations struggle with extreme weather’s impact on crop yields, others enjoy overshooting planetary boundaries at an unprecedented rate. In 2019, the richest 10% contributed to 50% of global emissions (Oxfam, 2023).

Therefore, this problem statement starts by addressing this urgent issue, - as should any other architectural project, - forcing the involved participants to partake in the solving of this global crisis.
This project aims to highlight vernacular architecture and traditional practices as a pathway to rediscover low-emission building techniques that prioritize health and indoor comfort. By embracing these principles, the project seeks to propose a contextualized design deeply rooted in cultural heritage.

The design will demonstrate, through the means of contemporary architecture and modern technologies, that simple building methods and local materials can create beautiful, affordable, and sustainable dwellings.

In doing so, we hope to inspire a shift in mindset, fostering sustainable change on a global scale.

Figure 126: Private picture - The building process of the prototype takes place. The final courses of muds brick are laid before the ring beam is cast in place.

Design Criteria

The design criteria are design specific criteria that are comprised of an array of criteria informed by the program, that are in place to make sure that we can assess the quality of the design proposal.

The assessment methodology is a progression of research-based evidence, information gathered from excursions and appropriation of criterion found in sustainability frameworks such as Living Building Challenge, Global Sustainability Tourism Counsel and the UN's SDGs.

1
Health & Well-being

1.1: Ensure a healthy indoor atmospheric environment complying with CO2 threshold DS/EN 16798-1:2019: Category III.

1.2: Support local community's access to and participation of health promoting initiatives.

1.3: Comfortable indoor environment complying with Adaptive Thermal Comfort Model.

1.4: Safe assembling, maintenance by minimizing strenuous lifting.

1.5: Comply with European static codes and regulations to avert building collapse.

2
Financial benefit

2.1: Deploy passive design strategies to minimize energy consumption.

2.2: Provide long term durability against natural disasters and climate change.

2.3: Source cheap and locally available materials to ensure affordable housing.

2.4: Enhance local economic growth by local employment.

2.5: Make a building system that is serviceable in the future by minimizing sophisticated materials or solutions that add to the cost.

3
Responsibility

3.1: Prioritize renewable energy sources for operation and material production.

3.2: Select appropriate materials, preferably biodegradable, relative to function.

3.3: Ensure no illegal or excessive forestry. Thus maintaining local carbon sequestration potential.

3.4: Avoid contaminants of building and running the building, like chemicals, inorganic compounds contaminate soil, air or water.

4
Culture & tradition

4.1: Preserve and safeguard local culture.

4.2: Interpret and deploy meaningful principles of previous generations' accumulation of knowledge.

4.3: Establish mutual engagement between staff, citizens and guests.

4.4: Exhibit and celebrate ancestral religion, symbols, architecture and art. Thus increasing awareness of tradition.

4.5: Express aesthetics derived from local tribes.

5
Regeneration

5.1: Allow for locals to create a personal revenue, by promoting local craftsmanship, cooking, teaching etc.

5.2: Replant trees (endemic) to promote healthy soil to increase Carbon-sink effect.

5.3: Recycle materials and keep their value at their highest throughout the materials lifetime.

5.4: Leave the building site more valuable after building service lifetime.

“

It is not about making architecture better, it is about making better architecture.

Manifesto

Let’s improve the lives of the people around us!

If we extend our focus beyond the boundaries of the blueprint, we can create projects that truly support local communities.
For every project, let’s make sure to add value to local communities.

Let’s preserve cultural tradition more!

Around the world cultural heritage and craftsmanship are being forgotten. This means knowledge passed down through generations are being lost. Can we embed a deep sensitivity towards tradition in our contribution to this world?

Let’s exchange knowledge more!

If we embrace collaboration across cultures and professions, we will be better equipped to achieve deeper and more impactful solutions for each project.

Let’s dare to pursue social justice!

If we reflect upon building budgets as architects, we have a chance of controlling the economic distribution. By doing so, local participants and their families can benefit rather than centralized investors.

Let’s redefine design standards!

We have got so used to a design process being detailed to the very last screw. If we design for an inclusive building process, diverse inputs will shape dynamic, adaptive projects that has the potential to exceed expectations.

Let’s build more memories!

Understanding how embedded qualities in a building can increase spatial quality. A building mass is not only a combination of materials but embodies the collective personalities of the craftsmen who build it. By building with empathy we can embed memories and culture thus increasing the belonging and responsibility toward the building.

Let’s be a good ancestor!

If we truly understand that everything we create will shape the world for our great-grandchildren, designing with deep sensitivity becomes inevitable. So, let’s not aim to avoid making an impact - instead, let’s make a BIG impact - and ensure it is a profoundly positive one!

As illustrated in the methodology chapter, the design process is no linear process. Therefore, this design process will be presented by thematic topics, rather than in a chronological manner. This is done to ease the understanding and communicate the process in the best way possible.
The chapter is structured in seven parts;
Firstly, the process of building the prototype is presented, since the knowledge gained here, has influenced most of the architectural decisions. Next, the overall masterplan iterations will be presented followed by form and plan studies on the reception area as well as the lodges.
Detail studies inform the design process on both the reception area and the lodges, and will therefore be represented together.

05 Process

Prototype

Introduction

The aim of this prototype was to gain knowledge on local mud brick building techniques in East Africa, to obtain insight on a building method with a low CO2-footprint using only local materials.
It is by local citizens considered a cheap material that is used solely by poor people. Concrete blocks on the contrary is considered sturdy and long-lasting because this is the material preferred for governmental buildings. The group sought to prove otherwise.

Methodology

The process of developing the prototype has been divided into two periods of time. The first one being the building and construction management, and the second one being the interpretation and analysis.
As it turned out, in the area of northern Tanzania, the indigenous knowledge on mud-building structures have already been forgotten by most locals, and therefore the process of building is based on an ad hoc procedure assisted by desktop research and local craftsmen.

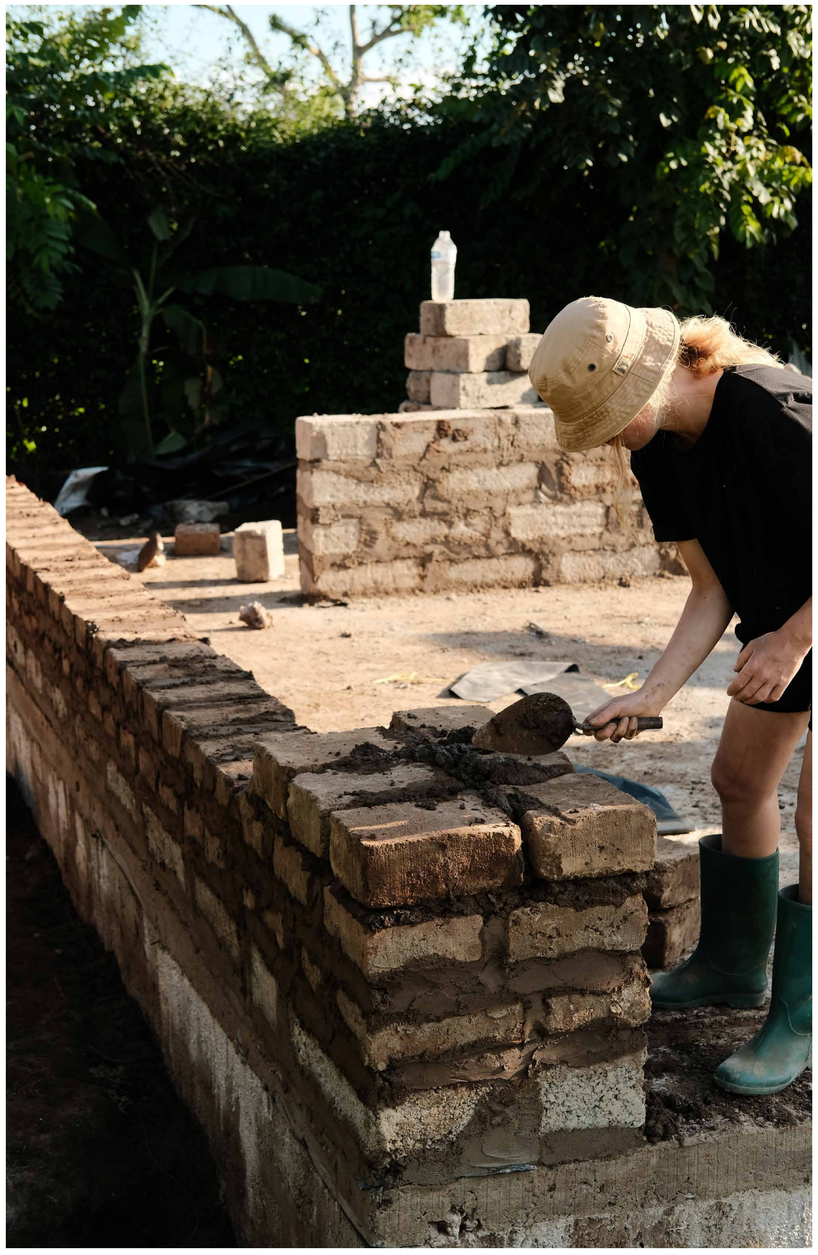


Figure 127: Private picture - Pointing the mud bricks using mud mortar.

Technique

Wall construction

Adobe bricks were difficult to obtain due to limited interest in the construction method. Time constraints made it unfeasible to produce our own mud bricks. Consequently, the project team opted to source sun-dried clay bricks from a local fired-brick factory prior to the firing process.

To prepare for the use of mud bricks, a layer of cement blocks was laid along the exterior walls atop a nylon sheet. This approach ensured strong adhesion with the terrazzo skirting and helped prevent moisture from daily cleaning and ground seepage from being absorbed by the clay bricks, which have a higher capillary drag than concrete blocks.

To utilize the entire strength of the wall, and thereby avoiding point load, a concrete ring beam was placed across the walls (Figure 146 on page 95) creating a linear load and thereby avoiding horizontal deformities by utilizing the plate effect.

Due to seismic activity, the wall must be reinforced to withstand lateral stress. This was done using chicken coup wire mesh in every other bond. These are embedded within the mortar, and are not visible after the plastering is made.

To ensure adequate curing of the wall before increasing the load of the mud bricks a maximum of five bonds was laid per day. This is particularly important due to the mix of the mortar as this contains hydrated lime. The lime does not reach nearly the same strength as concrete in the same amount of time.



Figure 128: Private picture - The Progression of 50cm pr. day is visible by the colour of the mortar.

Facade plaster

The most challenging aspect of the building process was the façade plastering, due to the lack of experience and knowledge among both local craftsmen and the project team. While the application method is similar to that of concrete plastering, the difficulty arose in achieving the correct mix and ensuring proper curing of the lime content.

The solution that yielded good results involved several key steps. First, the mud bricks were properly moistened by applying continuous misting for 48 hours before plastering. A lime primer was also applied, using a mix of approximately 1 part lime to 20 parts water, with at least one coat being applied. Just before applying the plaster, the bricks were misted again, ensuring that the water stayed visible on the surface. If the water dissipated too quickly, it indicated that the bricks were insufficiently moist.

The plaster mix used for the project was 1 part lime to 3 parts sharp sand. The plaster was then applied to the wall using a trowel or shovel, with the consistency determined by its ability to stay in place once applied. The surface was smoothed using a straight steel bar, and then a wooden trowel was used in circular motions to refine the surface. As the rough coat—the first of three layers—it was left with a coarse, non-friable surface to improve adhesion for subsequent layers. The rough coat was kept damp and allowed to cure for 14 days, during which it was misted regularly. It was found that this process worked best when the relative humidity was high, reducing the need for frequent misting.

After 12 months, the rough coat resembled cement plaster both visually and tactically. In areas constructed with cement blocks, cement plaster was used for finishing, including the footing and lower parts of partition walls. If repairs were needed, the same mix as the original coat was applied.



Figure 129: Private picture - Initial priming using a 1:20 lime solution to increase adhesion.



Figure 130: Private picture - Application of first coat (scratch coat).



Figure 131: Private picture - Finished plaster.

Facade finishing

The last step of the wall construction if the finishing leaving the surface aesthetically pleasing and more durable. The finishing coat is crucial to ensure erosion resistance while maintaining permeability. Test of abrasion, scathing, colour and erosion was examined to determine which system was better (Scan the QR-code Figure 138 to observe the testing process).
For inside purposes the group tested lime washing as is a traditional way of decorating wall surface using simple materials. However, the durability on outside façades in humid areas can be reduced dramatically and effectively requiring retouching every six months.
On the outside façades we tested variations of clay and lime coats. To determine the suited coat test were assessed in resistance to abrasion, scratching, erosion and colour. Literature suggests that polyvinyl alcohol (PVA) found in carpenter glue, casein found in dairy and wheat binder can be added to the mix to increase ductility and water repellency without compromising breathability (Maeder, et al., n.d.). In this study a carpenter glue was tested, which proved very abrasion resistant and moisture repelling. The glue was added mix with hot water in 1:4. Inspired by the Maasai tribe, addition of ash was tested, this shows insignificant chance to baseline.
The best result was found in adding 1 lime and 2 clay from the same material the brick was made from (scan the QR-code Figure 135 to learn how to extract the clay and produce a paint). This had great water repellency upon testing after 24 hours curing with continuous misting and further increasing the next days. The abrasion resistance is high as well scratch resistance if the previous layer is properly keyed by scratching smooth areas of the surface beneath.

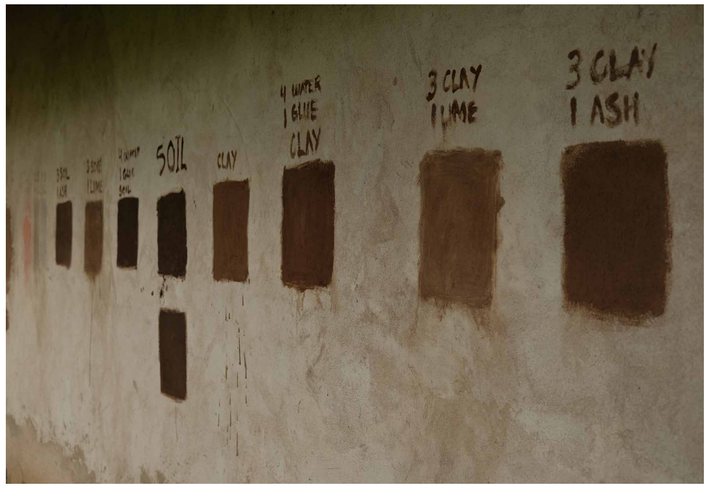


Figure 132: Private picture - Mixing samples of the finishing layer. The samples were tested in relation to water resistance, abrasion, colour and scratching. The mix using 3 part clay + 1 part lime proved to be the best in the test (Figure 138).



Figure 133: Private picture - Exploring three different soil mixtures.
Left : Filtered adobe brick.
Middle: Soil from site location.
Right: Unfiltered adobe brick.
By making a solution the content of clay can be approximated.

Figure 135: QR-code: Video of clay extraction and plastering with the fundis Roger and Baraka.



Figure 134: Private picture - Testing powder paints on mud brick.

Due to excessive bricks from the building this clay mix was readily available. The local soil's clay content was tested using a simple bottle test (Figure 133).

The soil tested has a darker colour and very similar properties. In the end the clay extracted from the bricks' material. The process of doing so included concentrating the clay. By putting the bricks into a plastic bag and tying a knot before beating the bag knocking the larger clay lumps to particles. The mix was filtered using a nylon insect net for agricultural purposes (mesh size 0,5-0,8 mm). This filters most of the sand and all rocks away leaving a smooth mix to use for coating. The hydrated lime available (Rhino lime) contained sharp sand in the mix, this had to be filtered away too. Once mixed with water the consistency should be soupy and if put on a trowel should start running of the sides. The applied layer should be very thin otherwise cracking is inevitable. The application is done by using a sponge and hands creating an appealing earthy nature of the surface.
If a smooth surface is desired a steel trowel is used to skim the surface, this will drag the clay particles to the surface and result in a darker colour, but cracking is also more likely. The application was done twice. Continue the misting for 14 days and leave to dry for another month. Make a final coat using carpenter glue and hot water 1:4 and apply the solution. This increases water repellency but must be applied after proper drying to avoid trapping excessive moisture inside the wall.
It is an easy process, after a couple of samples even unskilled craftsmen can perform the application. In this process the participants had never applied plaster before.
For footing a mix substituting lime with cement was used, however the colour is darker.

Figure 138: QR-code: Video of testing abrasion, scratching and erosion of examined clay plasters.

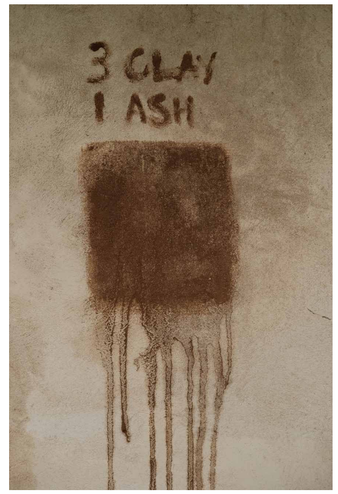


Figure 137: Private picture - Inspired by the Maasai Tribe, a finishing sample included ash. As illustrated, the mix did not resist water erosion.

Figure 136: Private picture - Fundi applying clay-lime finish with a trowel.



Foundation

Due to heavy wall construction, the foundation had to be a strip foundation. Advised on site by local craftsmen, the amount of concrete could be limited by using natural rock below ground level, excavated using explosives on site or in the neighbourhood.

On top of the rocks a cast of in-situ mixed concrete was used to make a level surface before stacking pre-cast concrete blocks on top of each other using cement mortar for three bonds.

The strip foundation was 30 cm across. Backfill sand and gravel was advised and watered down to compress the backfill, this is procedure is frequently used by local craftsmen to avoid using a plate vibrator.
We advised to add a nylon membrane to mitigate moisture transport through the foundation into the walls and ground slab. The ground slab construction was finished using 10 cm non-reinforced in-situ cast concrete. The project group decided to construct a high footing of concrete blocks, to avoid exterior erosion due to heavy rainfall in the rainy season.

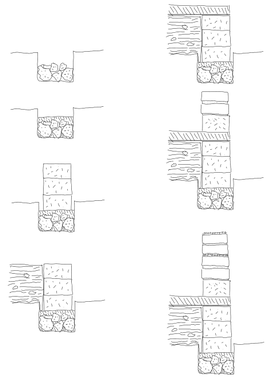


Figure 141: Diagram - process of the foundation and wall construction.

Figure 139: Private picture - co working with local craftsmen.





Figure 142: Private picture - the process of construction the foundation

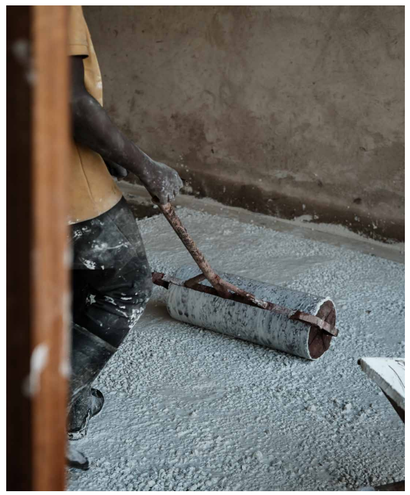


Figure 140: Private picture - terrazzo floor in progress.

Figure 144: QR-code: Video of terrazzo application in the prototype.

Floor

Traditionally, the floors in tribal communities are simply the bare ground, valued for its cooling properties during the dry season. The soil is compacted to create a level surface, then finished with a layer of ash. This ash serves both antibacterial and insect-repellent functions.

For the prototype project, a mud flooring option was initially considered due to its low emissions and cost-effectiveness. However, the need for daily cleaning, driven by the building's tourism function, led to the abandonment of this idea.

In urban and town areas, tiles are the most commonly used flooring material. The group explored this option but found that most tiles in Tanzania are imported from China and India. Hence, this choice did not align with the broader vision for the project. During the investigation, the group observed numerous instances where tiles were cracked, raising concerns about their durability and quality.

Upon visiting historical churches and schools in Tanzania, the group was inspired by the tradition of terrazzo flooring and decided to pursue this option. The terrazzo stones are sourced from a nearby river, and the manufacturing is carried out by a small, family-owned business. Although terrazzo includes cement, the decision to support local economies aligns closely with the values of the project group.



Figure 143: Private picture - gathered terrazzo stones are being washed before mixed with the concrete.



Figure 145: Private picture - the pitched roof construction made of whole timber

Roof construction

The roof construction is made using eucalyptus trunks varying from 8-15 cm in diameter. This is a construction method used sporadically in tourism projects. Alternative construction methods for this area include pine wood or steel fink trusses. The most common roof construction is a high pitch hipped gable roof. For this purpose, we opted for a scissor truss gable roof due to large timber members and increased potential of natural ventilation.

The roof is intentionally oversized to honour the local building tradition, and limit erosion and solar radiation on the walls. Eucalyptus is a great building material in this region due to its strength and availability in Tanzania. However, the jointing technology for timber constructions are limited to using nails solely for the majority of contractors. This can have serious implications to the integrity of the construction, as the joint is more likely to come apart than the material (Figure 155). This is due to limited use and availability of brackets and electrical machinery used to install screw plates.

Timber lintel

The timber lintel was tied to the concrete ring beam using steel wire. Due to the roof structure the loads are directly transferred to this joint, and therefore there was a high concern, that wind loads would push the lintel or wall leading into deformation. Therefore, a horizontal tie (Figure 148) was added acting in tension to reduce deformation.

This lead to the following design process:

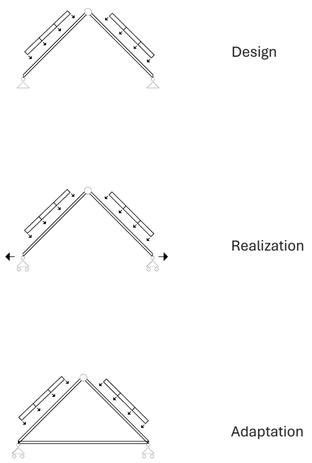


Figure 148: Diagram - the truss of the prototype had a failure of coming apart due to weak joints.

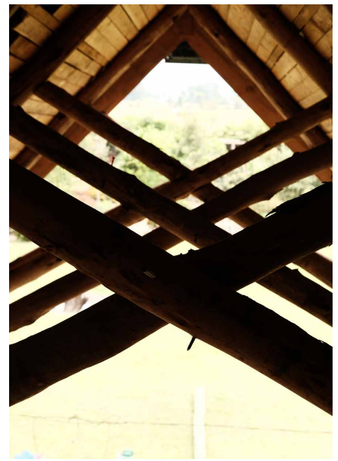


Figure 147: Private picture - The final roof construction of the prototype.



Figure 146: Private picture - Detail, the prototype.

Prototype : sections and plans

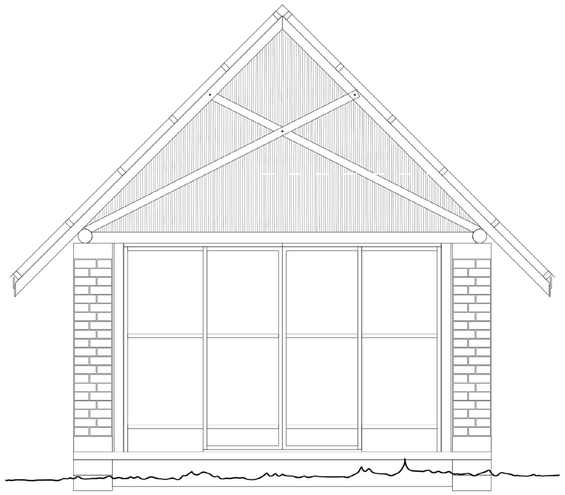


Figure 149: Elevation north - scale 1:50

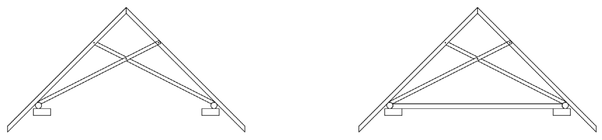


Figure 151: Diagram - the Scissors trusses uses on the prototype. Left without tie and right with tie.

Figure 150: Sketch - Elevation south



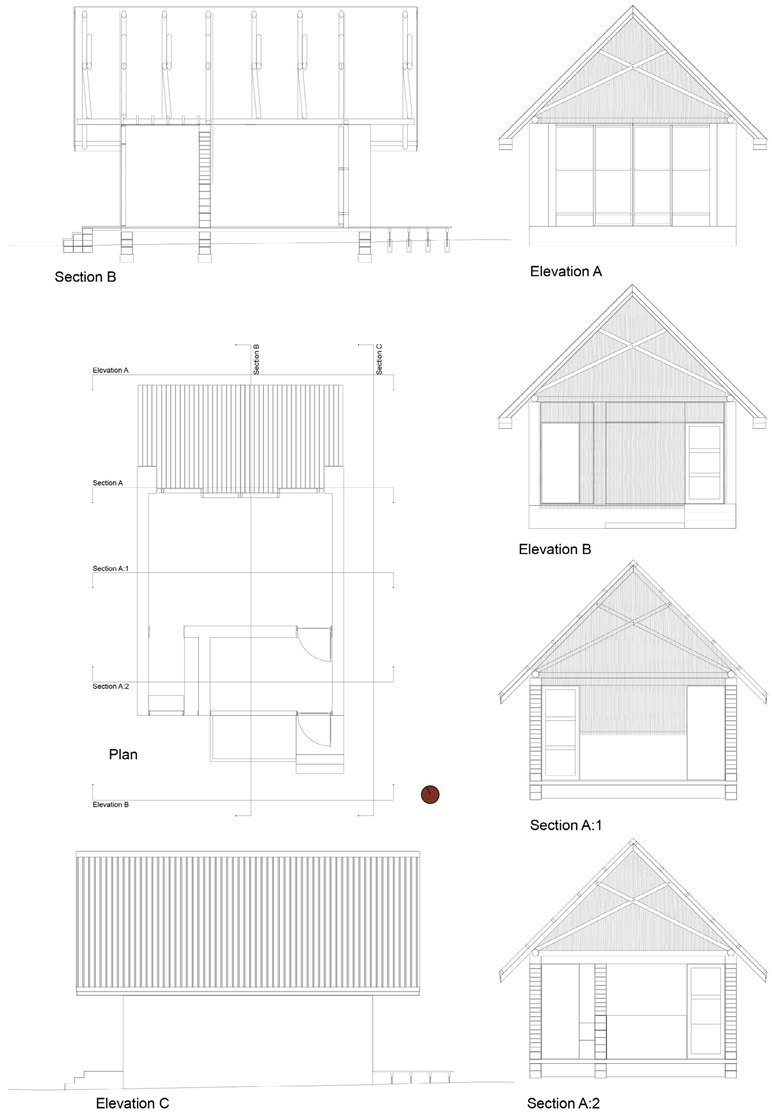


Figure 152: Prototype - plan and sections. Scale 1:100

Prototype : Evaluation

Second field trip, 2024

During the second field trip in 2024, the group members were very pleased to see, that the building was still in very good shape, even after being exposed to two rainy seasons and small seismic activity in the areal. Despite the over all good impression, minor problems concerning the foundation, the wall plaster and insights on timber joints were discovered. These insights will be evaluated in this chapter, and has informed the further design process.

Figure 154: QR-code: Video of examination of plaster coming off.

Joints

Revisiting the roof structure, the group members were relieved by the fact, that the additional horizontal tie was installed – as described on Figure 151 on page 96 - just before ending the first field trip. The reason behind this fact is, that when evaluating the roof structure, the nail joints slowly were detached as illustrated on Figure 155. This was a major concern and led the group members to advise on reinforcing the joints by using bolts and nuts.
These insights have provided knowledge on the quality of joinery, and will inform the design process of timber structures.

Wall

Evaluating on the wall, the group members found that the some of the plaster was detached from the adobe brick. This was the most challenging part of the process and had to be fixed urgently, due to the fact that exposed adobe brick erode rapidly when exposed to rain.
This was only the case of the two solar exposed corners of the wall, while the rest of the façade proved to be durable. Being aware that during the plastering process the solar intensity and evaporation was quite high during July, the members assume that the detachment is caused by the lack of moisture within the brick (Facade finishing on page 90). The water mist simply evaporated too quickly, leaving the brick too dry for the hydrated lime to bond with the clay.
This insight is very useful in time managing the procedures in the future, advocating that the plastering process is most effective during humid season. The knowledge also creates a focal point in the work with adobe brick, underlining how important well hydrated bricks are.

Floor

In the evaluation of the concrete slab, the group members found that several places, the slap seemed to be unsupported identified by a hollow sound when knocking on it.
Furthermore, rebar should have been in place and most importantly the backfill should have been compacted adequately.

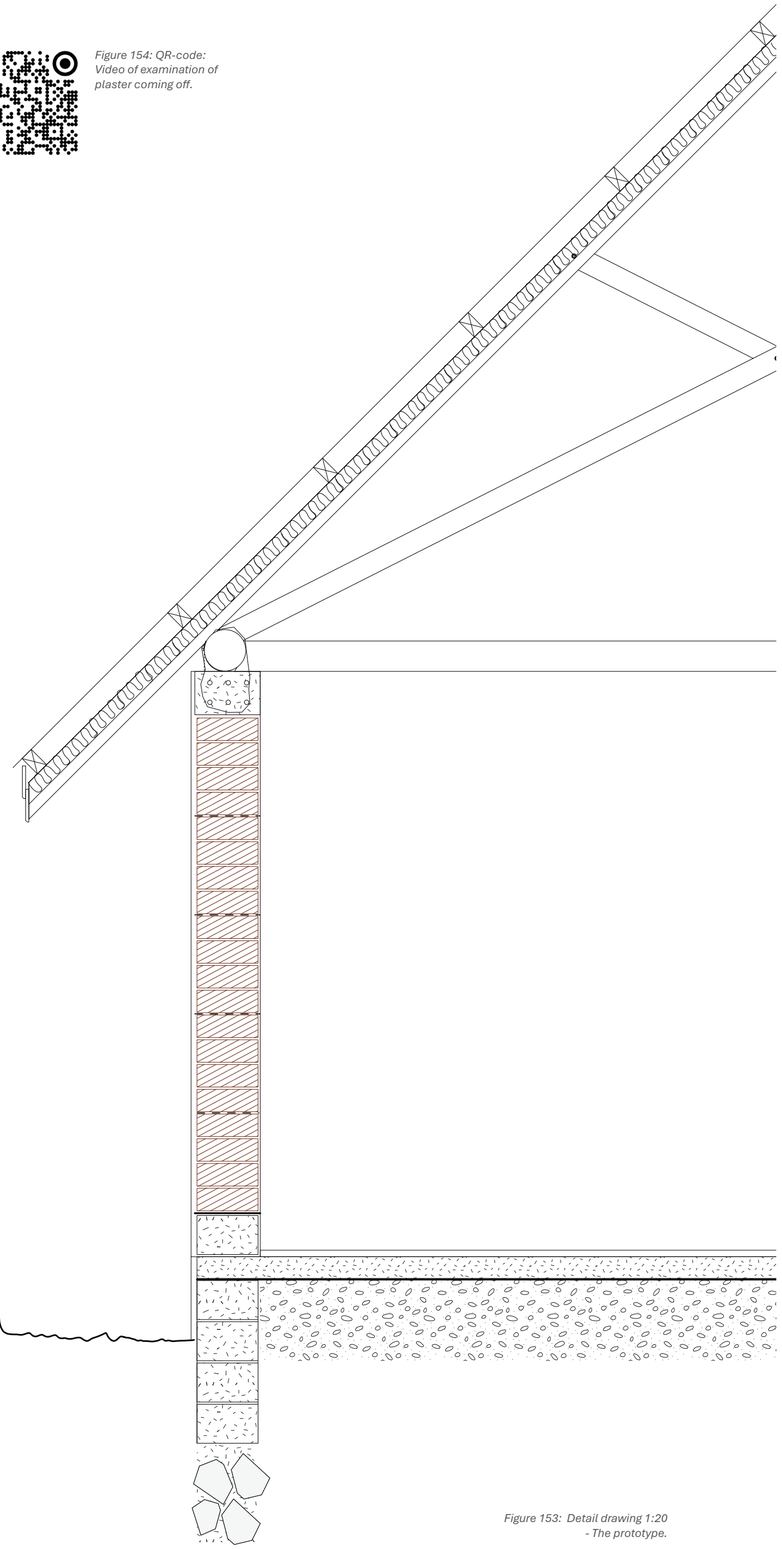


Figure 153: Detail drawing 1:20 - The prototype.

Figure 156: Private picture - The concrete slab had holes and cracks where the backfill had set further. This created a hollow cavity between the slab and backfill.

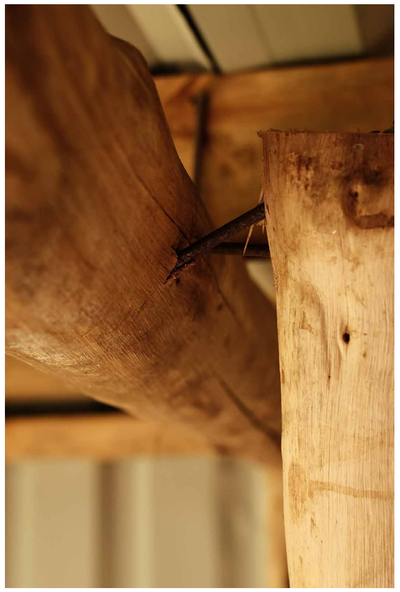
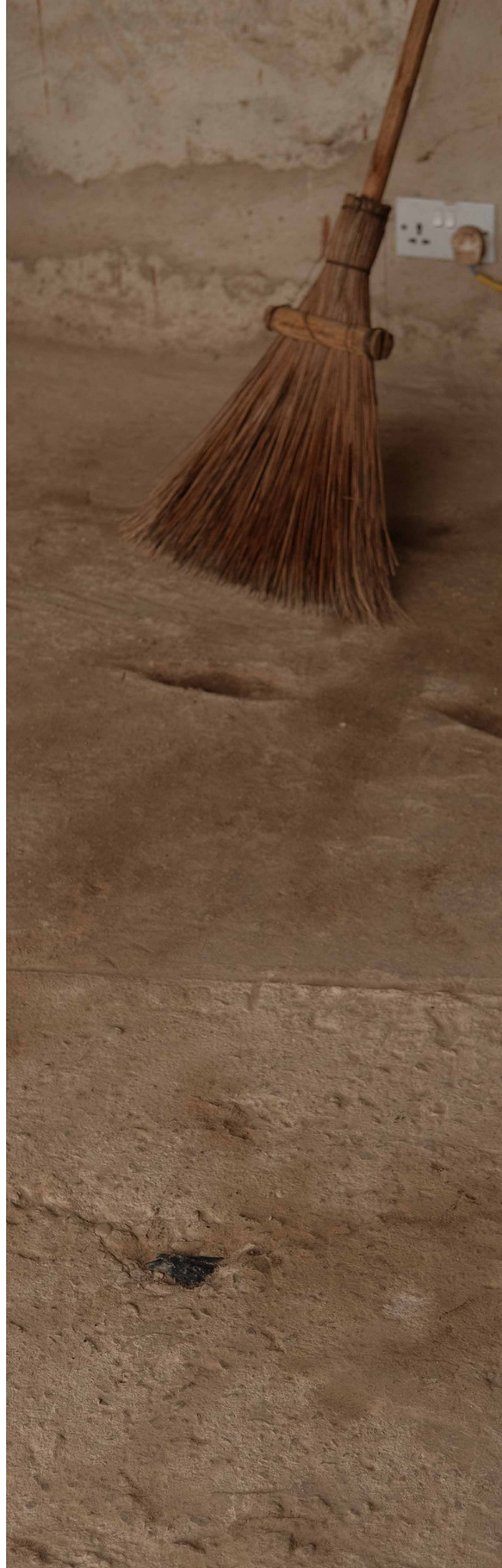


Figure 155: Private picture - The nailed joints had detached in the truss.



Figure 157: Private picture - Detached plaster on the exposed wall.



Masterplan

Functional diagram

The overall functional planning was developed during the field trips to Tanzania during 2023 and 2024. Extensive observations during this time and many conversations with the building owner dictated the final functional placement, as seen on Figure 160. Especially insights on main flow patterns for the employees informed the layout. Also, elements such as odour nuisance caused by the livestock was an insight obtained during the observation process.

Figure 160 is the current state of the site and has therefore been the point of departure the following design process executed on a desktop level. This includes all of the existing platforms and building structures that has already been developed on site.

2022

Figure 153 illustrates the functional layout as it was in 2022 . Functions like accommodation and staff quarters were not included, due to the minimal activity on the farm. Only a small shed for a few farmers were included closely connected to the livestock to secure the animal. In 2021, a wire fence was installed around the southern part of the site during the construction of the water bore hole.

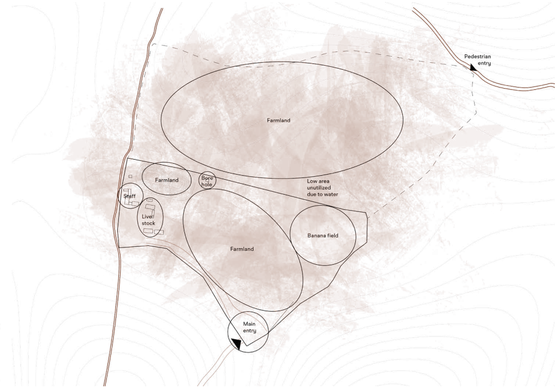


Figure 158: Masterplan - Functional situation in 2022

2023

Figure 155 illustrates the functional layout as it was in 2023, when the project group visited the site during the first field trip. Two large fish ponds located west of the site had been added since 2022, and a large staff quarter in the southwest corner had been provided. The old staff shed was transformed into livestock area, and a small shed to newly installed electricity had been build.
A toilet building by the main entrance had also been build.
During the three months field trip a lot of developments took place. The prototype was made and several new platforms in the same style were under construction.

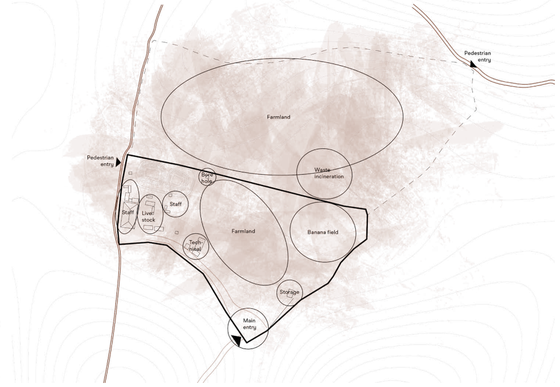


Figure 159: Masterplan - Functional situation in 2023

2024

When returning to the site in 2024, a lot of the initiatives made in 2023 had become a reality during the past year. All of the initial platforms had been perform. As seen on Figure 160 new garden areas had come into place and two large green houses had been established in the northern side of the park.

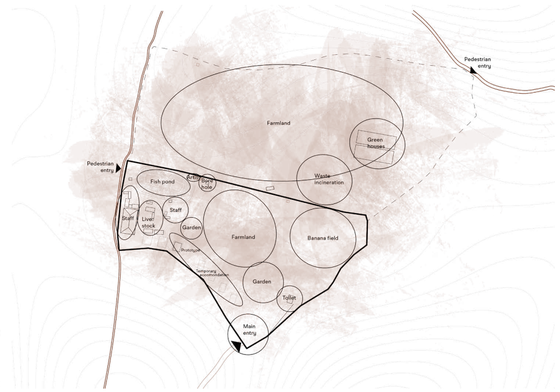


Figure 160: Masterplan - Functional situation in 2024

Figure 162: Private picture - the process of marking the prototype and adjacent platforms.



Functional plan diagram

Figure 157 acts as a functional guideline for the further development of the masterplan. The diagram integrates existing structures on site due to an environmental and financial reasons. New functions, such as increased staff accommodation and livestock area, as well as a large reception area has been introduced on the site, based on requirements from the building owner. Elements such as the integration of the village on the south west corner, a meditation space in the banana field and convoluted pathways are initiatives created to support the overall experience and purpose of the site.

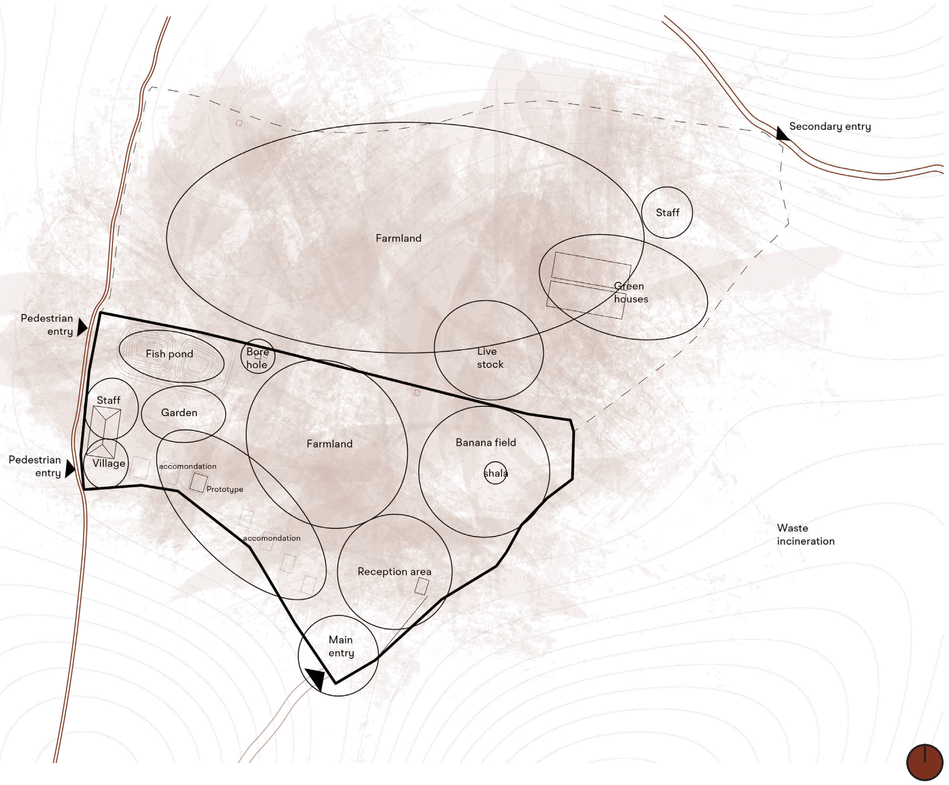


Figure 161: Masterplan - Functional diagram

Plan iterations

Reception area

The reception area is the first meeting with the site, and several functions are located in this area, including a reception, the office, the pool and lounge area as well as storage space and a restaurant.
Therefore, there was many requirements for the layout and form of this area, due to the many functions it holds.
Three concepts are presented on the following pages, suggesting very different directions.
Common for them all is that the overall form is inspired by extensive study on ancient cultures in the area.

The circular layout

The circular layout seeks to explore the social quality of a circle, as found in the Chagga and Hadzabe dwellings.
By following the circle a natural hearth occurs, traditionally the fire. In this case the centre could be a main meeting and lounge area, or as illustrated in Figure 163, a light well deeply rooted in the function of the fire.

By working stereotomically with the shape, the ground found a natural back of the form, allowing the shape open up towards the other. This element was difficult to work having to create an inviting gesture towards the front and the back, while also having to include several functions.
The group explored a dividing plan as illustrated on Figure 165, to accommodate more functions.

The group found that the circular form performed best as a free-standing shape, making it difficult creating a united experience of the area. Finally, by adding several volumes a new centre was created, which intrigued the group members, though the concept of the hearth lacked.

Figure 166: Project by Studio NJF located in Mozambique. https://studionjf.com/work/architectural-design/

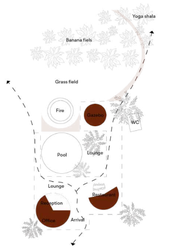


Figure 165: Reception area - Initial iteration situation plan of circular shapes.

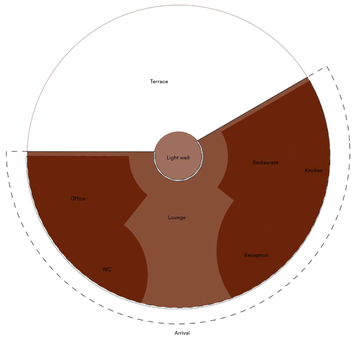


Figure 163: Reception area - Initial iteration on plan, circular shape

The rectangular layout

Inspired by the centre of the circle, this proposal seeked to adapt the circular qualities while letting the adobe brick material inform the form. Here, the flow of the occupants creates a natural centre of the building. Unfortunately, the members found that the shape seemed anonymous in relation to creating high quality surrounding spaces.

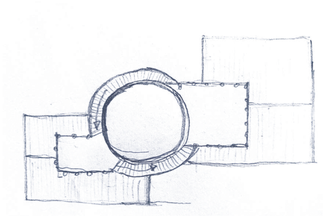


Figure 164: Reception area - sketch on plan, based on the rectangular layout.

Figure 169: Project by Hicarquitectura, on atriums https://hicarquitectura.com/2024/07/william-tailly-remy-aznar-villa-mondoukou.

Figure 168: Project by Estudio Botteri-Connell, on how bricks can create an atmospheric experience. Here creating light play in a lattice wall.

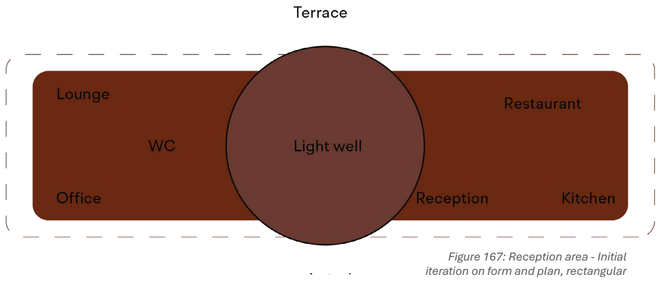


Figure 167: Reception area - Initial iteration on form and plan, rectangular layout

The split layout

Informed by the challenges of the process in particular the focusing properties of the circular geometry, the concept of a split layout was developed. The introduction of the square allowed the group to work more holistically with the interior and exterior spaces created by several volumes. Much like the Datoga tribe plan layout, small plazas were created between the rectangular geometries. The form also afforded private spaces such as an office as well as a focused space on the plaza for common activities. The challenge of connecting these together arose and from looking at for instance the Hidalgo project from Rozana Montiel (Figure 173) the poetics of a connection made through a shared roof emerged.

Figure 173: Project by Rozana Montiel located in Hidalgo, México. https://rozanamontiel.com/del-territorio-al-habitante/

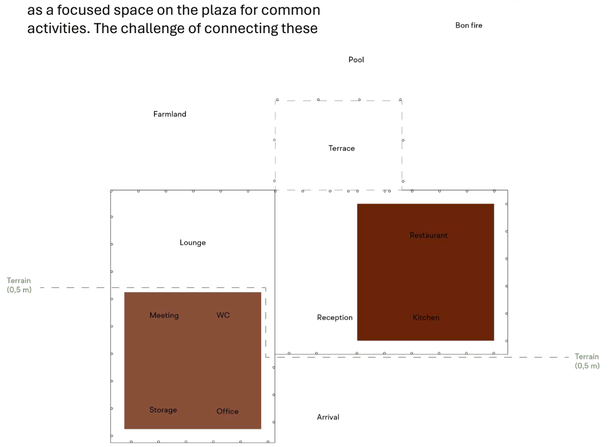


Figure 170: Reception area - Plan iteration on the split layout concept

The split layout - section iterations

Working with the sloping terrain the concepts of several volumes allowed the terrain to be expressed explicitly, creating an interesting and diverse experience when perceiving the sequence of spaces. Roof studies explores hierarchy and the pursuing of the connectivity amongts the masses. In this process the group revealed the quality of a pergola, that could unite the separate volumes, perceiving them as interlinked. The pergola would also act as a special element, defining different zones.

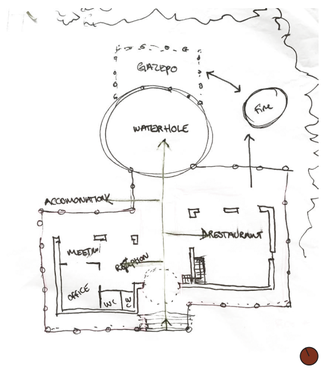


Figure 172: Reception area - sketch on plan layout based on the split layout iteration.

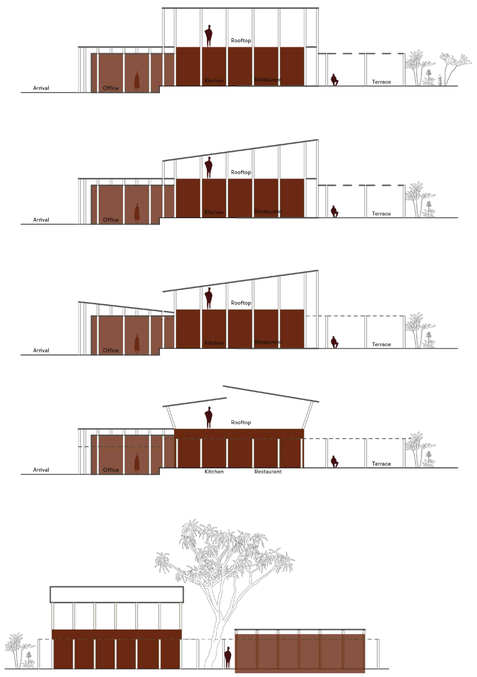


Figure 171: Reception area - Initial iteration on sections.

The split layout - plan iterations

Based on functional analysis, the group found that three major volumes could accommodate the functions needed. Through flow studies and general orientation of the area, the plan was tested in many directions.

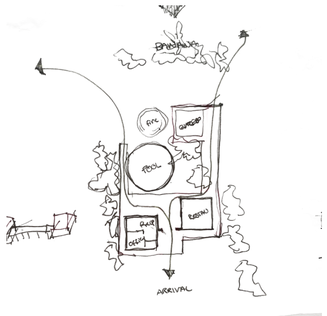


Figure 177: Sketch of reception area - on how the volumes divides the flow



Figure 174: Reception area - Initial iterations on plan and flow.

Flow and grid

Figure 175 is the plan iteration of the reception area that the group decided to explore further in the design process. The plan also illustrated different flow patterns of the employees and tourists.

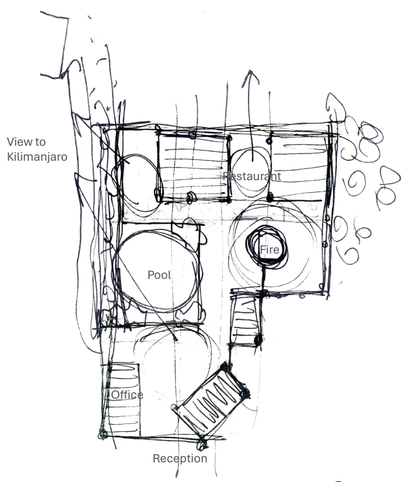


Figure 176: Sketch - the early design of the final plan layout.



Figure 175: Reception area - Initial iteration on the final situation plan. Here seen with flow.

Form studies

Reception area

The roofing

Different iterations on the roofing were studied in terms of orientation, structural type and general appearance has been made.
Based on the climatic conditions in the area as well as insights of material properties especially related to resistance on insects, the group members investigated different roofing materials, such as banana leaves, thatched roof, canvas and steel sheets. The group decided to pursue the last mentioned, encouraged by the very easy assembly, the low maintenance, the durability and high accessibility in terms of cost and location of the product.
In this process, the group members were very aware of the overall vision of the project.

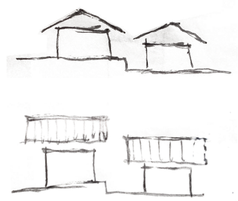


Figure 184: Sketch - Iterations on pitched roof



Figure 182: Sketch - Iteration on the entry of the reception area

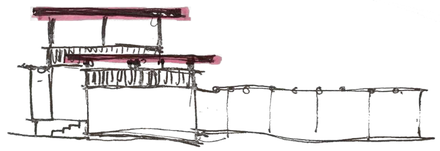


Figure 183: Sketch - Iteration on working with the terrain and a pergola.

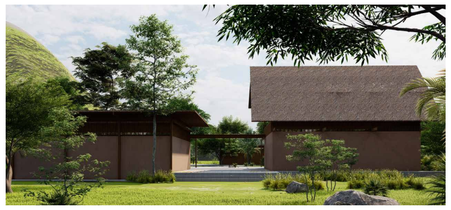


Figure 178: Reception Area - Iteration with a pitched roof in combination with a flat roof



Figure 179: Reception Area - Iteration with two pitched roof.



Figure 181: Reception Area - Iteration with two flat roof.



Figure 180: Reception Area - Iteration on the two pitched roof with a different orientation.

Lodges

The layout of the lodges was also explored. The incorporation of the already existing eight platforms towards the south was the point of departure in developing the positioning of the lodges.

01

In this iteration four lodges were placed where part of the previous staff area was located. This led to little disturbance of existing farmland. A big challenges was the high rising fish ponds obstructing the view for the lodges.



Figure 185: Masterterplan - Iteration 01 on lodge placement

02

Iteration two explores the possibility of creating uniform plan layouts of all lodges, so that all are accessed from the north. Unfortunately, the group found that the north side of each lodge would cause the main axis path to be between the lodges to be neglected.



Figure 186: Masterplan - Iteration 02 on lodge placement

03

In this iteration lodges are placed efficiently and close to the reception area. Despite this, the group found that the masterplan became too rational creating the experience of a resort like structure. This did not align with the overall vision of the project.



Figure 187: Masterplan - Iteration 03 on lodge placement

04

This iteration explored the potential of enlarging the area of accommodation, in order to explore the quality of a more spread out masterplan. The group members found, that a large area of the current farmland would have to be converted, and that the excess area between the lodges were hard to employ.



Figure 188: Masterplan - Iteration 04 on lodge placement

05

This iteration was interesting due to its non-linear appearance. A new path was created giving the master plan an interesting flow. Despite this, the group acknowledged that when arriving at the site, the plan layout made the appearance of seeing all lodges at once, making the space seem over occupied with construction and little farmland.



Figure 189: Masterplan - Iteration 05 on lodge placement



Figure 190: Masterplan - Iteration 07 on lodge placement

06

Figure 186 showcases the iteration that the members of the group decided to develop further. This layout allows all lodges to have to view towards Kilimanjaro, while still orientation them selves towards the main path way. The clustering in pairs of the new platforms in front (Figure 190), allowing new exterior spaces to be created. By doing so, a long and axial movement is avoided, and instead small spacial pockets along the path allows the user to engage with the surroundings.
The layout also respects the existing farming area by providing a large continues area, as is the case on the farm today.

Detail studies

The openings

The openings in the clay walls were explored through visualisations and sketches. On Figure 192 an arch was investigated intrigued by the tectonic expression utilising the properties of bricks. Though, the group members found that the curved shape did not align with the rest of the architectonic expression, but represented a north African or Zanzibari building style.

Instead, Figure 191 and Figure 193 was chosen for the project. The group members found that this iteration articulated the tectonic properties of the brick wall as good as the arch. In addition, this method was directly in correlation with the building techniques found in dwellings all over Tanzania. The knowledge on the simple method seemed to be well-known and therefore convinced the group of the option. In this way, local craftsmen are able to copy the technique easily in a future building project with clay.



Figure 191: Visualization - opening with a lintel over the door.



Figure 192: Visualization - opening with an arch expressing the properties of brick.



Figure 193: Visualization - opening with a lintel over the windows

Figure 194: Private picture - the lintel over the door articulates the structural properties of the masonry and timber.



The roof

Early in the design process the group had decided on using steel sheets for the roofing, due to the low maintenance and very affordable price. One of the main drivers for the project was to exemplify, that good buildings can be made on an very affordable budget.
During the field studies, the group members found that houses in the area of Moshi with organic roofing, such as thatched roof, were experiencing very high maintenance due to mold or insect attacks.

The colours of the steels sheets were discussed in group due to indoor climate comfort concerns as well as aesthetic expression.
If the sheets have a darker colour and thereby low reflectance, more solar radiation would be absorbed in the material leading to higher indoor temperature - as explained in the chapter on indoor climate on page 49.
On the other hand, by introducing a highly reflective light-coloured surface, the group found that the roofs on the lodged would be highly obstructive in the landscape. Due to the pitched roof, a concern on that solar reflections would cause discomfort for the employees working in the farm, as well as guests in the reception area.

This issue was addressed performing simulations on indoor climate (Building Energy Model (BEM) on page 118), and the simulations showed, that the operative temperature did not exceed the allowed, and therefore the group decided on a steel sheet roofing i combination with additional ceiling visualized on Figure 196.



Figure 195: Visualization - light coloured corrugated metal sheet roofing.



Figure 196: Visualization - dark coloured corrugated metal sheet roofing.

The footing

Based on the chapter on “The potential of earth” and the findings during the prototype, the group members wanted to ensure that the porous unburned brick wall would not be exposed to any water, be it rain from above or water splashes from the ground during irrigation or cleaning. Therefore, several footings were tested during the design process.
The group decided on moving forward with the visible concrete footing(Figure 199), to reflect the honesty of the wall structure. The concrete footing underlines the challenges of the unburned brick wall, but at the same it articulates it by lifting it off ground.



Figure 198: Visualization - natural stone footing.



Figure 197: Visualization - concrete footing with clay and cement plaster



Figure 199: Visualization - concrete footing.

The pergola

The pergola floats between the volumes in the reception area, blending interior spaces with the exterior. The pergola also binds the volumes together creating a strong sense of coherence, while providing a light phenomenon when occupying the space underneath.

In correlation with the plan development, the pergola was simultaneously developed to accommodate the buildings orientation and terrain levels.
This meant that the columns supporting the pergola had to work in two directions, like the grid illustrated on Figure 204.
One of the iterations made are seen on Figure 206. This accommodate the need of working in two direction, but required a large cross-section area for the column element. This requirement compromised the ambition of creating a light weight and cheap structure.
Instead, the group moved on with the iteration on represented on Figure 208 and Figure 209.

This construction allowed the usage of light weight elements, while being easy adaptable to different types of timber elements.

Figure 207: Pergola - Iteration on the structural system.

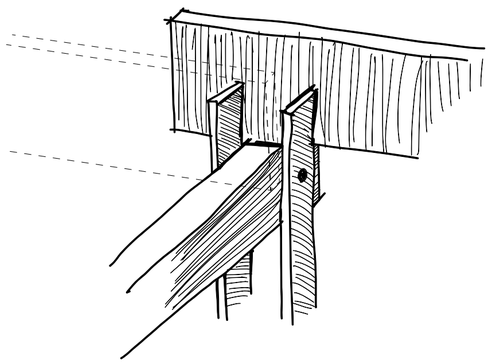




Figure 205: Pergola - Iteration showing one way layered twigs.

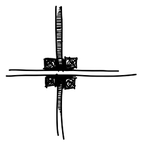


Figure 206: Pergola - Iteration on structural system. This iteration requires a large support column.

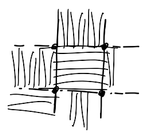


Figure 208: Pergola - Iteration showing a concept that allows different orientation of the twigs.

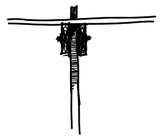


Figure 209: Pergola - Iteration on structural system that allows two-way support. The column support is constructed by using two thin rafters, supporting the concept of light weight structural system.

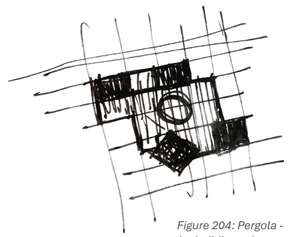


Figure 204: Pergola - the building volumes are tied together by the pergola,

In addition to the development of the pergola, the columns had to be further detailed, due to the risk of termite attack in organic materials, as described in the chapter Figure 84 on page 52 and illustrated on Figure 210. This required the timber column to be raised off ground. This meeting was explored in the study below.
In accordance with the findings of the study above, the group decided to continue with Figure 212.

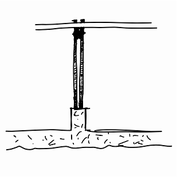


Figure 210: Sketch - the column can be raised off ground on a concrete footing.

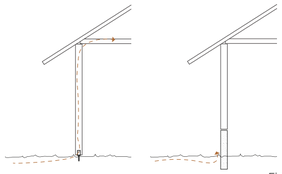


Figure 212: Structural detail on how to avoid insect attack in the timber construction.



Figure 200: Column detail - Iteration 01



Figure 201: Column detail - Iteration 02



Figure 202: Column detail - Iteration 03



Figure 203: Column detail - Iteration 04

The wall ribbon

Through the study on the microclimatic conditions, the UTCI map proved that if located in a shaded and ventilated a good comfort level could be obtained (Appendix 11 on page 195).
The group followed this concept for the building in the reception area, in order to create a good indoor climate during the daytime, when the buildings would be in use (page 72).

This led the group to come up with a concept of a permeable ribbon, providing ventilation inside the building volumes, while also articulation the lightweight roof structure.
Another important function was the creation of a concept that could accommodate a beautiful meeting between the pergola and the wall.
With this concept, the pergola could combine buildings despite different terrains, as illustrated on Figure 214.

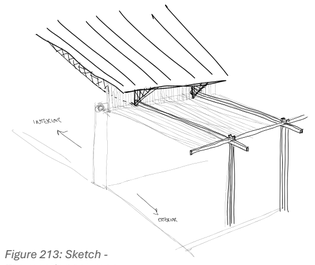


Figure 213: Sketch - The meeting between the pergola and the ventilation ribbon in the wall.

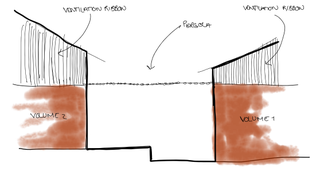


Figure 214: Sketch - How the ribbon allows the buildings to be connected through the pergola despite difference in terrain.

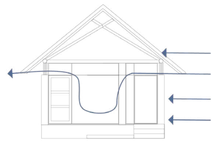


Figure 215: Illustration on how the air flow from east (the main wind direction) ventilates a building through the ribbon in the wall.



Figure 211: Private picture - the pergola is inspired by the construction found in the Maasai Boma. Here, twigs placed side by side are casting a varying shadow creating a unique atmospheric experience underneath. Joints are made using old cloth from the traditional Maasai shoka, a long scarf.

Construction

Roof construction

By analysing cultural heritage and ancient structures of the tribal communities as presented in the previous chapter, one of the main insights was the construction technique used in all the analysed dwellings. The concept of weaving structural elements together to perform an intricate and strong building has been very inspiring.

In the work with timber the process of translating this ancient technique into a contemporary aesthetics has been very informative. Along with the aesthetic design prospect, the project group were also in the pursue of creating a building system, that accommodate easy assembly and thereby inspire local craftsmen to partake in the design. The concept was also pursuing the utilization of small-diameter timber for structural purposes in order to serve as low-impact element and thereby avoiding a worldwide tendency of downgrading the material as biogas, paper wool, multicomponent engineered timber boards or simply fire wood.



Figure 216: Sketch - Redundancy of elements visible in the Datoga traditional dwelling.

Statically indeterminate by the highest degree

Through the studies it was established that redundancy is evident in traditional as well modern dwellings. Due to low quality joinery technology the most prevalent joint is tying joints in traditional dwellings. For contemporary dwellings nails has substituted the knots but joints have not developed much in terms of the joints ability to remove rotation. The group members learned from building the prototype that structures that have fewer continuous elements with less or none redundancy in the structure, severe chances of collapses emerges. In line with the tribal tradition the structures should be composed of more elements that are required to make a statically determinate structure. As the timber available does not have consistent strength classification, the design proposal emphasizes that the lack of strength is not an issue, but rather an expression. In the case members break, there is a fair margin of members that will sustain the structure. On the notions of excessive material consumption one may redirect the attention to the fact that the members are not raw small size twigs that grow fast and not milled timber from large trees.
The simulation below prove that the structural system become stronger if more members are added in a plane truss system. Especially due to shorter spans supporting dead-load the moment forces are substantially reduced.

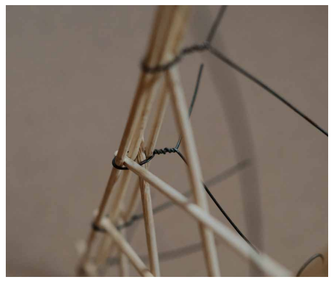


Figure 219: Physical modelling resembling a weaving technique derived from the tribal traditions.

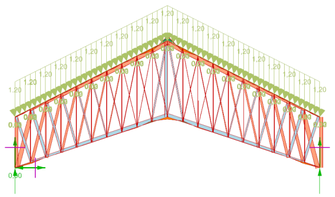


Figure 218: Bracing truss with discrete top and bottom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

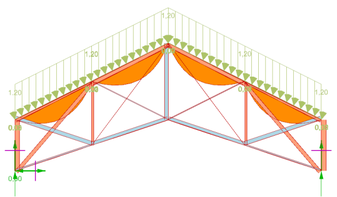


Figure 217: Bracing truss with discrete top and bottom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

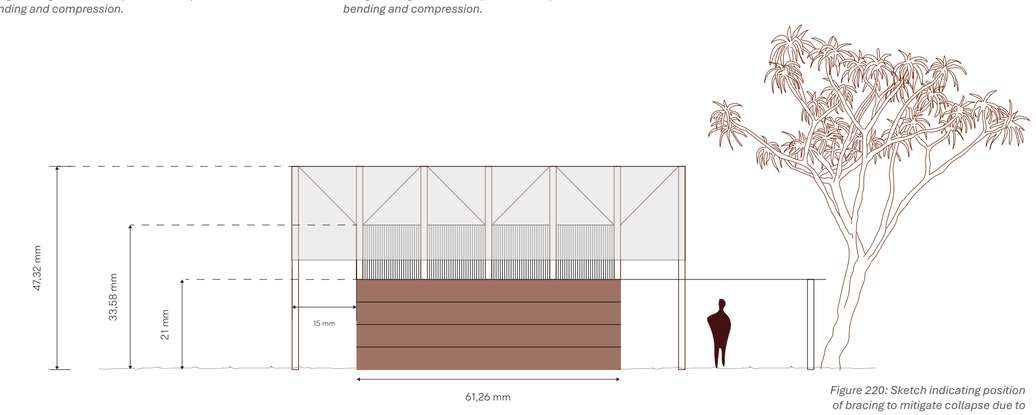


Figure 220: Sketch indicating position of bracing to mitigate collapse due to lateral loads - wind loads in particular.

Truss types

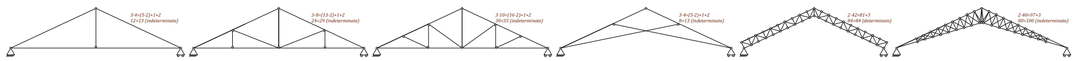


Figure 229: Free body diagram of a variety of trusses.

Inspired by bridge construction, that use discrete short elements that are joined using fixed or hinged joint. The characteristics of the Pratt truss are that it is an efficient construction with long span and low weight. The logic of pursuing the Pratt truss is in particular the possibility of using discrete elements allowing for less cumbersome material transport and construction, that ensures safety. Unlike, frame roof trusses that are widely used in pitched roof structures, they require relatively longer member in consistent quality timber. The diagram above shows different tested truss geometries that are statically indeterminate

$$2j = n + r$$

j = *nodes*

n = *Internal DOFs removed*

r = *DOFs removed by supports*

as well as a Pratt design truss that is statically determinate. The later is not desired as a single failing member will result in collapse due the structure becoming a mechanism. To examine whether members and joints are redundant, degrees of freedom are added up. For the two truss configuration to the far right on Figure 229 the formula is used proving that one is in equilibrium and the other removing excessive degrees of freedom.
The joint are all hinges (Charnier) this enable a simple joining technique like nail and rope tying. Studies showed great efficiency from the hinged Pratt truss, when compared to the similar Howe and X-truss it outperforms most design (Figure 320 on page 185). The studies examine dead load in ultimate limit state (ULS). This means that we are simulating the forces that the dead load inflicts on the structure and assessing if this exceeds the design strength of the member according to Danish regulations. By ensuring that it meets Danish requirements, that takes numerous safety factors into consideration, we can be sure that it will be fit for this context. The specified trusses are strength class C14 (parallel with grain), the top and bottom members are 60x60mm and the vertical members are 30x30mm.

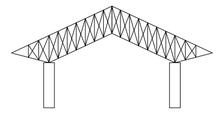


Figure 230: Diagram displaying an iteration of truss design, that uses strut and tie members for bracing.

Discrete element vs. continuous elements

By assessing the utilization factor, it becomes evident that the Pratt truss is more efficient than the other truss configuration (Appendix 10.1 on page 185). With maximum utilization factor less than 3 against almost 6. Additionally, when we change all elements to being discrete (Figure 376 on page 189 compared to Figure 398 on page 191), we get a slightly more effective design due to less moment stress. The bracing truss Figure 221 and Figure 222 combining the Pratt truss and the Howe truss has an advantage by reducing the number of failing members by 3 compared to the Pratt and Howe truss, however it does require more 1/3 more material. This truss design does improve, like the Pratt truss when all members are discrete (Figure 226 and Figure 227) as moment stress is reduced (Figure 225).

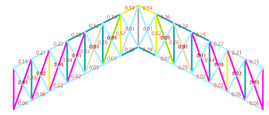


Figure 221: Bracing truss with continuous top and bottom members: 10 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces. (Figure 381 on page 190)

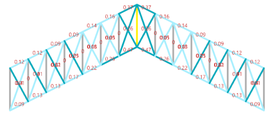


Figure 222: Bracing truss with continuous top and bottom members: 0 member's design strength exceeded (utilization >1) in ULS dead load, bending and tension.

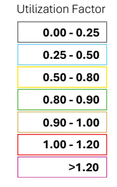


Figure 228: Utilization factor legend. Applicable to all illustrations on the spread.

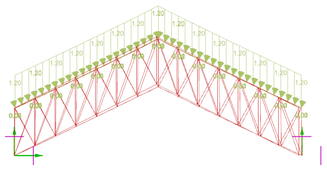


Figure 223: Bracing truss rendered with dead load and deformation. All members are discrete elements.

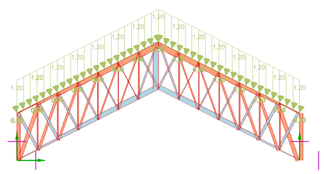


Figure 224: Bracing truss rendered with dead loads and normal forces. All members are discrete elements.

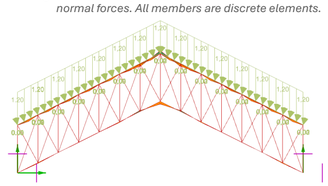


Figure 225: Bracing truss rendered with dead load and moment forces. All members are discrete elements.

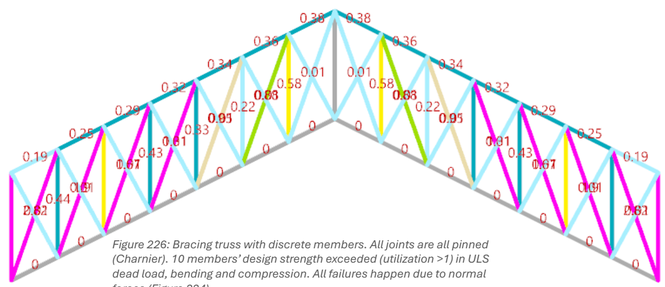


Figure 226: Bracing truss with discrete members. All joints are all pinned (Charnier). 10 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces (Figure 224)

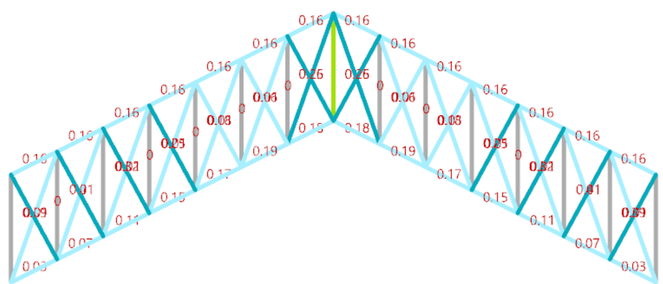


Figure 227: Bracing truss with discrete members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

FE-simulation

As the degrees of freedom (DOFs) iterations suggest, the desired truss system must be statically indeterminate. However, to suggest such a system, a finite element (FE) simulation should accompany the proposal to ensure that the structure is safe. Classically statically determinate systems can be solved by equilibrium equations, however in the case of statically indeterminate systems were DOFs removed are exceeding the amount of DOFs. Therefore, the same formulas do not apply and we must proceed with simulations instead of hand calculations.
A parametric design model built in Rhino Grasshopper allowing for continuous adjustment of geometry was continuously simulated using Karamba. Initial truss configurations below were tested to analyse the potential of using shorter members resembling the nature of tribal construction.

Ties

Reconfiguring the bracing truss into a tapered design (Figure 237) meeting in a single hinge toward the ridge, proved to be very effective. Proving that even with elements as skinny as 35mm only just exceeds the utilization factor (dead-load only) (Figure 233 - Figure 236) compared to the previous truss configuration this is better by great extent. However, the downside is if the supports must be able to stop horizontal movement as well as vertical, inflicting great reactive force to the walls(Figure 231). Ties are introduced to avoid reactions mitigation into the walls (Figure 235 - Figure 236). The ties serve numerous other functions such as intermediate decks, structure to install partition walls and suspend ceiling, lighting, curtain, AV-equipment etc. from.(Figure 238 - Figure 240)

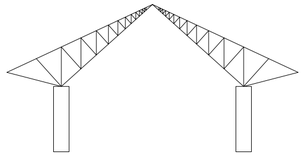


Figure 237: Illustration displaying an iteration of trusses that are tapered to conserve material.

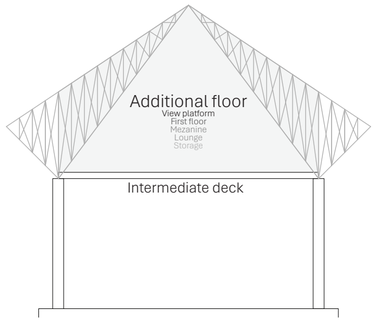


Figure 238: The tapered truss allows for an attic creating a mezzanine or view platform. Where the ties support a deck.

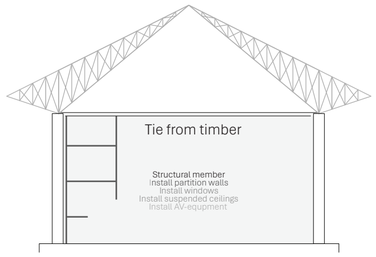


Figure 239: The tie supports installation of windows frames (page 15), partition walls etc.

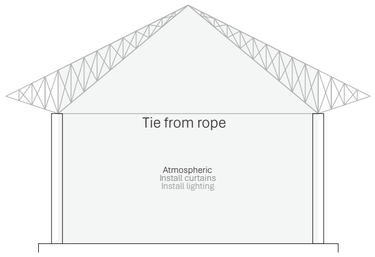


Figure 240: The tie is a mere rope that opens the space to the ceiling. The rope can meanwhile be used for curtains, AV-equipment, lighting, laundry etc.

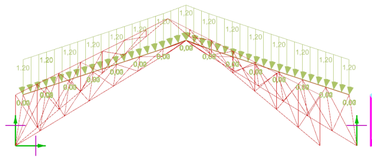


Figure 231: Tapered truss with discrete members. Pinned and roller support. All joints are all pinned (Charnier). Rendered with deformation in dead load ULS state.

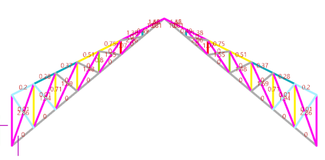


Figure 232: Tapered truss with discrete members. Pinned and roller support. All joints are all pinned (Charnier). 20 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

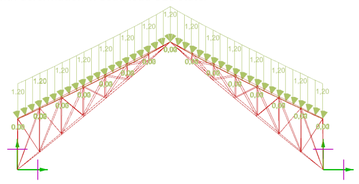


Figure 233: Tapered truss with discrete members. Pinned supports. All joints are all pinned (Charnier). Rendered with deformation in dead load ULS state.

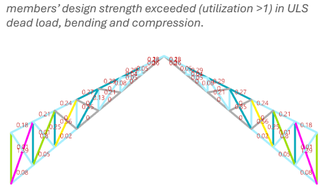


Figure 234: Tapered truss with discrete members. Pinned supports. All joints are all pinned (Charnier). 2 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

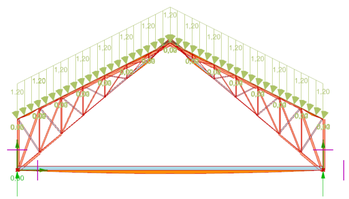


Figure 235: Tapered truss with discrete members and tie. Pinned supports. All joints are all pinned (Charnier). Rendered with normal and moment forces in dead load ULS state.

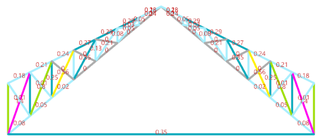


Figure 236: Tapered truss with discrete members and tie. Pinned supports. All joints are all pinned (Charnier). 2 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.



Figure 241: Utilization factor legend. Applicable to all illustrations on the spread.

Final truss design

Using Karamba the design that holds up to the parameters are the tapered bracing truss. All joints are tied together using rope (Charnier). All members are discrete and short - diminishing heavy hauling on the construction site. This system enables using of low-quality biomass that affording less illegal forestry. All members are 35mm circular sections. The top and bottom members are 2x35mm side by side.
The tested construction class was c14 (Figure 242 - Figure 245), which is quite possible and underestimation of eucalyptus' properties. A Brazilian study suggest that eucalyptus classifies to c30 strength properties (Nogueira, et al., 2019).



Figure 242: Tapered truss with discrete members. Pinned and roller support. All joints are all pinned (Charnier). Rendered with deformation in dead load ULS state.

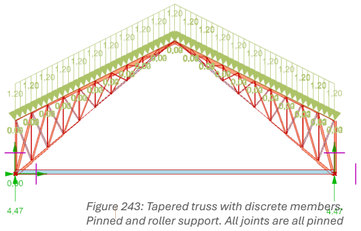


Figure 243: Tapered truss with discrete members, Pinned and roller support. All joints are all pinned (Charnier). Rendered with normal forces and moment in dead load ULS state.

Flat truss

For certain places in the design proposal decks are required. These can also be composed using same structural system. The sake of efficient usage of material a tapering flat truss was tested against a flat truss, showing great potential. The tested span is 6 m. The live load is define 1.5 kN/m2, dead load is defined 1.0 kN/m2, c/c is 1.5m. Asuming that the strength of the eucalyptus is c27 the span is possible using 2x50mm diameter members for the top and bottom members and 35mm for the vertical members.

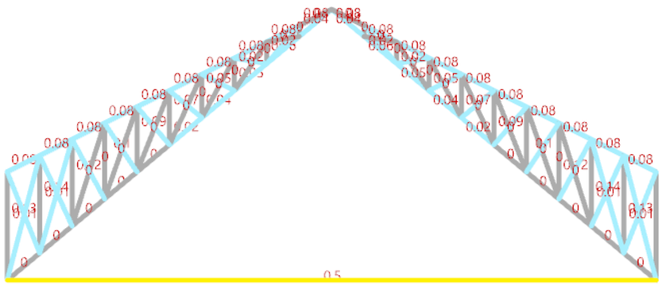


Figure 245: Tapered truss with discrete members. Pinned and roller support. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and tension.

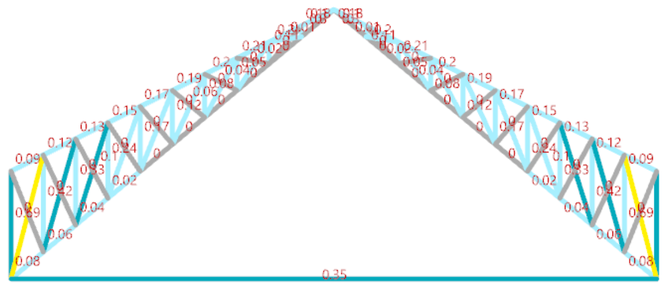


Figure 244: Tapered truss with discrete members. Pinned and roller support. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

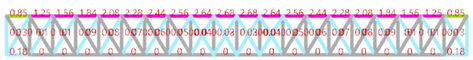


Figure 248: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C27.

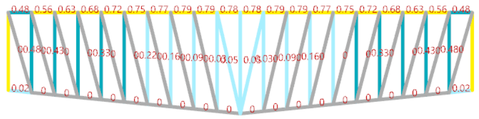


Figure 247: Flat truss. ULS live+dead load, Bending and compression. 140X140mm, 35X35mm c27.

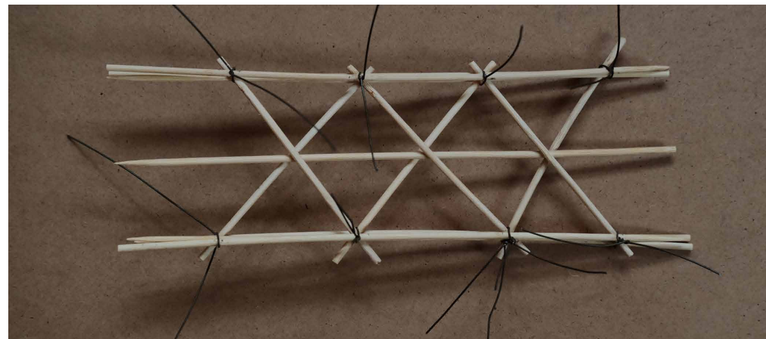


Figure 246: Physical modelling of a flat truss resembling weaving technique derived from the tribal traditions.

Energy and Indoor Climate

This chapter unfolds the process of determining the proper integration of passive design strategies through parametric analyses. Firstly, the characteristics of the modelling comfort ranges are determined by analysing the outdoor running mean temperature, that informs the adaptive thermal comfort model categories.

This study pursues compliance with the widest acceptable range: category III (DS/EN 16798-1:2019)
The parameters are articulated in design solutions in the program (page 48). The data is not presented in a strictly chronological order. Neither is all data presented as many iterations between data snapshots helped to gain intuitive knowledge on the effects of adjusting parameters sequentially or simultaneously.
The simulations are performed using Solemma's Climate Studio in the Rhino Grasshopper environment to ensure parametric design iterations can continuously inform the design proposal.

Outdoor running mean temperature (ORMT)

As the Adaptive Thermal Comfort Model suggests, there is a relationship between indoor and outdoor temperature and also the recent history of temperatures (Berger et al. 2023). Based on a weighted average of the past 7-30 days relative to the analysis day, the Outdoor Running Mean Temperature defined, by assigning most significance to the most recent day (ANSI/ AHSRAE 55 2013). This is expressed through present formula.
As guest have only a short experience with climate history for the area, a long window of historic air temperature values are redundant. Whereas for local citizens the long exposure is more relevant. One may ague that the effect of changing climate from departing country to Tanzania will impose a significantly changes perception of the climate. Since no thermal model supports this, it must be disregarded.

$$\Theta_{rm} = (1-\alpha).\left\{\Theta_{ed-1} + \alpha.\Theta_{ed-2} + \alpha^2\Theta_{ed-3}\right\}$$

θ_{rm} = outdoor running mean temperature for the considered day (°C).
α = constant between 0 and 1 (recommended value is 0,8)
$\theta_{ed\text{-}1}$ = daily mean outdoor air temperature for the *i-th* previous day

(DS/EN 16798-1:2019)

Running energy usage for heating and cooling (Assessment Criteria)

It is priority to demonstrate that indoor thermal comfort can be achieved in this area without using additional energy resources to control the indoor climate. This is beneficial because it has a low operation climate impact, it is cheaper, can sustain blackouts and mechanical flaws. Therefore, this criterion is a null-value criteria. Clearly this practice is not applicable to all climates. However, when assessing local data from the using the CBE Clima Tool (Betti et al., 2023) we can identify that outdoor thermal comfort inflicts very limited thermal stress. Using the Universal Thermal Climate Index (UTCI) we can see a distribution of thermal stress across the year. Looking at the graph showing thermal stress as a result of solar radiation and wind resembling standing in the sun being exposed to wind severe thermal stress is evident (Figure 436 on page 195). January, February and March all show more than 10% very strong thermal stress and eight out of twelve months show more 15% strong moderate heat stress. When consulting the heat map (Figure 437 on page 195), it becomes clear that the temperature peaks are evident around and slightly after noon. This is most likely when guest enjoy lunch in the shade. When the data expressing thermal stress without solar radiation (Figure 438 on page 195), the incidents are dramatically reduced. Strong heat stress is exclusively evident in march and is reduced to 0.8%. Moderate heat stress is evident in the range of 5-16% in five months between the hours 12 and 16 (Figure 439 on page 195). Ceiling fans can be installed to increase air movement on critical days or when natural driving forces are inadequate.

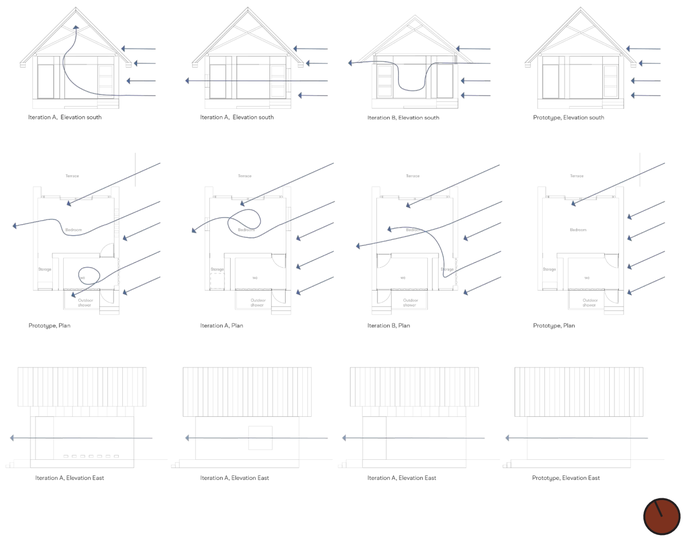


Figure 249: Diagram - studies on ventilation in the prototype.

Clean air (Assessment Criteria)

To ensure that the atmospheric indoor air quality remains healthy certain measures are taken into considerations. First of all, the air dilution of Volatile Organic Compounds (VOCs) is already very limited due to the choice of natural building materials. Although these can be introduced by irresponsible choice of furniture and cleaning agents. Carpets, mattresses, draperies often contain flame retardant as well as stain repellents. Some wood treatments also contain toxic formaldehyde. (American Lung Association 2023). Although these are important criteria only limited resources are available to simulate predict presence of these. This means that the criteria for air quality is concentration of CO2 in the indoor air. According to European regulations the design values of CO2 concentrations are categorized by three categories. Where Category I is stricter.

Design ΔCO2 concentrations for bedrooms (ppm above outside level) (DS/EN 16798-1:2019)

Category I: 380 ppm
Category II: 550 ppm
Category III: 950 ppm

The aim is that the design should comply with at least Category III.

Thermal Mass

As proposed by the study by Barbara Widera suggests thermal mass is a tested and tried building concept for hot arid conditions. Given the fact that temperatures change more than 10°C from day to night the great heat storage properties of mud bricks are invaluable. Mud brick walls have high thermal capacity (1000 J(kg*K)) and thermal conductivity (0.9 W/(mK)). Likewise, the potential of using heavy floors such as terrazzo, concrete, tiles etc. have similar thermal capacity and slightly higher thermal conductivity of 1.4 W/(mK) (Concrete) (Ubakus. de, n.d.).
The potential of harvesting energy from thermal mass is beneficial for passive heating and cooling. In the morning the heavy surfaces are cool and to counter heat discomfort. As the surfaces heat up from short wave solar radiation during the day they emit long wave heat radiation in the evening and night.
Such system does not balance every day, due to numerous parameters such as radiation intensity, temperature difference, heat conductivity etc. This is why additional measures must be taken to control how much heat is stored. This is why shading and night flushing comes into play.

Ventilation

Natural ventilation is a desired parameter utilized as stable power supply is disregarded. Using the driving forces of nature, i.e. wind, thermal buoyancy and solar radiation can power the ventilation system. The ventilation is primarily present for maintaining a healthy atmospheric indoor climate as well as for cooling.
In study of the traditional western sub-Saharan vernacular dwellings the ventilation rates was measured and determined that air exchange rate 0.25 to 0.5 VR/h was acceptable. When air exchange rates reached 1 VR/h and above occupants would be annoyed by it. (Widera 2021)

A study from Algeria suggests that optimal fresh air supply, to maintain healthy indoor air quality are a range between 0.3 and 0.5 l/s/m2 (Cherier 2024). This is also in line with the Danish Building regulations (BR18) suggestion of base air change of 0.5/h and for regular space height this is equivalent of 0.3 l/s/m2 (BR18 2024).

Weather data

In order to make use of wind as a driver of ventilation, knowledge of the wind direction is key.
The wind remains predominantly calm all year.

During the warmest month, February and March, the wind is dominantly from the east, with slightly higher wind speed during the day than night. The inlets of single-sided ventilation and cross-ventilation layouts must be located on the eastern facing façades. For cross-ventilation the outlets are preferably positioned on the western side. For the coldest period the June-August the wind direction is predominant south. As the outside air's dry bulb temperature is maximum mean temperature is 21.7°C and minimum mean temperature is 13.1°C for July, the natural ventilation inlets of the southern façade should most likely be controllable. (Betti et al. 2023)

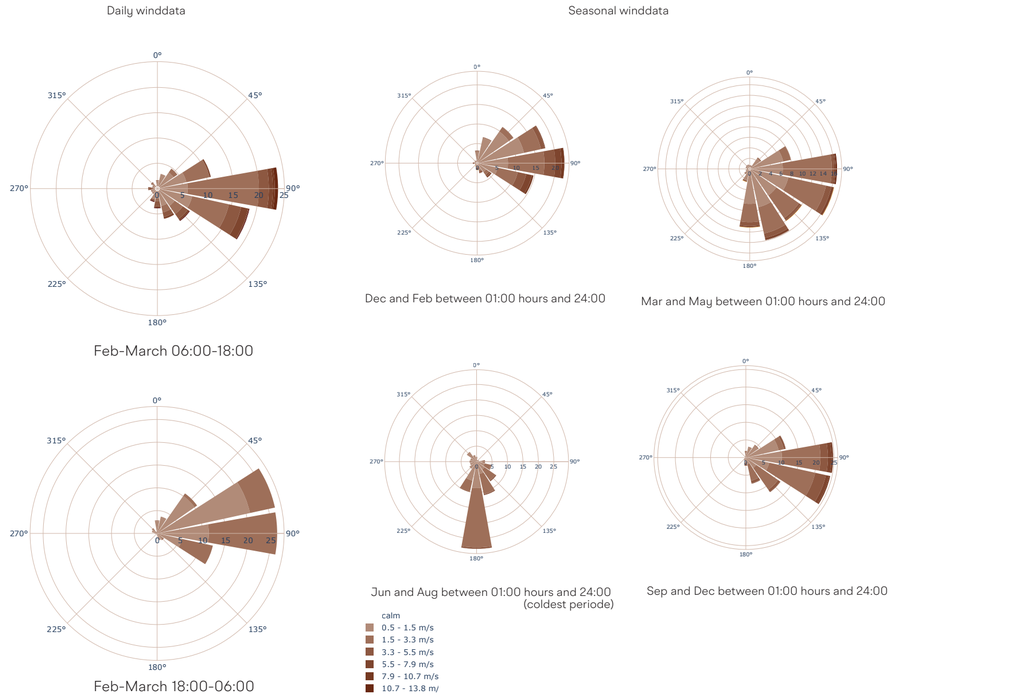


Figure 250: Wind data from Moshi, Tanzania (Betti et al. 2023).

Building Energy Model (BEM)

BEM is performed to merit the low energy consumption of the building during use. Majority of the energy consumed should be related to kitchen and office utilities, and heating and cooling should be achieved through carefully designed passive strategies. In the tropical climate the energy bill is constituted of substantial energy consumptions related to maintaining a pleasant indoor environment, especially cooling demands.
To ensure that occupant satisfaction in the indoor environment is ensured, however comfort range is wide, we are utilizing Adaptive Thermal Comfort Model developed by Gail Brager and Richard Dear (Brager, et al. 2001). Our aim is to provide a building that ensures that the occupant is always in comfort. The comfort zone is defined by the climate log performed by the group members during the field studies on site (Appendix 8 on page 183) and backed up by the Adaptive Thermal Comfort Model in the EN-16798 standard.
To test the climate model, the group made simulations in Climate Studio making a model of a single lodge unit.
The characteristics of the models geometries are found in Appendix 12 on page 196.
The examined studies seek to understand the relationship between natural ventilation concepts and thermal mass. Initially a baseline model was developed, that represents a usual household in the area.

Study #1
How many hours are outside comfort range when the system is relying on operable windows and vents and high thermal mass?

Study #2
How many hours outside are outside the comfort range when only permanently open vents are in place to support permanent air change.

Study #3
How many hours are there outside comfort range when a combination of permanently open vents and operable windows and vents are in place.

Additional study #3.1
Reduction of thermal mass to only heavy terrazzo floors, change walls to light construction with insulation.

Additional study #3.2
Removing of thermal mass entirely by changing interior floors to wood floors.

Additional study #3.3
Removing thermal insulation from ceiling and accept high heat radiation inside. Change reflection index on the exterior surface.

Additional study #3.4
How does changing solar radiation through windows change the result. Limit radiation by shading.

Figure 251: Private picture - The prototype with high thermal mass from the mud brick walls and oversized roof overhangs.



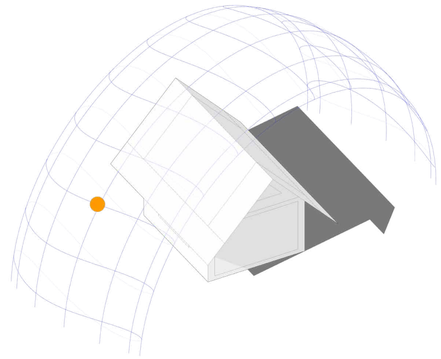


Figure 252: Grasshopper simulation model. Shading simulated on vernal equinox at 9 AM.

Step 1 - Baseline study

In this analysis the project group wanted to prove the initial assumption, that thermal mass would ensure a more stable indoor temperature. This was done by a comparative study using the digital Climate Studio simulation tool in Grasshopper. “The Baseline Model #1.1” is modelled in terms of materials to be resembling common building typology found in Tanzania. “The Baseline Model #1.2” is modelled to contain thermal mass. The baseline excludes window openings, which is a abstraction of reality, however many homes have limited opening area, and therefore limited natural ventilation potential and no solar radiation gain.

Analysis:
As seen on the graph, the “The Baseline Model #1.2” proved to stabilize the Operative Temperature inside the thermal zone of the Lodge Unit. The unmet hours decreased in both categories, too cold and too hot. The indoor climate remains poor as the CO2 concentrations are high.

Conclusion:
Based on this analysis, the group was convinced to continue working on a volume, with high thermal mass by using mud bricks as anticipated.

The Baseline Model #1.1
- Limited thermal mass & no ventilation

Ventilation	: No
Roof	: Steel sheet
Floor	: Wood boards
Walls	: **Hollow Concrete Block**
Gables:	: Solid wood
Opening North	: None
Opening South	: None
Opening West	: None
Opening East	: None

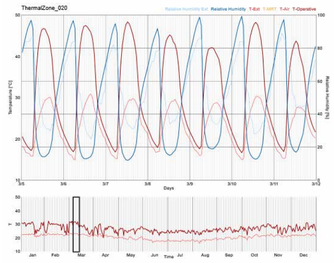


Figure 254: Graph form the warmest week of the year: Indicating that without thermal mass the fluctuation between day and night temperatures are great.

Hours outside temperature range:	hrs.	%
Category II:	7043	**80.3**
Category III:	6289	**71.7**

Hours above CO2 range:	hrs.	%
Category I:	8760	**99.9**
Category II:	5894	**67.3**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	3109	**35.5**
Too hot	3180	**36.3**

The Baseline Model #1.2
- High thermal mass & no ventilation

Ventilation	: No
Roof	: Steel sheet
Floor	: Concrete
Walls	: **Adobe Brick Wall**
Gables:	: Solid wood
Opening North	: None
Opening South	: None
Opening West	: None
Opening East	: None

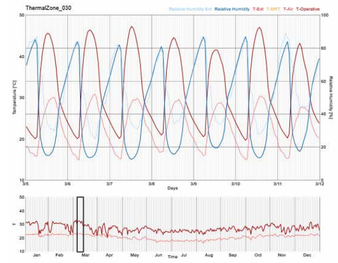


Figure 253: Graph form the warmest week of the year: indicating that addition of mud bricks are stabilizing the fluctuations especially removing cold hours compared to the model with hollow core CMUs.

Hours outside temperature range:	hrs.	%
Category II:	6148	**70.1**
Category III:	5055	**57.7**

Hours above CO2 range:	hrs.	%
Category I:	8760	**99.9**
Category II:	5823	**66.4**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	1969	**22.5**
Too hot	3086	**35.2**

Step 2 - Natural ventilation

This step investigates whether operable windows in the gable wall are necessary or not, in order to achieve less than 100 hrs. where the occupants are not in thermal comfort. The openable area of the window is 80% and the discharge coefficient is 0.65.

Analysis:
The study proves indicates that permanently open vents lead to more than double the number of hours that are too cold. However, it also leads to higher CO2 concentrations a slightly more increased hours above the thermal comfort. There is no evidence that this due to the fact that vents are operable or not, as it may just as well prove that the window area should be larger.

Conclusion:
Operability is necessary to ensure thermal comfort. When it comes to air quality, the human body is not likely to act on excessive CO2 concentrations, and therefore the air quality will drop with the ventilation solely relying on a thermal set point above 23ºC.

Model #2.1
- Partially operable windows

Ventilation	: Yes
Roof	: Steel sheet
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: **Non operable (Always open)**
Wall	: Operable
Opening South	
Gable	: **Non operable (Always open)**
Wall	: Operable
Opening West	: None
Opening East	: None

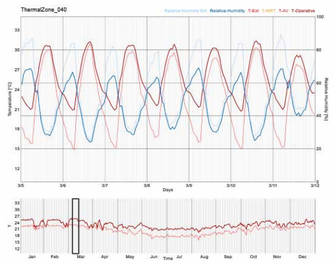
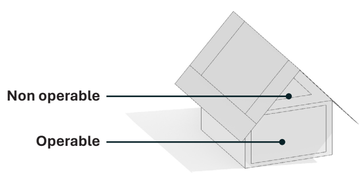


Figure 255: Graph form the warmest week of the year: Indicating that the operative temperature plunges deeper during night than compared to Figure 256

Hours outside temperature range:	hrs.	%
Category II:	3223	**36.8**
Category III:	1750	**20.0**

Hours above CO2 range:	hrs.	%
Category I:	0	**0**
Category II:	0	**0**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	1697	**19.4**
Too hot	53	**0.6**



Model #2.2
- Operable windows

Ventilation	: Yes
Roof	: Steel sheet
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: **Operable**
Wall	: Operable
Opening South	
Gable	: **Operable**
Wall	: Operable
Opening West	: None
Opening East	: None

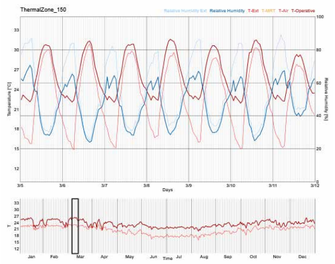
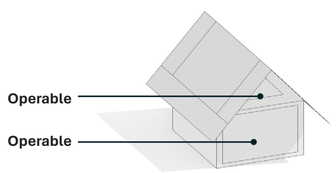


Figure 256: Graph form the warmest week of the year: The graph has high operative temperature peaks but the cold hours are reduced.

Hours outside temperature range:	hrs.	%
Category II:	2432	**27.7**
Category III:	902	**10.3**

Hours above CO2 range:	hrs.	%
Category I:	1795	**20.5**
Category II:	797	**9.1**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	811	**9.6**
Too hot	91	**1.0**



Step 3 & 4 - Natural ventilation & ceiling insulation

By adding thermal insulation beneath the ceiling, the heat radiation to the inside should be dramatically reduced during the day and the radiation from inside and out should be reduced. Thus, reducing the amount of too cold and too hot hours.

Analysis:
Comparing #3 with #2.2 the unmet hours are reduced significantly by adding 50mm of natural thermal insulation to the ceiling.
When increasing the amount of window area in the eastern and western façades the unmet hours increase.

Conclusion:
Increasing window area along the main wind direction in the warm session is not beneficial as it inflicts more unmet hours. The benefits of adding natural insulation to the ceiling is great.

Model #3
- Operable windows and ceiling insulation

Ventilation	: Yes
Roof	: Steel sheet + **insulation**
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Operable
Wall	: Operable
Opening South	
Gable	: Operable
Wall	: Operable
Opening West	: None
Opening East	: None

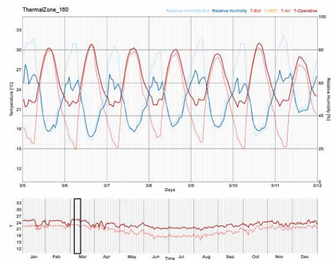
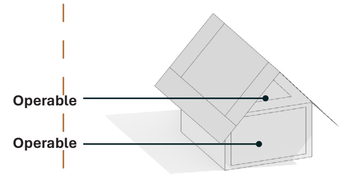


Figure 257: Graph form the warmest week of the year: The fluctuations of the operative temperature is decreased. However many hours remain to cold.

Hours outside temperature range:	hrs.	%
Category II:	2278	**26.0**
Category III:	718	**8.2**

Hours above CO2 range:	hrs.	%
Category I:	1910	**21.8**
Category II:	886	**10.2**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	697	**8.0**
Too hot	21	**0.2**



Model #4
- Operable windows on all facades

Ventilation	: Yes
Roof	: Steel sheet + insulation
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Operable
Wall	: Operable
Opening South	
Gable	: Operable
Wall	: Operable
Opening West	: **Operable**
Opening East	: **Operable**

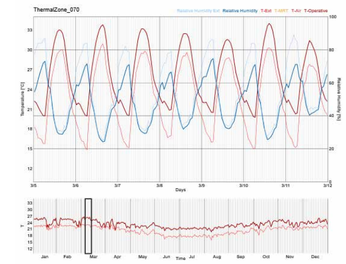
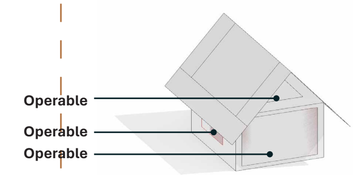


Figure 258: Graph form the warmest week of the year: The graph shows change to the previous proposal.

Hours outside temperature range:	hrs.	%
Category II:	2454	**28.0**
Category III:	895	**10.2**

Hours above CO2 range:	hrs.	%
Category I:	1817	**20.7**
Category II:	831	**9.5**
Category III:	0	**0**

Unmet hours Cat III:	hrs.	%
Too cold	851	**9.7**
Too hot	44	**0.5**



Step 5 - Shading

This study examines what it means to shade the thermal mass and shade the windows.

Analysis:
By allowing radiation on the thermal mass exclusively the number of hours too cold drops 83 hours. This is a relevant insight but a great sacrifice of erosion mitigation of the walls if the overhangs are entirely removed. On the other hand, it shows promising results to allow solar radiation through the glazed area to heat up the interiors. Although it doubles the number of overheating hours.

Conclusion:
Allowing for solar radiation inside appears to have great positive impact on reducing too cold hours. And allowing the thermal to gain radiation is another positive contribution. The air quality has also significantly improved due to more frequent ventilation when it is hot inside.

Model #5.1
- Shading on windows (rad on thermal mass)

Ventilation	: Yes
Roof	: Steel sheet + Insulation
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Operable
Wall	: Operable
Opening South	
Gable	: Operable
Wall	: Operable
Opening West	: None
Opening East	: None

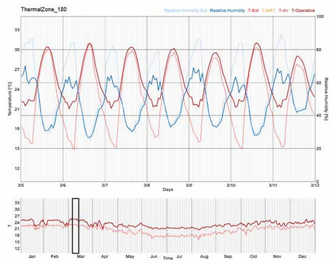
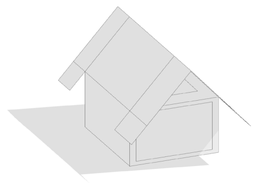


Figure 260: Graph form the warmest week of the year: Showing some improvement to the unmet hours.

Hours outside temperature range:	hrs.	%
Category II:	2167	**24.7**
Category III:	643	**7.3**
Hours above CO2 range:	hrs.	%
Category I:	1926	**22.0**
Category II:	920	**10.5**
Category III:	0	**0**
Unmet hours Cat III:	hrs.	%
Too cold	614	**7.0**
Too hot	29	**0.3**



Model #5.2
- No shading

Ventilation	: Yes
Roof	: Steel sheet + Insulation
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Operable
Wall	: Operable
Opening South	
Gable	: Operable
Wall	: Operable
Opening West	: None
Opening East	: None

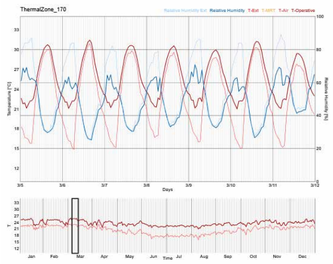
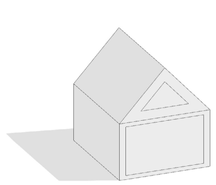


Figure 259: Graph form the warmest week of the year: Showing great reduction in fluctuations plunging below comfortable temperature especially in the cold season.

Hours outside temperature range:	hrs.	%
Category II:	1717	**19.6**
Category III:	327	**3.7**
Hours above CO2 range:	hrs.	%
Category I:	1433	**16.3**
Category II:	496	**5.7**
Category III:	0	**0**
Unmet hours Cat III:	hrs.	%
Too cold	265	**3.0**
Too hot	62	**0.7**



Step 5 - Shading

This study is a continuation of the previous study examining what it means to shade the thermal mass and shade the windows.
Study #5.4 suggest that if the radiation is permitted to enter in the morning and the evening where the heat is more desired and not at noon where it is too hot.

Analysis:
Comparing #5.3 with #5.2 it remains clear the radiation on the thermal mass is important. By adding 75 cm of overhangs the hours too cold increased by 20%.
Moving the window area to the eastern and western walls remain a negative strategy as the space gets too cold. It does make it slightly less to hot compared to #5.3. But falls short of #5.2.

Conclusion:
Paradoxically the best design strategy for reducing the hours that are too cold are allowing sun through the southern and northern façades. It also happens to be the same design strategy that makes the space too hot.
Allowing thermal mass to receive direct radiation from the outside remains a good proposal to reduce cold hours without increasing hot hours.

Model #5.3
- Shading only on windows

Ventilation	: Yes
Roof	: Steel sheet
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Operable
Wall	: Operable
Opening South	
Gable	: Operable
Wall	: Operable
Opening West	: None
Opening East	: None

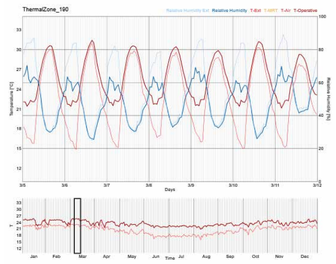
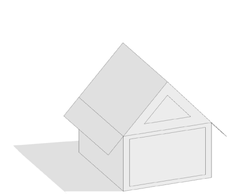


Figure 262: Graph form the warmest week of the year: The operative temperature decays slower in the evening than previous results.

Hours outside temperature range:	hrs.	%
Category II:	1902	**21.7**
Category III:	445	**5.1**
Hours above CO2 range:	hrs.	%
Category I:	1589	**18.1**
Category II:	587	**6.7**
Category III:	0	**0**
Unmet hours Cat III:	hrs.	%
Too cold	319	**3.6**
Too hot	54	**0.6**



Model #5.4
- West and east facing windows

Ventilation	: Yes
Roof	: Steel sheet + Insulation
Floor	: Concrete
Walls	: Adobe Brick Wall
Gables:	: Solid wood
Opening North	
Gable	: Non operable
Wall	: None
Opening South	
Gable	: Non operable
Wall	: None
Opening West	: Operable
Opening East	: Operable

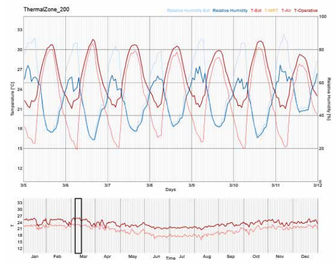
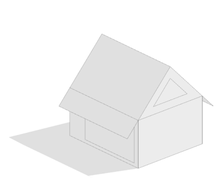


Figure 261: Graph form the warmest week of the year. The cold hours are increased.

Hours outside temperature range:	hrs.	%
Category II:	1941	**22.1**
Category III:	498	**5.7**
Hours above CO2 range:	hrs.	%
Category I:	1609	**18.4**
Category II:	673	**7.7**
Category III:	0	**0**
Unmet hours Cat III:	hrs.	%
Too cold	458	**5.2**
Too hot	40	**0.5**



Final steps

The performed studies proved that natural ventilation by operable openings can reduce the amounts of unmet hours that are **too warm to less than 1%**. By ensuring direct solar radiation on the thermal mass and through the glazed areas the number of hours that are **too cold represent less than 4%.** These hours are exclusively during the nights in the cold season (99% above 15°C).
Atmospheric indoor climate complies with Category III with zero unmet hours.
By adding adaptive shading i.e. curtains during the extreme warm hours and especially during the nights, were there are most likely used due to privacy concerns, are going to reduce the to cold hours further by reducing radiation escaping through the windows.
The best performing iteration is #5.2 (Figure 259) in all parameters except hot hours. The model has no overhangs. This is going to erode the mud bricks to quickly. Combination of an overhang of 50 cm and durable hydrated lime plaster should keep the wall safe during rain showers as well as exposing the thermal mass to direct sunlight.

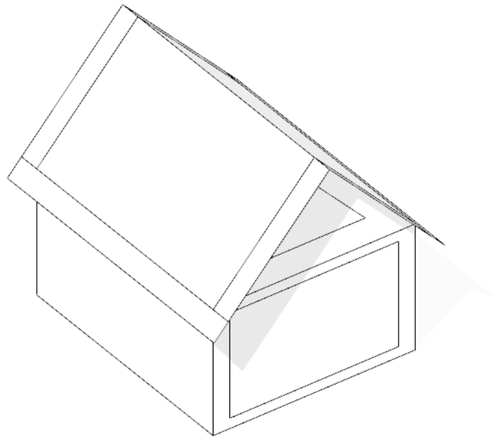


Figure 264: Model with 50cm overhang exposing windows and walls all though limiting radiation at noon. The final geometry shows less than 1% too hot hours and less than 4% too cold hours.

The properties of thermal insulation of the ceiling showed good results (Figure 257). Discussion on whether it is wise to insulate the walls too is deemed unnecessary as the mud bricks alone are store and release adequate heat to maintain acceptable indoor thermal comfort. Adding insulation would make the structure more complicated and ultimately more expensive. Additional parameters that deserve thorough examining are reflectance of the thermal mass' finish. With darker colours the walls are harvesting more energy during the day and releasing at night. Wall thickness studies should be performed to see the effects. Adding more insulation to the ceiling would most likely have a positive effect of the cold hours. Adjusting infiltration is another parameter worth exploring.

Energy consumption for hot domestic water

The required amount of energy for water heating per unit is **5.8kWh/day**. Assuming that one unit uses 100 litres per day. The heat rise is determined to 40°C degrees from 10°C to 50°C. This returns 4.68kWh/day (100liters*4.18kJ/kg°C*40°C=16,720kJ/day=4.64kWh/day). If the system heat loss 20% the resulting required energy is 5.8 kWh/day.
To avert using allot of electricity from a grid with a low renewable mix, the project should use solar thermal collectors. Using a standard conventional flat solar panel with and efficiency of 50% this assuming the solar irradiance is 5.3kWh/m2/day (Solargis, n.d.), the required solar collector area per unit is **2.2m2** ((0.5*5.3kWh/m2/day)/5.0 kWh/day). Figure 288 on page 151 displays the positioning of the solar panel in relation to a accumulation tank for each unit. Providing quick hot water for the outlets in each lodge.

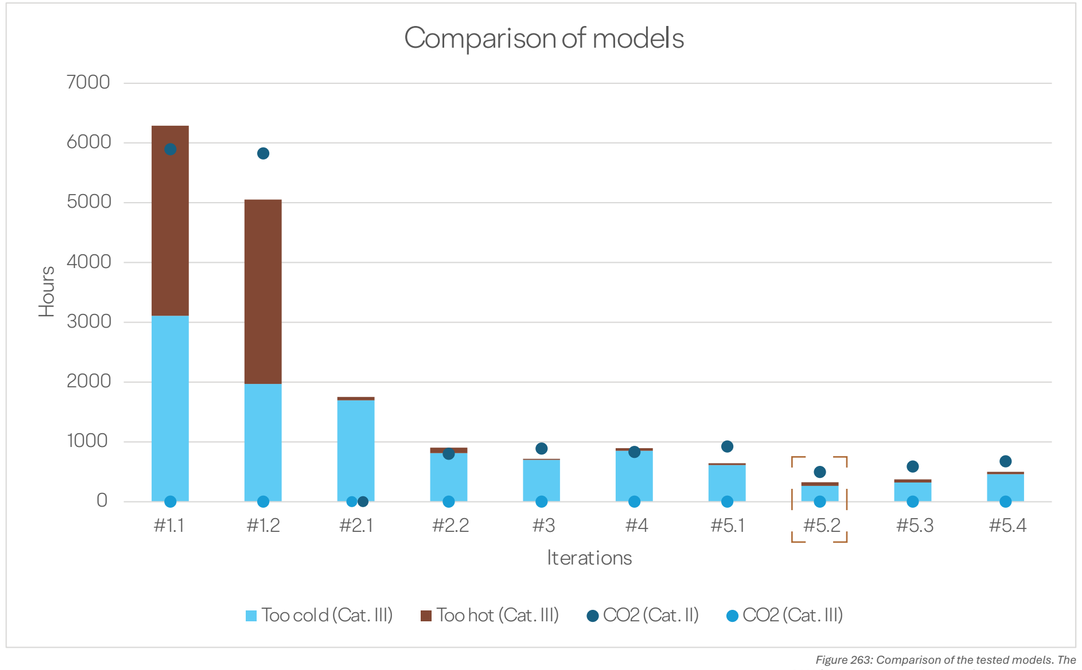
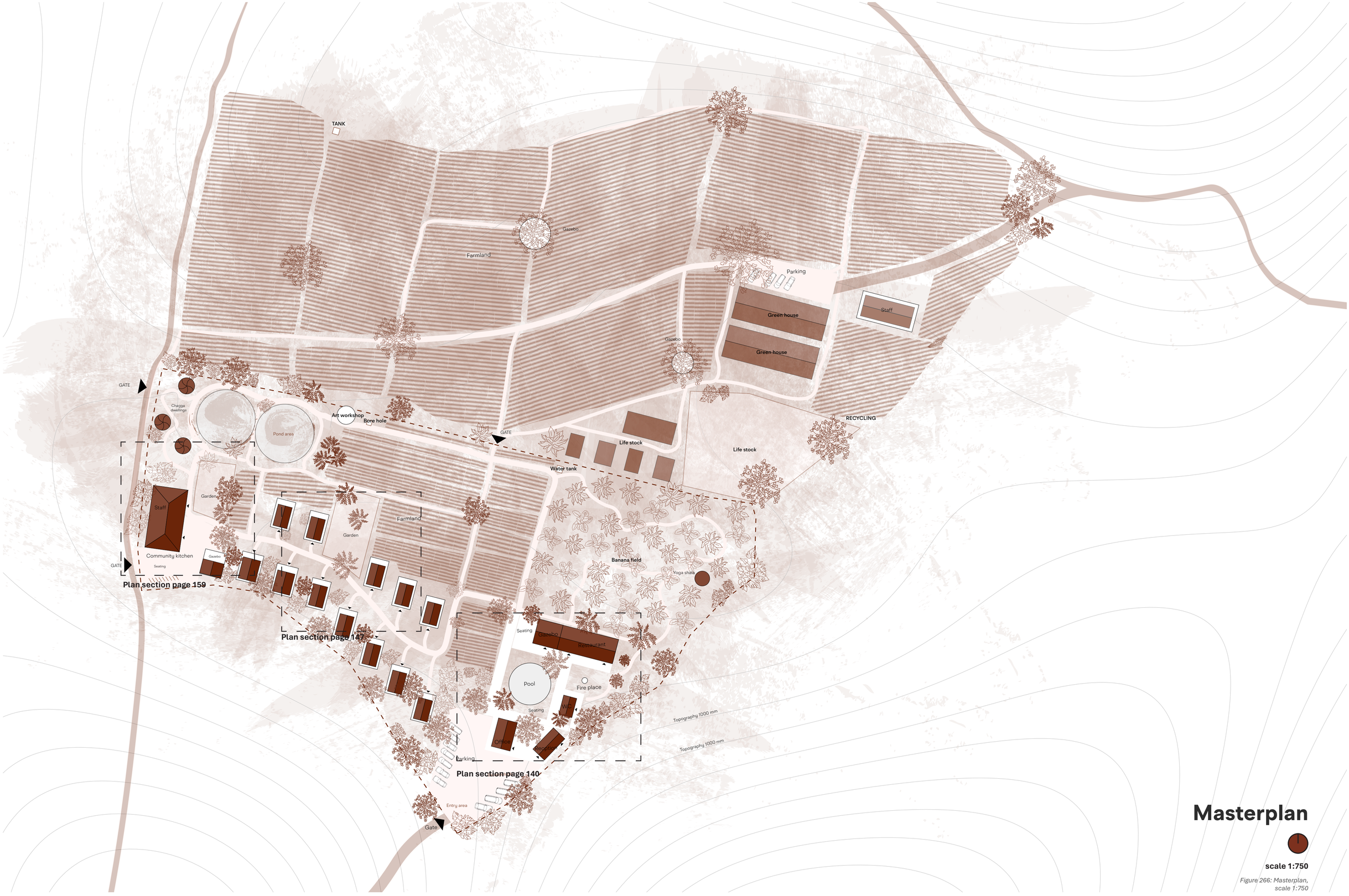


Figure 263: Comparison of the tested models. The baseline model on the left and the improved models to the right. Biggest improvements are deploying natural ventilation followed by thermal mass.



Figure 265: Private picture - Mr. Olomi is assembling cast frame for concrete lintel. Meanwhile fundi Aron is mixing concrete.

06 Presentation



Masterplan

scale 1:750

Figure 266: Masterplan, scale 1:750

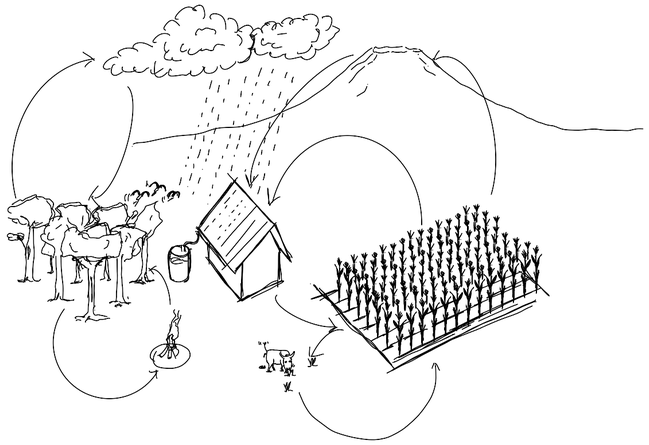


Figure 267: Concept drawing

“If we can join together, unite together, that could make a huge impact, and everyone can grow” Praise Nyange (Appendix 3)

Situated at the base of Mount Kilimanjaro, Nyange Farm Lodge offers a unique experience that seamlessly integrates sustainable design with cultural authenticity.
Crafted using locally sourced materials and inspired by traditional building techniques, the farm lodge embodies sustainability and cultural celebration.

The scattered reception area that includes lodge reception, tour operator office, conference hall, dinning, pool, open kitchen, a rooftop terrace, greets the guest with an low-key open space, that diminishes distinction between inside and outside. Where one can calmly roam around to participate in food preparation, farming, arrange a cultural excursion or simple ground oneself by the pool to prepare for a Kilimanjaro expedition.

Twelve small lodges are placed across the land, designed thoughtfully to ensure thermal comfort and energy efficiency, reflecting a harmonious balance between innovation and heritage. Gardens and farm fields occupies the areas between the lodges, allowing for a deeper understanding of the locally produced vegetables and herbs.

When strolling through the entire farm the guests can appreciate the cycle of food production, waste handling, life stock and manure production, as well as water collection etc. Equally important, they will learn that they are an important part of a social network encompassing local staff, farmers, craftsmen, local residents, porters and guides. Together they create a healthy sustainable interdependency and resilience from inherent distributed economy, cultural value and balanced ecological consumption.
In the quote Mr. Nyange, owner of the farm, is referring to the potential of establishing a agritourism concept based on collective minds. Some are experts on farming and growing the crops, some experts on preparing local food from seasonal vegetables. While some people can make beautiful tribal draperies and art, some can build using local culturally and contextually appropriate materials.
At the end of the day, if the mamas that work in the farm feel encouraged to adopt permacultural farming in their home or a craftsman wants to build the house for his family in the same manner, he feels proud to be the facilitator of this.



Figure 268: Render - east view to the office. The mud buildings are creating a small garden oasis between the volumes.

“We always forget were we are coming from. People have come here to ask abut the building [the prototype] not believing that it’s only soil and clay. I tell them an they realize that this material is timeless - not just for poor people”

Praise Nyange (Appendix 3 on page 176)



Section South, A

scale 1:200

Figure 269: Elevation South - reception area upon arrival , scale 1:200

Arriving at Nyange Farm Lodge

The reception area reflects the first meeting with Nyange Farm Lodge. Two smaller mud buildings are lifted above ground on a shared plinth, varying in terrain levels across two steps. Even though the buildings each have their own pitched roof, the volumes with their open façades seamlessly blend together, in the shade of the same pergola.

The buildings are withdrawn from the main gate, allowing a smooth transition from the rural environment outside the gate to a real oasis when stepping onto the plateau of the reception area.
This space acts as a flexible space used as parking area for the safari vehicles and as a large equipment packing space when preparing for a mountain hike, - usually involving 50 - 100 porters and mountain guides.

Upon arrival the guest will be welcomed by employees in the open reception building, - twisted to be orientating towards the main gate. As is the case of most village homes in East Africa, one may be meet by a grassing cow or a small pack of goats making sure the grass is cut ‘neatly’. Not to worry though, a young Maasai herdsman is always near by, showing you the way around.

Once checked in, the office of the tour operator Nyange Adventure is within reach if needed, and ready to assist tourists planning cultural tours or safari excursions.

Each building consists of load-bearing mud walls plastered with locally sourced soil, emphasizing how this place is grounded, - physically and metaphorically.

Eucalyptus twigs allow for natural ventilation, and the organic material reflects the light weight roof construction that unfolds inside each volume. Aesthetically, the twigs creates a continuous ribbon running atop the heavy mass wall connecting each facade. It also act as a mediator from one building to another, varying in height to allow to the pergola to fit despite ground levels.

The choice of materials expresses the ingenuity of this project, in a contemporary manner celebrating ancient building techniques and aesthetics



Figure 270: Render - view towards the reception area

Reception area

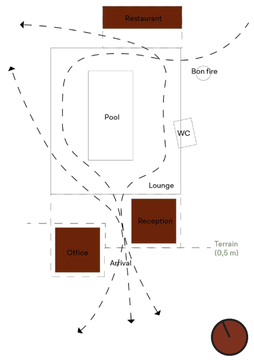


Figure 272: Conceptual drawing - flow in the reception area

Movement through the reception area

Passing the shallow entrance by the reception, an open space will allow the eyes to wander. Looking towards north, the Mount Kilimanjaro will most likely take the breath away towering 5895m above sea level.

Following the passage around the pool, a compelling shadow play displays across the path, providing shade from the hot equatorial sun. Leading directly to the restaurant and bar, a taste of Tanzanian cuisine is within reach, and can be enjoyed overlooking the farming fields, while the subtle wind from the east provides thermal comfort. For a even better view, head atop of the gazebo and let the eyes rest upon a endless natural environment until they reach the Uhuru Peak of Kilimanjaro.

Just below different pathways will intrigue the curious soul, one leading to the lodges, one to the farmland and another through the dense - and to some - spiritual banana field.
The paths will frequently converge with other paths leading to informal meeting with locals either harvesting tomatoes, herding the goats, crafting or simply consuming an organic meal in the shade.

Every night, a large bonfire will be lit and the iconic safari chairs circling around the fireplace will be occupied by guests as well as local fundies living on the farm. Storytelling of tribal battles will enlighten any soul and provide a genuine cultural exchange.

Entry

scale 1:200

Figure 271: Plan - reception area, scale 1:200



Reception area

The reception

The reception area is the first meeting with the farm. The building is oriented directly towards the gate, to provide a welcoming gesture for new guests. The twisted plan is underlining the importance of the building, while also accommodating the orientation of the plot.

The reception desk acts as a formal introduction to the site, and employees will provide general information and a guided tour around the site. The small storage allows staff to store guests luggage while waiting for their lodge, or as a small wardrobe for personal items.
The larger storage room is for mountain gear, including sleeping bags, tents, cooking equipment, mountain wear for porters and more. The location is near the parking area and when preparing for an expedition, all equipment will be sorted on the ground and packed into a small minivan. Take a seat and enjoy a cup of kahawa, because this is an exciting procedure to observe as a mountaineer to-be! Many porters and guides are involved, and frequent checks are made because forgetting gear can have fatale consequences...

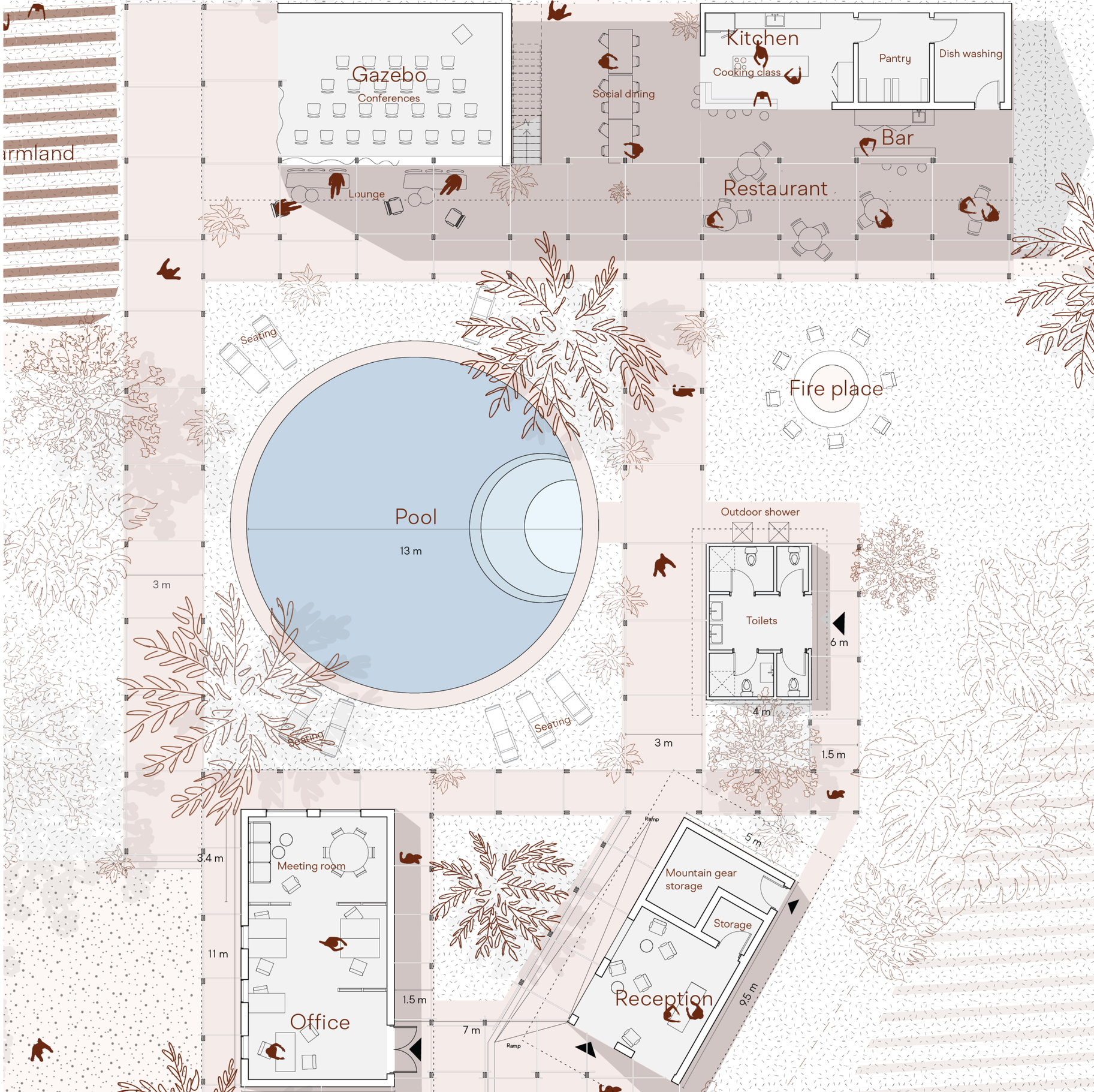
The office

From the reception, a few stairs up will bring you to the office of tour agency Nyange Adventure. Through the large double door, guests can be informed on different activities in the area.
Four to six employees work at the office on a daily basis and the open interior design allows for easy skill sharing and social quality for the administration. In case of absence amongst the staff in the reception, the office employees can easily keep a watch on the desk, ready to step in if needed.
Windows towards the west provides the office with a lush view, and avoids to building to overheat during the low rising sun in the mornings.

The gazebo

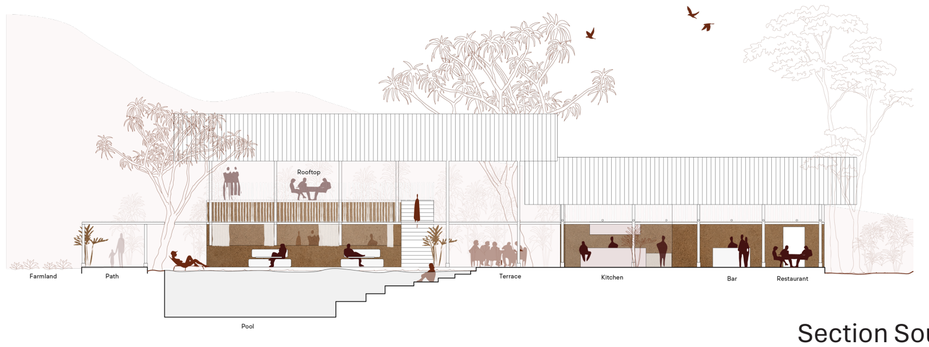
The gazebo is a multi purpose space. Agricultural conferences can be held here, or the space can be transformed into a romantic wedding venue when needed. Beautiful curtains in traditional patters crafted in the nearby village divides the interior and exterior, but if preferred, the west facade can be opened up creating an even more spacious room letting interior and exterior space blend together.
In risk of malaria epidemics, the guest of the restaurant can remain enclosed by an transparent mosquito mesh, allowing guest to dine at peace.

The first floor is a view platform. Ascending the stairs, and a beautiful view of the entire farm can be enjoyed. Enjoy a freshly made juice from the locally grown fruits in a hammock, while watching the African sun set around 18 o'clock. In the early morning hours the space may be used for yoga classes or meditation.



scale 1:100

Figure 273: Plan - reception area, scale 1:100



Section South, B

scale 1:200

Figure 274: Elevation South - restaurant area, scale 1:200

The restaurant

The shaded pathway underneath the pergola will lead to the open kitchen in the restaurant. Take part in a cooking class or sit for hours by the bar and learn the Swahili names of the many of locally grown vegetables by the chef, as she waits for the next order. This is also where the guest might be invited to follow the chef to fetch fresh pilli pilli - chill peppers - from the farmland, but beware! They create a strong natural thirst, if you are fooled to eat a whole one...

In the restaurant, you are encouraged to join fellow mountaineers from all over the world by grabbing a seat at the common table. But if you want to enjoy your own good company, find a more secluded area underneath the pergola or enjoy your breakfast with a view towards Kilimanjaro on the rooftop terrace.



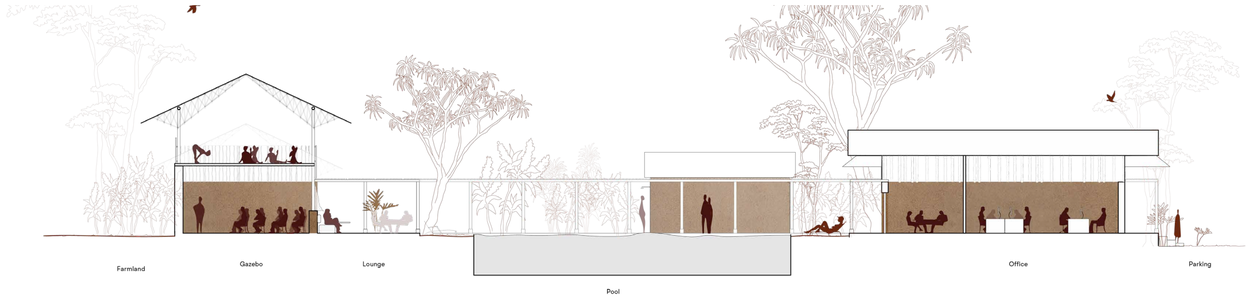
Figure 275: Private picture - food is brought directly from the farmland into the kitchen, where guest can try delicious local cuisine by joining a cooking class.



Figure 276: Render - pool area with view towards the restaurant



Figure 277: Private picture - food is brought directly from the farmland into the kitchen, where guest can try delicious local cuisine.



Section West

scale 1:200

Figure 278: Elevation west- the gazebo and office area, scale 1:200

From crop to table

Maybe you are used to seeing most of your vegetables wrapped in plastic foil as they lye on shelf in the supermarket waiting for you to pick up a bundle of perfectly colour matched and equally size tomatoes imported from over seas. In this restaurant look no further than over the edge of your plate and you will see from where your meal came.
The soils and temperatures in on the slopes of Kilimanjaro accommodate bountiful production of a wide array of fruits and vegetables. They have high nutritious value and no added chemicals. Follow the changes of the seasons as the selections of vegetables change accordingly.
It is in the DNA of permaculture to diversify crop production to mitigate soil deceases and return nutrients to the ground. All crop residue is composted and return to the top soil to bind more CO_2, water and nutrients.

Figure 279: QR-code: Video with Praise Nyange talking about the crop in the field.

The lodges

Kibo View

The carefully placed lodges accommodate a view directly towards Mount Kilimanjaro, the ‘Kibo’ in Swahili. In the early hours, the mountain will be lit by the rising African sun painting Mawenzi Peak and the glacier-covered summit in light pastel colours. Besides the mountain view, tourists will be surrounded by a lush landscape and productive organic farmland. Here, a fresh fruit juice can be enjoyed on the terrace alongside freshly baked bread and butter made from the cows milk. The daily farming tasks can passively be observed; mamas harvesting tomatoes, or young farmers preparing the soil for another crop. You can also take part in the production and get your hands dirty, from climbing into the papaya tree or plant your own indigenous species - it may bear fruit when you return next time.

Garden

Following the twisting path, places for contemplation and relaxation invites pedestrians to take a rest under indigenous, exotic fruit trees, such as the papaya tree, jack fruits and passion fruits.
But beware, the garden will be protected by its rightful owners, the geese. They will welcome guest by running vicious towards them, and if they smell your fear, you soon have to run the opposite direction to avoid sore shins...

In the garden one may also find a few children playing football or practicing acrobatics while waiting for their mama to finish the daily tasks in the fields. Even though you do not speak swahili, do not be afraid to join them in the game, - soon you will realise that body language and humour can be understood across the globe.

During the harvesting season, the garden may also be used for drying maize on tarps under the baking sun - best make sure the geese are in their cage.

“I want to build a home like this for my family.”

Mr. Baraka, fundi on the farm about the prototype building



Figure 280: Diagram - All lodges has view to Mount Kilimanjaro with an angle of 16 degrees



Elevation south

scale 1:200

Figure 281: Elevation North - The lodges, scale 1:200

Elevation south
Figure 281



Situation plan, lodges

scale 1:100

Figure 282: Lodges, scale 1:100

The lodges

Unit A, B and C

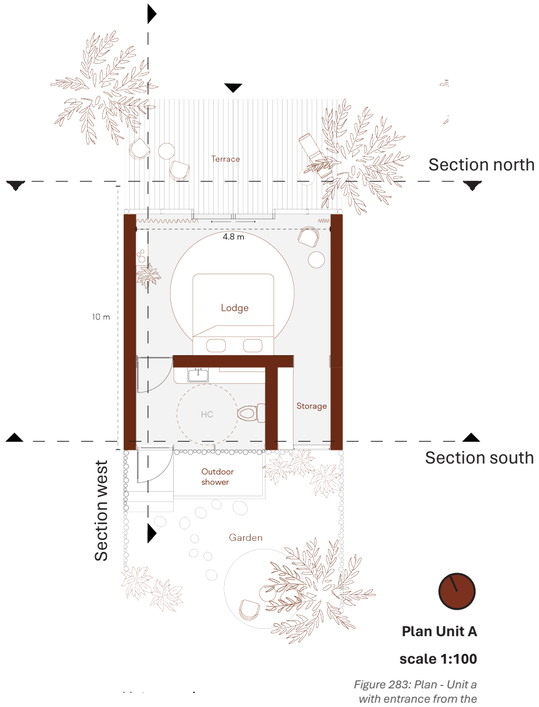
This is where you will be sleeping. As you approach the lodge you will immediately recognize that these building are - just like the reception - out of the ordinary. The walls are made from the same mud bricks and small eucalyptus twigs remains visible in the upper part of the façades and almost covers the entire gables. The steel sheet roofs share the same earthy tones.
Although the lodges are situated quite closely they all have a private path leading trough characteristic garden spaces that create identity to each unit. Depending on whether your reservation lye, your are either entering the lodge though a south or north facing door. In Unit A you will be accessing the lodge through large sliding glass doors facing Kilimanjaro. This lodge has a large outside shower in a private garden where threes and aromatic herbs grow. In Unit B you will be entering from the south with a small entry hall leading into the main space.
Both lodge typologies have minimalistic main space in conjunction with a private terrace. This space is occupied by a large double bed or two single beds and simple furniture that are produced in the workshop on site by the local carpenter in traditional and local Ebony or Mninga hardwood.
The lodges can be modulated to accommodate a family in a single unit, Unit C, as presented on Appendix 9 on page 184. Due to the generous ceiling height a mezzanine can easily be deployed.
The lodges promote a natural and intuitive interaction with the indoor environment. The eucalyptus ribbon will allow for natural breeze, while the thermal mass within the mud walls will slowly emit either a coolness or stored heat into the room, creating a comfortable indoor climate. No electrical power is required to run the lodges.



Section north

scale 1:100

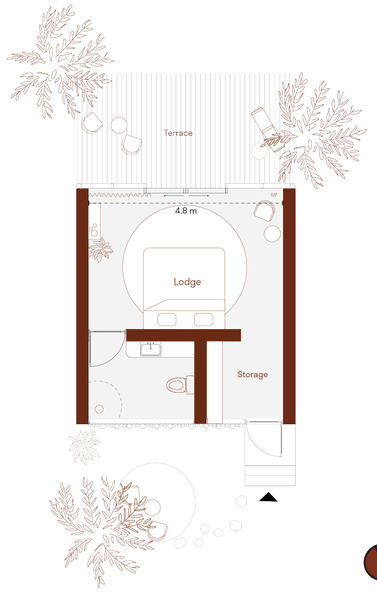
Figure 285: Elevation north - Unit A, scale 1:100



Plan Unit A

scale 1:100

Figure 283: Plan - Unit a with entrance from the north, scale 1:100



Plan Unit B

scale 1:100

Figure 284: Plan - Unit B with entrance from the south, scale 1:100



Figure 286: Render - interior lodge





Section south

scale 1:100

Figure 287: Section south - Unit A, scale 1:100



Section west

scale 1:100

Figure 288: Section west - Unit A, scale 1:100

Figure 289: Private photo - eucalyptus twigs on the gable walls allows for natural ventilation. Picture of the prototype.





Elevation north

scale 1:100

Figure 290: Elevation north - Unit A, scale 1:100



Elevation west

scale 1:100

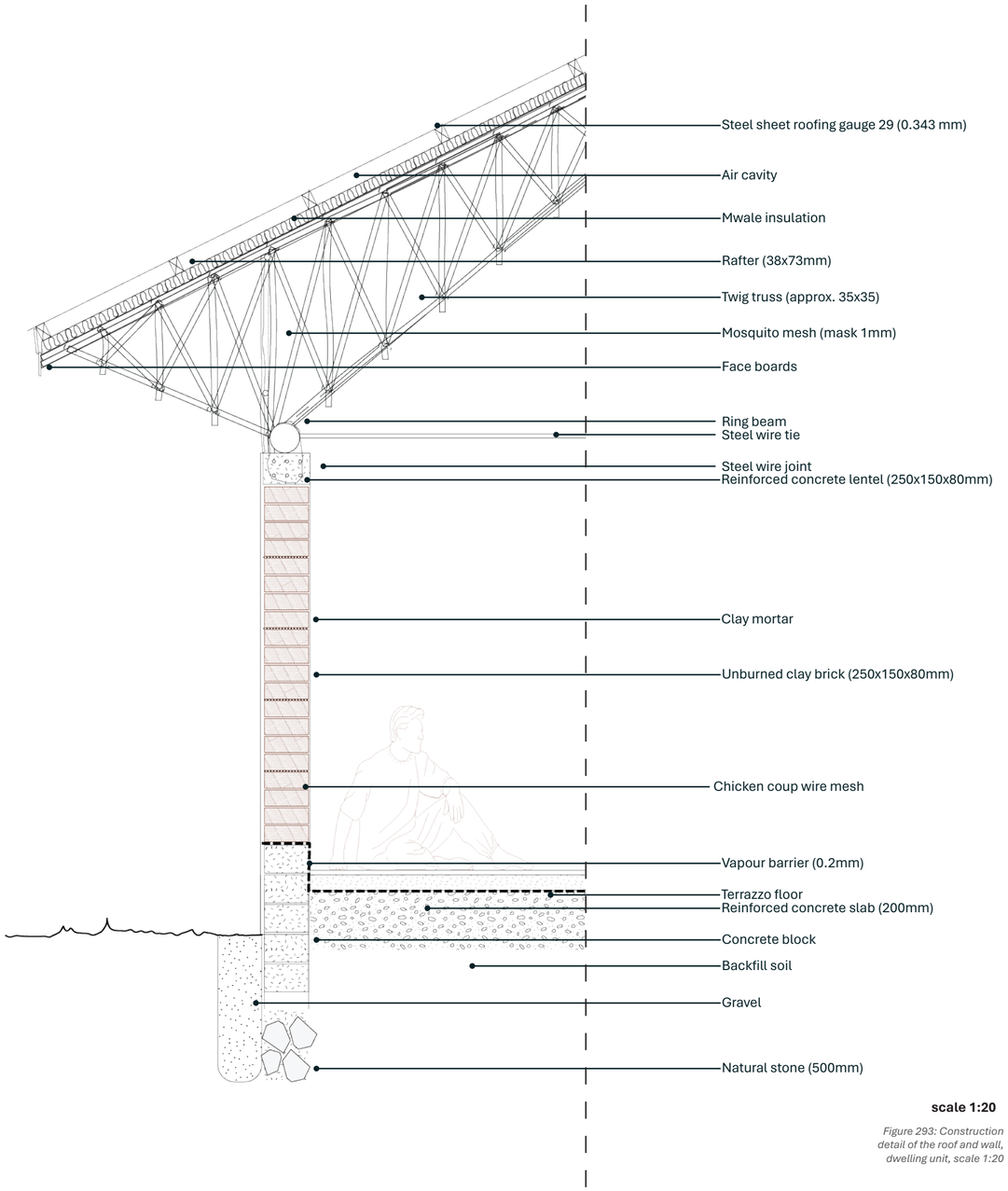
Figure 291: Elevation west - Unit A, scale 1:100

Figure 292: Private photo - each lodge will be having a view towards Mount Kilimanjaro. Picture of the prototype.

Construction

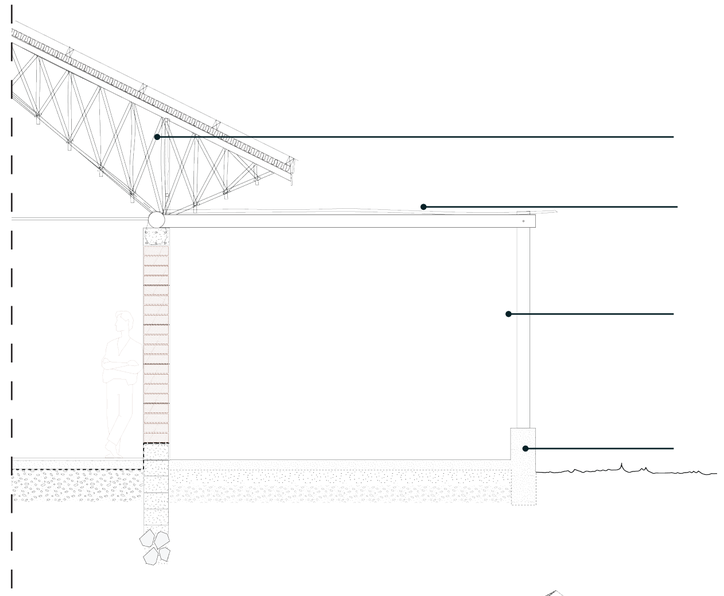
Wall and roof construction

The constructions are honouring local building tradition found in the tribal architecture. The mud bricks have sufficient mechanical properties to support a lodge this size, and a significantly lower financial investment and CO2 emission. The building process is intuitive and inclusive, and can easily be crafted by the local community. Same applies to the roof trusses that are made from discrete elements created by locally sourced eucalyptus twigs. This is low quality biomass and has little intervention with ecological habitats but are adequately strong to successfully make a span across six meters. Inspired by the ancient weaving techniques, each truss is composed by short but many twigs, weaved together in a strong and long spanning truss. Each twig is tied to the next by only using rope, just like the Maasai roof structure on Figure 295. Meanwhile they produce an intricate and structural systems that occupies the interior spaces making the eyes wander though intricate details and diversity.



scale 1:20

Figure 293: Construction detail of the roof and wall, dwelling unit, scale 1:20



scale 1:50

Figure 298: Construction detail of the roof and wall, reception building, scale 1:50

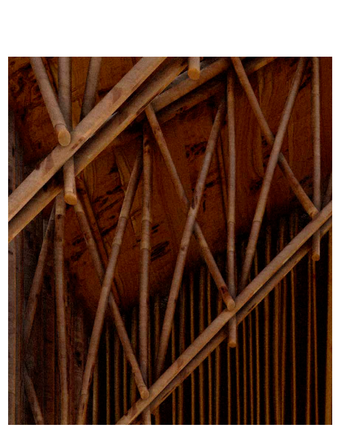
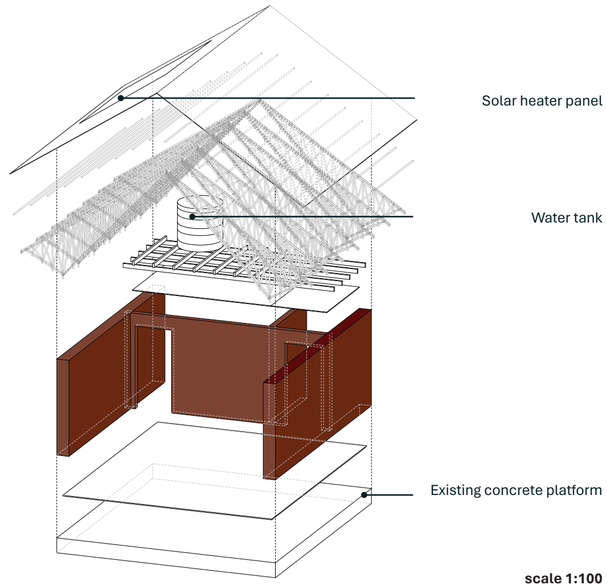


Figure 296: Render - detail of the truss made of small diameter tree.



scale 1:100

Figure 294: Exploded view axonometric of the lodge, scale 1:50



Figure 297: Private picture - the load bearing wall are constructed of mud bricks tested during the prototype.



Figure 295: Private picture - weaved roof construction joint by cloth from the traditional Maasai shoka - a tribal scarf identifying the person as part of the Maasai tribe.



Figure 299: Private picture - the bananas and lettuce grow along side the path. Agritourism allows guest to gain insight on crop production and local farming.

Path

Enjoy a stroll along the perimeter of the farm and your senses will be entertained by the diversity of tasks being performed any given day at the farm. As you pass from the lodges and head west you may find yourself in the middle of a social gathering among local residents sharing stories in the gazebo. Continue north and you will pass the wood workshop - maybe a craftsman can teach you how to carve the ebony furnitures or how they use bark ties in the Chagga dwelling reconstruction just next to the workshop. As you proceed you will be able to see the fish ponds. From here you are the highest elevation on the farm overlooking the fields towards Kilimanjaro in the north. As you move east in the direction of the reception area, you can greet mamas on both sides preparing crops or harvesting. In this fertile soils it is never far from a harvest and this is a busy and celebrated time of the season. You may find that you have to step of the path to make way for people conveying crates or wagons full of tomatoes that are bound for the local market. The paths are busy this time around so maybe you wish to seek peace in the banana field on the eastern perimeter. This is a place where you can feel calm under the large banana palm leaves that create cool shade. As the leaves get old they tear in the wind a creates an calm whistling sound that muffle all the chatter and commotion from the farm.



Figure 300: Render - the path through the lodges.

Community



Figure 302: Private picture - preparing a ceremony with the tribal community.

Community engagement

The staff quarters are home to many of the fundies - craftsmen and farmers - at Nyange Farm Lodge. In this area, the everyday life of locals unfolds, and tourist can observe or take part in the workshop crafting furniture or in the kitchen cooking the national dish, Ugali, served daily for the employees.

A fresh drinking water tap has been placed near the gate to serve children and parents passing the site on their way to and from school. This small but impactful addition addresses a vital need for clean water while creating a natural gathering point. The water tap does thereby not only provide a practical service, but also serves as an invitation for locals to engage with the site, promoting cultural exchange and fostering a sense of community.

Nearby, a dining area under the gazebo, adjacent to the staff kitchen, is designed to support local initiatives such as weekly community dinners. These events encourage farmers, staff, and other community members to come together, share meals, and exchange valuable knowledge about crops, agricultural techniques, and seasonal changes. By facilitating social events and knowledge-sharing, the project aims to enhance farming practices, improve yields, and contribute to the financial well-being of local families.

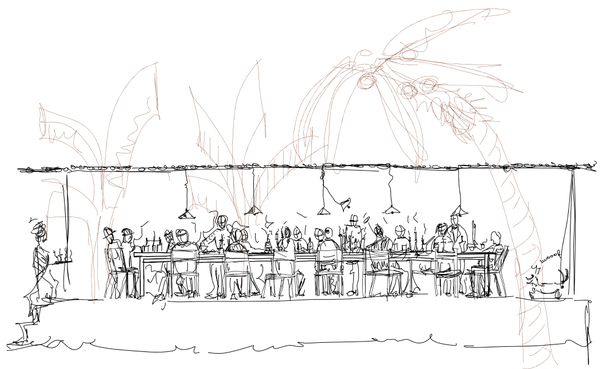
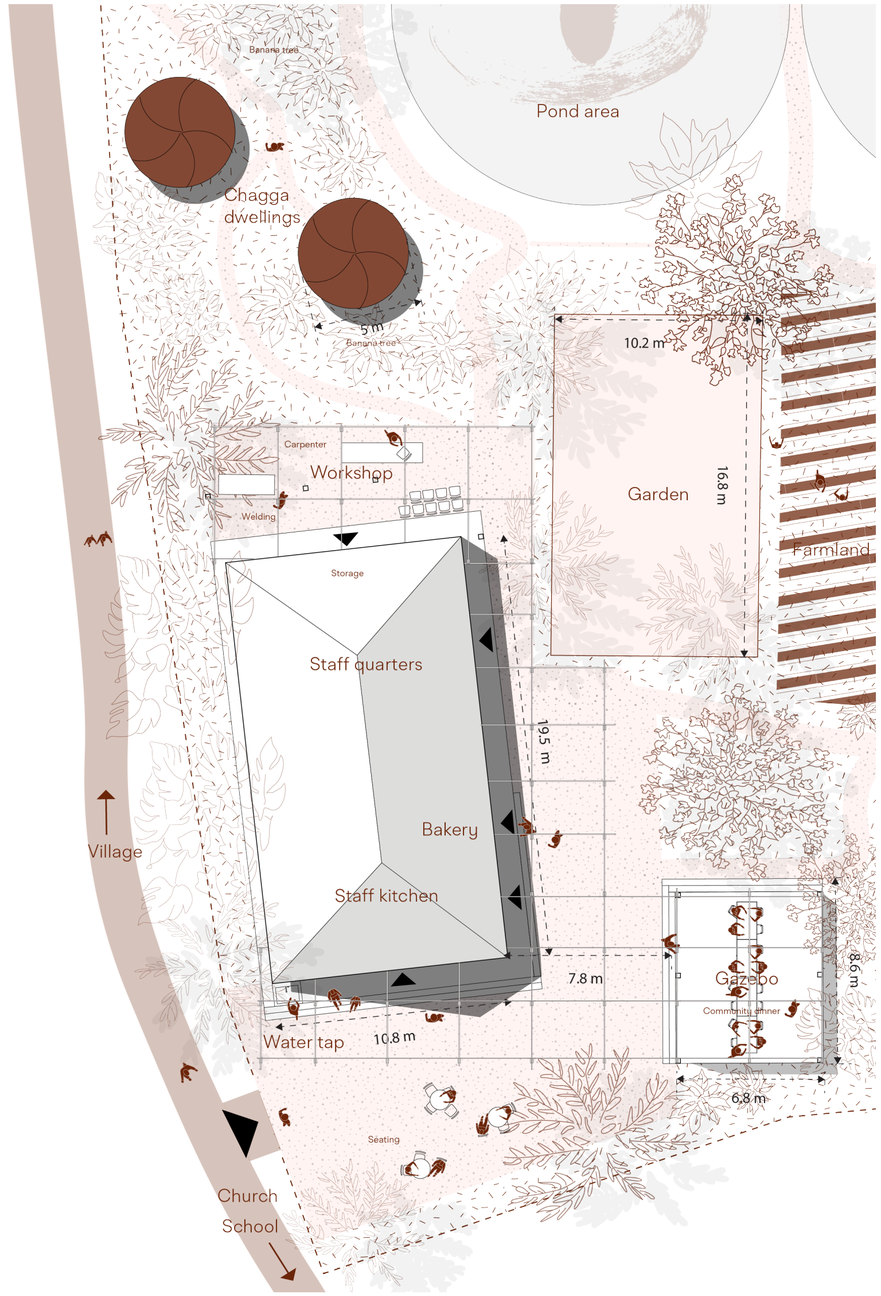


Figure 301: Diagram - Concept drawing illustrating community dinner, creating a sense of cohesiveness in the area.

Chagga huts

Three historic Chagga huts serves as an cultural experience, where knowledge on the tribal way-of-life can be explored. The Chagga huts are at the point of extinction, and therefore this site will also act as a preservation of this special building tradition.



Situation plan, staff quarters

scale 1:100

Figure 303: Plan - Staff quarters, scale 1:100

The epilogue includes a conclusion on the design proposal, and reflections concerning the design process, including the process of building the prototype and the process of creating the design proposal, as well as reflections on the final design proposal. In the Epilogue the bibliography is also included.

07 Epilogue

Conclusion

The proposal for Nyange Farm Lodge represents an interdisciplinary approach, blending traditional architectural principles with highly technical aspects to create a sustainable and culturally rooted design. This approach not only respects the cultural heritage but also embraces modern technology to ensure optimal indoor climate comfort and structural stability for all building volumes.

Local, readily available materials have been central to the design. Inspired by vernacular architecture of the tribal settlements in East Africa, the project translates a nomadic wattle-and-daub mud-technique into a long-lasting structure using unburned mudbricks, reminiscent of the tribal dwellings. The transition from light weight structures into more permanent thermal mass walls, allows the construction to regulate indoor temperatures naturally, ensuring a comfortable environment throughout the year, regardless of seasonal changes. The approach minimizes the need for energy-intensive heating or cooling systems, promoting energy efficiency and reducing environmental impact.
The project likewise reinterprets traditional weaving techniques, integrating them into a modern and versatile structural system. This system uses small-diameter timber, such as wattle and twigs, which are not only very affordable and locally sourced, but also allows for manual assembly, enabling community participation in the construction process. By incorporating this hands-on approach, the project empowers local workers and fosters an aesthetic that is achievable for all.
The construction of the prototype is an example of genuine participatory design and lied the foundation for the further development of the design proposal. By living on site, the group members have had the opportunity to integrate local craftsman and the user groups daily in the ongoing process, resulting in a highly contextual design and invaluable insights on culture and craftsmanship. During this time, several villagers acknowledged the design by deeply expressing their desire to build a home like this for their own family, - underlining the very impact of this project. By opting for these materials, families can construct a home with less initial capital – an aspiration that has given the group a profound sense of purpose with this project.

The masterplan emphasizes pathways that connect key areas, including staff quarters, the reception area, farmland, livestock and historic Chagga huts. These pathways are deliberately designed to spark curiosity, encouraging tourists to explore the site, while also providing a natural flow on the site based on existing flow patterns. They create opportunities for direct and indirect interactions, fostering mutual understanding and appreciation of cultural norms, traditions, and practical methods. For example, tourists can observe traditional permaculture farming practices or learn about the intricate techniques behind the construction of Chagga huts, enriching their experience and deepening their cultural awareness.

Through its design, the farm lodge serves as a model of sustainable development, showcasing how ancient practices can be effectively adapted to meet contemporary needs. By using local materials, embracing traditional techniques, and prioritizing community engagement, the project demonstrates that modern architecture can be both environmentally friendly and culturally enriching.
In doing so, it lays the groundwork for a shift toward more sustainable, culturally respectful building practices that can positively influence the future of architecture and community development.

With this design proposal we argue that if form is allowed to follow tradition the architecture encompasses a morphological response to not only socioeconomic concerns but also environmental and climatic conditions.



Figure 304: Private picture - shadows on the mud brick wall of the prototype.

Reflection

Process

The initial objective for the design proposal was to promote sustainable development of architecture supporting tourism in East Africa, a sector currently driving demand for sustainable practices. Agencies like Vores Afrika and Nyange Adventures are pursuing Global Sustainable Tourism Council (GSTC) certification(page 42), signaling this current progress (Appendices 3 & 4). as it is within the tourism industry that we currently see a momentum to deploy a more sustainable products and practices in East Africa. Tour operators experience an increasing demand of sustainable activities from their clients. This is evident from the Danish agency Vores Afrika as they have invested to achieve the Travel Life certificate (Appendix 4 on page 179), that is accredited by Global Sustainable Tourism Counsil (GSTC) (page 42). As well Nyange Adventures in Tanzania is on a trajectory to display the same certificate within 2025 (Appendix 3 on page 176). However, challenges persist. Field research highlights a strong preference for concrete among local craftsmen and building owners due to its availability and durability. Improved economic conditions drives aspirations for "modern" homes, with concrete symbolizing quality over traditional practices like wattle-and-daub.
While reducing emissions from concrete production offers incremental benefits, this alone is unlikely to address the broader Triple Crisis of climate change, biodiversity loss, and resource depletion. A United Nations Environment Programme (UNEP) report states that concrete, steel and aluminium production constitutes 23% of the global CO2 emissions which is a substantial part of the 37% of global emission by the building industry (UNEP, 2023). Therefore, this project sought to explore alternative materials, that reduce emissions during operation and production. At the same time satisfying the increasing desire to improve the built environment by thorough user analysis, local participation and celebrating an alternative ideal building typology. The deployed methods are discussed in the following chapter.

Methods

This chapter unfolds the knowledge acquisition methods. Discussion on the selection of underlying methodology are unfolded briefly on page 11.
The study of ethnography has historically been one of the finest duties of the architect, because it implies a deep cohesiveness with the building occupants, placing the human in the centre of the design. It requires the ability to leave all prejudices behind, and instead, observe, learn and relate allowing the architect to draw deeply contextualized buildings. In common architectural practices today, financial concerns impose an approach that in many cases has been degraded merely to desktop research, occasionally supported by a few interviews or day trips. This means that a great potential of depth and knowledge within architectural practice is unresolved.
For this project, we challenged ourselves to follow the path of ethnography allowing it to form our design. This was done not only by co-working with local craftsmen on construction sites, but rather, living amongst villagers learning their way of life, including spirituality, cultural symbols, cooking, family traditions, ecological knowledge, tribal storytelling, friendship and much more. This meant that we gained a holistic understanding of cultural heritage and norms, that has given us a profound sense of purpose for the project, deeply respecting local tradition and needs. By staying on the project site during dry and wet seasons, we also grained invaluable insights on challenges and potentials related to microclimatic conditions, sightlines, noise, materials properties and more, that has proved to be very useful during the design process. The structured interviews with professionals within the field of architecture, for instance the Triple A Architects (Appendix 2 on page 173), allowed us to gain a glimpse of the current state of a sustainable building approach, which lied the foundation for the very concern of the pursuit of the concrete legacy as described in the motivation.
For the construction of the prototype, we sought to encourage participatory design (page 13) by consulting local craftsmen and users during construction. This being the aim, only conceptual lines were drawn at the beginning of the project, hoping that this would allow for co-creation and skills sharing. This resulted in an overall aesthetically pleasing design, using material and simple principles that can be copied by local families to build affordable housing much cheaper than a concrete alternative.
Despite this, we also experienced many challenges deploying the method. Firstly, due to the lack of exact material quantities; timber, bricks, sand and more, materials were ordered ongoing during the construction, leading to stalling and prolonged the time schedule. In terms of structural quality, we faced many disagreements, though often trusting local methods based simply on previous experience. This proved to be very good in many cases, for instance when building the brick wall only using traditional practices such as plumb level. Unfortunately, in several other cases this degraded the quality of structural elements, such as large cracks in the non-reinforced concrete slab(Figure 156 on page 99) and unsafe timber joinery(Figure 155 on page 99).
The potential of participatory design in other contexts remains unexplored. While this approach holds significant value in small-scale projects, fostering skill sharing, knowledge distribution, inspiration, and economic benefits, it may face limitations when applied exclusively to large-scale buildings, particularly regarding safety concerns. To experience that people with no prior experience of construction, picks up a trowel, initially mimicking the master, two days later has developed their own technique, was very moving (Figure 135 on page 90). It was inspiring to learn that building practices can have a societal benefit. When studying the Kassena tribal architecture in Tiébélé, Burkina Faso (page 57), it revealed that the process of decorating the homes was a collective social task (Yakubu, 2023). By celebrating such rituals and letting collective practices shape the built environment with for instance culturally derived motives, chances are that there is stronger emotional belonging to the architecture. Furthermore, possibly improved livelihood from increased tourist activity that pursues the destinations that reflect local culture.

Data collection

For this project, the group experienced challenges acquiring valid data, especially during the erection of the prototype as well as during desktop research. This was the case of an array of data, including collection of simple topography data and site mappings, building material data, Environmental Product Declarations (EPD), as well as regulations and procedures.
Guided by a Danish data-driven perspective, the group found the absence of reliable data overwhelming.
For this project's extent it was inaccessible to acquire, produce or simulate data that would back the postulate of the design proposal improvement of sustainability compared to other similar designs. Benchmarking the design proposal against other projects was initially within the scope but rendered impossible due to lack of consistent data.
It remains a future aspiration to thoroughly quantify the design proposal's impacts planetary boundaries. The challenge of internationally recognized frameworks such as Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB), Building Research Establishment's Environmental Assessment Method (BREEAM), Living Building Challenge (LBC), Leadership in Energy and Environmental Design (LEED), is that they have an astonishingly disappointing coverage on the African continent despite being the largest international institutions.

LBC has 427 registered projects only 1 is in Africa (Living Future, 2024).
DGNB has 3650 registered projects 0 in Africa (DGNB GmbH, 2023).
BREEAM more than 535,000 certified projects across 74 countries only 4 registered projects in Africa (BREEAM, n.d.),(BRE Group, 2016).
LEED has 4773 registered buildings only 2 in Africa (GBIG, n.d.).

In total the African continent constitute 0.01‰ of the international portfolio of the above-mentioned certification systems. What causes this underwhelming coverage on the African continent is uncertain to us. Though we must admit that the difficulties we faced acquiring data were immense. Partly due to the complete absence of local data on building material for instance, and due to the fact, that deploying EPDs from other regions would be completely off target as the material production is most likely too different. Additionally, transporting may be performed by an obsolete diesel lorry that has poor maintenance and fuel economy or an off-the-shelf compressed natural gas truck. Due to the range of options, stretch of code and regulations and general lack of standardization, quantification of an EPD for instance, remains almost impossible.
Regardless of the challenges mentioned above, we cannot stress enough how important it remains to initialize data production that is executable to African contexts and is on par with internationally recognized standards.

Sustainability

Finally, in this part of the reflection we are revisiting the project's definition of the term.
The building certifications systems previously mentioned, as well tourism certification systems like GSTC (page 45), all read back to the United Nations Sustainable Development Goals (SDGs). Therefore, it was evidently clear that the underlying design criteria should be derived from a selection of these (page 37). Furthermore, we introduced theory from regenerative design that informs in particular end-of-life concerns of a building. Circular Economy was introduced because of its' regards of the individuals' social and financial sustainability. The aggregation of these yielded the design criteria (page 82).
An obvious continuation of Circular Economy is the theory of Donut Economy by Kate Raworth (Figure 305 and Figure 306). This master thesis never fully unfolded the concept of the Donut Economy as the framework was considered too comprehensive. By this we understand that some of the parameters of the donut economy remain off the scope of an architectural design process. However, the holistic approach of Raworth theory is highly compelling as it values assets outside the monetary economy. Which is in line with the idea of cultural preservation, as a mean of making better architecture and that leaves a positive impact on the globe as well as the individuals involved in the participatory process. There are strong indications, from our point of view, that implementation of a building system like that of the prototype may improve the social foundation as well as ecological boundaries. The building system displayed in the prototype alongside the design proposal creates improvement in particular to the parameters: work, income, social equity, housing, CO2 emissions, material footprint and ecological footprint. Secondly, sanitation, clean cooking and nourishment.

Cultural heritage and tradition

"Vernacular architecture is an essential part of cultural heritage, and embodies the knowledge on how to design in harmony with nature, in a durable, healthy and sustainable way. The local design strategies emerge from centuries of empirical rationality, resulting in comfortable environments that passed the test of time. The knowledge derived from vernacular architecture is at the core of truly sustainable design"
Professor, Manuel Guedes (Sayigh, 2022, p. 2)

The main objective of this paper was never culturally or historically to freezeframe a building culture of the tribal settlements. The purpose was to point out what are the great lessons we can learn from the local civilizations, that have grown accustomed to the microclimatic conditions of an area passed down through generations, by celebrating it through contemporary architecture.
This paper seeks to determine the inherent values of the traditional craftsmanship in local East Afrian tribes namely the settlements of Maasai, Chagga, Datoga and Hadzabe. These settlements prove great knowledge of the local conditions and with an inherited understanding of the local climate, a fit architecture has evolved. These settlements vary greatly in their identity, hence the distinction of one tribe from the other. Given the fact that Tanzania alone has more than 120 distinguishable tribes, there is without a doubt the great source of knowledge on bioclimatic design solutions.
The building system using mud and wattle is supporting a material acquisition that is more fit for affordable as well as sustainable housing across most geographical regions. By studying the building heritage of the regional building culture, one can identify valuable design information such as passive design strategies, material acquisition as well as processing, societal design strategies, value of spirituality and ornaments. Most traditional dwellings were developed in a time where scarcity was and may still prevail. This creates a natural harmonious relationship between consumption of energy and production of it. Before globalized supply chain, a civilization's material wealth would balance with the locally available materials. In this way developing regional architectural expression that is perfectly fit for geography and micro-climate.
As we look into a future where weather systems change at a radical pace and civilizations are tackling conditions that are putting severe stress on the settlements, know that people have settled anywhere at any given time. The modern human being has been around for more than 300,000 years and has overcome floods, drought, ice ages and severe hunger. By cultural exchange we can shift vernacular architecture fit for certain combinations of climate and environment from one place to another, making sure that citizens across the globe have affordable and safe housing. This is without a doubt possible to do without the use of steel and concrete, as these have only been available resources a mere blink of an eye compared to how long humans made settlements.
If we refrain from looking at the potentials of traditional culture related to sustainability, the conservation of traditional rituals, cultural traits and artistic expression have a tendency reemerge frequently. It is when we revisit our national culture that we feel belonging and unity within a society. As we acutely realize that not all nations in the world subscribe to globalization, we see a counteraction showing nationalistic expressions in various shapes. In a column in the journal Arkitekten senior researcher Mirjam Gelfer-Jørgensen describes emerging movement of "neo-historicism" ("nyhistoricism" in Danish). A longing for the historic environments has gained traction recently. She brings forward the rebuilding of Notre Dame in Paris as well as examples from Trondheim and Krakow where this affection of traditional architecture is evident (Gelfer-Jørgensen, 2019). In Denmark the old stock exchange building is too being rebuilt like it was before it burned in 2024. There are strong indications that tradition is deeply rooted in human beings, because it resonates with a part of our identity and creates coherence within a society.

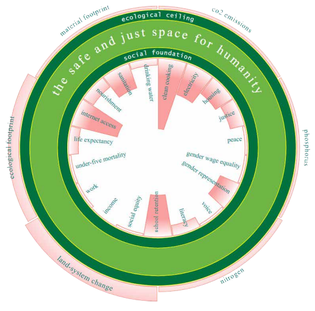


Figure 305: Donut economy of Tanzania (Surjadjaja, 2022).

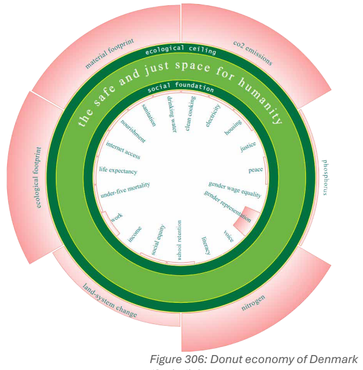


Figure 306: Donut economy of Denmark (Surjadjaja, 2022).

The next step

We wish to develop a design manual that fosters a balanced relationship between planetary boundaries and social foundations. This framework is intended to adapt to diverse global contexts while drawing inspiration from traditional regional cultures to inform effective, contemporary architectural designs.

The manual will focus on building systems that are affordable, feasible, and safe for untrained individuals in rural areas to build themselves, while respecting and honoring traditional architectural practices. Unlike industrialized and energy-intensive systems, such as those prevalent in Denmark. They may deliver high performance and efficiency but often come at significant environmental and social costs. Instead, this approach seeks to align sustainability with cultural relevance and accessibility.

If we zoom out and look back at the past 50 years, we have seen the building industry developing and disposing building materials that are extremely difficult to recycle. Not to mention extremely hazardous materials that have severely compromised human safety, that we are still struggling to handle responsibly – that is the case with asbestos, PCB, heavy metals etc.
The difficulties we are facing are clearly something that should not be exported. This should remain a integral part of a design manual to learn from international best practice.
Comparing Tanzania and Denmark using Kate Raworth's economic model (Figure 305 and Figure 306). It is evident that the profiles of Denmark and Tanzania are opposite. Where Denmark is breaking five out of six ecological barriers with large extents, Tanzania is only breaking one out six ecological barriers.
On the other hand, Tanzania is seriously underperforming on social foundation whereas in Denmark only one pilar is significantly misaligned.
By combining the two diagrams you almost get a perfect distribution of parameter scores. Thereby exchanging knowledge can mutually benefit both societies remain within social foundation and the ecological ceiling.

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Illustrations

Illustrations are created by the research group, unless other has been stated. External illustration references are stated below.

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Figure 95 on page 56: Tiebele by Jalvarezg (https://stock.adobe.com/images/tiebele/79573024?prev_url=detail)

Figure 101 on page 62: Moshi map (https://de.m.wikipedia.org/wiki/Datei:Kilimanjaro_campaign,_East_Africa,_1914-1918.jpg)

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Figure 305 on page 165: Donut Economy for Tanzania (https://doughnut-economy-fxs7576.netlify.app/)

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Appendix

Appendix 1

Interview with Chagga

Date: 02.10.2024

Location: Marangu, Tanzania



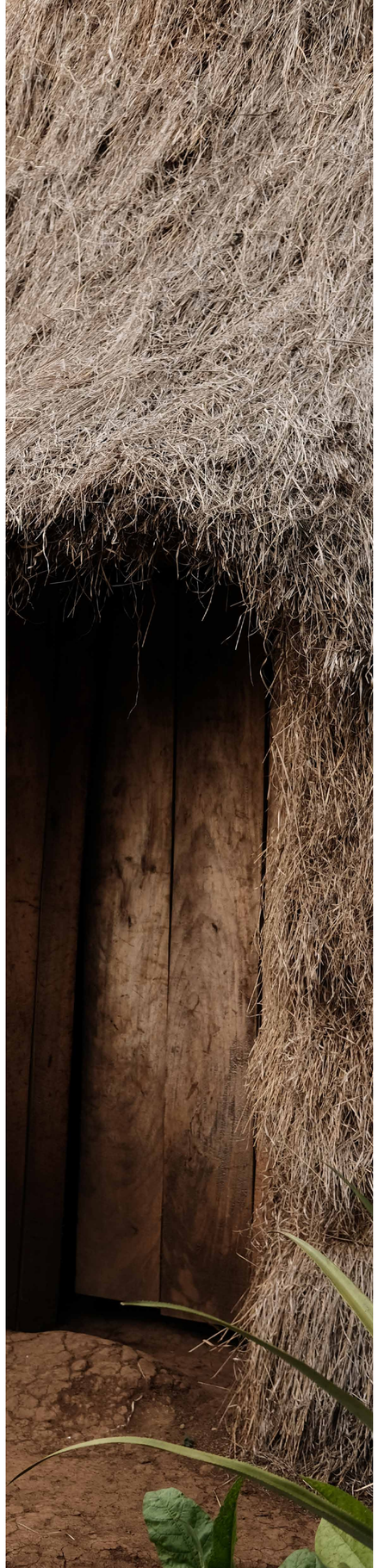
Figure 307: Private picture - Interview setting with representatives of Chagga tribe.

[00:00:00]
Alberte: Did you grow up here, or?
Edward: Um, in fact, long before I used to work in a certain museum, by which I was very close with my friend here, Danny.
Alberte: Was it this museum, or another?
Edward: No, no, no. Another museum. Another museum. But we used to be friends. We used to collaborate together. So whenever I would have some clients or visitors, he used to pass to me. And when I'm having some who are intending to learn about caves and whatever, I used to pass to him. So we became very, very close and great friends. Yeah, great friends. Yeah. Nice.
Alberte: But how do you know Nyangi?
Edward: Nyanke. Yeah? How do you know? Nyanke also, when he was a little boy, in fact, he used to rely upon me so much.
And in fact, Nyanke is a hard working guy. Hard working. Yeah, in fact, he makes me be amazed of him. [00:01:00] Nyanke. Oh, you're proud of him. I'm proud of him. Really. Are you friends with his family or? Ah, no, no, no. Only with Nyange. And mostly he do invite me at his place in Moshi, Kibosho, there. I remember he normally makes a very big fire, we relax there.
In fact, we normally enjoy. And right now he has really advanced by applying some big tents and whatever. If you view the farm, amazing. We Rasmus and I, we stay at the farm. For three weeks, this year, and last year, three months, we stayed in the farm. Yeah. So now we help him build a small cottage. Okay. Yeah.
And using only odongo. Odongo. Yeah. Wow. Only. No cement. No cement. No. So it's traditional. Yeah, traditionally. [00:02:00] Yes. We want to preserve the heritage. Yeah, we need to move away from cement. It's not original. And the dust from the cement goes into the lungs. And in Denmark we talk a lot about sustainability.
Yes. You know? And how to preserve the earth, we need to use good materials, so we don't, uh, emission. Recently, in fact, in fact, they brought us some seeds. They mentioned GMO. GMO? GMO. Maze. You plant. After shooting from the ground, reaching this level, ooh, insects, they start attacking [00:03:00] the crops and whatever, so you must apply chemicals, spraying and whatever.
Although we used to, to struggle to apply GMO. Mostly, you know, pili pili. Paper. Pili pili. Yeah, could just, uh, act, react a little bit. But it was not effective. We apply ash, no way. Okay, you lose everything in your farm, you see. But right now, in fact, they cut down. They stopped bringing the GMO seeds. And now we are trying to get some good crops.
Yeah. Otherwise, we're applying green. In fact, I don't know properly the name of that medicine. It's similar to, uh, Edward. Profere, I don't know, I can't really call it. Profere, I don't know, Edward. No, no, not really Edward, but Pro, Pro something there. Then you mix it with the booster. Oh, that's at the time you can, you can harvest.
But is it healthy? [00:04:00] Never. No. Even the way of preserving our, our crops is very delicate. Because we were deprived and brought, uh, uh, Carved down all the traditional storage, you know, in the past, our, our grannies used to preserve their crops in a proper way by using herbs, some leaves and whatever, having good fumes and whatever, and no insect could really the crop.
But anyway, because the technology is coming up, they started now applying drums. Iron drums, by which you don't know what was preserving, the drum was preserving, and if it was whatever toxin was inside, whatever, how sharp the poison was, okay, you just fill it with the crops, seal it tightly, and keep it.
Maybe one year, two years, three years, then you [00:05:00] come, okay, you drain out the maize, okay, you take to the machine, okay, you grind, you get the flour for making ugali, we call it polenta. Okay, you enjoy, yes, yeah, this ugali is so lovely. Oh, you are pumping in your body, hail of toxins, chemicals. Are you a farmer yourself?
You? Uh, small farmer. Small farmer. How come you know so much about the Chaga tribe? Uh, in fact, uh, Mm, you're interesting. I normally, I normally, I normally believe that the practice makes perfect. Mm. And most of my time I go and visit these old, old age people. Yeah. But they're, they're almost finished up.
Yeah. They're no longer there. They're no longer surviving. And in fact they used to to to to live longer. That's why I was interested in learning why they use their lifespan. Used to be very high, but right now, wolf [00:06:00] absolutely. Just imagine, I recall my grandpa died in 1994, having 125 years. 125! And recently, around Kibosho, recently, the last two weeks, they buried an old mama who, who was having, who was having 134 years.
Yes. Instead of mourning, in fact, they were celebrating. Yes. 34 upon 100. Were they healthy? Healthy. Could see well. All the teeth were not dislocated or whatever. The eyesight was very proper. Oh, it was very much. What's the secret? Food wise. Food? [00:07:00] Yes. Ugali, everything traditional food. Maharage, mixed up food.
We call it in Kichaga language Ngararimo. Ngararimo means you boil maize, you apply soda, soda, is it? The local one. The local one they get in the lowland. Yeah, so the bicarbonate, you boil hard, then you mix with the maize, you just let it cook now slowly, pole pole, then you dry it, you mash it, you keep it even you could consume that in a week or whatever.
If you are going for a long journey, you could just carry that as a lunch, as a lunch pack. And it could just make you survive. Then, um, Um, Yogurt. Yogurt? Yes. You pour it and mix it, then you become strong. Yeah. And they never go hungry. But right now, biscuit. You know biscuit? Biscuit. Sugar. [00:08:00] Oh, everything, everything.
They have sugar, mingi. So, in fact Do Of course, yes. Yeah, they were active. And they could travel, they could walk. I remember, I remember my dear daughter, my grandpa, whom I have stated that he died possessing 125 years. In fact, he went to They were You know when the missionaries landed in this area? Yeah.
In 18 90, 19 82, they were young boys, strong ones. They were able to walk from Kilimanjaro to , to roa, Irania, I don't know, something there on foot and back. And not only one trip, they used to make several, several roots to disperse religion. Yes. Okay. Was your grandfather a missionary? Yeah, in fact, they were hooked by the missionaries.
You know, first of all, the missionaries, as they came, they were [00:09:00] forced to be buying slaves. Not to resell, but to hook them because of language so that they could talk them nicely and they used to understand properly, quickly, so that they could enter now into the village to the local people by which they were, they could be understood well and learn the word of God. Okay. Yes. Wow. Hmm? Is everything set up, sir? Everything is set up, yeah. And this one is on? Yeah, everything is recording. So, recording and filming. So Nice? So, before we get, um, we get started with the real interview, we need to make sure that it's okay, um, that we are recording you, and that we will be, uh, publishing parts of this in, in our, uh, in our academic paper, um, in our, in our university.
You know what I mean? Cool. We're gonna make a report, um, [00:10:00] and then we have to make sure that it's okay, that we use things that you've said, maybe put a quote. Uh, the Edward from, from Chaga tribe. I'm not a Edward. Not a Edward. Just a layman, a man. Just a simple, very simple man from the village of the Chaga people.
No, I don't believe that I'm clever, but I accept and say thanks to my almighty. Yeah, and the thing is going to be so well, the way you are going to raise the question lightly, slowly, so that the, yeah. Otherwise, if there are hard questions, I'll be We just want to learn. Okay, you are most welcome. Just want to learn about the Chaga.
Who they are, where they came from. So can you explain, like, now you said before that the Chaga is a combination of many tribes. Yeah, starting with his, or explaining to that, Chaga Yeah. Is a mixture [00:11:00] of different tribes. Okay. And in fact, they were a little bit of northeastern. And when we mention about Northeastern, in fact, if you keep going or trying to seek what is Northeastern, you'll just stop in Kenya, you'll stop in Ethiopia, you'll stop on the other side to Somalia.
But we stick now to Ethiopia. And we are great, great, great grannies, grandchildren of a certain grandmama who was known as the Queen of Sheba. Queen of Sheba? Queen of Sheba. Sheba. And this Queen of Sheba from Ethiopia went to Jerusalem to seek an advice from King Solomon. He is mentioned in the Bible, of course, yes.
So, as a, King Solomon had many wives. The original wives were 300. The concubines were 700. Yes. How [00:12:00] busy man. Yeah, he's amazing. And, uh, in fact, after staying there for a couple of years, in fact, uh, she became partially a family member of King Solomon. But the, the GI wer intending to kill this, uh, this Finn.
They said, this concubine is ruining us. Let, we better kill her. King Solomon arranged. to make sure that she turned back to Ethiopia with her family. The family grew up, enlarged, and in fact they were very intelligent. Those are the Falashans around Eritrea and whatever, Falashans and Ashur. And Ashur are a part of Jews.
So, in short, we can say we Jaga people, we are possessing year and year from the Jews. Yeah. Of Jeeves. Yeah. So, as they started now, because of [00:13:00] development and whatever, it started, it happened to occur a chasm which formed them, some to go to the southern area of Ethiopia and some went to Sudan, southern Sudan.
So the ones who came to the southern area of Ethiopia, in fact, entered into Kenya and stayed there for a couple of years. The cows rose again, they dispersed, and some went to Pokomo in Kenya, around, over Mombasa there, and some just kept moving. But because of scarcity of sufficient grass to feed the animals.
Wow. By good luck, they saw something shining in the sky. A whitish. But they said, no, there. Kilimakeu. That is a white mountain. There must be a white mountain. Oh, of course, yes. Kilimakeu. Kiiimakeu. [00:14:00] Kiimakeu. That is Kamba language. Kiimakeu. Which is Kiima. Kiima. It's a mountain. It's a white mountain. Wow.
There must be water. Wow. On the other side of Kenya there, in fact there are only three rivers. There is Tana River, Athi River, and Savo River, by which if you are enrouting from Nairobi to Mombasa, you'll have to cross that river. But the water is contaminated. It's filled with bicarbonate. It's dirty water.
Anyway, not fit for human consumption, but it's good for human, for, for animal consumption. So, they kept moving. And luckily enough, by the year 1400 They were lacking enough now to land on the slopes of Kilimanjaro. 1400, 1400. It should be around the 16th or 17th century. I don't know. I'm not sure of that.
15th century. The exact [00:15:00] As they landed here, my dear friends, in fact, they discovered they were not the only people landing now to Kilimanjaro. They found other people landing on Kilimanjaro. We're here, but they are not interested of them. What they they were amazed of them of it is Every short distance you move there is a spring of water or a river you move a little distance You get a river spring of water.
And what about the water? Wow, so sweet. Not dominated springs of Kiimanjaro are ever, and those one, if you, if you, you have to obtain water tap from, from a spring or a stream of water or a stream. In fact, it's lovely. It's sweet. It's not preserved and whatever. It's sweeter than the bottled water we buy in the shops.
No particles, no germs, nothing. It's ever cool. It never rot or smell bad if you keep it as long as you [00:16:00] can. Provided you, you, you, you, you avoid sunlight. You know, sunlight makes some other, yes, algae and whatever. So. They started now settling here. After discovering that there were some people living here, the shortest people in the world, the Pygmies, they started ruining them, harassing them.
So they scattered in the plains and it disappeared into Congo. Even the animals were really disturbed because of over cutting trees for building. for making farms. So, um, uh, this carnivorous, Couldn't get sufficient food to eat. The predators couldn't get the animals for their food. What about the, the, the, the herbivores?
Okay, they were very much scared and scattered, disappearing to the plains and some went to the mountain. So here, it's so hard to get the wild animals or big animals [00:17:00] to disturb you, but sometimes they come and visit and say, Oh. This was our lovely place. We were, uh, this human, this being a dam, made us move out of this.
But the passing, they never make it resident, uh, or permanent settlement. So they kept that. Now after, after staying for a couple of years, making their lives, they started now making regime. They started. Because, in fact, you must make some laws and whatever to protect lawbreakers and whatever. And in fact, Those things must be there.
So they started now making regime and they started now formulating the, the, the, the way the leaders by which we say wa mangi, or the mangi, mangi, not monkey, mangi, the leaders, chiefs. After [00:18:00] ruling for a couple of years, they, they, they started becoming jealousy making it to be chieftains. You, you, you rule there, you become off sound and unable to make any decision and whatever.
Okay, you step down, your son or one of your clan must step there and continue ruling. Refusing, rejecting anyone from shooting from any corner and say, Oh, I want to be a leader here. No, you must follow that protocol. And every location used to have their own. Leader, likewise here in Marengo, we had a . The Maria, the first was installed here by Manna of Kibo and they used to follow that.
They, even the, they used to have their own leader and also Kier and ki you go to , KIBO [00:19:00] Ney also, they used to have their own leader. Yes.
What does it mean today? Yes. Uh, to be, uh, like you, a representative of, uh, of the cha tribe. Do you understand what I'm, what I'm, what I'm questioning? No, pardon? So you, Why is it important for you to teach Kijani? Um, Kichaka tradition. First of all, I'll just reverse a little bit. Um, There is a, there is a confusion somewhere.
And we are going to lose. And you know why I say that we are going to lose? Our language. Our language, our mother tongue language, first of all, is flopping. It's flying our way. It's going. Our kids cannot negotiate our language, our mother tongue anymore. Is it Swahili or? No, no, no. The Kichaga. The Kichaga. [00:20:00]
Yes. They just I better teach you my, my mother tongue. My mother tongue language. Rather than my kids. They can't understand it. They make mess. You say this is Shamboni Shuffle? They can't. You think, do you think, uh, maybe do you think the younger, does he speak, uh, Kichaga? Only the elderly, only the Babu, who speak, who speak, uh, Kichaga.
No, no, no, yes, they, but anyway, the mistake is the, the development or the widening up of knowledge is depriving us. But they can't believe to that. Okay, you just say. There are these international schools. Your kid go there, he starts learning in English language and whatever, no Swahili. If you speak Swahili language, [00:21:00] you are caned.
If you speak your mother language, you are thoroughly caned. Therefore you are scared. Okay, you base into English. Okay, when you turn back to your grandma, Oh, grandmama, how are you? Okay, slowly by slowly. Okay, you are teaching your grandmother language, but you are forgetting yours. Slowly by slowly, just like a chameleon.
You lose yours, and totally the Chaga language is dying, whether you like it or not. It's disappearing, it's disappearing. No one, is no one speaking anymore? Eh, they speak it in the, they are mixing with Kiswahili, also now they are snatching, they are snatching some English words and whatever, mixing together, then you lose the reality.
Oh, thanks. So, that is the story. In fact, a major problem. It's a problem. It's a problem. Are there [00:22:00] traditions associated with the tribe that is disappearing? For instance, I don't know, does the Chaka, do they have special gowns? Like special dress, special jewelry? Oh, those ones disappeared with our grandfathers.
Because even if, um, as I was in the museum, I was trying my level best to get the, the, the, the dresses. But, in fact, I was, in fact, I uncovered enough. I could even dig a grave and see if there is any gown or any dress remain there, but I couldn't do that. It's gone. Oh, it's disappeared totally, totally.
And, uh, in fact, it's a great loss. Why They disappeared with the, with the group of, you know, long before our grandmothers, the great, great grandmothers, they used to, to dress and they, in fact, everything is, [00:23:00] everything is gone. First of all, they used to be tall, very tall, from six. That groups, and also decorating their ears just like Maasai, dressing just like Maasai and whatever, but they were very hard working.
And, uh, that group ended up. Disappeared. I think there is a mosquito. You, you could, you couldn't get it. It has taken the blood of Mzungu. I'm not sure. These are the black ones. They don't, no, no, no malaria parasite. They're the small ones. Black spotted, we are acquainted, we are used to them. So, uh, that group in fact disappeared and right now, amazingly, I'm tempted to
Babu, if you get someone older than [00:24:00] me, maybe 90 to 100, right now, leave the ones you can get one here, there, and whatever. In fact, even the brain has gone off sound. Can't make up anything. So, the more you are disappearing, the more the culture is dying. And nobody is going to rise the culture. Was it recorded by anyone?
Rasmus: Did anyone take the pictures of their jewelry? The way they make their ears.
Edward: Ah, no, no, no. It is only when I was young. In fact, I used to see as one of my granny grandmama, in fact, and I used to be scared of her. Oh, I used to think that is, she's a messiah. Maiah is going to steal me there. I used to keep off her normally 1960s when I was just a little boy, just like an egg.
She looked like my size. Yes. The same, uh, dress? Yes, he used to [00:25:00] wear this, uh, In Kiswahili we say migorori. Tie very well. But not spotted like this one of Masai. It used to be a kaki. Kaki type. Kaki type. Of course, we used to call it, um, Marikano. Marikano. Because they were made of, um, With cotton. Yes. Would they acquire the cotton In Tanzania?
I don't know how they used to manage to get No, I think they used to be brought by the traders and whatever because as they found out that Tanganyika, it was known, Tanganyika by that time, in fact, used to possess many things and whatever. That's why traders and explorers managed to succeed their ideas.
Yes, because they found it easy. Well educated [00:26:00] people, they could understand things, but it twisted them so that it could just make them follow. I'm sure you understand what I mean. And we followed the protocol, but we lose. We lost a lot. Right now people are trying to wake up, but it's too late. It's too late.
You obviously find the culture of Chaga and other tribes very important to save, to keep in memory. Do you think this is the same for, for young people? Or they don't care about the tribes maybe. They don't, they don't, they don't care about the culture. It's okay if they lose, uh, the memory, the traditions.
Um, in fact, uh, first of all they are losing. And they are bewitched. As well as deluded. They are [00:27:00] gone astray. They are off, they are off the road. They're off the road. And I don't know whether they're going to turn back to the, to the thing. And, uh, as they say, strike the iron while hot. In fact, oh, the iron has run cold.
It's too late. It's too late. Can you tell me about the history of the chaga? Of the chaga. So now you talked about the messiah walking from Sudan. Yes. Yes. No, it, it is the first group. The first group, which in fact decided now to, to make a trail work, trying to seek, first of all, sufficient grass to feed the animals.
Yeah. And, uh, water. Were they what? Chaka, um, or where is the chaka coming from? The Chaka, the Chaga. In fact, he became farm. to be known as Chuck. You know, first of all, [00:28:00] as they landed here, the way the explorers were coming this way, and the traders, explorers, and as well as missionaries, as they landed here, In the low land, they try viewing this side.
They asked the, the rec, the resident over there. Uh, there are people living there now. You know, the language was too colloquial. They couldn't respond there. They say, oh, they're asking about the cha wha people living in the, in the chara, which means those people, yeah, there are people living in there in the bush.
They live in the bush. So, bush is kichaka. Kichaka. So, you mean, kichaka, what? Okay. Some who were friendly, accepted to trail with them or to walk with them, slowly, slowly. As they found them, they were, okay. Oh, they were amazed. [00:29:00] They started now teaching them language, jambo, jambo, jambo. They were amazed. What?
Some were running away, saying, kibo, kibo, kibo. The amazing language. Because that man was facing Kilimanjaro. But he had Kibo. So he formulated that, oh, that mountain, the peak is it Kibo? That's why it became Kibo. And as they were trying to interrogate, what is the name of that mountain? They say, oh, it has Njare.
Njare. Njaro. A big, big eagle which goes high in the, in the sky
They say, what do you mean? Even Jaro, Jaro means a, a, a caravan, traveling for a long caravan. They say, no, no, no, no. It is very, it defeated the caravan to go to climb it. So they say, why did I? [00:30:00] Because Kiima, Kiima means a small hill. Yes, Kiima means small hill. How comes a big, that's a big rock is turned to be a small hill?
A small hill, very minute hill, okay, instead of say, iim lima, ii in Swahili means large, you are degrading, you are, you are, you are degrading it, but kiima, you are, you are bringing it down, so kiima, it can be a small, small hill, a small hill, very minute hill, no, instead of huge mountain. So it remained, oh, because Kiimanjaro, Kilimanjaro, it defeated the caravan to climb, because you get you, you never reach there.
You go, you never reach there. You go, you are just around there because of climatic [00:31:00] condition and whatever, you never go there. Okay, it remained now, Kilimanjaro, Kilimanjaro, defeated the caravan. Yes.
Rasmus: Okay. In the beginning was the Chaka, a wandering Uh, culture. Nomadic? Nomadic culture. Like the Maasai. Okay.
Edward: Uh, no. No. No. They, they, they stepped here, they started now. Big areas because of sufficient water and good grass to feed the animals. And they started now making boundaries, but they were very intelligent because if you were, you were my neighbor, wherever we, we, we, came from, I never accepted to be close to you.
Because the land is sufficient. So they used to make up, go, try to get, be close to the river, for you to get sufficient water, and enough land to feed your [00:32:00] animals.
Alberte: Did you live amongst your family? Oh, you live one person, one person.
Edward: One person, yeah, one person. But the close neighbors, close neighbors. And mostly, uh, they formulated the clans.
You know, the close, the closer, the closer, uh, blood. Yes. Yeah, you remain together. And, uh, after making clans, They started now making traditional rules and whatever. This clan is not supposed to marry here or to marry this clan because it's close blood and whatever. They had very proper regulations. So, they started now making boundaries by using this yuka or dracaena staudinary.
Yuka. I'm sure you know. This is the giant one. They are the
Yeah. We know the small one. That's a leaf, right?
Edward: No, this one they call it, uh, for, for [00:33:00] elephant because it grows huge, it grows up. It's so big. But the, the traditional, the, the, the local ones are small, but also they grow big, but they don't become as big as this one.
So they used to put, to apply their boundaries and also they believed it is a, it was a peace plant. By which, if you could make any mistake, you could just pluck a leaf and apologize by using that leaf of yucca. And as well, they could perform ritual performances by using a leaf of that yucca. And everything used to go properly.
Rasmus: Yeah.
Edward: Never, never, ever. Everything is kicked off. I know. You pluck it, you punch my eye, then you pluck it. Oof! I know. It's too late, it's too late. It seems
like,
Edward: uh, the
Rasmus: Maasai, they have a [00:34:00] very strong and very visible culture nowadays. You can easily identify the Maasai. They, maybe they wear the Shuka, or they live inside the Boma. But, so they have, they have conserved, they have conserved their culture. Um, Why do you think other tribes have not, have not conserved it?
Edward: Even for Maasai, it's affected a little bit. Yes. Because of mixing up tribes. And education also is bringing chaos. Because you go far schools, you mix up with the different tribes, then you snatch.
Without your awareness, their culture, when you come home, you try to imply it. Okay, maybe it's good or bad. Okay, it disperses slowly and slowly it grows just like a mushroom and it becomes a big, big, big thing. Therefore, slowly by [00:35:00] slowly you keep on releasing children. I don't mean that we should not stop educating our kids.
They should receive education. Likewise myself. Um, anyway, I have studied with a couple of people for couple of years and whatever. That's even some people, they don't understand me. They can't get to me. They do ask me, Mr. Edward, Edward. In fact, we don't understand. Understand. You say, no, no, no. Why should we, why do you need to understand me?
No, it means it's me. Oh, you know this, and I don't know. But they, I give them courage that the practice makes perfect. They try to tell me to document the things and whatever. I know Tanzania has got many great educated Edwards, conmen. You apply, you accept to put it in the documentary. And as you are waiting for them to, Yeah, okay, edit it and whatever, okay, bring me whatever you have achieved.
[00:36:00] Wow, it's on air. It's gone. It's just remaining yawning.
Rasmus: In not, in not too long, there will not be 122 tribes, there will be one, which is Tanzania, people.
Edward: It will be? One?
Rasmus: It will be just one, one people.
Edward: Oh, yes, yeah, yeah, I get, of course, yes,
yes.
Edward: Because even Hazabe people, they used to view people wearing this decent clothes. They, they, they Keep off. They run very fast and to disappear.
But they're coming close. They have accepted to get married to different, they're gone. They're finished. Even Ang, oh, they never come close. Came close to people. But , they're plenty Kilimanjaro. Yes. So we are going to be one people, not even one 20 should be 1 26. [00:37:00] Even. They were expecting to be 1 21 over that because there are some threads.
It's hidden in the bush who are not known. Is there

Rasmus: really tribes that are not known?
Edward: Of course, yes. Even Hasabe were discovered recently. Not very recently, but long before. They used to stay in there, but as the knowledge is widening up, and over cutting, plus losing the fruits they were counted to eat, and even, they eat, they hunt, they hunt, they hunt. The animals are becoming, now less. Government is interfering, preserving the animals, otherwise they'll come. Because, oh, monkeys are lovely food to them. Yeah, they shoot, they shoot the monkeys, right? Yes, yes. So The Hatshape, they have their huts,
like,
Alberte: uh, so that, like, they, it's [00:38:00] placed differently.
Edward: Differently, yes. Like,
Alberte: no order, I think. Is there order for the huts? No, no, no, no, no,
Edward: no. The temporary ones. Temporary ones, because I'm sure they normally used to shift. Even Masai, only very recently Masai started now staying in one place. They could play, they could build themselves here. They call it Manyata, after a couple of maybe three months.
You are just a baron here, leave it, there you go. Because, Anyway, Maasai men never build houses. The houses used to be dealt with by ladies. But, uh, in within Chaka people, oh, no woman is supposed to, even if you are an engineer, you are not supposed to build a house. You must In Chaka? Yes. Ah, no, no, no, no woman was supposed to build a house.
It's
Rasmus: only the men?
Edward: Yeah, only men. Yes.
Rasmus: Um, so did, uh, did the Chaka, did they develop [00:39:00] a It's a system similar with the Boma, uh, for the Maasai, where they have, there's a structure. So you go into the Boma, in the center you have the cow, and the first one Oh, yes, yes, yes, yes, yes. That
Edward: is the work of this, uh, uh, grassy house.
This, uh, grassy hut. Yes. Yes. They normally used to build as you enter here in the door, through the door. Here, close to the door.
Rasmus: Okay.
Alberte: Like this is a boma, right? Yes. Yeah. For
Rasmus: Maasai. For Maasai. For Maasai boma. Okay. How, how will the charcoal look then?
Edward: Almost similar. Okay.
Rasmus: I'm
Edward: not a good drawer anyway. It's okay.
Similar to this one. And, uh,
okay. You, you get the door here. As you get inside. If you're a good drawer, you can just enter that thing, that grass house. It's how I can explain. Here you get a bed for father. It has to be. [00:40:00] For father. For father. Then here they just put a little barrier here. You get mama's bed here. Here
you get the kitchen.
Alberte: And this was the
Edward: yuka? They could just make a
Alberte: Inside the house. Inside the house. Ah,
Edward: okay. Yeah, they could just close here. As a special message when they want to be together. After the children. have gone asleep. Then here you could get a small, uh, not a small, a storage for, for the, for the mama, for the grandmama.
Here, the half of this one, here you get where they keep cows, space for cows.
Rasmus: They have space for cows inside? Yes,
Edward: and here you get for goats. Here for goats. And [00:41:00] over, there is attic, attic, attic. Overhead, yes. For placing raw, um, No, no, bananas to ripe. Raw bananas to ripe. By the, because you make fire here.
And because this house does not contain, possess any wind or any ventilators, ventilation, in fact the grass, it's a, it's an.
It's porous. It's porous. Enables, yes, enables the smoke to go out. And you must make fire inside daily. To stop ants, to stop also termites and whatever. And also be careful to check for the rats, not to be making holes, because they will be running inside because of the warmth. And funnily enough, these were multipurpose huts.
Because, when it is cold, inside [00:42:00] it's warm. When it is, uh, chilly outside, it's cold, inside it's warm. When it is warm, outside terribly, you go inside, it's warm. It's, it's cool. Yeah, it changes. Is
Alberte: that because the air flow is so Yeah,
Edward: it goes, it regulates. Plus, and no suffocation, uh, cause has ever occurred in such huts.
No,
Edward: no, because the wall is really porous and they used to preserve fire. You know how to preserve fire? You get a piece of hardwood, you place it under the fire, then you remove the burning wood, then you place ash on top of a hardwood, it keeps burning slowly, slowly, slowly, until the morning because they used to start fire in a very hard way by until you get, so you must preserve it.
If my bad luck, it goes off. You rush to your neighbor and ask a piece of burning charcoal, then you come and whatever. So [00:43:00] what, what's
Alberte: this circle? It's a, it's a, it's
Edward: a kitchen, kitchen. Ah, kitchen. It's a kitchen.
Alberte: Okay, so here, like, you have the three stones?
Edward: Yes, it's three stones.
Alberte: One, two, three, yeah. This is
Edward: storage for mama.
We, we'll get there, you see how there is a storage. Then mama, bed. For mama. This is papa's bed. This is papa's bed. To take care of the, whatever enters here.
Yes.
Edward: Yes, to guide, to guide. And here for goats, especially for goats.
Alberte: And where for
Edward: children? Children, they used to share with their parents, with their parents.
And as they were growing up, because they were gaining more, more, more ideas, anyway, Papa used to shift and go to a small, small hut of his, by which no child was allowed to go there. Mm hmm.
Alberte: Is that, [00:44:00] would that be here? Yeah, a
Edward: small hut, just a little distance from. If we are going to see it in reality, it is just there.
So it must be here. A small one, not equivalent to this one. And the way they used to build this thing, used to be very funny, very fancy. Because, um, the person who is intending to possess a hut must raise his problem to the elders. And he was just given a green light. to brew the local beer, the local beverage, and they could just roast a cow in a day now, supposed to be, meet, and they could test, they could sip first of all to check the quality if it was up to standard, and say, yeah, this is one of them.
And hence, in vino veritas, You know, in vino veritas, when you have this drink, you can talk much, much, [00:45:00] much. In fact, they could now approve all these things. After tasting, you stop now drinking. Ok, what is your problem, my friend? Ok, could you state his problem. I would like you to help me have a hat. Right. I could say, ok.
Is there any problem? They started now arranging duties For the ladies to cut grass The savannah grass Not only may have grass to be Collected in the bush, no There is most located one Specified one Grassy, and if you pass there in the evening it could smell just like a Farm of rice When even others and others could cut the tree could meet in different ways.
Any, IM cha. Okay. They used to give them, that is the, the way of protecting elephants. Look. That is the way of protecting the elephants not to attack us. Can you see
Rasmus: these today? Ah, they
Edward: are gone. Oh, it's long before and they are filled with the partial erosion because Kiimanjaro is very lucky. We don't, we don't receive erosion here, just the minor ones. I [01:01:00] remember I saw one around our area, where I was born. And, uh, now it's a field. They planted the, um, grass for feeding animals. Call it Katumala.
I don't know whether they are brought from Guatemala or whatever, but we gave the name of the Katumala, Katumala.
Rasmus: Why do you keep the livestock inside the house?
Edward: Uh, they were scared of Maasai. Maasai used to come abruptly, all of a sudden, to collect their cows. Because they said these people, in fact, they stole their cows from their uncles.
And the more you stay there, they have, they have breeded, they have exchanged, and they bring them back. And when they come, they come with kill. Yeah. They don't come politely. They're coming just to attack you and to grab. [01:02:00] And also they could even include some, some ladies. Most of our ladies were stolen by Masai.
That's why they are changing. That's the original, uh, color of Maasai of nowadays is not the original, uh, is not the original color of Maasai. Those are nelo mites. But right now they seem like, to be like bantus. What? What does this mean? Light
Alberte: color. Yeah,
Edward: the color of Maasai right now, it's well mixed up.
And it's similar to ours. But of the past. Oh, no, no, no. Wasn't that way. Were they
Alberte: much darker? Yes.
Edward: Just, uh, have we ever come across a Sudanese person? No.
Very dark. Very dark, just like [01:03:00] your camera there. Yes. But right now, because they are mixing up, in fact, the color is disappearing, disappearing, disappearing. What's the status in,
Alberte: like, which
Edward: hut you
Alberte: had? The bigger hut, the more status. Like, the chief? Did he live in a big house, or?
Edward: Uh, they started changing after the, the Arabs, the traders and whatever started now coming, bringing now new development and whatever.
So they used to have now big boma, by building, by using stones and surrounding. Like monk Sina of Kibosho, in fact has a very strong, strong home. Yeah, you could not enter there just, uh, bluntly. Yeah. Without permission, you could never meet Monk Sina. He was the most stubborn and fearful chief around this area.
[01:04:00] Yeah, he was followed by Monk Mele, Chief Mele.
Rasmus: In what, uh, what year? Yeah,
Edward: in the, in 1890s, Monk Sina was around. It's long before.
Rasmus: How
Today, what makes the Chaka special from other tribes? Until and
Edward: unless you are very, you are very wise. It's difficult. But the language, the accent, the accent can just, you can determine this is Chaga. There is a way they talk, they, okay, they delay or they, okay. And you can just determine, you can just recognize this one is coming from Kibosho.
Maybe this one is coming from Marangu. Because Marangu is where you get the original and you can write the language. It's somewhat difficult, but anyway, you can just write [01:05:00] it. If you go to Rombo Also, they have got a, a different dialect, but we are, we are, we are, we are, we are similar. We are just the same, the same tribe.
Rasmus: Besides the, the, the, the Maltung, is there any difference in, in clothes or how, um, how they live or their decoration made?
Edward: Ah, it's difficult. It's difficult. And
Rasmus: today they can also, they can be Christian and they can be Muslim, anything. Thank you.
Edward: To, to, to be together, to be what? Religion. The Chaga? Yes.
You can have, the Chaga, they can be Christian religion?
Edward: Oh, we have different religions, denominations. We call them denominations. There is Christian, Catholics, Muslim, Lutherans, whatever. But, uh, We stay together. We love each other. One funny thing. We don't discriminate each [01:06:00] other.
Yes. Likewise, there is Lutherans. And Lutherans also, they have got different denominations. Because once you mention Lutheran is only the, not only the Lutheran, you get Sabato, you get to whatever you get to. But uh, the major one is the Lutheran ones. Like here we say K, KKT. Like, uh, when we are coming, there is a church just close to the road.
That is KKKT, the, yeah. Of this North End side. Uh, also down there you could, I'm sure you have seen a Catholic church. So, down there there is a Muslim. Um, okay. In fact, down there there is no mosque, but a little bit distance here you get a mosque. They call it Hidayah. But [01:07:00] we stay together. Nobody discriminate or crush into each other, but we march together.
Yes.
Rasmus: Lovely. Okay, so besides the Chaka, is there any tribes that you personally find very interesting? Some, some, some tribes that you, that you have studied or some tribes you want to study. For instance, we, we have seen the Hadzabe and we think they, they are a very special tribe. They have the special language, a special way of, of gathering food and also for their, for their houses.
It's, they're very special. Is there any, is there any tribes that you in particular, uh, think are special?
Edward: Actually, no.
Alberte: No. No. No. What's up with the, uh, caves? Like now, this is the hut for Chaka. What about the caves?
Edward: The caves [01:08:00] were just, uh, applied there for, uh, the escaping chamber. Because, yes, escaping where you could save your life, avoiding the enemies.
Because, in fact, when the Maasai could just come in, and also, the slave trade caused them to dig these graves. These are not graves, these are caves. Because, um, the traders used to demand the strong boys to For carrying their luggages. You carry luggages from here to Bagamoyo, or you cross that corner to Mombasa, and whatever, it's a long distance.
Um, cheating them or deceiving them that once you go there, they are going to bring good, good items to you. Oh, okay, the chiefs were deprived. And they could release their people. Now, fearing that it might break a wall somewhere, who is going to protect me? [01:09:00] You are not supposed to release your boys. You should go to a different location.
You fight them. You camp there. You camp the strong boys. Bring and just isolating them in your camp. When the traders come, in fact, we could give them away, but not your men. But he decided and scratched his head and said, Okay, one of the time I must go there and revenge. If he comes to revenge, who is going to protect you?
So they could just be aware, training their boys to climb a tall tree and view particularly where the way yeah, was easy for them to come this way. If he could spot one, he could blow that trumpet of a, of a cudo in a different sound. Now the animals, if they were in the, in the, in the goat shade and whatever, cows inside cut the rope and they, the entry used to be inside these [01:10:00] houses.
And since, yes, since it's dark, you don't have a torch, you don't have any. And the alarm indicates that put off the fire, off, by splashing water. And because to start the fire you must struggle. Ah, it will take you time. But, and the animals could detect. There is something wrong.
And my friends, if you are having a shed here, there are goats outside, then you happen to open, even if it is midday, and just clap, they'll just run very fast inside.
And because already the, the lead, they used to treat a cow's skin, yes, as a lead.
Once it, oh, it's a danger. Plunge there and mama could just plunge there. That's why they used to limit the number of children. [01:11:00] One family, one family could possess only three kids. And one, after being born, could remain, could just stay for a couple of seven years. Then they used to arrange, let's make another baby, another kid.
Then after delivery, another seven. But they used to be polygamists. Because the more kids you have, the more honor you could, yes, you could be given. But they only have
Alberte: one wife. Oh, they used
Edward: to be polygamists. And because of possessing big lands, they used to be polygamists. And, uh, preventing land grabbers not to interfere with your land.
One mama there, the other one there, the other one You keep, you keep a boundary, you touch it, then you stay there in the same, in the middle. Yes. So it's only to pass information. You, or [01:12:00] when you slaughter, sorry for any vegetarian, when you slaughter, you supply meat, meat, and they pass you information for, that's how they used to communicate, to be together. Oh yes, let's get around inside there and see the partitions in a, in a, in a, in a reality.
No problem, no problem.
Rasmus: The special, uh, I believe, a Chaka speciality. It's like a potato that grows on the trees.
Edward: Potatoes?
Rasmus: Like, like a potato.
Edward: Oh, [01:13:00] those are
Rasmus: It's a, it's a vinous tree, uh, like a vinous plant.
Edward: They are known as a, yeah, some they call them stone potatoes, but they are, um, this Correa bulbifera.
Rasmus: Is that the Latin name?
Edward: Botanical, yes. Yeah. This Correa bulbifera. All right. And, uh, they produce and also in the ground you get, uh,
oh,
Edward: it's medicinal, it's very nice, it's very lovely. Traditional food our ancestors used to, yes. And also there is another one, hard one, they call it as, um, yam.
Yams. Yeah,
Edward: you buy, you, you, you. Even if you boil it, it is processing a yellowish color.
And the taro yams. Also, they're very lovely. Taro, I'm sure you know. It's the white one, right? Yes.
Okay.
Edward: Your mic. [01:14:00] Yeah, keep it. Then I can record inside. Okay.
I'm sure it's safe. Yeah, it's safe. Just close the bag, the bag.
Can we put it on the, on the table?
Rasmus: Yes.
Edward: Don't want a lizard to come there and start ransacking you. You know what I mean? Oh, yeah, yeah, yeah, yeah. There's some, there's some, there's some stubborn guys around, but not here. This, this one, this guy, this guy can kill someone. What about the pen? Should we carry it now? Okay, [01:15:00] we are coming back here.
Okay.
That one is the best. This one is supposed to be Papa's hat. Papa's hat after, after, after the family's become, but he, it's supposed to be smaller to this one. Smaller

sprinkling things like small stars, making the fire here burn.
Then when you taste it, it just make a, just like a bell, small bell. Yeah,
Rasmus: sounds almost like a metal.
Edward: This, if you bake this one, it'll give you better sound to this one. Mm hmm. Yes. So, that's how. And they are drinking calabashes. Gourd, chop [01:22:00] it, apply a handle for drinking. And it used to depend whom. This is for mama.
This is for ladies. And this is for papa. Discrimination. Papa is having bigger, bigger, bigger stomach. I
thought this one was for the entire family. Maybe for sharing.
Edward: No, no, no. For
father. This is Mpege only for
Rasmus: father.
Edward: For Mpege. Then, they were very funny. For drinking, for drinking, for the, for the, for the, drinking normally, they used to apply small ones.
And this one for making ritual affairs. Yes, by which you feel it. Anything strange occurring around your area, then you feel it, then you come, you sip it. Because what are you giving the elders or the ancestors? You must sip it, then you put it, just close the door, you have performed your ritual affairs.
Then, if you have offered, you have offered, uh, that [01:23:00] Mbegi or traditional Pombe to, to your friend or to whatever, in fact, the person who have given permission to, to, to supply the, the, the, that stuff, must get this Kalobash, this one big one, and fill it with, and put it aside, so that when he ends supplying the, the beer, or the traditional beer, he'll just come holding this.
Telling you, okay, the gave the, the, the work you have given me, it's done. So he drinks, he gives it to you, , so that you have ended up your job. Yes. Yeah. So here, center of this, after kitchen, after kitchen, you see where to keep cows and they could keep a limit of two or three cows, maybe two cows and a a calf.
And this area. Was [01:24:00] located for goats. And the chicken also could just be around. Also could keep some other important items just aside. So this is a traditional hut. And if, sorry for any vegetarian, if you are, you are, you are, your family is big and you could slaughter and your neighbors could just pay visit there, you could supply meat.
There was no carriers of baskets and whatever. So that's one. They used to collect dry leaves of bananas and just put, lay them down plus a leaf of a banana and put it on top of fire to make it more soft and place it there so that you could gather whatever you are given there. Meat, meat stuff and whatever.
Then you bring this one, this one, this one. Then you tie to this and in Kichaga we call it kisangu. To avoid, to avoid bad eye. And even wild animals not to attack you. It was strange for [01:25:00] you to carry meat on your plain hands. You are going home. People would say, Ah! Lovely meat! You go and eat the meat. You diarrhea to death.
So they used to keep it in this.
Mahindri, and it could be there even three years if you remove it and plant it in the farm. In fact, it could grow. But right now, because of, I don't know, the world is changing. Wow, in a month, second one, you see flower flowing from it, coming down. Even for storage, they used to tie these ones and, uh, on a tree.
I selected this tree in the farm, and it would just be there for them.
I feel very happy having this smile. It's a big smile. At the end of your mouth.
Edward: Then you must be a good, a very good dreamer, because, uh, were you calling me for this or that? No worries, please. [01:26:00] I'm
Rasta: trying to switch. I take the camera grip. Okay. It's coming in. Okay. We take this one out. You continue, please. Sorry for interruption. It's over. Maybe, maybe is Nyanga somewhere here? Pardon? Is Nyanga?
I am with him. Soon your food is ready, and then you're going to share. Okay.
Rasmus: Maybe could I get Nyangi in here, because I would very much like to learn which ones, which materials these are made from, and I know Nyangi is very good. He will tell you. He will tell you. Do you know, do you know the botanical names and everything for this one?
I know.
Rasta: And if you have the plant identifier, you take a picture and the phone will tell you quickly. Yeah. Or use mine to tell you. Alright. You take a picture and the
Rasmus: Okay,
Rasta: good idea. As far as you have internet connection, it's very easy nowadays, just shoot your picture. Shoot the leaf, and it will just get to you.
Yeah, that's right. Even the roots or whatever. [01:27:00] Sorry for interruption. Continue, Nyange will show here and he will tell you all about that. Karibu. Although he wanted me to tell because he is my boss. We have the expert here, so. I
Edward: know, we learn through each other. And
Rasta: this is Amy. She works here, so she is happy to listen to
my
Rasta: lecturer.
Karibu, Nyange. Karibu, Nyange. Yeah. I don't know how I got out of the temple and how I got to this place. You know? Even that day when I was going out with the women of Jerumani where my wife and I were studying. People were asking me, you have finished your studies? I said, yes. They were asking me, how are you?
How are you doing? I said,
that's why I'm here. They wanted to ask
Rasta: me, are you studying? I said, no. They were asking me, are you at school? I said, yes. They said, the Edward is tired. They were Pease, he's around.
Rasmus: [01:28:00] I wanted you to come so we can help, uh, or in, uh, in cooperation, uh, distinguish what are the different materials.
Like, actually, like the species of timber, uh, the different kinds of marundi, the different kinds of grasses. Maybe you know, I know, I know you're good with, uh, with, uh, with the botanical name. Exactly. Yeah. Okay.
Rasta: Yes,
please. This is your home from home.
Rasmus: [01:29:00] Um,
we had the room tour just now, and then, um, we were talking about before, what are the different kinds of material that they use for this. I know you use certain types of hardwood, um, so the different kinds of, I don't know Is this called Mirunda also? The way you make this? Yeah, it's kind of Mirunda. Not 100 percent Mirunda.
No?
Rasmus: Just sticks. We call them sticks. Yeah. And do you Was this a resource that was available in the forest around, uh Exactly. Okay. Would they go for a specific type of timber? Yeah, basically they have to do the specific timber. Mm hmm. And Daniel
Rasta: Yeah, they have to be specific, which means some of them has to be really glue.
If the, yeah, if the ants, insects will feed on them, they'll [01:30:00] close their mouth, glue their mouth. And some of them has to be poisonous, really bitter. Not good for feeding. So, distractors will not like your, uh, your materials. Oh, right. Yeah, beside it, the Straw you see from outside is thatchy, not from here, has to be from drier area, very harsh climatic conditions.
If it's from here, this fish grows here, it's the same but subtype of it, it tend to be tender,
too much
Rasta: watery, it's humid on the highlands than in the lowerlands, then it makes them not suitable for that purpose of building. And do you know,
Rasmus: what is the name of this type of, is it thatch, grass, or? Which ones?
The grass?
Rasta: Which one?
Edward: The savanna grass inside.
Rasta: Savanna grass, strong.
Rasmus: Is that the same with, uh, with the game, I think? Chelewa, we learned yesterday? Yeah. Is [01:31:00] this Chelewa? No, it's not Chelewa.
No, it's not Chelewa. It's the other grasses. Okay. The grass that we resisted.
Rasmus: All
right. Okay. Very
Rasmus: interesting. Which type of timber contains, uh, the poison, so the termites would need it?
You know? Is this, is it from eucalyptus, or?
Rasta: Eucalyptus is part of them, yes, but cypress, Cypress
Edward: is the, as
Rasta: you mentioned. Olea, Wesley, and Chio. Olea. Olea in Swahili. Olea Wesley, that's the botanical. Alright. Yeah. Okay. We will show you the tree outside, and when I get connection, you can breed from there. Once we take a picture, the plant identifier will tell you what is the actual species name.
Botanical, scientific, or common.
Alberte: Okay, so what happened up here?
Edward: Um, in fact, it's a space for holding raw bananas [01:32:00] to ripen in a short time.
Okay.
Edward: Because the ones placed there, they gain more. They gain more sugar. And, uh, this place for bananas, that one for firewood to keep them drying. For a rainy day, when it's raining, you can just go inside and bring, and the And
Alberte: is this the stair?
Edward: It's the stair for going over there. The ladder. The ladder. The ladder.
Alberte: Okay. And where's, like, the hole down?
Edward: Uh, here is not, is not here.
Rasta: Okay. Okay.
Alberte: Okay.
Rasta: Normally, it has to be in such a house, but under the beds, or behind the cow,
Edward: where
Rasta: the sewage runs. They have a technique to hide it there with a bunch of dry grass.
So if attackers come in such a house, no animals, nobody, just a bunch of dry grass, they normally Oh,
Alberte: so they took the animals down?
Edward: Oh, yeah. Yeah, the [01:33:00] animals could detect the danger. Just plunge inside, the mama follow with the children, and the papa could remain outside, maybe fighting and whatever, and if he's not intending to go there, he could just But you'll be termet as a coward. You must go and resist.
Alberte: Yeah. Yeah. You have to be a fighter. Yes.
Rasta: Always. But you have to be over 18, and your wife must have first the If you don't have any kid, you are not supposed to
Edward: go for the war, for fighting.
Rasta: Even if you are best fighter, until you are, you have a baby or a kid behind you, as the story about war, life is the neighbor of death.
You can meet one of them in any of the corners along the route you're doing. So, if you go With your life and meet his neighbor death, you don't show back home and no one. Will remember [01:34:00] you The king or the general who drafted you he will be cursed by god because no one will raise your name on earth ever he took you there before having a spring and He know you will never show back or you could so it's his mistake He will be cursed and the land also be cursed to kill Innocent young blood, which they could leave you behind for one year or two years.
Your wife become pregnant, make a baby. Then you have more fighters and it means more fighting. Why should the kid go fight? Because he's not a father yet.
Fight for what?
Rasta: Karim Karim. Ah, the driver. Sorry.
Rasmus: This is the, the, the.
Edward: It's really strong, yes, it could hold a massive row of bananas and in a few days could ripen they could be brought down now for preparing the local brew, the banana [01:35:00] beer. That side, the other side for holding a row of firewood to keep it drying. To use wherever it was raining or whatever, or whenever you intended to make fire inside here.
Alberte: How did you have light in here? So there's no windows?
Edward: No windows, but
Alberte: What did you do?
Edward: Uh, you have seen the gourd? The gourd? The gourd? They could not be smeared with the, with the, with the butter. Yeah. And, uh, they could, it could be used for emergency because it gives bright light and whatever. Otherwise, they were used to the fire which was on here.
Rasta: Ah, no, that doesn't support [01:36:00] itself. It's carried by the entire building.
Edward: The bunches, I said, the long ones must be reinforcing the hut. Ah, these ones you can see going round like belts. Yeah.
Rasta: They put them together and then the house becomes stronger. Without them they will split.
As
Rasta: you know, easily to get broken if you are apart.
But together, stand strong.
Rasmus: Did
Rasta: they ever take
Rasmus: the buildings apart to move it to a new place? I know.
Alberte: It's permanent.
Edward: It's permanent. And
Rasta: it's forever. It's lifetime. I know if you die here, they bury you inside your house in front of your door. A hundred and twenty days. It was a traditional taboo way back.
Changing time to time according to the need and whatever they could
have.
Rasta: The reason they had no enough land, we asked them, so if you did these permanent cemeteries It could be all over, graves and nowhere they could get food for cultivation and so forth. So 120 days they are [01:37:00] sure the flesh will be gone.
Yeah. Only fresh bones. Mm. No smell, et cetera. Okay. They will go for that. Yeah. And take the skull to the gathering of the skulls of your family. They believe that is the holy place you, God of your ancestors existed there. Yeah. They will go pray, they will do everything in that area.
All right.
Rasta: The other bones of your family.
The body will be gathered under a tree, a family tree of bones gathering, so they could use the area again for farming, for building, etc. But if they bury you there, that's it. No one will use the piece of land again, ever. And if you have too many people with a small piece of land, logically as you get higher, the land gets narrow.
Rasmus: It's a very effective mindset.
Rasta: Well, they were sent by nature to do so. Fight is like that. If you are not smart enough, you can't remain in the game any longer.
Rasmus: That's right.
Rasta: So you have to play smarter, get going, not just hard.
Rasmus: Where is the lavatory [01:38:00] in this kind of building? In those kind of
Rasta: life, in those days of this time?
They had a wood stick, like my stick. Um, that meter, a meter high. Uh, it's, uh, sharpened on the bottom like a pencil or a nail.
Rasmus: Uh, the weapon?
Rasta: That kind of toilet tool. It's a toilet
Rasmus: tool?
Rasta: A piece of wood.
Rasmus: Yeah.
Rasta: Like that. At least this far. Yes. But the bottom will be sharpened like a needle or whatever. If they take it to the farm, hit it on the ground, first in front and back, and second, left and right, you understand?
First hit on the ground, you will push forth and back to enlarge it. Next hit, you go left and right, should be wide enough for organic life.
Edward: Organic life.
Rasta: Population boosting, popping up, then pollution comes. [01:39:00] You can't do what you used to do way back. Then they centralized that kind of need. They needed a special area. Started with a big hole. They put logs on. And they planted, uh, special bushes. Here it's a holy plant. Yucca. Or other species that could cover.
And nobody could, uh But as you know, as time goes on, the need of space gets higher. We get closer all the time. So even those We are not good. Easier for people to see each other. As the population gets higher. Then we came to privacy. The modern ones. Concrete, iron, whatever. Although, as we need more space in the world, there's no security.
Now the Chinese, they are crazy. They drop a very private, nice, modern toilet. Nobody will see you. Yes, but not. The Chinese will keep a small camera like that on the toilet. You go there, you do everything, you go there, [01:40:00] and they take it, they clean it. And, uh, some young boys are very happy to see a woman going do that.
Oh, my goodness. You've got crazy young girls happy to see a man going there hanging thing like a cow. It's nature. Unfortunately, it's the world we are living in. Papa is sad. My gentleman friend is sad. But it's life changing. We call it cultural evolution, if not biological evolution. It's normal changes coming across.
And we have no chance to go against. The best thing we have to use our history to learn how to do our best future. And not try to live on the past. If you ever try to live on your past, you're dead. You can't stand the future. You just have to learn to do it. Is it clear? Yes. Sorry for the interruption. I will allow him to continue doing what he is doing.
If you need us, we are available. But he is the expert. He is the master.[01:41:00]
Um, Um, Um, Um, Um,
Edward: if
Rasta: you do a good job, you'll find out you're living in Bingu, you know that? Yes, I know. That's what I mean. Go and find out where Bingu is
Edward: and what you're
Rasta: going to do. Leave those people alone. [01:42:00] Um,
Edward: There is a microphone in my pocket.
Alberte: What, this door is kind of new. Did you have a door back in the days? Um,
Edward: no, this one is modified. Otherwise, in the, in the, during the, the days, they normally used to apply special lugs.
Okay.
Edward: Yeah, so that the animals could not interfere them inside.
Alberte: Oh, they would close it with lugs?
Yes. Placing it like that.
Edward: Yeah, or like this one, you could slide it. You could, yeah. Just slide it.
Alberte: Should we go to the small hut?
Edward: Well and good. Yeah? For the, for the papa.[01:43:00]
So far so good, my dear friends. Yeah. This now, as the children were gaining moral Aware. Aware, whatever. Papa now could just shift to his small Banda, that is where Papa could be. And he never share this Banda with anyone else, only himself. But, uh, in other occasions, Mama could just pay a visit and go back there.
Alberte: It's cool in here. Yes. It's
Edward: weird. Yeah, I mentioned [01:44:00] that there is a conditions here. When it's warm, outside here is cool. When it is chilly, outside, inside here, outside is warm. So it changes, it changes. So this is where Papa Rao, his banda, oh. Uh, what I don't know and I have never asked whether, he never kept animals inside.
Oh. It was only special for him, uh, and special for keeping his local drink there for inviting him.
Alberte: Did he
Edward: have a fire? Yeah, yeah. Oh, the remedy of this hurts. You must be making fire daily service. Daily? Yes. Okay. To keep, uh, to making the, the, the grass strong, plus the sticks. Okay. Yeah. Okay. Have a good one.
It's a strong hut. So this is Papa's [01:45:00] hut. Similar to that one but smaller.
Alberte: And a long tree. Is it alive or you just placed it up?
Edward: Um, some they used to apply this as a, as a king post and it just could be a ladder to go to the attic.
Attic overhead storage. Yeah.
It's a storage bin. Storage, storage bin. It's where they used to pack their crops, especially maize, finger millet, the tiny grains of millet for making
Alberte: Is this shared or for one family?
Edward: Ah, this is only for a family. Every family used to make their own. And they used to pound or to plaster it by using cow dung mixed with the ash to protect the soil.
Weavers, not to [01:46:00] drill this, yeah. They could plaster it totally so that it couldn't tip inside. and leave an entry on top. And they normally used to raise it above the ground to avoid rats. Because, because the rats is very funny when it comes running. Because they used to apply a sort of protector here. If a rat comes and hit here, it must fall down.
It will never be able to drill and get inside to interfere with the crops inside.
Um, it's a storage bin for holding especially crops. This one, this one is a, is a wooden, is a, is a cask, yes. It's for holding, uh, uh, local brew, local brew. Mbege? Mbege, [01:47:00] yes. It's, uh, this one, you see, even my friend, I don't know where he collected it, this is from a long time ago. It's repaired and really, it could say thanks.
Yes.
Rasmus: It must have been an expensive one. Because you see the repairs
Edward: and everything. Two hours of your time. Really, no problem. Talk, talk, talk. It's very good. So nice. Yeah, okay.
Alberte: Do you have any, uh, last questions, or? I think
you went through it all. Thanks so much.
Yeah.
Edward: Thank you. Yeah, thank you very much. The microphone.
Rasmus: I shouldn't forget this. [01:48:00] Great.
Alberte: Wow. And close it. Yeah,
Rasmus: bye bye. Nice

Figure 308: Private picture - Chagga architecture.



Appendix 2

Interview with Triple A Architects

Date: 27.09.2024

Location: Arusha, Tanzania

Rasmus: [00:00:00] Little space here.
Alberte: Someone did,
Rasmus: did Y choose to stay outside or
Alberte: He's in calls in and out. So I think it's, yeah, busy man. Huge, generous. But it was okay that we recorded, right? Yeah, that's fine. Great. Nice. And I'll also just turn this one on just in case. Okay. So as we were just telling Es, we are doing our master thesis, uh, in Denmark. We're both a student architect.
Okay.
Alberte: And so, yeah, we, we just wanted to learn like how it is to practice architecture here and what you see for the future, uh, in architecture. And then, um, yeah, we were inspired by your article on, uh, vernacular architecture. Yeah. So that's maybe the topic here. Yeah. But how long time have they travel ever been in business?
Um,
Beatrice Loishiye: 40 years in two years. So.
Alberte: Forty years?
Baraka Sikawa: What? [00:01:00] Been here since
1986. Wow. Okay. So, yeah, so now 48 years. Yeah, wow, great. That's long.
Alberte: And is the founder still here, or who is the founder? He's still here. He's still here.
Beatrice Loishiye: He's retired, but he's still here. Okay. We do run some projects through him as well.
Alberte: Yeah.
Beatrice Loishiye: Yeah, only the fun projects, not the, the more, the
Alberte: special ones. Yeah. Okay. Okay. Yeah. He likes to draw the concepts maybe. Yeah. Yeah. He's more on the manual side of things. Yeah. Yeah. Okay. Nice. Well.
Baraka Sikawa: He's also very good in project management. Yeah. Yeah.
Alberte: Okay. So, being on the construction side and. Yeah. Yeah.
Yeah.
Beatrice Loishiye: He
Alberte: has more, I
Beatrice Loishiye: think he has the most experience when it comes to construction. Yeah. So if there's any technical issues on site,
Alberte: he's
Beatrice Loishiye: the best person.
Alberte: Okay. He'll come. Yeah. How many people are you at the office?
Beatrice Loishiye: Um, 17. 17?
Alberte: No,
Beatrice Loishiye: I'm 20. 20 now? [00:02:00] 20. If you count interns.
Alberte: Oh, okay. If
Beatrice Loishiye: you go to England we are twenty, right now we have four interns, so twenty one.
Alberte: Yeah?
Beatrice Loishiye: Yeah.
Alberte: Okay, nice. Do you have an architectural school in Arusha or do they come from Dar es Salaam or? So they are mixed.
Baraka Sikawa: It's from Dar es Salaam and there. Those are the only two.
Alberte: Three? Three architectural schools? Yeah. Ah, okay. Which one are you guys from?
Baraka Sikawa: I'm from Aldi, not in town. I'm from Berja.
Berja.
Beatrice Loishiye: Okay. Yeah. So you have some few, only three from Berja, and the rest are from there.
Alberte: Okay. Yeah. And when you are, like, student at the architectural firm, do you only learn how to draw, or are you also a part of the construction side, like, the engineering kind of part?
Baraka Sikawa: Um, or
Alberte: is it just drawing or,
Baraka Sikawa: I wouldn't say we are, we are [00:03:00] more geared to the architectural engineering part.
Okay. So even the way you design most of the question is how would you construct this? Mm-hmm. Especially in our context. Yeah. So if you come up with an idea, which is I would say a little bit too advanced for photos and know we don't have the mechanism to build it. Yeah. You get you, you get crushed.
Alberte: Yeah.
Against the idea.
Baraka Sikawa: Yeah, you just have to find a way you can, you can
Beatrice Loishiye: explain it, explain the construction details. The construction details are the most important. I remember when I was in school,
Alberte: they
Beatrice Loishiye: don't care about how it looks like. It's like, how can you, how do you do this? Is there anything new we want to know about the construction method?
So you can have the most ugly building, but you explain the construction, how to fit in like, cool.
Alberte: Okay. So you actually also kind of construct, uh, contractors. in some way or what. Ish. Yeah, you can advise, advise the fundies here. Yeah, you can actually,
Beatrice Loishiye: um, they are teaching us to be more project [00:04:00] managers rather than, yeah.
Okay. So we, Oh,
Alberte: interesting.
Beatrice Loishiye: Yeah, so my school used to be a technical college.
Alberte: Yeah.
Beatrice Loishiye: So everything was more on the technical side of things.
Alberte: Okay. Yeah,
Beatrice Loishiye: so our, so every year you're supposed to do like a field study. Yeah. We were forced, because we liked it.
Yeah. We were forced to do site works. Okay. And not go to the office.
Oh, so you had to be on site and. Only the last year you're allowed to come to the office. Okay. Which is different from that.
Baraka Sikawa: Yeah, um, on our side it was because it was the older generation architects. They wanted things to go manual, they were much more interested with, um, with the designs that could be built.
Yeah. But then the, the newer generation of architects who had just finished, I'd say when I was in year one, he had, I think four, he had finished four years before I got to college, they were much more interested in the conceptual. But, [00:05:00] you should think to come up with a design that is different. And sometimes you would see the teachers arguing between themselves.
If it's good or bad.
Alberte: Yeah.
Baraka Sikawa: But it's usually, it's usually not a very good sign because it's usually the senior lecturer who would get in his way. Yeah. So if you're on the side of the senior architect or the senior lecturer, you get through. Yeah. If not. I think in our last year, some of the students were in, um, when we were doing our dissertation, we were in panels, we were different, we were about 102 when we were finishing, so we were, we were, uh, participating, we were putting portions in different, um, um, Oh So, no, not necessarily, um, not necessarily.
It's hard to predict, but it's hard to make a decision, because it's a question of manageable sections. So, those who were doing, um, the notation on urban design, they got teachers who were actually clashing that urban design is not architecture or is [00:06:00] architecture. Oh, okay. So, if one of the lecturer, and actually most of them were, actually all doctors, so if there was a doctor who was, who was saying.
He was against urban design. If he was not there, then they would get low marks. When he comes back, the marks get reduced. So there is a little portion pool between even the lecturers themselves. And, um, yeah. Yeah. But then, right now, that was, um, after I finished, there was one university. But then it got split, um, Um, now some of the lecturers which were in the, at the university, they went to the University of Jerusalem and started a new, um, there's a new course or a new bachelor's degree in, um, in Jerusalem.
So at least, um, at least they have two, two universities now. There also the, the thought, [00:07:00] um, on the way they teach architecture is a bit different between the two. Yeah. I see that. The students who come from the University of Dar es Salaam are geared more toward, um, designing. Yeah. Okay. They're
Beatrice Loishiye: flexible with their design.
They're, um, they've been taught it's okay to just go as creative as possible. Yeah. While others, they're still, I mean, playing Creative, but playing self safe. They're now, I'll say they're still strict. I think they're still the technical course. The university is known for being best in civil engineering.
So it's like most of the teachers kind of like are on the civil engineering and structural part of things. So they still, they'll get you something but they can explain the construction part of it.
Alberte: They can?
Beatrice Loishiye: Really good. Yeah, yeah, yeah.
Alberte: Okay. Yeah, that's good. We're doing like a small [00:08:00] project here in the north, yeah, in
Mushi,
Alberte: and there we just found it was really hard to come up with new ideas for the fundis, because they're used to one way, and so if you can't explain exactly, then it kind of just, yeah, the idea gets kind of lost, you know, yeah.
So do you have your own, like, team of fundis when you work, or? Like how do you do that? How is the construction? So we don't build. No.
Beatrice Loishiye: We supervise construction.
Alberte: Yeah.
Beatrice Loishiye: So, um, so we get to work with different fundees, a lot of different fundees.
Alberte: Yeah.
Beatrice Loishiye: And It actually depends on the type of project you're working on.
There are some, the contractor can easily understand the drawings, and there are some you have to be on site, measure things, explain, this is the ratio I'm talking about. Try this sample. Oh, that's a very good example. Yeah? Yeah. Yeah. We saw this on your webpage. Yeah, yeah. So we did a lot of trial and errors on that.
[00:09:00] Okay. Yeah.
Alberte: Like, what was the challenging
Beatrice Loishiye: part? So it's not concrete, it's just mortar. So it has been made with just sand and cement.
Alberte: Oh! Sand and
Beatrice Loishiye: cement,
Alberte: okay. The top part or?
Beatrice Loishiye: Um, so the ceiling, the top part. Yeah, yeah. So there is a steel skeleton.
Alberte: Yeah.
Beatrice Loishiye: A lot of steel skeleton goes in there. Yeah. So it was a bit tricky to convince the contractor, um, even the structural engineer that we need something that looks lightweight. Right. Right. Yeah, though it's full as if it's heavy. Yeah. Yeah. Yeah, so you need a lot of trial until we get so we build three Three of these of three. So the first one Really looks heavy, but the rest, after they try, the rest is like, ah, cool, we don't really need to do that, we don't really need to do that.
Alberte: Okay.
Baraka Sikawa: And I think even, even the contractors that we have worked with in different, in different projects, yeah, we tend to push them a lot. Norm, [00:10:00] so, I mean, there's one project that we, we had a bit of a struggle. As I said before. Um. of, um, concrete and steel, and it was also a learning curve for us. So even the structural engineer was, um, was looking at the building as, as if it's a, like it's a, it's a, it's a bridge.
So there's a lot of steel, and then you infill that with, um, blocks and, and the slabs of, of concrete. Even the contractor himself, they were, they were learning something also, this is something new.
Alberte: Um,
Baraka Sikawa: we were also getting, oh, this is something that you shouldn't do, you shouldn't mix the contents, you know.
In this manner, you have gaps, which water leaks, and we didn't, we didn't do that initially. So it was, uh, we didn't do that.
Alberte: Yeah.
Baraka Sikawa: Yeah.
Alberte: I guess a lot has changed through the years. If it's such an old architecture firm, then new materials are also just coming and you need to learn how to [00:11:00] use them.
Beatrice Loishiye: And clans are actually right now, I think the first, last five years clans are actually open to let us be creative.
Yeah. Somewhere like, I don't know, anything like that, I just want concrete blocks, mortar, columns. That's what they want. I mean, I'm sure most people want to play it safe. But we got, we're lucky that we get clients that are like, okay, make something unique. I want this as a landmark for everything.
Alberte: So it's
Beatrice Loishiye: like, you see that building now, you know where you are.
Alberte: So,
Beatrice Loishiye: which is good for us. Let's push our limits because at the beginning you played safe and like, no, I want something more creative than
Alberte: this. So do you use some like, Now, as you say, you're using a lot of concrete blocks, like, but traditionally you have probably been using, like, more clay and mud and stuff like this. I use this. Kind of introducing that in your modern [00:12:00] architecture or how do you go about it? Oh, I know you're
doing it.
Beatrice Loishiye: You're
Alberte: doing it?
Beatrice Loishiye: Yeah. Like, um, mud, bricks, clay. Like what,
Alberte: like sustainable building materials? Because as we know, the concrete is not really good for our environment. So, yeah.
Baraka Sikawa: I would say it's a very few clients who would go for that.
Open minded. Yeah. Okay. Bye. I've been trying to do that just for my personal projects, and then, um, my mum was like, no, you can't go backwards. We came from man houses. You can't build that. Even though you explained that, um, man has much more, um, thermal comfort, they look at it as, you just go backwards.
People just laugh at you. Yeah. G.
Alberte: Yeah.
Baraka Sikawa: Um,
Alberte: but you tried to do it for yourself or?
Baraka Sikawa: Yeah,
Alberte: yeah, yeah.
Baraka Sikawa: I was trying to do it, but [00:13:00] um, right now I gave
Rasmus: up on that idea.
Alberte: You gave it up. No. .
Rasmus: What kind of challenges did you face? The reputation of a, yeah, what, did you stop
Alberte: there? Did you start the project or did you just.
Baraka Sikawa: No, I studied it a bit, and then, yeah, so you know, building up a wall. So I was, it was actually mixed Javis, so it wasn't completely, um, the, the, the So it was mixing using, um, logs and then having, um, almost having a layer of, of, of mud. So it looks like it's a, it's a mud house, but it, it actually has, um, um, logs as the, as the structural part.
Um, I think right now, what I would use as the most sustainable would be drum death. I, yeah, I think that's it's a modern take on the traditional way of building. Are you
Alberte: doing some projects with rammed earth? [00:14:00]
Baraka Sikawa: We did a test here at the office.
Alberte: Ah, you did a test?
Baraka Sikawa: Yeah. Okay,
Alberte: cool.
Beatrice Loishiye: So we have different samples, different soils.
We
have
Beatrice Loishiye: two, three projects. Proposed, I should say, projects. Yeah. But the three projects, the first one is just a simple residential that the clients really want around there. So it was their ideas, not even ours. Ah, cool. Yeah, but their, um, their site is on a hill. So they want over cut, um, soil to be used for, for the walls.
Alberte: Yeah.
Beatrice Loishiye: Yeah, but they have no idea how to do it.
Alberte: No. Do you have any idea how to
do
Alberte: it, or?
Now
Baraka Sikawa: we know. Now we know. Now we know. And, uh, and, uh, at least we, we talked to, to, to Ron Deth, a specialist. He's a, he's an Australian. He's, he's doing a lot of projects in Australia, in the, in the Gulf, um, um, region. [00:15:00] Um. But the way, the way he talks about Sinamanth is not using the soil that you remove from site.
So he is talking about going to a quarry, um, getting the, the dust, and to use that. Need
Alberte: the perfect mix, mixture, right? Yeah.
Baraka Sikawa: And it, it actually feels like it's concrete.
Beatrice Loishiye: It's actually a very, very strong concrete block. Yeah.
Alberte: Yeah.
Beatrice Loishiye: Because the same as building of the stones, just like
Alberte: a grinded
Beatrice Loishiye: stone.
Alberte: Yeah.
But it hasn't been heated, right?
Baraka Sikawa: But you have, we, you do add about 10 percent of cement.
Alberte: Ah, okay.
Baraka Sikawa: So to make it a stabilized soil.
Alberte: Yeah.
Baraka Sikawa: Okay. And then we have done a test here. There was a soil that we actually thought it was very good on the test. Yeah. But then when we left it for, I think, about two weeks, we It actually, if you just give it a little bit of water, it drips down.[00:16:00]
It erodes?
Alberte: Yes. Yeah, okay.
Baraka Sikawa: And then the best soil was the one that we did. On site. Which was not advised at all for
Beatrice Loishiye: me, especially this one.
Alberte: But has he been working here in Tanzania or has he only been working with the soil? In Australia? Yeah,
Beatrice Loishiye: he
Alberte: does a
Baraka Sikawa: project, yeah, he did a project. In Ghana? Yeah. Pana, where is it?
Ghana. In
Alberte: West Africa. Ah, okay.
Beatrice Loishiye: Okay. But he's advising that it's not the best soil because it's not consistent. Okay. Yeah. The hairy one, you can get. If you want the specification, you can get that from the quarry, because they have the stones, so whatever it is, is there, then the dust has those properties.
But digging your own hole, taking the soil, then it's different, because from this hole to the next hole, it's too different.
Alberte: Yeah.
Baraka Sikawa: And we get it, it's a, it's a, it's a, it's a liability issue, right? Yeah. Yeah. [00:17:00] I think he's working with a lot of engineers and, um, just for liability aspect he, he actually can't do that.
Because he's, he's actually building, um, some of the buildings, uh, three, four stories I think I've said that. Even more. With rammed earth. With rammed earth, and they're being, um, almost produced offsite and then brought onsite.
Alberte: Okay. Yeah.
Baraka Sikawa: Which is a completely, I think, a different way when you think of rum that it has to grow from the ground.
Yeah,
Alberte: exactly.
Baraka Sikawa: So,
Alberte: um,
Baraka Sikawa: there's, for example, there's a soil, um, which is where I would like to test out, um, for myself. It's a, it's a soil in Ngosa. And from, um, that we see the soil properties there is so good that even, even when they're constructing the normal buildings, if they use that, um, it's almost sandy, they mix that with less cement because it's actually, it actually holds quite well.
[00:18:00] Yeah. Maybe less cement. Yeah. So maybe trying to test that soil and see
how that works.

Baraka Sikawa: How did you find out that snow has great properties? Um, we haven't done, we haven't done any kind of a lab test. But it's, uh, it's, it's from what the, the funders are doing on that site. On that, on that part of La Rochelle.
And I think it's because it's a volcanic soil. We're not sure why it has that properties. Until we take them, maybe to We can go through a lab test here in our workshop at the University of Birmingham,
where
Baraka Sikawa: we can get to another, the real comprehensive strength of that material. If it makes sense to go three stories, two stories, you can say that to another client.
Alberte: For the safe choice, the [00:19:00] concrete blocks. The concrete blocks, yeah.
Baraka Sikawa: Yeah. And it's not even just about safety, it's also, it's Available. Yeah, availability and also, um, the, that's what the, the skilled level in construction involves. Yeah, uh, yeah. Even just using brick, um, the brick works, the small bricks. The bricks, yeah.
Yeah. It costs more because you, you need, um, you need a much more skilled, uh, masonry, uh, masonry, um To do that. Yeah. But if it's just concrete cluster, you know you're going to put a plaster. So it's, it could easily just quickly put it up. Yeah.
Alberte: Okay. In Denmark, we are talking a lot about like, oh, we need to build more sustainable. Are you aware of this as well, or like how, what's your take on this topic of sustainability? Do you have some strategies for it or, it's not really, uh, what's it called? The clients don't really [00:20:00] require it.
Hard question. It's, I
Beatrice Loishiye: would say it's a bit of 50
Alberte: 50.
Beatrice Loishiye: So it's something that we pitch and we preach.
Alberte: Yeah.
Beatrice Loishiye: So like, the first concept we are always putting all the sustainable elements we want in the designs. But at the end of the day, the clients are always like, Uh, not really. Yeah, I don't really want all that.
Okay. I can only do one, two, three, four. Yeah. And mind you, the sustainable options in Africa are actually expensive rather than expensive.
Alberte: Okay, what, what could be the sustainable options?
Beatrice Loishiye: Um, so let's say if you want a green roof.
Alberte: Yeah. That's
Beatrice Loishiye: expensive. Mm hmm. Rather than just having a slab.
Mm hmm.
Beatrice Loishiye: That's cheap according to, yeah, according to numbers, that's cheap.
Yeah. So
Beatrice Loishiye: you'll find that you want this cool design that will look better with a green roof on top.
Mm hmm.
Beatrice Loishiye: You convince the client that, ah, it will be fine. But once you get The actual cost estimate just like,
Alberte: looks nice,
Beatrice Loishiye: but not [00:21:00] really. Yeah. Okay. So, um, that's what I'm saying, it's 50 50. Some are flexible, some are not.
So that's, we are opting, right now, it's the, Second month,
Alberte: third
Beatrice Loishiye: year. I think that we are focusing on just sustainable tension.
Alberte: So we try to Oh, so it's quite new for the company?
Beatrice Loishiye: We were practicing it, but not officially. Not like now everyone has to Now you have like, whatever it is we're designing, where's the sustainable part of
Alberte: it?
Yeah, do you have to like, um, what's it called, like list the sustainable elements? Or, like now you say it has to be sustainable, but what is Um, all
Baraka Sikawa: I can say, given the way we were, we were taught, is to reduce the, any kind of mechanization throughout the building. And it's, it's because there's a lot of power issues, it's because of the, of the costs [00:22:00] of, um, of, of anything that needs, um, mechanical, um, or electrical, electricity driven mechanisms.
So instead of having ACs, you're pushed to use orientation of the building so as you can get a good air flow. The most you can't, if you can't, if you get to do that, at least have a fan that could create that kind of movement within an air movement within a building. So it's small things like that, but they actually It tends to be the, almost the norm, but if you go in some parts of Tanzania, like Dar es Salaam, it's, I think it's also because it's growing as a city, so also the climate, the microclimate changes.
So it's always hot, then you just need an A. C. and you, you design a house, someone that looks nice, you have no A. C. and then after two, three months they tell you, we [00:23:00] need an A. C. Oh, okay. And so you need to just put outside. Yeah. It even, it even changes the elevation that you were thinking of, designing the elevation.
But
Alberte: do
Baraka Sikawa: you
Alberte: think to design, like, okay, now you're mentioning this air flow going through the building. Yeah. Is that just designing the openings or are you, are you going for some kind of special form that is providing with this air flow?
Baraka Sikawa: Um,
Alberte: Or like, how do you introduce.
Baraka Sikawa: I say, for example, for a project that we've been working on right now on Zenda, it's um, it's the use of, I don't know, like the corner storey, um, um, windows, and then also the orientation of the, of the building within the site that captures the
Alberte: Ah, the windows.
Yeah, okay.
Baraka Sikawa: So it's actually, it's things that we are taught, but sometimes you go to a [00:24:00] site, um, but the only way you can orient the house is towards the road accesses. Yeah. You can do this, but you need to twist it. Yeah. Yeah, okay. Um, but, yeah, it's a challenge, but yeah. If you get a, um, if you, if the site, um, um, can accommodate, um, the, the Disney sites, yeah, we, we definitely
Rasmus: tell
Baraka Sikawa: the
Rasmus: client to do
Alberte: more.
Yeah, yeah.
Rasmus: Could you, could you, uh, point out any, any project in particular that you are, uh, particularly fond of when it comes to applying, uh, sustainability measures?
Do you

Alberte: Ah, okay. Yeah.
Baraka Sikawa: And there's quite a lot of that philosophy of going green. So it's using greenery for privacy. It's using, um Um, that, because it's in a part of Arusha where it's in Kisomba, if you've been there. It's quite a very dry part of Arusha. Okay. So having, having introducing those green, um, greenery, it's, it's for the effect of cooling, it's for the, also for, for noise, it's going, it's going to Masking
Alberte: the noise, yeah.
Baraka Sikawa: So it's, uh, it's those themes again, we are repeating them. Yeah.
Alberte: Yeah. Do you have any kind of [00:30:00] sustainable certificate you are kind of going for? Do Tanzania have that or? No, not yet. We know
Baraka Sikawa: only of one architect in Tanzania. Who did that? I'm not sure if it's a project in Tanzania. I think it's a project in Zambia.
Beatrice Loishiye: The one, no, the one was big. It was triple glazing. The restaurant was also bigger. Triple glazing?
Baraka Sikawa: Yeah, it's very expensive. Yeah, it's massively expensive. It's massive. If you go in a commercial sense, it's, um,
Beatrice Loishiye: Doesn't make sense.
Baraka Sikawa: Yeah. No. No, I wouldn't go for that. Maybe if it's just, um, maybe if it's a government office, which there's a security, she's also going to go into organizing.
Yeah. So
Alberte: it's hard to kind of measure. Sustainability in your projects. Yeah. No,
Beatrice Loishiye: it
Alberte: doesn't exist.
Beatrice Loishiye: No, we don't have like a national certificates. No, I don't think so. Okay. Yeah. I [00:31:00] think the only thing we can do is get maybe a recognition or something in Akadeli. Yeah. Yeah. But
Rasmus: how do you prove that, that they're sustainable, the projects like um, I mean, Denmark, it's very common to, to make a life cycle analysis or assessment of, sorry.
Uh, where you, where you measure the, the, the emissions associated with using certain building materials.
Alberte: So you kind of map the whole process from cradle to cradle? Mm hmm. Of like concrete, okay. First you get it from here, then you transport it, then you, uh, burn it, and then you da da da da. Basically. So the whole life cycle you kind of map for every material.
And their carbon footprint, but
Rasmus: basically they're kind of generic data sheets. So you have carbon on one side, you have maybe earthquakes on the other side. And you can easily see, Oh, this one is much more sustainable. Um, is that something that's, that you work [00:32:00] with in that scenario?
Beatrice Loishiye: I would say no. No, in those times, no.
No. No. Because I would say if, if there is, um, the carbon monkeying, I'll say it depends on where the site is. Honestly. Yeah. Because you are supposed to count from where you get the materials, not from where the, um, not from where the manufacturer manufactured this material. Okay. And most things are done on site.
Yeah. Yeah, so I was talking to this person who was just telling me that generally, uh, when you talk about sustainable, it's touching the earth lightly.
So if
Beatrice Loishiye: there is not any, according to them, if there is not any effect around the, uh, on the environment around your site, then you have achieved something.
But if there is some destruction around, you have cut maybe let's say 50 percent of the trees, you have destroyed the environment, then that will count as not being sustainable. Okay. Yeah.
Yeah. Yeah. So, I would say that would be my take on it, but [00:33:00] counting the carbon, no. That would really be tough.
Baraka Sikawa: I think I've seen that pretty much a little bit in ARCHICAD, the program that we're using.
ARCHICAD? Yeah. But I've never actually done a calculation of really getting that though.
Alberte: No.
Beatrice Loishiye: Most concrete are mixed on site. Yeah.
Yeah. Yeah.
Beatrice Loishiye: So there is that. Only a few buildings, like, maybe if you are going 10 stories higher, you'll get from a concrete supplier. And that's the only part you can actually measure.
10
Alberte: stories?
Beatrice Loishiye: Yeah. Okay, wow. You get a mixer there, and two or three mixers, and you're good to go.
Baraka Sikawa: Yeah. And I'm saying that it's because there's no, there are very few clients who would say we want this. Yeah, yeah. Yeah.
Alberte: So, the, it seems like the initiative to being sustainable is very little here [00:34:00] because it doesn't get enforced by law or anything.
Yeah. No,
Beatrice Loishiye: because if, if we're talking about trees, you can cut all the trees on the site.
Alberte: You can?
Beatrice Loishiye: And no one will Once you get the permit? I'm saying no.
Alberte: You know,
Beatrice Loishiye: if you get the permit, you can do as
Baraka Sikawa: you please. I'm saying it depends, it depends on where.
Alberte: Yeah, okay. Oh, you have to get the permit to cut the trees.
Baraka Sikawa: I would say, for example, in, in Dar es Salaam, they wouldn't even care if you cut all the trees. No. Yeah. But if you come to Patsi in, in Arusha, if you go in Moshi, um, in some parts of Mbeya or Molo
Beatrice Loishiye: No, as, as, as long as they're not on the river, river line.
Baraka Sikawa: I
Beatrice Loishiye: know, even And they're not, they don't have any historical impact.
Baraka Sikawa: I know. I've seen in Moshi just, just to get the parent, it has to go through the original, um,
Beatrice Loishiye: In Moshi? Yeah,
Baraka Sikawa: you can't just cut a tree. If you cut a tree, [00:35:00] they're on your case almost every day, you'd have to answer for that.
Alberte: But that seems very sustainable in some way that you're not allowed just to cut it all in some places.
I'll say
Baraka Sikawa: in some places. And in some places, which is why I'm saying for, you know, So, for Dar es Salaam, where they're just pushing that for construction, for the city to grow, they're not very much, they don't really care. Unless the climate changes quite significantly and they can actually prove that it's because we're going in the wrong way of construction, then maybe they might start doing that.
But, that's it.
Alberte: No. Okay.
Baraka Sikawa: Go ahead, Les. They could get money out of that, because that is usually the biggest incentive for, I'm saying for the government to enforce something. Yeah. Anything. As long as they can, as long as they can charge for, whether it's some sort of taxation or [00:36:00] a levy. Yeah. Then you would see that getting pushed.
Alberte: Okay.
Baraka Sikawa: And
Alberte: when you're doing like a construction, do you have to get it um, you What, approved by the government?
Beatrice Loishiye: Yes.
Alberte: Yeah, okay. And they come and do check ups and Yeah. Oh, okay. Check ups, no.
Beatrice Loishiye: Now they do. Now they do. Now they do? Okay, something new? I've
Baraka Sikawa: seen that in government projects. Now they are
Beatrice Loishiye: forced not to sit in the offices.
Baraka Sikawa: Yeah.
Beatrice Loishiye: So there is an issue where I will ask for a permit for a single story, and then I'm building five. Okay.
Alberte: Okay. Okay.
Beatrice Loishiye: So now they do like, they do, they don't have like a timetable schedule, but they do, they will go through your site once or twice. Yeah.
Alberte: Okay.
Baraka Sikawa: I think it depends if you're for residential buildings, which is even, I would say that's, that's where most construction is here.
They [00:37:00] don't follow up because if they put these roadblocks, it's just saying, systemic people don't build your house. Yeah. But then if it's a, if it's a commercial, if it's a commercial, um, project that you're doing, yes, they would follow up on and stuff. And especially right now, there's the issue about fire safety.
It's, it's a growing concern in Tanzania because a lot of buildings, they, they really didn't care much about that. Yeah. But now it's, um, they're now getting, um, Okay.
Are you
Alberte: working together with somebody that can approve your designs and for the fire regulation? Or for the, uh, construction part, like, uh, the dimension of the,
Beatrice Loishiye: No, so we have to get all the permits from the government. Okay. So you have to, the first step is after you get your drawings.
Yeah. You
Beatrice Loishiye: get them stamped by architectural firm.
Then after that you take them to fire department. Okay. Okay. Okay.
Okay. So they have to
Beatrice Loishiye: cross check that. Okay. You have all the exits, [00:38:00] entrance, right, all the windows are okay, and the rest. Then they'll stamp your drawings, give you something like a permit that they have observed. Yeah. They might even want to go to your site and cross check.
Alberte: Yeah. And then
Beatrice Loishiye: after that, if they approve, then that one step towards getting the building permit.
Alberte: Mm hmm.
Beatrice Loishiye: And then the building permit, the government will actually go and cross check the site If it's correct, and then if there are trees, um,
Alberte: yeah. Okay.
Beatrice Loishiye: After that, you get the palm to build.
Alberte: Yeah. Oh.
Baraka Sikawa: I mean, I've seen just one place in Africa, um, excluding South Africa, because they're very well advanced in terms of, of construction.
The only other country that has even a code is Ghana. I've seen that for their fire safety, um, you should not have less than two exit doors, and, and I think a lot more than [00:39:00] four, three or four doors on the, if you have a ground floor. Um, and then you need to have some of the windows to be, um, because they know, uh, we have to have these, uh, security, you need to have at least some of the windows not to have that for just as a fire escape.
Yeah. Yeah.
Alberte: Yeah.

Baraka Sikawa: Okay. Yeah. Yeah. So. I'm hoping that also Tanzania will also be moving in that direction of actually having codes of why, um, because at the moment, even when we take our drones to fire, I'm not even sure exactly what they're taking.
Beatrice Loishiye: No. Yeah. They don't have like a list of, we're checking one, two, three, four, five.
No. So the only thing I got like a comment was the JFFT project, it was a big, huge project. So they wanted to know, exit. because we had plenty, but it [00:40:00] was not marked correctly.
Baraka Sikawa: Oh yes.
Beatrice Loishiye: And they wanted some few doors that we made them open inward to open outward. Okay. But then we had to explain why they were inward.
They were on the veranda towards the fire escape route. So if you open outwards, then it's like you're knocking people off the veranda. So we had to explain that. That's the only Of course in a good take. This is wrong. You need to change this. I have to explain it. They're like, oh cool. We'll see what we can do.
But they put that on the recommendation because they give you like a recommendation.
Baraka Sikawa: Yeah. So that for, for any commercial and institutional buildings or, um, yeah, offices and business. government institutions, you need to have clear, um, fire escape routes. Yeah. That I know for sure. Okay.
Alberte: And is there, like, um, a size of the building, like, below the size you don't have to do all this, or is it with every single, [00:41:00] like, housing project you do, you have to file it?
Like, I would just assume, like, one story, like, maybe 30 square meters or, like, 50,
Beatrice Loishiye: below
Alberte: 100.
Beatrice Loishiye: Now they want everything.
Alberte: They want everything.
Beatrice Loishiye: I think five years ago it was okay for a single story to not have any, even fire. You can just, and you don't even have to go to the, um, to the regional level to get your building permit.
You can just go to the village council
and get a
Beatrice Loishiye: handwritten building permit. Like, it's their land.
Alberte: Yeah,
Beatrice Loishiye: they're building a residential building. That's it. Yeah, but now anything you're building they want to save a permit
Alberte: Okay. Yeah, because we see a lot of like farmers and like people who don't hire architects Yeah.
Then they just start building themselves. But they
Baraka Sikawa: And that is usually mostly the cities. Yeah. When you ask them to go outside of the cities, they Yeah. They truly don't fall out. In the countryside. Yeah, they don't. Okay. For the [00:42:00] cities, because of, um, there's a need to control so that you don't build on someone else's land.
Mm hmm. It's quite a big issue right now.
Alberte: Oh, okay.
Baraka Sikawa: Um, land ownership. So, one aspect of why you need to get a building permit is to ensure that The land you're building is actually yours, yeah. And if it's not yours, there has to be an explanation why. So there's some kind of partnership maybe. You have your land, somebody else is building, and maybe after some time you get the building in the end.
So there has to be an arrangement written out that they can accept.
Alberte: Mm, okay.
Rasmus: Is that why you always have to include the deed when you make an application? Yes, yes. Okay, yes.
Alberte: Yeah. Yes. Makes sense.
Rasmus: Yeah. Alright.
Baraka Sikawa: And then it's also, it's also another way for the government
Alberte: tax Oh, they do taxation on like, eh, yeah.
Your buildings. Yeah. So when you get, you have to pay [00:43:00] a tax for it. Yeah.
Baraka Sikawa: So when you, to get the building permit, there's a, there's a certain amount of fee. You
Alberte: okay?
Baraka Sikawa: Yeah. And then after you've finished, there is a property tax. So it's one way to mark that. And now they're attaching also
Beatrice Loishiye: the building plans with their team number.
So it's like, uh, your name, your information, you go to check your team number, it's like, eh, you have this huge debt. Because you haven't paid like property tax.
Alberte: Okay, okay. Makes sense. Yeah. So, um, okay, switching the topic. So we were very interested in like how you translate this cultural heritage, into a modern architecture.
Are you aware of this or like now just reading your article it sounded very interesting but I'm not sure I can see it in all of your projects like how like how you introduce this [00:44:00] heritage you have or are you just looking forward and get it like where are you getting your inspiration from? I'd
Baraka Sikawa: say there's some projects, yes, we, we look at, we get inspirations from, I'd say from, from the way, um, buildings or village or, or housing, and, and the way it's done, um, locally in the different parts of Africa.
So, for example, one project that we've been, the one that I keep going back, the non residential, the office one. Yeah. It was a building, um, so the client is, um. Um, it is German based. The founder is German based. But it's an office building for different regions of Africa. Um, church. So even the architecture also needs to not just be Tanzanian.
It needs to almost, um, talk about the African [00:45:00] architecture.
Yeah. Yeah. So what we looked at is how most of the, um, uh, organization of, um, on a site, um, against what the regulations of the government wants when you're building, it's a, it's a, it's a beach front property. So you have to, we have to go with what the government wants and then, you Um, match what, um, we call the African architecture.
So, the, what we looked at was organization, the shape of the building,
um,
Baraka Sikawa: the material inside. It looks like it's African, but it looks like it's a, um, native, um, way of building using mud, but it's actually using ferrocement.
Alberte: So you're not actually using the mud? No, no. No, you did use the cement? [00:46:00] Yes. Yeah, okay.
Because it's
Baraka Sikawa: a, um, if we went with the mud route, it would be almost like building, I think, the mosque in Mali. They have to repair each and every year. Oh, okay. So you can't go that kind of route, especially in Da'in, especially a rich front province. So you at least have the material there. Would be able to, to sustain that.
Yeah. And then at least give that feeling that this is still
Rasmus: African.
Alberte: Yeah. Yeah. Okay.
Rasmus: Do you have a picture of that property or I see you have some there. Maybe we can see it on the computer. Um, we still, we are now. Okay. Yeah. We, anyway, we'd also. Briefly about some of the other projects in your, in your, uh, in your book page, because some of them seem very interesting.
Beatrice Loishiye: Yeah, like this one. This
Rasmus: one? Okay.
Beatrice Loishiye: Yeah. This is the
Baraka Sikawa: latest [00:47:00] one. Thanks. Oh, I think, uh, I think this needs a few more edits. A
Beatrice Loishiye: few changes.
Rasmus: How about the one in the, um, in the top right?
Beatrice Loishiye: Yes. That was
Rasmus: a very distinct character also.
Beatrice Loishiye: So this is from Davis.
Rasmus: Yeah? Yeah. Oh it is? That's the
Beatrice Loishiye: project we were talking about? Oh yeah, so we did the conceptual development. The client is okay with that, but right now he has one pause until they're back.
Alberte: Oh yeah, it's a render.
Yeah,
Beatrice Loishiye: but when we told them that we are doing some samples, they were super excited. Okay. Yeah, because they For us, Ramday Earth was a new concept, but they are familiar with Ramday Earth. So they're just like, oh, that's even much better.
Yeah.
Beatrice Loishiye: The one I was talking about was just a simple residential photo.
Oh, okay. Okay. Yeah. Uh, and they want to do it by themselves. Yeah.
Rasmus: Yeah. So when you talk about, uh, vernacular [00:48:00] architecture in, in the article, what, what, how do you understand this? What, what is, uh, uh, what is your definition of this?
Alberte: I don't know if you read it recently, maybe it's, uh, we couldn't see the date on it.
Baraka Sikawa: I would say that it's either going with the local materials or going with the local construction techniques. So, um,
it's a battle that people want to feel modernized. So, um, you really need to take into account that you're asking a client to use an architecture or that feels it's quite old and primitive. So, it is of the, not many people accept it. I would say [00:49:00] the projects Um, yeah. I think the best, which are best for that would be, um, something like lodges.
Where people want to just, to experience something that is different. Um, yeah. Or something that was, you know, vernacular architecture and then go back to the urban housing. Um, yeah. So, that would be the, at least the best way of approaching vernacular architecture.
Um, yeah. Um, yeah.
Baraka Sikawa: So, um, we tried that with a project, uh, that was supposed to be built in, um, Karatu.
But then, uh, um, the client, that's what they wanted first, and then when they started doing the, the, um, the concepts, they changed that and they wanted something, um, something more modern, and so we moved
Rasmus: away from that.
Alberte: Okay. So
Rasmus: do you think simply the, um, the nature of the architecture that, that, uh, you may call traditional, uh, or tribal is, I mean, does not, does not [00:50:00] live up to modern standards of living?
No. No. It
Beatrice Loishiye: doesn't.
Rasmus: All right.
Beatrice Loishiye: It really doesn't. Um, so in, uh, is it central, if not west? They used to dig a bit of a hole, so their house is this much high from the outside, but you go down, it's actually, you go like another meter. And they did that just for the temperature changes. Yeah, the cooling, right?
Yeah, for the cooling. But you can't really do it right now.
No.
Beatrice Loishiye: You will flood. Yes. One rain and you'll be in a swimming pool. Yeah. And mind you, um, for them, they didn't have like wild animals, so it was safe. While in Arusha or on the This side of things. They still do that, but they still have to go like with the boma thingy, where you have all your animals at the center.
Like the Maasai. Yeah. Like the Maasai. These houses, um, after one or two rain, you have to redo them again, you have to re plaster them again. And the intention was to have buildings that are [00:51:00] not permanent. Because this year you're here, the next two years you're somewhere else. So it actually depends with the nature of the people.
And since as African, we don't have like, one language, which you can say, okay, this is an African architecture. So what we do in some projects is we just take some elements that's identified. Okay. This is an African architecture.
Might
Beatrice Loishiye: be Ghana, might be Nigeria, might be Maasai, might be anything. But you just put that in here.
Yeah, in a project. As long as you have, you find meaning. So, we had these.
Rasmus: Can you point to the element that you So,
Beatrice Loishiye: these are all these elements. Ah, the ornament.
Baraka Sikawa: Even the shape Even the shape of the buildings It's a West African I don't remember the name off the top of my head. I think it's I think it's the horse or The western, uh, northwestern part of [00:52:00] Africa, um, they had their buildings in different shapes.
So they had some of the buildings going outwards, some of them going inwards, some of them going inside. So that is an element that we Wow. Okay.
Yeah.
Baraka Sikawa: Wow. Um, the other thing that we were We It's It's a It was a tricky situation. This project belongs to the church, so even the, the, the symbols and the markings need to align with the church, so you can have something that, which is different
Beatrice Loishiye: if it was not, then could have been some really crazy elements in there, but most of the, uh, which I'm calling them crazy, but they're really nice, that they go against the church.
Baraka Sikawa: Yeah. And patterns like, um, something that we, we looked, they were quite good, was the, The Shona, they're from Zimbabwe, South Africa, Zambia. And they have [00:53:00] really nice, cool, um, um, patterns. Colourful, bright coloured patterns. But then they have, they, they have a, Um, uh, they have a, a, I wouldn't say religious.
They have, they have like a, a tribal, traditional, traditional tribal, even behind them. So we actually implement mm-hmm .
Alberte: Okay.
Rasmus: It seems like you, you have done a lot of research all across Africa about certain, and, and it could be like very small elements, small details in the article that you like and want to introduce in, in a, in a, in a architectural piece.
Um, how, how much do, do you study the, that, uh, the different tribes in, in Tanzania? Or in East Africa, like they're, they're just, I mean, of course, some of them must have some, some kind of ornament in their architecture also, but also, uh, uh, you, you said that you were making your, [00:54:00] uh, a mud house at home with a combination of, of, um, of timber pieces and, and mud.
Um, this. This makes me think about certain typologies that we've seen alongside, um, when we drive from, from, from, from, uh, Russia to Moshin, that this is a, this is, this is something that you could also find in, uh, in, uh, in tribal architecture, couldn't you? Um, yes. I would say, for
Baraka Sikawa: example, this project here.
This one? Yeah. Yeah. So, um, the concept behind this was, uh, was a Maasai bowman. Yeah, so it's that, um, you have a central, um, the central tree where people could, um, or the, the family or the, the, the grant would congregate. That is where they have the meetings. Mm-hmm . That is where they, um, any serious stuff that they have to have.
Yeah. So then the center, and then you have the buildings, um, around, and you have the, and then you have the bomber to, to close the, the, Yeah. [00:55:00] Yeah. That's very interesting.
Yeah. Yeah. We couldn't put the bomb exactly in the fence. But so it was a mixture of the, of the buildings around, um, and circling the, the, the tree or the, the meeting point.
And so it's elements like that, um, that you, someone would look at that and they wouldn't see that until you explain it. Explain it. Yeah. That concept.
Yeah. Yeah. .
Baraka Sikawa: And I'll say the, I would say the Maasai is very easy to go to because I'm a Maasai. Oh yeah. .
Beatrice Loishiye: So that's a very lazy research
Baraka Sikawa: for me. . And it's, and I think it's also because the Maasai culture stems quite out a bit.
Mm-hmm . Can, um, learn different parts and, and I think it's also because, um. Yeah, the Maasai culture is seen as a, as a novelty because we have quite a lot of tourism, um, around here. So, [00:56:00] for example, if you, if you go to the national parks, you'll, you'll see there's quite a lot of, um, um, um, manyatas that you, you, you are welcome to go and see.
And, and view mm-hmm . But then if you go for the different tribes, there isn't much of that, but there's, there's quite a lot of, um, good, um, architecture. I would say the, the higher, um, I, I love the way they do the hearts. It's almost the higher, yeah,
Alberte: the higher. Okay. The, the
Baraka Sikawa: north of Western Lake, um, it's the lake zone in, in Tanzania.
Yeah. They're, they're next to Rwanda. So. They share almost some, some sort of architecture that, um, the beautiful one. Yeah. It was a building, um, so the client is, um. Um, it is German based. The founder is German based. But it's an office building for different regions of Africa. Um, church. So even the architecture also needs to not just be Tanzanian.
Alberte: Dome? Like, oh.
Baraka Sikawa: Oh, a dome. It's almost like a. Like a straw. Yeah. Yeah. Okay.
Alberte: the local people to Yeah,
Beatrice Loishiye: so instead of having, uh, taking the time to get the straws going, cut them, dry them, treat them so they don't have any termites,
put them
Beatrice Loishiye: on top and then just to have another sheet on top, well, you can just go to a shop, get that in a day,
Alberte: Yeah.
Beatrice Loishiye: Your house is finished. Yeah.
Baraka Sikawa: And then again, the modern, the modern look. Yeah. And then you'd see, even, even by then, you wouldn't see, um, residential houses having the thatched roof. It's more of the, um, the bars and restaurants that would have that. So it's, so that they can stand out. In between the Rothschild's houses.
Alberte: Yeah.[01:03:00]
Do you get a lot of inspiration from, like, um, Western countries? Like, or Europe, or the U. S., or, like
I
Baraka Sikawa: you say? Yes.
Beatrice Loishiye: Yeah.
Baraka Sikawa: I, 'cause I feel
Beatrice Loishiye: like I see the technology part of it.
Alberte: Yeah.
Baraka Sikawa: Yes. I would say even architecture, but for example, um,
Alberte: but looking at this one, maybe that's, could be some American style actually as well. Very Mediterranean
Alberte: material. Yeah. Yeah. Yeah. Okay. Mediterranean.
Beatrice Loishiye: Yeah. It actually depends on the client because, um, their attitude of style is like fashion so everyone has their own taste.
Uh, you might, you might come and just propose something, I would say post modern, post modern attitude and they'd be like, nope. [01:04:00] I want contemporary as much as possible, you see this. Or you produce something contemporary this way, no? My style is Mediterranean. So you will send a different concept with Mediterranean in mind.
Alberte: Yeah. Yeah, okay. It's, uh, like, through all your projects, do you have something you always, like, this is probably architects who did this. Do you have something, like
Rasmus: A signature. A signature,
Beatrice Loishiye: yeah. There's one which I wanted to make it the signature, but no one likes it. It's flat roofs. Flat roofs? Yeah. But I
Baraka Sikawa: was actually going to say the opposite.
It's a single mom and pop. Yeah, that's flat roof. Yeah, that's flat roof. If you look this, it has a monopitched roof. Like,
Beatrice Loishiye: yeah, pitched one. Yeah, just with one angle.
Baraka Sikawa: So the project today, when we were talking about the football academy school, every building has just one monopitched [01:05:00] roof. Or that element of a monopitched roof.
Alberte: Is there a reason for this pitched roof, or is it just Like a style you really like, or?
Beatrice Loishiye: Give a reasonable, a
Baraka Sikawa: reasonable reason and just give. I would say, um, construction wise it's something that it's, it's, it's easy to make, right? Yeah, it's easy to make um, construction method wise the materials are there, you could you could have it with, um Steel structures, you can have it with timber structures, you can have it with log structures, so Yeah.
You can play around with different materials, you can just say, put boxes in a book. Yeah. Actually, that's the reason why we, we go for that.
Alberte: Yeah,
Beatrice Loishiye: We all hate pitched roofs, so.
Baraka Sikawa: This, this roof? Yeah. Yeah, yeah, yeah. It's also, it's also, it's almost like a, it's almost like a neat, neat, um, neat Is high picture that we see [01:06:00] everywhere.
Yeah, yeah. Even the house that I'm building next. Every plot that is next to me has the roof. Yeah, for every. Yeah. They have the roof.
Rasmus: Yeah. The gable and the hips, right? Yeah. Yeah. It doesn't
Beatrice Loishiye: matter if it's height or if it's gable. It's just, you get like a 45 degree angle roof and just go like, you know, you can fit another building there.
Like the roof might be five meters and The The house is just three meters. For me, it doesn't really make sense. What we can just put like, phew, a monopinched roof. And you save a lot of money, but people really don't understand that. I'll understand that if it was a dark, because you need like air circulation, but still it's unnecessarily.
Okay.
Baraka Sikawa: Actually, um, that kind of architecture is, is a tribal kind of a, it's, it's in the tribe in, um, in Kigoma, Wara. They're called Wara. So the richest person or the chief in the, in the village [01:07:00] has the highest roof. Yeah. Nice. Yeah, so it was, um, so it started moving from the, from the west, um, part of Tanzania and then it just took over, yeah.
Whoever has money, gets it. Because it actually, even, even right now, it actually costs more in terms of the roof structure. It costs more in terms of the material. But you
Alberte: need to
Rasmus: use an alternative, a roofing membrane, right? If you have a flat roof, then you can use a steel roof, steel sheets, or
Beatrice Loishiye: Yeah. It's the same thing with the bank brick and the concrete blocks. The bank bricks per square meter. The actual expensive rather than the, yeah. Twice expensive. Twice expensive than the, um, the concrete blocks and the cost for the bank breaks are on, not on the, on the. The individual bricks, no.
On the labour.
Alberte: Yeah.
Beatrice Loishiye: Because fundi spend a lot of time [01:13:00] on the bank bricks than on the Is that because they're smaller or? They're small and you need to be really Precise. Precise. Unless
Baraka Sikawa: you're going to plaster it, and then there is no point of using burnt bricks. Burnt bricks if you're going to plaster it.
Beatrice Loishiye: It doesn't really make sense. Okay. Yeah, so now, like I'll say, in food terminologies now, burnt bricks are delicacy. So it's like, that's something you want to show off. So it's no longer something, I'll say, it can't be used. It's just plaster. No. Okay. It's a delicacy that you want everyone to see. Oh, you did this with burnt bricks.
Yeah. Yeah. So that's why they are not expensive.
Baraka Sikawa: Where people go to the road trip, no, just cladding with burnt bricks.
Beatrice Loishiye: Yeah. So, it's actually cheaper. You build with just concrete blocks, you clad with burnt bricks, and you still save some money. Okay. Yeah.
Alberte: Alright, I went through all of my questions and I see that we have We have an hour in, [01:14:00] so.
Rasmus: Can I ask one last question? Um, what do you think about, um, like there's a general tendency of, uh, um, making sure that your property looks secure. Uh, we come from a different culture where we, you would never see bars on a window. So, uh, you would never see, um, like the gate and then the wall around the property.
Um, is that something that's, uh, consistently requested, uh, for you as an architect? Like, would you, or this is always something that the client wants and, uh, what are your thoughts like in general on this and on all of these safety measures? Is this strictly necessary? Um, yes. It is. No,
Baraka Sikawa: I wouldn't say. I'm sorry.
No, I wouldn't say that. Yeah. It is enforced that you It's not fair. No. But it's for your own safety. Yes. Yeah. So you wouldn't Um, the moment you just build without the, [01:15:00] the, the back of us, it's just like you're telling people. Just don't. Carry on. Take everything you want. Um, I, I do know, I remember that my, one of my nurturers, they did build a house.
Um, they didn't put the, the, the, the grills. Yeah, and he hadn't moved in and people broke into the house. So like, if even before I've moved in, there's actually nothing of value yet inside the house. But then people just went, came in. He just had to put them back in. So it is a security, um, it is a security issue.
I remember one of our lecturers actually told us there's, um, So if you have these grills. It's, it's for your security. If you remove them, it's for your safety. Because if you need to go out, you can't go through.
Alberte: Yeah.
Baraka Sikawa: So in terms of safety, if there's a, you need to go outside, you need to run away if somebody's inside or there's a [01:16:00] fire.
That's a, you don't have safety. So you have to choose between safety. Yeah. And everyone chooses security. Even I would choose
Beatrice Loishiye: Yeah.
Rasmus: And then it's that big of a
Baraka Sikawa: problem. And it's because the way, um, the way people steal, it's not, they don't plan it. It's almost, um, spontaneous. If they see I could get through here, then if they see an opportunity, they will come
Beatrice Loishiye: for it.
Which is the worst, I guess, kind of, um, situation. Because they don't plan, so, it's like, oh, the gate is open, oh, the door is open. It goes in. It says, whatever it is, they're out.
Baraka Sikawa: Mm. There's some projects that, um, there's something like Kewley Cove. So, because they, [01:17:00] they don't, they don't accept you to build a boundary wall, so the way you have your windows and doors is to have much more division for the, for the glass so that a person can actually go through.
They could break the glass and maybe steal something small, but they actually physically can't get in the house. Unless they have, yeah,
Beatrice Loishiye: machines or, yeah. But then that's, again, that's, that's a very gated community, and people are hunters there. There is no way you want to go into there. No,
Rasmus: but it's Sorry, one has weapons, right?
Baraka Sikawa: Um, yeah. No, but it's, it's so isolated that someone could get in.
Beatrice Loishiye: You can just get in. You can't Yes, you can get in. You just can't get out.
Baraka Sikawa: No, no, you can. It is an issue. Now? Yes, it is an issue, because villagers can actually go through the, the estate. It
Beatrice Loishiye: But they have security guards, they have guardians, they have [01:18:00] like But still,
Baraka Sikawa: if somebody wants to That's the thing is, that's why I'm saying it's even opportunistic.
So, it's not somebody that is physically planning that there's something very valuable in that house and want to steal. It's that I can see I have an opportunity, maybe I could get ownership.
Alberte: Okay. So it is necessary. Okay. One more question is for, um, natural disasters. So we know here in Tanzania, you have like earthquakes and maybe also floods or like, what do you do?
Do you do something to prevent, uh, the houses from falling or, or is it even an issue here? Like the earthquakes? Or any other natural disaster?
Baraka Sikawa: I'd say, I'd say yes. Um, so, the way you, the way construction, um, we have the, the, the, [01:19:00] the blocks. So the way you tie in the blocks is using, um, concrete ring beams or concrete beams.
Yeah. So that at least ties the building together and even if, if there's a small tremor, it, it can sustain it. Okay. Yeah. Um, parts where there's Quite significant earthquakes is in Kigoma and the houses are risen. Um, they're shorter. They,
so they don't have very high multi story. So that's the way they, they, they were able to, to build so that, so that earthquakes don't, um, don't affect them much. But the other places in Tanzania, earthquakes are quite massive.
Beatrice Loishiye: Not really earthquakes, but it's just along the[01:20:00]
So when I was studying there, the highest building had only four storeys and had massive columns.
Alberte: Ah, okay. Yeah.
Beatrice Loishiye: Yeah.
Alberte: But concrete.
Beatrice Loishiye: Concrete. Yeah.
Alberte: Okay.
Beatrice Loishiye: Yeah. Because anything else You would think
Alberte: that timber would be more flexible.
Beatrice Loishiye: And so the, the thing with timber in, I don't know if it's in Tanzania or in general, is the maintenance.
No one likes the maintainers. So anyone who wants to build that, like, I want to build something that has zero maintainers. But with timber you have to, after two or three years, you have to make a day. entire house or building then get these people out to then live somewhere in mind that's their only house yeah they don't have like vacation house or something
yeah
Beatrice Loishiye: so they can't do that there was actually a timber house somewhere along [01:21:00] Giro and Giro I'm not sure if it's still there
Baraka Sikawa: there are a few there are a few timber houses but um there's an issue of termites there's a lot of termites in Russia so yeah people tend to move away there's some there's some kind of There's some trees that if you use, no, no, no insect or pesticides would, the pests would want to, you know, to eat that kind of thing, eucalyptus.
Eucalyptus is good, yeah. Not even termites want to eat it. Yeah, okay. In terms of floods,
Beatrice Loishiye: um, Floods, um, it depends on the location. So, most of the, the valleys, the build, the build that I build on the valleys do suffer some floods.
Alberte: Okay. Yeah. So,
Beatrice Loishiye: I'd also say that's more of like a location thingy, rather than every In general. Yeah.
Alberte: Yeah. Okay.
Beatrice Loishiye: So, if you're up the hill, then it doesn't matter [01:22:00] how much rains.
Baraka Sikawa: Up. Up. I've seen, but that's something that is recent. It's not, it's not like a, it's not like the go to, um, kind of construction. It's in, in Arusha, um, in, in the lowland areas where, um, they're, they're almost like flood plains.
One third of it was just dirt on piles. It was almost a pile system and raised in a house. So he gets almost like the. The Florida, the us Florida where they, they built on almost like peers, but um, but specific architecture, the, the only way people would avoid, um, floods is just raising the rest. Yeah.
Length of the house. Yeah.
Alberte: Okay.
Baraka Sikawa: And the, the place where they suffer a lot of floods is,
Hmm.
Baraka Sikawa: That most of the time you'd hear is in there. It's because people have, they have encroached to the, [01:23:00] um, The water
Beatrice Loishiye: Water lines.
Baraka Sikawa: Yeah. The water channels where water from all the rivers, they need to go to the ocean. So they have moved into those waterways.
And every rainy season you'll hear It's always flooding at those areas. Okay.
Alberte: Okay.
Baraka Sikawa: Or you'll see a very nice house if you want to rent. It's extremely cheap. Then you know Then you know what happens.
If it rains, then
Baraka Sikawa: That's what
I is
Baraka Sikawa: Okay. You up in the middle with a 19 year water , but in Russia, floods some parts.
They have floods and people are, it's where the city is moving because people need, um, those areas. It's in Yeah, Ong, but that's the low,
Beatrice Loishiye: that's still lowland.
Baraka Sikawa: Yeah. So it's where you see, 'cause
Alberte: the city is expanding then. You need to use this. Use this.
Beatrice Loishiye: Yeah. But I think in the next five or ten years, once [01:24:00] people are in there, and it's, they're no longer farms, they can create some sort of like storm water.
Yeah. Drainage things.
Alberte: Where do you see Tanzania and the architecture here heading for the next years to come, in short? We're gonna have impressive buildings. Like, what, what tendencies do you see?
Baraka Sikawa: I'm saying, I'm saying it's, it's, it's it's, it's architects need to at least push more, most of these ideas.
And also, and also the government, because the way people tend to, to accept and do things, it's following the government, what the government does in its buildings. Um, so if the government uses certain types of, uh, certain types of, um, materials, types of architecture, you will see people also wanting to adapt.
So they feel [01:25:00] comfortable because they know the government will always have something that is sustainable, that is durable. But, yeah, but it's also architects um, needing to push the
Beatrice Loishiye: place up all the time
Baraka Sikawa: But then the biggest thing here is also, it's also the cost. Yeah. Yeah,
Alberte: who are your clients even? Like, yeah, because it's, it's not the middle, uh, what's called society that pays for an architect here, is it?
Or is it like usually high end?
Beatrice Loishiye: Not
Alberte: really.
Beatrice Loishiye: Oh,
Alberte: we
Beatrice Loishiye: wish
Alberte: for high ends.
Beatrice Loishiye: We have some few high ends. But, um, most are institutions, as you say. Yeah. Yeah, so for like individual people these are not, they go for residential like crazy houses like this. Yeah, big houses like this Yeah, really crazy big houses like this.
[01:26:00] Yeah, but and those are Should I just say like those are between like high, enos and middle, enos in between.
Alberte: Yeah,
Beatrice Loishiye: because the good thing about about Africa or Tanzania is you can do foundation today Transcribed Wait for 2 3 years. Do the walls. Wait for 4
Baraka Sikawa: years. Ah, yeah. Because even the banks are providing these loans now for construction.
Alberte: Okay. Otherwise people have to pay cash
Baraka Sikawa: and therefore
Alberte: it was like
Baraka Sikawa: So for example, my parents built their house for 10 years. Yeah. So they had to build it, um, slowly. And he was building two houses in two different regions. Okay. Yeah. So, um, there's that, um, when a person gets a certain income, um, a part of it goes to do something.
To build. So they build that in [01:27:00] stages. And at least, yeah, some of the banks are doing, are giving these loans. And they've been going around of them. They know if you give someone money they might not utilize it in the project. So the way they provide loan, uh, with the loan is paying to the contractor. Ah,
Alberte: okay.
So the bank pays contractor. Oh.
Baraka Sikawa: Yeah, so you get a loan in that fund and then they pay the contractor and they own the house. So it's almost like a mortgage system.
Alberte: Mm. Okay.
Baraka Sikawa: It's, it's getting better. This idea is construction right now. I'd say it's more. Even for the, even for the middle income. So they, they might not pay for the full architectural, um, service.
But at least to get a design. Yeah. Yeah,
Beatrice Loishiye: a design and a bills of quantities. So, because you can't just go and just say like, okay, with this floor plan you need 200 million. With this, okay, where are the bills of [01:28:00] quantities to buy this job. So from there, it's like, okay, you actually need 200, you need 180 something.
Yeah.
Beatrice Loishiye: And then after you're done, then they come and get all the documents for your house. So it's

Appendix 3

Interview with Praise Nyange

Date: 15.10.2024

Location: Moshi, Tanzania

Nyange: [00:00:00] Tourism. Yeah. So then, uh, yeah,
Rasmus: how do they con like, uh, you know, like if you can, uh, bring forward, uh, some examples on how, on how your businesses support each other.
Nyange: Absolutely. You know, like when you look, um, even Tanzania itself, you know, the first three sectors that leading tourism economy, I mean Tanzania economy, it's, uh, agriculture, uh, uh, mining and tourism.
And then through this point I've been looking, I'm not good at mining, so. That's something that I can't touch, but I mean being tourism and farming exceeds something that I can cooperate together and could help each other so cause Some before I start this farm I used to go the farm at the market to buy the food and to see how the radicular price and perhaps You know, not sure where the food coming from [00:01:00]
Rasmus: Chemicals.
Nyange: Chemicals. You don't know what they're used for. Absolutely. And then you don't know how even they treat. Because, uh, the time I start to get interest more in the, do the farming, and I mean like start the farm, I also visit the other farm, uh, rounds, and then go to market and see what the price is. Because there's so many things, people can very good talk on the success, but they never tell you all the ups and downs to do the process. And then from that point I say, like, this I can make it better. Like, make sure my client have a good food. Which we already, we have grown at the farm. And also even the supply could be much easier. Because sometimes you can find like, you know, and this, and then you go to the market and you know the, uh, the season.
So for me also be very good to know the calendar and make, start growing the food. Different food that can feed, uh, my client to climb the mountain or safari. And then afterwards I say, wow, there's so much that I can do at the farm. Because when I tell people let's go to farm, they think [00:02:00] only just a plain area because I say like, ah, wow, I can Do like a campsite and people can come and stay and learn like what we are doing And then from that point I came with this idea to do agritourism And this make also more connected Tourism because people, they travel, but it's surprising.
You can see people ask like, where, where the papaya coming from when see, Oh, this is a papaya tree. Wow. We never see this papaya tree. You know, I've never seen the mango tree and even to test how the, uh, the food is really a testy and they not, uh, Yeah, absolutely. And then there's not the food from supermarket because many kids, they know, uh, I mean, they grow the food from supermarkets.
And also the idea to do the cooking class also is very inspiration. Like so many people very, uh, get interested to see like how you guys eat, what, uh, the recipe and that's what you want to keep more so that it can help Nyanga Adventures and [00:03:00] Nyanga Farm also to increase the revenue stream. Yeah. So,
Rasmus: so, um, um, Nyanga Adventures Aside, let's focus on the Shambhala.
What is your vision on the Shambhala?
Nyange: Yeah, I think the Shambhala is more, uh, I mean, like, uh, wish to be the center for excellence. So that, I mean, everyone, the students locally and international could be a center to learn and exchange the experience. And you guys already started, so I can see the future so bright.
Because, uh, Rasmus and Emil now, they start bringing this innovation on how to build a mud house. And that's also make environmental friendly and also about sustainability, you know. And also see the mamas are working here. So it's all Corporate, so that in the end of the day, it's not like, uh, what Nyang'o benefit, but also the community just sent here.
Because the mama, when they come here, they work, they watch, [00:04:00] and they get inspired, like, Wow, next time when I grow my maize, I need to do this way. Oh, okay, so that's also be a win win situation. Everyone benefits.
Alberte: Who are the workers working at the farm
Nyange: here? The majority leave the mama around here. You know, like, it's very, um, I mean, it's make me happy and very proud of what we've been done so far.
Because I met the men down the street, they say, Wow, you know, we're very happy you stand out and start this farm. Because you can't imagine how many thieves could be in the area. Because they don't have a job like to do. Because now you can see how many boys that can be here during the tomato or other crops production.
Yeah. Yeah.
Alberte: How many are there?
Nyange: Wow, like now, uh, sometimes you can have more than 20, up to 30. Depends, like during the preparation of the field [00:05:00] or the harvesting time. And
Rasmus: Um, so I think we, we're kind of discussing the topic of sustainability, at least in terms of, uh, employing local, um, local people. That is something that, uh, I believe lies within the definition of sustainability. Yeah. What, what, what is your, what is your understanding of, of, uh, sustainability?
Nyange: Oh yeah, that's, uh, it's actually a, a broad term, you know.
Yeah.
Nyange: And then, uh, it could be start from environmental, social, and economic. Right. So that's again categorized in that, uh, aspect. And then you can see when you talk about the environmental, we really try to be, uh, organic here. And then use, uh, a biological control that's, we don't incur a lot of [00:06:00] cost on the control, the pest or whatever. Even the recycling the water or like we see this fish pond that we use the water from the fish pond and then go to the, uh, Um, gardens and that's one ecosystem. And then when you come and see the social impact, we really try to employ the local people around here, local engineers, so that we can be also a win win situation.
Rasmus come international and then help the local and also the local can share their knowledge because I know like we make a fun about Kobiro, you know, like you guys like, yeah, you know, You use the different, like more, uh, advanced technologies. So that we can see it already. We want to impact and as well, let become, um, economic, like people get the income and also the support their families, especially the mamas, because we could ask the mama, Hey, how many [00:07:00] kids do you have?
Oh, we'll have 10, maybe five kids or six kids. How can you manage to send them to school? Well, we're happy. Now you get the money here and we have a small circle and that's helped them to I mean, I could see that Nyange farm has really impacted the community in general.
Uh,
Nyange: I would say around eight, eight people, yeah.
It could be, sometimes it could be eight, uh, ten, depending on like what project we have. Because, uh, we have the, like, a minimum five people must be here. Yeah, because some of them come and go. Yeah.
So basically you have a garden which is be a permanent and then we have like guy who take care The cows the kettles and then the one who do the farming because must be there 24 7 to observe Because they in [00:08:00] animal if you leave the few minutes, I mean like the plants if you leave a few Hours, it's just a disaster.
So like should be someone who monitor closely and then I report on time and make the action Yeah
Rasmus: How do you make sure that your, your staff, they follow your, your visions for the area, or that they have mutual understanding of sustainability or the practices that you would like to, to develop in this area?
Nyange: Yeah, so basically, that was very, um, a very, uh, I would say, uh, a problem, but it was a very good challenge, because even I started, this was bare land, and then when you talk, say, I want to do this. I want to do this. I want to plant this. I want to plant this, and then I want to make a fish farm, and then people are like, wow, how comes?
And then when I see I brought the machine to dig the fish pond, like, [00:09:00] huh, what's going on here? You know, they have no clue. But for those who are very close to me, I try to explain to them. And, you know, some come, some go because they can't keep what you, because I would say I'm a visionary, you know, and it could be difficult to, to tell everyone, let's go this way, you know, some people like right now to say, wow, I think you're right after the time.
So, but, uh, why, uh, what, what makes people to believe the process is try to involve them. As you can see, like leaving us a very good ambassador because you really understand what we already talk. And not even talk, really do it, because you can have a thousand ideas, and then if you don't excript them, you know, it'll just be a story then. Yeah, though it's been, it's just been a journey, I would say, so what I started and where we are, and where we're going, I could see it's a very, a, a [00:10:00] good move, you know, that could be impact, uh, locally and also international. Yeah. Yeah.
Rasmus: Are they rewarded to encouraged or rewarded, um, in a way to, to follow, follow your, your, um, your development.
I mean, of course, if they, if they, if they don't subscribe to the same, the same philosophy, you may in the end, end their employment, uh, sooner or later. Or, but in the other, in the other sense, like how, if, if they do perform very well, how can they be rewarded?
Nyange: Oh, absolutely. That's, uh, that's, that's my wish all the time to think and to see For those who believe the process and could be patient to that process and that could be the best employee and that can keep growing.
However, as I think yesterday we just talk about, uh, I mean, I think it was [00:11:00] talking about on how to, uh, uh, improve stuff. For example, uh, there's one lady here. She was a gardener. Now she's a housekeeper. So can see how they just get promoted. Mm-hmm . Because they just learn and see and keep growing. So, but at the same time, there's people, they always come and see the money or they get paid and they don't care. They don't want to learn it.
Yeah.
Nyange: They don't want to be part of the, you know, part of the process. So, but, uh, I think the good reward it be a, a, a learning point and also a personal development. Mm-hmm . Because I think majority of the staff, I'm talking there as a business owner. Most of the staff, they don't really see how the personal growth, they want the tangible, you know, I want my money, I want this and then just that is, but if they could see a personal growth, that's absolutely could make a difference and could make [00:12:00] the whole community to prosper and see, because, uh, if you don't, if you just come here to Now it's checking at eight and then, uh, five, done.
But could you ask, like, what have you learned this day? What have you learned by meeting, uh, Rasmus and Emily? So I hope, like, a few guys, if you could ask those questions, they could be able to mention. But somebody's going, okay, I just finished this job, what do you say? Just tell me to do, and then I'm done.
We've
Rasmus: experienced, uh, during the last few weeks now, that people, they find, uh, the way, the way we're building right now very interesting. Absolutely, yeah. But, they don't, they don't see how the alternative is problematic. Yeah. Unless, unless you take the time to explain, uh, the concept of, of climatic, uh, disasters or, um Um, uh, global climate, what's it called, a global warming climate change.
Global warming, yeah, yeah. [00:13:00] They don't really, uh, understand the, the consequences and how their, how their, um, initiatives can help change the future. Yeah. Um, what do you think, uh, is the initiatives that you are, uh, launching around here that have the biggest impact, uh, in the future, for a better future?
Nyange: Yeah, I think, um, It's just, first of all, to believe the process. That's a big thing. And then, once you believe it, and then you work on it, it absolutely makes a difference. Because, uh, people, they just get discouraged. Or they don't take it because we don't have the expertise that they can make them to be confident.
Because most of the thing we see in the business or reforming, it's a seeing is believing. Because if you could talk to someone, I build a mud house, like, ah, you crazy, you know, [00:14:00] you think the mud houses could be stable? Oh, I know the mud house could be like this and this, you know, but when they see it, and I was like, wow, I think we can do it. Wow. Now it's works. It's yeah, we saw that praised build. And I would be surprised to see that's a mud house. So, I say like it's a big, but, uh, uh, a confident. So the confident could be the engineer that could build the trust and the confidence to someone who want a specific house or specific design. Yeah.
Rasmus: At what stage do you think, uh, your colleagues in the tourism business and, uh, um, maybe even Accra, Accra tourism business or, or, um, climbing business? Do you think they see? They see, uh, the same way on things?
Nyange: Well, some, some, uh, they just see right now. Cause, uh, it's, it's always like, who [00:15:00] started? And then people start copying, right?
Right.
Nyange: And, uh, I always say, sharing the knowledge that can help to build a future. I mean the future, to prosper together. Because if you come to me, and then I don't want to share the experience I have, or the knowledge I have, I think that won't be a good thing. But if you can join together, unite together and that could make a huge impact and everyone can grow, right?
You know how to build a greenhouse. You know how to do organic stuff. So if we can join together and that's make, uh, uh, a bright future, you know, so that's always, uh, support people to just share the knowledge, no matter what, even the little, you know, That also, if you join together, make a [00:16:00] difference.
Rasmus: When you use the word share, do you mean free of charge?
Or do you mean that we engage in a partnership where we mutually benefit in short or long term, uh, economic gain?
Nyange: Yeah, so here be a different way, right? It could be a direct or indirect. So if someone come and visit, hey, wow, there's a pepper, it's a good production. Wow, the tomato's a good production. Mm hmm.
If we, you are interested, and then we join together, and that can make a stable supply chain. For example, I want to Kenya to explore more market. So if the Kenyans say, oh, price, we need one ton or ten tons a week, and I'm not capable to produce that one, but Rasmus visit my farm and you see the, uh, a pepper production, it's a good thing.
I say, wow, can I start? Yes. If you start, [00:17:00] I can assure you the market. Because many people, they're not sure about the market and that really discourage a lot of farmers. And, uh, the first thing about the farming is just to know the yield calendar, where the market is, and that's also can, uh, they can get their guarantee where they're going to sell the product.
Right. Because
Nyange: we can grow and then there's no market. Or you grow at the wrong time and then find everything's flooded. So even, uh, back when you asked about the other colleague in tourism, when I mentioned that I am doing the farming, like, people's like, wow, that man run crazy now, he's doing farming? Ah, no, farming, no.
Because a lot of, uh, story, most of the failure story, and this is because of the, uh, the Technology and information. And that's, we say the knowledge sharing because we can find the best farmers, but they may, perhaps we don't go and ask them. We feel like, ah, maybe Rasmus wants to [00:18:00] tell me, but just be confident and be a genuine person.
Like I want to do this. Please show me the way. Cause some people, I believe like some guys, they have to, they hear like Nyanga is doing farming, like, wow. Okay. Maybe we can try, but if you don't come and ask, So even, uh, you ask about, uh, also the, um, uh, the mutual benefit. For example, like the lady I met in Nairobi last week.
She's very interested, like, know about building, uh, uh, the cabins like that we're building or a tent at camp. So if we share the knowledge and what she's doing. You guys will share the knowledge. Also, it can make a big ecosystem. So if someone come to Kenya, say, wow, we can go some Tanzania and then stay the same place like what we're doing here so that we can also strengthen our partnership.
Cause uh, this knowledge could be, uh, cause I, as I mentioned, [00:19:00] always like try to connect even the big, uh, other universities, international universities, so that if you bring the knowledge, The knowledge, it also impact the whole community, I mean the community here. So that means it be a growth together, you know, the whole community will be prosper.
Yeah. But that's what we need to think out of the box, man. Really? Yeah.
Rasmus: You mentioned previously that you are in the market of acquiring a Certification of Sustainability. Yes. The Travel Life Certification. Exactly, yeah. Right? Um, maybe you can tell us about why you have that? First of all, why, why do you aspire to, to, to, uh, to acquire a certificate?
Is this, is this for your adventure business, uh, agricultural business, everything?
Nyange: You know, that's a very good question, uh, Kaka, because Erasmus is, uh, I will start maybe verify a little bit just about [00:20:00] our education system. You know, our education, I feel like it's just trained us to perform our exams, right?
And then, uh, for example, we Tanzanians, we're not good to tell, I mean, to tell people what you are doing exactly, right? And that's what makes me to think and see what the travel life doing, what they are doing. Ah, okay, they help you or they will assist you to tell. You can tell the world, we are doing this.
Cause what the travel life explain or other those sustainable practice explain. We might do it. We're doing that, but without knowing it's a right way to do. Does it make sense? Because if someone could ask, Ah, okay, use this flower to control this [00:21:00] stuff. Okay, we've been doing this for many years, but no one, I could mention this is a right thing.
Or it should be a sustainable way, an ethical way to practice it. You know, and then after here, I participate a few workshops about the travel life or ethical practice and I find, wow, I think maybe at Nyange we already did some few things in the right way without knowing, but now we need to get the certificate to show that this is what we're doing and they can tell the world we are really practice this.
And get that certification. What does it mean the certification? It's you get approved of what you practice, right? And then I see like Nyange, we just started the Nyanga farm and it could be the right time because Uh, some of these practice are very expensive, right? Especially to redo it. So that's why even it take for me a year to finish this house.
Cause I was just thinking like, wow, if you're going to [00:22:00] build this and then rebuild this, there's too waste of resources. Time and people, you know, so basically, uh, this, it's makes me to be in a position by partner or get certification that I can show Nyangi what we are really practice and it could be easier for the world to recognize a Nyangi farm, what you exactly practice because everyone can say I'm doing, uh, sustainable, but okay. Can you tell how sustainable you are? Are you part of the sustainable community? No, but I'm doing okay. . It's like, uh, a doctor could say a doctor because you wear the white shirt. No, you must go to school and get the, a certificate that show you are qualified as a, uh, sustainable partner company.
Alberte: Have you experienced that?
The guests coming to Tanzania or to an Ang adventure mm-hmm . That they're requesting now [00:23:00] more sustainable solutions? Or where is this coming from? Like, why do you want to be sustainable?
Nyange: Yeah, it's always, uh, when you want to, uh, I mean, we, how people, could ask, you know? Because when, less than the tourism, people, they, uh, before they book the trip, there's so many categories that make, why we choose Nyanga or we choose Rasmus Company.
And perhaps, that could be amount of the factors That makes people to select you, because I have a farm, I get more time to talk to people. Hi, why did you book with us? Ah, I see you guys, you're local, I see you guys, you have your own farm that's sustainable, la la la la. I say, okay, thank you, sir. We saw you online, la la la.
And that's, wow, okay. And from that point, I see, wow, people are talking more about sustainability, because now [00:24:00] that's the world to go. Like the world now see how we're really bad to the environment. And now it's like, why don't we as Nyange farm and Nyange adventures take that opportunity and stand out the crowd.
And that show the world what we're doing the good thing to our people and also the environment for the future generation.
Rasmus: Yeah. Did you consider, um, I didn't even know if Tanzania has a local national, uh, certification that proves sustainability? Sure.
Nyange: Yeah, I will say no, yes, but it should be there.
However, it could be just, uh, to, uh, encourage people and get organized. All the information sharing, that's the thing.
Cause
Nyange: it might be that sector, maybe in Dar es Salaam. And a few people, they get that link to know like, hey, we can do this. Cause I was very surprised when I was in Nairobi and then [00:25:00] one, uh, Farmer I mentioned like, Oh, you know someone?
Yes. I know. He's my neighbor. He's the one who do, uh, permaculture. It's like, ah, I didn't know that. And that's why when I was thinking also at the Nyange farm is I could have, uh, more meetings to connect the farmers, to connect, uh, international farmers, local farmer and sharing the knowledge, sharing the experience.
So that even, uh, for what I see so far, what they do in the farming. I wish if we could have a, a union like Kilimanjaro or Moshi farmers mm-hmm . And sharing the experience, I think would be a big game changer. Yeah. In the, in term of farming, because that can, uh, strengthen the, uh, uh, supply. It can help also to improve the production or the yield mm-hmm
In the farm. And also to have a, a promise or a reliable. Market [00:26:00] so that people can be encouraged to farming because people always get discouraged because they don't know what the ends will be, you know.
Rasmus: Yeah.
Nyange: So first of all, we, cause we just opened right now here, we just started naturally get out, get live. Mhm. So first of all, we think to do a lot of, uh, build a website so that people can read and also document what we have been doing, what we've been doing so far so that people could be awareness because we need to also to raise awareness and this could be in the website or social media, that engagement that make people to understand.
Why should I book the Nyange farm accommodation, or why should I visit the Nyange farm?
Yeah, [00:27:00]
Nyange: or maybe also you guys you could have some inputs that will also be very appreciated so that way now we can, uh, we can tell the world what we are doing on sustainability, yeah. Can
Alberte: you explain just basically, what are the functions of Nyange farm?
Okay,
Alberte: the functions. In like, what are they right now?
Nyange: Mm hmm.
Alberte: And what do you envision?
Nyange: So, in terms of what, uh, Emily?
Alberte: Like, last year when we came, there was like no accommodation. Exactly. There was like the small tents. Yeah. So we basically started from scratch. Yes. But now, I see that you have put, how many tents?
Nyange: Yeah, now we get six tents already. Six tents
Alberte: plus the mud building. Yeah, three. And two foundations. Yeah, that
Nyange: could be also nine. Yeah. So basically, uh, so come back from the, uh, come back from the, uh, [00:28:00] where we coming from. Yeah. And what the future and where we are right now. So, I had the idea to start accommodation way back before even the farm.
And I used to have some bed and breakfast in town. And then when I start the farming, I say, wow, now it's going to cooperate, the accommodation, the farming. That's my idea. We'll be at the same place, and it could be much, uh, easier to manage all these two projects at one time. Because people, they'll stay, they need food, they need to eat.
The staff will need the food. And that's when I asked so many hotels around here, A big portion of their expenditures go to food. And when you have your own food, that more makes you more sustainable. So you make your, even the, your cashflow be stronger and stronger. So, and then, uh, like last year when you came.
[00:29:00] And I was thinking like, wow, these, uh, students, they'll be here for three months and what will be next? Where are they going to stay? So it's like the, the time and the situation makes you, I always say it's a good challenge. So that makes you to, uh, uh, work hard. So from that, you know, it came for three months.
I was like, wow, let me do something. Let's make one tent and then see how things works. And people on the visit say, wow, I would love to stay here again, you know. And there's, okay. Uh, another friends came and said, like, I want to bring a friends. And then four people, like, uh, I need to build another one, two more tents.
And then I do more and more. But, I don't want to do it, also be very, a big commercial here. Because if you be like too much, like you're going to lose the theme, you know. Because I don't want to be like here, mass tourism, no. So a maximum, we're thinking about [00:30:00] 15 units, so maybe can have a maximum between 20 to 30 people.
So that'd be easy, manageable because we, as we know here, we do a farming. So the interaction, the plants and human beings must be well controlled. And also to get that exclusivity, like people will enjoy the, like feel this more home, like we really want to feel people with the real home, a peaceful place.
Exactly.
Alberte: So you have the accommodations. Mm-hmm . What else are the functions?
Nyange: So the most of the accommodation, and then we'll have, uh, a farming business that's main, the main, uh, uh, revenue stream because the accommodation will help the farm and the family helps. The, uh, I mean the accommodation, you feed the accommodation, plus the four course company,
[00:31:00] yeah.
So, but if you have three, that's make [00:31:00] you also busy.
sustainable, like be sustained, like self sustained. Yeah. So you have an area for the, uh, lodges? Lodges. And then we have, uh, animals. Area for the animals? Yeah. And then also for, uh, doing, we have the greenhouses and also the outfields. That's, yeah. And then you also have an area for staff. Exactly, yeah.
Right? Yeah. What does this area include? So the area for staff, that'd be, uh, mostly we're staying here. But we're going to build another area here where we can have, uh, like, uh, a dining area or the common area where all the staff, like during the day, they can catch up there for our dinner, I mean lunch.
And then if our meetings or cause we're going to have some workshops, if we have a, a new project that's, uh, for example, say company A want to teach us about organic, something like that, or a new techniques on how to control the stuff. So that could be easier, even training. Could be, uh, [00:32:00] not only my staff, but other farmers around the area, that could be an area where the people can sit.
And also a few houses for them, and also the, uh, maybe even a small shop, so that we can have people that can buy the stuff, all the needs they want here, rather than go all the way to town, if it's not needed, like, cause there's some stuff that can go in town, but they're just a basic thing, at least they can get out of the area.
Rasmus: This is, uh, shop Exclusively for the staff? Yeah, just for staff. Right. And also, there's a chef connected to the staff, right? Yeah, yeah. So, you need a kitchen. Basically, yeah. For cooking for approximately 30 people. Exactly. Yeah, yeah, yeah. A meeting room, and then a bedroom. Yeah, bedrooms. For approximately 8 people.
Nyange: Exactly. And also, that side also can have a farm office as well. So, for those who are coming, they can use that way. Just go to farm and those are coming for accommodation. Could be a [00:33:00] different entities. So that could be easier to manage and everyone could be accountable. Okay. Okay. And the, um, kettles? Yeah.
Is that supposed to be, like, directly connected to the, uh, the workgrass here or is that a separate area? What do you think? Uh, what do you mean? Like the Like the Okay. Livestock. Livestock, yeah. Where is it kept? Yeah, it should be, uh, you know, like, if you connect the accommodation, like, smell and other stuff won't be good, I guess.
Nyange: So, at least to have a nice, the special area for this animal be this way. Because that's so many considerations, like, the way the wind direction goes. Because, to be honest, You know, the wind comes that way and it goes straight to the house of the client, you know. It won't be a good experience anymore. So, at least be well planned.
That's why we have you professionals to come and help us. Yeah, and sharing the [00:34:00] experience. And then, we've also been talking about the last area, which is kind of the entry to the farm. Exactly. What do you think about that? So, basically, uh, cause right now we have only the accommodation. But a demonstration, a reception, which is now a key.
Because people, they want to come and be a very nice welcome. They can chill out when the room is ready and, you know, get the information. And also we can even have a small, uh, shop. Like, because our thing is also to process for what we have. For example, we can make like, uh, you know, a butternut jam or something like that.
So more, we, uh, we call the, uh, value addition. So, when you come to stay at Nyange Farm, you get a gift. Oh, wow, this is a gem from Nyange Farm. Oh, this is the bride from Nyange Farm. So, that's also help to, uh, a memory. And also, at the same time, could be [00:35:00] also help for us to increase our, our revenue, our income.
Cause, this must be a, a self sustainable, like, uh, It's every project must help each other. There's no need like, uh, cause so far we don't need to get money from that point and then help this way. So it itself must be generate income. That's the idea. And then we need, uh, uh, like the reception. We need, uh, a good kitchen, uh, a dining area.
Cause now we can have a, maybe those are not come to stay with us. Just come for day. For example, you need to plan to have like a family or a school visit. They'll come just for a day. They can visit the farm. They can have a lunch. They can have a good, uh, washrooms. That's make, uh, I mean a good place. Yeah.
So that's we really need you guys to help us with the design. So that we can have a very good, uh, a very good, uh, place. Uh, farm and [00:36:00] accommodation. Of course we have some few ideas, but at the same time should be also aligned from the, uh, also the government requirement. Also the SAFT was, that's the most important.
Can you elaborate on that? Yeah, of course, like the, the SAFT we need to know like, uh, Where, like, uh, in case of, like, fire happen, you know, or the fire extinguisher, or the control, or the, you know, the way you build the house, or the hygiene, hygiene, like the sanitation. You know, Rasmus will ask me, like, where, you know, if that's follow the, the government rules or the standards, because when you come to the, even the travel life, whatever, they need to see all those, uh, All those, uh, informations.
Nyange: Everything must be documented. Absolutely, yeah. What do you think is, um, like, what environment or mood so you can have this high end, [00:37:00] uh, like, um, high end structure or you can have, like, more, uh, yeah, low key, uh, simple way. Like, what is the vision for this? So, basically, uh, what I see, and what I believe, uh, this place, it won't be for everyone.
Right? There's people who want the luxury stuff, they love that market. And for those who want to see a real life and sustainable practice, they will definitely follow your way, right? So, even people ask me like, what's your target customer? I say, you know, like why you don't have a sign, why you don't promote that much?
I say, no, no, no, no, no. A friend could tell a friend. So that we can have, uh, a [00:38:00] community or a cycle with the same interest. However, we don't mind to have people outside the box and they can get inspired and then maybe we can make a big movement, a big change in the future. But right now, I'm not into luxury stuff like crazy things or like crazy building.
So that's why I'm thinking to do, uh, to do this, uh, search. Of, uh, uh, like what our parents back used to do and make, uh, something would be affordable, environmental conscious, and also can make an impact towards the community. So that is my main goal. Yeah. So you come to Africa also to see African
Absolutely, yeah. Culture. Exactly. Yeah. Yeah. So even, I like the fact that when you went to the village and uh, I told you like, I really want to build like this, [00:39:00] uh, a ch house. So I forget to mention that's also be a part of our NY farm, uh, accommodation and also a culture center. So it's not only to. To, uh, just to stay and see the farming, but also to learn what the culture, because in Tanzania, more than a hundred tribes, 120 tribes.
Nyange: So that's very also fascinating when people come here. Wow. We have more than 120 tribes. And then right now we also have a friend, uh, Roger, a Maasai, so also can tell more about what Maasai doing. Also where I, in Chaga, I can share, I don't mind to have more tribes. When people come here, they get to learn a different, uh.
Rasmus: As a student of architecture, we are very, uh, inspired by, uh, ancient, ancient building structures. Exactly, yeah. But how come you are [00:40:00] compelled by, um, what, what we would consider, uh, low tech architecture? Do you know what I mean when I say low tech? Well, can you explain that? I mean Buildings that basically sustain a nice environment without the use of, uh, electrical supply.
I mean, for instance, a high tech initiative would be addition of air conditioning to control the indoor environment. Could be motorized shading, uh, to ensure that the sun does not heat up the room excessively. Yeah. Um, modern types of heating systems, stuff like this. How come, how come, uh, you are compelled by, uh, the opposite?
Yeah. That's a very good question, Kaka. You know, it's like, uh, sometimes when you look at the world, the world really goes fast. And, um, people, they really also go really fast. They're very easy to copy. [00:41:00] And then they keep running. Because, uh, I always think, Young people, they know how to run, but they don't know the way.
Nyange: And then they reach the point like, ah, I think I wasn't right, which is maybe too late. So like, uh, for example, in Tanzania, the technology came here, people very eager to cop and go that way. And then at the end, they come to realize, I think this is not my thing, which is too late. So after being seen. So we basically started from scratch.
And I said, this is not for me. Let me try to look back where we're coming from. Because we always forget where we're coming from. And we just think, like, this is the right thing. And then afterwards, and then people come, Eh, I think, nah, this wasn't right. Because now we can see how the impact. Because I've been asking, like, why [00:42:00] we use the clay and burn clay soil.
They say, oh, this is because of this and this. Oh, okay, that makes sense. Because they're waving the build, and they can see it's over lasting. It's timeless. And then also it'd be, uh, a very good, uh, for example, when you talk about the, the green energy. We don't use more, uh, electrical here, we use, like, solar panels, we use, like, to heat the water, we use solar panels.
And that's also, it'd be a good environmental friendly, and also it could be increased with income, or revenue. So why should I spend Thousands of installing the crazy heater pump or heater. I mean, the heater, solar heater. I mean, the, the, I mean, the solar, uh, electrical solar, which is reduced. And a very good, um, a very good example.
One of my friend visit the farm and I was just taking around and I say, well, this is, uh, you know, uh, water heaters like, oh, okay. We use [00:43:00] electrical, you know, this is solar, you know, and have 300 liters. Wow! Really? Yes. And I ask, what are you using? I have more than, uh, seven, seven, um, uh, electrical heaters.
And I ask him, how many liters? Oh, I think, uh, 40. And we calculate, uh, how many? Six or eight. How much you spend for electrical? And then you know what? The next two weeks. He called me, say, praise. I changed everything. I said, wow, thank God, at least I make the changes. Mm-hmm . So imagine how many people with the same issue they need to get transformed from that point.
And then because they cope, they see what the, um, the Chinese call. The Chinese also try to make things, uh, cheaper and, uh, easier to access. But the end of the day it's really impact, uh, environment. And then we [00:44:00] come, we, we know this will be a problem, and then we try to forget. And then later on we use so much money to solve our problem, which we could get a right of them in early stage.
So that's, I think, makes me to be very, uh, conscious on see, uh, how the technology and makes me to think backward. And see how we can make it, uh, this world a good place. Yeah. A better place. And whether adoption of new technology is really necessary? Well, you should be conscious, man. Like, whatever, if I say this is good, you should ask a question.
Like, why it's good? And why it's not bad? Because it could be someone want to sell stuff, you know, and they can come with the various, uh, sweet words. And they can convince you to buy it. And then at the end of the day, it's make your, you know, you spend so much, and it's not good or some environment, yeah. [00:45:00]
Rasmus: From, we, after we've been working with, uh, this, um, Project. Prototype, the project on, um, on mud, on mud bricks, What, what kind of systems or ideas, Do you, do you wanna transfer or develop in, uh, In, uh, the building of the reception and, and, and administration area? Could we, uh, Stuff that we have learned together.
This is something that is interesting. Yeah, this is a concept when I work with again You may also be aware of certain concepts from from the Chaga or from other tribes or from from from some some part of like Tanzanian tribal architecture that you wanna that you want to develop or work more with Some ideas you really want to pursue for the reception and administration area.
Nyange: Yeah, absolutely. You know, uh, by saying [00:46:00] that, in Tanzania, we have more than 120 tribes. It says a lot to offer. A lot of knowledge. Absolutely. So if you connect those 120 architects, wow, you can make something better and very inspiring to the world. So why don't we go back and And make, uh, and twist, you know, uh, that architect.
And I believe you guys at the university, it's been a wonderful partnership. So that we can help to transform, in a good way, the, uh, our ancestor, what they used to build. And, uh, the time that we have right now, the accessibility to the materials and the knowledge, we can make it better. And very nicely, because right now we can go in the 3D and make a crazy design, [00:47:00] but it doesn't have a theme behind, right?
So if we can cooperate, the, um, our ancestors or the ancients doing and what the modern offer, I mean the currently, uh, architect offer. And make it that way and make a touch of African or Tanzanian taste. I think we could have a fantastic design. Amazing. Yeah. Why do you think that, uh, two architectural students from Denmark, Yeah.
Rasmus: Um, are the ones who, uh, show up here and value the, the, the, the, um, the prospects or the precious parts of tribal architecture in Tanzania? Yeah. Why, why, why would you even address, uh, someone? From outside Tanzania to try to develop a, uh, architecture based on Tanzanian values. Yeah. You know, I know basically that's a, [00:48:00] it's a very good, a very good point to mention.
Nyange: Cause, uh, when I think, or majority of us would think we don't have an expertise, for example, Denmark or Europe, wow, could come with a fantastic design, you know, a beautiful house. But for you guys, when you came, I was really surprised. Oh, praise, we can go to the man house. Oh, you know, we can do the local materials.
Wow, what are these people talking about? You know, I was thinking, like, let's go to the concrete. Because that is what the current, you know, architect will say that. But I was very inspired, because that's what we always think that way. And that's make me My journey to make it easier, because as you see, so far, it's been a journey.
Yesterday we said this is the journey, because you can have an idea, [00:49:00] but to get the right people or the right team to understand your idea and work together to see the impact together. Ah, that's a big thing. It's absolutely, uh, uh, quite challenging so far here. But, uh, I believe the partnership and I really encourage you guys and your studies to, um, impact not only Tanzania, even the neighbor countries.
And I'm very happy like to connect with the lady from, uh, Netherlands in Konya. So we can make some moment and this could be a game changer for African countries without forgetting the, uh, where we're coming from and we can make, we can improve what we have and we can solve our problems because we believe that all the students when they go abroad, you know, like maybe go architect, learn architect in Denmark.
They won't think about where we're [00:50:00] coming from. They just go, you know, what, uh, now, what modern technology. And then they forget what the best, and it could be a less cost, even to build the master piece. For example, people get here and say, wow, this man's rich, man. Yes, build a lot of houses, but I say, wait my friend, you know, do you know this house where they're coming from?
It's a madhouse. Really? No way. So I think when you look about this part of sustainability and also the economic wise on how we can save the money. I think this is the right way and also be very good to the environment.
What, what are some challenges right now, challenges right now at the farm? Okay. Like, we've talked, uh, about [00:51:00] the livestock being near to the accommodation. Yeah. But we've also kind of talked upon, like, security issues. What, what do you need here for it to be safe? Yeah, I say, uh, it's a safe place. Maybe you can tell, since we've been here.
Nyange: Any security issue been counted? Have any issue been counted? No. No, right? And, uh, I can tell the secret. Uh, in your house, there's no thief will come a hundred miles to come to take something from your house. It start from the people that we have in your house. I mean the team that we have. By employing the local in this area, that's the first security.[00:52:00]
Rasmus: Because if, if they choose to steal, you know where to pursue them, or, or, how do you mean? Because now they don't need to steal because they're employed.
Absolutely. And that's, I know, this is the area we need to make sure it's safe and we get, uh, our daily bread from this. So if we're going to do something to our people, like our client, that means they're going to ruin everything.
Nyange: And the job won't be, uh, won't be, uh, it doesn't make sense to people. If we can go there and then thieves come in my tent or whatever. But so far, you build the first security around the community. But the community is the one who take care of this area. Yeah. That's a great identification. Yeah. But still, when we're traveling in Tanzania and we also come here, you have like a big fence.
Yeah, exactly. You have a fence covering the whole land. Yeah. And other people, they have like [00:53:00] big concrete walls. What is your opinion on this? I think, you know, it's everyone with a different taste and a different views, right? Cause. People they think, like they're very proud of you to say, wow, you see, if you wanna get my house, you can see the big wall.
Nyange: That's my wall. Right? You feel proud to build that wall, and that's making pleasure. You know, there's no friends. But, uh, for me, when I see, I want to see the, the nature I see, want to see. I want to get the fresh air. I want to see, I want to get a real, a welcoming place. And these fans, even that building. It does make, it does make, it shows that it's a, uh, you get 100 percent security.
As I said, a thief can come to your place anytime if they want. Even if you [00:54:00] put an electrical thing, still, they can break your house. It's how you build the relationship to the neighbors and the whole community, and that can make you stand out. So there's so many things that can help you to connect first with the community.
The big things I would say to connect the community. And the community could be your security guard. Yeah. So, like, as we see the future of Nyange, we're going to start a Nyange Foundation, so that this foundation can help even the kids or the community in this area, even to train them on the hospitality and the farming and the other thing, because even the guys here, maybe one day they'll have a family.
The kids will come to work here. And that's my future. That's my, my wish. So that I can see, uh, how Nyanga branches or how Nyanga farm can employ, generate more, uh, employment to the community, even bigger than the picture in the Tanzania [00:55:00] economy. So, in case of the, uh, the security, I would say, uh, build the, uh, concrete.
Somehow it could be just the worst. resource. Yeah. So we must be also conscious is not only that we have money, we can afford to build that. And then it can be old. Think about the environment as well. Like what the concrete produce, you know, so that's, it's actually, it could be a lack of knowledge. Like people, they don't, they don't understand, you know, they just see a neighbor of a beautiful, uh, A big concrete wall and say, yeah, I want like this.
And then if you could ask the guy, why you build this? Ah, to secure it, la, la, la. And say, okay. And they secure it, so here someone can climb it and get in, you know. So that's, uh, there's so many ways that we can try to protect your area. Yeah. But these fossils, yeah. You don't feel [00:56:00] like you need the fence? At the fences, I mean, we need this one because, first of all, it's just for, uh, animals.



Figure 309: Private picture - Praise Nyange in giving interview in the banana field at the farm.

Because we, as you see, like, here, so many, uh, other people keep their livestock. So, basically, when they go around, they can allow, I mean, the cows or a goat, they don't, they don't, they know the way, but they, they don't know, like, am I, I'm not supposed to go this way, you know. And this is actually makes me to Start, uh, to put this fence to protect from the animals or the dogs.
Because sometimes, imagine, if you are, the guests are here, and then the dogs get in the, in the accommodation. I think that won't be a good picture. Because, you know, you don't know, like, how they put the injection, the rabies or something. So, that's mostly to protect the animals.
Rasmus: I have a last question. Do you have another question? Last? I don't think so. Alright, my [00:57:00] last question is, the No, no, maybe the last. Let's see. Okay. Maybe the last on this interview. No worries. Um, but my question is, the building system that you are developing right now, using mud bricks, using maybe more timber, more, um Biobased materials with less emission.
Do you think this kind of, um, building system is something that is exclusive to, uh, tourism industry? For instance, lodges, accommodation, this kind of, this kind of, uh, activ

to be here for the foundation. Yeah, big time, yeah. Yeah, yeah, yeah. You know like, uh, why I mention, regarding like those houses over there, which we believe there's no, uh, or maybe at some point if you want to build, like transform this, uh, This tent to the mud house, I can make like one storage, you know, to sell the space.
Nyange: So like a family, kids can be hired or we can have even two, uh, two couple go this way. Yeah. I think you could easily develop like a very interesting buildings, uh, on the same, on [01:13:00] the same side. Yeah, exactly.
Yeah, two story, yeah. And it makes sense to put them in the back and then we can have one story in the front. Exactly, yeah. Exactly. So that means you don't need much. Because what I see, like, uh, Some people, they build, like, these sort of cottages. And they just look, uh, a dead place. Because it's a crowd of so many houses.
Like, ah! Yeah. You know? Yeah. Yeah. I think you should really, you should stay true to the, uh, You want to make a few, but exclusive or, um, or thematically correct buildings. Do you want to interview at the gate? At the gate? Yeah. Or we can just take some, yeah. [01:14:00]
Maybe we can go by the borehole as well. Ah, the borehole, yes. Yeah. Yeah, the borehole, of course.
Rasmus: Wouldn't it be nice to have these people in the back and you walk in front of them? We can just pass them on the way maybe? But if we walk like along one of the road scales or It doesn't matter.
It just looks really good with all of this. Yeah? You know? And the background of the What? You wanna walk in front? I think we should do it [01:15:00] so you have the sun against you. Otherwise it would be hard to see something on the camera. I see. Yeah. So which direction? So, we start in this direction, and then this way.
Nyange: Okay. Is this
something you want on your website? Yeah, yeah, that'd be nice. Like, specific shot or anything? Yeah. Or we'll just share what we Exactly, yeah. You take some mama picture there? Yeah. Of the harvest? I didn't. Yeah, you didn't. No. I'm afraid of them. I know. Chop, chop. Sorry. What are you doing? So you be also in the camera or no?
I can walk by you. Okay. So then you can explain. So we need to get out these boulders. Yes. No, no plastic boulders. Yeah. [01:16:00] I can't carry all these. We can do, uh We can put them down here somewhere. But
Nyange: that does look good, man. Okay, so it's just praise? Yeah, I think so. Okay. I'll be out of the picture. Yeah, I know. Okay, can you explain a little bit about what kind of crops that you're growing and why you chose? Yes. Uh. So welcome to So should I start? Yeah. Okay, so welcome to Nyange Farm. So here it's, uh, we grow a lot of, uh, hort culture products.
[01:17:00] And, uh, we have varieties of, uh, vegetables. And the mainly practice that we really practice here is more, uh, in permaculture, like, also do, uh, to make sure. Our soil, the soil that stay healthy. And by doing that, we're doing a lot of, uh, crop rotation. So like this time when you grow a tomato, we don't repeat again the tomato.
So at least we mix, uh, different crops so that we can improve the fertility of our land. And basically we do, we do a lot of, uh, vegetables like cabbage. Cause this cabbage can be Feed with the people here, the team of the farm, and also even the normal dishes. And also we have beetroots, lettuce, and this mostly we feed, I mean, the local market and [01:18:00] also our client that climb the Mount Kilimanjaro, so, and also go on safari, so that we get a lot of food from the farm, because our main customer right now, we focus. The hotels around the area and also the Nyanga Farm lodge and also the Nyanga Farm, I mean Nyanga Adventures company so that the food that we feed our people are much, uh, I mean safe and we see where the food is coming from. Yeah. Okay. Can we do a shot maybe down here? So, if I walk backwards this way, and you'll be walking in the same line,
Rasmus: and maybe you can tell us about, give me a second, so Brace, maybe you can tell us[01:19:00]
about, uh, the crops that are in season, and where you, where you imagine to, to, to sell these, what markets are these, the locat crops for, and while you do that, please walk towards me. Okay, so, we actually, before we grow anything here. We must follow the year calendar. Because some of the products we, as we practice using the drip irrigation, and we have a reliable water source, like we have our own borehole, so that we can grow any time that we want to grow any product.
Nyange: But basically, uh, like most of this vegetable, like spinach or lettuce, we mostly grow during, uh, before the high season of the tourist. Cause during the high season, you find a lot of, uh, the demands of these. This product is so high, like the hotels need, because we are more than, uh, I mean, 20 hotels around this area.[01:20:00]
And we all feed those, uh, all the products that we are growing here. So basically, this, uh, mainly, uh, I mean, the high demand of the hotels, and that's why we keep growing this one. Yeah. Great. Yeah.
Rasmus: It's good pictures. Yeah. Yeah. It's fine. Yeah. Yeah, it's good, right? Yeah. Also, I think if you remove the shades, Just, uh, the Ray Bans. Yeah, yeah. Yeah. More personal. Yeah. Alright. Yeah. So, no, no like a mafioso. No. Yeah. That, that's the thing. I mean, sometimes you want, It does, it does look more transparent if you, if you don't have, if you don't have the glasses, right?
Nyange: Yeah. But also, it's, uh, You know, we call the brand a personal brand. Mm hmm. So, So, Yeah, it's like, uh, all the famous person, you know, like when I mentioned like, uh, [01:21:00] I'm trying to think maybe an actor or a person, you know, like, whatever I come to stage.
Oh, maybe you are the hat, for example. For example, if you talk about now, uh, it was so funny last weekend. In this conference, I mean, this meeting, it went, uh, there's one person he taught about praise. And then he said, when you make praise always wear the hat. So that's like, okay. If whatever one wear the hat, this is praise.
So it's like, it shows your personal brand. Yeah, so it's, somehow it's, uh, it's very tricky on how you It's an identity too. Identity, yes. And if we did a video with you, no hat, [01:22:00] no shades, they would be like No one is like, who, who is this? Who is this even? Exactly, yeah. Maybe we can take one by the cucumber.
Okay. Yeah, because it's all Yeah. Okay. You can just take from the back. So Say hello to your mamas. If they could wave or something. Exactly. They are, they are two right there. Do you want us to go? Yeah.[01:23:00]
Nyange: Okay.
Okay.
Rasmus: Yeah, exactly. Yeah. Yeah. Yeah. Yeah. Yeah. Yeah. Yeah. Yeah. Okay. It's. It's. [01:24:00] It's. It's. Yeah.
Nyange: How are you? very much. Can you show us the boathouse? Oh, the boathouse, okay. While you speak? Yeah. Yeah. Yeah. Can you show us the boathouse? Oh, the boathouse, okay. Yeah. Yeah. While you speak? Yeah,
yeah. Yeah. You busy? Yeah, it's okay. I think, uh, the main part we already covered, right? The promo video.[01:25:00]
It's so funny, like, uh, the guy yesterday, uh, from London, from UK, from Bristol, he's just like, ah, I keep following this one guy, he's called Charles. He's also a farmer in the UK. Yeah. And he's exactly the guy, you know, he built this farm and so, yeah, so we're going to do a big thing with him. Nice. Yeah.
Coincidence. Yeah, what a coincidence. Yeah. But that's a universe. Connects. All right. Jumbo jumbo. So this is actually our engine. Okay. So without this borehole, there's no life. And I always make a joke, the water, it's a medicine, the soil. So if you have, uh, water, you can see the green. It just bring the life.
Nyange: So without the water, there's no [01:26:00] life. So, and, uh, very lucky here. We have only, uh, 70 meters of the borehole. And from 10 meters, there's a lot, a lot of water. And, uh, here we can get the water around here. The water is safe, clean to drink and other uses. And basically, when you come and see, uh, Uh, right now we are using the electrical pump to pump the water, but the future to have a solar pump, so that we can also be, uh, aligned this about sustainability on how to use the green energy.
So that's our future to have a solar pump. solar pump to pump the water. Is this a big investment for a company like yours? It's a big investment. But it's a smart move. Because if you don't have a reliable water source, energy, you can't [01:27:00] do farming. Because without this one, you may rely on the rainfall or Uh, the natural spring, which is not very reliable because everyone is angry on that one.
But having this one, you could be able and reliable to do anything at your farm, followed with the proper and innovative, uh, technology. So that, for example, you're using this, uh, drip irrigation. So by having the solar, I mean, by having the borehole, We pump the water and go to the tank and use the gravity for irrigation.
So that means it's a smart way and also more efficient by using the drip irrigation. And, uh, that's make, even increase the yield and also to control the disease as well. Yeah. Even, it somehow can sound not good to have less people, but also to be very easy to manage and how to control the, uh, irrigation system.
Alberte: Yeah. Great. Mm hmm. [01:28:00] Good. That was it? Yeah. Santa Zama. Yeah. Yeah. You tired? Two hours. Oh, one and a half. Yeah. Yeah. But really good. Yeah. You have to go? Should I? No, let me go to the house. Yeah. I think the house would be nice for the progress. Yes. The mud house or the tent? Yeah. Actually, while you walk here, tell me about the indigenous species that you're planting around here.
Rasmus: Oh, wow. We have, uh, maybe we can go up there. There's, uh Do you mind if I go through here? Yeah, exactly. Should we come the other way then? Oh, you go the other way. Yeah, yeah. Yeah, we can talk about, uh, uh, uh, this plant here. Yeah. The, uh The black one. The black, yeah. Yeah, exactly. Yeah, exactly. That's me.
Nyange: Ah, here. Do you want to take a picture here? No. Oh, [01:29:00] battery. He's out. Yeah, what do you think if you can walk from here? Yeah, I think it's nice. Beautiful, yeah.
Maybe, should I be in it, or? Yeah, we can do both. Just alone and you also. Right?
Nyange: Action! Tell us about the habitat here. Yeah, so, here we try to create a very good environment. Uh, with the artist, they actually sit here and drawing, uh, what we have at the farm and also make some, a small gift to our guests when they come to stay at the farm. But also we have a frog, with this we call a frog zone, which basically there's a water retained here, but actually we change the water, but it's also helps to, uh, grow other microorganisms.
That's for example, can [01:30:00] help to grow. grow like other flowers that attract the insect and also some of the control the, uh, control the mosquito so they can eat the mosquito so that could be more biological control then also environmental friendly so it's the everything's here it's an ecosystem yeah very nice yeah then go back maybe with emily okay you still a guest Yes, Wageni?
Wageni, yeah. Ready? Jumbo! So, welcome Emily. Asante sana. Welcome to Nyange Farm. It's, uh, it's not only farm. It could be a home for, uh, ideas. So, like, people learned about farming, architect. Yeah. Yeah, design. So, Uh, so first of all, we start there with a, a [01:31:00] fish pond. And this idea, we start the 2020 where we start the, um, we ha managed to have harvest more than 10 tons of a catfish.
But the idea right now, we're gonna extend this area, another pond, do another, another, uh, variety of fish, like to have like a trout and tilapia because this could be also help. Uh, there are cash, I mean, there are revenue at the farm, but also increase the, uh, food production because also the fish, it's a high demand in Tanzania or even the world in general.
Okay. You know. So you would serve the Mwakeni? Yes, the tourists and also even the local who are coming here. Uh, we can do have a sports, a fishing. And also, uh, you know, like a catch of the day or a farm to table. That's a mainly idea. It's like we'll sit and they will harvest and eat that one. [01:32:00] Okay. Yeah.
Nice. Oh, the species. We have a variety of, um, cause here we really try to practice to grow our indigenous plants so that we can help also to bring. Our natural, uh, habitat for the animals and also, um, all the, to save the planet or the climate as well. Because, as you can see down there, we have this plant.
This tree is called, uh, ebony tree. And this ebony tree is very, uh, important to our planet by doing the carbon offset. Because this is very, uh, a very good tree to make these carvings. So most of the carvings are made from this plant. And it's actually a very respected plant and it's actually the national plant.
If the government cut, cut this plant, you'd be in trouble. [01:33:00] And this gets up to 60 years to get matured. And that's what you see, the tracks get very black. And this shows on how It's been absorbed so many carbon dioxide from the plant. So we need to plant those tree to do a lot of carbon offset. I, you know, you guys, we travel all the way from Europe.
You can see how, how we distract our planet. And this could be a great movement to plant a lot of trees. And we really encouraged to plant mostly of indigenous plants so that we can bring back our unnatural habitats for many of the birds because even the birds would be get scary they run away because this gets surprised with the plants that we're keeping growing.
I know people love to plant a lot of trees which is mostly, I mean exotic, but don't forget to plant indigenous plants. Very important to our ecosystem. Very nice. Yeah. Do you want to go to the house? Yeah. Can we [01:34:00] help you? Sure. I know you don't like it. Only today. Follow the way.
There's no shortcut in life. What's up? Huh? Yeah, I think this is the last thing, and I have a feeling we have to leave. Yeah, it's okay. And we even have people working in the, in the back. That's just great. Yeah, yeah. Maybe if you stand in the shade, then you have the same exposure. Mm hmm. Yeah,



Figure 310: Private picture - Praise Nyange in the fields of the farm.

so, welcome to our new chalet, or the new cottage. We are still working it. It's great. And it's coming very well so far. And, uh, we have Baraka and, uh, Rogers. They've been [01:35:00] working day and night here to make things happen. And, uh, now it's a stage of painting. As you can see, this is an old mud house. So, like, we can't wait to welcome you guys.
To come and experience and see. How the mud house look. And, uh, it would be very nice to stay here without A. C. The ventilation is fantastic. And, uh, we have a nice terrazzo. So this terrazzo would be, uh, also very good to see. Because here we mostly see terrazzo in the churches. And it would be nice to see, uh, a small cottage.
All practices would, uh, be environmentally friendly. And Be very conscious on how we control the, uh, and use the available and the local materials. So, Karibu Sana to our place. Yeah.[01:36:00]
Braka: Okay. Okay.
Okay.
Okay. Yes.
Nyange: Okay. Very good. So I've been asked, like, which, uh, what they're doing the rest of the year. Yeah. Oh my god, it's looking so nice. Yeah. Finally, yeah. So this is, uh, we drove all the way to Arusha. [01:37:00] Oh. Keep in calling. Yeah.
So this one.
Rasmus: The idea is to apply another code. Yeah. Uh, not with this one, but with the, mixed with the glue. The glue, yeah. Yeah. Yeah. Yeah. Not too much. Should I, uh, unplug you? Unplug me? So, uh, I'm not recording you all day. What is he talking about? I want to solve this one all day. Yeah. Nice. Thank you, my friend. Thank you, brother. Asante. God bless you. You too. And good luck in studies. Thank you. You too. [01:38:00] Not with your studies, but with your Like, career. Your career.
Rasmus: Yes. The project. Yeah, the project. The education never ends. No. That's right. Never. Until we get older. Yeah. And then try to keep transformed. In knowledge and experience.
There's a lot of people who call you during the interview. And maybe like ten times you're receiving a call. Yeah, but you can edit that, right? Yeah, we won't see that you're receiving the calls. Yeah, yeah, yeah. You can neither hear it nor see it. I think your phone is It's visible, but we'll just crop it a little bit.
Yeah, I think we should crop. Sorry, like sometimes I need to check, like, what's going on. Yeah, of course, if it's someone important. Big crash. Hey, mom. I wish you called me. And [01:39:00] then I could explain our problems. Yeah. So, it's so nice, what I'm doing. What I see.

Appendix 4

Interview with Vores Afrika

Date: 25.10.2024

Location: Aalborg, Denmark

Alberte: [00:00:00] Men Nana, er det okay, at vi optager det her, og at vi bruger det til vores projektrapport?
Nana: Ja. Mange tak.
Rasmus: Den kører nu.
Alberte: Har du dine noter?
Rasmus: Ja det kan jeg. Det finder jeg frem i alt.
Alberte: Nå, okay. Nana, kan du ikke lige fortælle om dig selv og din virksomhed?
Nana: Jo. Jeg hedder Nana, og jeg startede mit lille rejsebureau for 10 år siden, i år faktisk sammen med min far.
Jeg ved ikke, hvorfor det aldrig rigtig liggede i korten, at vi skulle starte Rejsebureau, men det blev sådan besluttet fra den ene dag til den anden, og så gjorde vi det og sprang ud i det. Altså ud på dybt vand og learning by doing, og havde nogle gode folk i ryggen som vi samarbejder med stadigvæk den dag i dag.
Alberte: Er det fordi, I havde en baggrund?
Nana: Vi havde nogle personlige venner som driver et rejsebureau i Tanzania og Kenya. Og har hele tiden synes, det var super fedt men vi havde også hver vores karriere min far [00:01:00] arbejdede i en rigtig stor virksomhed, og jeg læste og sådan nogle ting, men så kom dagen bare, hvor det gav mening at starte det her rejsebureau op, så det har vi gjort. Og det er kvalitetsrejser til Afrika, dermed ikke sagt, at man ikke kan købe nogen. Altså det er ikke, fordi det skal være guldvandhaner og storslåede hoteller, men vi laver rejser af god kvalitet Vi kan stå inden for de rejser, vi laver, og der hvor vi sender folk hen, de hoteller de bor på og sådan noget.
Men det er ikke, fordi det behøver at være skidedyre rejser alle sammen Slet ikke.
Alberte: Og hvor mange er I ansat på kontoret i dag?
Nana: Vi er to ansat. Mig og Line. Og Line startede i sin tid før corona som studiemedarbejder, med henblik på at blive fast ansat men så kom corona, og der havde vi jo rigtig mange ansatte, og så havde vi lige pludselig ikke nogen ansatte.
Men så kom Line tilbage, eftersom vi begyndte at få mere travlt efter corona. Og nu er min far pensioneret, så han kommer bare en gang imellem og siger hej.
Alberte: Og hvad er det for nogle rejser I [00:02:00] sælger? Altså hvad for nogle lande
Nana: Det er jo rigtig meget Tanzania, hvor med Kilimanjaro og Zanzibar og Safari og sådan nogle ting, og Kenya også, Uganda, Madagaskar.
Så ser vi en tendens til, at vores vestafrikanske rejser også begynder at slå mere og mere igennem. Det er meget med kultur og historie stammesamfund og lokale ceremonier og sådan nogle ting. Og jeg tror, at folk har rejst så meget inden At det skal være mere og mere anderledes Og så begynder de at kigge mod Vestafrika, og det er mega fedt.
Jeg har jo boet i Vestafrika, det er det, der er hele grundlaget for den her virksomhed også, at vi har boet der, da jeg var lille. Er
Rasmus: noget, som jeres kunder efterspørger, eller er det noget, I måske på en eller anden måde forsøger at puste? Nu sidder I ligesom og rejser op i Vestafrika, og så er bare mega populær og så kommer kunderne til jer og siger, hey, vi kunne faktisk godt tænke os at rejse til Vestafrika.
Er det noget, I overhovedet kan prøve Kan hjælpe os med at planlægge?
Nana: Vi har været helt lowkey i forhold til at promovere det, fordi [00:03:00] vi er godt klar over, at det er sådan lidt, altså folk ved ikke, hvad det er. Så vi har promoveret mest vores populære destinationer så folk har helt sikkert selv fundet frem til det.
Nana: Jeg ved ikke, Og om det kan smitte af med nogle fjernsynsprogrammer for eksempel nu ved jeg ikke, de der, Anne og Anders hedder de det, der har rejst, har de ikke været i Vestafrika de har været i Ghana, har de ikke? Det kan jeg pas. Jeg kan ikke huske det, men om det er sådan noget, der også smitter af, eller om man simpelthen kigger på den der Globus, hvor er det mest mærkelige sted at tage hen, og så finder de ud af, at er Vestafrika jeg aner det ikke.
Altså men lige pludselig inden for de sidste halve år, der er efterspørgselen bare... Sprunget i luften.
Rasmus: Det
Nana: er så mærkeligt, men det er så fedt.
Rasmus: Er det meget drevet af en eller anden for at få ønsket at se en ny kultur, tror du?
Nana: Ja det er også drevet af, at folk har rejst rigtig meget. Altså dem, der tager til Vestafrika, de har rejst far.
Og det er både par, men det er også familier. Og de familier der tager afsted, det er [00:04:00] så nogle, vi gerne vil vise vores børn Hvad der ellers er. At det ikke bare er bale i stranden og det her lukrative øliv eller sådan noget der. Men sådan noget helt, helt basic, low key, hvor man virkelig finder ud af, at sådan her ser det også ud.
Ja, smækkende.
Alberte: Hvad er det for, altså hvis du skulle beskrive de kunder, der vælger Østafrika,
Nana: hvem
Alberte: er det så?
Nana: Det er rigtig blandet. Jeg har lige solgt en rejse til et par. De skal kun Uganda. De er 24 år, men jeg har også lige solgt en rejse til en familie på 8, hvor den ældste er nok 80. Så det er virkelig forskelligt.
Men det er klart nogen, der gerne vil opleve noget, og måske nogen af dem også har rejst meget før i Thailand eller Bali, og nu vil de gerne til Afrika, fordi for mange er det en stor dræm. Men det [00:05:00] virker også mystisk at tage til Afrika, og hvad er det for noget, er det farligt og sådan noget.
Men
Nana: jeg tror...
Jeg kan ikke sætte én finger på, hvilke typer der tager afsted.
Rasmus: Hvad kan du sige, de gerne vil besøge? Hvad efterspørger de?
Nana: De efterspørger klart dyrliv, det gør de. Den helt klassiske safari, og så efterspørger de også den helt klassiske zanzibar ferie men vi kan også godt se, at Madagaskar er en af vores bedst solgte destinationer og det er meget kultur og natur, hvor det hele er meget øde.
Og uberørt på en eller anden måde, og ikke særligt udviklet i forhold til Tanzania og Kenya, hvor der jo kommer masser turister hvert år, det gør der slet ikke i Madagaskar. Så vi fanger nogle af dem der, som gerne vil noget anderledes og som de andre rejsebrugere ikke får fat i, fordi de laver det samme som de har gjort de sidste 20 år, hvor vi er små vi kan lynhurtigt navigere rundt i en ny destination, eller et eller andet og få den [00:06:00] på benene.
Mange af jer er nogen, der gerne vil noget anderledes men vi har også dem, der gerne vil det helt klassiske, som stadigvæk er en fantastisk oplevelse.
Alberte: Nu kender du jo Mushi-området, som jo også er vores projectsite. Hvad kan I tilbyde der, eller hvad efterspørger folk i den region?
Nana: Klart Kilimandjau. 100% Kilimandjau, Kilimandjau, Kilimandjau.
Og
Alberte: hvordan ser sådan en rejse ud?
Nana: Når de efterspørger Kiliimandjau, jeg forsøger så vidt muligt Og gøre sådan, at de lander om aftenen og så næste dag kan de komme på en lokal tur, for eksempel til Marangu eller Imochi eller et eller andet, så de kommer til at se bare en lille fli af Tanzania og lokallivet, fordi jeg vil bare gerne have, at oplever det og får den der vibe ind, inden skal op på bjerget og så hjem, eller hvad det nu skal.
Så det [00:07:00] er klart sådan, altså fra Moshi enten tager til Marangu, eller... Og
Alberte: hvad er der i Marangu?
Nana: I Marangu er der vandfald, og de kan vandre rundt og de har Tjaka-hytter, som I også har været ude og se. Altså hele Tjaka-stammen, som mange af vores Kilimanjaro-guider og porters, de er jo fra den der Tjaka-stamme.
Og
Nana: det synes jeg er fedt at få med og vide, hvor fanden er vores lokale guider fra. Det synes jeg er mega vigtigt. Så er der selvfølgelig farmen, som I har boet ude på, hvor jeg også synes, det er vigtigt at komme ud og besøge den og se, at her kommer alt det der mad, vi spiser på bjerget. Det kommer fra den her farm.
Hvad
Alberte: er det, der er fedt ved at få folk ude på farmen?
Nana: Farmen er super, super cool, fordi du kommer... Det er bare noget andet, altså det er ikke sådan noget masseturisme der kommer du ud, og det er det fedeste projekt, fordi det er på en eller anden måde low key at komme [00:08:00] derud i forhold til alle de andre oplevelser der er i Tanzania, som hele tiden skal være sådan nogle store ekstraordinære oplevelser, her kommer du ud, og så er du bare der helt stille roligt, altså det...
Efterspørger mange folk også at komme ned i gear på en eller anden måde.
Alberte: Er det også mødet med sådan de lokale mamma'er, der går?
Nana: Altid Jeg synes altid at mødet med de lokale er noget af det allervigtigste. Hvis det kan komme ind i et rejseprogram, så vil jeg altid forsøge at gøre det. Og så synes jeg, at det er fedt Jeg håber at farven bliver ved med at være...
Basic på et eller andet måde. At det ikke skal være noget storstået med pool og kæmpe kaffebarer og sådan noget der. Jeg håber, at det bare nærmest bliver, som det er. Det kan noget.
Og vågn op fra det der telt og bare stå op og kigge ud over de der marker og bjerget.
Og så er der ikke noget andet. Og så får man serveret en eller anden simpel morgenmad ude i haven, og om aftenen er der bål så hvad mere har man brug for?[00:09:00]
Det synes jeg er fedt.
Alberte: Okay, som turist så lander man om aftenen, bliver indlogeret på et hotel eller på farmen, så dagen efter, så er der et kulturelt indslag eller sådan Ja, så
Nana: har vi arrangeret et eller andet kulturelt, hvor man enten er i Mushi eller Marangu, altså hvor man kommer ud og ser noget gerne med sin lokale Kilimanjaro-guide, så man kan lære dem at kende, og de kender alt til områderne, så det er oplagt at tage dem med, og de kan fortælle om det, og hvor de kommer fra.
Og dagen efter det så kommer man op på Kiliimanjaro,
Alberte: som typisk er hvor mange dage 7-8
Nana: dage. Så kommer man ned fra bjerget igen, og så kan det jo være, at man kan slutte af med en fest eller et eller andet båt og mad ude på den der farm eller være på sin lunch. Og så? Typisk så tager de fleste andre på en safari, måske tre dages safari, og så tager de videre til Zanzibar, højst [00:10:00] sandsynligt også.
Alberte: Okay,
Nana: og er
Alberte: der en uges tid?
Nana: Ja, så er måske bare en fem dage eller sådan noget. Det er lige pludselig mange dage, altså hvis man skal være på bjerget i otte dage, og man kommer to dage før det, og så har man lige tre dage safari, og så fem dage sandtidbar også. Ja, okay. Vi
Rasmus: vil først gerne snakke om noget, der trender i turismebranchen fra tiden.
Jeg tænker at bæredygtighed må have en eller anden form for indflydelse. Hvad tænker du, når vi siger bæredygtighed Er det noget, jeres kunder efterspørger? Er det noget, I forsøger at implementere?
Nana: Det var det sidste år, hvor vi fik vores Travel Life-certifikat, og det betyder, at der er nogle ting, som vi skal rette ind efter.
Vi skal være så bæredygtige som overhovedet muligt. Vi har fået alle lamper skiftet. Der er mange ting, vi gør herhjemme, men når jeg tænker bæredygtighed I forhold til rejser, så tænker jeg især social bæredygtighed. Og det er sådan noget som [00:11:00] KPAP, altså at vi arbejder sammen med dem, som er den her non-profit organisation, det tilsikrer, at vores porter får minimum løn og de får ordentlige arbejdsvilkår på bjerget, og de bliver respekteret, og de bliver talt ordentligt til,
de
Nana: får uddannelse i førstehjælp og alle sådan nogle ting.
Altså alle vores kæmpediavture, de bliver jo overvåget. Der er en med fra KPAP, vi ved aldrig, hvem det er, som er med simpelthen for at overvåge. Altså han arbejder stadigvæk som porter. Men han overvåger, og så bliver vi simpelthen, så får vi en eller anden procentsats. Nå men den her tur, den var 95%.
Og
Nana: hvis det samlede procentsats kommer under 84%, så er vi ude af KPAP'en.
Rasmus: Okay. Har I en KPHP certificering eller licensering, eller er det de samarbejdspartnere? Det har
Nana: vi, men vi skal alle arbejde sammen med en, der er KPHP certificeret også. Altså en lokal? [00:12:00] Ja, en lokal. Med mindre vi selv går ned og siger at det er svært det kan vi ikke, så skal vi være dernede. Så vi skal have en lokal samarbejdspartner.
Rasmus: Er det noget, jeres kunder også efterspørger? At hvis man skal på Kiliimanjaro, så vil man gerne have sikkerhed og social ansvarlighed i orden? Ja,
Nana: helt sikkert efterspørger de sikkerhed og tryghed. Men der er mange, der ikke ved, hvad KPP er. Jeg havde snakket med min far. Fire kilometer javrejser til fire unge piger, der er i start 20'erne, og de siger til mig, vi har valgt jer, fordi I er KPAP-medlemmer.
De unge efterspørger det, de ved det godt, altså det er det, de benhårdt går efter, hvorimod hvis jeg sender nogen på 50 afsted, de ved ikke noget. De forstår det først når de er på bjerget og kan se, nå okay, jamen det kan vi godt forstå, men det er ikke noget, de efterspørger inden slet ikke. Jeg ved ikke, om det kommer, det håber jeg, jeg gør virkelig alt, hvad jeg kan for at promovere det, for jeg synes det er super vigtigt, og jeg kan ikke forstå, hvorfor vi kun er to byråer herhjemme der er medlem af det.[00:13:00]
Men de unge gør. Det er ikke så mange i startjuren vi sætter afsted men dem vi sætter afsted de efterspørger det der så kan det være at de ældre efterspørger andre ting også i form af noget bæredygtighed og vi sørger for også at arbejde sammen med ecolodges og sådan nogle ting der okay,
Rasmus: hvad vil det sige at
Nana: Lodgers, der også går op i bæredygtighed, de
må
Nana: gerne være Travelize-certificerede, de behøver ikke, men bare at de tager hensyn til miljøet og byggematerialet og hvad det hele er blevet bygget i og sådan noget.
Og igen, færre behandling af deres medarbejdere. Sindssygt vigtigt. Hvordan
Alberte: vurderer I, om de opnår jeres kriterier
Nana: Altså vi går jo meget ud af at besøge alle de her lodges og sådan noget, men når vi for eksempel nu skal jeg til Mauritius, som er vores nye destination, så går jeg ind og ser, hvad for nogle hoteller kunne være interessante at arbejde sammen med, og der er behovedet gået efter dem, der har en [00:14:00] eco-certificering af en eller anden art.
Okay.
Nana: Ja. Det kan jeg lige så godt, så alt andet er sorteret fra.
Rasmus: Er det fordi, så er der en eller anden bevisbjørne fra virksomheden? Ja, klart Så er undertagt nogle
Nana: krav som de skal følge. Så det synes jeg er meget fedt
Altså heldigvis Afrika, de har været sindssygt gode til at gøre det her i årvis og bygge efter miljøet og bæredygtige materialer og sådan noget, så du kommer næsten ikke nogen steder hen, hvor der ikke er en grad af bæredygtighed. Men hvis jeg kan se, at det er sådan noget med, at de tilbyder klapning af dyr eller sådan et eller andet, altså så er de ude, jeg kan ikke have det med det at gøre, plus der skal være den her ordentlige behandling.
Altså hele vores forretning er gennemsyret i ordentlighed og det forventer jeg, at det går videre,
både
Nana: dem vi samarbejder med,
men
Nana: også vores hoteller og sådan noget.
Alberte: Hvem er ansvarlig for den der Travel Life Certificate?
Nana: Hvem der har [00:15:00] fået den i hus-agtig?
Alberte: Ja, altså hvem Hvem certificerer? Er det bare en virksomhed?
Nej, det en hel
Nana: uddannelse. Så lige når hun har siddet med det, så er det sådan en hel slags uddannelse hvor man skal gå ind og skrive ned. Det vi gør, det gør vi, det gør vi det gør vi, og det her kommer vi til at forbedre. Så der er jo flere grader og lige nu har vi ikke den helt højeste grad, men det får vi endnu noget.
Satser jeg på.
Rasmus: Hvorfor er det Travelife? Fordi det er den
Nana: største det er den, der allermest anerkendt inden for rejsebranchen. Altså nogle eco-certificeringer.
Alberte: Siger den noget om jeres samarbejdspartner også, eller siger den kun noget om jeres virksomhed? Nej
Nana: de har stillet som krav, at vi kontakter vores samarbejdspartner i forhold til det her, at der er nogle krav vi stiller til dem.
Okay.
Nana: Så vi har jo skrevet rundt alle vores samarbejdspartnere, om de kan skrive under på, at det her det bliver gjort, altså en [00:16:00] hel mail og sådan noget, og det har de så gjort. Okay. Jeg
Rasmus: kan ikke forestille mig andet, end det er for dyrene for jeres rejser i sidste ende. Dyrene
Nana: og menneskene. Nej,



Figure 311: Private picture - Owner of Vores Afrika.

Rasmus: jeg mener at det gør processen dyrere.
Nå ja, klart klart klart. Så hvorfor har I valgt at sige, nu tager vi den her. Nu sned vi nogle penge efter det her certifikat med Travel Life er det fordi vi kan mærke at kunderne de vil gerne have at vi kan se på døren her er der nogen der faktisk mener bæredygtighed eller er det internt at I tænker at det her det er ansvarligt for os at reagere på den her måde hvad kommer ønsket om at få certifikatet når nu vi åbentlig vil antage at det koster mange penge
Nana: begge dele Det begge dele Det er både for os, men vi tror også på, at der bliver større og større efterspørgsel på det her.
Den er ikke så stor endnu, men det tror jeg helt sikkert, den bliver, [00:17:00] så kan vi lige så godt være på forkant. Jeg gider ikke være dem, der raster rundt nede i bunden, og så kommer man halsende bagefter de andre.
Rasmus: Ser jeg konkurrenter, som klarer den ikke, fordi de ikke gik op i bæredygtighed i ret af tid? Så meget betyder det ikke i Danmark endnu?
Nana: Nej, det betyder ikke så meget endnu, det gør det ikke. Folk vælger stadig de rejsebord, som de måske har rejst med i rigtig mange år eller et eller andet. Men jeg er 100% sikker på, at det på et eller andet tidspunkt bliver en efterspørgsel. Altså dem jeg snakkede om før, da jeg startede 20'erne, de bliver også lige pludselig 30 og 40 år gamle. Eller får familier lige om lidt, det ved jeg ikke om 10 år eller sådan et eller andet. Og så tror jeg på, at de efterspørger det. Og det er igen den der på at blive i ordentlighed hvor vi bare gerne vil være under den. Det er svært at promovere sig, fordi man kommer lynhurtigt til at løse med sådan et eller andet frøtest, og det er svært når vi sender masser af fly ud på [00:18:00] vores rejser og sådan nogle ting der.
Men der, hvor vi kan gøre en forskel, så må man gøre det. Det synes jeg er sindssygt vigtigt.
Rasmus: Ja, for det vil jeg egentlig gerne spørge om, fordi at
Nana: rejsebranchen

Rasmus: har en stor udledning, eller hvis man siger Flytrafik i det hele taget og jeres rejser kan ikke lade sig gøre uden flytrafik. Så hvad er jeres tanker omkring at have en relativt stor miljømæssig påvirkning, fordi at,
jeg
Rasmus: ved godt det ikke er jer, men jeres kunder,
de
Rasmus: kommer til at lave et stort klimaaftryk, men de kommer så godt nok til i form af at vælge jer og bidrage til positiv social bæredygtighed på de områder de kommer
Nana: Ja det er det.
Altså verden er ikke sort-hvid på den måde der, fordi hvis der ikke var nogen der fløj til Afrika, så havde de nærmest ikke et livsgrundlag dernede. Altså der er så mange ting i det her. Man kan så også sige, jamen så kan de tage én stor rejse som de kommer på om året som vi laver, så måske ikke flyve nogen steder resten af året.[00:19:00]
Altså der er mange ting i det, det synes jeg virkelig der er.
Ja.
Nana: Jeg er også 100% sikker på, at der kommer nogle bedre løsninger i forhold til de her fly og brændstof og sådan noget der. Det er jeg slet ikke i tvivl om
på
Nana: et eller andet tidspunkt så det bliver rettet ind på en eller anden måde. Men det er svært for mig at så se på en masse folk dernede hvis livsgrundlaget er turisme eller hive folk op ad et bjerg.
Altså det synes jeg også er vigtigt at tage ned og støtte dem. Det ved jeg ikke hvis vi ikke 100'er så tusindvis af mennesker vi har sendt så mange mennesker op på Kiliimandjav,
Rasmus: mad
Nana: på bordet til de her lokale befolkninger.
Rasmus: Ja, det er både socialt økonomisk egentlig, at virksomhedens drift leder til, man kan sige CO2-tidning, men den leder virkelig også til rigtig meget økonomisk vinding i

nogle områder, der altid ikke vil have noget.
Klart.
Vi har sådan i [00:20:00] Altså i forbindelse med, at vi interviewede Praise på farmen,
så
Rasmus: er vi kommet til at falde over nogle emner som for eksempel agritourism hedder det på dansk. Agritourism. Ja altså
Nana: agri... Altså det er ligesom en
Rasmus: sammenligning af agriculture og...
Nana: Landbrugsturisme
Rasmus: Landbrugsturisme og sådan noget ja.
Nana: Og
Rasmus: ecotourism. Er det sådan nogle buzzwords som... Som du hører folk efterspørge, eller det er noget der bliver smidt omkring her i... Det
Nana: er det overhovedet ikke, og jeg synes, det er langt sjovere at flette det ind, altså så det bliver eco-tourism uden at folk overhovedet fatter, at det er det.
Hvis
Nana: du forstår, fordi igen det der med, at nogen de stegler, nu skal de lade som om, de er bæredygtige igen,
så
Nana: vil jeg hellere bare, når folk kontakter mig, lave en rejse,
og så
Nana: er den mega eco-agtig, altså for eksempel at komme ud på den farm eller sådan noget.
Det synes jeg er fedt. Men det er ikke noget, folk efterspørger, og er heller ikke noget, jeg presser ned overhovedet på folk, [00:21:00] Jeg prøver så vidt muligt når jeg promoverer det, en gang imellem at sige, at vi gør noget for en social bæredygtighed eller et eller andet Men jeg skal virkelig passe på. Det er varsomt et skridt for ellers bliver man hurtigt svinet til på en eller anden måde.
At man skal fandme ikke komme her tro, at man er bæredygtig.
Rasmus: Nej, det må du heller ikke længere sige, så vidt ved. Man jo ikke bare sige, at jeg er bæredygtig eller vi er bæredygtige. Nej. Hvad skal du sige? Vi er bæredygtige fordi de er den der. Ja præcis Vi jo have en belæg for det, ikke? Ja,
Nana: klart. Der
Rasmus: kan man jo nemt få øjet den her maskine.
Nana: Fuldstændig. Og jeg gider heller ikke at skal lyde fra alt, så vil jeg hellere bare, at Nå, men det er bare sådan her, vi gør det, og det er sådan naturligt. Det synes jeg er langt videre frem for, at man skal fortælle om det hele tiden. Altså det har jeg ikke noget behov for, egentlig.
Rasmus: Hvor stor en del fylder det kulturelle i rejser?
Altså det er jo en ting du selv ynder at besøge, og du siger også, at er vigtigt [00:22:00] for jeres rejsegæster, at de kommer ud og ser noget lokal kultur.
Hvorfor er det egentlig vigtigt at besøge det?
Nana: Jeg synes, det er super vigtigt at se noget andet end det, man går rundt i herhjemme Altså hvordan livet også kan være, og det der med, at render rundt tror, at det er livs nødvendigt at jeg skal tjene en hel masse penge.
Så kommer man derned, og så ser man nogen, der ikke har noget, og de har de største smile på i hele verden hvor vi går rundt og hjemme og er mega sure. Så det er sådan, at kontrasten er. Fuldstændig til at skære igennem.
Vi
Nana: havde en snak om det den anden dag. Altså det er bare at komme ned og se nogen der har så lidt og alligevel formår at få ting til at fungere og være kreative, hvis nu fungerede det her ikke, så må jeg prøve noget andet.
Altså det synes jeg er fedt Og så synes jeg bare,
jamen, jeg ved det sgu ikke. Altså [00:23:00] Hvem vil ikke gerne se, hvordan andre mennesker bor?
Rasmus: Det her det er sådan, jeg tror, jeg ved, hvad du mener hvis jeg siger polo-polo-lifestyle. Det er den her øst-afrikanske Swahili-kultur. Hvad med mange af de stammer som så er i Øst-Afrika, som er den historiske altså kulturarven, hvis vi så kan kalde det det, er den vigtig at konservere?
Nana: Det synes jeg, er. Jeg synes, den er vigtig og der findes også nogle stammer der er mere interessante end andre. Massajerne er jo så udviklet og render rundt med deres iPhone og flytter til storebyerne og kommer en gang imellem tilbage. Og så er nogen, man slet ikke hører om. Tjaka-stammen, som har været i kæmpe krig med Massaj-stammen.
Jeg synes, det er interessant, og det er også fair nok, hvis man ikke synes, det er interessant. Men det er jo ligesom dem, der har boet på Afrikas slætter i de sidste... Altid. Mange år. Mange mange år. Eller at komme [00:24:00] ud og se hans arbejdsdamme. Det er jo sindssygt. Det er vildt Jeg nogle gange, at det er vigtigt lige at få sådan en lille opvågning.
At man går rundt i sin egen osteklukke men sådan her kan det altså også godt se ud.
Rasmus: Lød det som om, der er sådan en eller anden form for... Du har nogle tanker om, at der er noget, der er sådan lidt cliché Der er noget, der er stillet op for turisters skyld altså når det kommer til kulturarv, og så er noget, der rent faktisk er en kultur, der er hvordan skal man sige...
Ej,
Nana: men det er også forkert sagt, fordi massagerne eksisterer jo, og de lever stadig som de gjorde, men det er blevet helt sindssygt turistet, og de står der og venter på, at vi kommer, og står de og håber ikke, at de kan ikke bare leve deres liv. Det er virkelig blevet turistet, men stadigvæk interessant at se, fordi du får stadigvæk et indblik i, hvordan det har været,
Rasmus: og
Nana: hvordan de lever.
Ja, ja. Så selvfølgelig er det [00:25:00] interessant. Der er bare nogle andre ting, jeg synes, der er mere interessante. Men for nogen der kommer ned til Tanzania eller Kenya første gang og skal se det her, så er jo fedt Så er det jo helt underligt.
Og det skal jeg hele tiden huske på.
Jeg
Nana: har været der hundredvis af gange Det har de altså ikke.
Rasmus: Det er ret interessant. Nu er vi igennem spørgsmålene, men vi har jo læst lidt op. For eksempel Harzabe er jo faktisk på verdensplan en meget, meget meget unik civilisation.
Der
Rasmus: findes ikke særlig mange jægersamlere af civilisationer tilbage.
Overhovedet
At en
Rasmus: af dem findes i Tanzania er faktisk ret utroligt.
Det er så sindssygt. De er 1300
Nana: tilbage eller sådan et eller andet. Det er jo
Rasmus: stamme der besøges af antropologer fra hele verden for at undersøge deres levegrundlag. Det er ret utroligt. Det helt
Nana: vildt Og så
Rasmus: er så samtidig mega troede på deres land. De bliver virkelig begrænset.
Nana: Fuldstændig. Ja. Og i Uganda.
Der er der en stamme der består af pygmæ, altså sådan nogle små mennesker, der er heller ikke ret mange tilbage, og de er [00:26:00] jo også lidt ved at, altså hvor skal de tage hen og sådan noget, fordi der bliver bygget på der, hvor de bor i skovene sådan noget, og det er også sådan et samler samfund.
Det er fandme interessant, helt vildt.
Med sejerne har jeg lidt sådan en idé om, at de egentlig har røven fuld af penge, altså fordi... De har bare formået at udvikle sig, og det er det, der sker Det kommer også til at ske med atabestammen, det kommer til at ske med alle stammer.
Rasmus: Synes du, det er et problem, at de går væk fra den historiske livsstil?
Nana: Det er så godt et spørgsmål. Det er virkelig et godt... Det tror jeg faktisk, du har spurgt mig om før. Okay. Jeg tænkte du havde spurgt det kan kun være dig. Jeg ved ikke, om jeg synes, det er et problem.
Nej,
Nana: det er ikke et problem. Jeg synes selvfølgelig, det er ærgerligt fordi... Jeg sælger rejser og synes, det er meget interessant at komme ned og se noget, der er endet.
Noget andet. Men sådan går det.
Rasmus: Det
Nana: er jo sådan
Rasmus: er livet. Det har en værdi for en beskuer at se noget, der er
Nana: specielt
Rasmus: på den måde Hvor træls det end
Nana: lyder, men det har en værdi.
Rasmus: Det
Nana: [00:27:00] har det virkelig. Men
Rasmus: du siger, at du vil heller ikke undne dem at få en teknologisk udvikling, så de kan få en livsstandard, som er tilsvarende hos andre.
Nana: Klart. Det er bare... Alt det der der var originalt altså ting flytter sig så hurtigt lige nu, og det gør de i stammet samfund også.
Rasmus: Ja, altså det er jo snart Interessant for os, som undersøger deres arkitektur,
så
Rasmus: har de jo faktisk rigtig mange af de her stammer har jo udviklet nogle måder at bygge på, som faktisk er bedre end den kultur, der bliver introduceret med moderne hvad skal man sige, byggematerialer og sådan noget.
Nana: Det er det, jeg mener. Altså de er sindssygt fremadtænkende og det her fungerer ikke, vi bliver nødt til at gøre noget, der er bedre noget, der er anderledes eller et eller andet. Altså, jeg kan virkelig godt lide den der afrikanske tankegang, siger jeg lige, fordi de er nødt til Og tænke kreativt.
Rasmus: Men egentlig også i deres konservative tilgang til ikke at skifte nomadisk [00:28:00] livsstil ud med lejlighed i byen og at bo der og bo der.
Så har de faktisk gemt en ret værdifuld læreren, fordi de har boet på slætterne i tusinder og tusinder Mange af stammerne har måske boet der i mere end 100.000 år, så selvfølgelig har de da lært noget undervejs. Hvis man lader dem få muligheden for at få en moderne livsstil, så kan det være at de glemmer det.
Ja,
det er
Rasmus: rigtigt. Så glemmer de måske livsstil, og så glemmer faktisk den viden.
Og det er sådan ret håndfast for os, at vi kan se, at arkitekturen faktisk fungerer ret godt. Det giver super god
Nana: mening.
Rasmus: Tjaka-stammen effektivt bor ikke længere på måde Der er ikke nogen der har et original Tjaka-hus længere.
Kun museet. Nej det er der jo ikke. Ja, kun museet. Ja Ja.
Nana: Vi venter lige. Ja, men det er faktisk interessant, fordi det der med, Man kommer ind i det der mainstreamagtige noget, og så glemmer man alt, hvad der var.
[00:29:00] Fordi det
Nana: hele skal være effektivt, det hele skal være ... alle mulige ting og sager. Og det er sgu også lidt det, jeg elsker ved at komme til Afrika.
Det hele er ikke effektivt
Og det behøver
Nana: det ikke at være. Det må gerne gå langsommere end det gør her. Men vi kan ikke tage deres livsstil og så trække den her ind. Det kan ikke lade sig gøre.
Vi kan
Nana: måske implementere lidt i vores eget liv, men det vil ikke kunne lade sig gøre at implementere Sådan en hel pulle-pulle-livsstil her?
Rasmus: Nej. Det tror jeg
Nana: simpelthen ikke.
Rasmus: Nej, det tror jeg da ikke.
Nana: Prøv at leve som Tanzanianer i en måned. Ej hvor vildt. Så skal vi sidde derude på kajen og sidde og snakke timevis om... Om ingenting. Ja. Det er jo vildt.
Alberte: Det kunne være fedt. Hvad... Hvis vi lige skal snakke om sådan... Hvad er for nogle minimumskrav Du stiller til et lodge.
Fordi okay, det kunne jo være fedt at komme ud og bo i nogle af de her med sej hytter.
Nana: Ja, ja absolut. Men
Alberte: der er ligesom som europæer der er der nogle [00:30:00] minimumskrav vi stiller til vores overnatningsfaciliteter Okay, i
Nana: forhold til... Ja okay.
Alberte: Hvad er forventningerne?
Nana: Forventningerne er, at... Bare sådan helt basic. Ja, men der skal være ordentlige toilet-faciliteter.
Alberte: Altså europæiske?
Nana: præcis.
Alberte: Der skal ikke bare være et hul?
Nana: Nej, det går folk ikke med til. Jeg kan gå med til det selv, det kan andre ikke. Nej. Bad. Eget bad. Eget bad, ja. Men det må stadig gerne være primitivt bad, altså hvor for eksempel vi arbejder sammen med en lodge, sådan en tellodge, der hedder Kati Kati.
Så siger man, nu vil jeg gerne i badefyn nok, de varmer noget vand op, og så står de og så er der en spand, så hiver de den der spand, og så står man inde bagved, og så får man vand i hovedet og sådan noget der. Det er totalt primitivt, men det er mega fedt Så det må gerne være primitivt men stadigvæk lækkert, altså der skal være ordentlige [00:31:00] sovefaciliteter selvfølgelig også og sådan noget, men dermed ikke sagt at det skal være en kæmpe stor overdådig seng, men bare sådan, at the basic needs skal være der.
Og der skal selvfølgelig ikke være fyldt med kryb og myre eller sådan et eller andet. Så skal der være som minimum en nogenlunde god restaurant, altså man skal kunne få nogle ordentlige måltider og sådan noget.
Alberte: Er det vigtigt, at man kan se hvor maden bliver lavet?
Nana: Nej, det tror jeg ikke, folk tænker over.
Det må gerne være europæisk mad, men også blandet med noget lokalt. Swahili for eksempel kultur eller sådan noget. Men det der med, at det skal være helt lokal mad, det duer heller ikke. For mange i hvert fald Selvom det smager jo sindssygt lækkert, men det ikke noget, de gider spise i en hel uge. Så hvis de har muligheden for at smage det en gang eller to, så er det fint og så skal det desværre være de der europæiske standarder.
Rasmus: Hvad byder [00:32:00] man så gæster på i Østafrika? Er det engang ufærdeligt? så er sådan, ellers tak, det var sjovt for dem.
Nana: Ja, så er vi lige siddet sådan her, havd fanden er det? Ja ej, men vi har jo... Nu tager jeg selv afsted næste uge hvor vi har den der tur ud til Marangó og spiser på Vipreses mor eller hvem det er.
Og så får vi det her lokale måltid, hvor I kender det selv. Spinat linser er der chapati også? Det ved jeg faktisk ikke. Og jeg elsker jo den mad. Jeg kan sagtens leve af det der. Men jeg er også godt klar over at kan andre ikke. Det gider de ikke. De synes, det er sjovt nok at smage den der en gang, men hvis de skulle leve af det hver aften i så og så lang tid.
Det kunne de ikke overskue.
Rasmus: Er der nogle turisme koncepter, som du har drømt om at udvikle i Moské eller i Østafrika? Det kunne være sådan, at du vil gerne sende dine folk til cooking classes, lære at dyrke din egen tomat eller sådan noget. Forstår du hvad jeg mener? Ja, jeg forstår det. [00:33:00] Er forskellige koncepter, som du går og leger med, som kunne være sjove at have i dine pakker?
Nana: 100%, hvad det hedder. Jeg kan godt lide at lave de der mere aktive ture, og så kommer man til en camp, og så sover man i et telt.
Rasmus: Ja.
Nana: Og cooking class skulle faktisk være super super fedt det ville jeg rigtig gerne, og der har vi også sendt nogen ud på praises varmen.
Ja.
Nana: Altså de havde røven fuld af penge og de havde lige et på overnatning og derude at skulle have den cooking class, så tog de videre på deres dyre safari og sådan noget der, så det var bare lige et kort øjeblik.
Men jeg har udviklet en tur sammen med... Dem fra den kapitel, Jørgen og Kristine,
en
Nana: grupperejse, hvor der er rigtig meget cykling, der er rigtig meget vandring, og der sover man i basic-telte og så har man en kog med, der laver mad over bålen hver dag. Er det en
Rasmus: cykel-safari?
Nana: Der er ikke en cykel-safari men hvor fanden cykler de egentlig hen?
De starter med at cykle i Moshi et eller andet sted altså det er bare en [00:34:00] dag, hvor de cykler rundt og ser det, men ellers så kommer de ud på vandring rundt omkring forskellige steder i Tanzania, også ude i safari-pakkerne og sådan nogle steder der. Den bliver fed, den tur. Sådan noget der, det synes jeg er fedt Jeg synes det er pissefedt at tænke noget helt andet, altså at få fat i dem, der gerne vil være aktive og gerne...
Ikke gider at sidde i en bil hver dag i hovedtimer eller sådan et eller andet.
Ja. Det
Nana: synes jeg er cool.
Okay.
Nana: Nu tager jeg til Mauritius i december. Årh de fleste de tilbyder jo smukke strandferier. Jeg skal ud og vandre, jeg skal ud og tilbyde noget andet der på Mauritius, fordi jeg ved, det er der.
Så det
Nana: synes jeg, det vil være fedt.
Og strandferien jo klart det skal man da også opleve men at få det andet implementeret ind i nogle rejser, også med nogle fede vandreture, det synes jeg er cool.
Ja.
Nana: Okay. Så det er meget... Der er min tankegang.
Jeg
Nana: kan godt lide at pilve det der, som der ikke er så mange andre der måske gider at pilve eller sådan et eller andet.
Det synes jeg er sjovt. [00:35:00]
Rasmus: Og det har en kontinuerlig god effekt på din virksomhed, at du tilbyder noget, som måske andre ikke har?
Nana: Øhm,
Rasmus: ja det
Nana: varierer. Jeg har jo mange af dem, der gerne vil det klassiske men jeg vil gerne have fat i endnu flere der vil det andet. Og det skal nok komme. Det er jeg sikker på.
Alberte: Hvad er de største udfordringer ved at sende folk til Østafrika lige nu?
Nana: De største udfordringer Er der noget
Alberte: med sikkerhed, eller er der noget med...
Nana: Nej det er der ikke. Altså hvis der er uro, så sender vi ikke folk afsted. Altså, sådan er det bare.
Alberte: Ja.
Nana: Ja. Så er det nogle ting, men man skal altid, uanset hvor man rejser hen, skal man jo tage sine forholdsregler.
Rasmus: Ja.
Nana: Ved at sige.
Rasmus: Ja.
Hvad for en type er... Camp eller lodge eller boform, hotel, er mest efterspurgt eller bruger du mest? Og du måske har en udtalt om det, fordi det er noget, du synes er spændende for dem at opleve, eller de efterspørger det egentlig?
Nana: [00:40:00] Tit hvis de er på safari så er det sådan en blanding af hytter, altså en lodge eller et tændet lodge.
Rasmus: Og med lodge, der forstår man en form for privat enhed, altså et hus eller et lille... Ja bungalow, eller det kan også
Nana: godt være et værelse inde i en stor hovedbygning eller sådan noget. Men jeg synes klart at er fedest med et telte, fordi der kan du virkelig ligge under den der teltdue og så lytte til dyrene, der pusler rundt lige herude, det synes jeg er mega fedt.
Og det er jo tit en form for luksustelte altså der er fast bund, og der ligger badeværelser og gode senge, og så er bare et telt, som I selv kender det med. Ja, teltdue og sådan noget Man kommer lige lidt nærmere naturen
Det
Nana: synes jeg er ret cool Bungalows er også fint Det kan også godt være hyggeligt Det var ikke det samme Det synes jeg
ikke
Nana: Det er faktisk ikke så tit Der er nogen der har specifikke Ønsker omkring, der kommer nogen [00:41:00] der siger at vi vil gerne bo i Tinted Lodge eller et eller andet Og der kommer også nogen der siger, at vi vil ikke bo i de der telter, fordi de synes det er farligt Altså man er bange for, at der kunne være en næsehund, der rammer liggenom Ja præcis så er de mega bange for det Og så efter det kommer vi selvfølgelig det Men sjældent er der nogen der siger at vi vil helst det eller det Så finder vi bare på noget til dem Att efter deres budget Ja
Alberte: Men budgettet varierer fra mega skrappet til eksklusiv rejse.
Så I har
Nana: hele paletten? Hele paletten. Der var en, der ringede i går. Hun ville gerne have sine tre døtre med. De har et budget, der hedder 20.000. Det kan den jo ikke. Det er helt umuligt. Så bliver det så skrappet, at det kan jeg ikke selv stå indenfor. Jeg kan godt lave det basic, og så ved jeg, at er godt, men jeg kommer ikke til at lave det, hvor det virkelig er skrabet.
Men så har jeg også nogen der betaler 89.000 kr. pr. person for deres rejse [00:42:00] og
Nana: sted i 12 dage. Altså det er vildt. Men alle er lige. Så uanset om du har et budget, der hedder 25.000-30.000 kr eller du har et budget, der hedder 89.000 kr., så skal alle have den samme behandling
Og
Nana: tit er det faktisk sjovere Nej, tit er det mere givende At lave en rejse til dem Som har et lavere budget Fordi de har sparet, sparet sparet Og de kommer måske ikke på sådan en rejse igen Og
så
Nana: får de bare den vildeste oplevelse Det kan jeg virkelig godt lide Dem der har 89.000 per person De rejser jo helt vildt De har masser af penge De har rejst og rejst og rejst Og oplevet en hel masse Det er det bare for at komme væk Men dem her og de andre Det kan jeg godt lide
Alberte: Mmh, det er meget sødt.
Nana: Ja.
Alberte: Nu er jeg klar.
Rasmus: Du må gerne pause, men så er det ikke tæt hvis du ikke slukker døren.
Alberte: Tak for intervjuet!

Appendix 5

Interview Irene, chef at Nyange Farm

Date: 10.10.2024

Location: Moshi, Tanzania

Irene: [00:00:00] Ah, this is
Emilie: the new fridge. Okay, Irene, you need a microphone. Have you used a microphone before? Yes. You can wear this,
Rasmus: like, Some, some, some, they put them, like, under the shirt, or it could be [00:01:00] wherever.
Irene: Okay. Oh, you
Rasmus: used it when living was here.
Irene: Yeah? For me? It's good?
Rasmus: When living was here, you used it, right? It's just like this. Okay. Maybe we can put this, maybe just here. Okay. Or are you going to use the bathroom? I don't think it's
Irene: alright. No, it's alright. You thought
Rasmus: I was going to do an interview? Put something.
Irene: You see? If I get the Yeah.
Emilie: Do we need to take our shoes
Irene: off? No. It's okay. If we finish, I'll mop.
Emilie: Okay.
Irene: Yeah.
Emilie: But maybe
Irene: I should
Rasmus: stay here. Yeah. Okay. So,
Emilie: [00:02:00] we're just here
Irene: with Irene, our chef,
Rasmus: at Nayarit Farm.
Emilie: And her facilities, as they look right now. So, starting here. Yeah. So you've just got a
new fridge.
Irene: Yes.
Emilie: So, this size, and then a freezer down here.
Irene: Yes, this one is a fridge, and this one is a freezer.
Emilie: Is it big enough, or?
Irene: This one is, uh, I think now it's enough. Yes. And this one is only fridge.
Emilie: Fridge? Yes. Okay. Yeah.
Irene: Yeah?
Emilie: And then I see a gas stove.
Irene: No. No? But I told you at Nyange, this one is not good inside.
Okay. The, supposed to put outside. Hole. Ah,
Emilie: okay. Yes, some,
Irene: [00:03:00] some like, uh, this one is coming inside and, uh, this plate is not enough. Yes, and this one is, this is the home, like it's not the big kitchen like this.
Emilie: Okay, this is like a home kitchen? Yes, it's like a home kitchen. Yes, four, four.
Irene: Four is good. Yes, four is good.
Okay. But I put something, something,
Emilie: yes.
Irene: And this one is extra. Yes. If four is busy, this one is extra. Yes.
Emilie: Yes.
Irene: This one is, uh, spice. Some spice. I want some, like, uh, Shelf. Shelf. Yeah. When I cook, I take the one, I put in the, in the, in the food, and then I turn it. Yes.
Emilie: Like something you open? No.
Irene: No. This one.
Some things are open and closed. This one, shelf. Okay,
Emilie: [00:04:00] you want this to be covered. Yes, to
Irene: be covered. Because, uh, if you look, you look like this, it's not good. No. Yes.
Emilie: Because of the rats? Yes,
Irene: some, some, like, uh, this one, fly. Fly. It's coming. Yeah. Yes. It's have the two, one shelf, like, uh, one here. I put the, like, like a pineapple or watermelon in down.
And then this one I put the potato down, like two shelves, and up I put another thing. And that, I close it.
Emilie: Then you close it. Yes. And here's your oven.
Irene: This one is an oven. It's not, this one is not good. Okay. Yes, but it's But the size
is also
It's no, not good, yeah.
Emilie: You want a bigger or
you
want two?
Irene: Yes, I want a bigger, like, uh, like this.
Okay. Yes. Yes, we, we, we open like this, or [00:05:00] like this. Yes, because this one is too small. But template is small. Okay. Yes, even template is small. Template is small. Yes. And this one, I want the, to cover. Yeah.
Emilie: Yes. Cover everything.
Irene: Yes. Not everything. Okay. But this one, we cover because for storage. Yeah. So it's.
Yes, food, something, yeah, I want to put here to take the store, like a, like a, like a kg today, I put here and then I close. Yes, this one is um, I want some shelf, not, not covered, yes, because I put like a, like a this one, we call what? Hot. Hot. Hot, yeah. Yes, pot. Put like a pot. All pot we put here. And that's this shelf too. Uh, not is a [00:06:00] like a, I want shelf like a, like a what? Like a this. Plastic shelf. Yes. Not plastic. Not plastic. But mesh. Yes. Like this. Ah, mesh shelf. Yes. Yeah. We put the water zone. Yeah. Yes, you see the inside? Yeah. Yeah. And this one, you put like this, no, no, no covered, because this one is supposed to put it here, if I have shelf, and this one is a, is a food warmer.
Yeah. You see? Yes. Not, not cover, because if I am finished to take the food warmer in the, in the buffet, then I put here. Yeah. Yes. This one is not covered because the dustbin is put here. Yes. You
Emilie: don't want the dustbin
Irene: to be covered? [00:07:00] I told her to bring for me the dustbin covered. If I put something, it's nothing.
Yes. I put inside. Yeah. Yes. What's here? Two, two, two dustbins. For food and for like, uh, like a blanket. Pepper. Yeah. Recycle. Yes. Yes. Bottle. Yes. Here. And then you have a sink. I have the thing, sink, but I want another sink.
Emilie: Two sinks.
Irene: I think that's three sinks because, yes, because this one for dishwasher. Not for prepare something for food.
No. Yeah. But I prepare here because I don't have another sink. Yeah. Yes.
Maybe another thing to put it here, and here, this one for dishwasher only, and this one for prepare something vegetables, or, [00:08:00] or, no, this one is a prepare something vegetables, and this one we prepare something the meat, fish, yeah, you see, not mix the vegetables and meat.
Some people is coming, some guest is not here. He's a vegetarian pure. Yes, he don't eat the meat. If you mix, it's not good. And then
Emilie: what about all of
Irene: this? This one, it's not good to put it on the table. It's not good? Yes, it's not good. It's supposed to put it on the, like, uh, I think, like, uh, Shell? Yes. Yes, it is. First, you put like a, like a, like this. Yeah. Remove the water. I think, I think we call what? Tray. Tray. Yes, tray. Put the, remove the water and then you fill your [00:09:00] nali. And then you put on the shelf. Yeah. Yes, all the cup. Closed or open? Yes, closed. Yeah. Of course. Yeah. Why? Because, uh, Some things are like a vumbi, yes, flies, it's coming inside, yes, it's supposed to cross, yeah.
Rasmus: Vumbi is dust, right? Yes. And
Emilie: here?
Irene: Here is having the store, store for dry, dry food, yeah. We, we must to put the shelf, yes. Men's
Emilie: shelf? Men's
Irene: shelf, yes. Every dry, every spice, everything we put here. Yes. Maybe shelf, shelf, all this. Some like a one, two, three, and then the four. Yes.[00:10:00]



Figure 312: Private picture - Irene the chef at the farm.

And the window, window is not good. Window is
Emilie: for the drying.
Irene: For the dry, but it is not have the, you see the, the grass. The grass? No grass. No, but some things are like outside is coming inside. Yes.
Emilie: Ah, so dust, everything. Yes.
Irene: Vomit, juices, smell is coming inside. Yeah.
Emilie: And what do we
Irene: have in here? And here I said that this one is like a pastry.
Emilie: Yeah, bakery.
Irene: Yes, bakery. Yeah. I told Nyange this one is, uh, put the baekal, because baekal is not the mixing for, for kitchen, for another kitchen from Arakat, yes, but personally, every time, every day, [00:11:00] we put the flour. Yes. It has to be
Emilie: clean.
Irene: Yes, it has to be clean, yes, because, uh, something, something kidogo put in the flour is not good.
No. Yes. Yes. Okay. Yeah. Yes. And some, some things that's not enough. Some grass.
Emilie: Okay.
Irene: Yes. Must to, to, to give the, many more, yes. And cups, and side plates. Bowl, bowl, bowl for, for salad. We don't have bowl for salad. Yes. Don't have. And
Emilie: this is for service?
Irene: Yes, this one. For put the order here. And then waiter he take it.
Yes. This one is good, but I don't know this one.
Emilie: Why?
Irene: Yes, why is put here? Because [00:12:00] I think the supposed to put food, not this one. Like a, like a marketing. Marketing. Morning the open.
Emilie: Yeah.
Irene: Evenings are closed. Yeah. Because if you put like this, everything you close night, you put, you close the door, you close the door, you close the window, this one is open.
Yeah. Anything is coming in, it's not, yes, it's not good. Okay. This one is closed, and morning it's open. Yeah. Yes. Yeah. And this one, there may be the two shelves. I put the plate here when I want to take the, to put the order. Yes, if I want the plate, no, no, no, I'm going there. I come with my pan, I take the plate, and then I put the order, wait a second.
Yes.
Emilie: And what about the uniform? [00:13:00]
Irene: Yes, I need the uniform. You see, now, this one is not the uniform. Okay, that's your own stuff. Yes.
Emilie: Yeah. So how would you like your uniform? Uniform? No,
Irene: not, not dress.
Emilie: It's like, uh, It's
Irene: a uniform to look like Africa. We must, we must put the, like, uh, African kitenge. You know kitenge?
This one is a table there. It's a kolikitenge. Okay. Yes.
Emilie: It's like a sleeve, uh, no, that's the shuka.
Yes,
Irene: it's like a shuka. Yes. But
Emilie: it must also be practical. So you are working a lot, so it should fit your work as well.
Irene: Yes, [00:14:00] like a shirt, and that's the template, what you call, template is changing. So you need a jacket.
Yes. Full, full, full uniform like here, like this one. And if it's warm, it's short. Yes. And trouser, it be like a kitenke.
Emilie: Okay, so like a dress.
Irene: Yes, like a dress, yes. Like this. And this cut, or like a, short cut, like chef cut, is like a, this, this, like, this we call what? Color. Color. Yes. Put like a kitenge. And this one, like a kitenge.
And hat, we put like a kitenge. Yes. Only this one is going to white coat. White. And this one, kitenge. And color kitenge. And trouser, kitenge. Okay. Nice. Yes. Mama Africa. [00:15:00] Yeah. but, uh, I, yes, I, uh, I have the shoes on Arusha, I forget to take, for kitchen, only for kitchen, yes, this one only for kitchen, but must be the, what is the, I cut knife with blocky, yes, it might protect me, yes.
Emilie: You're saying you wanted a back door, you don't want the door here, you want it in the back,
yes,
Irene: because, If some guests, if some guests come here to, to, to allow the, see the, every, every, yes everything here. But me, I want some guests to come here to see me when I cook. Ah, but Nyange, I told Nyange, this one, he says that this, this [00:16:00] kitchen for images. Yes, for images. He said to me to put the kitchen there in the garden.
Yes. And he, he told me to, to explain what is the, put in the kitchen, even, even jiko, this way. Yes. I told that. Yeah.
This one, if I, I clean, this water is go straight on the chamber. Yeah. Yes, on the chamber outside. Okay. Yes.
Rasmus: You use a lot of water for
Irene: cleaning. Yes. Because if I'm busy, this one is go very dirty. I clean up the, then we cross the lubber squeezer, remove the outside on the chamber.
Yes. [00:17:00] And, and, uh, you see this one?
Of this one. Maybe the, I have the, I don't see the microwave. You know microwave? Yes, I can't see the microwave. Microwave is supposed to be here. Because the, everything small, small, you put on the microwave. Yeah. This one, all this, that have the shelf there. Yes. This one very spicy. This one spaghetti.
Inside for the store.
Okay, storage. Yes.
Emilie: And the coffee area? You're telling that you want
Irene: a coffee machine. Yes, coffee machine in there. Uh, it say to put the kitchen there. And then the space for coffee machine and bar. [00:18:00] And
Emilie: bar. Yes. Okay, so different place for bar and coffee. Yes. Yeah. Okay. Is it okay that we
Rasmus: use this
for
Rasmus: our project?
At
Emilie: school? It's good. Okay, and publish it. Yeah. Great. Asante sana. Asante sana. Cool. Nice. Good job.
Thank you. You make your perfect assign.
Irene: the upside to put the, uh, The ceiling poles. Yes, like, uh, you see, Ah, the
Rasmus: ventilation. The
Irene: structure. You see this sun? Mm-hmm . If we put the white, ah, this one? Yeah. Yes. White. White. There.
Not, don't put the like, uh, symbol sim, you know, symbol sim.
Rasmus: Ceiling board. Ceiling
Irene: board, yes. Slim board there. Mm-hmm . Not put on the kitchen [00:19:00] because if you put the ceiling board, put structure to, to remove the smoke inside. Yeah. Yes. And uh, this one. We put the white, this one you call it, you say we call it?
The
Rasmus: sheets up here?
Irene: Yeah, the sheets.
Rasmus: Do you mean the middle? Middle. Or the embow?
Irene: Not embow, this one.
Rasmus: Yeah, sheet roofing.
Irene: Sheet roofing. You put the white. Yes, because the sun, you know now, now is the sun is outside. This one, light is on. Yeah. Because this one you put the white, tar is off. Light is off. Yeah.
Right. Yes. The sun is inside. Much
Rasmus: better illumination of the kitchen area. Yes. Yeah. Exactly. Yeah.
Irene: Nice.
Rasmus: Yes.
Irene: All right. I
Rasmus: think Nyange has prepared the ceiling box. Yeah. This looks like a preparation for ceiling box. Yes. I see. Yeah. But I told, I told
Irene: Nyange, Nyange say to put [00:20:00] the structure, but I don't know put where, the structure.
But because you put the ceiling board, I think the white is swimming, but if you cook, the smoke is going up.
Irene: Yes, this one, I don't know why Nyangis put this one.
Rasmus: I, I Security.
Irene: Yes, like a security. Yeah. I think about some People outside, you try to come out, to come in.
Irene: Yes, the window is coming in. Yes, this one is not fire. What do you do? I don't know. But me, I am already totally Yankee. Yeah. Yes. This one is not good. Because if it was a fire inside, you would not escape. Yeah. But this one, the door doesn't open. Yeah. Yeah. And the door for kitchen is supposed to be, to make the big one.
Rasmus: Bigger than this one? Yes, more than this one. Okay.
Irene: Yes. Like, uh, up the, up the ear.
Rasmus: Why is this?
Irene: Why this? Because you, you tool, tool, [00:33:00] tool the, tool the door. Like this. Hmm. Yes. If you, you, you see the tablature inside, you, you open all. And if you see the, you close one, you one, you put one. Yeah. Yes. And this one is not supposed to hear.
But if you hear, supposed to see every, if the guest is there, he see you. This one is a chef. What is doing? Like you see the chef. Sometimes, like, uh, happy, dancing, cooking, yes. And guests see that. Chef, chef is crazy. Do you think they
Rasmus: see the chef dancing? They feel happy? Yes. Yeah. Sometimes guests
Irene: are feeling different, yes.
If we, if we, if we, you, you, you say the chef is happy because they are dancing. [00:34:00] Sometimes guests It is feeling different. Yeah. You see that? Why? Yeah. Why? Are
Rasmus: they being paid? Are they being paid for this? Yes. They should be making my food. Yes. Yeah.
Irene: Supposed to, you know, the, everywhere, the kitchen, they put the, like, uh, like, uh, like, uh, names here.
Mm hmm. All, all stuff. Ah, yeah, yeah, yeah, yeah, I understand. All stuff. Or, or, we put like a, No enter. Yes, without permission. Yes, like this, because, You know, if a guest is coming in, It look like a, like a, Something's wrong. Yes, he's not happy. Yeah.
Irene: Yes. Me? I say no. Yeah, because I know you and , your guest is guest. Yes. But, uh, but Asiya, she told me, Come to, to cook with me.
Yes. Emily, she come to cook with me. Oh. Yeah. But me, Emily, she told me to, to, to come to help me. Me, I say no. Because I, I, I'm not thinking. But she, she's, last day, last year, she, she cooking here, but I don't

Appendix 6

Briefing after meeting Professor Emeritus, Geology at AU, Claus Heilmann-Clausen

Date: 18.11.2024

Location: Brabrand, Denmark

Rasmus: [00:00:00] Okay, nu sidder vi i bilen på vej hjem fra Brabant, hvor vi har besøgt Claus Heidmark Clausen, professor emeritus i geologi på Aarhus Universitet. Vi havde en kort samtale med ham omkring lærerjord. Og han fik de læreprøver vi har med Dancenia i hånden. Og selvom det ikke var hende på hans område, så kunne han stadig sige nogle ret interessante ting omkring det.
Hvad synes du var det mest trænende skab? Jeg kan da også bare selv sige det. Han var i stedet til, ud fra bare taktilt at røre ved det, kunne han ret hurtigt fastslå at i hvert fald den lokale jord, den vi har på farmen, var i hvert fald meget lærholdig. Måske er det selvfølgelig hans forholdning mere lærholdig, end den, der [00:01:00] faktisk blev brugt til at murste hende, selvom det var sådan lidt uklart.
Det var fordi, at han... Så havde jeg bare sådan og nullede det med fingrene. Man gjorde det lidt vådt og så kunne han fornemme hvordan den blev mere formbar. Og det var netop en af de tre definitioner der er på ler. Måden man definerer ler på. Hvor den ene er netop...
Alberte: Pottemagerens
Rasmus: definition, ja. Er det formbart.
Vil det stå?
Alberte: Holder det formen?
Rasmus: Ja, når du blander det, så ældrer det sammen med noget vand ikke? Og så var der en anden definition, som var kornstørrelsen med det du ville sige. Der er altså en partikel, der er under
Alberte: 2
Rasmus: µ. Er det lærepartiklerne? Nej det de
Alberte: allermindste lærepartikler.
Rasmus: Nå okay. Var det så op til 63?
allermindste
Alberte: lærepartikler. [00:02:00] Det er dem, som er meget klassiske. Det er
Rasmus: dem,
Alberte: som kan udvide sig rigtig mange gange
Rasmus: Men det var alt afhængigt af, hvad for et mineral det var. Alle mineraler kan være forskellige størrelser.
Han nævner det her med, at ved istidens gletsjers bevægelse så bliver der jo produceret en masse rigtig små partikler Som sker ved, hvad skal man sige, friktionen, nedbrydningen af stenene. Ja,
Alberte: sker men det var lige så meget, at de blev sorteret de partikler der er.
Rasmus: Det var det, der var meget unikt, som kun lige fandtes to steder i Danmark.
Ja,
Alberte: og det var der, hvor det var under 2y. Meget meget fint sorteret ler. Lerpartikler. Hvad
Rasmus: var så grænsen for ler? [00:03:00]
Alberte: Jamen, så kommer man op i det, man kalder sandkorn.
Rasmus: Ej silt.
Alberte: Nå, silt og så sand.
Rasmus: Ja.
Alberte: Men
Rasmus: hvad var grænsen for ler?
Alberte: Det var det, der gik i en rødnedel, eller hvad var det, du skrev om
Rasmus: Jeg skriver 2 my, 63 my og en syvende del millimeter.
Alberte: Det kan jeg egentlig ikke huske, men det er måske heller ikke så vigtigt.
Rasmus: Det
Alberte: man jo bare kende.
Rasmus: Det var definitionen vi godt kendte. Og så var der så en sidste definition. Den tredje definition af ler. Som var, at det er små partikler værende enten
En eller flere af mineraltyper, som var bl.a smegtit eller [00:04:00] bentonit, som faktisk er det samme bare med andet navn og så var der kavelit Eller kaolinit og ilit. Og det var relativt almindelige forekommende mineraler som ville forekomme i forskellige variationer i langt de fleste leretyper i verden over.
Eller hans leretyper handler egentlig om bjergearten ler. Det kan være, hvis jeg bruger det kompletteret til bjergearten ler eller et eller andet. Det ved jeg ikke, om du forstår Sand også er en bjergeart, silt også er en bjergeart, og sådan noget.
Vi snakkede mere om smagtit end de andre, fordi smagtit havde nogle ret unikke egenskaber, at når det blev badet og fugtet, så kunne det udvide sig måske op til tre gange. Fra sin tørretilstand på grund af den konstant struktur, den har. Man ser også en anden meget interessant skala som hedder [00:05:00] plasticitetsindekset, som drejede sig om Hvis man forestiller sig, at man har tørt lerpulver, så tilfører du vand, og på det punkt, hvor lerne begynder at blive formbare, så hælder du
Alberte: mere
Rasmus: og mere vand i.
Så når du på et tidspunkt en anden grænse, som hedder flyvegrænse. Det vil sige, så ændrer det din tekstur til at være mere som en suppe Du kan ikke længere samle dem, det er for opslemmet. Og så kvistede han os lidt i, hvad vi troede f.eks smøktit lå på. Og rigtig nok så har den meget højt plasticitetsindeks, fordi at den kan optage meget vand, før den når flydegrænsen [00:06:00] Hvorimod silt kan ikke optage særlig meget vand før den når flydegrænsen dermed har det et lavere plasticitetsindeks.
Og der kunne man godt forestille sig uden at han vidste noget om det, at leretyper med højt plasticitetsindeks, Har gode potentialer i lærbyggeri, fordi det er det, der er med til, i hvert fald ud fra, hvad vi har læst, at minimere risikoen for revner i murværket. Og det kunne jo være satanavandt i en pus.
Det er et godt spørgsmål, om lime har høj plasticitet, tror I ikke det har?
Det



Figure 313: Private picture - Discussion with Claus Heilmann-Clausen on types of soil brought from Tanzania.

Appendix 7

Talk with local structural engineer

Date: 27.09.2024

Location: Nyange Farm, Tanzania

Rasmus: [00:00:00] Okay. Nu har vi lige været til møde med en konstruktionsingeniør.
Alberte: Structural engineer.
Rasmus: Ja, structural engineer hedder det. Og han har faktisk gjort til os nogle ret spændende ting. Først og fremmest var han virkelig i møde kommende år for,
Bæredygtighedsdagsordnen, hvor vi før jo bare har følt at der er ingen, der forstår hvad vi vil. Altså selv det med at forklare konceptet med mindre emissioner kan være svært for nogen at forstå. Og dermed heller ikke at han var på samme niveau, som vi er i Danmark. Han
Alberte: understregede, at der var ingen, nobody cares.
Rasmus: Men selv han var ikke klar over, hvad LCA er. Han forstod [00:01:00] ikke vores opfattelse af det her med, at nogle materialer har mere CO2-dung end andre, som vi kvalificerer i Danmark. Det synes jeg var meget spændende egentlig. Men han har jo ikke før selv arbejdet med Lime eller Adobe. Han havde lidt konceptuelt arbejdet med det.
Og forstod også rigtig mange af inspirationskiderne, som vi deler med ham. For eksempel at han også kiggede meget på Timbuktu og var også bekendt med, hvad der sker i Shanta Faye og Sydamerika, altså sådan adobe-byggerier der.
Alberte: Ja, men det var jo en opgørelse med, at man her i Afrika kigger mod Vesten.
Rasmus: Ja, det ser han vestlige...
Alberte: Han ser jo faktisk det der med,
Rasmus: at alt vil altid være inspireret af jer. Ja
Alberte: Ja. Kan vi quote det?
As you know, [00:02:00] the aesthetics is coming directly and copied directly from Europe and the US. That's what everybody wants. Yeah. And his concept was doing the African vibe. Yeah. No straight lines.
Rasmus: Yeah. Ja, det er rigtigt. Han kendte godt til fordelene ved at bruge lime og bruge ler. Hvis vi starter med lime, så er det noget af det første vi har snakket om, at han...
Han... Han... Hvad hedder det? Jeg tror det er en ko, det hedder. Jeg tror det er en ko over ved naveren. Han kendte udmærket godt til lime. Han havde for nylig været i Mombasa, hvor han havde... Se da de havde bygget med lime. Helt præcis hvad det var for noget. Entageligt. Ja, helt præcis hvad det var det vidste han ikke helt.
Men han konstaterede at det hærdede hurtigt. Det skal man [00:03:00] selvfølgelig altid være skeptisk for, for det gør lime ikke. Han sagde at der er mulighed for at der er et eller andet additiv i det. Men det var han rimelig gode på. Og egentlig bare ville bestille og sagde lidt i overlegnet at det kunne være halvdag i morgen.
Hvis man bestilte det for ham på Mombasa. Altså ganske vist er det garanteret noget finere limeprodukt end det vi får her fra Rhinolime. Nogle gange så forstår vi så ud, hvad det kunne være større der. Og så i forhold til at behandle det, det er så overfladet. Der har vi jo selv meget bekymret for, at vores plaster ikke har været stærkt nok.
Altså vi er meget understreget af, at det regnede væk mens vi ikke var her. Og der er jo ganske forstået, at vi ville have en diffusionsåben maling Jeg kan altså rette i, at det er nærmest umuligt at finde her. Der er ikke nogen, der forstår hvorfor de skulle bruge en diffusionsåben maling. Men det er
Alberte: jo ikke umuligt at finde her.
Han sagde jo, at der var mange, der havde det. Ja, pulveret? Ja, pulveret, ja. man sagtens kan få det der [00:04:00] pulverpigment. Ja. Og det er mega billigt, fordi nu til dags vil folk have med akryl.
Rasmus: Ja, præcis ja. Han vidste ikke helt, hvad pigmentet var, men han kunne i hvert fald konstatere Det er noget, der kan bruges i alle former for opslømninger om det er i lime, cement, alt muligt.
Eller bare med vand. Ja. Og
Alberte: det er jo meget pysseligt.
Rasmus: Ja. Og så synes han, at det uforstående. Han kunne godt forstå vi havde snakket om at hælde lindolie i malingen. Han kunne godt forstå det, men han tænker sammen, at det må være et fordyrende element, og han kunne ikke forstå, at det skulle være nødvendigt i limeplaster.
Han var faktisk helt over i, at han ville lade lærjorden, som er inde bag limeplasteren stå synlig udefra. Hvilket vi dog senere gik lidt fra, da han så, hvor evotionsskadet de lærklodser, der har lagt udenfor var Men synes ikke,
Alberte: at det gjorde noget, at man tydeligt kunne se, at det evoderede.
Rasmus: Ja, vi skulle bare have nogle bedre lærsten.
Han synes, at de virkede for svage i [00:05:00] forhold til, hvad han var vant til. Og der havde han en anbefaling til et sted hvor man kunne få sådan nogle ca. 100 km herfra.
Alberte: Så snakker han også med nogle ved taget.
Rasmus: Ja. Ja, hun går til et fladtag ikke også?
Alberte: Altså han sagde, at den største load, hun taget, det var regn.
Rasmus: Ja, der tror jeg at tænker vi måske lidt bullshit-alarm.
Alberte: Hvor vi i Danmark ved, at det er vind. Men han sagde, at der er ikke nogen vindlast, fordi at vinden den bliver bare... Når det rammer den ene
Rasmus: side af gavltaget, så blæser vinden opad, som så skaber et nedadgående tryk ikke? Det
Alberte: sagde han jo ikke. Nej
Rasmus: det sagde han ikke engang.
Men der ved vi jo, at der er tryk på den ene side og sug på den anden side. Det var han tilsyneladende ikke klar over. Der kan man selvfølgelig hurtigt blive lidt skeptisk der, [00:06:00] om det er kvaliteten af alt andet rådgivning. Og nu ved jeg ikke, om de regner med en regnbelastning. Selvfølgelig regner vi med en nedbørstbelastning i Danmark, men det jo kun sne.
Ja, og
Alberte: jeg er sikker på, at det regner ret meget mere i Danmark.
Rasmus: Ja, det lyder lidt mærkeligt, må jeg godt nok sige. Han sagde jo også, at kunne sagtens have tyndere vægge. Han anbefalede at bruge et system, meget inspireret af macejerne. Macejerne bruger så godt nok et rammesystem, de bygger op i nogle træelementer som er trækviste, du får fra akaciatræerne.
Det er så behandlet på en særlig måde, som overhovedet ikke kunne overføres i nogen form for industriel praksis altså sådan håndarbejdet.
Og så er det så lærklinet med, for massagerens tilfælde er det jo kohlort, aske og lærjord. Og han sagde, prøv nu at tænke på, hvis nu man tog et [00:07:00] galvaniseret rivenet, så kunne du lærkline op ad det i stedet for, altså helt undlaget.
Og
Alberte: så ville det være den bærende?
Rasmus: Ja. Hvis jeg ved sådan noget, så ville jeg også sige, at du nok ikke prøvede lægge en ringbeam her, altså en toprem.
Generelt så syntes han jo, at vores designforslag var meget overdimensioneret.
Alberte: Ikke meget. Nej, okay. Vildt lidt.
Rasmus: Og så forstod han
Alberte: ikke det der høje tag.
Rasmus: Nej.
Han var meget begejstret over vores materialeopvalg i det hele taget. Han har også gået lige til retsågen der.
Alberte: Ja. Fordi det er en teknik de har kendt igennem århundreden.
Rasmus: Ja.
Alberte: Den kendte han godt, men folk [00:08:00] bruger det ikke mere.
Rasmus: Nej.
Alberte: Fordi det ikke er moderne
Rasmus: Nej, men han forestillede sig, uvalgt på slum at det skulle være billigere end mange europæiske eller amerikanske klinker, men godt nok dyrere end kinesiske og indiske klinker.
Så det var han ret huk på.
Alberte: Og så sagde han også det der med, at det var dumt at vi havde sat en søjle ned til jorden, Så ville termiterne nok kravle den vej op til tagkonstruktionen Ja tøjle,
Rasmus: der understøtter indgangspartiet.
Alberte: Ja. Ja så ville termiterne komme den vej op, fordi nu har man ligesom lavet en bridge for dem.
Så i fremtiden er det bedre ikke at lave en bro.
Rasmus: Ja, en [00:09:00] termitbro, ja.
Alberte: Træet væk fra jorden så de ikke kan kravle op til tagkonstruktionen fordi hvis vi ikke havde lavet det, så havde der ikke været problemer i tagkonstruktionen
Rasmus: nej
Alberte: det er der ikke nu, og han sagde også, at man må gå lang tid men det er bare sådan et tip
Rasmus: men han sagde, at behandle det med crude olie, så er der ikke noget problem

Appendix 8

Climate log

Date: 2024

Location: Nyange Farm, Tanzania



Figure 314: Private picture - Wet and dry bulb thermometer.

Dato	Tidspunkt	Temp	Relativ luftfugtighed	Heat index	Dew pt.	Wet bulb	Wet bulb Globe temp	Comments
09.25	22:10	23,1	60,1	25	15,1	17,9	19,8	Alberte: feels chilly. Rasmus: feels chilly, low activity level. pants and shirt, feels like 15 degrees
09.26	12:30	31,2	43,5	31,5	17,2	21,4	25,5	Alberte: feels hot and dry. Small breeze is nice. Productivity and energy level is decreasing.
	16:10	29,3	46,5	29,7	15,9	20,5	23,7	Rasmus: feels slightly too warm to perform psychical activity, wearing only shirt and underwear, fatigue and dehydration.
	18:50	25,4	56,1	26,3	16	19,4	21,2	Alberte feel energised. sun has just set. sweater on
	22:10	23,7	67,2	24,8	16,9	19,3	20,9	rasmus: feels comfortable and Nice temperature for light physical activity,
09.27	00:30	22,1	71,4	23,6	17,1	18,9	20,3	Rasmus: comfortable temperature for light physical activity
10.03	13:15	29,5	42,1	30,5	15,4	20,8	24,1	Alberte : feeling tired, staying in the shade
10.01	12:40	29,7	57,4	31	19,1	22,2	24,3	Alberte : too warm, needed to take a cold shower.
	13:00	30,5	42,7	31,1	16	21,3	24,4	Alberte : Working slowly in the sun. Very hot
10.04	18:40	23,6	69,6	24,6	17,8	19,6	21,8	Rasmus: slightly cold when wearing pants and t-shirt doing no activity. But comfortable temperature for high activity.
	20:00	21,6	74,8	22,7	17,8	18,5	19,5	Rasmus: uncomfortably cold so I had to wear sweater
10,07	8	21,2	79,4	22	17,1	18,7	19,7	Rasmus: Feels slightly cold when wearing pants and t-shirt. Emilie: warm sweater so the temperature is comfortable for her
10.07	15:12	35,4	35,9	36,4	18,1	22,6	26,1	Rasmus : feeling active and not tired. Alberte :same
10.09	08:09	22,2	80,8	23,3	17,5	19,3	20,1	Alberte : comfortable
10.10	14:30	28,7	45,1	28,6	15,7	20	22,6	Rasmus: feels comfortable when exposed to wind, however slightly warm when in calm area. Shirt and pants
	20:00	24,5	60,4	25,6	16,3	19,2	20	Rasmus: comfortable when wearing a sweater
10.11	7:46	21,4	74,7	22,7	16,8	18,5	19,5	Rasmus: comfortable temperature to do physical activity. And slightly cold to do seating work.
	10:35	27	52,3	27,7	16,4	19,9	22,2	Rasmus: comfortable temperature for sitting work
	12:30	30,2	39,7	29,9	14,8	20,2	23,3	Alberte : too hot to be productive. fast exhaustion
10.12	7:40	21	78,3	21,9	17,1	18,4	19,3	rasmus: slightly cold wearing Long sleeve shirt and pants and being stationary. Comfortable temperature for physical activity
	9:00	23,9	64,4	25,1	17,3	19,3	20,9	Rasmus: slightly too cold when exposed to wind and slightly to warm when exposed to sun
10,13	07:30	20	86,2	20,2	17,7	18,7	19	Rasmus: slightly cold for sitting work. But comfortable for physical work
10.13	8:30	21,2	84,3	21,4	18,2	19,2	20,1	Alberte: feeling cold. Need to put on long sweater and pants
	16:00	27,1	41,1	27	12,5	18,1	20,7	Rasmus: comfortable when wearing pant And shirt. Alberte is feeling warm wearing short and thin shirt
10,14	10:00	23,7	68,4	24,9	17,6	19,4	20,9	Rasmus: comfortable in the shade, too hot in the sun. Wearing long pants and shirt
Assessment of tents								
Tent 1 (claved stone) rongai	13:10	30,5	52,9	32,6	19,8	23,4	25,3	
Tent 3 (plastered cinderblocks) number			31,7	52,3	34,5	20,4	23,7	26,1
Tent 6 (floor boards) northern circuit			32,4	49,2	35	20,3	24,3	26,6

Figure 315: Climate log from Tanzania in 2024.

Appendix 9

Unit C plan layouts

Plan Drawings

Besides Unit A as presented in the presentation chapter, the group explored the possibility of creating two extra plan layouts to accommodate more user needs and integration of the masterplan.

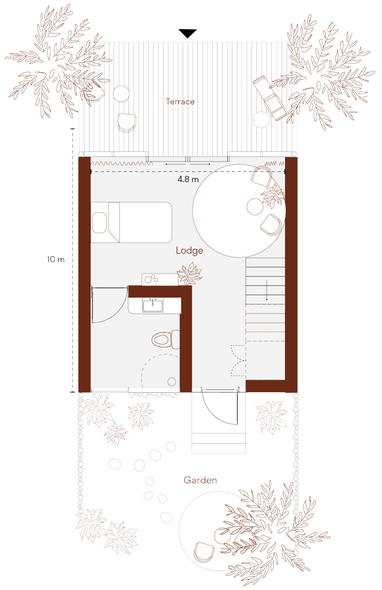
Unit B has the main entrance towards the south, as the masterplan dictates of the first row of unites.

Unit C provides another option for Unit A, where an attic is incorporated. This provides the unit with an extra bed, and another architectonic quality much inspired by the construction of the Chagga tribal architecture.

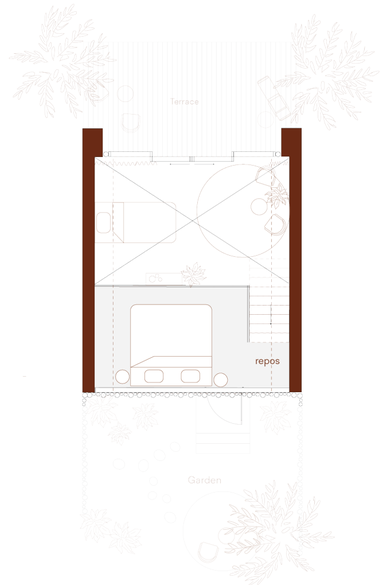
Unit C

scale 1:100

Figure 316: Plan - Unit C with an attic and entrance from the north, scale 1:100



Ground floor



First floor

Appendix 10.1

Static calculations: fixed ridge

As the degrees of freedom iterations suggest, the desired truss system must be statically indeterminate. However, to suggest such a system a finite element (FE) simulation should accompany the proposal to ensure that the structure is safe. Classically statically determinate systems can be solved by equilibrium equations, however in the case of statically indeterminate systems were DOFs restraint are exceeding the amount of DOFs. Therefore, the same formulars do not apply and we must proceed with simulations over hand calculations.
A parametric design model built in Rhino Grasshopper allowing for continuous adjustment of geometry was continuously simulated using Karamba. Initial truss configurations below were tested to analyse the potential of using shorter members resembling the nature of tribal construction.

The illustrations show how a Pratt truss constructed in four ways. Depending on the joint the material acquisition and construction process can be radically different. (Figure 317, Figure 331, Figure 326 & Figure 332)

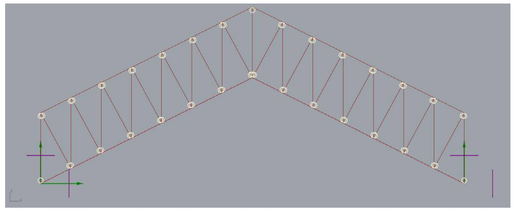


Figure 317: Illustration showing Pratt truss, that has continous top and buttom members. Joints indicate that the ridge is fixed and the vertical members are pinned (Charnier).

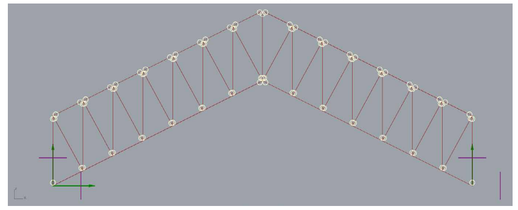


Figure 331: Illustration showing Pratt truss, that has continous buttom members. Joints indicated are all pinned (Charnier).

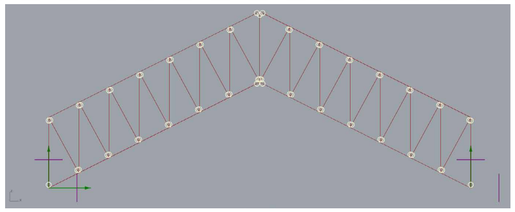


Figure 326: Illustration showing Pratt truss, that has continous top and buttom members. Joints indicated are all pinned (Charnier).

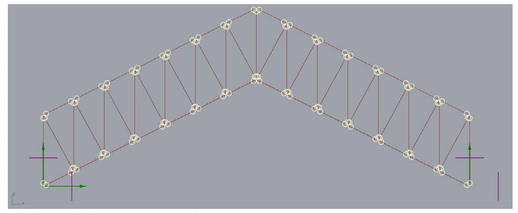


Figure 332: Illustration showing Pratt truss, that has discrete top and buttom members. Joints indicated are all pinned (Charnier).

The Pratt truss is a design inspired by bridge construction, that use discrete short elements that are joined using fixed or hinged joint. The characteristics of the Pratt truss are that it is an efficient construction with long span and low weight. The logic of pursuing the Pratt truss is in particular the possibility of using discrete elements allowing for less cumbersome material transport and construction, that ensures safety. The Pratt truss is compared with other similar truss designs i.e. the Howe truss and bracing truss.
In this study we are testing dead load in ultimate limit state (ULS). This means that we are simulating the forces that the dead load inflicts on the structure and assessing if this exceeds the design strength of the member according to Danish regulations. By ensuring that it meets Danish requirements, that takes numerous safety factors into consideration, we can be sure that it will be fit for this context. The specified trusses are strength class C14 (parallel with grain), the top and bottom members are 60x60mm and the vertical members are 30x30mm.

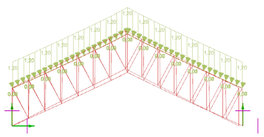


Figure 318: Pratt truss with dead load distributed alon the top beam. Left support is pinned, right support is a roller. Deformation is rendered however not representing real dissplacement.

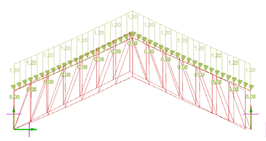


Figure 319: Howe truss with dead load distributed alon the top beam. Left support is pinned, right support is a roller. Deformation is rendered however not representing real dissplacement.

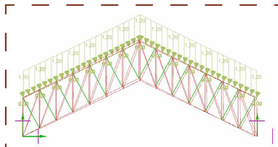


Figure 320: Bracing truss with dead load distributed alon the top beam. Left support is pinned, right support is a roller. Deformation is rendered however not representing real dissplacement.

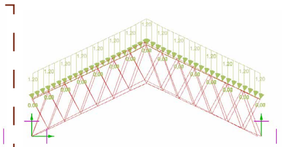


Figure 321: X-truss with dead load distributed alon the top beam. Left support is pinned, right support is a roller. Deformation is rendered however not representing real dissplacement.

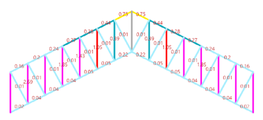


Figure 322: Pratt truss 12 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces. (Figure 370)

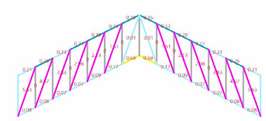


Figure 323: Howe truss: 12 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces. (Figure 380)

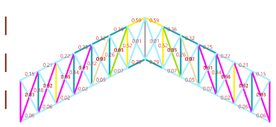


Figure 324: Bracing truss: 10 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces. (Figure 381)

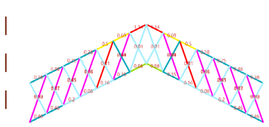


Figure 325: X-truss: 16 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. Failures to vertical members happen due to normal forces (Figure 369). Failures to top and bottom members happen due to moment forces (Figure 368)

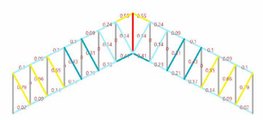


Figure 327: Pratt truss 1 member's design strength exceeded (utilization >1) in ULS dead load, bending and tension. The failure happens due to normal forces. (Figure 370)

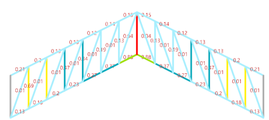


Figure 328: Howe truss: 1 member's design strength exceeded (utilization >1) in ULS dead load, bending and tension. The failure happens due to normal forces. (Figure 380)

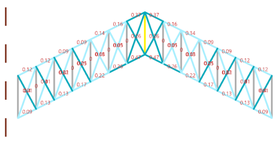


Figure 329: Bracing truss: 0 member's design strength exceeded (utilization >1) in ULS dead load, bending and tension.

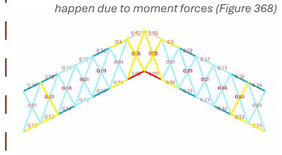


Figure 330: X-truss: 2 member's design strength exceeded (utilization >1) in ULS dead load, bending and tension. The failures happen due to moment forces. (Figure 368)

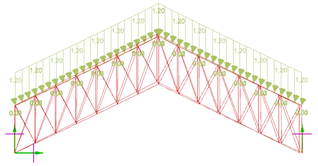


Figure 333: Bracing truss rendered with deformation.

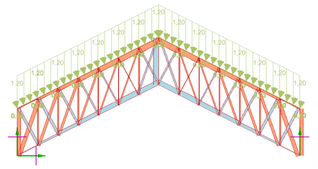


Figure 334: Bracing truss rendered with loads normal forces.

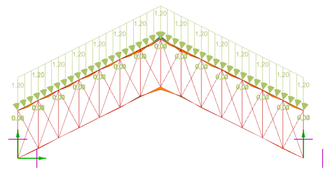


Figure 335: Bracing truss rendered with moment forces.

By assessing the utilization factor it becomes evident that the Pratt truss is more efficient than the Howe truss. With maximum utilization factor less than 3 against almost 6. Additionally, when we change all elements to being discrete, we get a slightly more effective design due to less moment stress(Figure 393)). The bracing truss combining the Pratt truss and the Howe truss has an advantage by reducing the number of failing members by 3(Figure 221) compared to the Pratt and Howe truss, however it does require more 1/3 more material. This truss design does improve(Figure 226 & Figure 227), like the Pratt truss, when all members are discrete as moment stress is reduced (Figure 225).

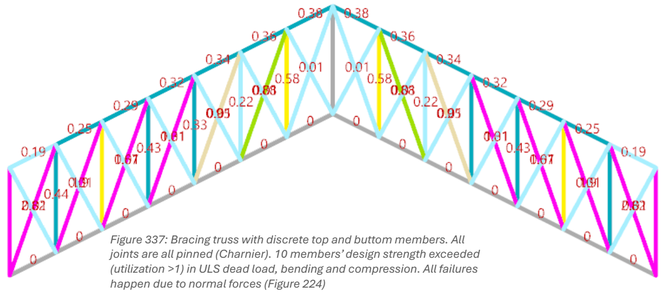


Figure 337: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 10 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression. All failures happen due to normal forces (Figure 224)

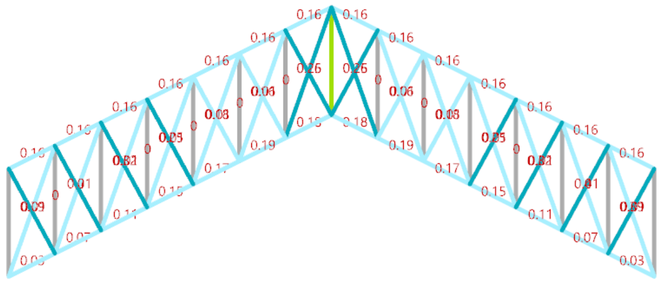


Figure 338: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

Figure 336: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor

0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

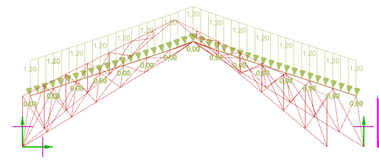


Figure 339: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

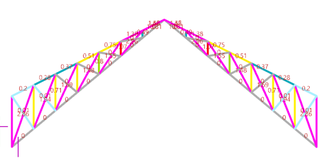


Figure 342: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

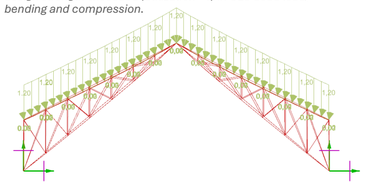


Figure 340: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

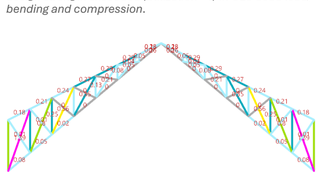


Figure 343: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

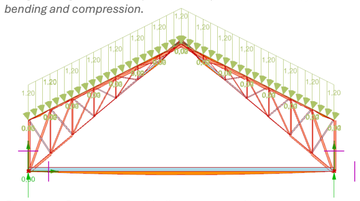


Figure 341: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.

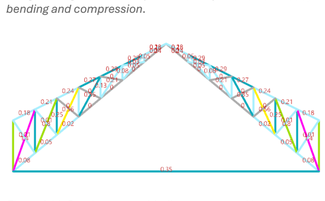
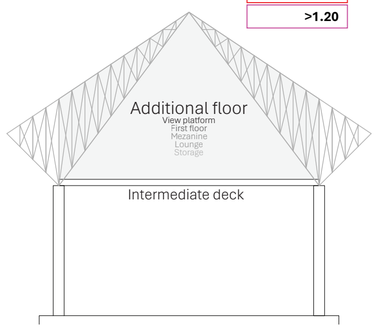
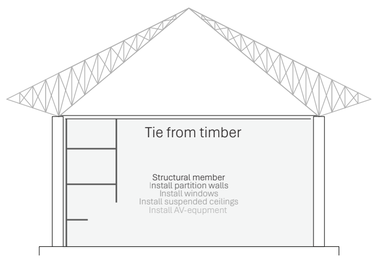
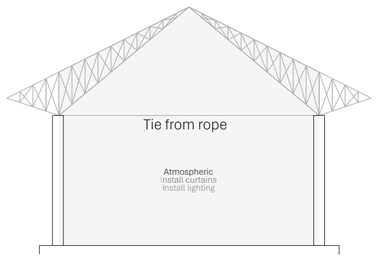


Figure 344: Bracing truss with discrete top and buttom members. All joints are all pinned (Charnier). 0 members' design strength exceeded (utilization >1) in ULS dead load, bending and compression.







Appendix 10.2

Static calculations: fixed ridge

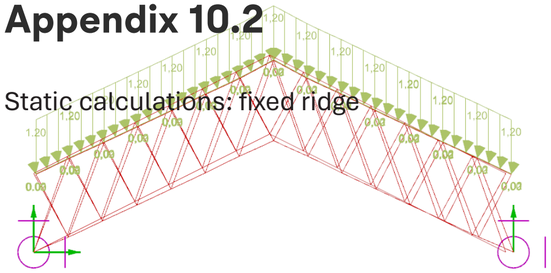


Figure 345: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

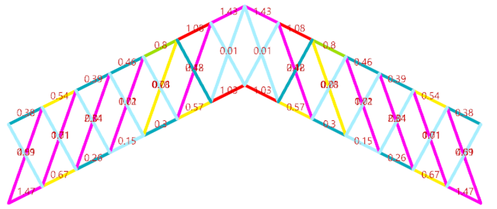


Figure 346: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

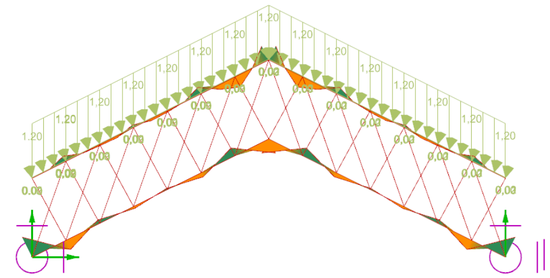


Figure 347: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

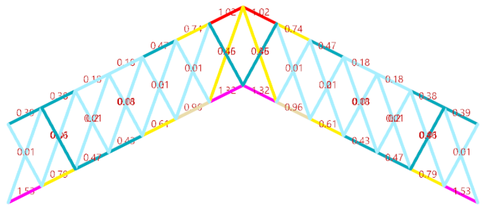


Figure 348: X-truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

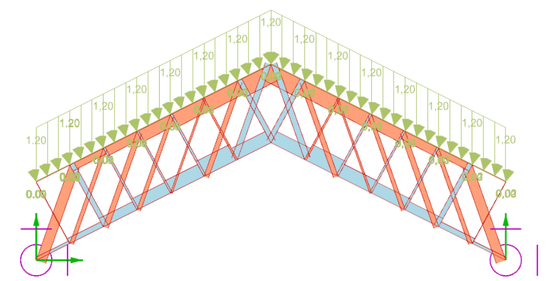


Figure 349: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

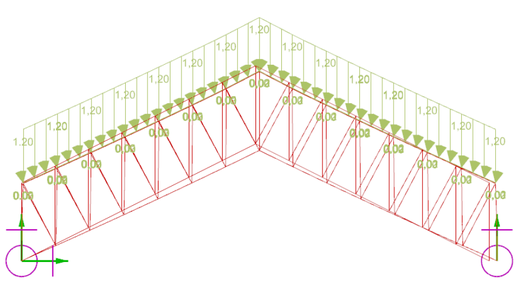


Figure 350: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

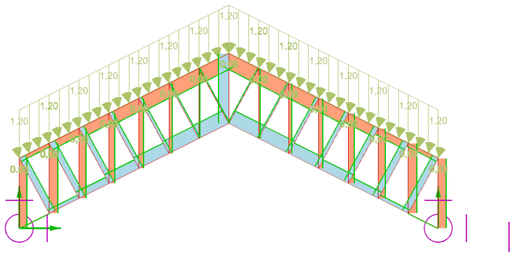


Figure 351: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. normal forces. .

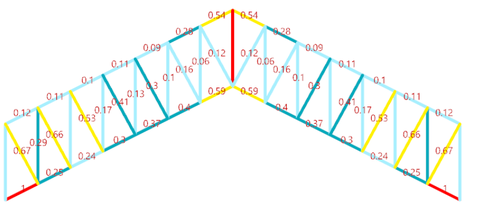


Figure 352: Pratt truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

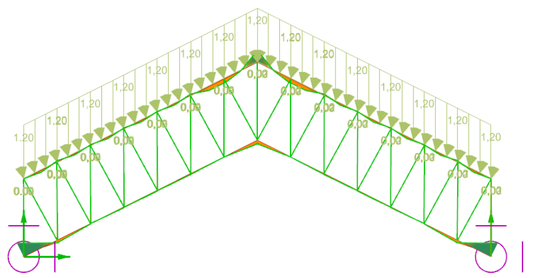


Figure 353: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. moment

Figure 355: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor

0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

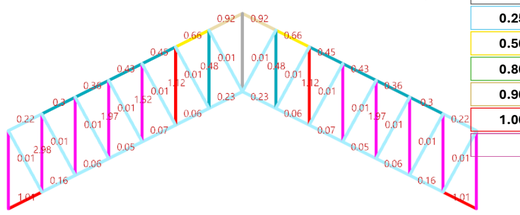


Figure 354: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

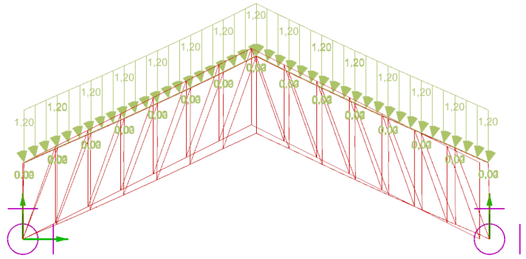


Figure 356: Howe truss, ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

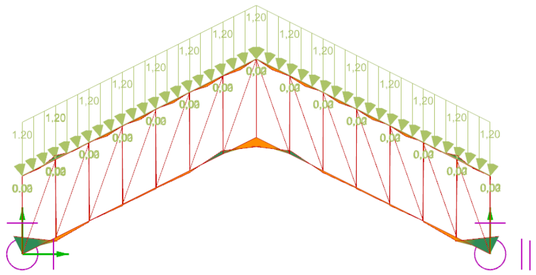


Figure 357: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

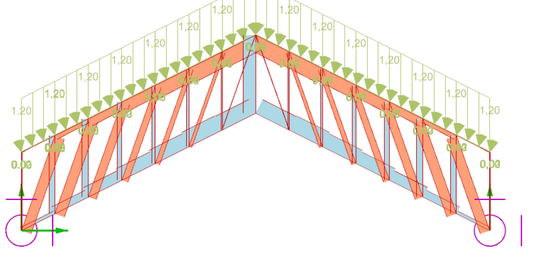


Figure 358: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. normal forces.

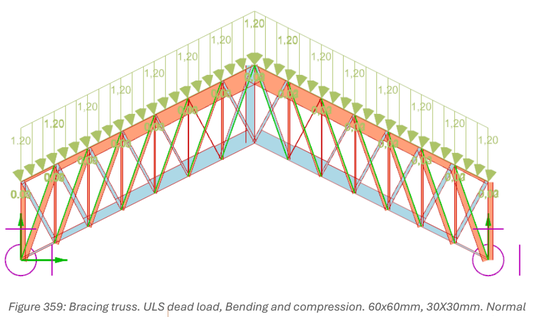


Figure 359: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

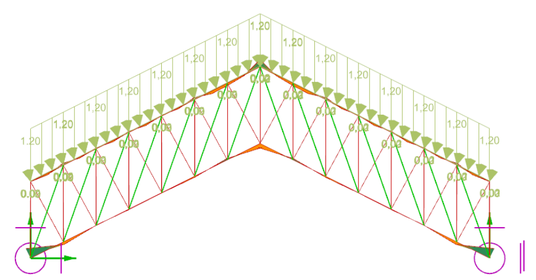


Figure 360: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

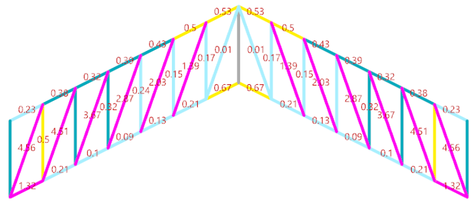


Figure 361: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

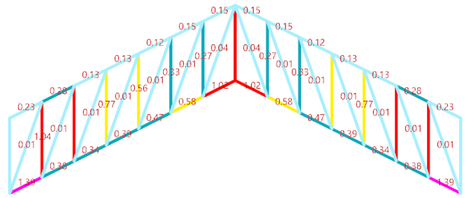


Figure 362: Howe truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

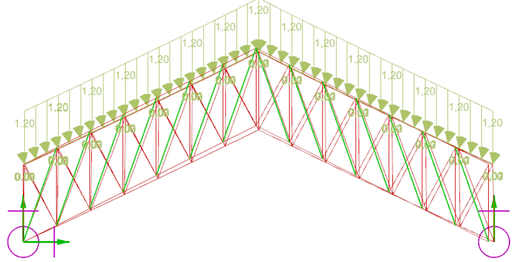


Figure 363: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

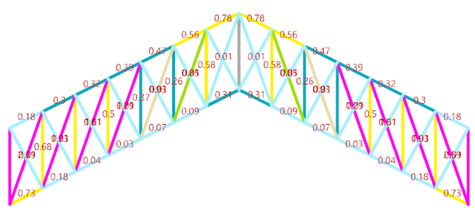


Figure 364: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

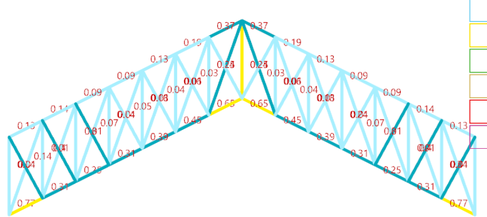


Figure 365: Bracing truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

Figure 366: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

Appendix 10.3

Static calculations: pinned ridge

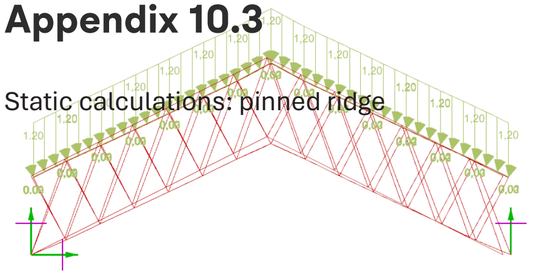


Figure 367: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

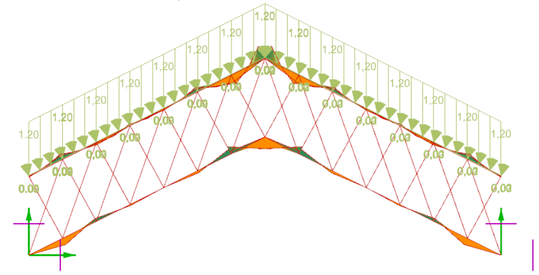


Figure 368: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

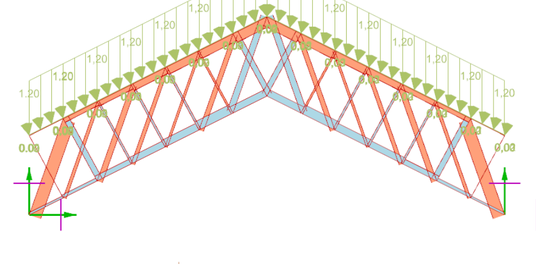


Figure 369: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

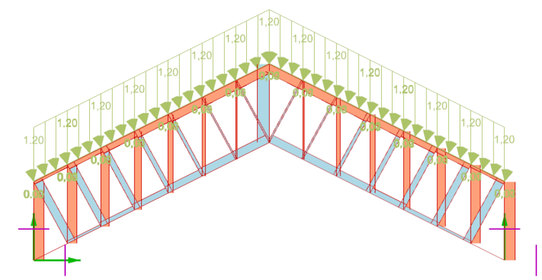


Figure 370: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. normal forces. .

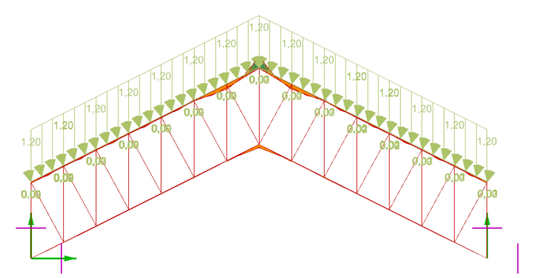


Figure 371: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. moment.

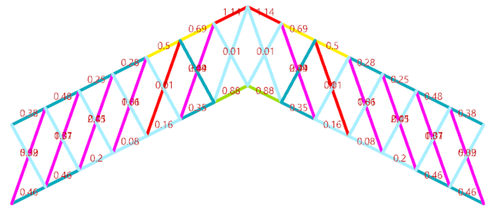


Figure 372: X-truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

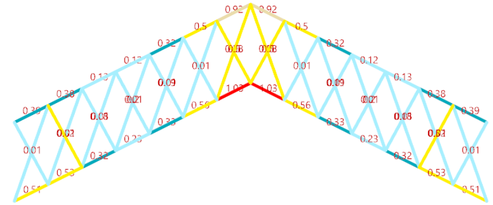


Figure 373: X-truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

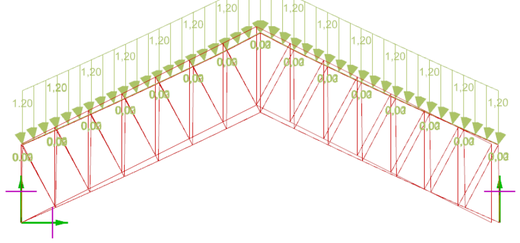


Figure 374: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

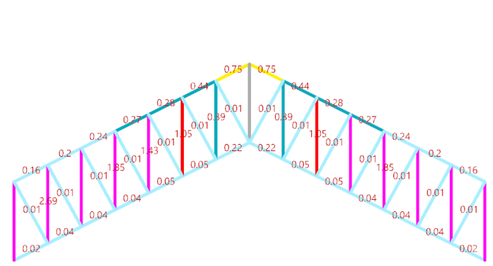


Figure 375: Pratt truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

Figure 377: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

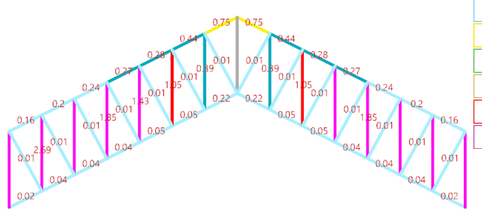


Figure 376: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

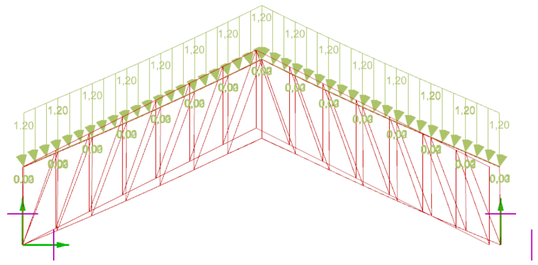


Figure 378: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

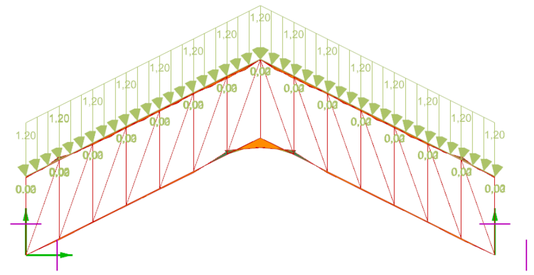


Figure 379: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

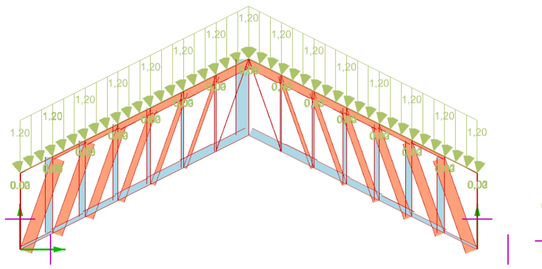


Figure 380: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

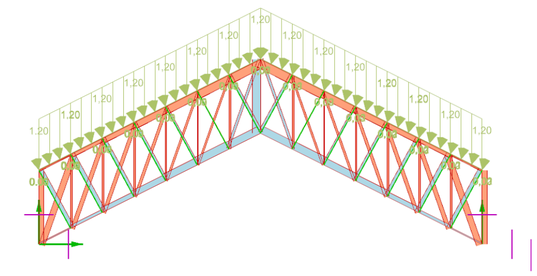


Figure 381: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

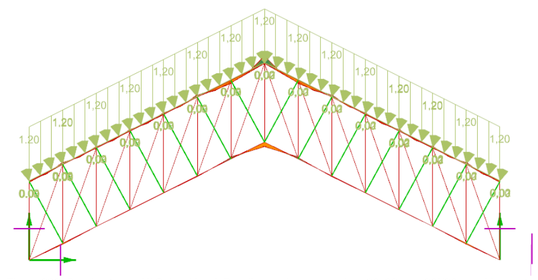


Figure 382: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

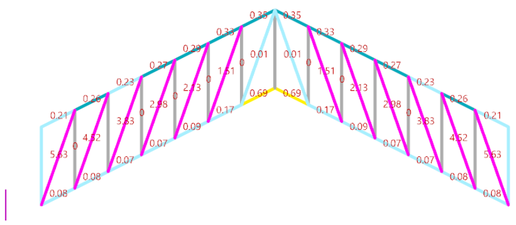


Figure 383: Howe truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

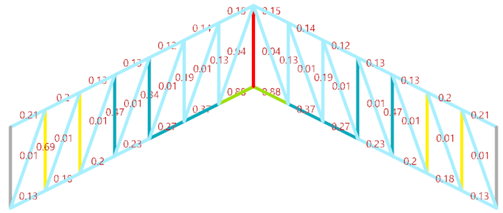


Figure 384: Howe truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

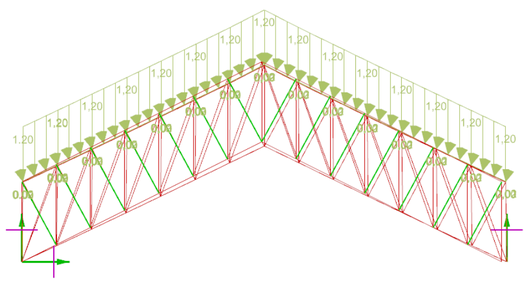


Figure 385: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

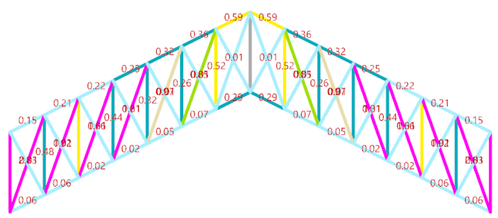


Figure 386: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

Figure 388: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

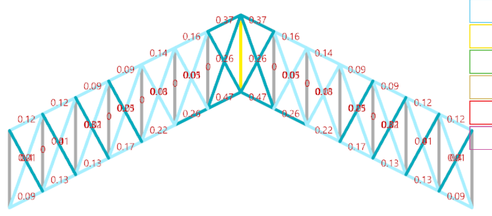


Figure 387: Bracing truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

Appendix 10.4

Static calculations: Discrete elements and pinned joints

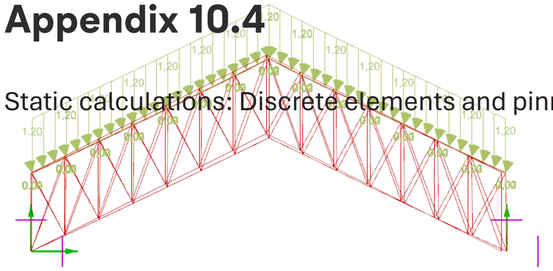


Figure 389: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation.

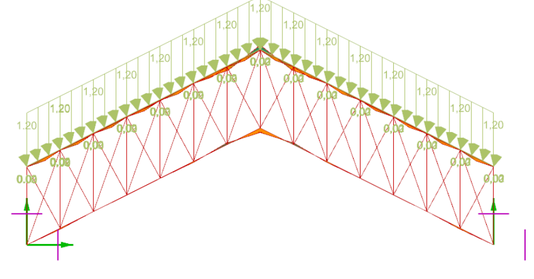


Figure 390: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Moment.

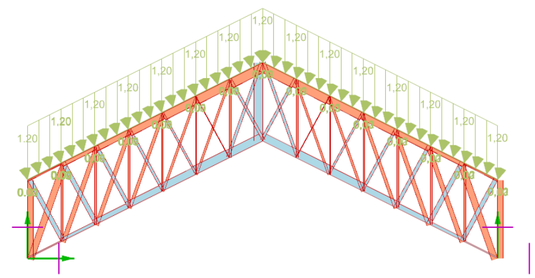


Figure 391: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

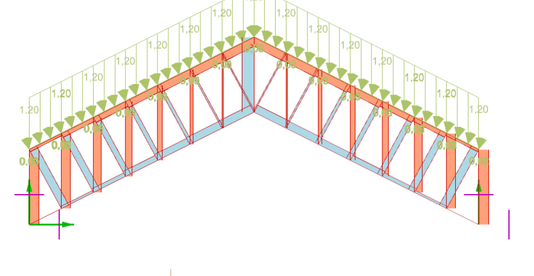


Figure 392: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. normal forces. .

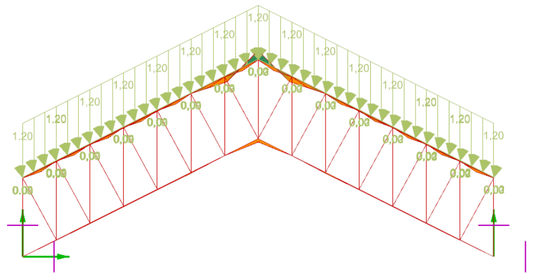


Figure 393: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. moment.

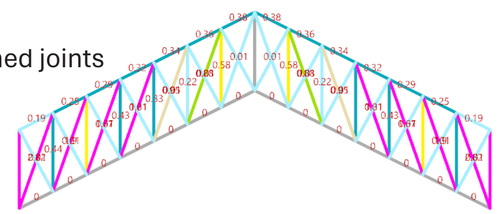


Figure 394: Bracing truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

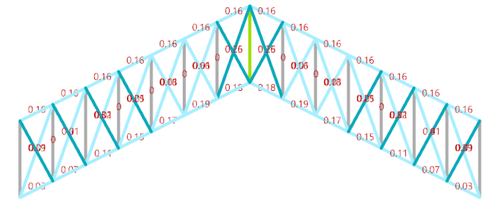


Figure 395: Bracing truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

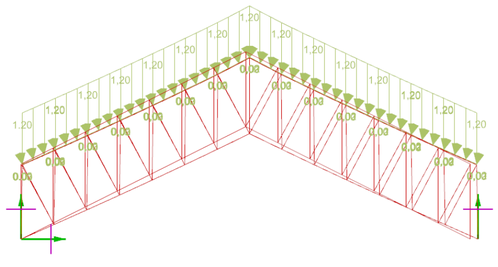


Figure 396: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

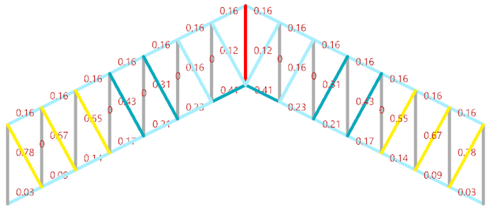


Figure 397: Pratt truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

Figure 399: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

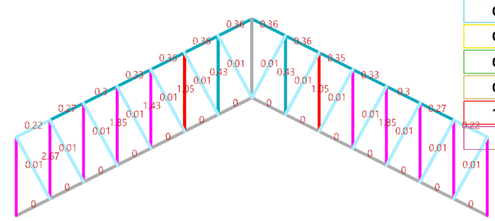


Figure 398: Pratt truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

Appendix 10.5

Static calculations: Tapering truss

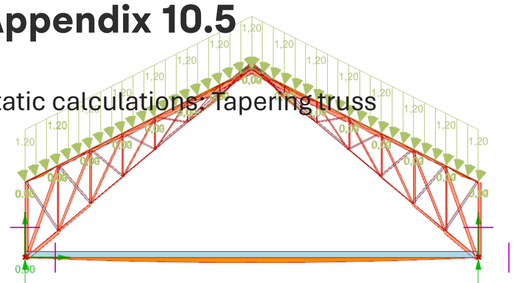


Figure 400: Tapering truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm. Normal forces and moment.

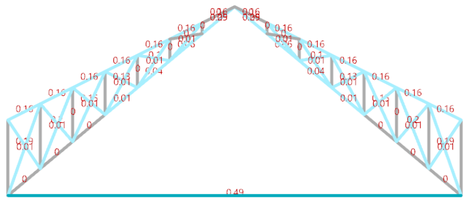


Figure 405: Tapering truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

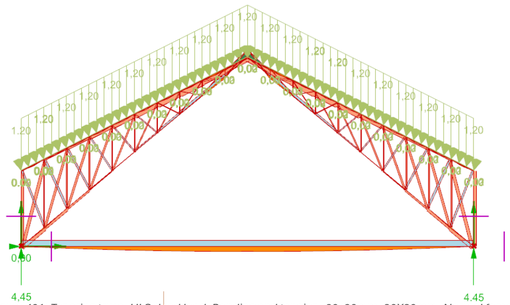


Figure 401: Tapering truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm. Normal forces and moment.

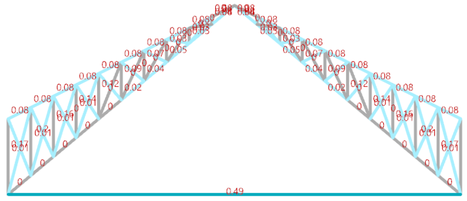


Figure 406: Tapering truss. ULS dead load, Bending and tension. 60x60mm, 30X30mm.

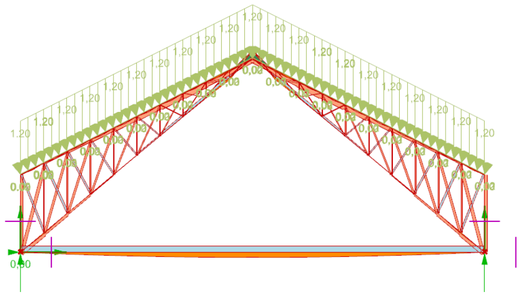


Figure 402: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces and moment.

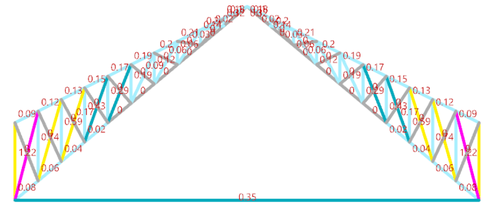


Figure 407: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

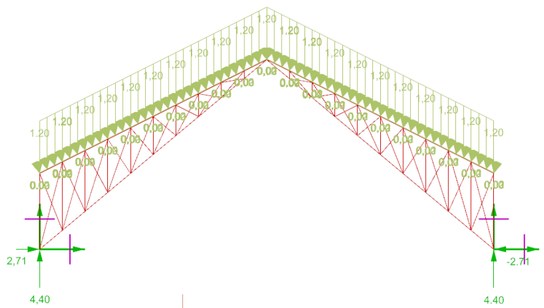


Figure 403: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Deformation

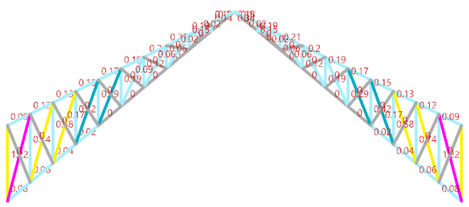


Figure 408: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

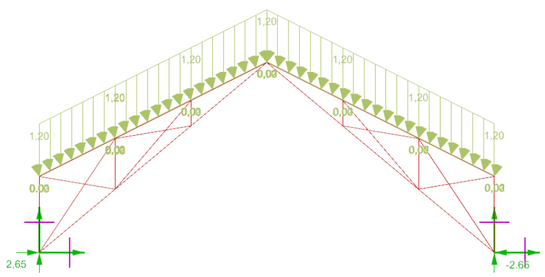


Figure 404: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces and moment.

Figure 410: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

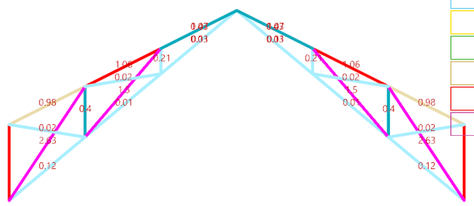


Figure 409: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm.

Appendix 10.6

Static calculations: Discrete elements and pinned joints

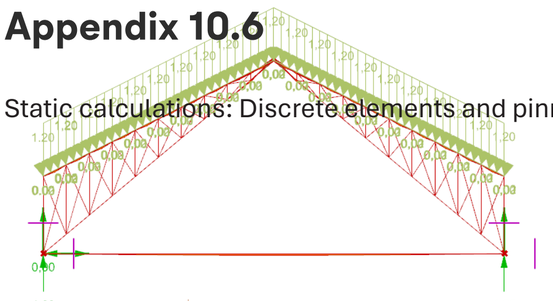


Figure 411: Tapering truss. ULS dead load, Bending and compression. 2X 35x35mm, 35x35mm. Moment.

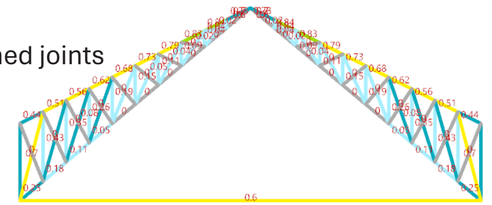


Figure 415: Tapering truss. ULS dead load, Bending and compression. 2X 35x35mm, 35x35mm.

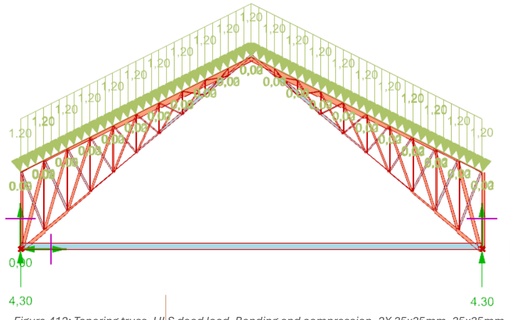


Figure 412: Tapering truss. ULS dead load, Bending and compression. 2X 35x35mm, 35x35mm. Normal Forces.

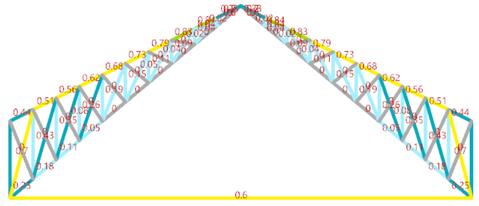


Figure 416: Tapering truss. ULS dead load, Bending and compression. 2X 35x35mm, 35x35mm.

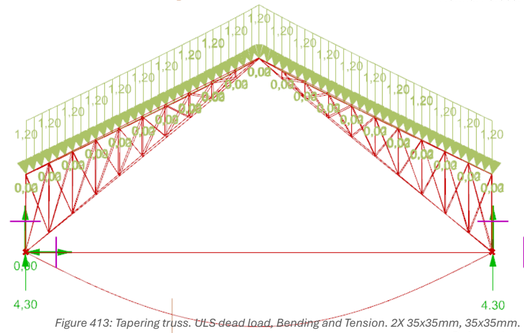


Figure 413: Tapering truss. ULS dead load, Bending and Tension. 2X 35x35mm, 35x35mm. Deformation.

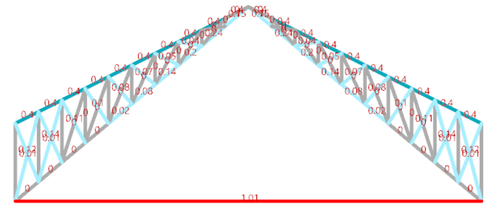


Figure 417: Tapering truss. ULS dead load, Bending and Tension. 2X 35x35mm, 35x35mm.

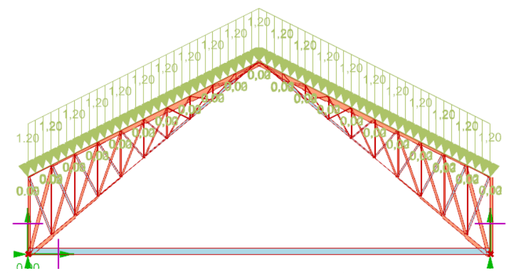


Figure 420: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. Normal forces.

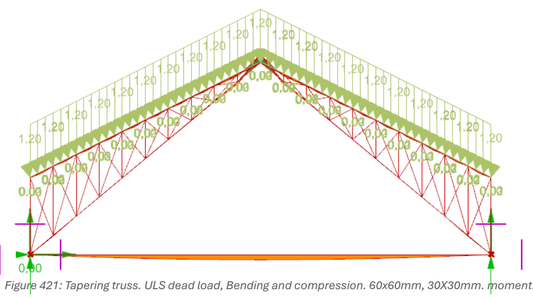


Figure 421: Tapering truss. ULS dead load, Bending and compression. 60x60mm, 30X30mm. moment.

Figure 419: Utilization factor legend. Apllicable to all illustrations on the spread.

Utilization Factor
0.00 - 0.25
0.25 - 0.50
0.50 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.20
>1.20

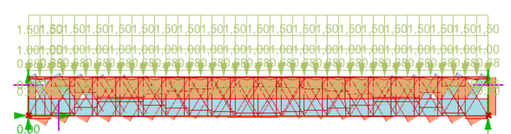


Figure 414: Flat truss. ULS live+dead load, Bending and compression. 140X140mm, 35X35mm c14. Normal forces and moment.



Figure 418: Flat truss. ULS live+dead load, Bending and compression. 140X140mm, 35X35mm c14.

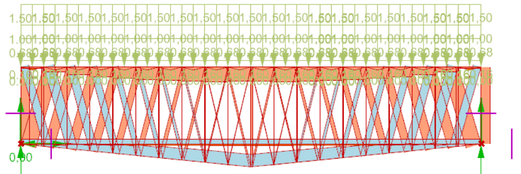


Figure 422: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22. Normal forces and moment.

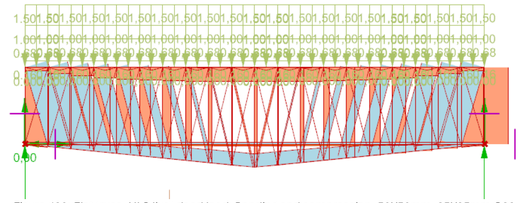


Figure 426: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22. Normal forces and moment.

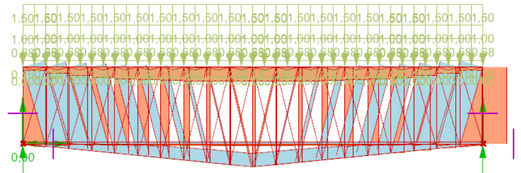


Figure 423: Flat truss. ULS live+dead load, Bending and tension. 50X50mm, 35X35mm C22. Normal forces and moment.

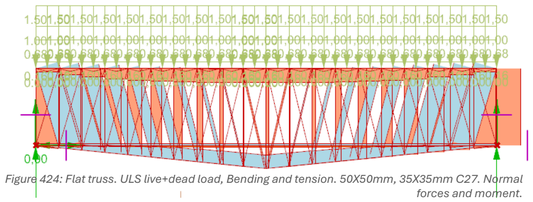


Figure 424: Flat truss. ULS live+dead load, Bending and tension. 50X50mm, 35X35mm C27. Normal forces and moment.

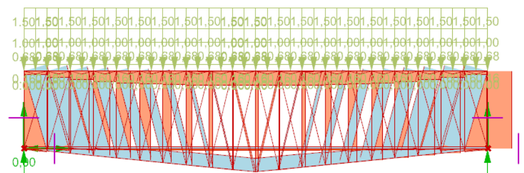


Figure 432: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C27. Normal forces and moment.

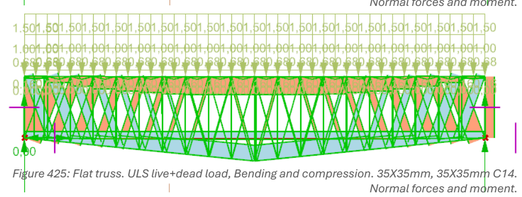


Figure 425: Flat truss. ULS live+dead load, Bending and compression. 35X35mm, 35X35mm C14. Normal forces and moment.

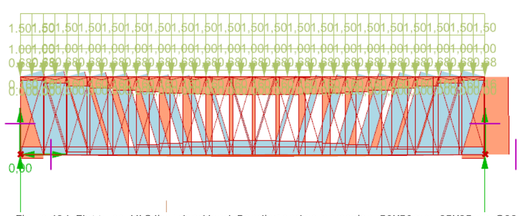


Figure 434: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22. Normal forces and moment.

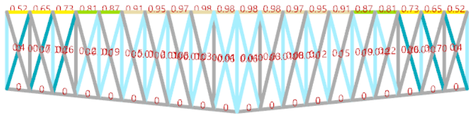


Figure 427: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22.

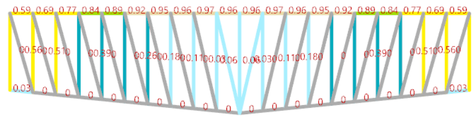


Figure 431: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22.

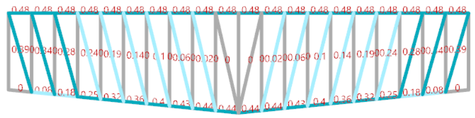


Figure 428: Flat truss. ULS live+dead load, Bending and tension. 50X50mm, 35X35mm C22.

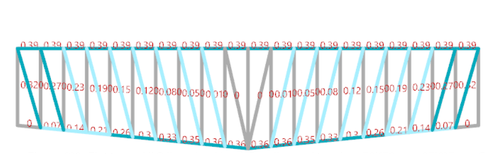


Figure 429: Flat truss. ULS live+dead load, Bending and tension. 50X50mm, 35X35mm C27.

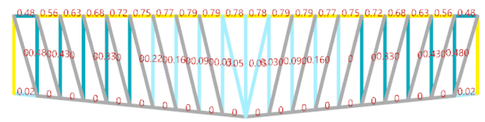


Figure 433: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C27.

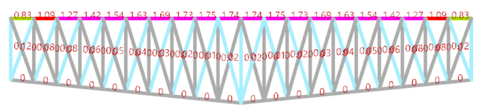


Figure 430: Flat truss. ULS live+dead load, Bending and compression. 35X35mm, 35X35mm C14.

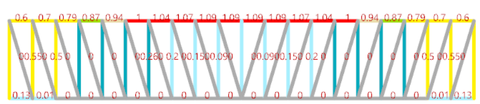


Figure 435: Flat truss. ULS live+dead load, Bending and compression. 50X50mm, 35X35mm C22.

Appendix 11

Weather data (UTCI)

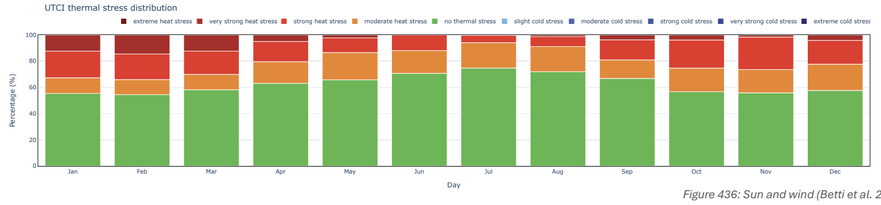


Figure 436: Sun and wind (Betti et al. 2023).

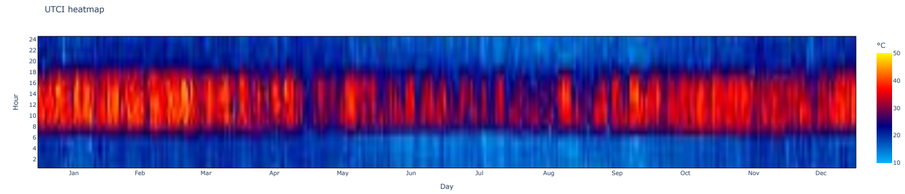


Figure 437: Sun and wind (Betti et al. 2023).

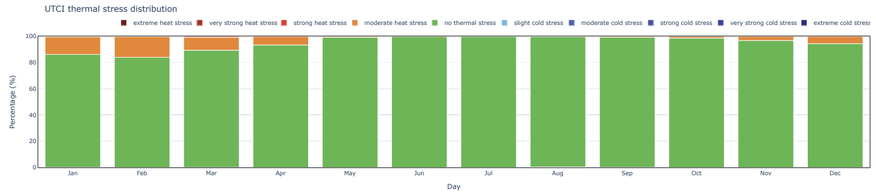


Figure 438: No sun and wind (Betti et al. 2023).

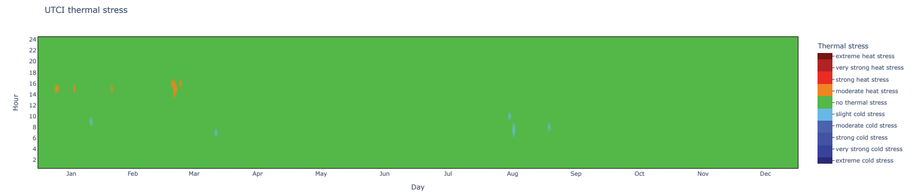


Figure 439: No sun and wind (Betti et al. 2023).

Appendix 12

BEM characteristics

The characteristics of the model are:

	Floor	Walls	Gable	Openings	Roof
#1.1	Wood boards on soil. Low thermal mass.	100 mm hollow CMU with cement plaster. Medium thermal mass. High infiltration. High heat conductivity.	20mm Wood boards. Low thermal mass. Low heat conductivity. High infiltration.	No openings	Steel sheets Large infiltration. Overhangs: 75cm
#1.2	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	No openings	Steel sheets Large infiltration. Overhangs: 75cm
#2.1	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Screen openings: permanently open in gables. Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Steel sheets Large infiltration. Overhangs: 75cm
#2.2	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Steel sheets Large infiltration. Overhangs: 75cm
#3	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 75cm
#4	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration. Additional windows east and west.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 75cm
#5.1	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 150 cm over windows Overhangs: 0 cm over walls
#5.2	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 0 cm over windows Overhangs: 0 cm over walls
#5.4	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 0 cm over windows Overhangs: 75 cm over walls
#5.4	Concrete 100mm on sand. High thermal mass. High heat conductivity.	300mm mud brick wall with lime plaster. High thermal mass Medium heat conductivity. High infiltration.	20mm wood boards. Low thermal mass. Low heat conductivity. High infiltration.	Window openings: Operable. Single pane and solid frame structure. Large infiltration. Exclusively windows east and west.	Natural thermal insulation 50mm U-value: 1.1 W/m2K Large infiltration. Overhangs: 0 cm over windows Overhangs: 75 cm over walls

Appendix 13

Earthquake Report

United States Geological Survey (no date) Earthquake Track. Available at: https://earthquaketrack.com/p/tanzania/kilimanjaro/recent (Accessed: 19 December 2024).

Recent Earthquakes Near Moshi, Tanzania
Report from 19. December 2024
10 months ago 4.7 magnitude, 10 km depth
Magugu, Manyara, Tanzania
1 year ago 5.5 magnitude, 10 km depth
Ikungi, Singida, Tanzania
1 year ago 4.7 magnitude, 10 km depth
Konde, Pemba North, Tanzania
2 years ago 4.6 magnitude, 10 km depth
Mto wa Mbu, Arusha, Tanzania
2 years ago 4.6 magnitude, 10 km depth
Mbulu, Manyara, Tanzania
3 years ago 4.1 magnitude, 10 km depth
Mto wa Mbu, Arusha, Tanzania
4 years ago 6.0 magnitude, 15 km depth
Kilindoni, Pwani, Tanzania
4 years ago 4.9 magnitude, 15 km depth
Maramba, Tanga, Tanzania
5 years ago 4.8 magnitude, 10 km depth
Naberera, Manyara, Tanzania
5 years ago 4.2 magnitude, 10 km depth
Mbulu, Manyara, Tanzania
5 years ago 4.1 magnitude, 10 km depth
Magugu, Manyara, Tanzania
5 years ago 4.8 magnitude, 9 km depth
Wundanyi, Taita Taveta, Kenya
5 years ago 3.7 magnitude, 10 km depth
Moshi, Kilimanjaro, Tanzania
8 years ago 4.8 magnitude, 10 km depth
Galappo, Manyara, Tanzania
10 years ago 4.4 magnitude, 10 km depth
Galappo, Manyara, Tanzania
11 years ago 4.6 magnitude, 10 km depth
Mbulu, Manyara, Tanzania
11 years ago 4.6 magnitude, 15 km depth
Monduli, Arusha, Tanzania
11 years ago 4.6 magnitude, 9 km depth
Mto wa Mbu, Arusha, Tanzania
11 years ago 4.5 magnitude, 9 km depth
Mto wa Mbu, Arusha, Tanzania
11 years ago 4.3 magnitude, 10 km depth
Magugu, Manyara, Tanzania
12 years ago 4.5 magnitude, 10 km depth
Makueni, Makueni, Kenya
14 years ago 4.4 magnitude, 10 km depth
Galappo, Manyara, Tanzania
14 years ago 4.3 magnitude, 10 km depth
Galappo, Manyara, Tanzania
14 years ago 4.6 magnitude, 10 km depth
Galappo, Manyara, Tanzania
14 years ago 4.2 magnitude, 10 km depth
Galappo, Manyara, Tanzania
15 years ago 4.5 magnitude, 10 km depth
Magugu, Manyara, Tanzania
16 years ago 4.4 magnitude, 10 km depth
Ngorongoro, Arusha, Tanzania
16 years ago 4.5 magnitude, 10 km depth
Shimoni, Kwale, Kenya
16 years ago 4.7 magnitude, 10 km depth
Monduli, Arusha, Tanzania
17 years ago 5.3 magnitude, 10 km depth
Longido, Arusha, Tanzania