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Swedish University of Agricultural Sciences

Faculty of Landscape Architecture, Horticulture
and Crop Production Science

Design program
for Kombolcha Campus Site

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Water management, Vegetation, Placemaking.

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Abstract

The objective for this Masters thesis is to conduct a Design program, as a planning and design tool, for the outdoor environment at the campus site of Wollo University in Kombolcha, located in northern Ethiopia. The geographical location as well as the social and political context of the site has constituted the framework for this Design program and Masters thesis. Kombolcha Campus site was established during 2006/2007, as part of the Ethiopian government's strategy for higher development which was initiated in the Ethiopian policy of 'Education and training' 2001. Investment in higher education was a step towards the development of socio-economic conditions and an essential prerequisite for poverty reduction and important for the future of Ethiopia (Federal ministry of Education, 2010). The strategy has resulted in several universities being built during the last decade distributed in different parts of Ethiopia.

At Kombolcha Campus, most buildings are more or less constructed. However, there are still some facilities and constructions lacking and parts of the infrastructure as well as the outdoor environment are yet to be planned, built and established. Because of its location, Kombolcha Campus confronts a high risk of flooding during heavy rainfall in the summer. There is a gully running down the hillside through the middle of the campus site which creates a threat towards many buildings and has already caused severe damage to some. In addition the campus faces problems with erosion. The outdoor environment and the vegetation at site is young and represents a surface with a few green spots and many empty, large scale, areas. It lacks seating areas and shade in order to support the use of the outdoor environment.

The choice of subject for this Masters thesis was initiated from a raised interest and a request from Wollo University in order to conduct a Design program for the outdoor environment. The main focus in this Masters thesis is to highlight the landscape architectural perspectives and to contribute with a planning tool, as well as applicable design approaches. The aim is to provide additional support and ideas for the development of the outdoor environment at site. Focus has been laid upon how to strengthen the study environment and make Kombolcha Campus functioning and attractive. The emphasis has been placed on students and their desire and requirements in particular. The methods used hazve been based on a pragmatic and an empirical perspective (Patel and Davidson, 2003). Analysis tools employed have mainly been mapping, observations, participation, talks and interviews with a focus on the students in particular. Within the program special focus has been laid on how to deal with three main fields at site: Water, Vegetation and Placemaking. Examples/Suggestions of solutions are given through several approaches of how to deal with: Water issues such as flooding and erosion; possible ways to work with and establish Vegetation; as well as identification of areas suitable for additional support for Placemaking. Thereafter seven key areas are shown as examples, including a range of different approaches applied within each key area.

Acknowledgement

During the work with this Masters thesis we are thankful for all the important local and general knowledge and contacts in our surrounding which were generously donated by the many people who have helped us.
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Ida & Josephine

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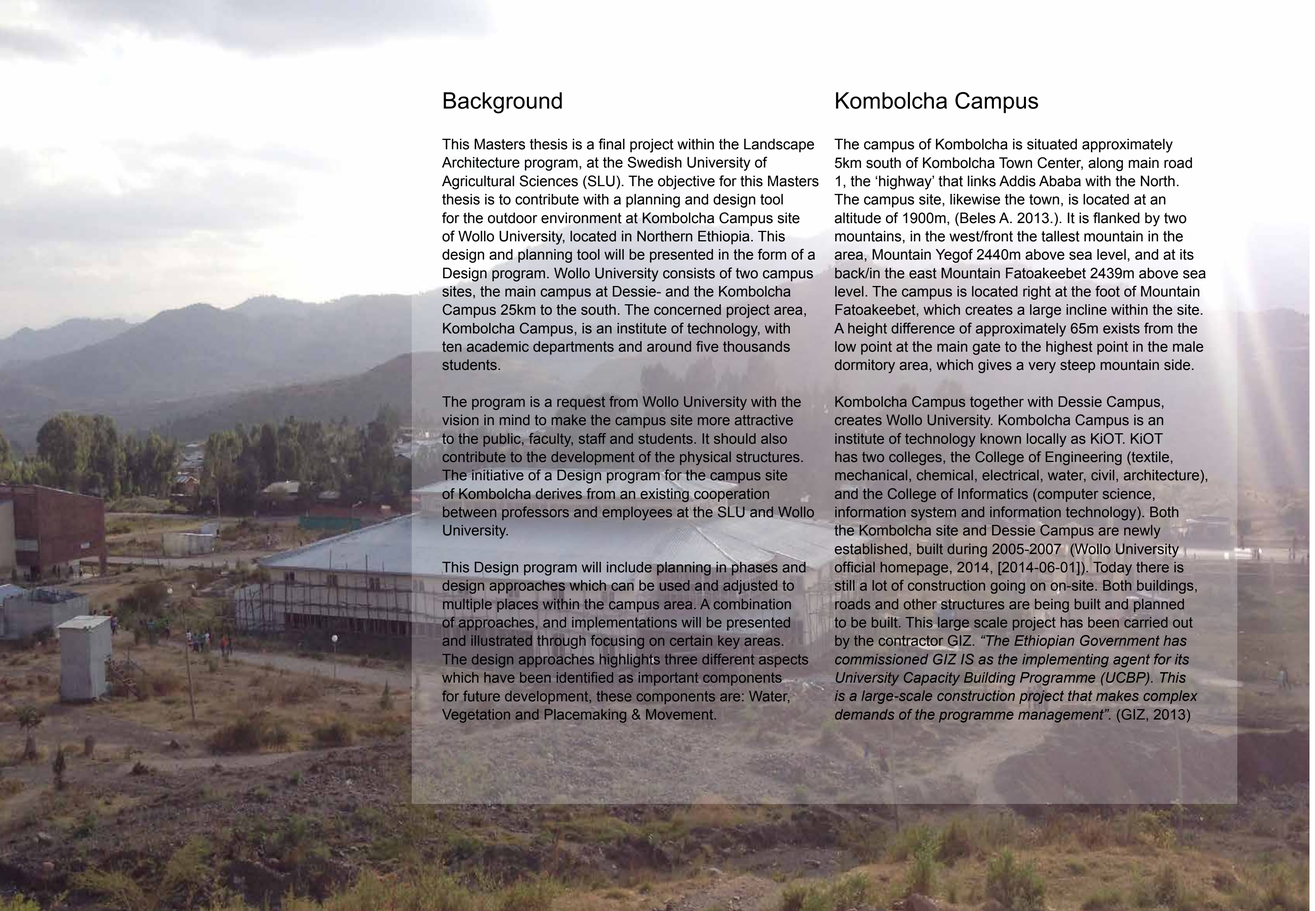
General Introduction



Background

This Masters thesis is a final project within the Landscape Architecture program, at the Swedish University of Agricultural Sciences (SLU). The objective for this Masters thesis is to contribute with a planning and design tool for the outdoor environment at Kombolcha Campus site of Wollo University, located in Northern Ethiopia. This design and planning tool will be presented in the form of a Design program. Wollo University consists of two campus sites, the main campus at Dessie- and the Kombolcha Campus 25km to the south. The concerned project area, Kombolcha Campus, is an institute of technology, with ten academic departments and around five thousands students.

The program is a request from Wollo University with the vision in mind to make the campus site more attractive to the public, faculty, staff and students. It should also contribute to the development of the physical structures. The initiative of a Design program for the campus site of Kombolcha derives from an existing cooperation between professors and employees at the SLU and Wollo University.

This Design program will include planning in phases and design approaches which can be used and adjusted to multiple places within the campus area. A combination of approaches, and implementations will be presented and illustrated through focusing on certain key areas. The design approaches highlights three different aspects which have been identified as important components for future development, these components are: Water, Vegetation and Placemaking & Movement.

Kombolcha Campus

The campus of Kombolcha is situated approximately 5km south of Kombolcha Town Center, along main road 1, the 'highway' that links Addis Ababa with the North. The campus site, likewise the town, is located at an altitude of 1900m, (Beles A. 2013.). It is flanked by two mountains, in the west/front the tallest mountain in the area, Mountain Yegof 2440m above sea level, and at its back/in the east Mountain Fatoakeebet 2439m above sea level. The campus is located right at the foot of Mountain Fatoakeebet, which creates a large incline within the site. A height difference of approximately 65m exists from the low point at the main gate to the highest point in the male dormitory area, which gives a very steep mountain side.

Kombolcha Campus together with Dessie Campus, creates Wollo University. Kombolcha Campus is an institute of technology known locally as KiOT. KiOT has two colleges, the College of Engineering (textile, mechanical, chemical, electrical, water, civil, architecture), and the College of Informatics (computer science, information system and information technology). Both the Kombolcha site and Dessie Campus are newly established, built during 2005-2007 (Wollo University official homepage, 2014, [2014-06-01]). Today there is still a lot of construction going on on-site. Both buildings, roads and other structures are being built and planned to be built. This large scale project has been carried out by the contractor GIZ. *"The Ethiopian Government has commissioned GIZ IS as the implementing agent for its University Capacity Building Programme (UCBP). This is a large-scale construction project that makes complex demands of the programme management".* (GIZ, 2013)

The Core Values

•-Wollo University, drawing its norms from the exemplary community that it finds itself in, cherishes unity in diversity, respect for others and communion with all irrespective of differences.

• It believes that life shapes itself in a progressive manner based on the gains of knowledge. To the degree knowledge changes in cumulatively qualitative leaps, the University treasures passionate pursuits in scholarship and research.

•Given this importance and reality, the university regards highly the generation of knowledge as a means of personal and social transformation and the provision of education to all as an important public responsibility.

•The university also increasingly appreciates the role the environment plays in the sustenance of all that passes as human achievement. To the degree the interdependence between man and nature is undeniable, the University maintains an environmentally friendly stance in all that it teaches, researches and applies.

Vision

Wollo University strives to generate and apply the kind of knowledge that contributes to the renewal and transformation of society.

Mission

The mission of Wollo University is to accelerate the democratic, social, technical and economic development of the country by offering various disciplines in the sciences, technology, medicine, social science, the humanities and business to provide the knowledge base for continuous and value adding achievements in all sectors of societal development in the immediate area in particular and in the country and the region in general.

Strategy

•The strategy of the university is holistic student development to the extent knowledge in all its dimensions needs to be transferred from one generation to another to ensure not only its continuity but also its evolvement taking on the additions that the human mind brings from time to time. The methods being used in the knowledge transfer are interactive challenging the student to be analytic and innovative in view of the need to develop problem solvers and leaders in the many professions. Given that knowledge has to be exhaustively searched and mastered to enable an accomplished scholar and a competent professional, the university emphasizes extensive reading on a subject matter for a student to master know how beyond lecture points and application exercises on the job or in the contexts of laboratory and/or workshops

The University will apply a competitive learning process to maintain the minimum standard of intellectual rigor and to challenge students to the use of their minds and time. The University will put in place a setting that enables self learning and comprehension replacing the tradition of rote learning and preparation just to pass examinations.

Partial view of the male campus.

•The programming of cultural and recreational activities within the campus will serve as means to constructively vent energies and develop inter personal and social skills. Student activities shall be programmed with developmental outcomes in mind and collegiate experiences will be designed and managed in such a way that they facilitate the growth process in the physical, mental and psycho-social aspects of human development.

•Every effort shall be exercised to minimize the negative distractions that confront students outside of campus so that desired levels of energy, purpose driven life, concentration and motivation are maintained for the best of outcomes in educational and developmental attainment. With the strategy setting clear expectations for students and the kinds of impact that each staff member is expected to register in enabling student achievement, the University shall engender productive and positive working relations between the staff and the student.

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Wollo University

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WOLLO UNIVERSITY

Background and Establishment

Wollo University is one of the federal universities built among a group of 13 universities in the country. Being located in the South Wollo Zone of the Ambara State, the University is designed to be a center of learning and research in a wide range of fields to meet the growing demand of trained manpower. The foundation stone of the university was laid on May 3, 2005 (Miazia 25, 1997EC) by H.E. Wro. Genet Zewdie, the then Minister of Education. Initially, the University was named Dessie Kombolcha University, which started operation on February 19, 2007 with 760 students. This name was later changed to Wollo University by the Board following an affirming survey.

ወሎ Wollo ዩኒቨርሲቲ University

The New main gate of the university.

The University is at the center of an area characterized by archaeological, anthropological and historical achievements and diverse ethnic and religious people groups known for their harmonious coexistence. The area has also featured rich cultural and literary traditions and accomplishments as, for instance, four of the country's musical notes were known to have originated.

The University has two campuses, the Dessie Campus of 72 hectares within which the main office is located and the Kombolcha Campus of 47 hectares located in the City of Kombolcha some 26 kilometers south east of the Dessie Campus. During the 2011/12 academic year for instance, both campuses hosted 9,570students in the regular program; 3,054 students at night and 3,926 students during the summer school.

The 3.25 Kms Asphalted road (under construction.)

Having no less than 44 undergraduate degree programs, working on establishing graduate studies in a number of fields and opening up branches in some of the neighboring towns, the University is positioning itself to be an outstanding educational institution in an area of considerable population confluence and business opportunity.

Dessie, having a population of no less than 250,000 and tucked in the Ethiopian highlands of 2,500 meters in height, is a commercial hub serving some seven of the city and of the area. Since 2011, the Kombolcha Campus has developed its own uniqueness, complexity and potential beginning to play its strategic role in the evolving industrialization area. Owing to this standing, the Ministry of Education designated as the Kombolcha Institute of Technology. As this niche increasingly became a source of strength, as high a number of students began to enroll in the

The 7th Nations' & Nationalities day.

institute posing increasing demands for changes in leadership, managerial attention. On account of this natural development, the Board decided to restructure the university in terms of the two campuses with each running its own business with relative autonomy under the guidance and oversight of the main office of the University.

Academics Units and Programs

In Dessie campus five colleges, two schools and one institute are found. These are: College of Agriculture, College of Business Education, College of Natural Sciences, College of Medicine and Health Sciences, College of Social Sciences and Humanities, School of Law, School of Veterinary Medicine, and Institute of Teachers' Education and Behavioral Sciences. Whereas, Combolcha campus, which is the home of Institute of Technology comprises two Colleges namely College of Engineering and College of Informatics.

As far as post graduate program is concerned, the university has already opened five programs and address its education in the country in general and in the area in particular. Thus, the Post Graduated programs which are dispatched in last year and in the current year are; Masters in TEFL(Teaching English as a Foreign Language), Masters of Public Health, Masters in Agricultural Economics, Masters in Business Administration, and Masters in Biology.

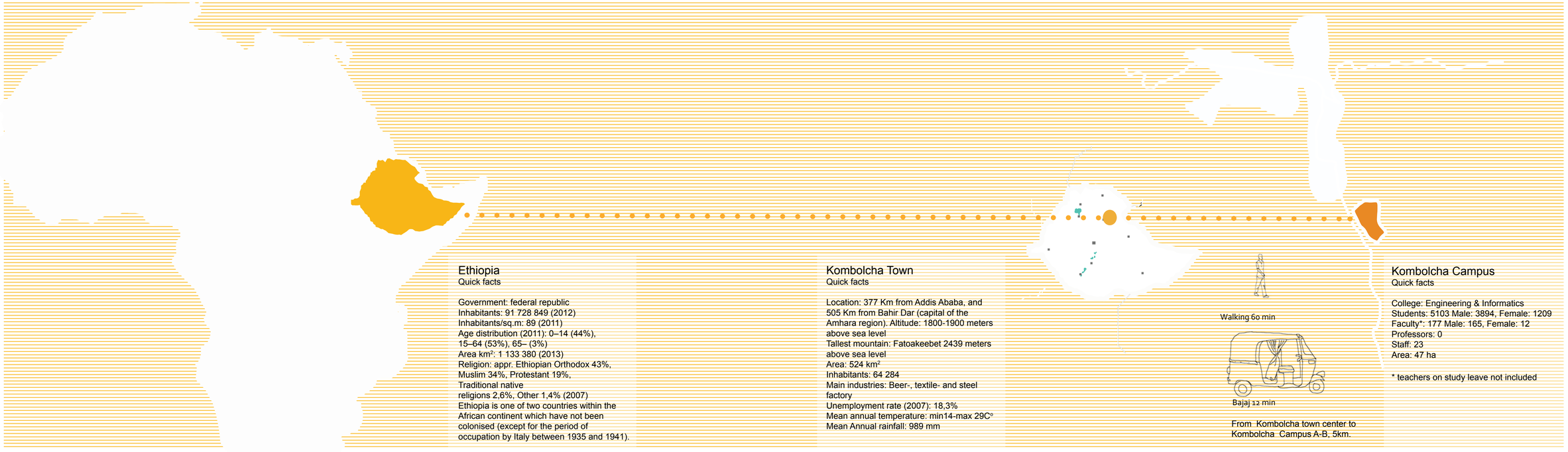
Statistical facts

Currently, the university is hosting 10,642 students in regular program,2029 students in the Extension program,5531 in Summar, and 265 students in Post graduate program(i.e.the number of post graduate students includes regular, continuing and summer programs).

In line with this, the university contains 692 Academic staffs, i.e. 549 in Dessie campus and 143 in Combolcha campus. This number includes those who are in study leaves. Besides, 694 numbers of Administrative staffs are working in both campuses as contractual and permanent level.

Wollo University

-Broschyr Wollo University, external & public relations office. (hand out 2013).



Ethiopia
Quick facts

Government: federal republic
Inhabitants: 91 728 849 (2012)
Inhabitants/sq.m: 89 (2011)
Age distribution (2011): 0–14 (44%),
15–64 (53%), 65– (3%)
Area km²: 1 133 380 (2013)
Religion: appr. Ethiopian Orthodox 43%,
Muslim 34%, Protestant 19%,
Traditional native
religions 2,6%, Other 1,4% (2007)
Ethiopia is one of two countries within the African continent which have not been colonised (except for the period of occupation by Italy between 1935 and 1941).

Kombolcha Town
Quick facts

Location: 377 Km from Addis Ababa, and 505 Km from Bahir Dar (capital of the Amhara region). Altitude: 1800-1900 meters above sea level
Tallest mountain: Fatoakeebet 2439 meters above sea level
Area: 524 km²
Inhabitants: 64 284
Main industries: Beer-, textile- and steel factory
Unemployment rate (2007): 18,3%
Mean annual temperature: min14-max 29C°
Mean Annual rainfall: 989 mm

Walking 60 min

Bajaj 12 min

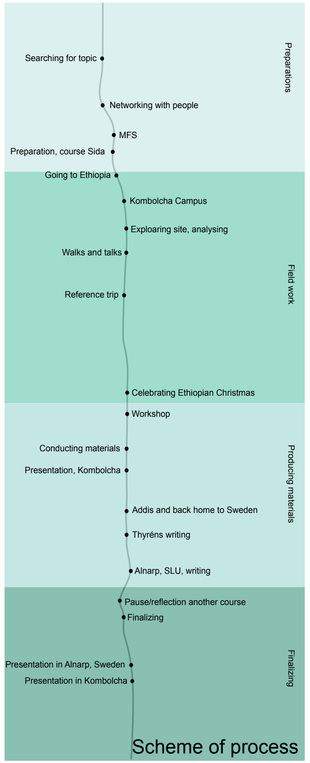
From Kombolcha town center to Kombolcha Campus A-B, 5km.

Kombolcha Campus
Quick facts

College: Engineering & Informatics
Students: 5103 Male: 3894, Female: 1209
Faculty*: 177 Male: 165, Female: 12
Professors: 0
Staff: 23
Area: 47 ha

* teachers on study leave not included

Geographical context of Kombolcha
-Quick facts



Perspective from Wollo University

Wollo University has a vision which concerns both "branding" of the University, as well as creating proper physical structures. One vision for Wollo University and the Kombolcha Campus in particular, mentioned by the present Scientific director of Kombolcha Campus is, *"to make the Kombolcha Campus site attractive to the public"* (Masresha, M. oral, 2013-12-10). When communicating with one of the consultants for the University, GIZ, thoughts regarding how certain places can be developed for different types of usage were expressed. More specific ideas, which were expressed by the consultants, were that our contribution could include activity areas, recreational areas, pathways as well as meeting points (Tamrat. oral, 2014-01-10).

Interpretation of the assignment

The motivation for this assignment is a need to analyze, interpret and provide a suggestion for further development of the outdoor environment at Kombolcha Campus. The interpretation of the assignment is as an overall planning and design project. We aim to contribute with new perspectives, inputs, material and inspiration as well as visions for the site.

Situation and point of departure

For the entire campus there is an existing master plan. This master plan sets out the large scale structures such as: buildings, roads, pavements, lighting, fencing and larger ditch constructions. In contrast we have not come across any set plans containing small scale solutions and detailed constructions such as plans for outdoor sitting areas and planting schemes. Expressed by the consultant firm for Wollo University, GIZ, the detailed scale is not yet set. *"The Campus is not finished and is still under construction"* (Seman, A. oral, 2014-01-29). Neither is there an extended plan combining green structures together with the Master Plan for the built structures (Masresha, M. oral, 2013-12-10). When investigating different areas and communicating with the head gardener at the Campus, it was for instance highlighted that there is no collaboration between the planting team and the team of road construction. The result of this has meant unnecessary work and time spent. On some occasions, lack of communication has meant that trees have been planted where later a road is established. The trees are then embedded or removed (Endaloumaw, D. oral, 2014-01-06).

There has been work carried out and suggestions given which concerns how to prevent future flooding at the campus site. However, the financial situation is still a dilemma. So far there has been restoration of the main library which was damaged by flooding in the summer of 2013. It was overcome by around 1 meter of mud carried in by the flood water of the gully. At site there are also new constructions going on. However, a big part of the construction already built and planned to be built are in one way or another, threatened by the flooding and erosion issues at the site. We state that the prevention of flooding needs to be dealt with before continuing and starting up new constructions.

From the perceived situation it can be stated that a Design program must concern different scales, and will need an overall framework. Firstly, at the larger scale, there is a need for prioritization which focus on what to construct next and in what order, as well as an extended plan accompanying different functions at site. Secondly, at the smaller scale, there is a need for detailed spatial planning in the outdoor environment, followed by a careful time schedule for when to design and arrange the different areas, according to the building and construction works.

Objective

The objective for this Masters thesis is to contribute with a planning and design tool for the outdoor environment at the Kombolcha Campus Site. The main purpose is to conduct a program which supports the development of a well-functioning and spatially defined campus. The document aims to contribute approaches and plans as well as serve as inspiration for an improved study/work environment, living area, for students, faculty and staff.

Main research question:

In what ways can the interaction and the resources; water and vegetation, at Kombolcha Campus site be supported and developed?

Ethical position

"The whole process of reasoning and the giving of reasons, what we think is important and how we think we should express this and validate our reasoning claims, is grounded in our cultural conceptions of ourselves and our worlds." (Healey, 1997, p. 51)

As Landscape Architecture students at SLU we are educated within the scope of a western context. We carry with us the experiences of being brought up in a western country. From this we receive empiric experiences and embedded knowledge influencing our way of interpreting our surroundings. In order to achieve as wide an understanding as possible, the framework for this thesis is conducted through a pragmatic approach. This means that a mix of methods have been used in order to grasp the area and also better understand the cultural context of Ethiopia. We have aimed to take a site specific approach, directly related to the location of the Kombolcha Campus of Wollo University in Ethiopia. We state that it is crucial to employ a site-oriented approach and find solutions suitable for each condition and position at site.

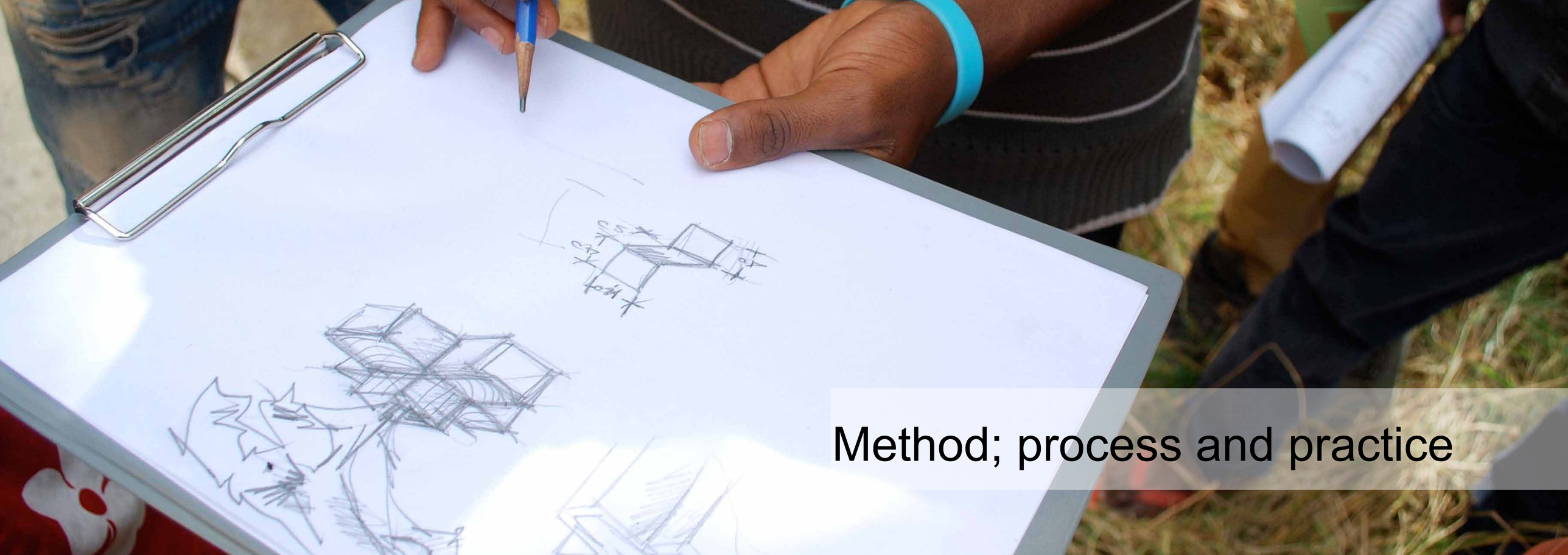
An influence for this work has been to go from general high-tech solutions to more simple solutions adapted to each site, by building on existing local and historical knowledge. This shift is also an ongoing trend in Sweden and other European countries. As an example, cities in Sweden and Europe have started to remodel their storm water systems, from closed channeled systems to open visible channels (Stahre. 2008).The main reason to do this is to recreate the natural flow of water. It has been found that this is a more sustainable way of dealing with water. This way of thinking makes it is possible to incorporate function with recreation and aesthetics. A cornerstone is to first search for solutions onsite, using embedded knowledge and simple solutions. In Kombolcha it can mean using the knowledge from, for instance, the surrounding farmers or the faculty and staff at campus. Simple and cheap solutions adapted to Kombolcha can be made instead of using technically advanced turnkey solutions at a high initial cost as well as incurring expensive maintenance costs.

Limitations

This Masters thesis and Design program will include a general master plan and approaches concerning how to plan for and work with features like; water, vegetation and placemaking to reach long term solutions. Prioritizations in terms of phases will be suggested and examples of implementation will be given. Concepts and suggestions of how to treat different areas will also be included as general examples. The solutions and general examples will be kept in a flexible manner. The purpose of this is to be able to adapt a solution to various places and situations at the campus.

Other issues which need to be taken into consideration, are the sanitary- and sewage issues. The problems here are manifold and diversified. There is a lack of water, the total number of toilets is not sufficient, the quality in terms of building materials and design is poor. Aware of that, this subject will be mentioned but not further treated in this paper, as it is beyond our capacity and there is existing expertise within this field at site.

Another crucial aspect which needs to be considered is the economic constraints. A limitation for Kombolcha Campus is the restricted budget (Dr. Balcha, oral, 2014-01-31). Awareness of the limitations within the economic situation has been considered when deciding how to develop this thesis. Site oriented simple solutions using knowledge and materials from the surroundings are therefore prioritized. As an example: within the proposal of how to treat the gully, a recently formed seasonal water course of significant size, we have searched for cost efficient and simple solutions instead of technically advanced turnkey solutions with high initial costs and recurrent maintenance costs. However, calculations for any material or construction costs will not be included in this paper. Firstly, it is due to the limited knowledge and access to information concerning costs of materials and reasonable prices for contractors in Ethiopia. Secondly, these decisions would require taking part in discussions not available to us. *"Action and funding for this project requires decisions from the board and politicians"* (Dr. Balcha, A. Oral, 2014-01-31).



Method; process and practice

Methods general

Geographically this Masters thesis is delimited to comprise the specific campus site situated in Kombolcha. The thesis is built from an empiric perspective, meaning that it is built on experiences and through observations based on our surroundings (Patel and Davidson, 2003). The work includes explorations and findings uncovered during the research and preparation time, subsequent follow-up and the final generation of this thesis. The specific design proposals, solutions (both general and specific), are derived from the outlined context.

In the book *Development Fieldwork a practical guide*, Scheyvens and Storey describe the risk of “academic tourism” when carrying out fieldwork in developing countries (2003, p.2). From a three-day workshop prior to the field-trip organized by Sida, Swedens largest aid organisation (Sida, 2013), we brought with us extended views upon communication. Verbal interaction is just a small part of what is communicated in meetings with other people. People express themselves through haptics - touch such as handshakes, proxemics - space and territory, semiotics - symbolism eg dress code and status, and many more. This relations are described through the symbol shown on p. 21 (Sida, handout A, 2013-10-02). With this in mind, we have noticed the importance of an open minded approach, being engaged with people; both through interviews, and conversations but also socializing and sharing experiences and thoughts. Focus has been laid upon how to strengthen the study environment and make Kombolcha Campus functioning and attractive environment. Effort has been laid on students and their perspective in particular.

Throughout this Masters thesis and the related fieldwork a qualitative approach has been used, in order to develop site-specific planning and design for the Kombolcha Campus. During the Sida-led workshop the discussion about externally driven projects or collaborative projects was brought up.

To a large extent the latter is the contemporary way of thinking and working, in other words working context-relevant projects and programs developed jointly with people at site instead of implementing pre-planned/pre-determined programs (Sida, hand out b, 2013-10-02). During the field study, occasional and unplanned interactions became vital. This required an open mindset as well as a flexible attitude regarding planning, a useful way of working and thinking throughout the thesis work.

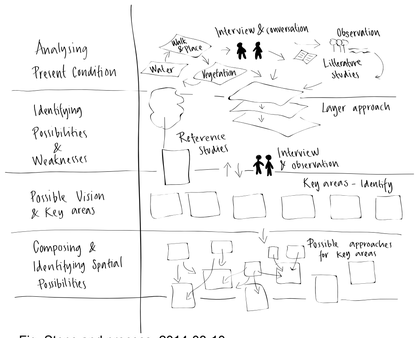


Fig. Steps and process, 2014-08-10

Mapping and drawing

Different kinds of mapping have played a major part of the work at site. Different kinds of information have been collected regarding; movement, gathering areas - nodes, house use, house levels, vegetation, storm water, flooding areas, erosion, light/electricity and the closest surrounding area. The mapping has been conducted by us but also performed with help of students of KiOT. This mapping is dealt with here as interviews. This method will be presented under the sub-header “Interview and conversation”. In order to capture the spatial environment, sketches, drawings and narratives are important tools when trying to understand a place. Through this we can reach a deeper and wider understanding of a place (Hasibul Kabirand, 2012; Jakobsson, 2000.). We believe that Khondaker Hasibul Kabirand has a point when he, in the article: *Why is drawing important to research?*, states that drawing and sketching helps him as a designer to, see, understand, visualize and make relationships (2012). These methods have together created a foundation for analyses and conclusions based on more generalized knowledge and a more full scale understanding. Also 2D drawings, models in 3D and photographs have been used. Latest version of maps and CAD-drawings of the Kombolcha Campus.

Interview and Conversation

Through out the whole site-based research, mainly three types of interviews have been used: semi-structured, open/conversation and conversation over maps. When meeting and conversing with people a more nuanced understanding of how people look upon their campus area emerged. For instance we gained a much deeper insight into how the campus is used and what needs there are. The interviews conducted have followed semi-structured and qualitative strategies. A qualitative and semi-structured interview method has been used with the purpose of encouraging people to tell their own story with their own words. This is a method often used in the Social Sciences (Patel and Davidson, 2003). In addition open interview approach was used in this research which can be interpreted as a conversational way of gathering information (Ibid).

Another Masters thesis concerned with the same kind of topic, conditions and questions as this current study has been carried out by Hedlund and Wejbro (2012) at the Dessie Campus of Wollo University. In that thesis Hedlund and Wejbro argues for an approach or motto which they call “Go with the flow”. It basically aims for flexibility and deeper understanding by letting input and events influence the project. This is an approach affiliated to visiting an area and getting involved with people.

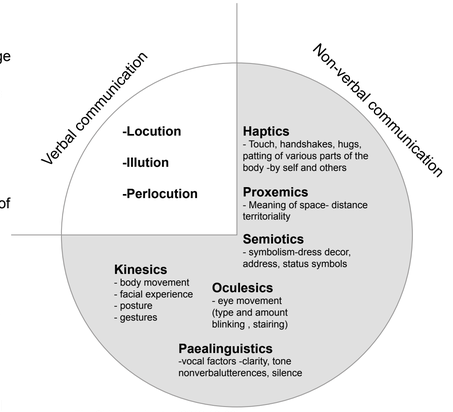


Fig. Sida, hand out a (2013-10-02)
Freely interpretated from Alex Mugai 2013-04-05.

Conversation over map

The method which here is called “conversation over map” has been carried out with the help of a map covering the campus area. Two differently coloured pens are used, one for the interviewer and one for the interviewees, who are current students at KiOT, in order to keep track of who was drawing or commenting on what. When employing the “conversation over map” method the interviewer initialised the interview with a question, as well as a brief explanation of the map. The students were asked to comment about how they use the area in and around the Kombolcha Campus, as well as to point out and draw on the map. Thereafter the interviewer mainly stayed passive, only asking additional questions to prompt further explanation or to bring up a new topic when one started to fizzle out. This type of mapping turned out to be an efficient tool to start discussions between students, bringing up both positive and negative comments and thoughts about the area in question. It gave the opportunity to receive input and thoughts connected to specific locations. It also became a tool to confirm previous knowledge or achieve new inputs.

The conversations were conducted with female and male students both individually and in groups. All students were within an age range of 19-26 years. The groups were separated by sex. Two different sessions were conducted. One was with a large group of approximately 14 male students and the other with a group of 7 female students. The reason that the conversations were separated by sex was the fact that most students were hanging out separately and in mixed groups girls tend to stay quieter. A second reason was that more male than female students were approaching us, therefore we had to approach more female students. Culturally, girls are less assertive than boys, and wait to be approached and asked.

Walking tour

Mapping in terms of guided walks of the campus have been carried out. From these we gained information and valuable discussions took place during the walks. Two walking tours were conducted. The focus for these walking tours concerned water and flooding issues and vegetation on and around site. The first walking tour (2013-12-10), concerned the gully and flooding issues, was arranged by and took place with Assamenew, 5th year civil engineering student. He has provided documentation and a study, prepared by him, concerning the gully and flooding. The work includes research and possible solutions to the flooding issue. The water-walking tour gave site-specific awareness and a more detailed knowledge, a helpful source of information connected to the area.

The second walking tour focused on vegetation, and was conducted with Solomon Melaku, a teacher and PhD candidate at the forestry department at the Dessie Campus of Wollo University, (2013-12-25). This walking tour enabled identification of all kinds of trees planted at the campus site in Kombolcha. Further we identified common trees growing in and around Kombolcha town. This walk and contact, together with the book Useful Trees and Shrubs for Ethiopia (Bekele-Tesemma, 2007) created a good base to understand and get to know the vegetation in the region better.

Observation and participation

The field study has included continuous daily observations and almost daily action-orientated observations. The action orientated observation as a method is, according to Mikkelsen (2005), favorable when trying to gain a greater understanding of a particular field. Our first thoughts of observing, were to accomplish the observations by residing in the periphery and from there observe a sequence of events taking place. However, this became difficult at spot. We became part of the situation and observed instead of being the observers. This is one of the reasons why an open and interactive, participatory approach became more suitable throughout the research. This has in turn led to the importance of occasional and unplanned interactions.

Workshop

In order to exchange knowledge and understanding as well as achieve examples of more site specific thoughts from students about their study and living environment a workshop was arranged. The aim was firstly, as mentioned, to exchange knowledge about outdoor use of space and secondly to see how students interpret their everyday environment. When working with workshops it creates an understanding of a certain area. It both deepens the theoretical knowledge and involves the participant, which in turn creates a feeling of belonging to and responsibility for the area. As stated by Banning and Cunard:

“In fact, the likelihood that a campus design will meet the needs of the community may be a direct function of the extent to which community members participate in the design process.” (Banning and Cunard,1986, p. 3)

Further the authors highlight the learning opportunities for the students.Through workshop students get the chance to work in a group dynamic manner of give and take. It also creates the chance to participate in leadership positions. This means that being a part of a participatory process, when designing or redesigning, supports the development of critical and analytical skills.

Workshop - “Create spaces for sitting areas in the outdoor environment”

A one-day workshop was planned for second year architecture students. The workshop was carried out on 2014-01-01, with twenty-two students participating, divided into 4 groups. The task was to create a space for sitting, scale 1:1, within the campus area. The students were allowed to use existing materials from the site, waste materials from construction as well as some optional materials handed out, such as string and nails. The guidelines given were; a list of keywords (every group were supposed to choose one), presentation parameters and a time limit. At the end of the session every group presented their work including the, planning process, their choice of location, materials used, the purpose of the area and description of the prospective user and discussion of how the space will be used. See Appendix: Workshop

Study visit

Another method used has been to make study visits. Through the study visit at Amhara Development Association (A.D.A. an organization working with a wide range of development projects around the Amhara region), Kombolcha Agricultural College, and Green Mesk Farm (a nursery, plant breeding centre and market garden) new knowledge was gained such as information regarding plant cultivation, establishment, growth and habitus for indigenous species as well as exotic ones. The visits also contributed with examples of combinations of trees and shrubs, planting and agro forestry systems appropriate to the Kombolcha area. Visiting Green Mesk Farm became a great inspirational source, since it occurred as a green oasis in the otherwise more or less dry environment of Kombolcha.

For landscape architects another well used method is to look at reference sites (Creswell, 2009). For us it meant different campus sites in Ethiopia. Through reference sites new insights about design and planning can be gained. In a new context it became an important component, both for understanding and for interpreting as well as for inspiration in the continuous work.

Literature

An interdisciplinary literature study has been conducted. It is based on published articles, books, documents and handouts. Articles and books have mainly concerned the field of architecture, landscape architecture and planning. In addition, literature from the field of engineering, in terms of water and land management has been included. Similarly literature connected to the environment concerning all matters of research, education, innovation and creativity has been examined. In order to find facts and information directly related to the campus, Kombolcha Town and its context, documents and homepages from Kombolcha municipality as well as from Wollo University have been used. Local Ethiopian sources about trees and plants have been consulted.

Methodological reflection

Open interview

The choice and type of interview became adapted as a result of the local situation. For example it was hard to conduct spontaneous interviews with one person, at a time, as more people would always be joining the conversation. This spontaneous involvement is characteristic of the local cultural norms and different attitudes and understanding of concepts of privacy and personal space. The risk with such a type of interview is the fact that people may influence each other when answering. In the local context the open interview method is - both a challenge and an opportunity. Another challenge has been to converse and interact with an equal number of female and male students,faculty and staff. One reason for this is the fact that the number of male students,faculty and staff is much larger. The social and cultural context have also had an impact. Beneficial aspects when using the conversation/open interview is that it allows the interviewer to be free and spontaneous. It also opens the possibility to elaborate with questions and adapt to the current situation. On the other hand it is a challenge to keep track, remember and take notes. Open interviews are also a more difficult task when it comes to evaluate and compare both questions and answers.

Just as we were interested to know their opinions and experiences, most students, faculty and staff were equally interested in asking us questions about our task and our opinion of the campus. In the beginning we tried to avoid giving generalized answers and instead focused on asking them questions in reply. After some time we realized that their answers became different if we also answered the questions they had asked. We experienced the answers, in the dialogue created, to be more direct, honest and thoroughly expressed. See, Appendix Talk & Interview

Interview and conversation

There have been a larger number of males, comparing to females, participating in the interviews and conversations. This has had an effect on the outcome and analysis when looking at how the campus is used and interpreted. The fact that males have been overrepresented has been taken into consideration. Nevertheless constant attempts to create an environment which can suit males as well as females have been made throughout the work. There are different reasons why interviews and talks with male students, faculty and staff have been overrepresented. Firstly, the total number of male students, faculty and staff is higher compared to the female number. Secondly, a larger number of males were approaching us. Thirdly, interviews and conversations often were conducted spontaneously. When conversations and interviews were conducted with female students, it often needed to be at our initiative.

The method: “Conversation over map” became a useful tool during the inventory process and for the development of an overall understanding. It turned out to have several advantages. Firstly, the map created interest and became a focal point which led to a more relaxed interview. Secondly, the map became a more precise base for discussion and it reduced the risk of misunderstandings. Thirdly, it helped organizing, in terms of letting one person speak and draw at a time. It also became helpful when summing up and analyzing the interview. Hence there are some more negative aspects as well. Dealing with interviews in this manner makes it difficult to know who is stating what and how many persons are expressing his or her point of view. As mentioned earlier, the fact of interviewing several people at once, the influence of thoughts or beliefs might be affected. At the same time though, the thoughts expressed by one student can create a spin-off, triggering someone else to express or develop a new thought.

Literature

There is a lack of information in written sources about campus sites in general. The literature found, has been based on a western 21st century perspective. It makes all the generalizations and “truths” less reliable in an Ethiopian context. It is also important to take into consideration that there is a lack of research based upon newly established campus areas. Even fewer sources about universities in an Ethiopian context have been found. Therefore our own impressions and gathered information from site, have been of greater importance.

Western perspective

When conducting the field study cultural aspects have played a central role for the understanding and interpretation of the environment of Kombolcha and its campus. Many theories in the field of Landscape architecture have a western approach and it is, in some cases, hard to apply these in the Ethiopian culture and environment. Literature and perspectives of Landscape architecture in Africa in general and Ethiopia specifically is very limited. On the one hand the use and the reading of the outdoor environment is to a certain extend different in this context. On the other hand, within the globalizing world we live in today, there are cultural equalizing forces both through media, internet, increased traveling an intercultural meetings and a growing research arena which changes ideas, ideals and beliefs. It can though be argued to what extent this has an impact of the day to day life at Kombolcha Campus. These are subjects, preferences and beliefs, hard or impossible to categorize and uniform between parts of the world, countries or even within a country. Therefore it is of importance to look at the site and specific parts of a site to reveal what can be preferable and needed since every place is unique.

Observations

Throughout the initial observations in the research we ourselves became “the situation” or “the object” in a location. Therefore many observations of a specific place, location or phenomenon had to take place from a distance. Through this practice we might have lost detailed information of a specific incident or event. However, the problem associated with not being a part of a situation in observations, led us to a work in the opposite manner, by taking an active part in participatory observations. This might have affected the outcome of the observations; however, the frequent interactions have been helpful in order to get a better cultural understanding. In addition it became important to see how people move and interact at different places and times during the day. The participatory observations often gradually, or rapidly, changed into open interviews or conversations. Sometimes it was therefore hard to distinguish the different research techniques one from the other.

Linguistic

Communication: In terms of gathering information, certain limitations have been encountered when it comes to communication. In the campus environment there is variety of students from different regions around Ethiopia, with different native languages. In Ethiopia English is taught as a second language, which also influences the spread and the level of speaking of the English language. During the project English has been used, due to the fact that our skills in Amharic are very limited. This means that the level of language skills have been a barrier in some situations. The linguistic impact has affected the group of people we have been in contact with as well as the outcome of information and interpretation of interviews and talks. However, in order to gain a correct understanding, many people have been asked the same types of questions and asked to spot similar characteristics, types of places, problems and advantages.

Universities and Campus sites

Campus sites in general

Definition

A campus site usually includes; libraries, lecture halls, student centers, parks, sports arenas and residential areas (Dober, 2000). In general a campus can be defined as a gathering of buildings related to a specific purpose and an academic institution. *“A Collage and a University environments are places with a special purpose: student learning.”* (Strange and Banning, 2000).

Every university has its own expressed vision. Generally they all strive to be an environment in which people can develop and where knowledge grows. According to Juul and Frost Architects, the development of a campus area depends upon the universities physical context and the academic profile that it holds (Juul, 2012). Wollo Universitys’ vision reads: *“Wollo University aspires to a national recognition of excellence and performance in teaching, research and service.”* (Wollo University, 2014-02-24)

From historical to contemporary University design & planning

Within a historical context universities have been a reflection of contemporary society and academic philosophical spirit, all expressed in different architectural and symbolic icons. Every era’s needs are also expressed in the architectural style of a research environment. At the end of nineteenth century there was a clear boom in the building of universities in Europe. During this century new trade had led to flourishing welfare and an increased membership of a developing middle class which in turn gave rise to an escalating demand for higher education. During this time in America many universities started to consider themselves almost as cities.

We see terms like *“City of learning”*, which is in line with the trends for urban patterns and planning, where people more and more moved into the cities (Coulson et al, 2010). *The University of California was chartered in 1868 and its flagship campus — envisioned as a “City of Learning”* — was established at Berkeley, on San Francisco Bay (Berkeley University, 2014, [2014-03-22]). Every era and society, its traditions and fashions, will influence expression and design within research environments.

When it comes the contemporary design and planning of universities, a fairly new danish survey conducted in 2012, by Helle Juul, Architect and researcher, states that the way of planning campus sites today focuses on spots for people to meet. In such way it can be seen as a new role of campuses; *“In the future, campus areas will become increasingly interdisciplinary, so different faculties will create a vibrant educational environment. New professional hybrids will emerge and they will result in yet unseen combinations of study programs that thrive on different methods and approaches.”* (Juul, 2012. p.1) Furthermore, the survey states that a university, in its whole, is much more than just a place for gaining new knowledge and to develop critical skills and consciousness. The reality of a university is also about development when it comes to meeting challenges in a social context. A great deal of thinking and development of new ideas have their breeding ground when and where human interaction takes place. The phenomenon of creativity is said to be rare in formal rooms created for learning purposes, instead it has a higher potential to flourish in open places where people interact and meet in a more spontaneous manner. This is what the survey defines as meeting places - places where both formal just as informal meetings can take place (Juul, 2012). The usage of campus sites varies around the world as well as from site to site; however, it normally includes facilities such as libraries, lecture halls, offices, cafes, areas for living, sports and park/recreation (Dober, 2000).

Universities and Campus sites in Ethiopia

Strategy for higher education

In the beginning of the 19th century the first schools in Ethiopia were founded by missionaries, the majority of them from France, Italy and Sweden. The investments continued when Emperor Haile Selassie came to power in 1923. This progress came to an end just over ten years later during the Italian occupation (1935-41) when about 70 percent of the higher educated people were killed. Thereafter the educational system had to be rebuilt, under the supervision of Haile Selassie (Cornell, 2004). In the 1970s the educational system again was harmed again, this time during a period commonly known as The Red Terror following the communist coup led by Soviet in 1971(Ibid). In 1974 Haile Selassie was then deposed by a military junta, the Derg, led by Mengistu Haile Mariam (Gish, 2007). After this the educational system once again started to be built up.

During a short period of time, in the beginning of the 21st century, the government invested in building 13 new campuses for higher education in various parts of the country. Wollo University’s, Dessie and Kombolcha Campuses are two of these, established in 2006-2007 (Wollo University official homepage, 2014, [2014-06-01]). On the official homepage of the Wollo University website the main reason for this initiative is stated:

> *“Within its overall plan of alleviating wide spread poverty, Ethiopia aims to become a middle level income country within a short period of time, but there is a shortage of skilled professionals. To further ensure sustainable growth, improve livelihoods so that we can take our place in the global economy, we are looking to build our capacity in order that we may, in future, be able to train up a large number of quality graduates in various disciplines.”*
> (Wollo University official homepage, 2014, [2014-06-01])

In line with the expansion of higher education, the number of students has also increased (Audensen, Gulliksen, 2013). Today the number of students in higher education is rising. The number of male students remains higher than for females and during 2011, male students in Ethiopia were 3 times as many as the female students (Landguiden, 2013-10-27, [2013-11-20]). It is likely that the possibilities for education need to expand since the pressure and need of education is expected to rise. Approximately 4 out of 10 Ethiopians are under the age of 15 years. (Landguiden, 2013-10-27, [2013-11-20]; NE, 2014-06-15, [2014-06-15]). The program of “Higher Education” is developed in order to reach a higher social and economic development. According to the Ministry of Education in Ethiopia, higher education is provided by universities, university colleges and specialized institutions (MoE, 2002, [2014-02-19]). It is argued that the rapid expansion and quantity of universities in Ethiopia, both in the public and private sector, have made it hard to secure good quality within the higher education system (Ashcroft. Rayner, 2011; Landguiden, 2013-10-27, [2013-11-20]). The number of staff at the universities has increased in line with the expansion of universities. However, 70 percent of faculty in the new public universities lack post-graduate qualifications; the bachelor level of degree is the most common one that has been achieved by members of faculty. The expansion of higher education has been realized through a significant budget supported by donors. Even with this support included, it is stated that the system of higher education is underfunded and there is a shortage of resources for libraries, equipment and other supplies (Ashcroft. Rayner, 2011).

Visiting universities in northern Ethiopia

During our stay, eight universities (Kombolcha Campus not included) were visited. The aim was, firstly, to gather information and gain a greater understanding of campus sites in Ethiopia; how they are constructed, planned, used and developed. Secondly, the visits were conducted in order to get a better picture of how the system of higher education is expressed in physical structures and campus design. The reference trip was limited to five days, with visits to four bigger cities within two regions in the north part of Ethiopia - Wollo and Tigray were visited. In addition to this, one university in Addis Ababa, the capital, was visited.

Five of these eight universities were established between the 1950-1970's; Bahir Dar University Engineering Faculty, University of Gondar, Mekele University Arid, Mekele University Ad Haki, and Addis Ababa University EiABC. The three remaining campuses are newly established, around 2006-2007; Debre Tabor University, Woldia University and Wollo University in Dessie. The later ones are all part of the plan for higher education, mentioned in the previous chapter.

There were several differences from site to site, from location differences, topographical position, climate conditions, to number of students as well as educational programs. One direct difference was the standard and the development of the older campuses compared to the ones recently established. The older universities had a wider range of architectural variety and detailing, site specific materials such as cobble stone and colors. Another difference was the often rich vegetation at the older university sites, especially in Bahir Dar since the climate there is beneficial for plants. The vegetation was often mentioned by people as a positive and important aspect, enriching the campus. The vegetation at these universities helped to reduce the scale of the big building complexes; it created shade and shelter as well as served as meeting points. It created recognition and helped distinguish one area from another. Vegetation can however be a problem when it comes to the feeling of security during hours of darkness, especially if there is a lack of light. This was not investigated further during our stay at any of the campus sites but will be brought up and discussed further on.

One clear observation made from these visits was that those universities created during the period between 2006-2007 where based on the same building typology. The biggest difference was created by the terrain at each location, affecting the placement of these buildings in relation to each other. The new universities did suffer from a lack of bins and an overall waste management. In contrast the older universities were more or less free from waste material on the ground and different kinds and sizes of garbage cans were placed generously at various points. There was also a shortage of water supply and electricity. Some of the newer campuses had made more progress when it came to installations of water tanks and electricity generators than others. But they can not be compared with the older universities. One explanation or fact which has to be taken into consideration is that the newly established campuses are all located outside a more dense city area while the older campuses were situated and related within bigger cities.

The visits at the different University sites led to different insights but first and foremost it gave inspiration for further development possibilities for the Kombolcha Campus.


Gonder


Bahir Dar


Debre Tabor


Woldia


Mekele


Addis Ababa, EiABC


Mekele


Bahir Dar


Addis ababa, EiABC

Gonder University

Debre Tabor University

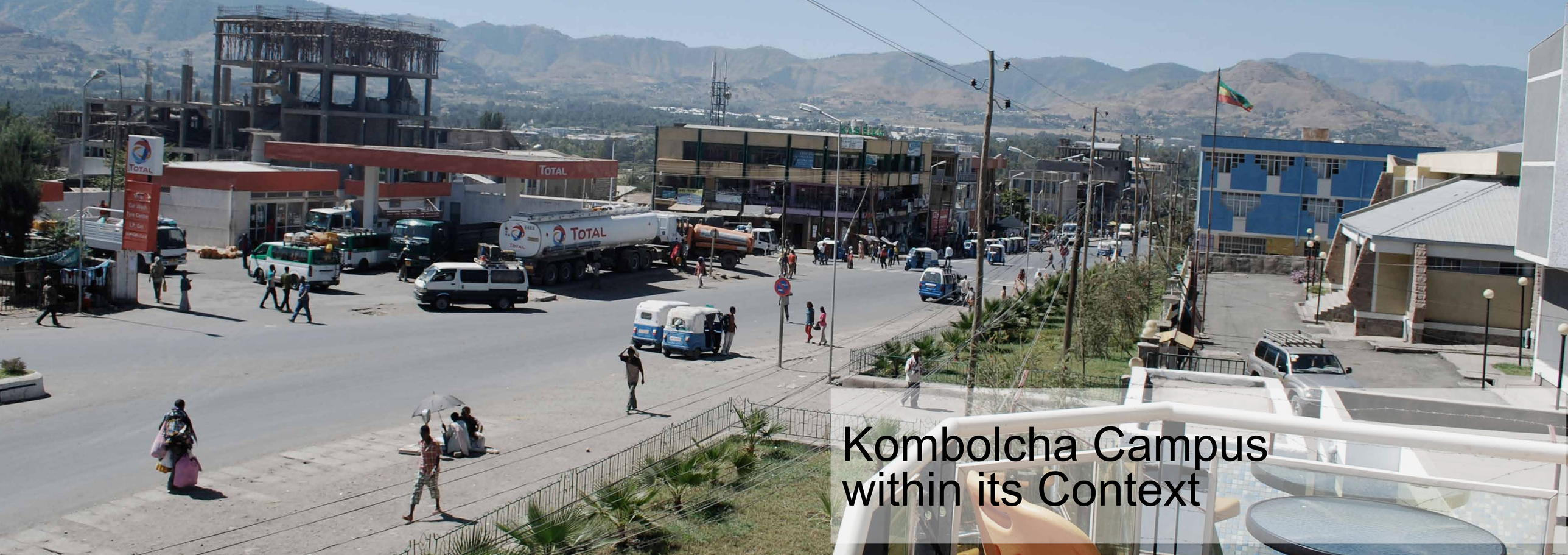
Addis Ababa University
EiABC

Bahir Dar University
Engineering Faculty

Mekele University
Arid, Ad Haki

Woldia University

Wollo University
Dessie



Kombolcha Campus within its Context

"Many people appreciates Kombolcha, when driving by it's a common place to stay for food or coffee, it has so nice plantations and trees all the way along the main road." (Rayan 2014-01-29)

Landscape traits of Kombolcha town

In the areas surrounding Kombolcha, mountain ranges create a dramatic view and feeling of enclosure. Kombolcha town lies in a depression between two mountain chains. The land use in the area mainly consists of agriculture, situated from the valleys to high up in the mountains. Terracing is a common system for cultivation. In the higher altitudes the bedrock is often revealed between the compact layer of silty, loamy soil and sparse vegetation. Together these characteristics create a landscape scene of dusty, red-brownish colored hills covered with clusters of green vegetation.

"(...) an industrial and commercialized centre of some substances in its own right". (Briggs, 2005)

Kombolcha is described in books as a more industrial town and an important town when it comes to infrastructure, not least because of the airport providing traffic for South Wollo. Most of the dwellings consist of one storey houses.

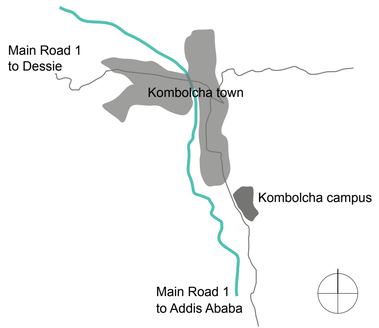
Within the town centre the architecture differs from the dwellings and buildings have several levels between 2-6 floors. The higher buildings are located closer to the main roads.

Kombolcha town is located in north-eastern part of Ethiopia, 377 km, north-east of the capital Addis Ababa and 24 km southeast of Dessie, the capital of the region South Wollo. The town has an approximated altitude of 1800-1900 meters above mean sea level. Administratively, Kombolcha is one out of 17 districts in the South Wollo zone of the Amhara Regional State. The main road 1 from Addis Ababa stretches north, passing through larger cities such as Dessie and Mekele, also passing through Kombolcha.

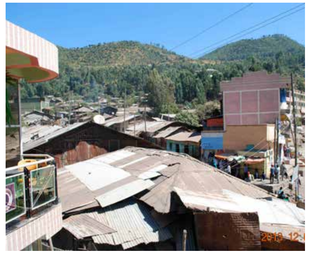
Kombolcha was established between 1943 and 1950. Within the document for the storm water master plan provided by the municipality, Beles Engineering PLC. M.B.S.A Consultants PLC. 2013,

Kombolcha is described as a fast growing city within the region, with industries also vastly expanding. A localization close to Main road 1 creates a connection to the routes to Djibouti and its harbour. This is an important factor for the growth of the industries in the city, as well as the city itself. The location in northern Ethiopia has also attracted industrial investors to the area and allowed the easy exporting of finished goods and importing of raw material (Beles A. 2013). With its old airport Kombolcha has had an important role in the transportation and infrastructure. Right now a new airport is under construction.

The high altitude of 1800-1900 meters above sea level, the level has big impact on the climate. In average the temperature is relatively high all year round, with an average temperature around 21-25 °C (World weather online. 2014), with a range from a low 14 to a high 29, according to Kombolcha City Administration homepage (2014).











The campus is located in the south of the urban parts of the town, counted to the rural kebeles (parts) of Kombolcha. Around the campus area the hillside of the mountain Fatokeebet, creates a tremendous backdrop and a more or less steep environment at site. West of the campus the tallest mountain in the area is located, Mount Yegof, which creates a dramatic front-scene. The height differences within the area fluctuates between 1870 - 1980 metres above sea level (GIZ, Master Plan, 2008-12-23). The site stretches over an area of 47 ha (Wollo University, external & public relations office, Handout, 2013.). Most buildings are located on the lower hillside.

Situation of Kombolcha Campus

Present - and future plans

Today a master plan, a cad-drawing, is set for the entire campus. The master plan includes different constructions such as buildings, roads and storm water. What is not included in the plan is the green structure. At site, when a decision for a construction is taken and financed, the work goes quickly and often several projects are ongoing at the same time. Most houses are finished or about to be established and finalized while a few are yet to be constructed from the projection drawings. The same applies to the development of roads and storm water. The majority of the infrastructure is built while some smaller walking paths and bigger swales do not yet exist. There are also additional/new drawings which are not included in the master plan. These have been planned at a later stage. At the same time there are parts of the master plan which will not be constructed and built due to the risk of flooding or other practical reasons such as complex road constructions.

Present situation

Future plans

Today and forward

In the strategy of the development for the Kombolcha Campus, focus has been laid on restoration of the main library. The building suffered severe damage caused by the flooding during the rainy period in June-July, 2013. This restoration is not yet fully accomplished.

Prioritization and a large amount of money has been dedicated to the restoration of the library (Assamenew, 2013) but still nothing in the physical structure, concerning the gully and hillside restoration has been made (Masresha, M. oral, 2013-12-08). There are different proposals made for how to deal with the flooding issues. However, at the moment, there is a lack of financial support which is needed to implement solutions to reduce the annual and high risk of flooding. At the moment there are also suggestions of approaches and methods to use, that are strategically appropriate, economically feasible and achievable in a manageable way, of how to deal with the flooding issue. According to a GIZ source, despite the urgent situation concerning flooding risks, the prioritization is now, due to governmental decisions, to secure the campus area with a wall, (Tamrat. oral, 2014-01-10). Other plans in the near future are to finish the new teachers' lounge and the student lounge construction of which has just started. The number of students is expected to increase in the coming years. To accommodate the students' additional expansion is then needed. Further dormitories and a warehouse are incorporated in future thoughts for the Kombolcha Campus (Tamrat. oral, 2014-01-10).

Construction of wall around Kombolcha Campus. Photo: Eric Miller 2014-03-25

Construction of students' lounge Photo: Eric Miller 2014-03-25

Construction of teachers' lounge


Male dormitory
Student cafeteria
Student lounge
DS TV
Male dormitory
Classroom
Boundary
female and male dormitories
Workshop
Classroom
Teachers lounge
Classroom
Library
Female dormitory
Registration
Library
Classroom
Entrance
Administration
Small shops and cafés
Use of the buildings
N
Scale 1:2500

Architecture

Kombolcha Campus is a large scale project with the University buildings designed and constructed exclusively by Ethiopian companies, through collaboration with GIZ (GIZ, 2013). Mainly four types of buildings are represented, cubic constructions 2-4 storey buildings aligned with each other. They are all also facing the main road in an east-west direction. The site is built with specific areas for classrooms, dormitories (female and male separated), practice areas, administration and registration, with some exceptions.

There are, at the moment, two buildings of a more specific character that creates variety in the architectural expression; the main library and the cafeteria. However, currently there is ongoing construction of three new buildings which also are different in their architecture from the rest; a teachers' lounge, a student lounge and the new administration building.

When comparing the building architecture within the Kombolcha Campus and Kombolcha town it can be considered as rather different. In general, the private dwellings and houses in the city are of smaller scale. Whilst the houses on campus are built with several floors, all built with concrete and with wider spacing between them. While housing in the town area represents a great variety in size mostly houses consist of one floor, except in the more urbanized town center. The private houses are built in a dense manner next to each other. There are also areas where there are more newly built condominiums. The condominiums have a more similar look and layout as the campus.

Interior

The dormitory buildings consist of three kinds. All rooms in the dormitory buildings are around 12-15 square meters, planned for 4 persons all with the same design, look and interior. There are two bunk-beds, one on each side of a central door. Opposite to the door there is a French balcony and on each side of the balcony there are two cabinets with four lockers. There are today some buildings in which students are living more than 10 persons together in a room which was meant to function as a common room. Colors used are all in a brownish tone. There is no functioning running water and no toilets indoors. All the students use toilets outdoor.

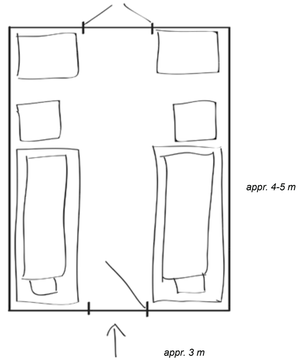


Fig. Common floor plan in the student dormitories

Girls dormitory, 2014.


Engineerings office Photo: Eric Miller 2014-08-20


Lecture hall


Dormitory


Student cafeteria Photo: Eric Miller 2014-08-17


Lecture hall Photo: Eric Miller 2014-08-17


Dormitory Photo: Deborah Worton 2014-08-16


Administration building Photo: Eric Miller 2014-08-20

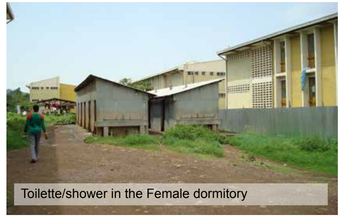

Lecture hall


Dormitory


Library building


Lecture hall Photo: Eric Miller 2014-08-20


Cafeteria


Toilette/shower in the Female dormitory


Students washing area


Students temporary cafeteria


DSTV-building (for large screen tv and events


Library

Main gate Photo: Eric Miller 2014-04-18

In the brochure created for Wollo University, it states "Wollo University" strives to generate and apply a kind of knowledge that contributes to the renewal and transformation of society." (Wollo University, external & public relations office. handed out 2013).

A university is 'a small town,' as it is often referred to, if you will, comprising of thousands of students with diverse political and religious persuasions, as well as a whole set of personal or group interests. (Wollo University official homepage, president, 2014, [2014-03-12])

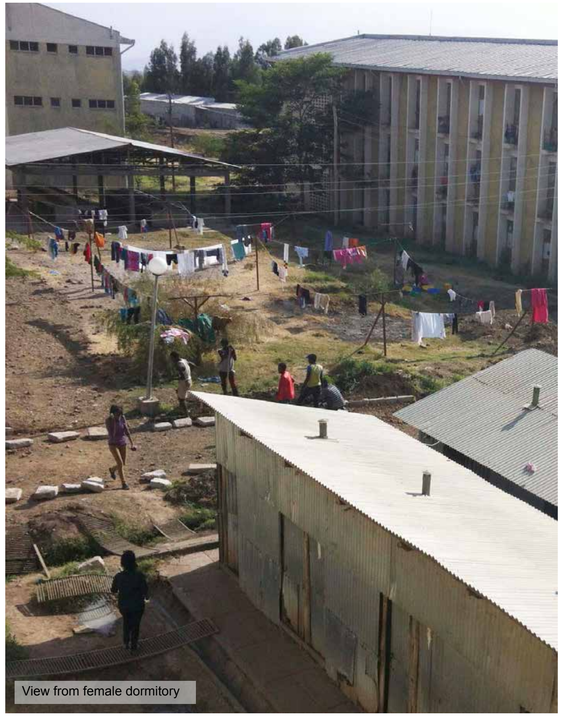
As it is growingly involved in local communities, the university is becoming increasingly corporate in nature, providing different services and enlarging its internal revenues from time to time. This proves that the university begins to see itself as a conscientious citizen with a responsibility to serve the community. (Wollo University official homepage president, 2014, [2014-03-12])

Use of the site

Today a wall is being constructed around the campus site, just as around most other campus sites in Ethiopia, in order to secure the area, by only allowing authorized people access and to discourage the arrival of wild animals. Within parts of the campus area and further up the hill, there are farmers who handle livestock such as sheep and cows. These animals graze freely and are driven between lands with help from farmers who watches over them.

The majority of the users at site are students. Yichalewal Goshime, the acting vice scientific director at Kombolcha Campus, estimates that out of 5000 students 3400 are male and 1700 female (Goshime,Yichalewal. 2014-01-28) Most students live in dormitories at the campus, except a few students with family or relatives in the near surroundings. All students are served meals three times a day in the canteen, "the student café", at site. In addition there is a student lounge where coffee and smaller snacks can be purchased. Just outside the campus area there are several smaller kiosks and cafe-like houses.

The faculty and staff working at campus are, approximately 200. The staff either lives in or around Kombolcha town or Dessie town. The majority of faculty and staff commute to the campus by the intended campus bus, while only a few commutes by car or auto rickshaws called "bajaj", a three wheeled motorbike.The buses for teachers arrive between 08.45 and 08.30. At lunch time the buses drive to and from Kombolcha town, allowing "hop on hop off" at pre decided spots. At the end of the day the buses leave from campus around 17.00 and 17.30, both to Kombolcha and Dessie.



View from female dormitory

female washing area

Administration building

Site reading;
Kombolcha Campus

Dormitory:

On campus there are three dormitory areas, two for males and one area for females. The border between the female and the male dormitory areas is marked by a fence of corrugated sheet metal. All students live in shared dormitories, most commonly in accommodation that is 4 students per room. The rooms are approximately 12 square meters. The dormitory functions as the living area for sleeping, studying, spending free-time etc. Other activities in the dormitory houses are sometimes games and TV (girls' dormitory).

"There is one room that should function as a TV-room, but not until one more house is built. Now girls are sleeping in there. There is also one additional TV-room. One girl owns the TV, so she carries it there."
(female student, oral, 2013-12-13)

"We study in shifts, two people at the time. Then we swap."
(female student, oral, 2013-12-13)

Female dormitory:

The movement, around and within the female dormitory zoneis mainly concentrated along the established roads with some additional shortcuts. "Never walk behind the storage-houses, there are animals there, big rats. Because the cafe is throwing leftovers and garbage there." (female student, oral, 2013-12-13). When it comes to areas suited for "hanging out" these areas are concentrated along the road between the library and the female dormitory. Entrances into the houses are also used for such a purpose. The more open area in the south west corner towards the main road is used as an area for studying. This area is less exposed and calmer than most parts of the campus.

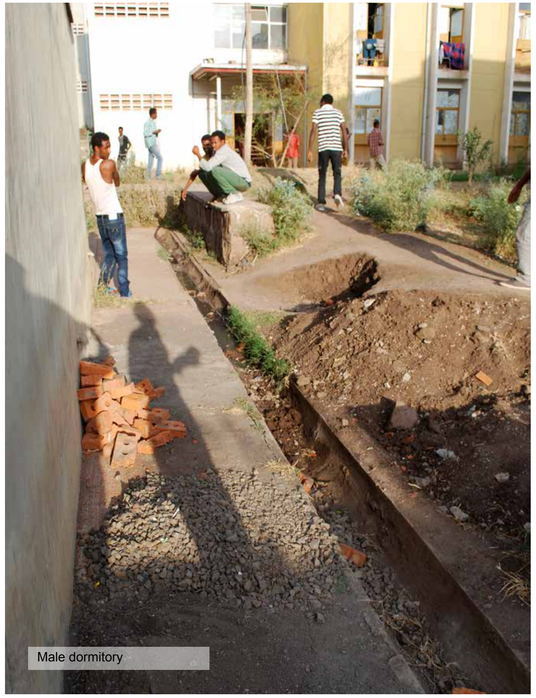
Male dormitory:

In the male dormitory area movement is concentrated along the established roads and paths. Places popular for informal meetings and recreation are located along the bigger road connecting to the dormitory area, which leads up to the present student lounge. Another less exposed area is in the boys' dormitory to the south of the site. Here both washing clothes and work out take place.

Male dormitory
Female dormitory
Meeting areas
Buildings

Female dormitory

Male dormitory



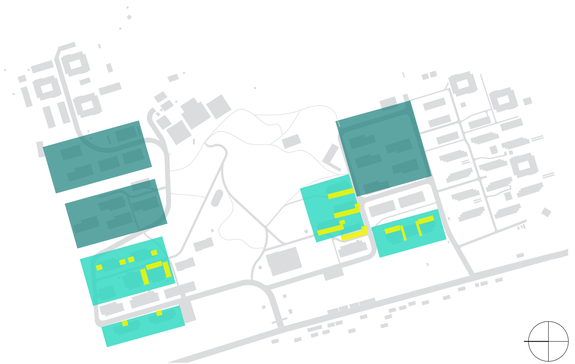
Male dormitory

Classrooms:

The classrooms are spread around the campus area. There are still some classrooms under construction and some not yet in use, in the northern area of the site. The classrooms have a central role as recreation areas, both in the stairways and just outside the buildings, often when waiting for the class to start. There are secondary informal seating areas at spot which consist of for instance concrete house foundations, retaining walls or staircases. The present main Wi-Fi-zone is today located next to the classroom and registration building. The registration building is also the main house for IT and technology.

There is a secondary Wi-Fi-zone outside the College of Engineering building, with students sitting on concrete retaining walls and pathways to the front and rear of the building.

- Classrooms in use
- Classrooms not yet in use
- Meeting areas
- Buildings



Administration and Libraries:

The administration building is an important area for meetings between faculty/staff and between students and faculty/staff. The main library is under construction and in the future it will serve as an important node and meeting point. However, it will also function and functions as a focal point and key emblem for the campus. There are two additional libraries at site. The area in front of the two libraries is the main meeting point for both male and female students.

These buildings are used every day by most of the students since they are located right next to one main path through the campus and because they are open all day and night, providing indoor study places with information and literature.

"We call the girls in the dorms and ask them if they want to meet us in front of the library."
(male student, oral, 2013-12-12)

- Administration in use
- Administration not yet built
- Administration not in use
- Meeting areas
- Buildings

Toilets and showers:

"There is a scarcity of water and cleaning. Showers only working during, early morning and late evening. Always scarcity".
(male student, oral, 2013-12-12)

"The toilets are not clean, that is the least we can say."
"Showers are mostly out of function."
"But the water is also very cold, we go in to Kombolcha for shower, it costs Birr1-2".
(female students, oral, 2013-12-13)

The showers, washing areas and toilets in the female and male dormitory areas are located outside, in between the buildings. A general issue in Kombolcha is the scarcity of water. The campus area is connected to the town system, but is the last area connected and less prioritized than the town which often leads to cut off and low pressure (Gaul, R. oral, 2014-01-28), though there are constructions going on to cover the needs for cooking and fire extinguishing. There are also water tanks in case of drought. Usually the water scarcity at campus is more frequent in the male dormitory zone. This is due to the location, which is at a higher altitude than the female dormitories. According to some students the chance to get water is more likely early mornings and evenings than during the middle of the day (students, talk, 2013-12-12).

Faculty, staff and students, female as well as male, have many comments regarding the water issues at the campus. General comments focus on the poor water systems, their construction and design. Showers are combined with toilets in the dormitory area, with toilets on the outside and showers on the inside of the buildings. Around these areas it can be hard to pass due to the insufficient and uncontrolled run-off which leads to smaller ponds and lots of mud.

There is one house with eight toilets close to the administration building which is intended for faculty and staff. The function of these toilets is inconsistent. This leads to the fact that they are not used. Most faculty and staff wait until the lunch break when they go home. In general the function of the toilets varies over the whole campus site. Sometimes they function, sometimes not. For 5000 students, and about 200 faculty and staff members, one inevitable conclusion is that there is a severe shortage of toilets to serve this basic need. This means that they often get overwhelmed and are not cleaned, emptied or repaired in time.

- In use
- Not in use
- Toilette and shower
- Washing
- Buildings

Showe & toilet female dormitory

Lounge, Cafeteria and DSTV-house:

Coffee - 2,5 ETB
Tea - 2,5 ETB
Tea-coffee mix 2,5 ETB
Bread and egg 3 ETB
Injera 4 ETB

There are two lounges at the site today. Here students, faculty and staff can come all day and get a coffee, tea, soda or easier meals at cost. The prices here are relatively low compared to those outside campus. These are places with a relaxed feeling. Another meeting point is the cafeteria.

According to students it is a meeting point but not a place where the students socialize and recreate for longer periods of time. In the cafeteria there are meals served 3 times a day, usually around 8.00, 12.00 and 17.30. The meals are included for each student during their study. The DSTV-building is used for bigger events and gatherings as well as for students to watch football or movies. Some of these events are arranged by the student union or the staff.

In use
Not yet in use
Meeting area
Buildings

Outside the Campus site:

An important meeting place is the area right outside the campus, where there are smaller shops for mobile phone cards, gum, soap, nuts; food places; tailors; beauty salons; pool-houses.

"When meeting teachers it is outside the campus area around the smaller shops and cafés." (male students, oral, 2013-12-09).

"Study place – also outside campus, opposite side of the entrance. Otherwise lack of places to study....people also sit in the fields to study." (female student, oral, 2014-12-13)

Further there is an area 500m away from campus where there is an ongoing construction for a "youth centre" which will provide a football field, tennis court and a library. The land is bought and is being developed by the Catholic Church.

Meeting area
Buildings

Sport and Activities:

Football, table tennis and volleyball are sports available at campus today although the size of each field is relatively small compared to the number of students. The bigger football field is located on the hill on a plateau north of the male dormitory in the north area of the campus. The football field and the volleyball field in the lower part is not used as frequently as the one in the north. There were several reasons mentioned for this, lack of shade, small space and the closeness to the main road which created an insecure feeling. Many students are also playing table tennis and today there is one table available. Often there were big groups hanging out in the shade where the table tennis table was placed. Other activities are placed outside the campus gate, located just across the road from the campus. Here many students went after school to play pool and stayed until it became dark.

"It's nice, we come here often, almost every day, there are at least ten pool places."

"Mostly male students come here but a few female too." (male student, oral, 2013-12-09)

Students answered, if they could make a wish, what type of sports they wanted at site. In general the answer concerned the wish to have a wider range of sport activities such as, tennis, basketball, swimming, a better area for volleyball. These were mentioned both among female and male students. Also bigger areas were desired, possible to be used by more people at the same time. Another need, expressed from some girls during one of our talks, was to have an area with space for sports activities located close to the girls' dormitory (talk with girls. see Appendix: Talk & Interview).

Meeting area
Football field
Buildings

Fotball field in the hillside above the campus

Wi-Fi-area at night

Outdoor Light at site:

"The outdoor light has not been functioning properly since last year in September (2013)."
(male student, oral, 2014-01-22)

Today there is an existing lightplan from the contractor company, GIZ. The existing light poles are established along the roads and bigger walking paths. According to students the function of the light varies. During the time when the field study was conducted (November- February) there were a few lights along the upper hill close to DSTV-building which were functioning. The main source of nighttime illumination was instead generated through light coming from classrooms and staircases in buildings which had not been switched off. This has a great effect on the possibility to move and use the campus site during the hours of darkness, approximately from 19.00 - 05.00. During our observations in the evening we found it hard to use the same walking paths as during day. Instead we stuck to the bigger roads and paths close to buildings with light. In the light plan for the campus there are light poles, of various kinds, set out in strategic places next to main roads, paths and houses. These are mostly installed but not in use or not functioning.

There is a need for extra light poles along the more established shortcuts crossing the gully. These stretches are used as main walking paths for students. Extra light is also needed by the toilets, since female students expressed fear of entering the toilets during the night-time because the lack of light.

Light poles

Buildings

Accessibility:

What affect the accessibility is both the physical structures as well as the natural characteristics of the site. At campus there is a lot of natural leveling in the landscape. The roads and the inclinations are adapted to the natural height changes and variation in -gradient. A gradient from 8 percent and up is not unusual. Accessibility also varies during the seasons. During rainy periods the access to roads and buildings is more limited than during dry seasons. When entering a building it is common to pass at least one step or stair.

The buildings are resting on a grounded concrete plinth which is usually raised a couple of decimeters in order to avoid water flooding indoors. At site there is no consideration regarding access for people with functional impairment. This can make it hard for people with any disability to access and enter the campus.

Ramp leading into classroom at Mekele Campus

Movement structure:

For pedestrians and cars there are wider roads made by cobblestone from the surrounding area. There are also smaller walking paths mainly made of cobblestone. Less wide paths are meant for pedestrians, these are not all finished. There are trodden paths or shortcuts used for crossing the campus, one in the lower part leading between the dormitories and classrooms and two in the upper part between the cafeteria, the DSTV-building and the dormitories.

"The shortcuts are mostly in use when it is dry season" (student male and female, oral, 2014-12-12)

Due to the rain, the movement patterns shift between seasons. During the rainy seasons pedestrians are restricted to the paved paths.Today most roads and paths are leading from point A to B, from door to door. There is no bigger net of paths supporting the possibilities of recreational walks and jogs. However the campus area covers 47 ha, with the possibility to have paths that spans the whole range.

"Everyone is walking everywhere." (male student, oral, 2013-12-12)

Walking path

Buildings

Water structure:

At site today there is a scarcity of water during most parts of the year, both tap water and natural water. The soil consists of silty loam, causing the water to infiltrate slowly. Already after a couple of hours of light rain, water is standing in puddles, making the ground muddy. The campus is situated in a hilly area with few terrasses or depressions. Therefore there are few places where the velocity is slow. This causing severe erosion.

There are two smaller, natural all-year-round streams at campus, partly underground, partly open. These areas are of high potential for growing lush greenery all year round without significant interventions.

Through the campus there is a gully, which has been rapidly increasing in size during recent years. The gully is dry most of the year and causes a “dark crack” or scar through the campus. During the rainy season there is a constant low flow of water and during some days it is filled and even over-filled with high speed water. This causes problems such as flooding and sedimentation in low parts.

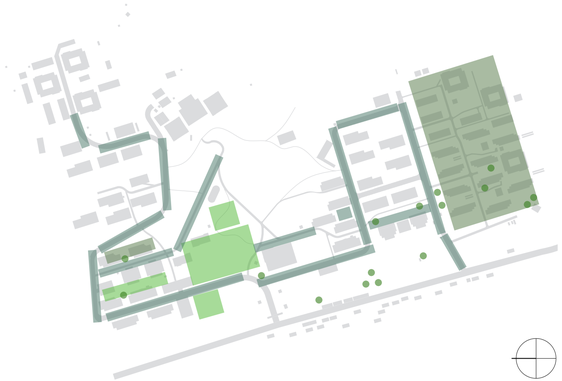
- Gully
- Building position at risk
- Buildings

Vegetation structure:

The vegetation at campus today is under establishment but so far is sparse. There are few fully grown mature trees. Most vegetation has been established during the last couple of years and some just after the construction 6 years ago (Melaku, S. oral, 2013-12-25). Trees are mainly planted along roads and paths as well as next to buildings. Trees are mainly divided into three categories: ornamental trees, forest trees and fruit trees. Shrubs are rarely planted in the area, rather they have self seeded.

Some of the plantation is established close to buildings and constructions which might in the future become a problem since the root-system grows bigger, it might lead to cracking of constructions as it searches for water.

- Existing older trees
- Ornamental
- Established vegeation
- Leading structures
- Buildings



Site approach;
Kombolcha Campus

Main research question:

In what ways can the interaction and the resources; water and vegetation, at Kombolcha Campus site be supported and developed?

Site approach

Introduction

In this chapter, analysis, approaches and design solutions are combined, described and presented concerning the fields of; Water, Vegetation and Movement-Nodes. Each field is treated within separate chapters which all are divided into three parts: Description, Analysis and Approach. The “Description” is focusing on a general introduction of the field, from a wider perspective, connecting it to its general importance and the research made. Also, we aim to connect the field to the site and its surroundings, here in the context of Kombolcha. The part of “Analysis” deals with the current situation within each field based upon Kombolcha Campus site and its unique conditions. The third part explains possible “Approaches”. Each field discussed, consists of several approaches of dealing with, and planning for the future. The approaches are described and can in turn be divided into steps to proceed.

With “Approach”, in this paper, we consider different tools to handle and tackle different problems in relations to each field. The approach-thinking is a way of meeting and planning for the future using long term goals in a flexible manner. Since unexpected things can occur and change the direction of an extensive project this requires several solutions combined together in a flexible way. The flexibility is crucial since the process depends on the incremental building of one step on the basis of another, the optimal ‘next step’ being dependent on the outcome of the previous steps. Each step has to be based upon the previous stages as well as knowledge and other external changes or unexpected turns within the planning implementation process. Hence a range of options and a flexible approach are essential for a successful project outcome.

The approach-thinking here does not include an exact time schedule for the proposals, this due to the required flexibility within the planning. Each step has to be taken based upon the previous step as well as new knowledge and other external changes or unexpected turns within the planning and forthgoing development.

There are two main purposes with the choice of using an approach-based method. Firstly, due to the rapid changes within the campus area, approach-based thinking makes it possible to have a long term planning instrument. Each field can be changed by addition, change or subtraction of approaches. In comparison to the use of exact solutions, approaches create flexibility. Secondly, the collection of approaches can be seen as a toolset and a guide to a range of possibilities that can be adapted to different areas at campus.

Ongoing storm water construction

Construction of furniture from workshop

Presentation of workshop

Site approach;

Water management.

Gully, Hillside, Storm Water

"Vegetation cover assessment in the catchment shows that most of the area around Kombolcha haven little cover of vegetation due to deforestation for different purposes and poor catchment management practices" (Beles B. 2013, p. 1)

The general consumption of household energy is based on firewood, charcoal and animal waste which leads to a perpetual search and hunt for wood. Because of this big forest areas have been deforested and this deforestation has caused widespread soil erosion (Landguiden, 2013-10-27, [2013-11-20]). One hundred years ago more than a third of Ethiopia was forested, but by the year 2000 the quantity was down as low as 3%. Thereafter large tree-planting projects have been carried out and the amount of forested area today is over 9%. (Landguiden, 2013-10-27, [2013-11-20])

Water and flooding

-Quick facts

43.4 *million*

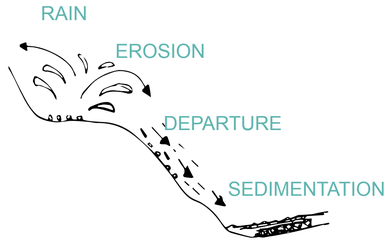
PEOPLE IN ETHIOPIA HAVE NO ACCESS TO SAFE WATER

Source: Water aid (2014-03-26)

67 *million*

PEOPLE IN ETHIOPIA HAVE NO ACCESS TO PROPER SANITATION

Source: Water aid (2014-03-26)



Rain process and Infiltration process

The process of infiltration is slow in relation to the process of rain. The rain water has to be taken care of in order not to cause flooding, especially where the infiltration is low. Commonly used are different methods of slowing down water which remains on the surface, either in retaining reservoirs, using equalizing surfaces, flooding surfaces, ditches and swales (Sundahl, A-C. oral, 2014-03-27).

Precipitation in Ethiopia

The amount of rainfall varies considerably between different geographical areas around Ethiopia, and with marked annual variation. In general the amount of annual rainfall is estimated to be a minimum of 1000 millimeters. Looking at western Ethiopia, perception is calculated to be at least the double this amount, whilst on the highlands in the north and in most of the lowland areas it is considerably more dry. In the eastern lowland area, this isthat part that most vulnerable to long periods of dryness. In general it has been known for a long time that Ethiopia has had many long periods of drought (Landguiden, 2013-10-27, [2013-11-20]). Global warming has had an impact on the temperature and the frequency of precipitation, which will affect draughts and floods (IPCC, 2014). Land degradation due to extensive deforestation for fuel wood production and in advance of cultivation in the catchments as a result of rapid population growth, are leading to higher peak discharges, stream sediment loads and unstable rivers (Mengesha, 2008). Water issues and flooding are in this way linked together with the climate change just as environmental changes (Brown, 1999). What contribute to Ethiopia’s environmental problems are issues such as land degradation in form of soil erosion and loss of soil fertility etc. Land degradation is an ecological question and a general problem for Ethiopia and the area of South Wollo in particular (Assamenew, 2012). Ethiopia has initiated a large amount of projects as a response of the expanded land degradation. Efforts in order to reduce erosion problems and work with watershed management just as rehabilitation of land have been carried out. In the highlands such activities have been ongoing since middle of 1970’s (Assamenew, 2012; Landguiden, 2013-10-27, [2013-11-20]).

Water system of Kombolch Town

The catchment area around Kombolcha town is to a large extent identified by its hilly nature and continuous mountain ridges with steep slopes. The average temperature varies from a minimum of 11.9 °C to a maximum of 26.8 °C. The annual average precipitation of the town is about 1044 mm. There are two annual rain periods, the major period stretches from the middle of june until september and contribute about 84% of the annual rainfall, a less extensive and shorter period occurs in the spring, some time between february to april (Beles. B., 2013). The large amount of rain, together with a low infiltration, makes the runoff strong. The draining water reaching the lower plain is estimated to above 60%. This causes flooding in Kombolcha town just as in the downstream areas. The vegetation in the catchment areas in Kombolcha is most consisting of Eucalyptus plantations, clustered around settlements, remnants of riverine trees and trees in and around cultivated lands. The catchment area is covered with sparsely occurring patches of natural vegetations and Eucalyptus plantation (Beles. 2013).On highland areas the storm water pattern gets denser and most of the streams that flows into the Borkena River originate from the surrounding lands (Mengesha, 2008).

The main river running through Kombolcha is called the Borkena River. The river originates from the highlands in the direction of Dessie (2600 metres above sea level), north-west of Kombolcha (1800 metres above sea level). The Borkena River is the main catchment for storm water running from the highlands. Due to river bank erosion and the nature of the embankment soil the river becomes more and more wide (Bekele 2013). On its way through the town the rivers; Karaoli, Eyole, Werka and Berbere Rivers are connected to the Borkena river. With the tributaries, large amount of sediments are transported from different parts of the surroundings into the Borkena River. The municipality of Kombolcha town is developing a storm water Master plan in order to prevent the city from flooding, landslide hazards just as maintain stability of infrastructure (Bekele 2013). However, so far this does not incorporate the Kombolcha Campus site.

The gully at the campus site connects downstreams, south of Kombolcha town, and causes therefor no threat to the city's' urban area (Bezabih, A. e-mail conversation. 2014-05-16).

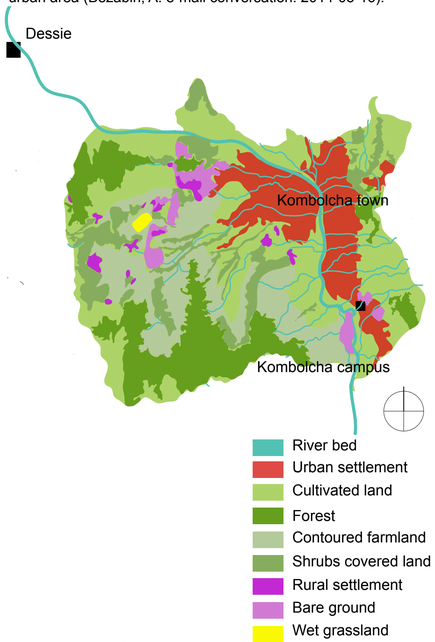


fig. Land use of Kombolcha campus.

The gully passing the main Library

Photo: Eric Miller 2014-06

Soil structure

Analyse Water system of the Campus site

The Gully
Where the Kombolcha Campus is located there is a gully running through the site. When the University was established the gully was not considered to be a dangerous risk for the campus. However, the gully has grown wider and deeper with each rainy season (Seman, A. oral, 2014-01-29). When measuring the edges within the gully some parts of the sides are up to 3 metres high.

Prior to the seasonal rainfall the last few years, temporary embankments of soil have been put up. These have been flushed away but helped to avoid major flooding, until last year when it was totally washed away, 2013 (Seman, A. oral, 2014-01-29). In July 2013, a huge rainfall and unexpected large amount of water masses entered from the top of Mt Fatoakeebet. The extreme water masses created damaged to both the main library, student dormitories and the student cafeteria, all in one night. The vast, high speed water masses represents not only a threat towards buildings at site but also to the students, faculty and staff who live and work at campus (Goshime, Y. oral, 2014-01-28). The water also transports a large amount of sedimentation on its way down the slopes (Assamenew. oral, 2013-12-10; Getachew. oral, 2014-01-15).The sedimentation then stay at low points and are often blocking outlets. The restoration work after the flooding during last summer has required a lot of money in order to get these buildings back to function (Assamenew, 2013). Half a year later the cleaning of sedimentation in the main library was still going on.

In order to be able to make changes properly and sustainable within the gully, knowledge about water flow has to be gathered. For instance the stream discharge rate should be measured: a measure of how much water flows under normal conditions and at times of high flooding, cubic meter per second.
(Q=V*W*D discharge=velocity*width*depth).

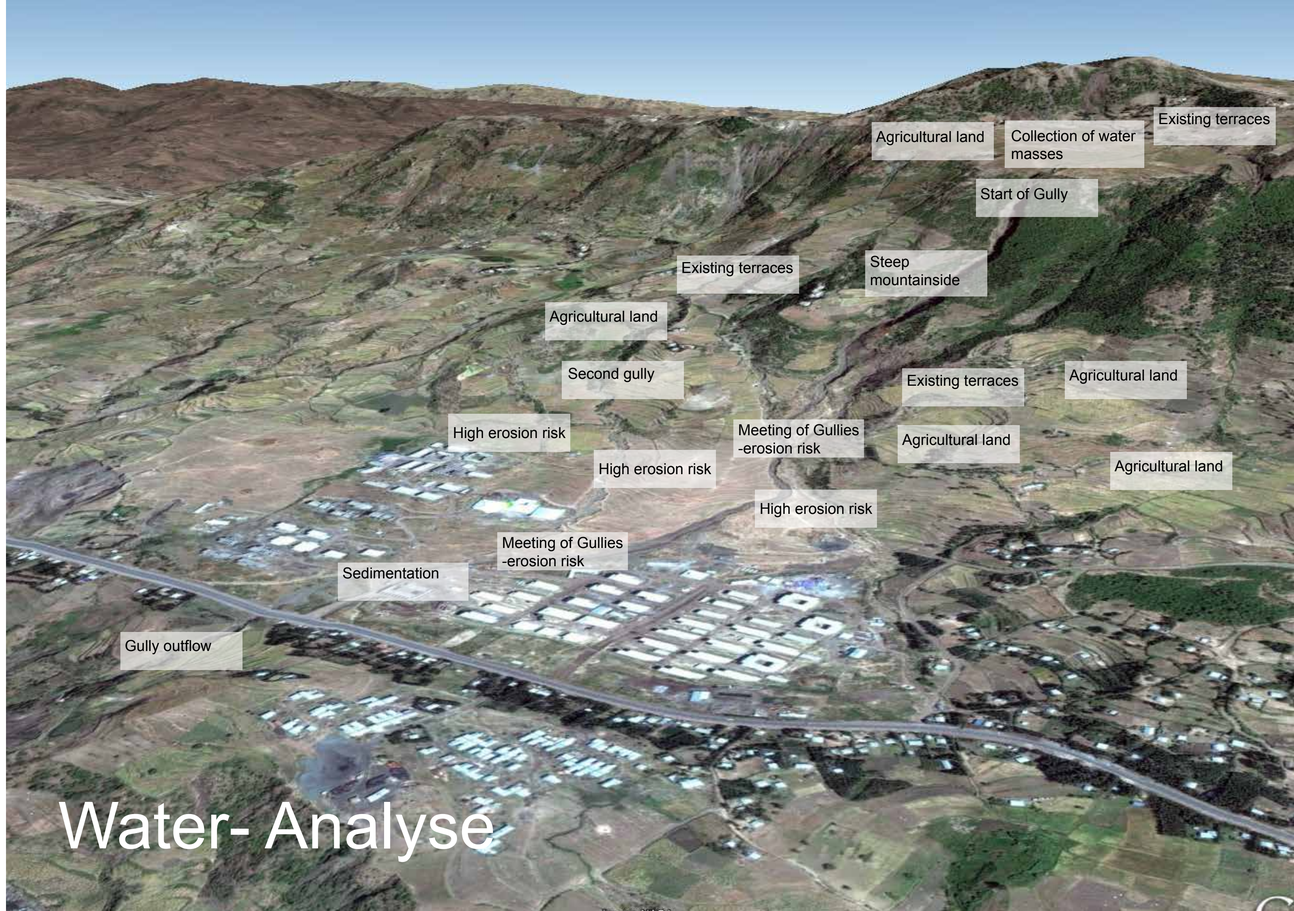
The three main issues concerning the gully today are:
- The sides of the Gully are unprotected which means that they will continue to widen by erosion created by the water stream.
- The angle of the gully sides are too steep in order to be protected
- The structures within the gully are affecting the speed of water in the sense that the speed increases.

The hillside
Within the area of the Kombolcha Campus the soil is mainly of silty loam which gives a low infiltration rate (Assamenew. oral, 2013-12-10, Gustafsson, E-L. oral, 2014-03-12). The soil and the climatic condition, with dry long periods prior to the rain period, dries the soil and creates loose soil structures. These added to each other creates a situation with a soil with low capability to infiltrate water (Sundahl, A.C. oral, 2014-03-28). The water reaches a high speed rather quickly since there are few obstacles in its way down, until reaching the campus buildings. Strong winds are also a dilemma, especially at some parts of the campus site, mainly in the north east area. The winds are not only causing significant soil erosion, also buildings have been damaged. During 2013 two roof of two buildings in the north east male dormitory area were blown off (Seman, A. oral, 2014-01-29). However erosion is a natural process, which means it should not and cannot be stopped but the amount can be reduced (Mathur. da Cunha. 2009). Land use has a large impact on the soil infiltration capacity (Lenka, 2011; Wezel, 2001; L. Alemayehu Duguma et al. 2011).

The land above the Kombolcha Campus is connected and used for agriculture. Families subsist on agriculture in form of crop cultivation, livestock- rearing and fattening. There are at least, 54 households with around 270 persons (Assamenew. oral, 2012-12-10). Though, in the farmland in the nearest connection to the campus site small scale soil- and water conservation as well as watershed management have been performed. For instance terraces and smaller check-dams have been constructed, however, problems with water and erosion is still a major issue.

The main concerns when it comes to the erosion at the hillside are:

-Lack of conserving structures
- Deforestation
- Improper land use and agricultural management
- Insufficient storm water management
- Soil, structure, permeability, content of organic matter
- Strong winds



Approach

Within the hillside and gully treatment various systems can be used in order to reduce the velocity of the water. The speed reduction will have a positive influence on the percolation of water into the ground. A higher grade of percolation will help in raising the water table, decrease erosion and create possibilities to increase vegetation at site. A richness in vegetation will create microclimates, protect from drought as well as both water and wind erosion.

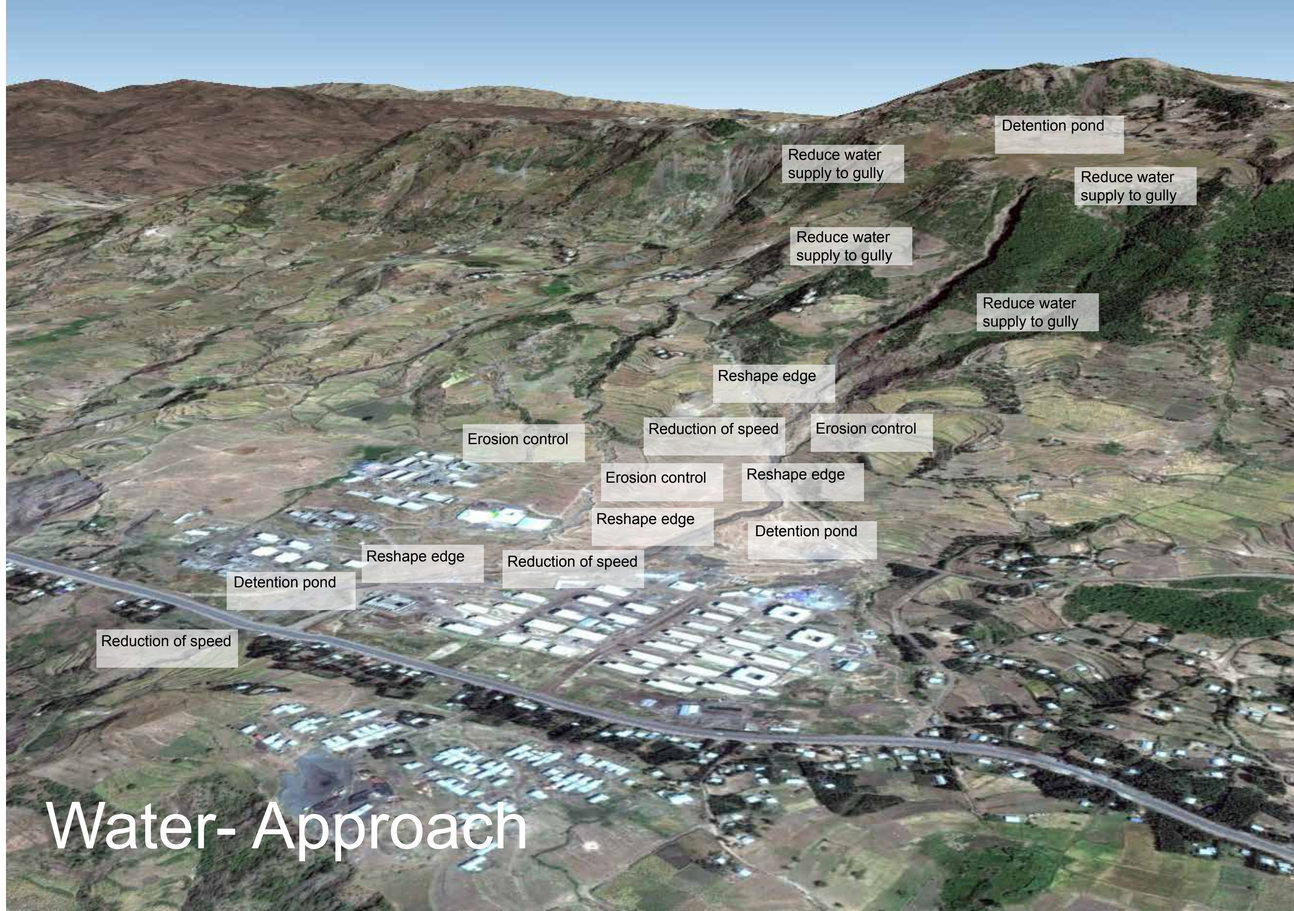
Water runoff:
“Slow down” measures for water need to be carried out on site. This in order to decrease the high amount of water flowing down the hill and also to hinder it from reaching the gully. This will in turn lead to less pressure on the sides of the gully which means less erosion and sedimentation, as well as less pressure in the lower part and on the outlet. Slowing down the water by dividing it into smaller catchments, by adding water swales and additional paths the water can be diverted into smaller sections already at the top of its flow.

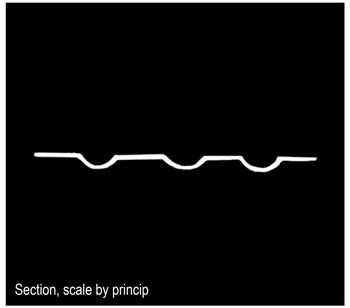
Erosion:
In order to reach a sustainable land management practice, ecosystem restoration and biodiversity, needs to be taken into account. The infiltration capacity at site is very low due to the dense silty loam; improvement will take a long time.

In general, whilst the process of water is fast,the infiltration process is slow. This means that it takes time before the water infiltrates and rather takes the fastest way down to a plane surface or low point. The time process needs to be considered, so that as much water as possible will move in a slower pace. As an example, studies have shown that water infiltration increased when using contoured hedgerows and water could be stored with great effect under the hedgerows. Thanks to the stems of hedging which create a barrier effect, and hedgerows could decrease the speed. In addition the macropores also increase underneath the hedge (Kiepe, 2005, in; Kinama, J.M. 2007). It is also of great importance to reduce the amount of raindrops falling directly on the bare ground. The power of raindrops, falling on the ground, breaks the top soil and increases the risk of erosion, especially in steep areas.

On the hillside above the Kombolcha Campus the land can be divided into different uses and situations. Soil improvement, a degraded soil requires repeated and consequent treatment.

Planting trees and shrubs, often combined with other soil cover, has a major impact reducing wind erosion as well as water erosion (Kinama, J.M. 2007). This can be done at site with various approaches at the different sections on the hillside. Further ways of dealing with runoff and erosion are also presented below and in the chapter concerning vegetation approaches.



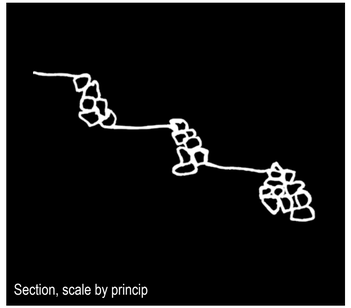

Section, scale by princip

Planting pits/planting zai

Use: Reduce water supply to gully, erosion control, reduce water velocity.

Application area: Preferably where the slope is no more than 5%, preferably around 2%. The area can be broken and uneven and suits all soil types (Assamenew. 2013).

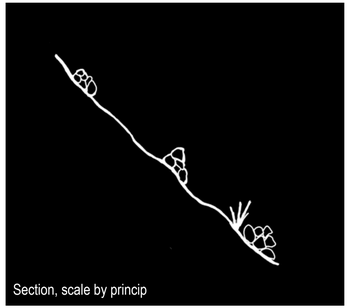
This method is suitable in most degraded gentle slopes. It consists of small pits dug in systems related to each other. Often along contours or in between stone bunds. The pit allows the water to flow to and remain a longer period in one place, which helps the vegetation planted and eases the infiltration possibility. (DESTA, L. ET AL. 2005) The Zai system improves the soil structure, the circulation of water and nutrient in the soil as well as consequently protecting the soil from further erosion as well as helps storing the water and nutrition (DESTA, L. ET AL. 2005).


Section, scale by princip

Terraces

Use: Reduce water supply to gully, erosion control,reduce water velocity.

Application area: Common in most parts of Ethiopia. Useful in steep areas, a large depth of soil eases the implementation. An efficient structure which combines of water and erosion control (DESTA, L. et al. 2005). Terraces requires maintenance yearly. The approach can be combined with food production. Terraces is an efficient way of protecting the hillsides even, this is an approach requiring both hard work to build and to maintain, commonly farmers are parts of both building and maintaining these structures (Gustafsson, E-L. oral, 2014-03-12).

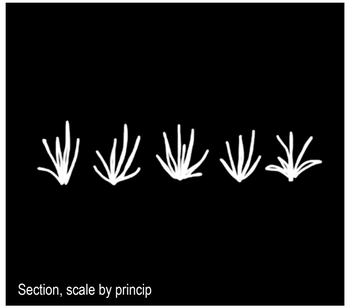

Section, scale by princip

Narrow Stone bund along contour

Use: Reduce water supply to gully, erosion control, reduce water velocity.

Application area: Preferably where the slope is no more than 5%, preferably around 2%. The area can be broken and uneven (Assamenew, 2013).

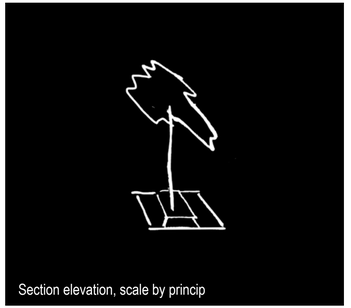
Often used for run off systems with marginal soil cover, commonly in combination with farming and temporary grazing. Can also be used as vegetation improvement. Productivity of grass can be improved considerably in areas with stones and with gentle slopes (max 3-5%). If applied over large areas it can control erosion quite significantly and slow down water runoff. Being a semi-permeable or permeable system it is not considered as efficient as other systems in similar conditions but it is cheap (DESTA, L. ET AL. 2005). The stone bunds can also be used to direct water in preferable directions.


Section, scale by princip

Contour planting

Use: Reduce water supply to gully, erosion control, reduce water velocity.

Application area: Possible to put anywhere in the slope Hedges and grass rows can be used efficiently to reduce soil erosion. The mulch also incorporates with soil improvement. (J.M. Kinama. et.al. 2007.) Rows of narrow planted grass have been used at test sites in Dessie Campus, and have shown good results in the establishment phase as well as a protection and a speed reducer for water. For best growth and result the grass rows have to be maintained both during the establishment phase as well as every subsequent or every second year (Melaku, S. oral, 2013-12-25).

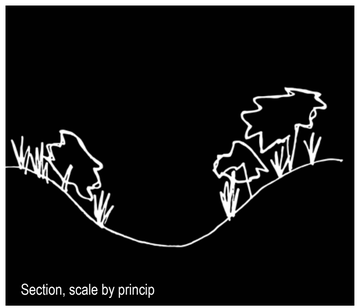

Section elevation, scale by princip

Water collecting trenches

Use: Detention pond, reduce water supply to gully, erosion control, reduce water velocity.

Application area: Start at the top of the slope, suitable for all types of soils (Assamenew. 2013).

Contour plantings of trees can be highly effective in reducing soil erosion if the right species are chosen (J.M. Kinama. et.al. 2007.). This would be a drought resistant tree suitable for the Kombolcha area. Vegetation in the hillside can also be intercropped and used in farming purposes. In the planting and establishing phases trenches are a useful way to increase the chance of survival. A trench is a dug out area around the tree which functions as a water sump. This method can be used for single or multiple trees at once (DESTA, L. ET AL. 2005).


Section, scale by princip

Ditches/swales

Use: Lead to detention pond, reduce water supply to gully.

Application area: Waterways, vegetative and stone paved, can be used in any area where you want to lead the water from point A to B, at a lower level.

Using a low level of inclination also contributes the possibility of greater amounts of water infiltrating the ground. Other advantages using vegetative waterways are the increasing levels of infiltration, evaporation as well as the protection the leaves are creating for the surface soil (Sundahl, A-C. oral, 2014-03-27). The ditch can be as narrow or wide as suitable for the specific area. The ditch can also be connected to other water flows, connecting two flows to each other or work as a relief for a bigger water flow.

List of species suitbale for hill side shown on next page.

Examples of trees suitable for hill side

Acacia albida - Grar
Acacia Saligna- Akacha saligna Srub
Albizia gumifera – Sesa
Cupressus lusitanica - Yeferenji-tid
Dodonaea viscosa - Kitkita
Entada abyssinica - Kentefa, Kontir
Grevillea robusta - Grevila
Parkinsonia aculeata - Filfile, Ye eyerusalem eshoh
Sesbania sesban - Girangire

Examples of grasses suitable for hill side

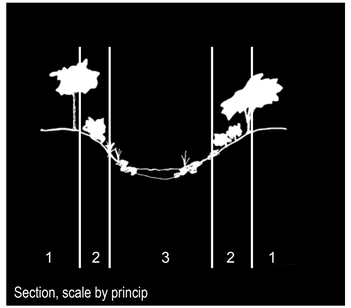
Styiosan treshumilis - Alfalfa
Sorghum almum - Columbus
Elephant grass – grows denses and fast, needs cutting

Examples of trees suitable for gully side

Acacia melanoxylon - Omedla 2-3
Acacia saligna - Akacha saligna 1-2
Albizia gumifera - Sesa 1
Callistemon Citrinus - (Botl birsh) 1
Chamaecytisus proliferus - Tree lucern 1-3
Cordia africana - Wanza 1-2
Dodonaea viscosa - Kitkita 1-3
Entada abyssinica – Kentefa, Kontir 1-3
Erythrinia brucei - Ergofit, Kermo ayederk, Korch 2-3
Leucaena leucocephala 1-3 Lukina
Parkinsona aculata - Filfile, Ye eyerusalem eshoh 1-2
Salix mucronata - Ahaya, Wonz admik (2-3)
Sesbania sesban – Girangire 1-3

Examples of grasses suitable for gully side

Elephant grass – 2-3
Riverine kikuyu – 2-3



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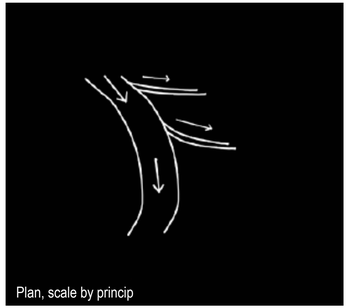

Plan, scale by princip

Treated gully side - Vegetation

Use: Reshape edge, erosion control, reduce water supply to gully.

Application area: All along the gully, where the sides are not too steep for vegetation to establish, varies from plant to plant.

For example of species, see: planting list below. Commonly used is a combination of species with a mix of creeping and drought tolerant grasses, shrubs and trees (Melaku, S. oral, 2013-12-25.; Assamenew. oral, 2012-12-10). Limitation: vegetation struggle to establish.

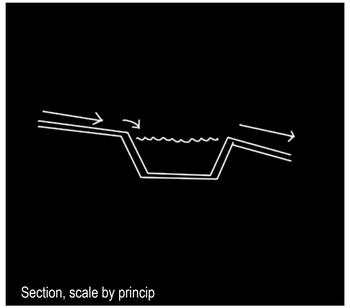
Picture showing areas for vegetation suitable to use in the gully side. List of species to the left, numbers indication in what area each species can grow. No aquatic plants are listed.

Dividing ditch

Use: Detention pond, reduce water supply to gully, reduce water velocity

Application area: In areas with low inclination and stable soil with no risk for erosion or constructed with stones. Placed on the upper part of the gully edge. “The dividing ditches” can be used to ease the pressure on the gully, decreasing the amount of water flowing down the gully during the period of high water level or peak discharge. Cut off drains can be used where it is possible to manage open and closure of the drains. The ditch connects to an area functioning as a detention pond; these together can also have the positive effect of increased infiltration as well as increased vegetation in the area (Sundahl, A-C. oral, 2014-03-27).

Limitations: erosion by the the inlet, if improper built (DESTA, L. ET AL. 2005).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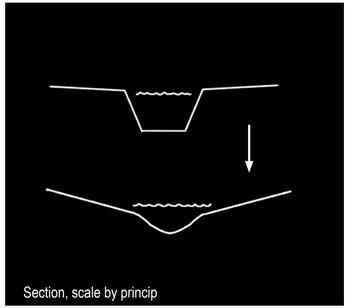
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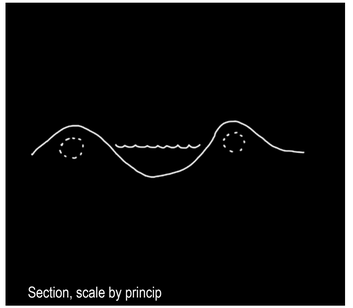

Section, scale by princip

Ponds/micro ponds - areas for equalization

Use: Detention pond, reduce water velocity, erosion control

Application area: Where the water has a lower speed, and before and after check dams to create a less turbulent area. Ponds & micro ponds take care of surface runoff as well as making the water in the gully slow down and leave sedimentation, preferably repeatedly along the gully. The ponds can be used together with a ditch as an area for equalization. Areas for equalization can also contribute to easing the infiltration (Sundahl, A-C. oral, 2014-03-27).

Limitations: Not suitable for sandy soils. Standing water may induce water borne diseases (DESTA, L. ET AL. 2005).

Reshaped gully side 1 - decrease inclination

Use: Reshape edge, reduce water velocity, erosion control.

Application area: Enough space on each side of the existing gully, no risk of overflowing.

By changing the inclination on the gully sides there will be a more smooth transition to the surrounding area, this creates a lower level of water, it reduces the speed and decreases the amount of sedimentation carried down with the water mass (Sundahl, A-C. oral, 2014-03-27). The reshape of the gully sides can preferably be combined with the “Treated gully sides - Vegetation” approach.

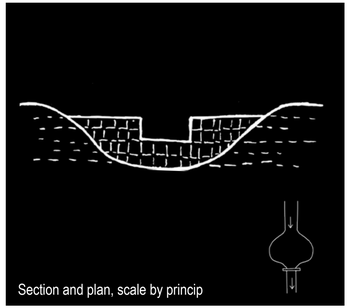
Reshaped gully side 2 - soil bank with clay core

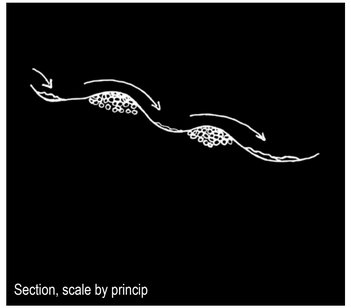
Use: Reshape edge, reduce water supply to gully.

Application area: Highly exposed areas, i.e. to protect buildings, infrastructure or other important elements.

Protection walls consisting of a soil bank with a enforcing clay core can be put up in highly exposed areas, can also be combined with other solutions within the gully.

Limitation: When constructing the soil bank there is a need of clay soil for an inner core (Sundahl, A-C. oral, 2014-03-27).


Section and plan, scale by princip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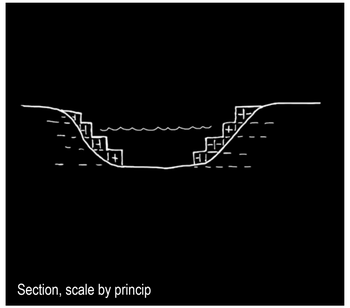

Section, scale by princip

Check dam - Gabion

Use: Detention pond, erosion control, reduce water velocity

Application area: This can be put up where the water is neither too turbulent nor where the velocity of water is very fast, nor where the gully is wide (DESTA, et al. 2005).

Make sure to protect the gully sides both upstream and downstream, due to the increasing turbulence in the water (Gustafsson, E-L. oral, 2014-03-12; Sundahl, A-C. oral, 2014-03-27). Sizes of single gabions can be constructed with the measurements of approximately 2x1x1 m. Where the water flow is strong there might be need of more than one row of gabions (Assamenew. 2013). The gabion-check dams can also be combined with a simple bridge construction on top, flat or with a vaulted top to increase the possible amount of water passing under.

Check dams -Stone or sand bags

Use: Detention pond, erosion control, reduce water velocity

Application area: This can be put up where the water is not too turbulent neither where the speed of water is very fast, nor where the gully is wide (DESTA, et al. 2005).

Make sure to protect the gully sides both upstream as well as downstream, due to the increasing turbulence in the water (Gustafsson, E-L. oral, 2014-03-12; Sundahl, A-C. oral, 2014-03-27). Sandbags used where stones are not available.

A check dam is a structure crossing the bottom of the gully; this reduces the velocity of the streaming water as well as preventing deepening and widening of the gully.

Gabion walls

Use: Erosion control, reshape edge

Application area: In shorter distances, preferably not more than 50 m in one stretch, where there are critically steep gully edges and where there are specific structures close to the gully which needs protection (Gustafsson, E-L. oral, 2014-03-12). Make sure to protect the gully sides both upstream as well as downstream, due to the increasing turbulence in the water (Gustafsson, E-L. oral, 2014-03-12; Sundahl, A-C. oral, 2014-03-27).


Example of how to work with terraces


Farmland in the land above Kombolcha campus


Example of how to work with elephant grass

Storm water management

The characteristics of catchment areas, are important factors when designing urban storm water facilities, just as the intensity of percipitation must also be taken into account. A well-functioning storm water system has a major advantage when it comes to safely disposing of the generated floods into a sufficient receiving system (Belete, 2011). In the literature; A long term and sustainable storm water management (2004) (Freely translated) written by Peter Stahre, former professor and technology doctor, specialized in storm water systems. He has shown that an increase in impermeable structures, such as roads and other infrastructures, reduces the natural infiltration system which also puts more pressure on the construction of storm water facilities. This is also brought up by Kolbolcha municipality *"Urbanization along with its impermeable structures is the major causes of flooding in urban areas. Urban storm water influences the service life of urban infrastructures" (Belete, 2011, p. 1).*

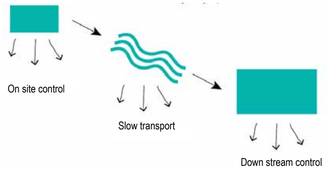
The system thinking of Stormwater:
Open storm water system has many benefits both ecologically, economically and aesthetically. Water is the source of life, both flora and fauna thrives. By using storm water for watering plants Kombolcha can become a greener and lusher environment which in turn is a branding. And since the human has such a strong affection for water there are many qualities that come from an open storm water when working with it as an element at site. The rain is an important source and from a European perspective. Peter Stahre, in the report: Blue green fingerprints in the city of Malmö, Sweden (2008), states that "in the sustainable approach open storm water is looked upon as a positive source in the urban landscape." (Stahre, 2008, p. 7) Further, the report states that a "sustainable urban storm water" often is carried out and implemented by means of an open or partly open storm water system. This means that the water should be visible during the runoff. This takes advantage of nature's own way when it comes to handling the rainwater in terms of infiltration, surface runoff, slow storm water in open systems as well as the holding of water in ponds and wetlands (Stahre, 2008).

Facilities for storm water can be divided and categorized into groups in order to locate a suitable scale for implemented and where to put the focus. Some of these categories are: Onsite control, Slow transport and Downstream control (Stahre, 2008).

"Onsite control" focuses on what can be done around the buildings and implementations that can be achieved in a small scale. Implementation that concerns this field are facilities such as green filter structures, surfaces specially prepared for occasional flooding and ponds, to have mentioned some of them.

"Slow transport" focuses on the various structures for transportation of the storm water within the open storm water system. In order to slow down the water, implementations such as swales, various types of ditches and creeks or canals, can be used.

"Downstream control" involves storm water facilities on a larger scale, for instance downstreams where larger water captures temporarily need to be taken care of. This can for instance be achieved through larger ponds and wetlands.



Fig; Freely translated from Stahre, 2008.

Analyse

In Kombolcha the storm water system has to be able to take large amount of water during rainy seasons, especially when it peaks, it is common that there are some days each rainy season there is more heavy rainfalls. Many hard surfaces have been constructed since the last rainy season. When impermeable structures increase in an area, it also puts a lot of pressure on the storm water system, more hard structure and surfaces lead to more water runoff. A sufficient storm water structure built to take care of the water is required when natural slopes and green infiltration structures are reduced.

The storm water system is in the finalization of the construction phase. The storm water close to nearly all paved roads and buildings are completed. Most buildings have a structure for leading water to an outlet and further to a ditch by the paved roads. These are almost all made of concrete or stone. That said, this does not mean that the system is fully functioning and in good condition. The concrete at site, used both for the building constructions and for the drains, is of poor quality. It is easily noticed that the concrete crumbles rather easy. Facilities such as drains and wells are especially sensitive since they are exposed to severe pressure of water. In several places at site the concrete has given way to the water and created standing water at the side of the chute instead of within it. The connection points and joints of the storm water system are in some places, especially around the dormitories, not balanced to the low points and instead some parts get flooded.

Today the drains lead down towards the bigger road where it is supported by a ditch and a grass covered infiltration area. The ditch is not that deep and the infiltration area is however limited. During the rainy season it is important that the rain is divided on its way down otherwise the main road will be at risk. This is also a risk at the national scale, since this road is the main North-South arterial road through the country. It is important that the two outflows that go under the main road are intact. Insufficient structures will lead to safety risks on the main road.

Approach

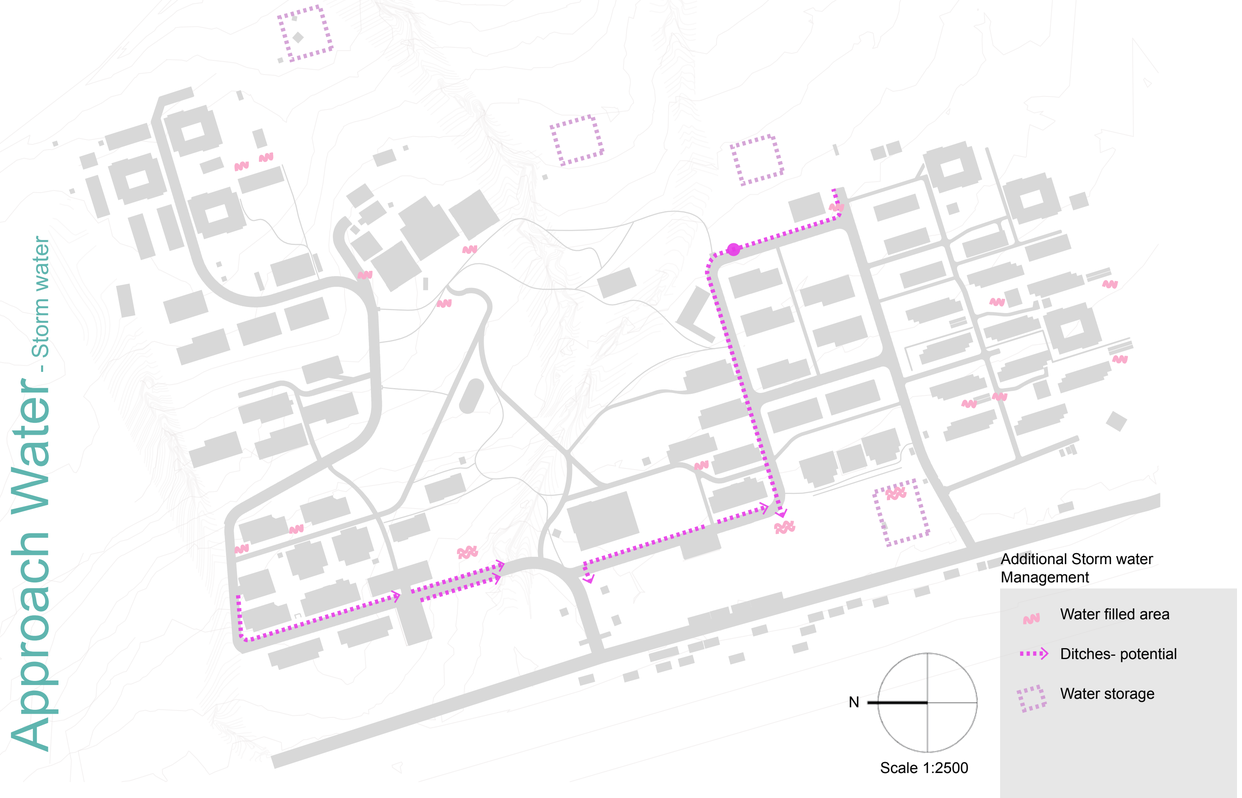
The main approach towards the storm water at Kombolcha Campus site is to slow down the water in order to protect the outflows. Since most ditches have been constructed it is of importance to lead the storm water to infiltration areas such as swales, which in turn can contribute to an improvement of the green structure at site. This is one way to distribute the water so that it can be better utilized.

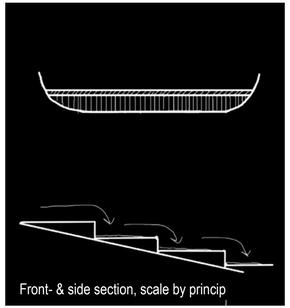
Within the category for *“Slow transport”*, hard surfaces increase the speed of the runoff (Sundahl, A-C. talk, 2014-03-27). In order to slow the water down and increase the infiltration capacity, vegetation cover can be added to some of the not yet constructed ditches. The ditches can also, together with the function, be regarded as an aesthetic element to the campus. Different types of additional structures within the ditches, such as decreased inclination of planes, can both add a pleasant sound when the water runs.

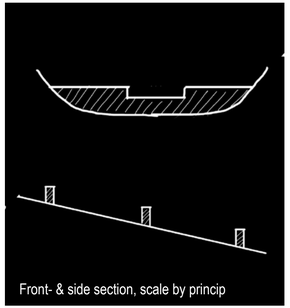
For the approach of *“On-site control”* the water can be utilized in its best way at site. In order to use it wisely; smaller swales and low points can be placed strategically in the landscape in order to combine it as a water source for vegetation plantings. For instance the water from the showers can be drained to a planting area that provides shade and possible places to stay.

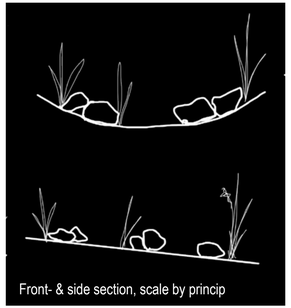
“Downstream control” at site can be used through swales, these can be combined with agro forestry. At site there are some larger low points where the water easily can be led. The disposition of the water can from the upstream be led through a range of smaller creeks towards bigger swales in the lower parts.

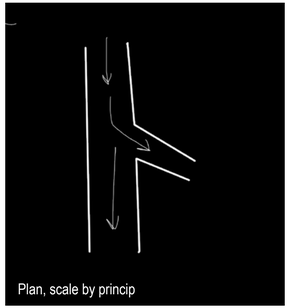
Approach Water - Storm water











Ditch, tilting step

Application area: In connection to roads or houses to reduce the velocity of storm water, in an aesthetic way, before it reaches the outlet and more fragile open ground. During lighter rain it can also functions as a filter and impediment for sediment to reach the outlet with the risk of plugging it.

Ditch with barrier

Application area: In connection to road, slope from road stretching 400-1200mm till ditch bottom. The spacing between each barrier depends on the inclination of the ditch. < 3% not required, 3-5% every 20 m, 5-7% every 10 m (DESTA, L. ET AL. 2005). The barrier can be constructed by stone, sticks or concrete and can also functions as a filter and impediment for sediment to reach and plug the outlet.

Ditch, open swale

Application area: In connection to road or path where the inclination is rather low. Ditches with open soil require water with less velocity in order to avoid further erosion within the ditch. Planting grass in both new and already established ditches helps to slow down the water stream but mainly it can function as a filter and impediment for sediment to reach the outlet with the risk of plugging it. Placing of larger stone (> 15cm/diameter) in the ditch can help to slow down the water.

Turn out ditch

Application area: Where the water is preferably led by open swales to an adjacent green area which can be allowed to have a damp to wet surface. Such as a prepared catchment area, see map for example spots. Where there is a gradient < 4% the suggested spacing between the turn out ditches are 100 m, 4-6% 80 m, 6-7% 60 m (DESTA, L. ET AL. 2005).

Phases

Regarding water management, the suggested phases relate to a bigger picture and are directed to a wider area than just the campus. For water management it is required to work over extended fields and for Wollo University to collaborate with Kombolcha Municipality and the surrounding settlers. The main reason of zooming out is that water is a natural element clearly and directly dependent upon and influenced by conditions both inside and outside the project area. Basically these water management phases' start from the larger scale at the top of the hill - moving further down, zooming in, towards the campus site to the smaller scale.

1.
-Measure amount and velocity of water in the gully
-Collaborate with farmers and municipality to work on the hillside and top-plateau
-Reduce water from hillside to flow into the gully
-Reduce risk of overflowing gully - Identify low gully sides

What needs to be done first at site is to reduce the risk for the campus to be damaged further. The water running in the gully is very powerful and constitutes a great risk due to its high velocity and the large amount of water (Assamenew, 2013). The large amount of water makes it hard to start working with "slow down" structures within the gully since it is of high risk that these elements would be washed away with the huge and unpredictable amounts of water (Assamenew, oral, 2012-12-10). Before building any form of hard structure blocking water masses it is crucial to measure the amount of water and the speed of the water flowing within the gully. In order to begin reducing risk at the campus site, firstly the water has to be reduced in amount, which also helps reducing the speed. Water flowing direct from the hillside to the gully should be prioritized. Approaches on the hillside can include; making more runways for the water just as making more slopes and swales at site. These can hold the water for some time and prevent the water to run directly to the gully all in ones.

At the top of the mountain, where the gully has its origins, it can be an idea to make swales in the form of smaller "side" creeks. A complementary approach to this is tree plantings. As mentioned earlier, vegetation is a long term solution which preferably can be combination with other structures. Vegetation can then have a significant impact on the flooding (Gustafsson, E-L. oral, 2014-03-12).

Another prioritization is to identify especially the lower edges of the gully-side, where it is high risk for the water to break and overflow the site. Side structures, both permanent and temporary structures, therefore also needs to be implemented within the first phase. For instance priority should be given to where the flooding occurred in 2013. The edge requires consistent control and management to prevent such overflow to recur.

2.
-Follow up and evaluate previous work
-Restore and re-shape gully edges
-Separating water from the gully - create water storage
-Incorporate paths and functions

It is of major importance to follow up and evaluate the work already commenced in the first phase as well as continue the work carried out. The gully edges are important to restore and re-shape such as with the approaches included in the categories; reduce water velocity, reshape edge, detention pond. These are important in order to control water masses and prevent water from overflow the gully and cause damage in valuable areas. This means putting up erosion protection and embankments where it is required, with the aim to prevent the gully from getting bigger and consume more of the surrounding landscape.

Phases Water

Additional water creeks can be constructed and implemented. These creeks would allow water to run more slowly, within a naturally meandering shape of a creek with low inclination and added vegetation, from the top-layer of the gully-edges towards a bigger swale. This can be a method of both reducing overflow-water and leading water to where water is needed (Sundahl, A-C. oral, 2014-03-27).

The gully, today, forms a great part of the direct vision of the campus and it is seen as a threat (Goshime, Y.oral, 2014-01-28). However, a potential for Kombolcha Campus is to work with the gully in such way to control it and turn it into a resource. Using multifunctional approaches to overcome its high risk, it should be possible to both reduce further levels of erosion and water flow whilst also being able to use the water to make it beneficial for the campus landscape. For instance, gully treatment could be integrated with paths for walking, which would take advantage of the water and strengthen the green structure. Thus the site could be a useful and pleasant area for people. Creating the opportunity for it to be used during those months and the majority of the year when there is no rain at site.

3.
-Follow up and evaluate previous work
-Incorporate storm water management
-Construct detention ponds and swales
-Incorporate paths and functions
-Water storage

Evaluation and follow up are important in order to draw conclusions and succeed in the continuous work. In this third phase the work started in the first and second phase will most probably need to be continued and managed alongside working with phase three.

Water management and storm water are both in need of being looked upon as a part of the bigger water system. When constructing and developing an area more hard surfaces appear, such as pavements and roofs. Infiltration areas decreases and at the same time water flows faster on top of impermeable areas which leads to a higher pressure by and on the outlets (Stahre. 2004). In order to handle the extended amounts of water in an efficient way the whole system has to function in all scales with good supplies and connections (Sundahl, A-C. oral, 2014-03-27).

Within ditches “slow transport management” can be implemented. This can be done through the storm water approaches: ditch with tilting steps, ditch as open swale, ditch with barrier and turn out ditch. Where there is enough space by the paved roads, new additional ditches can be constructed in a natural shape as extended ditches or smaller creeks, leading the water in a meandering path to slow down the water and ease percolation and vegetation.

Low points need to be pointed out and used as “on site control”. These can be designed as detention ponds and swales to support and take care of bigger water masses. Here there is a possibility to introduce new vegetation at site by collecting water during the rainy season. Existing and some additional natural low points are possible places where “on site control” could be utilized.

Future, more costly, possibilities could include closed water storage tanks, to decrease the risk of water transmitted diseases. This water can for instance be implemented and used for irrigation for vegetation.

Vegetation

General

Hundred years ago more than a third of Ethiopia was forested; by year 2000 the number was down as low as 3%. Thereafter large treeplanting projects have been carried through and the number is today over 9%.
(Landguiden, 2013-10-27, [2013-11-20])

In the end of this chapter approaches will be presented as design suggestions conducted by us, based on the analysis and observations carried out. It takes time for trees to establish and grow into a robust and sturdy individual therefore it is of importance to establish vegetation with a long-term perspective in mind.

Ethiopia is part of the tropical zone. The climate and temperature vary according to the altitude. Commonly Ethiopia is divided into three climatic zones.
(Landguiden, 2013-10-27, [2013-11-20]); (Bekele, Tesemma, A. 2007)

About importance of vegetation

When including vegetation in the planning of a city or a site it creates microclimates and contributes a significant positive impact on the conditions experienced by people (Givoni, B. 1998). The areas with vegetation affect air pollution, nuances the level of noise and climate condition, often mentioned as microclimates (Givoni, B. 1998, Gustavsson, 2004) Vegetation can also create locations for meeting places and social interaction. Different uses can be enhanced by different ways of planning and using green elements, shade for open sports fields, smaller places for escape, leading structures and framings for entrances and buildings, are some examples (Givoni, B. 1998). Science has also shown that vegetation creates possibilities for a diverse environment with shade, microclimate zones, biodiversity as well as soil conservation and soil fertility (Gustavsson, 1994). Vegetation can also serve for branding purposes of a site, both in terms of functions for the campus as well as for the design. It is also found by researchers that natural environments have a positive influence and strengthen humans' ability to relax and restore from mental fatigue (Kaplan, R. Kaplan, S. 1989). This is first presented in the ART-theory (Attention Restoration Theory) developed by Rachel Kaplan and Stephen Kaplan, professors in psychology, specialized in environmental psychology at the University of Michigan, in their book The experience of nature: A psychological perspective (Kaplan, R. Kaplan, S. 1989). With this given background vegetation can be seen as an important element of the Kombolcha Campus and which also needs to be further implemented at site.

"25% of the town is covered by natural greenery. There is a park with area of 400 ha, two playgrounds, and street trees planted along 5 km of the streets in the town."
(Kombolcha City Administration, 2014, [2014-06-11])

Diversity in species enriches

The strict and fixed way of using monoculture tree-lined avenues have been common, almost as a standard, way of planting in Sweden and around Europe for a very long time (Gustavsson, R. lecture, 2014-03-04). This also seems to be as a common way of planting along roads in Ethiopia and also in the case of Kombolcha. Rows of trees can be a useful way of using trees in order to emphasize leading structures along roads or to reinforce architectural forms (Dober, P. R. 2000). However, what is important to highlight is that monoculture plantation of tree stands, rows, alles and single ornamental trees is to a larger extent a risk than with a feature of mixed trees. This is because the order and strict structure that monoculture and ornamental trees create can easily be disturbed by death or mis-growth of plants from for instance drought, strong winds or disease (Dober, P. R. 2000, Gustavsson, R. lecture, 2014-03-04). According to published research, biodiversity and richness in species is important in several ways. A diversity in plant communities creates a more stable and resistant system, both when it comes to stress tolerance and external environmental stress. It is also emphasised that in an area with high biodiversity one species can fill gaps where anothers cannot make it (Dunett, 2004, Gustavsson, R. lecture, 2014-03-04, Nielsen, A.B. lecture, 2014-04-08). The diversity in age will probably and hopefully have the effect of a more sustainable nature system in terms of succession. The life length of every individual life cycle varies among species and individual resistance, condition and combinations of species. Diversity when it comes to vegetation also enriches the life of organisms and insects which are essential for a functioning ecosystem. Other Universities in Ethiopia have for instance taken advantage of bees producing honey from some flowering shrub species at site, and then sold the sweet honey in order to gain money and knowledge for the school (Melaku, S. talk 2013-12-25).


Entrance square


Middle square & secondary libraries


From study visit at Green Mesk farm

Analyse of vegetation at Campus

The existing vegetation at campus is relatively new, with the majority was planted two to four years ago, and new establishment is an ongoing process. On site there are very few existing mature trees; most of them are self-seeded and existed before the construction of the campus started (Mealku, S. oral, 2013-12-25). Within the campus site the most mature and developed vegetation qualities are located around the dormitory area. The existing plantings are generally placed too close to constructions, such as buildings, walls and infrastructure. In the worst cases this can lead to an unwanted situation where the roots crack the construction in its search for water and space (Melaku, S oral, 2013-12-25). Many of the trees planted are, so called “ornamental trees” planted as leading structures along roads and paths as well as around buildings. Today the plantation is continuing and plants are now also being placed between hills and buildings. The type of plants used today are mainly ornamental trees and fruit trees. The majority of the newly established plants consist of Mango plants, Mangifera indica. The choice of plants is mainly depending on the costs. “What we afford and can get we plant.” (Endaloumaw, D. oral, 2014-01-06)

Today there is a lack of synchronization between different fields. For instance infrastructure and planting structure are often interfering with each other (Masresha, M. 2013-12-08). The university hires eight persons working with the vegetation; one of them is employed as the head gardener, who highlights that there is today no specific plan for vegetation (Endaloumaw, D. oral, 2014-01-06). This is one factor which makes it hard to suggest a long term strategy for planting development. Another factor is the absence of a long term planting budget. This results in insecurity both when it comes to plant investments and security in maintenance. The economic insecurity has lately resulted in less variation of plants bought and planted at campus. Most of the trees are today coming from Green Mesk farm and their secondary plant nursery, situated close to the campus. The Green Mesk farm also has a main nursery north-west of Kombolcha city center where a wider range plants can be found.

This nursery is really an inspirational source which shows the possibilities with vegetation in the existing climate.

Within Wollo University there is a great knowledge about vegetation and the systems of vegetation. At the University College of Agriculture in Dessie there are programs of agricultural sciences, forestry and extensional plant breeding. At Dessie Campus there is also a small-scale experimental plant nursery. This means that there are high opportunities for Wollo University to gain an extraordinary vegetation development if an extended collaboration between the campus sites in Dessie and Kombolcha were to be implemented.

Scale by princip

Vegetation at Kombolcha Campus today:
- Recently established
- Mainly ornamental
- Same plants are used
- Spread over the campus

Bulit in vegetation

Vegetation along path

Lush summer vegetation Photo: Eric Miller 2014-06-30

Approach

Vegetation can contribute with a multifunctional way of using an area. It can fertilize and bind the soil in steep areas, it contributes with shade and can give shelter from wind and rain. It can also constitute a landmark or an ornament, function as a wall, strengthen a direction or an entrance. It can provide fruit, a nice scent and flowers to admire (Dober, P. R. 2000. Givoni, B. 1998). A biodiverse campus site gives different areas different expressions suitable for what is needed in terms of shade, water catchment, study areas and gathering points. It also serves the purpose of supporting a campus which students, faculty and staff can thrive and feel relaxed in. Last but not least it generates a university which feels tempting for students to apply for. A gathering of different characteristics and planting approaches will be presented together with suggestions of species of trees and shrubs. There are more trees that have the ability to survive and thrive in the environment of Kombolcha, hence the trees listed are trees which are known and identified living in the area of Kombolcha or similar conditions. In the lists of characters same species can occur several times, this since they suit more than one description. This also tells that the characteristic approaches can be overlapping. The characteristics have been created this way in order to give a wide range of examples as well as to show the flexibility in vegetation and within each species. All characteristics/ tree figures are shown as simplifications. The figures show a more mature stage of trees, the expression varies from individual and combination of plants as well as maintenance and establishment. See Appendix: Vegetation, for list of trees in Amharic, Latin and English.

Shape & use
When choosing species to a specific place it is critical to be aware of ground conditions, position in the shade or the sun. It is also important to think of the need and wanted use and appearance of the location in the future. Choosing right plant for right location or area is therefore essential. By planting trees according to a need can then help to strengthen an area and the way it will be used. When combining plants we aim to highlight the purpose they serve together. A combination of plants with different strategies can together complement each other. There are different desired expressions or functions when combining trees. For instance it can be a multifunctional use of plants to get a luxury feeling by an entrance which leads you and states something special - such as the combination of the palm tree: Borassus aethiopum and the flowering bush Nerium or the function of a windbreak or a wind catcher is important to secure buildings and make areas more comfortable to stay in. When aiming for an increased biodiversity and working with small eco-systems, a diverse mix of trees is an efficient approach to use.

Establishment
Succession and Maintenance approaches
To get the wanted expression or reach a certain need it does require knowledge about planting and maintenance. The use of the right tree/trees put at a suitable site, in a preferable mix and maintained correctly creates a long lasting and dynamic landscape (Dober, P. R. 2000). When having the knowledge about plants different strategies, these can be used in a wide range of ways and enhance a variety of expressions. Using plants with variation creates different kinds of spaces. As an example, when wanting a more narrow scale and smaller room, smaller trees and a dense low canopy can be used. Or when framing an object a stricter frame of for instance tall species can be used. It all depends upon where and for what purpose the vegetation will be used.

The way of planting trees; in groups close to each other or one by one as a solitaire, all influence the plants' development. The competition for light, water and nutrition forces the tree to grow differently from how it would have developed as solitaire, with unlimited resources of light, water and nutrition. Not only does the competition with other plants and weeds change the expression of a tree, but also the climate, the ground conditions such as the water table, soil compaction and the place of planting, whether it is in shade or full sun all have an impact (Gustavsson, 1994; Nielsen, A-B. lecture. 2014-04-08).

Tall log, high canopy

This category of trees 'tall log, high canopy' are all growing tall upright trees with time and right conditions. They develop a large canopy, many times also wide. It is possible to create a higher canopy, by pruning, due to the height of the trees. They can be great stands for creation of shadow, landmarks, defining and filling a space between buildings.

Acacia albida
Acacia sieberiana
Acacia polyacantha
Borassus aethiopum
Casuarina equisetifolia
Celtis africana
Cordia africana
Croton macrostachys
Grevillea robusta
Podocarpus falcatus

Light canopy

Trees in the category: 'light canopy', the canopt creates a open and light space underneath. Often the first branch division, depth of canopy, starts relatively low, 1 - 2,5 m from the ground. This can easily be managed through pruning, which makes it easy to achieve different characters using these types. Wind breezes makes the leaves move around creating a whispering sound. This creates a dappled shade under the trees. Thanks to the light transmission other shrubs, grasses and smaller trees can grow underneath.

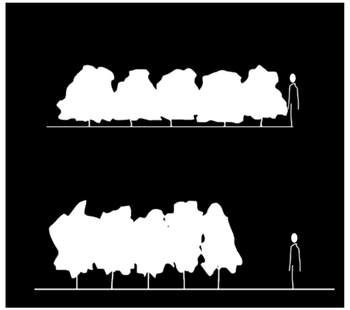
Acacia albida
Acacia asak
Acacia saligna
Acacia polyacantha
Schinus molle
Celtis africana
Jacaranda mimosifolia
Rhamnus prinoides
Tamarindus indica

Narrow canopy

With 'narrow canopy' it is here meant that the individual tree has a more slender habitus, striving upward, often growing to a tall tree if allowed. Some of the trees in this list will stay slender for its whole life cycle while others will grow horizontally with time. This is also a question of maintenance and combinations of trees in groups.

Casuarina equisetifolia
Cupressus lustinica
Grevillea robusta
Podocarpus falcatus
Pinus patula
Terminalia laxiflora

Approach Vegetation -shape & use



Fence/Hedge:

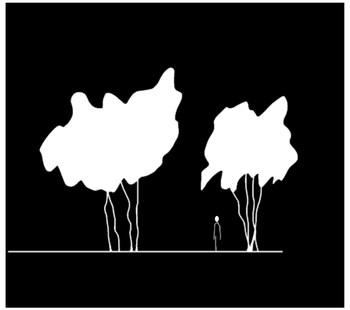
Vegetation in the form of ‘Hedge/fence’ has been used for a long period of time. In order to create division and clear rooms within the outdoor environment. Some species are very commonly used in the area of Kombolcha. Others can easily be introduced. Often hedges need to be planted densely and maintained regularly in order to be dense and grow into an stay in the desired form. Some species needs to be cut regularly in order to widen and not only grow in height. Other species needs to reach the wanted height before the first cutting. It is also possible to use a construction and plant climbers next to it.

Grasses
Hibscus
Parkinsonia aculeata

Low canopy

‘Low canopy’ are smaller trees, approximately 7-20 m, also trees which have the habitus where the canopy layer begins fairly close to the ground, often 1,5-2,5m. The trees in this category are often good to use in more narrow areas or when wanting to achieve the feeling of a smaller more personal space. They can be useful trees to create an understory layer, beneath other larger light species.

Acacia asak
Acacia bussei
Acacia saligna
Albizia lebbeck
Callistemon citrinus (Bottle birsh)
Erythrina abissinica
Erythrina brucei Spathodea campanulata



Multi-stem

The ‘multi stem’ category is trees with diverse stems from the ground, or very close to the ground. Many trees can appear as multi stem trees, it varies between plants and within each species. Many shrubs can also be pruned and function as smaller multi stem trees. The multi stem quality is easy to adjust with age and growth with help of pruning or coppicing. This quality can also create a light canopy-roof closed to the sky with a great spatial sense.

Acacia saligna
Acacia bussei
Callistemon citrinus (Bottle birsh) Rhamnus prinoides

Solitaire/ornamental

‘Solitaire/ornamental’ are tree species which have been seen used commonly as ornamentals in Ethiopia, especially in the Kombolcha area. The use of ornamentals can be good if wanting to create a landmark or a gathering area. The ones used in this list are trees with different extraordinary features, such as unusual bark, foliage, flowering or habiscus etc.

Acacia ssp. Albizia ssp.
Avocaria
Borassus aethiopum
Cupressus lustinica
Erythrina brucei
Jacaranda mimosifolia
Spathodea campanulata
Terminalia laxiflora

Round

Sometimes there is a specific need of a certain ‘shape’ or special feature in order to create a special feeling or character to a place. This can often be used with help of a shape or habitus.

Acacia saligna
Azadirachta indica Cordia africana
Croton macrostachys Erythrina abissinica Erythrina brucei

Wide/umbrella

Often the first branch division, depth of canopy, starts relatively low, 1 - 2,5 m from the ground. This can easily be managed through pruning, which makes it easy to achieve different characters using these types. The canopy creates a dappled under the trees which makes it comfortable to sit underneath.

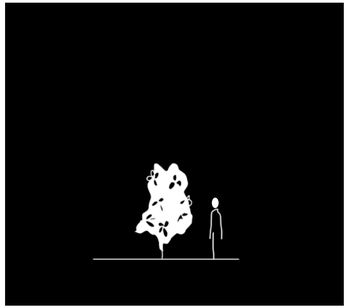
Acacia abyssinica
Acacia asak Acacia bussei Acacia sieberiana Delonix regia

Approach Vegetation -shape & use

Fruit trees

‘Fruit trees’ are all beloved trees providing us not just with sweet fruits to pick and eat, they are also flowering and giving an attractive sent. This also serves to attract insects and birds which in turn enriches the biodiversity in the area. Fruit trees are drought sensitive and profit from growing near a nursery tree, which provides shade during some parts of the day. Fruit trees, they are helped by pruning and then set more fruit. Animal grazing is a natural way of pruning, though hard to regulate.

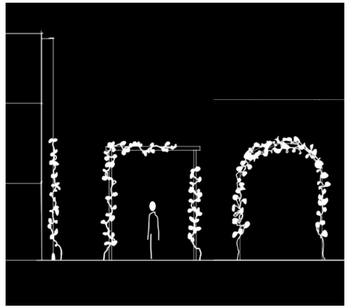
Caica sinensis
Citrus sinensis
Mangifera indica
Persea americana
Malus ssp.



Flower

The category of ‘flowering’, are species all flowering in different range, time interval, shape or color. Many of them also contribute with not just a colorful scenery but also nice scent, as well as attracting both birds and insects enriching the biodiversity. Flowering trees and shrubs are commonly and successfully used close to attributes wanted to be emphasized and enriched, such as entrances, squares or tree-lines. Both in en masse and as single trees they can be just as effective.

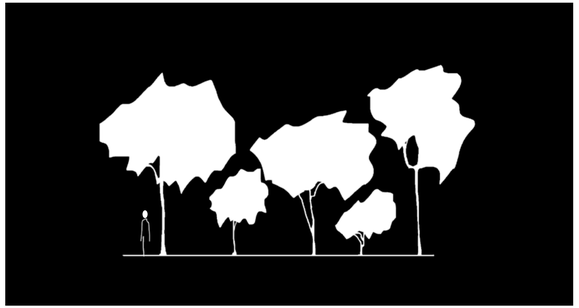
Acacia sieberiana
Callistemon citrinus (Bottle birsh) (Cordia africana)
Croton macrostachys
Delonix regia
Eribotrya japonica Erythrina abissinica (Hibiscus) (Holandery)
Jacaranda mimosifolia Spathodea campanulata



Pergola

‘Climbers’ are useful when it comes to dress an area, a pole, a pergola or a fence. It can also be used beneficially in narrow spaces. With time climbers gives shade where they grow, from light all the way to deep shade. They create an enclosure and add a detailed scale. Most climbers can grow close to buildings and structures without doing much harm, depending on the species chosen.

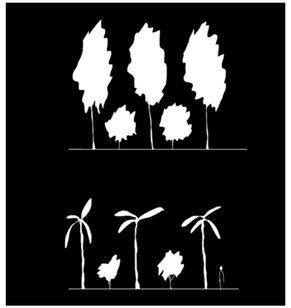
Hibscus
Morus alba



Windbreak

In order to work efficiently with wind breaks there is a need to reduce the speed by catching and spreading it. “Catching” the wind can be done with larger tree stands and “trick” the wind down to a more diversified area closer to the ground, where it can be divided further with help of shrubs. Therefore a mix of both high and low trees and shrubs is the most preferable way of combining plants (Gustavsson, 2004). Using only high stand trees as a wall will make the wind hit the ground behind the stand while only low shrubs will just decrease the winds closer to the ground. A stand of trees which is created as a tilted edge will instead of stopping the wind - give speed to it and again hit the ground behind the stand, with increased speed (Gustavsson, 2004).

Acacia albida
Azadirachta indica
Causarina equisetifolia
Cupressus lustinica
Grevillea robusta
Eriobotrya japonica
Parkinsonia aculata
Senna siamea Spathodea campanulata
Tamarindus indica



Combination

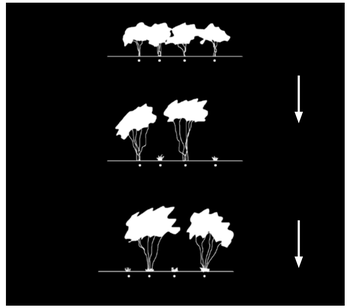
Combining trees is often a good way to create a feeling of care, a design action. By combining trees it is also possible to exaggerate and show height differences and varieties between species - they can emphasise each other.

Borassus aethiopum
Cupressus lustinic
Holandery flower
Terminalia laxiflora

Agroforestry system

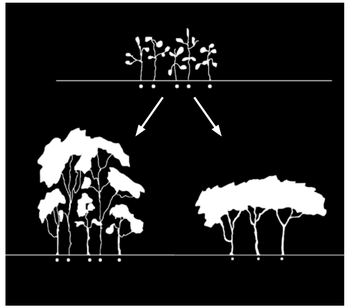
The advantages when mixing plants are many, not only thinking about the biodiversity, a system of plants can together function and be beneficial for each other. Some plants are more vulnerable, dependent on the protection of others. When using these systems and introduce also crops/livestock and herbs they are called agroforestry systems. A agroforestry system combines agriculture and forestry to create a sustainable land-use system (USDA National Agroforestry Centre, 2014-03-24, [2014-04-11]). Also fruit trees can be used with great successin these systems since they need partly shaded conditions for optimal development.

Approach Vegetation - establishment



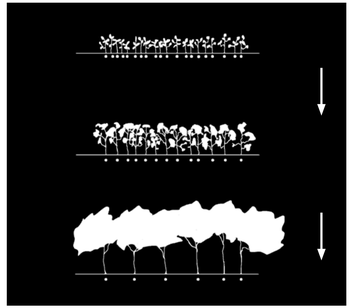
Coppice

When planting trees and shrubs the coppice method can be used in order to rejuvenate a stand of bushes or trees. When coppicing the branches or the trunk are taken down to the ground and new sprouts are allowed to shoot. In this way it is possible to keep trees and bushes alive for a very long time. This is also a useful way of shaping the tree and make it more playful, for instance a tree can be shaped as a sitting place (Gunnarsson, A. lecture, 2014-05-10; Gustavsson, R. lecture, 2014-03-04).



Plant in groups

Planting in groups creates a competition between each plant, making them grow fast in the initial stage to reach as much light as possible. This is mostly shown if planting light demanding trees (Richnau et alt. 2002). Trees growing in the shade will find it suitable to have a less aggressive initial phase and invest in growing underneath the more light demanding species. This creates variations within one stand of for instance 3-4 trees. The trees are in that way helping each other, or fighting each other. Using this natural behavior can create fast growing stands, quickly reaching a desired look or using the succession of trees over time, letting different trees rule a stand at different time.



Plant dense - cut out/reduce

Using an approach when planting several trees in a smaller area and then thinning the area at intervals of a few years in between, creates a variation over time. Through this way of management it is possible to steer the vegetation towards a certain shape and aesthetic expression. This method is especially useful in urban woodlands (Gunnarsson, A. lecture, 2014-05-10; Gustavsson, R. lecture, 2014-03-04)

Phases Vegetation

Phases

It takes time for trees to establish and grow into a robust and sturdy individual therefore it is of importance to establish vegetation with a long-term perspective in mind. Firstly the preventive vegetative planting approaches, concerning the gully and the hill side is something that is important to start with in order to protect the campus site. The water approaches containing vegetation can also be seen as part of the vegetation approach since they are interlinked. They can be combined advantageously with the vegetation approaches, such as the detention areas as well as contour planting, which contributes a strong architectural character. Also the approach “Windbreak” can be looked upon as one the interlinking approaches. Since it not only helps secure the buildings, it also gives shelter and decreases the soil erosion caused by strong winds.

1.
- Planting on hillside - see approaches concerning vegetation in water approaches
- Establishing existing plants
- Windbreak
- Complement planting for leading structures
- Areas of trees

The last few years many of the plantations have been planted and established. The continued work with establishing these trees and shrubs has to be a prioritized task. Additional shade providing trees can be added here as a solution. As mentioned a big proportion of the existing vegetation consists of various plants growing along roads and paths as well as around buildings. This “Leading and framing” planting-approach has been started has the possibility to be continued in order to create a kind of backbone structure at the campus site.

Some additional rows of trees such as by the entrance can with benefits be planted to create a first impression of entering the Kombolcha Campus. Other areas where it is of importance to early establish vegetation are areas where windbreak is needed. Other areas of importance, since many students spend much of their time here, are the library and around the new student lounge. The vegetation can contribute to an even better gathering area and study environment.

2.
- Evaluation
- Additional planting
- Continued maintenance of existing vegetation
- Areas of trees
- Trees along new recreational path

Evaluation from phase one is of great importance to be able to see the progress and draw conclusions of what have been made. In the second stage work with continued maintaining, thinning and pruning of the existing vegetation is essential to reach the wanted appearance of the tree stand. As well as ongoing further planting and establishment of new vegetation in the new vegetation can be planted in the dormitory areas is suggested, this since vegetation can contribute with areas of shelter and create location and privacy, as space and room dividers.

Different spaces around the sports areas, the planting can be strengthen through the creation of place making. Vegetation can also be planted in a way that it with time will create shade on the sports fields and in the resting and audience areas around the actual sports field. Additional plantings can be made in the open field behind the main library to create a comfortable area to reside in, drink coffee, study and walk around in. Clusters of trees can be planted connected to where the recreational path will be.

3.
- Evaluation
- Additional planting
- Continued maintenance of existing vegetation
- Areas of trees
- Rows of trees

Evaluation of the earlier steps are important, to learn and draw conclusion from. Further management, thinning and pruning of existing vegetation must be an ongoing continuous task. New areas for planting and establishment of vegetation can be added to the already established ones. It is suggested that the cafeteria and planned administration area, is planted when the administration building is finished or when the site for the administration building is set. This area can become an important midpoint-node of the campus site, a big gathering area and an important representation area. Clusters of trees in the areas with classrooms to create diverse spaces and microclimates. Row of trees along main road 1 connecting with the main entrance will emphasise the arrival to the campus when passing by.

Placemaking & movement

Placemaking & movement

General

There are different functions and features which need to cooperate in a design. This is in order to support the use and the atmosphere within an environment and space, Christopher Alexander an Austrian architect and Jan Gehl, a Danish architect and urban design consultant, are two architects who states this (Alexander, 1977; Gelh, 2010). In Jan Gehl's published work, Life between buildings (2010), it is expressed that a thoroughly pleasant space, gives the feeling of physical and psychological well-being. In addition to this, creation of space requires collaboration between different components (Gehl, 2010). Movements, Nodes and Placemaking are some of these features. These are also components in our daily life; we move between locations, crisscross between and uses functions within nodes as well as when we stay in places. When improving and trying to make comfortable movement, places to stay and meet features can be used as a way to support the users within a site.

Placemaking in campus areas

Recently there have been two studies carried out concerning research environments; *'The Future Campus – a world of meeting places'* (2012) by Helle Juul a Danish architect and 'Colab City' (2011), conducted by Smog Studio - Caroline and Per-Johan Dahl (2011), architects with focus on experimental practice. These studies both states that a university and research environment, rich in a variety of areas to stay and meet, can be thought of as inspirational and stimulating. Therefore a relation between spatial design and the stimulation of creative behavior can be seen (Dahl, 2011; Juul, 2012).

"Creating room for different moods: It is not only loud, colorful and creative space necessary for innovation. Room for reflection and quiet conversations is also needed."
(Dahl and Dahl, 2013, [2014-05-28])

In planned campus landscapes open areas and vistas as well as nooks and crannies are needed. This is to provide opportunities for the individual as well as smaller and larger groups to be able to participate and be a part of the student life (Dober, 2000). A wide range of possibilities to choose from are of importance - from the more secluded area for one person, to the larger space where groups can meet and share ideas and study together.

When focusing on different mindsets, it is said that creativity can flow within a flexible environment that supports collaboration, while innovation rather takes place within environments designed for individual contemplation (Dahl, 2011). These different areas can consist of spontaneous to purpose-built spaces, from vegetation of bigger plantings and hedges to built details such as stairs or benches (Dober, 2000). According to Strange and Banning (2000), the physical environment contributes to students' learning and development, based on the fact that features in the physical environment are able to encourage or discourage the processes of learning. In addition, the design of physical environments may also promote the gathering of skills that are important for students learning and development progress. Further, Strange and Banning (2000) state that a feeling of community is important for inhabitants in any environment. They also highlight the importance and need for a private space and manifold "niches" at a campus. Example of these "niches" can be a private place in the library or a favorite chair or bench out in the landscape (Ibid.).

Also small scale features and details are stated to be important features for a campus environment, such as: light poles, gazebos, trash receptacles, signs, flag poles and outdoor furniture are common features at campus sites. In addition, other components of even finer detailing, like patterned or colored tiles can create a functional, attractive environment, and can also be important. All the individual elements together form a whole.

Detailing is also a big factor contributing to a hallmark or trademark of a campus. (Dober, 2000., p.247). The same author states that, of all outdoor furniture, the seating is the most important. Seating' of all different kinds and solutions has been identified as the most substantial object in a campus area (Ibid.)

Movement, Node and Place:

In this thesis the term 'Movement' refers to places for moving a certain distance, from point A to B. Movement consists of both, paved walkways, paved paths for vehicles and pedestrians as well as the more informal trampled and spontaneously used paths.

'Node' is here about an intersection where people meet, both where paths cross each other and where different activities are situated, as an example the washing areas, the toilets and the staircases.

'Place' here refers to a place for staying, where people meet and interact or find peace to stay. Nodes are natural thresholds for spontaneous gathering, conviviality, participation in different activities or conversations. Together with areas for movement these are places which enrich and advances campus areas.

Movement, nodes and placemaking in Ethiopia

The street and the space surrounding the streets are, from our perspective, true shared spaces. All kinds of transportation are coexisting and intermingled. Meeting points are mostly the sidewalks, if there are any, or the local coffee shops and the bigger outdoor market place which every town has. When travelling around the country, smaller squares and piazzas, designed with people in mind, were mainly rare but seen in Lalibela, Bahir Dar and Addis Ababa. These cities are three of the major tourist attractions in the country. In Addis Ababa the main square is Meskel Square, this square functions both as a place for swapping transportation, for sports and for spontaneous hangout (Aragaw, 2011).

Movement, nodes and places in the context of Kombolcha town

In Kombolcha there are meeting places everywhere. The town consists of a mishmash of streetscape, bus and bajaj-stop, market stands and cafés etc. Not long ago Main Road 1, which crosses the town, was reconstructed taken a new route. It now takes a new faster direction and includes two roundabouts. These are now the focal points when travelling through the town. Grass and plants are planted and irrigated throughout the year, maintained by the department of ‘Beautification and Sanitation’. Along the new main road stretch trees have been planted. There is also one newly established area in front of the municipal park, planned and planted by ‘Green Mesk farm’.

When reading books and articles that concern design related to human behavior, it can clearly be related to an European context for instance in social interaction. Carney Strange and James H. Banning (2000), make reference to four distinctive zones, space around a person, where we are comfortable in meetings with other people: intimate, personal, social and public. What is interesting is that when staying in Kombolcha and interacting with people it is clear that the distances given in literature are not possible to applicate within this environment.

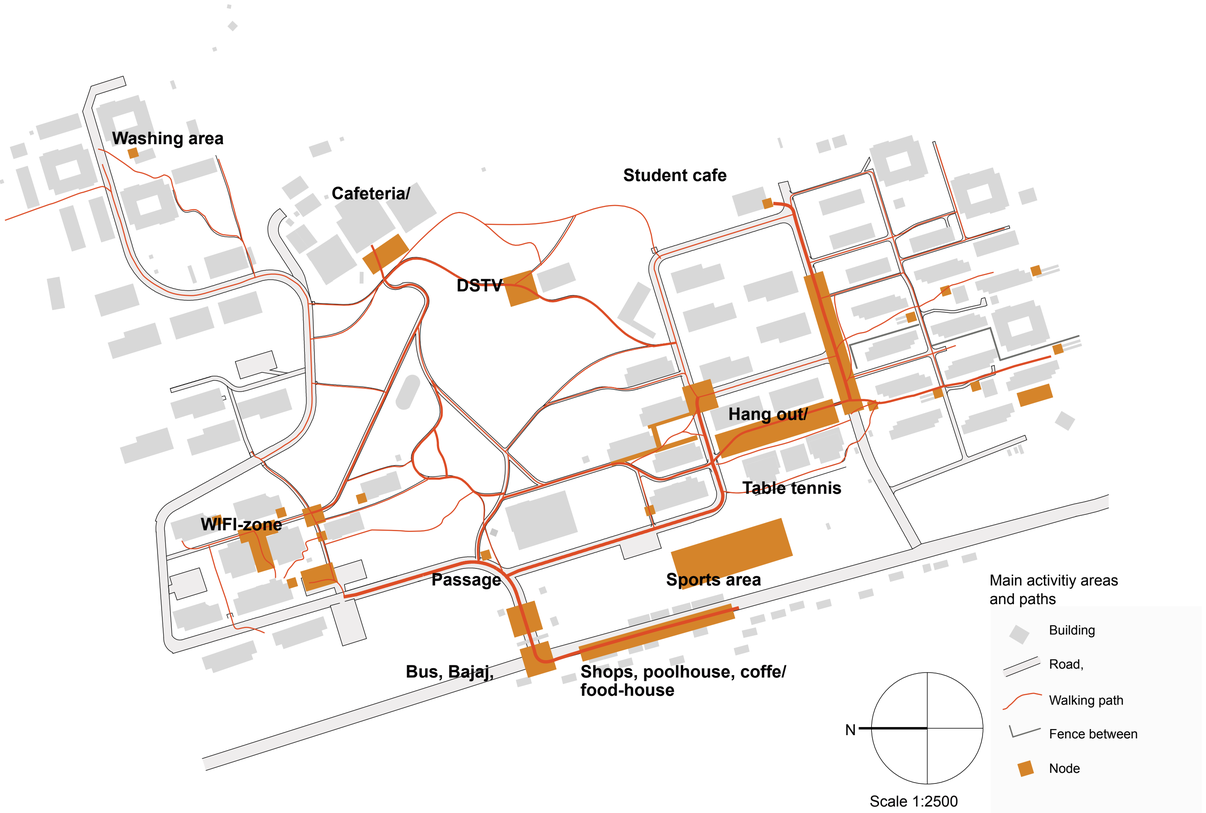
Comfort-zones depend on given different contexts. Personal space and the acceptable distance between people is shorter in Kombolcha than i Sweden. However, statements concerning different zones and the design matter for different types of distances and interaction are important, but vary from culture to culture.

Analysis of Kombolcha Campus

Within the analysis of the Kombolcha Campus interviews as well as observations have been the most used sources when collecting data. In addition to this a workshop was conducted in order to exchange knowledge of how the campus is used and how it could be improved from a students perspective. During the interviews and spontaneous talks, questions such as, *“How do you move from point A to point B?”, “Which roads and what shortcuts do you use?”* were asked. Just as questions regarding where to stay and what to do. *“What do you do when not studying?”, “Where do you hang out and spend your time?”*. The knowledge of ‘When’ is another important factor, for instance questions like *“When do you usually use the area in front of the library?”*.

Movement

The existing conditions of the walkways at campus vary, from newly established cobblestone roads to more or less well trodden paths. There is a system of walkways, including car routes, which is laid out over the whole site. Parts of the system is not yet finished. Today the existing walkways are mainly connected to the doorways and function as a leader from point A to point B.



Since the trodden paths are working as the shortest linkage between many areas they are of great significance. It is worth mentioning that these shortcuts are mostly preferred by both students and teachers, views which have been expressed in interviews and seen through observations. Today, many of the paths have a rough or even bumpy surface which make them hard to walk on, especially at night time when it is dark. Another aspect when planning is that the majority of the paths are crossing the gully and therefore they are disrupted by flooding during the yearly rain seasons. During these periods the users are restricted to the bigger paved main roads.

See further analysis: ‘Movement’, ‘Accessibility’, ‘Light’ p.50-58

Nodes at the campus site

Within the campus area there are several kinds of nodes represented. Examples of these are: paths crossing each other, building entrances, stairways, the bus-stop and the main gate. Most of these are not primarily thought of as nodes, this we see as positive aspects, a function which can be used in multiple ways.

See further analysis: ‘Movement’, ‘Light’, ‘Accessibility, ‘Administration and Library’. p.50-58

Place/meeting points

Places or meeting points are often connected to both nodes and movement. Place is a spot where you can linger or perform an activity. At Kombolcha Campus there are spontaneous places for meeting as well as planned ones. The more spontaneous ones are, for instance, edges such as curb stones, retaining walls and sockets around houses. All of these edges often have the function of sitting, hang out and other activities, even though they are not designed for such purpose. The more planned ones can be the student’ and teachers’ lounges. Here a more informal activity appears. All are important areas for meeting, socializing and relaxation. From one point of view there are plenty of places to meet and interact. However from our perspective there is a lack of planned meeting places where students can study or relax, both one by one as well as in groups are in short supply.

Sports

The need for and importance of playing fields have rarely been questioned. Sports have an educational value of participating in teams, both formal and informal ones (Dober, 2000). At Kombolcha Campus there is today one Sports manager, coordinating the sports activities led by the university. Around Ethiopia there is a tradition of yearly competitions between the universities both in the regions and nation wide (Belay, T. oral. 2014-01-20). All organized sports and training are today directed by the main Campus in Dessie. In Kombolcha we have seen that there is a lack of available sports areas.

It is important to provide areas with a different focus and design in a way that supports physical activity and a multipurpose use. This is important since physical activity has been stated to support both physical and mental health (Mårtensson, 2012). Physical activity includes all forms of organized sports events, individual occasional, or regular, training and day to day walks. At campus today most paths are leading between buildings, from point A to B, therefore the possibility to move around for recreational purposes is limited.

See further analysis: ‘Dormitory’, ‘Administration and Library’, ‘Lounge, Cafeteria and DSTV-house’, ‘Sports’ p.50-58

Workshop

- creating space for sitting area in the outdoor environment

See Appendix> Workshop

“We also want to build our campus”
(female student, presentation workshop, 2013-01-01).

Through arranging a workshop we could better understand the students view upon the site and the needs they thought of as important dealing with sitting areas.

The workshop continued for one day, ending with presentations and reflections. During the day and the presentation many thoughts were brought up, for instance regarding; how people use the campus and what the students consider as pros and cons within the site. One of the main issues brought up was the lack of sitting areas in general. Many students gave the reflection that a good space should include a nice sitting area, preferably with a good view or be situated in a more closed area, they should also be strategically located close to functions: a path, the Wi-Fi-area or a certain view. It was also important for the students to state the comfort like protection in the back, accessibility and the look of the sitting area. These criterias were brought up by all groups. For us the workshop contributed to an idea of how the students look upon an area made for sitting and staying.

Approach

When working with the outdoor environment and place making, concerning the movement just as the nodes, there are several components that interplay with each other and decides how we humans perceive our surroundings (Gehl, 2010; Dober, 2000; Alexander, 1977). Based on this, some of the components have been identified as more important than others. The components are also mentioned in literature as well as found from interviews, observations and the workshop conducted at campus. From this it can be seen that edges, objects, paths, natural elements, light and shade as well as activity areas are components that have great impact on Kombolcha Campus.

We will now present design approaches, later connected to a possible development in the chapter Site Edit, when it comes to *'movement', nodes'* and *'place'* at Kombolcha Campus.

Edges

"In public spaces (depending on the cultural context), people frequently choose to sit, wait or occupy edges of scapes rather than positioning themselves more centrally." (Dee, 2001, p.118)

Edges are places where interaction and activity takes place. Many people are drawn to edges when moving and staying. Edges can be mentioned as something in which man relates their movement pattern (Dee, 2001). When it comes to the urban environment the edge zone in a space provides the highest opportunity for a person to observe and survey the space. It is also known that people like to have their back protected. In that way other people can approach frontally which makes it easier to watch and react (Gehl, 2010; Kaplan and Kaplan, 1989). In the edge zone it is often possible to find shade which can contribute to a temperate and comfortable place, another possible support can be provided through benches, plants, trees and columns etc. These are features a are interesting when consider how to work with and define edges for the campus site. As can be seen by the pics given edges can consist of various elements both vegetation just as a seating area all in order to provide a well working space. To combine an edge with a seating element can be one way to work with an edge and highlights its use.

Furniture

The term furniture can be used to describe any element serving a function or an aesthetic value which has the effect to either clutter or unify designed places. A furniture element can both be in shape of seating, bollards, lighting, monuments just as litter bins (Dee, 2001). When it comes to sitting areas, these ought to be placed where people meet, wait, stay or socialize (Dee, 2001. Gehl, 2010). Primary sitting areas usually consist of chairs and benches. Secondary sitting areas can be complementary to primary sitting areas and consist of other features such as stairs, steps, low walls and boxes etc. At Kombolcha campus site litter bins and seating are among those furnitures which could be used and placed more frequently at various spots, especially within the central parts such as the administration area and classrooms just as within the dormitory area.

Path

When moving through a space, the scale of the surroundings often has a great impact on the pace as well as the general mood. This concerns both walking and bicycling as well as when driving a vehicle.Walking and moving of any kind is a way of transportation; it is also a way of being present in the public environment. It is often important to be able to choose between different paths and routes in order to support different needs (Gehl, 2010; Gustavsson, 1994). When it comes to walking with a certain destination in mind, people are often interested in taking the shortest distance from one point to another, whilst slightly meandering paths are said to be more enjoyed by the person moving (Gehl, 2010). Axis and straight paths often have associations with order, power and control while the type of meandering path is more often associated with the naturalness (Dee, 2001). Many times it is also important for a path to be efficient and free from barriers (Strange and Banning, 2000). When constructing and developing environments it is of importance that they can be used both by individuals with full mobility and people using a wheelchair or who have impaired seeing or hearing etc. This is in order to support the possibility for everyone to participate as well as to create equal availability and conditions for as many persons as possible within society. (Boverket, 2013, [2014-05-29]). When working with the path structure of Kombolcha campus it is needed to focus on different hierarchies and add different scales to the paths. One way to do this can be to work with placing of trees and vary the intervals in between.

"Good campus physical space planning efforts do not stop at providing physical safety and convenience alone, but they also attempt to enhance the pleasurable aspects of the walking experience through a variety of design features such as sitting walls, benches, flowers, and weather protective features." (Strange and Banning, 2000. p.10, [2014-06-17]) A path made with recreation and physical movement in mind can be developed at the campus site in order to support mental and physical health. In connection to the path certain areas with simple tools and design for workout and training could be added. This would create the possibility for recreation and exercise even for those who do not participate in any of the organized activities.

Natural Element

Natural features are represented by for instance leveling in the landscape such as terraces, water and vegetative elements. These together can be used to support the designed space and the wanted use. For instance, focal trees can be used to mark or define a certain feature and a group of trees can be used to accentuate high ground and provide shade. A water element such as a waterfall can enhance the height differences and create a dramatic scene and sound. A smaller spring can be attractive due to cultural and historic association of cultural/historic as well as the opportunity to be used for drinking purposes (Dee, 2001).

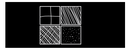
Light and Shade

"Light can shape how space is viewed. It visually expands or limits depth and directs the eye through the space according to brightness from one object area to another. Light introduces emotional qualities to the space such as romance, mystery and drama." (Jankowski, 1993)

There are different types of light that need to be taken into account at Kombolcha Campus. Daylight, provided by the sun, is very strong. This makes it important to

use elements that can provide both half shade and full shade for places to sit, stand, relax and study at site. For the aspect of different types of light, it is important to think of how the light affects the mood and the spatial perception. This concerns both daylight as well as artificial light at night. A site during the daytime can be discovered to be totally different by the light at night; it all depends on which elements and areas that are enhanced (Dahlin, J. oral, 2013-09-30). In the publication *'Lighting exteriors and landscapes'* by Wanda Jankowski, 1993, there are three main objectives to consider when it comes to the aspects of artificial light. The objective of light is to provide both *Safety*, *Security* and *Aesthetics*. Where the safety aspect aims to prevent injuries, it is imperative to highlight elements like stairs and slopes. For security, light can in many ways give a psychological sense of protection (Gunnarsson, A. et.al. 2012). Finally, aesthetics focus on the enjoyment of the environment. Light can support different ways of making characters or elements attractive, by small means at site. During dark hours it also provides opportunities for activities such as sports and hang out in the outdoor environment, in that way extending the hours of outdoor use.

Materials:



The choice of materials and structures creates endless possibilities for the expression at site. For instance what is its character in terms of dark/light or matte/glossy as well as what are its tactile characteristics and degradation potential? The importance of the change in the material is also needed to be taken into account. For instance, some materials can have a totally different expression with time and that can be an aesthetic point to consider (Johansson, 2007). The choice of material is also important in terms of sustainability, it can then be of help to include and answer different questions. What is the wanted and expected life length of the area or object to be constructed? What is the expression and impression wanted from the constructed thing? Where is the closest place to get material to this, in order to save time, transportation and money?

To create a unique place which can stand for and be representative as a label, it is a well-used method to relate the area to the place and surrounding. It is then common to try to find patterns, colors and building constructions related to history, traditions and religion from the country in general and the closest surrounding and specific area in particular. This creates a uniqueness and locality in the design and the expression. With this said, it is not meant that new influences, materials and ideas cannot be included. Instead new knowledge, trends and design can be added and mixed with the local.

Approach Placemaking

Edges

Objects

Paths

Natural elements

Light and Shade

Materials

Phases

In order to support the use of the campus site both for students, faculty and staff, the first key areas can be defined as those areas used for outdoor possibilities for studying, socializing and participation in sport activities. Here the use can be supported through objects made for seating.

1
- Establishment of paths
- Identify nodes and meeting places to develop
- Develop and strengthen sports areas

Continuation of the establishment of the ongoing paths constructions is of importance. In addition the shortcuts/trodden paths across the campus site could be profitably examined. An establishment of one, two or three paths could also be done in order to ease the possibility to reach different areas of the campus more easily. It is a good idea not to construct the overpasses crossing the gully until a later stage, when the risks concerning the gully and flooding are under control.

In order to find and reveal suitable areas for meeting points it is often a good indicator to locate the most used nodes. For instance, an area that would benefit from extended meeting and sitting possibilities is the Wi-Fi-zone where many students hang out from time to time during the whole day. Other important nodes or places are the teacher and student lounge. In the future these can play a major role for studying and integrating with people. Especially, placemaking within the dormitory areas is of great importance since this constitutes the home base for the students.

Physical movement of different kinds are important, with the desire for sports facilities being highly requested during interviews. The existing sports area located in the west is suitable for development and strengthening, both in quality and size. Different kinds of sports can be included in order to suit a wide range of student interest.

2.
- Evaluation of prior phase
- Strengthen existing and develop network of paths
- Strengthen places with sitting areas
- Develop area in front of the cafeteria
- Start work with recreational path

In the second phase it is important with continuous evaluation and strengthening of the existing network of roads and paths where it is needed should be implemented. Paths within the dormitory areas should be further developed. It is of importance to arrange the ground around showers and toilets where the drainage is poor, today it easily gets muddy, especially during rainy season.

Places for meeting and sitting, both smaller and larger ones, can be added in addition and in connection to already established paths. An already established route can for instance be strengthened with e.g. benches or other features supporting the spontaneous meetings.

Further, the area in front of the student cafeteria has great possibilities of forming a representing area as well as a good meeting point for everyone at campus. Especially when the new administration building is constructed the areas can be connected.

3.
- Evaluation of prior phase
- Strengthen and maintaining existing paths and places for meeting
- Develop area around main library and main entrance
- Develop additional sports areas
- Further development of recreational path

In the third phase continuous evaluation, strengthening and maintaining of paths and places needs to occur. When the gully is under control, we recommend the construction of comfortable crossings over the gully. The control of flooding and erosion is also of importance for the timing of start to develop the ground and establishment around the main entrance. The entrance is a high-potential area for future development. Different ground material can be considered and detailing, vegetation and objects added.

Additional sports areas with room for spectators and hang out are suggested to be added around the existing or new sports areas. In this later stage a recreational path can be fully extended.

Site editing

High potential areas for developed

The intention with this map is to indicate the great potential there is within the campus area. The colored squares shows examples of potential areas for additional small scale changes or larger structural elements. The orange color includes all kind of movement and meeting areas. The Green color comprises all kind of green structure approaches while blue symbolizes water management approaches.

Chosen key areas

Dark grey areas are the areas presented further in this chapter. The thicker dark grey line stands for a recreational path, both joined to existing pathways and extended with new walkways in the area. The key areas are shown as examples of how to use and to apply different approaches. Each one of the seven key areas are shown with picture, a schematic plan including the different colors representing the approaches, sections connected to the plan. The sections facilitates an understanding of the differences in height and distance. Some key areas are also explained further with spatiality descriptive sketches as well as sketches including elements selected from the approaches.

Middle Square

Existing site:

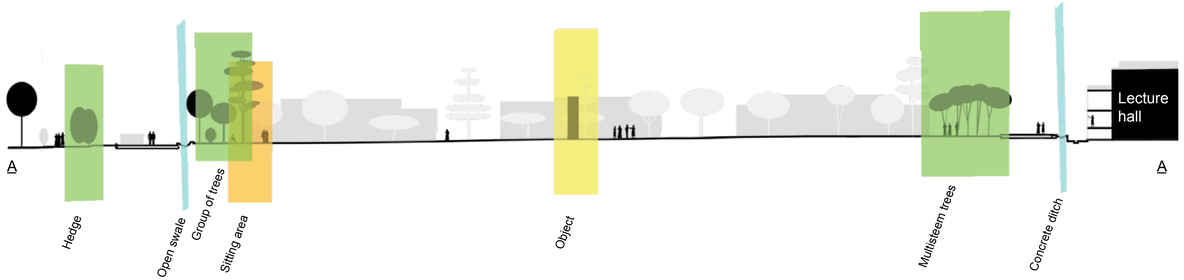
The Middle Square in front of the temporary library is, for the students, one among the most popular places for social interaction and hanging out. The all day opening hours and the light source the library creates during evenings are part of the reason for its popularity as well as its location, close to the dormitories and on the main passage to the classrooms in the north-west part of the site. Today the established trees are mainly planted in rows along a walking path made of cobblestone. The walking path connects to a bigger open surface which stretches alongside the path.

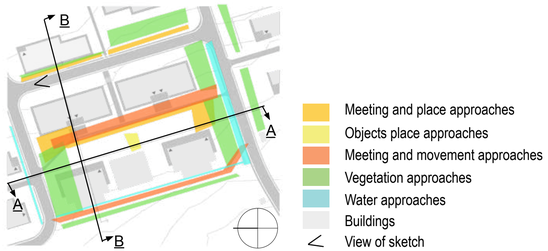
Approach:

Water; Open swale, Ditch concrete barrier
Vegetation; Climbers, Group of trees, Light canopy, Hedge, Ornamental
Place making; Sitting areas, Pergola (climbers), Monument/Object

Through the conducted analyses of the area it was seen that students did hang out around the edges of the lower buildings in the west and around the entrances to the library. The students are using the existing building edges and borders made out of concrete to sit on. Since this is such a popular place, seating objects should preferably be added in order to strengthen the area further. In the proposal seating is placed close to the entrances and in connection to the lower houses in the west. These are places where vegetation is already established.

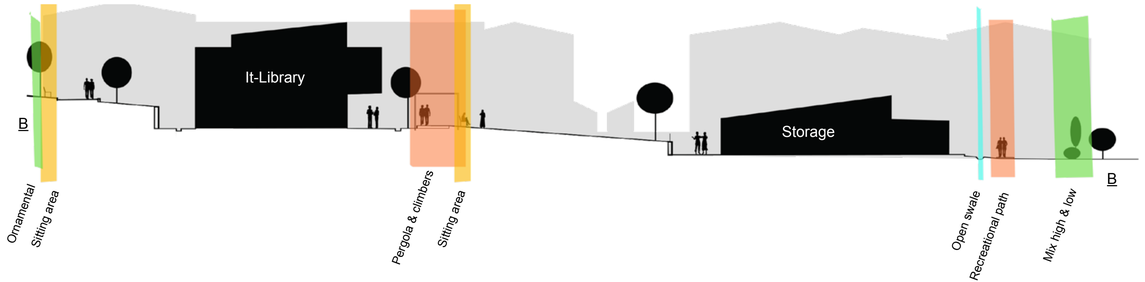
The path could, in addition to the planted vegetation, be enhanced and improved with a pergola. This in order to create a comfortable climate with half shade. The pergola structure also provides the opportunity to decrease the scale of the two temporary library buildings and in that way also contributes to dividing the large middle square into sections or rooms with different feeling of spatiality and pace.

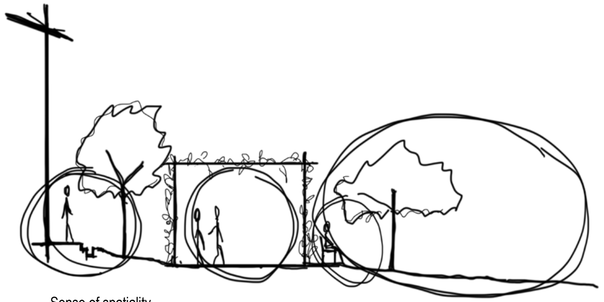




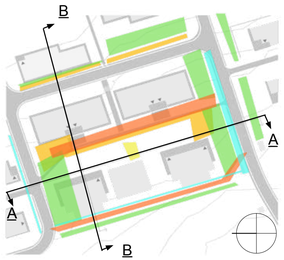
Meeting and place approaches
Objects place approaches
Meeting and movement approaches
Vegetation approaches
Water approaches
Buildings
View of sketch

All scales by princip





Sense of spatiality



All scales by princip

Dormitory

Existing site:

The area of the dormitories is the home for the students. The areas needs to include a variety of functions, all from more public to private chores; areas for washing, using the shower and toilet, socializing, studying and resting. There is a need of environments within the areas with different sized rooms and spatiality, supporting a range of needs for the students.

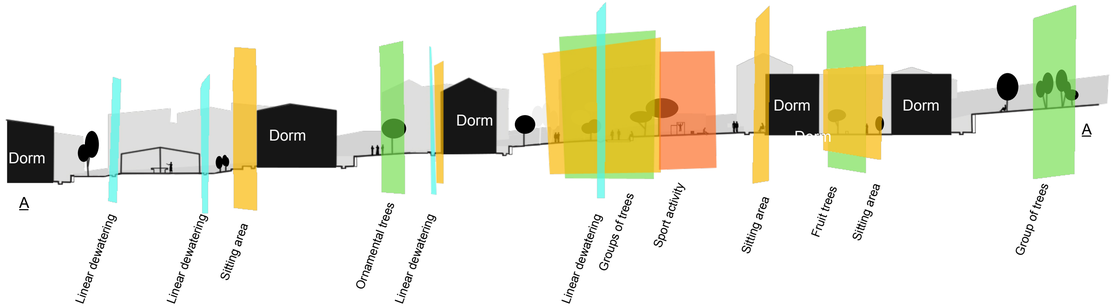
Today the dormitory areas basically consists of houses and some laid out walking paths with young vegetation on the sides. The stairs and edges made out of concrete and stone are used as secondary seating areas. Two buildings consisting of toilets and showers are located outside in between the dormitories in both the male and female section. Around the dormitory houses there are some large green areas which can be used by the students for various activities. There are existing height differences which are worth to take advantage of when they can work as natural space dividers when working with spatiality.

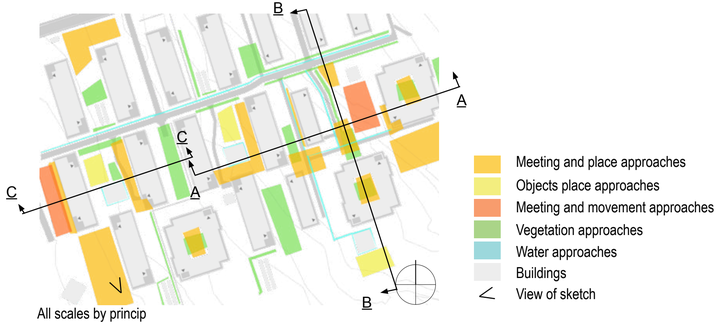
Approach:

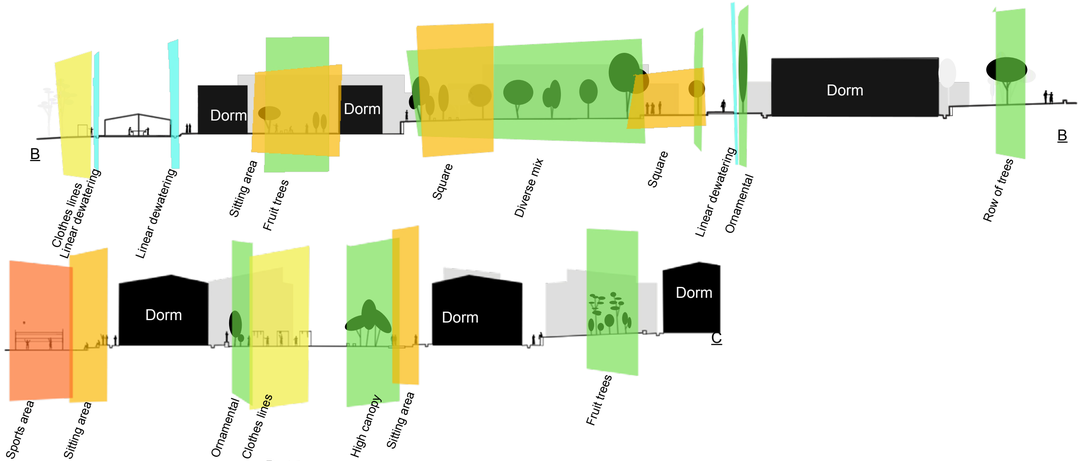
Water; line dewatering
Vegetation; Hedges, Single tree high canopy, Groups of trees, Fruit tree
Place making; Sports Activity, Sitting areas, Clothesline
Improving existing functions such as toilets, showers and washing areas.

Within a dormitory it is important that the space involves different scales in order to fit various needs. At the bigger scale, the space must suit the needs of gathering together larger groups of people, as well as the smaller scaled space where one person or a smaller group can stay for studying and contemplation etc. In each dormitory area there are such places which can be developed further, with additional half shade trees, hedges or an element for sitting.

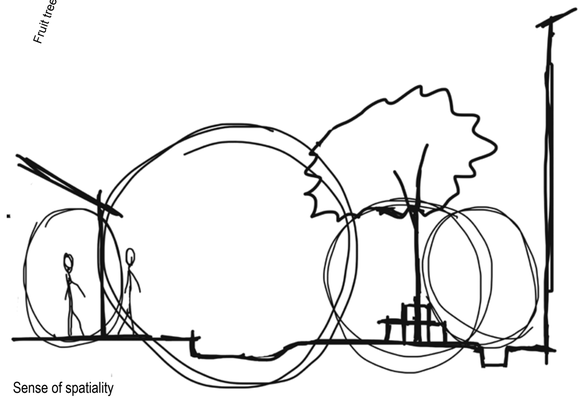
In the sections some of the open surfaces are suggested to be developed further for physical activities like sports. During rainy periods an additional surface covered by a roof could provide opportunities for extra space when study space is short within the dormitory rooms themselves.







All scales by princip



Sense of spatiality

WIFI-Zone

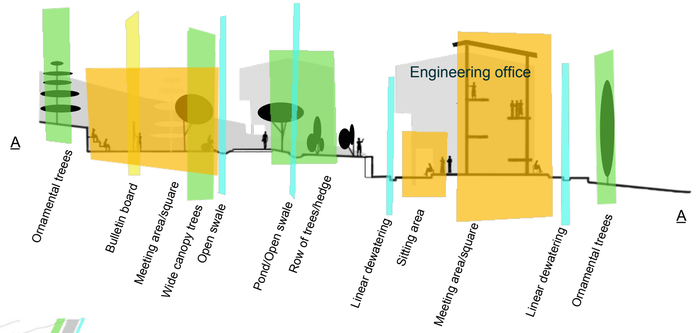
Existing site:

The area with the best Wi-Fi connection is located next to the IT-building and the Engineering office building. It is just outside these buildings where it is, possible to get internet connection outdoors. Many students spend a lot of time around these buildings when surfing or making internet calls. This area is a well used intersection, with many people crossing due to the location in between and close to both offices, administration and classrooms. Trees are planted next to the paths and some ornamental trees are planted close to one of the existing bulletin boards. Next to the IT-building one natural stream rises. Altogether this is a central area with a highpotential to become a well functioning square.

Approach:

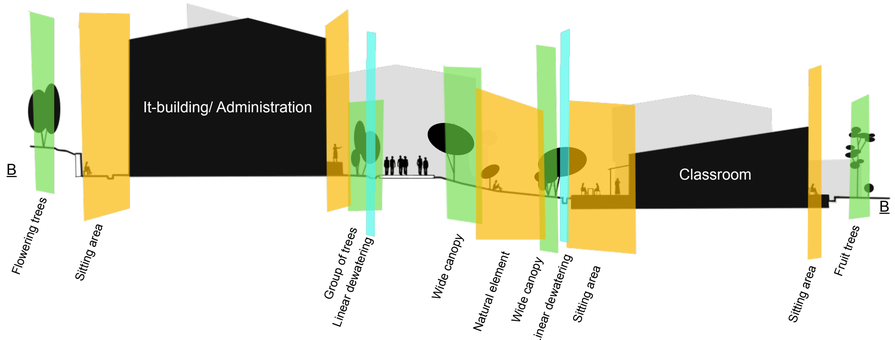
Water; Pond/Stream, Open swale
Vegetation; Ornamental, Single wide canopy, Groups of trees with light canopy, Fruit tree
Place making; Ground material, Square, Sitting areas, Roof construction, Bulletin board, Natural element

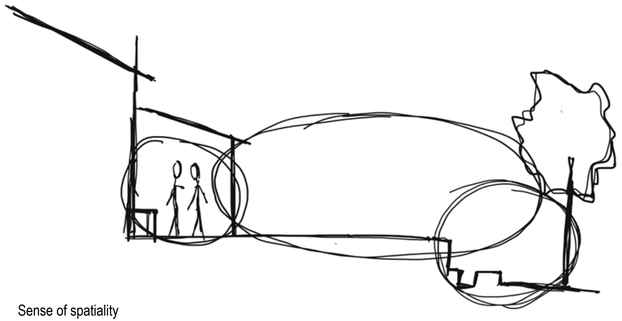
Within the suggestion and section (shown on the page to the right), construction of additional roofs are added to create more shade. In addition benches under the roof can preferable be added. The ground where the bulletin board is located is today of uneven natural ground material. This could be improved by levelling the ground and possibly adding a new ground material such as cobble stone, concrete slabs etc. When using levels this can also support and be used as a seating possibility to widen the opportunity for more people to use the area at the same time.The existing ornamental trees will, with time, manifest this area with their height and growth habitus. Additional vegetation can be used in shapes of both solitary trees with wide canopies and/or trees in groups. These can be added next to the square in order to support the possibilities for shade. The natural stream could be enhanced by widening it and using the water for a year round lush green area.



Meeting and place approaches
Objects place approaches
Meeting and movement approaches
Vegetation approaches
Water approaches
Buildings
View of sketch

All scales by princip

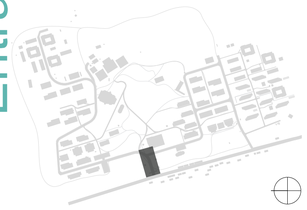




Sense of spatiality

All scales by princip

Entrance



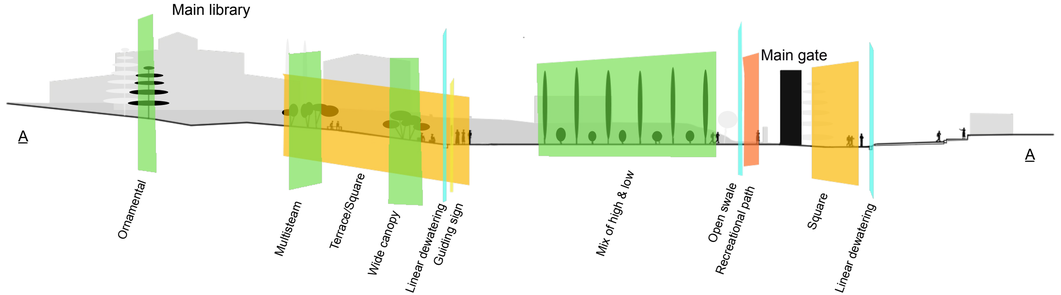
Existing site:

The main gate and the area surrounding the entrance creates an important first impression of Kombolcha Campus. It is an area which must function efficiently for many different functions at once. All transportation to and from the campus must pass the main gate in order to enter the area. The area along the main road is also functioning as stopping-place for busses and bajaj vehicles. Throughout the day students, faculty and staff are passing the gate by foot in order to stroll along the area outside campus for shopping, eating or socializing.Today the ground consist of packed clay, often bumpy, with low infiltration and poor dewatering. The focal point when entering the gate is the main library, a beautiful building with great potential when fully constructed and in use. The vegetation around the entrance is sparse or nonexistent.

Approach:

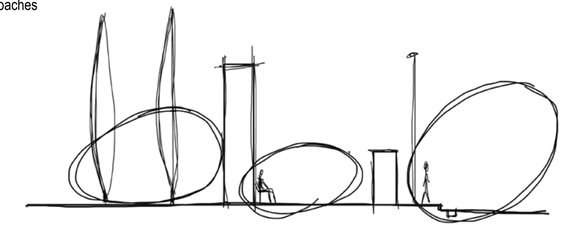
Water; Linear dewatering
Vegetation; Ornamental trees, Flowering trees/bushes
Place making; Ground material, Square, Guiding sign, Sitting areas, Flagpole, Parking, Recreational path

The entrance could be improved with a sufficient storm water management and a more suitable material for the ground, such as cobble-stone or asphalt. The road leading you into the site could be enhanced by ornamental trees and/or flowering bushes. Meeting a guiding sign and a square formation connecting to the library with groups of trees and sitting possibility for a more comfortable and functional meeting point.

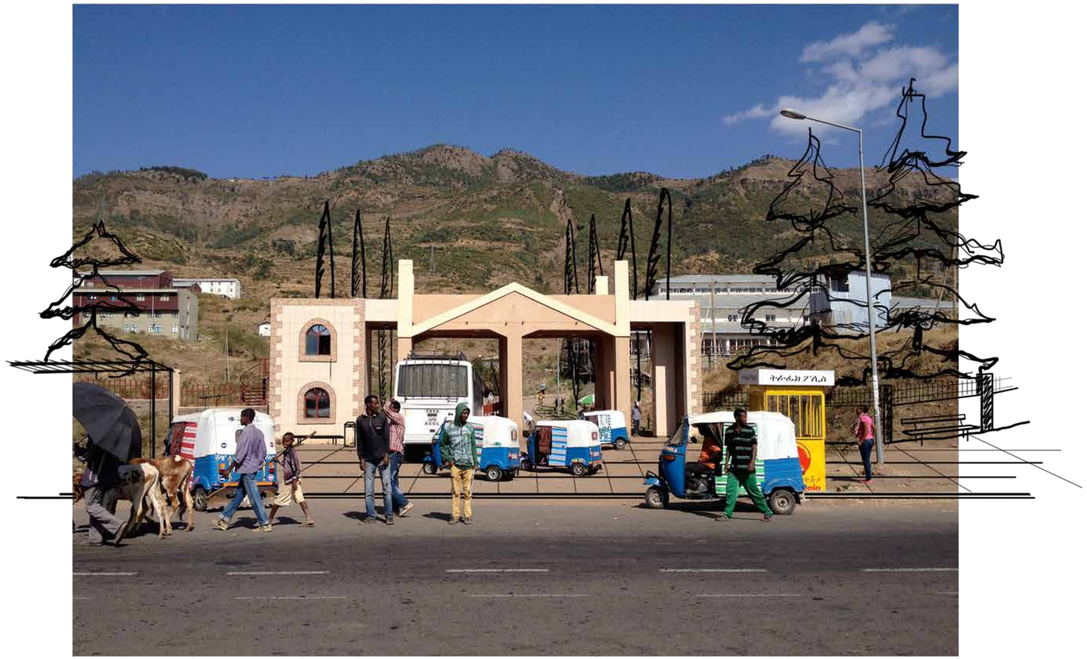


All scales by princip

- Meeting and place approaches
- Objects place approaches
- Meeting and movement approaches
- Vegetation approaches
- Water approaches
- Buildings
- View of sketch



Sense of spatiality



Student Lounge

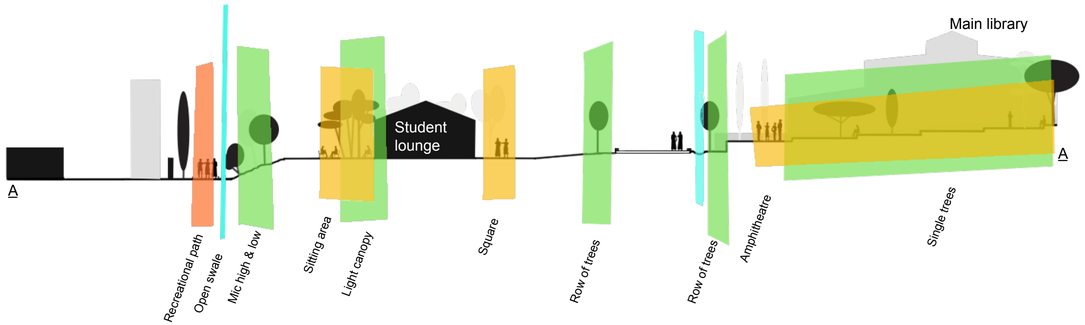
Existing site:

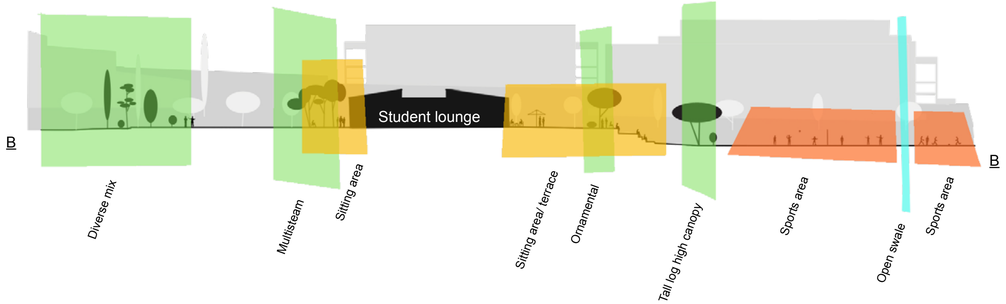
A new student lounge is under construction. The new lounge area has a profitable location, close to where many students pass throughout the day. It is also located close to; the main library, the main entrance and closer to where most staff and faculty are working. This can be an important spot where students and teachers can meet and interact. This area together with its surroundings can be a main meeting point and incorporate a range of different activities and functions.

Approach:

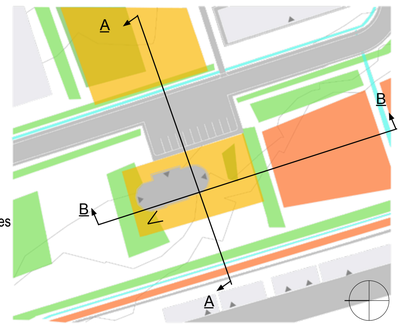
Water; Open swale, Concrete drain
Vegetation; Groups of trees light canopy,
Place making; Ground material, Terrace, Amphitheatre, Sports area, Recreational path, Sitting area, Natural element

Within the proposal a suggested veranda could be added together with a terrace which will take advantage of the height difference, adding sitting possibilities and generating a smooth meeting with the suggested sports area. Trees with light canopies can be added to bestow light shade among the sitting areas. The area surrounding the lounge is not yet constructed and by taking advantage of the existing height differences it can provide multifaceted possibilities. The suggestions here are to add a recreational path and a sports area next to the lounge. This opens up the area for both spectators and interaction. Next to the library there is today a slightly sloping area. This can be remodeled as an amphitheatre, used both as a gathering area, classes or, personal study and as a theatre or for other performance.

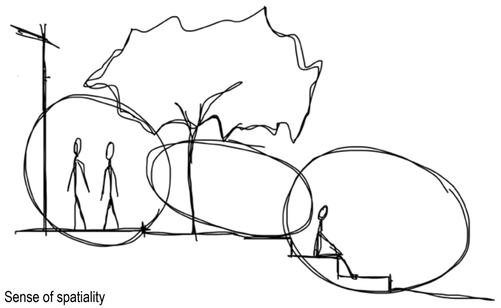




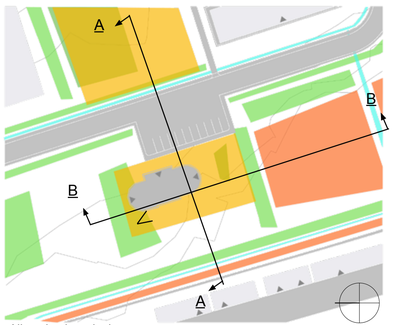
Meeting and place approaches
Objects place approaches
Meeting and movement approaches
Vegetation approaches
Water approaches
Buildings
View of sketch



All scales by princip



Sense of spatiality



All scales by princip

Cafeteria and Administration

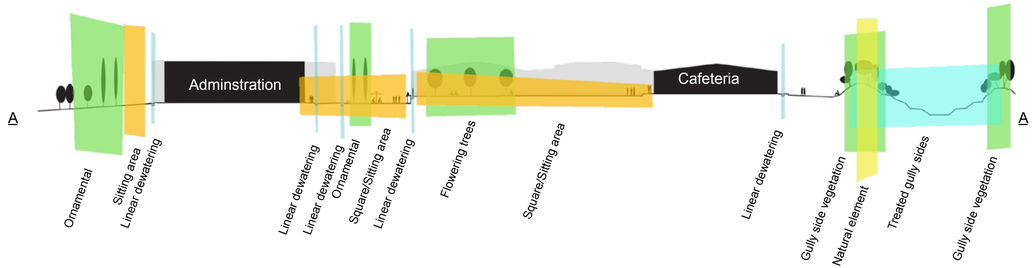
Existing site:

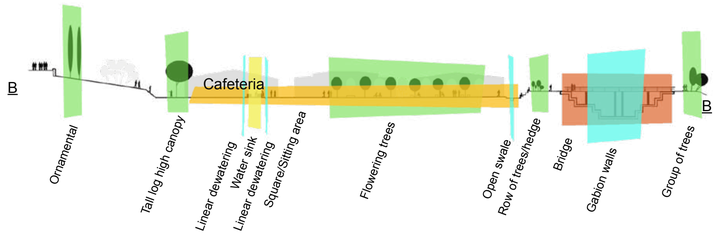
The cafeteria is placed in the higher parts of the campus environment. There is a natural terrace in front of the cafeteria with high potential to become a comfortable outdoor environment. The high location of the cafeteria gives a scenic view over the valley with Yegof Mountain as the backdrop. In the cafeteria all students are served meals three times a day. This means that it has to be an area accessible for many people in a short time span. The open area in front of the cafeteria is also a well used path, used when walking from the north area to the south area of the campus. Today the ground consists of packed soil with an uneven surface, dusty when dry and slippery when wet. The runoff from the area is insufficient as it is today. The area is also threatened by flooding and erosion as well as risks from the gully alignment down the hill. When it comes to vegetation there are trees along the main paths reaching the cafeteria. Otherwise its is mostly sparse grass and with some smaller bushes spread by natural processes.

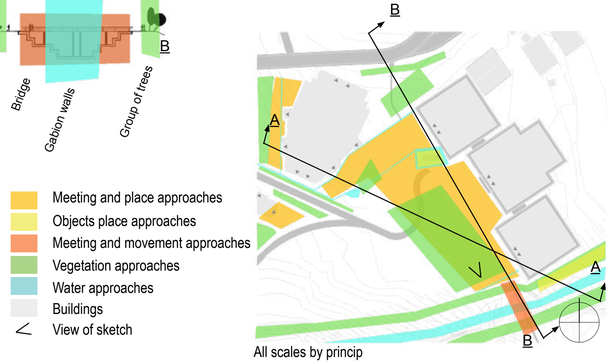
Approach:

Water; Linear dewatering, Soil bank with clay core, Reshaped gully side decreased inclination, Gabion walls including bridge, reinforced core.
Vegetation; Ornamental trees, Flowering trees, Groups of trees, Hedges
Place making; Water sink, Sitting area, Natural water stream, Bridge

Next to the cafeteria there is a plan to build a new administration building. This will add a representative value to the area. In the suggestion the terrace could be enriched with ground material such as concrete slabs or cobble stones combining the two buildings. Planting lowering trees in rows and tall ornamental trees close to the planned administration building can provide extra value and define the space around the cafeteria further. Additional water features for hands washing and sitting areas could also be used. The gully that runs to the south side constitutes a risk towards the cafeteria the sides of the gully need to be strengthened. When doing so there is a possibility to also incorporate a bridge and then ease the movement to and from the cafeteria during rainy season. The slopes and sides of the gully here can also be strengthened with a reinforced core made of clay.







All scales by princip

Gully- as a meeting point

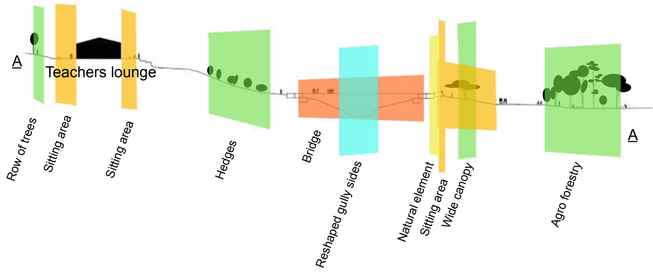
Existing site:

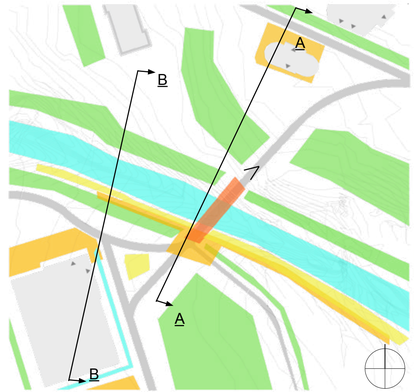
The gully leaves a scar in the hillside descending through the middle of the campus site and creates a threat towards many buildings. The gully and the flooding have caused severe damage to both the cafeteria and the main library. The water mass has also stopped planned construction of some parts of the campus.

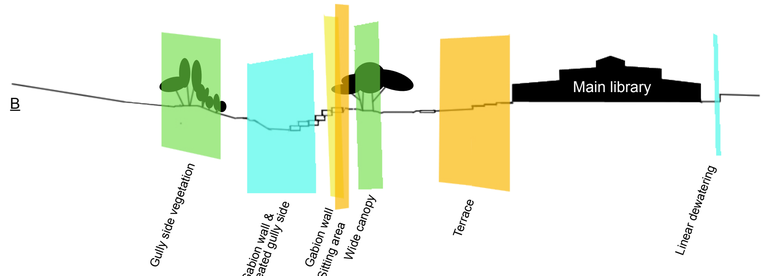
Approach:

Water; Treated gully side vegetation, Gabion walls, Reshaped gully side decreased inclination, Check dams
Vegetation; Hedges, Ornamental trees, Flowering bushes,
Place making: Sitting area, Square, Natural element

Using different treatments together with designs this can instead of being a risk be turned into an area with water, vegetation and constructions which can support and enrich both the movement and the stay in the area. In sensitive areas where the gully has low edges gabion walls can be constructed in order to both reduce the erosion risk as well as to provide sitting space during the drier periods. Where the path crosses the gully, gabions can be combined with a bridge construction. To protect the edges of the gully the steep inclination of the edges can be reduced, rounded and planted with grasses and bushes.







Meeting and place approaches
Objects place approaches
Meeting and movement approaches
Vegetation approaches
Water approaches
Buildings
View of sketch

All scales by princip

Gully - wider perspective

To zoom out and see the whole picture of the campus site and the gully. Not only within the site itself but also look upon the entire and whole system and its connections. However, it is important to highlight that there is not one solution in itself that can solve and create a well functioning campus site. Instead it is a range of solutions working together. The solutions adapted to each area along the mountain side, the gully and the site which all together can make the difference.

Photo: Eric Miller 2014-06-15

In the mirror

- reflections and discussion on the results of the work and ways to reach there

IN THE MIRROR
– reflections and discussion on the results of the work and the ways to reach there

The product of this work is a design program for Water management, Vegetation and Placemaking & Movement at Kombolcha Campus site. With localizations and time phasing, as well as examples, this framework can be applicable for different situations that may appear during the years to come.

Throughout the main research question has been: *"In what ways can the interaction and the resources; water and vegetation, at Kombolcha Campus site be supported and developed?"* There is not only one given answer to such question. Our way of answering this question has been to construct a flexible and interdisciplinary framework for Kombolcha Campus. This has been undertaken through an approach based design and planning program, a design and planning program focusing on prioritization and phases allowing changes with time. The design program includes approaches possible to use at different locations as well as possible to combine with each other. In this way, suggestions as to phases and approaches given in the design program are components of what we think of as a flexible tool and framework that can be a support for the coming detailed design and development of Kombolcha Campus site.

Points of departure

"Is it justifiable to conduct a design and set master plan when the water and the sanitation is not sufficient?", and *"How can we deal with a design program when there is a scarce budget and an insecurity in what will be developed next? Is then the need of a set design and a fixed master plan program relevant?"*

Kombolcha Campus is, at present, at a stage where functions are relocated due to new buildings added at site as well as a threat of flooding. In addition to this situation, aspects like the limited and uncertain economic capacity needs to be taken into account.

The above mentioned questions generated the conclusion that a Master plan, which was our original thought to conduct, for this site would not be a sufficient product. Instead it can be argued that there is a need for a design and planning program which can be adjustable over a longer time span, that can reflect and respond to the prevailing economic situation, and contingent tendencies. These are also thoughts that can be related to the movement of Landscape urbanism. Landscape urbanism highlights the issues when stipulating a decisive program, when the future is indecisive and has to accommodate the contemporary changes within its context (Waldheim, 2006). According to, Lindholm (2012), Landscape urbanism is a way of bringing together knowledge from architecture, landscape architecture and urban design, urban planning and landscape planning in order to grasp and keep the complexity within a project (Lindholm, 2012). With such an interdisciplinary approach Landscape urbanism engages both the large scale and the small scale as well as political aspects. This masters thesis been based on such premise in many ways. However, the way of performance is regarded to be based on the interactive premise rather than a top perspective from which the Landscape urbanism often is used.

Structural hindrances

Today within Kombolcha Campus there is no comprehensive planning document or common goal which brings together different fields. Plans and actual constructions within different fields are not brought together and coordinated in time. This made the search for information a continuous process during the whole time spent in Ethiopia.

Information needed was found by talking to the concerned person, following threads and themes as they were discovered and by networking. However, the search for right person was also a process in itself. Either we were asking the wrong questions or the way of communicating differs from culture to culture and person to person. This shows the importance of networking and socializing. Using other tools, such as maps and pictures when talking and interviewing became crucial. These tools together with body language opened up the possibilities for interaction and participation.

On the one hand, it is possible to argue that the search for information made the pace of the process slow and inefficient. On the other hand, through this search and numerous meetings with people, it instead widened and strengthened our perspectives and the information about the campus. Information and views, which might have passed us by, were now revealed and reflected upon.

Modes of flexibility

The major components chosen to make this a flexible planning tool have been to use approaches and phases. The approach based method contributes a range of different solutions possible and necessary to combine with each other. The approaches are all applicable and suitable to use at different locations within the site. An area, a function or design can therefore be developed in innumerable ways. This can seem as a way of not dealing with or solving a problem but instead a way of circumventing it. We state that a flexible way of working instead challenges the designer to find multiple solutions applicable to a site since the wanted outcome is often not known from the start. When it comes to design, there is within the field claimed by Allen, 1999, that as a landscape designer in one way it is necessary to give up all the huge amount of control of their work:

> *"complex and instrumental landscape issues involves more organizational and strategic skills than those of formal composition"*
>
> (Corner, 1999 p.160).

When planning a big scale project with several crucial fields, it needs to function well as a whole. One way is to work with phases as a planning tool. Phase-based thinking allows flexibility even once a long term project has started. Each phase is dependent on the former step. Through evaluation the project and the goal can be updated and revised to the current situation and contemporary tendencies. Phases is also one way to allocate costs as well as to be able to handle and to prioritize the most important and crucial engagements in a project.

When stressing different solutions in the program it has been a standpoint, from a sustainability point of view, to strive for low-tech solutions. By sustainable we mean from the perspective that many solutions can be accomplished by local resources and knowledge. Local knowledge and materials are most likely cheap and eases the adaption at site. Many of these solutions and approaches are also already tested, evaluated and in use in different parts around Ethiopia.

Directions

Nevertheless, just as with any project, this also has to be transferred to the practical and detailed scale in order to be assessed. When taking this project from a planning level to realization a suggested start is to organize a group of experts within planning and different relevant fields. Engaging several experts can be seen as an expensive investment. However, firstly when working within phases it is possible to prioritize and postpone certain operations and costs forward in time. Secondly, this project concerns a university with great potential and variation of qualified personnel. This group of experts needs to cooperate, and can when needed, engage additional expertise along the process to encourage the interdisciplinary approach. In order to develop this into a long term project it can be of importance to cooperate with Kombolcha municipality as well as involving local people in the surrounding area. This is especially relevant since the fields dealt with, water management, vegetation and placemaking & movement, are fields concerning a larger area and wider scale than just the campus site itself.

Long term projects are often dependent on a determined board and project group, striving for a common vision. Therefore one can argue that a long term project is uncertain in its future development and in its possibilities when it comes to reaching a common vision. On the other hand, a comprehensive planning which frames the interdisciplinary fields is a more allowing way of designing than a fixed plan. This since the comprehensive planning can be improved and strengthened by possibilities within changes over time. With new occurring situations the plan has to be re-evaluated in order to suit a new, current situation.

Perhaps it is possible to discuss whether these approaches within the different fields, water management, vegetation and place making & movement have covered the core of the issues at Kombolcha Campus and whether these solutions can support the campus in the best possible way. However, what is important in these cases is a common vision, goal and effort and above all, the will to make changes. For this matter in Kombolcha there is no doubt that there will be a decent and functioning campus with time.

Sources

Published sources:

Aragaw, M,T. (2011) *Urban Open Space in Addis Ababa - The case of Meskel Square*
Also as websource: *http://stud.epsilon.slu.se/2829/.* [2014-06-17]

Ashcroft, K. and Rayner, P. (2011) *Higher Education in Development.* Charlotte, Information age publishing. 2011.

Bekele-Tesemma, Azene (2007) U*seful trees and shrubs for Ethiopia. Identification, Propagation and Management for 17 Agroclimatic Zones.* Nairobi: RELMA in ICRAF Project, World Agroforestry Centre – Eastern Africa Region Programme.

Beles A. (2013) Beles Engineering PLC. M.B.S.A Consultants PLC. 2013. *Kombolcha storm water Master Plan Design Study. Report for Urban Local Gouvernment Development Project (ULGDP).* Addis Ababa: Federal Democratic Republic of Ethiopia Amhara National Regional State

Brown, A.G, (1999) *Fluvial processes and Envrionmental Change.* Wiley & sons; New york, USA.

Briggs, Philip (2009) *Ethiopia.* London: Bradt Travel Guides.

Cornell, Erik. (2004) *Revolutionärernas förräderi: Afrika efter kalla kriget.* Studentlitteratur, Lund

Creswell, J. W. (2009) *Research design : qualitative, quantitative, and mixed methods approaches.* Third edition, Thousand Oaks, Calif. : Sage

Dahl. C, Dahl. P-J, Wong. A (2011) *Colab City.* Region Skåne and Lunds kommun, Sweden 2011.

Dee, Catherine. (2001) *Form and Fabric in Landscape Architecture.* Spon Press. London & New York

Dober, Richard, P. (2000) Campus Landscapes, Functions, Forms, Features. John Wiley & Sons, Canada

Gehl, Jan. (2010) *Life between buildings.* Sixt edition. Skive: Arkitektens forlag

Givoni, Baruch. (1998) *Climate consideration in Building and Urban Design.* New York: Van Nostrand Reinhold

Gish, Steven. (2007) *Ethiopia, Cultures of the world.*

New York : Marshall Cavendish Benchmark

Grahn, P. Stigsdotter, U.K. (2011). *Stressed individuals' preferences for activities and environmental characteristics in greenspaces.* Urban Forestry & Urban Greening, vol. 10, 2011, sid. 295–304

Gustavsson, R. (1994) *Det nya landskapet: kunskaper och idéer om naturvård, skogsodling och planering i kulturbygd.* Skogsstyrelsen, Sverige.

Hasibul Kabirand, (2012). *Why is drawing important to research?* Journal of Landsacpe Architecture, spring 2012

Hedlund, and Wejbro, (2013). *Design program for Dessie campus.* Alnarp: SLU, Landskapsarkitektur . Also as websource :http://stud.epsilon.slu.se/5022/

Jankowski , Wanda. (1993) *Lighting exteriors and landscapes.* Diane Pub Co; First Edition edition.

Johansson, Desiree. (2007) Material i Landskapet. Stockholm: Arkitekternas forum för forskning och utveckling (ARKUS)

Lindholm, G. (2012) *'Visible gestures'-on landscape perspectives in urban planning.* Planning Theory Vol 11,1,pp5-19.

J-B. Carillet. (2013) *Lonely Planet Ethiopia, Djibouti & Somaliland.* Lonely planet publications Pty Ltd.

Kaplan, R. Kaplan, S. (1989). *The Experience of Nature.* Cambridge University Press, Camebridge.

Martensson, Fredrika. (2013) *Guiding environmental dimensions for outdoor play.* Socialmedicinsk tidskrift, Vol 90, Nr 4, 2013.
Also as websource: *http://socialmedicinsktidskrift.se/smt/index.php/smt/issue/view/87/showToc.* [2014-03-20]

Mikkelsen, Britha. (2005) *Methods for Development work and research-a new guide for practitioners.* 2nd ed. Sage, London.

Scheyvens, Regina and Storey, Donovan (2003) *Development fieldwork a practical guide* London: Sage

Patel, R., & Davidson, B. (2003). *Forskningsmetodikens grunder. Att planera, genomföra och rapportera en undersökning.* (3 uppl.). Lund: Studentlitteratur.

United nations (1987). *Our common feature. Nairobi: United nations envrionment program.* Rapport. FN-Dok. A/42/427, p. 37.

Sida, handout a (2013-10-02) *A communicative approach to cross-cultural dialogue.* Handout prepared by Alex Muigai

Sida, handout b (2013-10-02) *Elements of two paradigms: A comparison. Time to listen: Hearing people on the Receiving End of International Aid - 6000 people interviewed.* Handout prepared by Alex Muigai

Stahre, Peter (2004). *En långsiktigt hållbar dagvattenhantering.* Ljungbergs Tryckeri, Klippan

Stahre, Peter. (2008). *Blue-green fingerprints in the city of Malmö, Sweden.* Tryckeriteknink AB, Lund

Healey, Patsy. (1997) Collaborative planning. Houndsmill, Basingstoke, Hampshire: Palgrave, ss.51, 64.

Wollo University, *external & public relations office.* (handout 2013). Wollo University. Dessie: Wollo University

DESTA, L. ET AL. (2005): *Part 1: Community Based Participatory Watershed Development: A Guideline.* Addis Ababa: Ministry of Agriculture and Rural Development.

J.M. Kinama. et.al. (2007) *Contour Hedgerows and Grass Stripes in Erosion and Runoff Control on SLoping Land in Semi-Arid Kenya. taylor francis online*

Arid Land Research and Management Volume 21, Issue 1, 2007

Sources

Electronic sources:

Audensen, E and Gulliksen, A-K. (2013) *Report on recognition of higher education in Eritrea and Ethiopia. NOUK.* Accessible: http://ebookbrowsee.net/gulliksen-anne-kari-audensen-erik-report-on-recognition-of-higher-education-in-eritrea-and-ethiopia-2013-1-pdf-d449012768 [2014-03-10]

Banning. H and Strange C. (2001) *Educating by design*: : *Creating Campus Learning Environments That Work.* San Francisco: Jossey-Bass Publishers

Boverket. 2013 *Tillgänglig och användbar byggd miljö.* Accessible: http://www.boverket.se/Tillganglighet/Tillganglig-och-anvandbar-byggd-miljo/ [2014-05-29].

Dahl. C, Dahl P-J (2013) *coLAB City och det innovativa stads-landskapet.* Accessible: http://www.landskapsobservatorium.se/?p=1536 [2014-03-15].

Elissa Jobson, freelance journalist, Good governance Africa, 2013,http://gga.org/stories/editions/aif-15-off-the-mark/gambling-on-education)

GIZ (2013) *Deutche Gesellschaft für internationale zusammenarbeit (GIZ) GmbH.* Accessible: http://www.giz.de/en/worldwide/18963.html [2014-02-18]

Google maps (2014) Landsat mapdata. https://www.google.dk/maps/place/Ethiopia/@11.0833966,39.7323972,9665m/data=!3m1!1e3!4m2!3m1!1s0x1635d0cedd6cfd2b:0x7bf6a67f5348c55a

Gunnarsson, A. et.al. (2012). *Vegetationsstyrning för ökad trygghet. (Landskapsplanering, trädgårds- och jordbruksvetenskap.* Rapport 2012:13). Alnarp: Sveriges lantbruksuniversitet Accessible: http://pub.epsilon.slu.se/cgi/search/simple?q=Vegetationsstyrning+f%C3%B6r+%C3%B6kad+trygghet&_action_search=%C2%A0S%C3%B6k%C2%A0&_order=bytitle&basic_srchtype=ALL&_satisfyall=ALL [2014-03-10]

IPCC. 2014 IPCC, 2014: *Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32. Accessible: http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf [2014-06-10]

Juul, H. (2012) *The Future Campus – a world of meeting places.* By -, Bygnings - og Landskabsarkitekter. Accessible: http://byensrum.dk/english/documents/Thefuturecampusaworldofmeetingplaces.pdf

Kombolcha City Administration 2014. Accessible: http://www.mwud.gov.et/web/kombolcha/home [2014-06-11]

Landguiden (2013-10-27) Accessible: http://www.landguiden.se/Lander/Afrika/Etiopien [2013-11-20].

Lunds University (2013-10-13) Accessible: http://www.lunduniversity.lu.se/about-lund-university/vice-chancellor-and-management/mission-and-values [2014-03-28]

MOE,Ministry of Education. (2001/2002) *Higher Education in Ethiopia: Facts and Figures 2001/2002.* Accessible: http://www.moe.gov.et/English/Information/Pages/HEIadm.aspx [2014-02-19]

NE (2014-06-15) Accessible: http://www.ne.se/lang/etiopien/landsfakta [2014-06-15]

Sida. (2013) About us: How we operate. Accessible: http://www.sida.se/English/About-us/How-we-operate/ [2014-06-14]

University of California, Berkeley (2014) Accessible: http://www.berkeley.edu/about/fact.shtml [2014-03-22]

USDA National Agroforestry Center. (2014-03-24). Accessible: http://nac.unl.edu/#about [2014-04-11]

Water aid (2013) http://www.wateraid.org/uk/where-we-work/page/ethiopia [2014-04-22]

Wenr, 2014-02-19 Accessible: http://wenr.wes.org/2011/08/wenr-julyaugust-2011-an-analysis-of-the-strengths-and-weaknesses-of-ethiopian-higher-education/

Wollo University official homepage, president. (2014) Accessible:http://www.wu.edu.et/president.php [2014-03-12]

Wollo University official homepage (2014) Accessible:http://www.wu.edu.et/reasons.php [2014-06-01]

World weather online (2014) Accessible: http://www.worldweatheronline.com/v2/weather.aspx?q=11.0830692053473,39.7418403625488 [2014-06-11]

Sources

Oral sources:

Assamenew, S. (oral, 2013-12-10) Open interview and walking tour. [2013-12-10] Kombolcha Campus.

Dr. Balcha. (oral, 2014-01-31) President. Wollo University, Dessie and Kombolcha Campus

Belay, Tewobsta. (oral 2014-01-20). Sports manager. Wollo University, Kombolcha Campus

Bezabih, A. e-mail conversation. (2014-05-16).

Dahlin, Josette. (2013-09-30) Lecture: *Important visual concepts for Lighting Design. Course:Design composition and Materiality.* SLU, Swedish University of agricultural Sciences.

Endaloumaw, Dehebe. (oral, 2014-01-06) Head gardener, Wollo University, Kombolcha Campus

Gaul, Ryan. (oral, 2014-01-29). Volunteer at the American peace corps, positioned in Kombolcha.

Getachew. (oral, 2014-01-15) Department head, Soil and Water. Wollo University, Kombolcha Campus

Goshime,Yichalewal . (oral, 2014-01-28). Vice Scientific director. Wollo University, Kombolcha Campus

Gunnarsson, Allan. (lecture, 2014-05-10). Lecturer: Landscape Architecture, Planning and Management. SLU, Swedish University of Agricultural Sciences

Gustafsson, Eva-Lou. (oral, 2014-03-12). Lecturer: Landscape Architecture, Planning and Management. SLU, Swedish University of Agricultural Sciences

Gustavsson, Roland. (lecture, 2014-03-04). [lecture notes] Professor: Landscape Architecture, Planning and Management. SLU, Swedish University of Agricultural Sciences

Masresha, Muluken. (oral, 2013-11-10). (former) Scientific director. Wollo University, Kombolcha Campus

Melaku, Solomon. (oral, 2013-12-25). teacher and PhD candidate at the forestry department at Dessie Campus

Nielsen, Anders Busse. (lecture, 2014) *Stand structure and forest dynamics.* [lecture notes] course: Dynamic vegetation design, SLU, delivered 2014-04-08. Professor of plants and planting design på University of Copenhagen, assosiate professor at the Swedish University of Agricultural Science (SLU).

Seman, Allemayehu. (2014-01-29) Resident Engineer at GIZ. (Deutsche Gestellschaft für Internationale Zusammenarbeit, GmbH)

Sundahl, Ann-Christin. oral, 2014-03-27. Civil engineer and technical licentiate in water resources engineering. 14 years experience as a consultant at the company Tyréns, since 3 year head of water department within the company.

Tamrat. oral, 2014-01-10 Consultant at GIZ (Deutsche Gestellschaft für Internationale Zusammenarbeit, GmbH).

Appendix: Talk & Interview

General voices of students
9/12 Monday, walk, with male student, outside campus, along main road 1.
- Here are small shops and places to eat, stay and meet, like for eating, play pool, beauty salon.
There are at least 10 pool places. The food costs around 10-15 ETB.
- We need more green-areas. Everything is Eucalyptus.

12/12 Tuesday, talk with students about life at campus, behind the two libraries in use.
- Please give us Questionnaires instead.
- Otherwise, We don't know what to answer.

Question about where they have their study places and where they meet.
- We also sit outside campus, opposite side of the entrance. Otherwise lack of places to study, people also sit in the fields to study.
- By the registration building there is good wifi, many students who have a computer hang out there, it is a meeting area.
- Girls and boys meet by the library and student café.

22/1 Wednesday- 2014 Evening outdoor light walk
"The outdoor light has not been functioning properly since last year (September 2013)."

Male Dorm (South area)
Date: 12/12 -2013 Thursday afternoon
Walking with 4-6 male students

Comments from boys concerining the male dormitory-area
Toilets and washing areas
–There is a scarcity of water and cleaning. Showers only working during, early morning and late evening.
- Always scarcity of water.

Comments from boys when having a tour in the male dormitories.
12 dormatory buldings, 3 types of buildings.
1st House: three floors (rectangular house with two entrances, in north and west direction)
- At the Top-floor there is a corner used as toilet – pie corner.
- There are no toilets in here so at night time everyone does not go out.
2nd House: three floors, shaped as a cube- with an open inner yard.
- We don´t use the inner yards, no grown up vegetation for shade.
- No7 is the best dorm. From there we are seeing into the female dorm". - We just call to them and decide to meet outside the library.

Female dorms
Date: 13/12-2013 Friday afternoon around 14-15.00 o´lock
Walking with 2 girls. First year students "Freshmen"

Walking to the dorm area – from main library on the road passing the libraries and enter the dormitory area
- Never walk behind the houses for washing and storage, there are animals there, big rats. Because the cafe is throwing leftovers and garbage there.

Comments when looking at the outdoor toilets and the showers
- Not clean, that´s the least we can say!
- Showers are mostly out of function, it works only after 6 o´clock. But it is also very cold, we go in to Kombolcha sometimes for shower, cost Birr1-2.

Comments when walking in the female dormitories
-There is one room that should function as a tv-room, but not until one more house is built. Now girls are sleeping in there instead.
- There is also one additional tv-room, one girl owns the tv, she carries it there.

Talking about where the girls usually eat
- We don't eat at the student cafeteria, not the dinner, it is not good.
- We eat in a cafe outside campus instead.

Comments from male and female student
Comments when talking about study paces
- We shift, either we sit in our dorms or in the library. Then we sit two and two.
Asking if they never sit outdoors for studying?
- Outdoor, not much places to stay or any shade to sit in.
Some people sit outside.
- Mainly in the that corner close to the building. In the south-west corner there are some low trees and shrubs where some sit. Other areas are not really comfortable.

Comments about what they do in their free time?
- There is no free time.
- When we are free we have to study, wash and clean.
- Hang out, by the student cafe and by the library. And drink coffee, mostly outside campus.
Do you do anything at night time?
- We don't go outside campus at night when it's dark, never. We are "freshmen".

Comments about the outdoor lights?
- The light functions in the dorms. And outside the library, not on the road outside the dormitory area. (east-west road)

Comments aboyút the Wifi-zone
- At registration building. Better in the afternoon, not good after 7pm. A lot of people hang out around there.

Comments from the girls when boys walking by us.
- The boys are cheating on us.
We ask what she means.
- They are calling us nicknames. Especially on that road, when walking up to the café. (Pointing at the east-west road)

Compilation from talk with Male Students concerning topics below:
Movement: Shortcuts are used through the fields. During flooding different directions are used, usually the main road. However, the gully is almost always crossed.
Especially for the male students living in the north dormitory area up the hill. The male dormitories are separated depending on which grade the students are. Upper hill are the students from 1-2 grade. Next to the girls dormitory are the males in the 3-5 grade.

Meeting points: The dinner house and outside. The east-west road between classrooms and dorms. The library, not the main one. The green house with the TV (DSTV building). Another important meeting place especially for the boys is the "shop area" just outside campus. When meeting teachers it is outside the campus area around the smaller shops and cafés.

Activities: At the campus we only have soccer and volleyball and these areas are far too small in order to fill the need for all to join. The volleyball plan (along the road) have problems because it is unsafe and there is shade. Outside the campus the cafes, shops and pool places are the places where most activities takes place during free time.

Wishes: For activities there are wishes to have a wider range among sport activities. Such as, tennis, better area for volleyball, basketball and swimming.

Today lack of/ weak points: Water and sanitary problems, according to the boys the water only functions 25% of the times. Also the lack of space when it comes to the field of sport. And space outside to study.

Compilation from talk with Female Students concerning mentioned topic:
Movement: During daytime, the starting point is the dorm and from the dorm the closest way to the class. Which is through mostly trampled shortcuts, via the libraries and behind the main library and up the hill.

Meeting points: The libraries are the main meeting point, where both male and female are meeting and hang out (the two smaller libraries now in function - this will probably change/ extend when the new library is repaired). The library is open 24 h. Also important is the east west road, the entrance and the cafeteria. The two last ones mentioned are meeting points but not places where the students hang out. The meals are served 3 times a day, at 1.30, 5.30 and 11.30 (local time) - 7.30, 11.30 and 17.30 (standard time).

Activities: Most of the activities takes place within the females dormitory, and outside within the female area. According to the female student this is due to that this area is "safe". The girls expressed that they are afraid of walking longer distances and especially crossing the field when it is dark. Some expressed the fear of meeting the opposite sex.

Activities outside campus: In the nearest area outside campus the girls visits beauty saloons, food places and smaller shops. Kombolcha city center is a place where they go during their free time to hang out. Religion is a big part of the daily life, Orthodox Christian or Islam are the majority groups, therefore the church and the mosque are visited several times each week.

Wishes for the campus area:
- A place close to the girls dormitory area, where there is space for sport activities such as: football, basketball and volleyball. Another wish mentioned is swimming.
- A planting area
- TV
- Place for studies outside close to the girls dormitory.

Workshop
- create spaces for sitting area in the outdoor envrionment

The main objectives with this workshop is to practice the skills of reading the outdoor environment and create a space within it. You will in groups discuss, interpret, produce/build and present a sitting space built from existing material at campus.

The task
In groups you are going to create a sitting space within the campus area, using existing materials.

You, and your group, will pick a "keyword" which will influence the design of your sitting area. Discuss the content and meaning of the "keyword" and think of how it can be expressed within the shape of a sitting area.

After discussion you will choose a suitable place and use own interpretations of why this is a good spot to use. (Remember to put a mark on the map where your location will be.)

Within your group you are free to use any natural material found at the campus site. Like stones, branches, garbage, strings etc. (Do not use construction material, such as cobble stone). We also have some additional materials that you are free to use.

Parameters
Within the task you also need to take in consideration some parameters. These parameters are a tool for you discuss and it can be help for you in your presentation.

Purpose, *What*, *How*, *When, Future (development), Where and creation of space.*

Presentation
You will shortly tell about your choosen spot and design of the sitting space. Remember to include your "Keyword" and motivate your choise of spot. Try to include the parameters, to easier comunicate your thoughts.

Be aware of the time given and try to limit yourself in order to gain the maximum expression. (5min/group + 5min discussion)

Keywords:
Flexible, Excitement, Participatory, Play, History, Agriculture

Remember that you are the ones who put the boundaries and sets the creativity in the assignment given. In this assignment there are no rights or wrongs, only open minds.

Good Luck and feel free to ask us as many questions as you want!

Appendix: Workshop

- Creating spaces for sitting area in the outdoor environment

1/1 2014 From 10 am - 5 pm
Second grade architecture students. Totally 23 students in the class (22 showing up).
Working in groups, 5-6 students in each group.
Managing the time disposition within each group.

The workshop started with a brief introduction of the task and the objectives. Thereafter the class was divided into mixed groups. The group together choose a keyword, which they could freely interpret, which should influence their design in the task. Thereafter the group deciding a spot/area to build/ arrange a site.

Appendix: Vegetation

Latin - Amharic - English

A
Acacia ssp. - Fabaceae -
Acacia albida - Grar - Apple-ring acacia, winter thorn
Acacia asak - Sebansa - Wait-a-bit thorn
Acacia bussei - Girar -
Acacia melanoxylon - Omedla - Australian blackwood
Acacia polyacantha - Gmarda - Falcon's-claw acacia
Acacia saligna- Akacha saligna - Port Jackson willow, Weeping wattle, Willow wattle
Acacia sieberiana - (Tigrinya Nefacia, Tseada-chea) -
Albizia gumifera – Sesa - Peacock flower
Albizia lebbeck - Lebbek - East-Indian walnut, Siris tree, Woman's tounge
Aloe vera - Eret - Aloe vera
Azadirachta indica - Kinin - Neem

B
Borassus aethiopum - Zembaba - African fan plam, Borassus palm, Deleb palm, Palmirah palm

C
Callistemon Citrinus - - - Crimson Botttlebrush
Causarina equisetifolia - Arzelibanos, Shewshewe - Whistling pine
Celtis africana - Amlaka, Kawoot - White stinkwood
Chamaecytisus proliferus - Tree lucern - Tagasaste, Tree lucerne
Citrus sinensis - Birtukan - Sweet orange
Cordia africana - Wanza (Urogu) - Large-leaved cordia
Croton macrostachys - Bisana - Broad-leaved croton
Cupressus lusitanica - Yeferenji-tid - Mexican cypress

D
Delonix regia - Dire Dawa zaf, Gorade - Flamboyant
Dodonaea viscosa - Kitkita - Hop bush

E
Entada abyssinica - Kentefa, Kontir - Tree entada
Eriobotrya japonica - Woshmella - Loquat
Erythrina abyssinica - Korch, Goro, Korra, Kuara - Flame tree, Lucky-bean, Red-hot poker tree
Erythrinia brucei - Ergofit, Kermo ayederk, Korch -

G
Grevillea robusta - Grevila - Silky oak, Grevillea

H
Hibiscus ssp. - Hibisc - Hibiscus

J
Jacaranda mimosifolia - Yetebmenja zaf -
Jacaranda, Brazilian rosewood
Juniperus procera - Tid - African pencil cedar

L
Leucaena leucocephala
Lukina - Leucaena, Pink leucaena, Lead tree

M
Malus ssp. - Pom - Apple
Mangifera indica - Mango - Mango
Morus alba - Yeferenji injori - Mulberry

N
Nerium oleander - (Oleandery) - Oleander

P
Parkinsonia aculeata - Filfile, Ye eyerusalem eshoh - Jerusalem thorn
Persea americana - Avocado - Avocado
Pinus patula - Pachula - Mexican weeping pine
Podocarpus falcatus - -

R
Rhamnus prinoides - Gesho - Shiny-leaf Buckthorn

S
Salix mucronata - Ahaya, Wonz admik - Wild willow
Schinus molle - Quando berbere - Pepper tree
Senna siamea - Yeferenji digita - Ironwood, Kassod tree
Sesbania sesban - Girangire - River bean, Egyptian rattle pod
Spathodea campanulata - (Spathodea) - African tulip, Flame of the forest, Nandy flame

T
Tamarindus indica - Humer, Roka - Tamarind
Terminalia laxiflora - Baguri -