

MUD CAFETERIA

BUILDING A CAFETERIA FOR THE FUTURE COMMUNITY SCHOOL IN ABETENIM, GHANA

INFORMATION BOOKLET

In the village of Abetenim in Ghana, the local population's children do not have access to secondary education; the few schools that do exist in the region are located well-outside any reasonable walking distance. We therefore want to build a new school, in the village of Abetim, to allow these children to continue their education and to pursue a better future for themselves and their families.

Building time:

July 9th 2017 - September 30th 2017

By Anna Schweiger & Jaap Willemsen, 2016



DONATIONS

Donate to MUD Cafeteria and give children in rural Ghana access to education

Bankdetails:

Name: MUD Cafeteria
IBAN: AT52 3800 1000 0011 2508
BIC: RZSTAT2G001

Thank you for your support

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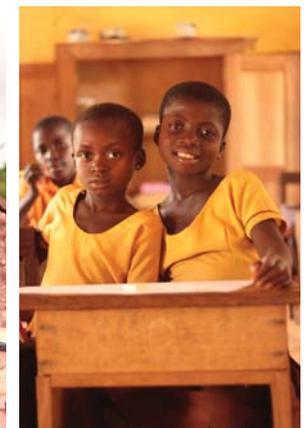
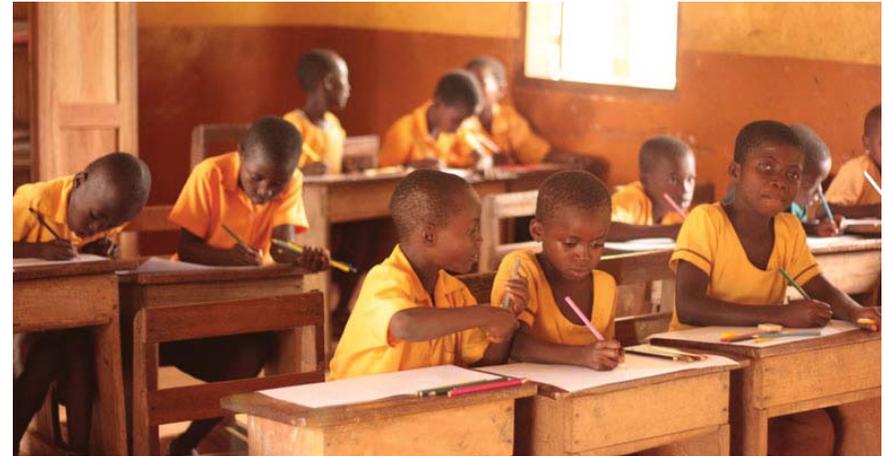
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M.Sc. Anna Schweiger

M.Sc. Jaap Willemsen



Photos © Mireta Florese

1 INTRODUCTION

Building the school cafeteria for the community secondary school in Abetenim, Ghana

In the beginning of 2016, we, Anna Schweiger and Jaap Willemsen, decided to participate in the 4th Earth Architecture Competition. This international competition, organised by the NKA foundation, focuses on earth (mud) as a building material and, in this edition, centered on a masterplan for a community secondary school in Abetenim, Ghana. The design-exercise was to develop a modular-design for one of the functions of the school (classrooms, dorms, cafeteria etc.) so that the campus can grow along with its number of students. Our design entry was shortlisted by the International Jury and now we have been invited to build our design for the school cafeteria in Abetenim.

We are planning a workshop for the summer of 2017 in which we will construct several modules of our cafeteria design with the help of volunteers (students) and the local community. The workshop aims to serve as a learning environment where both the students and the local community can gain valuable practical experience building with earth. Furthermore innovative building techniques can be put into practice to improve the building discourse in the developing world.

Of course the most important goal is to give the children in Abetenim access to secondary education. Education is the key for underserved regions to take their future in their own hands, which, in our opinion, should be the focal point of international development efforts.

Are you willing to contribute to help us reach this goal? We hope we can arouse your interest in the following pages and we would be delighted to present the project in a personal meeting.

Our motivation

In the past few years we have learned that the daily routine of an architect is strongly governed by economic parameters and social-cultural or environmental aspects often fade into the background. Therefore we felt the need to fuel our creativity again and decided to participate in an architecture competition. The design exercise of 4th Earth Architecture competition seemed just the right project for us as it deals with the lives of children in need and also strongly focuses on sustainable design. With the invitation by the NKA foundation to organize a workshop in Abetenim we are offered a great opportunity to realize our design for the school cafeteria and as such give the children in and around Abetenim a chance for a better future.



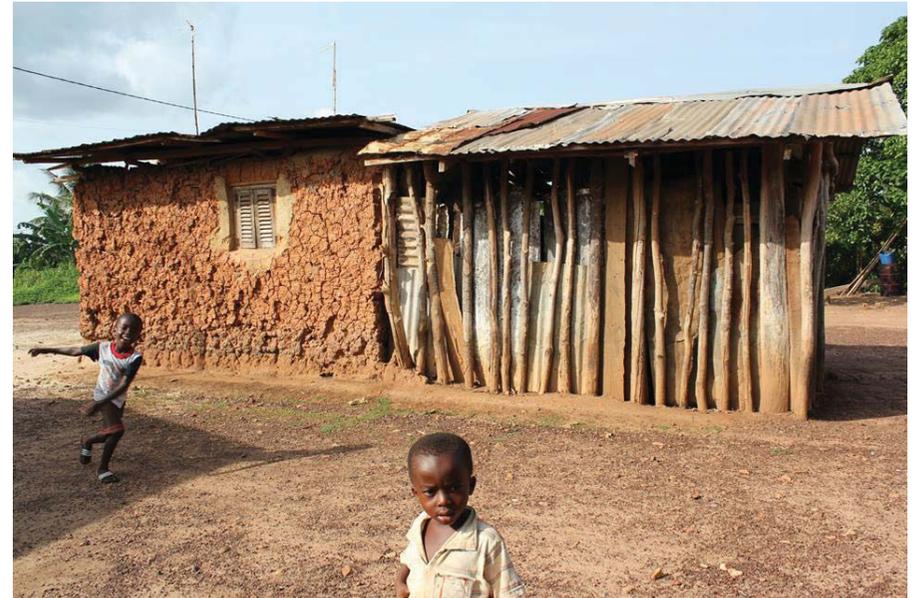
Photos © Mirela Fiorese from her artist-in-residence project at Abetenim Arts Village

2 MAKING A DIFFERENCE

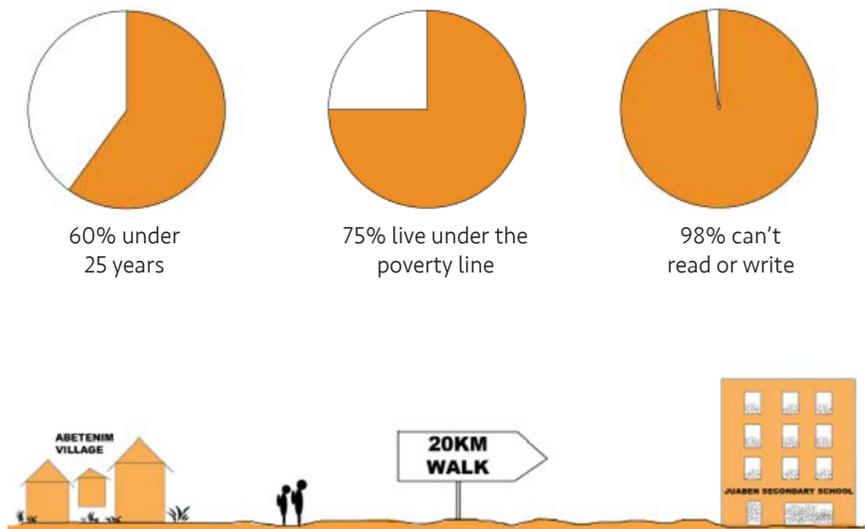
Why a school in Abetenim?

Abetenim is a small community located approximately 40 km southeast of Kumasi in the Ashanti Region of south-central Ghana. Today, the population is about thousand people, with 60% of them under 25 years. Abetenim is facing an extremely low literacy rate of 2%. About 98% of the adults in the village are unable to read or write proficiently because they did not have access to elementary school education. Residents are primarily subsistence farmers earning little to no disposable income. More than 75% of the people in Abetenim live below the poverty line, as defined by the United Nations, by subsisting on less than \$2 (USD) per day. The architecture of the village is the architecture of necessity. The village is dotted with mud houses, built in ways that speak of abject economic poverty. Spaces are small. Materials are basic. Most activities, from cooking to socializing, take place outside in the shade of a tree or veranda.

With the help of numerous international partners, the NKA Foundation has helped the community in Abetenim build a junior secondary school and a kindergarten. Acknowledging that a senior secondary school is now urgently needed, the community has identified a ten-acre site for the proposed campus. The NKA is coordinating the planning process and the development of the school. This project is intended to provide Ghana and, indeed, development countries around the world, with a **model school** to be used as precedent for future developments in other communities.



Photos by Workshop eARHouse 2016



Photos by Workshop eARHouse 2016

3 PROJECT ORGANISATION

The masterplan and the workshop

In October 2015, the NKA approached the United Nations Volunteer Organization with a request to facilitate the organization of a team of international professionals to assist with the planning, design and development of a secondary school campus in Abetenim, Ghana. Although work is ongoing on this project, the proposed guidelines, designs and strategies have been principally accepted by the NKA and the Abetenim community. The campus is to accommodate a target population of 1,200 students from around the region and will be built entirely with local materials and the help of the local community as well as from international volunteers.

The design proposals for the various school functions are a direct result of the outcome of the Fourth Earth Architecture competition (4EA).

Several of the teams who participated in the 4EA competition - and who were shortlisted by the jury - have been invited to plan a workshop within the next three years to realise their design. The organisation of these workshops is planned in accordance with the NKA. The NKA assists us as project leaders with valuable information based upon the experience of organizing similar workshops over the past few years. The NKA is strongly embedded within the local community in Abetenim and as such plays an essential role in creating acceptance along the local community for the workshops. Furthermore the NKA provides the local infrastructure for the workshops like facilitating housing for the volunteers, transportation of materials, contacts with the local workforce and so on.

Working together with the community

The construction of the school can be regarded as a form of community architecture. By this we mean that the design proposals are built with and for the community. The workshop principle therefore should be understood as a bilateral learning environment where know-how is exchanged between locals and students within the scope of a realistic building project. As the workshops in Abetenim will bring together project-teams from all over the world, a cross-fertilization of skills and knowledge will add to the dynamic of the workshops. As the local community has built with mud for over centuries now, it should be evident that the workshops cannot be considered as a 'classical aid project' where the developed world shows the developing world how things are done; hence an important aspect of the workshop is the **empowerment** of the local workforce.



Masterplan



Workshop *Raumgeschichten* in Abetenim (2015)

4 THE CAFETERIA DESIGN

Our design

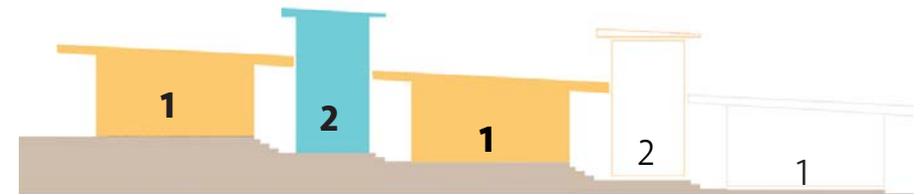
The design of the cafeteria is based on modular units which can be repeated throughout the design. The modules are structurally independent units allowing for a step-by-step development of the cafeteria in accordance with its increasing number of students. However, as we consider the cafeteria as a single building, with one spatial program, we have tried to create a design-concept where the arrangement of the individual modules both architecturally and technically form a coherent whole. The modules thus do not remain independent structures, they become parts in a greater structure. We furthermore decided to design the school cafeteria not only as an eating-place where the children come and go. We have considered it as a center for social exchange, a place with perfect conditions to learn and relax after class. To achieve this we conceive and juxtapose the modules in such a way that different kind of spaces envelop; from areas for public gathering to semi open spaces or even private spaces. In this way the children can choose their preferred space.

Building in a tropical climate

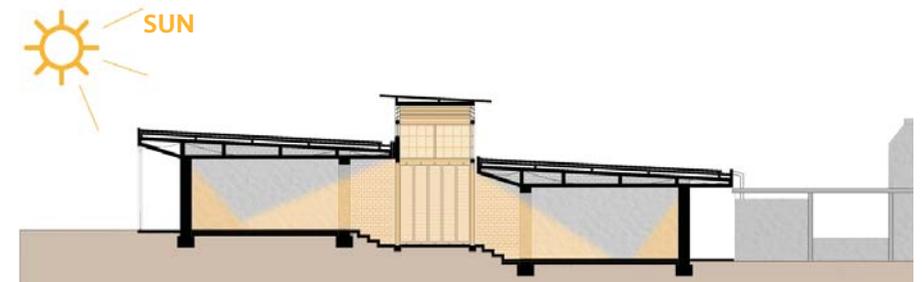
Buildings in tropical areas requires a special approach with regard to the indoor climate. With constant hot temperatures during the day it is difficult to keep the indoor climate cool, especially without the help of advanced mechanical installations. One of the main challenges of the 4th Earth Architecture Competition therefore has been to consider traditional and alternative methods for ventilation and cooling. In order to obtain a relatively comfortable indoor climate we conceived the *main module* (module 1) as a 'box within a box'. The outer layer shelters the inner part from rain and direct sunlight. The inner layer, made up of thick rammed-earth walls, works as a heat buffer that helps to stabilize the indoor climate during the day. The main modules are *connected* by extending chimneys (module 2) that help the flow of **natural ventilation** and allow **indirect daylight** to penetrate the inner parts of the building. To increase the effect of natural ventilation the main axes of the modules will be orientated in such a way to maximally benefit from the prevailing wind directions.

The projecting roof prevents direct sunlight reaching the interior and it protects the rammed earth walls from rainwater erosion. The shaded patio that accordingly is created around the building can serve as a more private space for students to retreat to. We plan to use **sandwich-panels** for the roof that are made up of corrugated iron sheets with a layer of earth in between. This should not only reduce the noise emission during heavy rainfall, it should also help to prevent the overheating of the roof as the outer metal sheets heat up significantly due to sun exposure most of the day.

THE CONCEPT



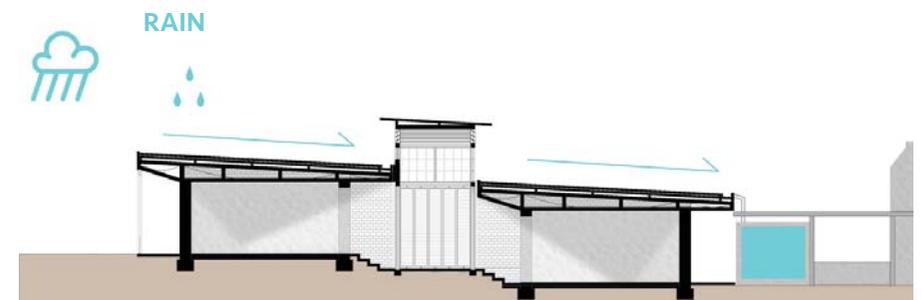
The basic module can be expanded as needed



The projecting roofs prevent the building from direct sunlight



The chimneys induce natural ventilation and indirect natural lighting



The rainwater will be collected and reused

The modules in the design concept are arranged stepwise so rainwater can be harvested efficiently using the inclination and varying heights of the modules. Although some of the here presented approaches are hypothetical in a sense, we are convinced that the practical implementation of some of these ideas can noteworthy contribute to the architectural discourse building with earth.

The building materials

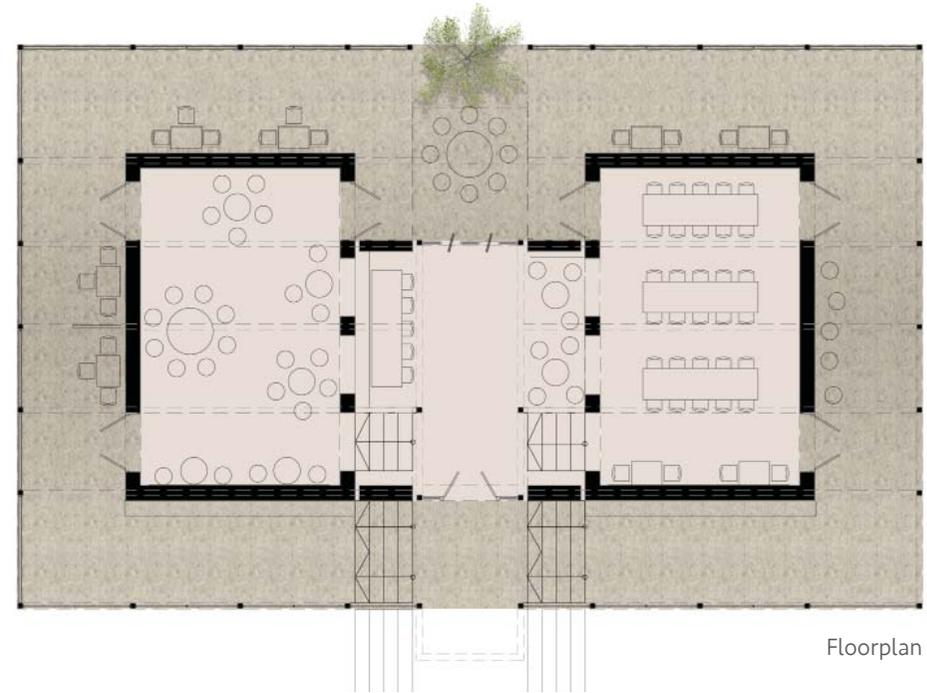
For both modules earth and wood are the core building materials as both are natural materials and widely available. The walls of the main module are built as rammed earth walls. This is a traditional method of erecting walls in rural Africa which has slightly fallen into oblivion due to its, arguably, relative elaborate construction process. In recent years however a steady increase can be recorded in building with rammed earth and it is currently a regular research topic.

The columns and roof structure are build with wood. Although the production standards for wood aren't at the standard we apply here in Europe, it is still one of the most sustainable building materials available. However, as larger wooden beams are relatively expensive we to use wood efficiently. The main beams that span the roof therefore are composite beams comprised out of smaller wooden pieces that together form a framework that has the strenght of a larger beam. Some more materials are shown on next page.

Mud as a construction material

The school buildings will be constructed entirely of mud and other local materials, as it is tradition in the region. Earth architecture is getting more popular even in modern day construction due to its ecological and aesthetic benefits. There are examples of airports, embassies, hospitals, museums, and factories around the world that are constructed out of earth. In fact, it is estimated that half of the global population, approximately three billion people on six continents, lives or works in buildings constructed of earth. Some of the benefits of building with mud are:

- as a material, earth costs little or no money
- it is locally available worldwide
- it requires the absolute minimum use of energy in the production cycle
- mud is nontoxic, fire proof and has very good thermal and acoustic properties.
- it is the most sustainable of all building materials: the mud can either be returned to the ground or it can be recycled as a building material (indefinitely).
- building with earth today can preserve traditional building techniques and organisational principles, while introducing modern design and sustainable building technologies



Floorplan



Conceptual rendering



Rollable sunscreens are a cheap alternative to prevent the direct incidence of sunrays heating the building.



Corrugated metal sheets a common sight in rural Africa as the sheets are cheap and very functional as roof covering



Wooden louvres (that can rotate vertically) can serve as entrance portals to maximize the effect of cross-ventilation



Longitudinal Section



Mud
The earth at the building site is suitable for use in rammed earth constructions. The earth that needs to be removed for the construction of the foundation and for the excavation work (to create the varying levels) therefore can be used to construct the rammed earth walls.



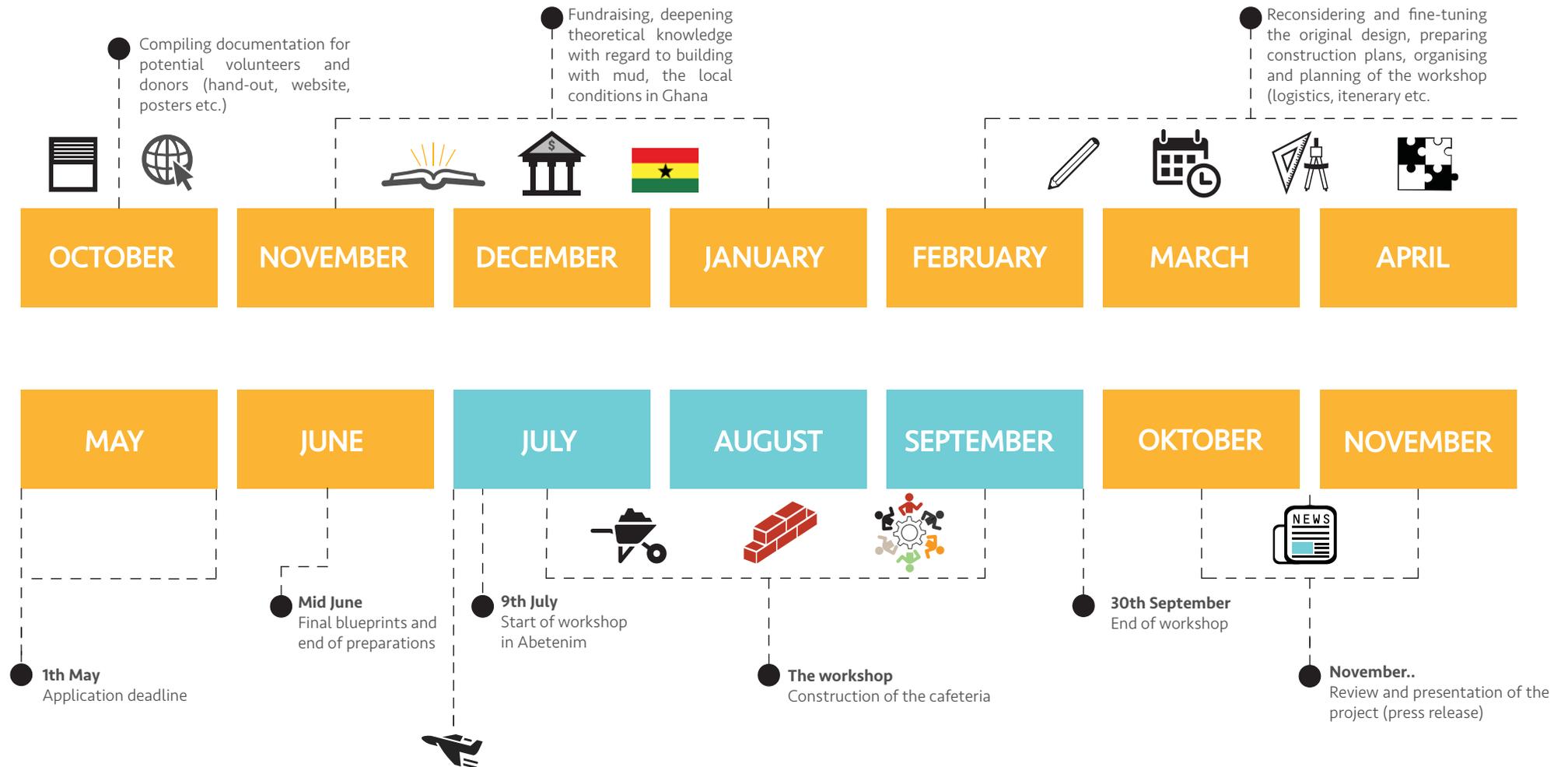
Rammed earth walls are as strong as concrete, are load bearing and provide an ideal indoor climate. It has a strong identifiable texture of piled layers of varying colors



Rainwater Collection
The main modules are arranged stepwise so rainwater can more easily be harvested.

Timeframe

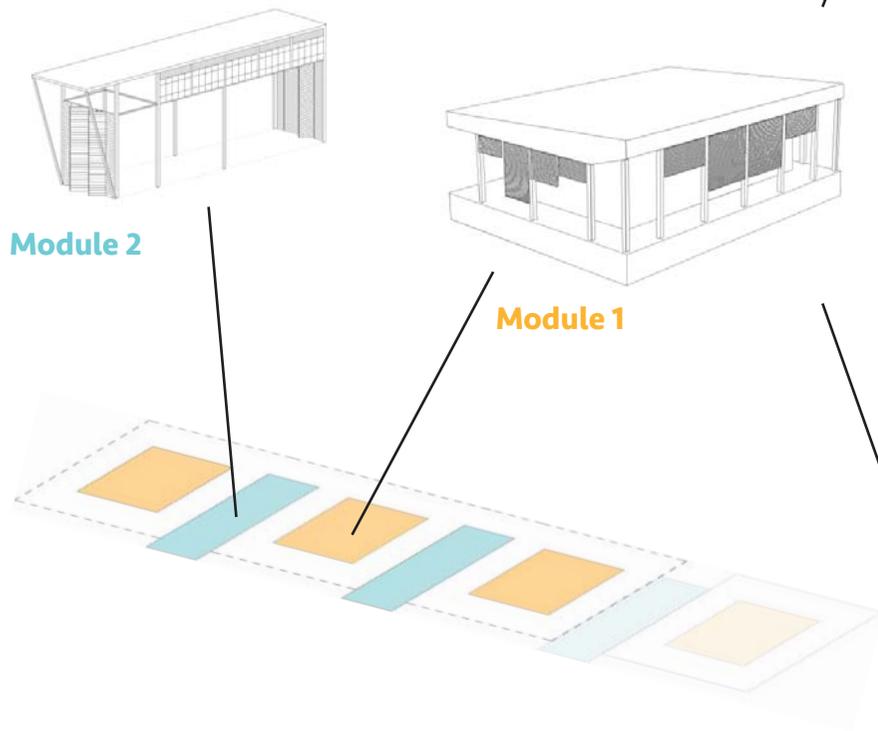
The official start of the Workshop in Abetenim will be the 9th of July. From that day on volunteers are welcome to join us for any given period until the 30th of September. Shown below is a timeframe with the upcoming tasks and deadlines in the planning process, starting with the preparatory tasks that are already underway to the final construction phase of the cafeteria in Abetenim.



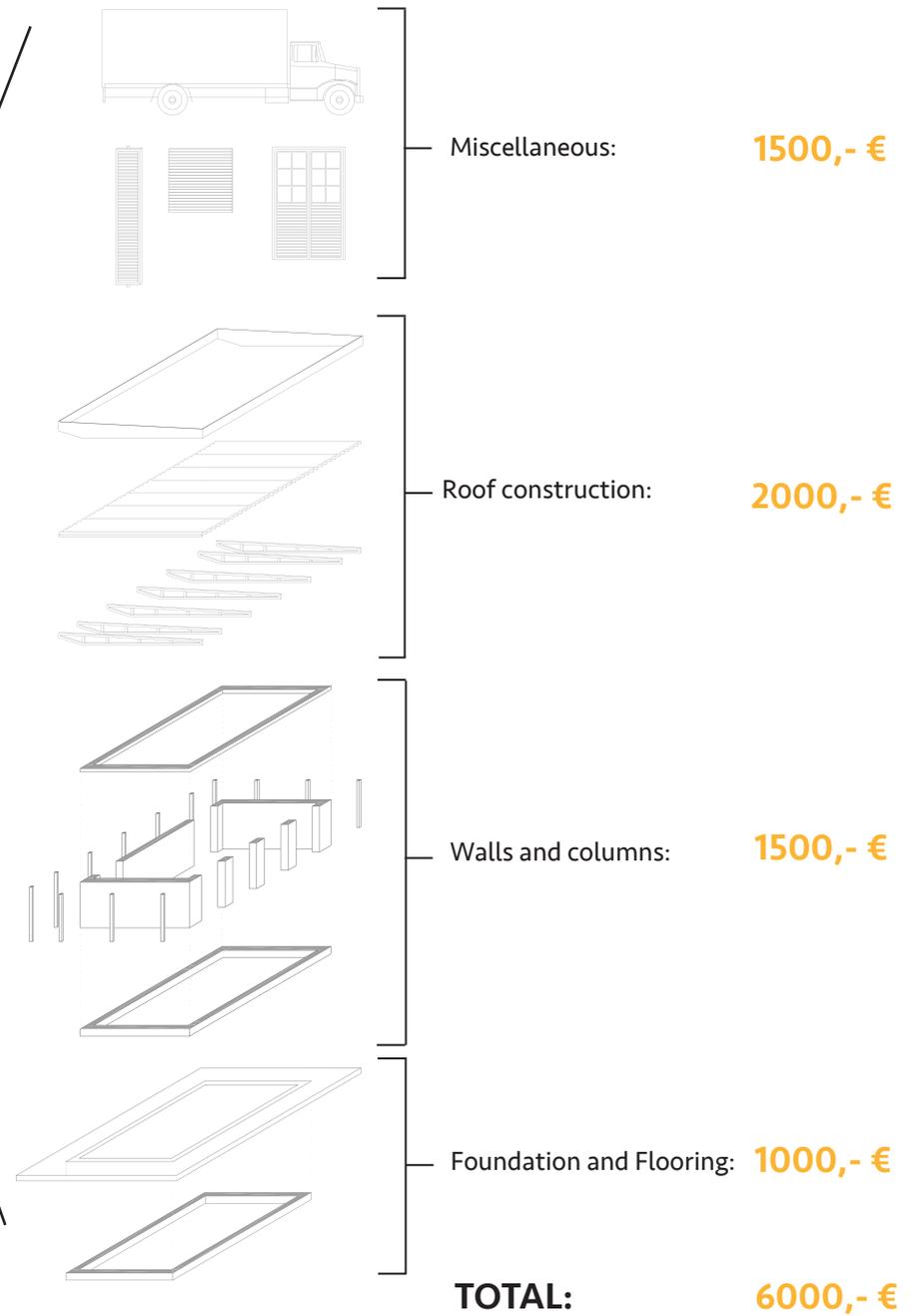
5 BUILDING COSTS

Modular cost break down

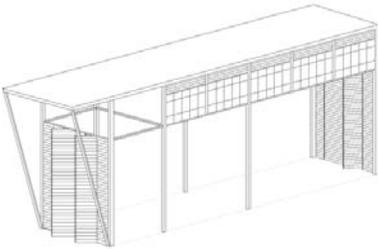
In the following graphics we have tried to give a simple overview of the cost structure of the two modules. We gladly provide a more detailed budget upon request.



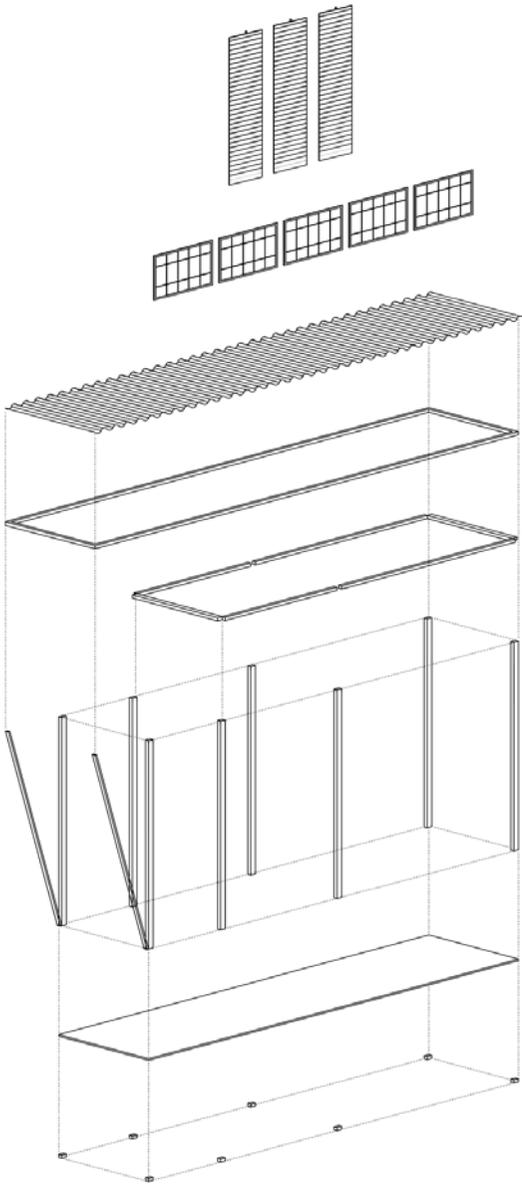
Main parts module 1



Main parts Module 2



Module 2



Miscellaneous: 750,- €

Roof construction: 250,- €

Walls and columns: 500,- €

Foundation and Flooring: 500,- €

TOTAL: 2000,- €

6 SPONSORING

Project size

As shown in the previous chapter, the building costs ('raw material costs') for module number one are 6000,- € and for module number two 2000,- €. Taking into consideration certain uncertainties regarding building in a foreign (developing) country, the availability of volunteers and other potential constraints (the weather for example), we think it is appropriate to plan for two different scenarios for our workshop: basic and ambitious.

Although the modules are self-sustaining and structurally independent from one another, architecturally and with respect to the indoor climate, they supplement each other. Therefore, we consider scenario no. 1 as the absolute basic that we want to realize, also taking into consideration the practical use of the cafeteria.

Scenario no. 2 is the combination that we strive to realize as it would more clearly transfer our design concept and, moreover, would generate a larger dining area to cover the basic needs of the school in the initial phase of its development.

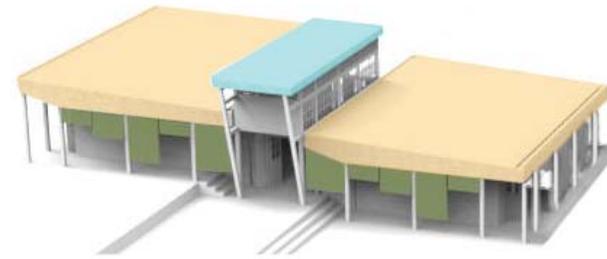
In addition to the 'raw material' costs, we will have to take into account the cost of building tools, transportation and other miscellaneous expenses necessary for preparing and facilitating the project. When we include these additional expenses (we gladly present a more detailed budget upon request) the total amount for the two scenarios is 20.000,-€ and 30.000,-€ respectively.

Ambition

As we aim to raise 30.000,- € we will need to find sponsors as we cannot solely depend on donations and support from friends and family.

As the design is made up out of modules, we think it is appropriate to consider an investment plan where companies, organisations or individuals can finance a single module. This means that, by investing either 2000,- € or 6000,- € you could be responsible for the realization of a clearly identifiable part of the cafeteria.

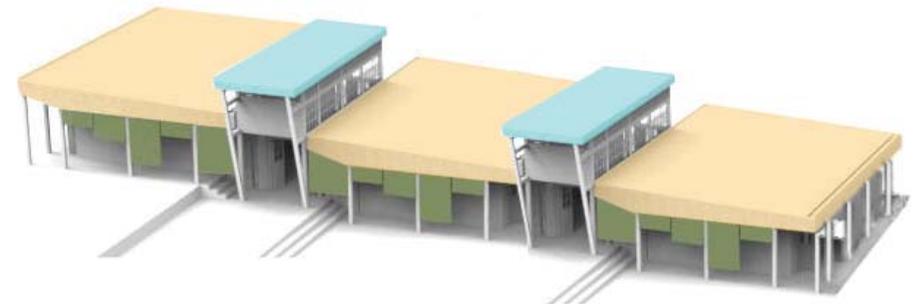
Each sponsor will be presented with a scale model of the cafeteria and a final booklet with full documentation of the project. In addition, the name of every sponsor that helped to realize the construction of a single module will be memorialized in the cafeteria.



Combination 1: BASIC

2 large and 1 small Modules

Financing: 20.000,- €



Combination 2: AMBITIOUS

3 large and 2 small Modules

Financing: 30.000,- €

Why do we need your help?

The cafeteria will be primarily build with the help of volunteers and the local community. The volunteers, and we as project leaders, will work for free and so will the local workforce in Abetenim. This implies that the volunteers will have to cover their own expenses such as accomodation and flight or their daily expenses. It is reasonable to say therefore that a considerable part of the budget is brought up by the local community and the volunteers. Financing the costs for labour, accomodation and transportation (flights) would generally consume a large part of the budget for such an undertaking. So as this joint effort is, in our humble view, considerable, we still depend on the help of charitable donors to finance the construction materials or to cover the costs of transportation, building tools or other (unforseen) corresponding expenses.

The impact of your donation

With your donation you are supporting a project that will have a direct impact on the lifes of many children in the Abetenim Region and, perhaps, proves to be a paradigm for other underserved regions around the globe. After completion, the Abetenim community secondary school will be a landmark in the region demonstrating other communities a contemporary example of community based development work.

Advertising/Publication

If you decide to support our project your name and/or logo will appear on all the media we will use to communicate our project. Of course you can also publish the project on your own website for promotional purposes. Some of the media we intend to use are:

- **website;** serving as as a information platform for potential volunteers and for communication of the progress during the construction phase
- **social media;** through facebook we will communicate the latest news about the project
- **announcement poster;** (call for applicants); this will be published online at the NKA website and handed and send to universities (also foreign) and other (educational) institutions to advertise the workshop
- **newspaper;** we hope to publish our project in newspapers or magazines
- **final presentation;** after completion of the project we will share our work and experiences at a final presentation at the TU Vienna
- **book;** the outcome of the workshop and the project will be documented in a book that we intend to publish



Workshop Tanzania goes mud in Abetenim 2016



Workshop Raumgeschichten in Abetenim 2015

ABOUT US

M.Sc. ANNA SCHWEIGER



1989	Born in Rottenmann/Austria
1995-1999	Primary school in Admont
1999-2007	Stiftsgymnasium in Admont
2007-2011	Bachelor programm Architecture TU Vienna
2011	6 Months Internship at Coop Himmelb(l)au
2012-2014	Masterstudy Architecture TU Vienna
Masterthesis:	Transformation of the Gymnasium School in Admont into an all-day school
2011-2014	BWM Architects
2014-present	DIO Bau und Planungen Projektleader for renovation and transformation of residential buildings in Vienna

M.Sc. JAAP WILLEMSSEN



1981	Born in Nijmegen/the Netherlands
1987-1993	Primary school in Cuijk
1993-1999	Atheneum (Gymnasium) in Cuijk
2000-2004	Bachelor programm Built Environment HVA Amsterdam 1 year of Internships at B.A.M International and Heren 5 Architekten
2005-2006	Clark and Prince Architects, Cairns, Australia
2005-2006	Successful admission to the Master program Architecture at the TU Delft
2006-2007	Masterstudy at the the Faculty of Architecture in Oporto, Portugal
2007	O24 Architekten, Nijmegen, Holland
2008-2010	Masterstudy Architecture TU Vienna
Masterthesis:	The impact of mass-tourism development upon the urban landscape of small or medium sized towns - underlined by a case study in Nesebar, Bulgaria' (two-month field study).
2011-2012	Echtzeit Architektur, Vienna, Austria
2013-present	DIO Bau und Planungen Projektleader for renovation and transformation of residential buildings in Vienna



CONTACT

Websites:

www.mudcafeteria.org
www.facebook.com/MUDcafeteria
www.nkafoundation.org

E-Mail:

info@mudcafeteria.org

Post:

Rochusgasse 19/6
 1030 Wien
 Austria

Tel:

+43 650 2055108
 +43 664 1430444

