MangoTree is a school project in northern Kenya on the Lamu archipelago, aiming to teach those who cannot otherwise afford education. It consists of new school grounds with space for children to play and explore, providing girls and boys regardless of which religion with a safe and appropriate learning environment. The primary school for 360 students includes two school wings with 14 classrooms, a library, and arts center and sanitary facilities as well as an office and entrance building, a kitchen and dining hall, a basketball court, a garden, and a chicken coop. The design combines local culture and low-tec solutions with modern approaches to natural light, structural concepts, and sustainable resource management. Spacious classrooms and outside areas favor active, play-based learning.
View from the toilet building towards the classrooms. 12.01.2021 Nico Jeuch
A reduced single-story structure ensures a simple building and maintenance process. Coral brick walls combined with concrete frames act as the base for a highly functional roof, comprising timber truss beams and corrugated panels. A plywood panel is fitted under the corrugated iron sheet in order to optimize the thermal impact of solar radiation. Another thermal advantage of the roof design is how it allows a constant airflow underneath the top layer. Tall windows on both sides generate cross ventilation. Adjusting the wooden rotary shutters can eliminate strong drafts through the classrooms. The ground plan shows how this structure appears in alternating closed, standard classrooms and open areas. The classrooms are supplemented with smaller group rooms supporting the pedagogic concept.
Lamu is located at 2 degrees south. Thus, sunshine is nearly vertical all year around. Beyond protection from this sun and heat, bright classrooms were a high priority for the project. Those qualities are not easily achieved in such an extreme climate. Large windows would overheat the rooms, and direct light would increase the visual contrast, leading to an overall darker impression inside. MangoTree instead works with indirect light. The classrooms are set on an east-west axis to guarantee solely diffuse light distribution inside the building. The white Lamu sand around the building and locally traditional cotton sails across the wide hallways act as solar reflectors. The prototype reveals the efficiency of this concept.
Building in such remote areas is never easy. Transportation is limited to donkeys and one single tractor on the island. The coral bricks are brought from the next island by boat and bigger cement and timber quantities are coming from Mombasa. The supervision is another challenge and the whole project relies on all our local partners. To get everything right from the beginning one classroom and an open area have been built as a Prototype. During that period of time a swiss supervisor was present. All the details can be discussed and possible problems can be corrected. Also we know exactly how much material is used per element and an accurate price can be made. As we proceed with the construction a frequent exchange between locals and the architect is necessary but the prebuilt sample on site makes communication less complicated. At the moment, the pandemic is making construction management even more difficult, but so far all the craftsmen can continue working and the completion of the project is steadily approaching.
The Entrance & Administration building includes a social workers office and a hand-washing station.

On site the traditional Makuti roof is being built. 22.10.2020 Jahawi Bertolli
| The soon to be finished entrance building in front of the neighboring village. 13.01.2021 Nico Jeuch
The Dining area with Kitchen and additional outside fire places.

Plastered building with the roof being built. 22.10.2020 Jahawi Bertolli
Almaawiya students looking around the campus. 11.01.2021 Nico Jeuch
The whole project in its simplicity has an extremely low carbon footprint. The built structure is well adapted so no artificial light and no electric cooling will be necessary during the day. For evening lessons the classrooms are equipped with LED lights which, as well as the computers and water pumps, are powered by photovoltaic panels on the roof. We are mainly using local material such as coral bricks from the neighboring island brought by sailing boats and some of the material is transported up to site by donkeys. The durability of the material is prioritized and by constructing all buildings with the same repeating elements a high quality can be assured leading to a long life span.

Part of the educational concept of the school, besides imparting contemporary live skills is to intensify the students conscious of their own cultural and agricultural resources. In the educational garden the kids will learn how to make soil in the sandy surrounding to grow vegetables and fruits. To teach responsibility each will own a goat to take care of, once they graduate from primary school the goat can be sold and with the earnings the secondary school fees can be financed. Another gain of that small farm is that the kitchen can complement the diet with fresh foods. The big roof surface is ideal to collect rainwater for the garden. The intention is to include the people of the adjacent housing area in such projects. MangoTree would function as a community center for young and old.
The pupils in the wide hallway of the school buildings. 11.01.2021 Nico Jeuch
The Library & Study Corners are pergola alike underneath the big mango tree.

Library construction under the mango tree. 22.10.2020 Jahawi Bertolli
Supervisor Hyder, massai Paiai and Nico testing the study corners of the library. 11.01.2021 Nico Jeuch
The arts centre with spacious exhibition wall to present paintings.

Plastered building awaiting the Makuti roof. 11.01.2021 Nico Jeuch
Back side of the building facing the future vegetable garden 11.01.2021
Nico Jeuch
Top view of the two large art classrooms 12.01.2021 Nico Jeuch
1:100 Model overview of the school grounds with the centrally arranged library and existing mango trees.
The entrance area next to the existing village. 12.01.2021 Nico Jeuch
One of the two school wings with the roof being built. 22.10.2020 Jahawi Bertolli
6th grade students and teachers inside their new classroom. 11.01.2021 Nico Jeuch
While the construction of Almaawiya Primary School is in full swing, the planning for the second phase of the school area development is underway. The sports field is located between the primary school and the future secondary school. The football pitch is equally accessible to all students and at the same time creates a free space between the schools. The basketball court, built from coral blocks, reinforcement and cement, will besides school sports play an important role in the recreational activities of the Almaawiya students, as well as the whole neighborhood. It will be the third hard field in Lamu, which means that nothing stands in the way of a small „Lamu Basketball league”. The sandy but compact ground is very suitable for the running track that goes along the fence. In this area the bushes will be cut back, which will also improve the overview and safety. Volleyball fields and various sports equipment are also planned.
The ShadeCube is a mobile pergola concept that invites students to design their own environment. The wooden framework is rigid on three sides to meet the minimum static requirements. At around 140kg, it can be carried around, tilted and realigned to each other by no more than four people. The edge length of the cube is two meters. Four meter long equipment/seat benches can be used as a spatial link between the ShadeCubes. The pergola provides shade for spectators, bookworms or teachers who want to enjoy a short break.
| Visualisation of four cubes on the playground

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Testing incon.ai while building the first Shad Cube on site as a prototype.
Almost completed ShadCube.
Overview of the sports field between the new primary school and the future secondary school.
In a first step the whole area was subdivided to simplify future developments. While the primary school with entrance building, dining hall and kitchen will be completed soon, the sports field is already in planning. In collaboration with Massive Small Development a neighborhood centre will be designed by university students. Other future development areas include the secondary school with dormitories and recreation zones. In order to ensure the efficiency of the programme all these areas need to be continuously revised and developed. It is also necessary to examine what possibilities exist to generate income for the school in order to ensure its maintenance. For this purpose the situation in Lamu has to be considered as a whole.
Only with the right know-how and generous funds this project is made possible. In early design stages there was an exchange with an engineer and an electrical planner. Their long lasting experience was truly important. Also a major impact on the project had the meetings with a lighting planner. Only through that we could assume how it will look inside the classrooms. On the more practical side we had a carpenter advising us for the construction of the roof trusses and a sanitary planner for the water concept. A financial input was given by the Lions Club Zollikon. Together with Kids in Motion’s generous donors and the Almaawiya e.V. the project is now on the best way to completion.