



IDEAL SCHOOL . NEPAL

PREPARATORY RESEARCH ON SUSTAINABLE SCHOOLDESIGN

CEPP



KU LEUVEN

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PREPARATORY RESEARCH ON SUSTAINABLE SCHOOLDESIGN

Katholic University of Leuven (KULeuven), Faculty of Architecture, Campus Ghent, Belgium.

International Master of Architecture and Master of Interior Architecture program. <https://arch.kuleuven.be/english>

In collaboration with CEPP (Centre for Educational Policies and Practices), Nepal. <http://schoolingnepal.org>

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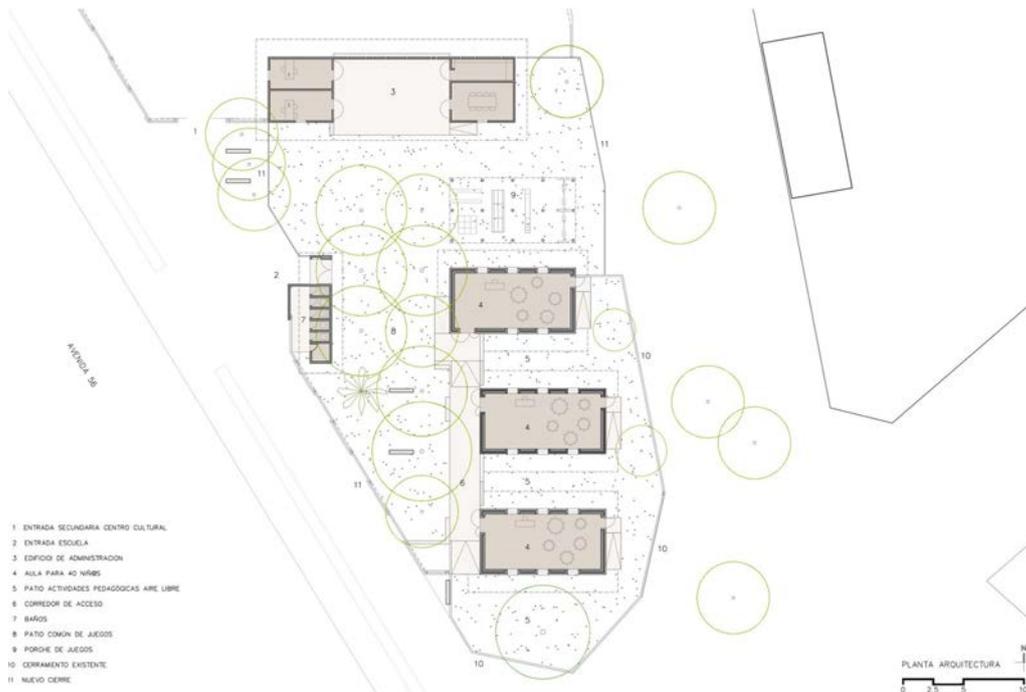
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CASE STUDY: LAAFI NURSERY SCHOOL - ALBERT FAUS

Koudougou, Burkina Faso. 2014.

A new cultural centrum was created in the city Koudougou, capital city of Burkina Faso, a place where they stimulate education, artistic production and cultural exchanges. Throughout the participation process there arose a collaboration with the local citizenry, a team of young masonry students helped during the constructions and women from a village nearby realized the interior wall finishes made by hand from adobe clay. Everything is built with a maximum of natural materials, taken into account the environmental condition of the sub-sahelian zone. Almost all the materials used, came from the main town Burkina Faso, they were made in the city itself. By working with the locally available materials it increased the knowledge about the traditional materials used in a new context, for different purposes.

Acacias, fruit trees, were planted on site to create a shade that falls over the playground all year. Around this playground classrooms are precisely arranged to avoid too much exposure of the facades for violent storms during the harmattan season between November and March.



- Architects: Albert Faus
- Location: Koudougou, Burkina Faso
- Project Area: 300.0 m²
- Project Year: 2014
- Photographs: Courtesy of Albert Faus
- Engineering: Antoni Espoña
- Construction: Asociación LAAFI + Comunidad local
- Collaborators: Ferran Grau, Jordi Arboix



The double walls of the classrooms are made of earth blocks that were dried in the sun (adobe) with a foundation made out of stone and mud. By applying a double wall they were able to protect the inner wall against rain and external thermal radiation.

The roof rests on the earth blocks construction with in-between a small concrete slab of 8 cm thick to avoid that termites might creep in the roof. Different ceramic vessels that allow extracting the hot air that accumulates indoors were used in the concrete, this technique is still used in the building process of traditional buildings.

Each classroom has it's own courtyard that forms an extension of the interior. The courtyard connects the classrooms and generates open space; it promotes interactive events among the children. The intermediate space functions as a multipurpose porch where the children can give performances use it as a theater or get classes outside.

SOURCES

ArchDaily. (Trans. Quintana, Lorena), <http://www.archdaily.com/588911/laafi-nursery-school-albert-faus/>, 20 January 2015, Accessed January 2017.

Homedoo, <http://www.homedoo.com/sustainable-design-ideas-nursery-school-laafi-nursery-school-albert-faus-burkina-faso/>, Accessed January 2017.

Photographs: Courtesy of Albert

Open Source Permanent School

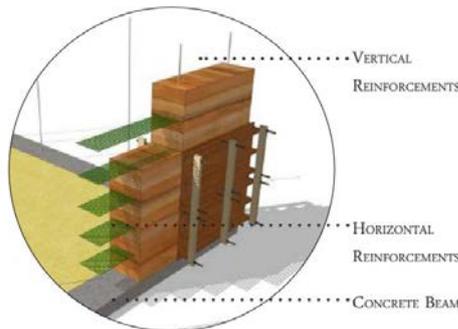
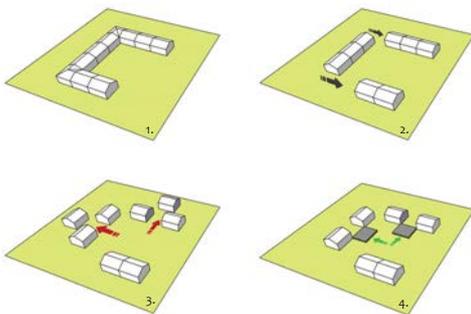
The intention is to rethink the existing paradigm of educational spaces for children in Nepal post earthquake. The buildings will be made from locally sourced materials and constructed using modified vernacular techniques designed to create safer and inspiring structures. The school of Nepal's future will feature intuitive natural technologies as well as permaculture values in order to instill a strong sense of curiosity and thirst for knowledge in the children.

The permanent school can transform and expand according to individual village needs and site conditions. Built with local, natural materials with a climate responsive approach and universal access.

1. Existing classrooms all over Nepal
2. Breaking down of the monotonous layout
3. Removing the central unit
4. Introducing a central play space

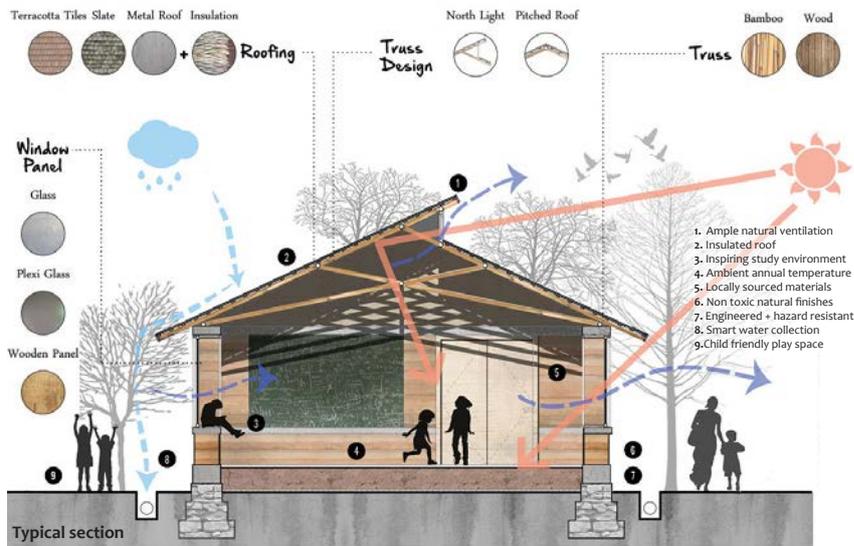
The play space component is an integral part of the design and it will challenge the typical design of classrooms all over Nepal. This multi-functional space can be conceived for many functions such as an covered play space, an art center, a small theater and a communal space. Moreover, having a covered play space will allow the students to move and play around regardless of the weather conditions.

The classrooms are not that big, but there are multiple ones, which allows to work with smaller groups in different rooms. In groundplan you can see that the classrooms have different set-ups. Working in groups on round tables. working individual on separate table. That a standard classrooms allows different set-ups is a big advantage and offers possibilities.



Architects: ABARI, construction firm
 Location: Unbuild, suggested for Nepal
 Construction size: undefined
 Project year: unbuild, open source design

Abari (2015). Open Source - Permanent School Design. Consulted on 12 november 2016 Through <http://earthandbamboo.com/permanent-school/2015/9/17/permanent-school-design>.



The inner court between all the classrooms creates a safe play area outside. A safe outside play area is nice, but a covered play area next to the classrooms is even better. The weather is always unpredictable so a covered play area in between two classrooms creates a good balance between playing and teaching.

The structural design will be multi-hazard resistant and will act as a model for earthquake resilient structures for the entire community. On-site labour using and training the local workforce: The masonry foundation was constructed by a company from the regional capital Dinajpur.

The earth building works and bamboo construction was undertaken by local labourers.

The building techniques were implemented and developed on the job together with architects and tradesmen from Germany and Austria. 25 local tradesmen from the vicinity were trained during the building works creating new jobs and providing professional "help for self-help".

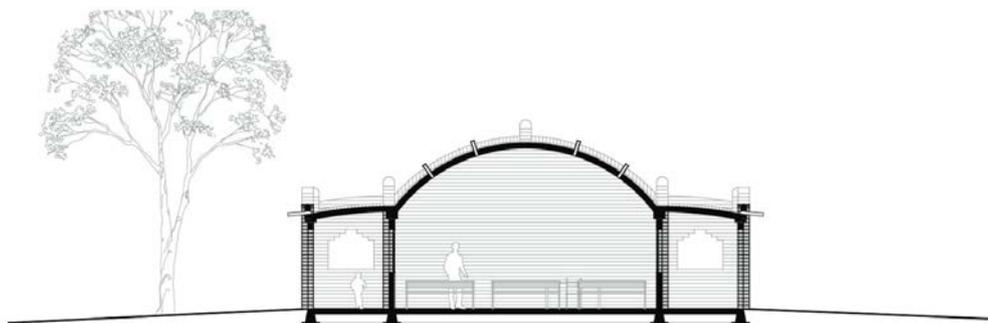
Abari (2015). Open Source - Permanent School Design. Consulted on 12 november 2016 Through <http://earthandbamboo.com/permanent-school/2015/9/17/permanent-school-design>.

CASE STUDY: PRIMARY SCHOOL IN BALAGUINA - JOOP VAN STIGT AND JURRIAAN VAN STIGT

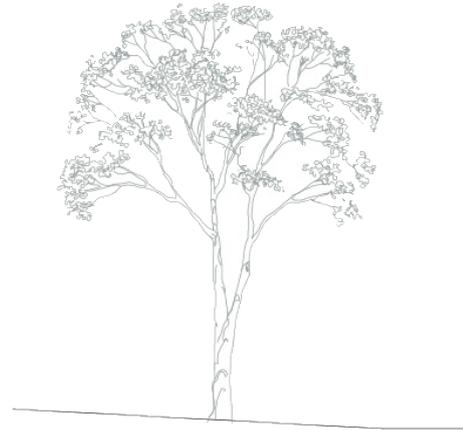
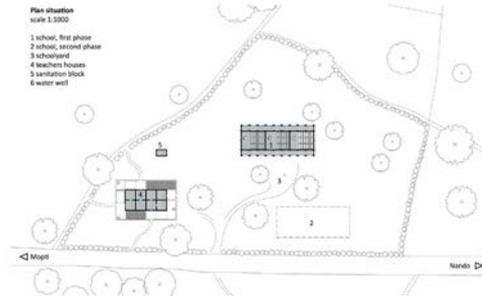
The rural village Balaguina, Mopti, Mali. 2012.

Taken into account the supportive functions like wells, sanitary, housing for the teachers and a location that is situated just outside of the village, the project became so much more than only the construction of a new school building. It turned into a school that belongs to all the surrounding villages by cause of building just outside of Balaguina on the road to three other villages. Also taking into account the tradition of the Dogon villages, where everything is about family, they built housing for the teachers at the school wherefore the tradition doesn't get disturbed.

Characteristic in the Sahel zone is the cycle of rainy and dry seasons, with those in mind it was important to make the building waterproof. A typical and very common building material in the Dogon region is clay, combining the traditional knowledge with innovative building techniques gave the local people the opportunity to learn about construction work. Choosing for clay as building material was economically more interesting and a sustainable solution. To make the compressed earth blocks waterproof, 3-4% cement was added to the base mixture. On the roof a layer of red earth mixed with cement of 2-3 cm thick is applied to waterproof it and handmade ceramic gargoyles abduct the rainwater quickly. Creating a comfortable climate inside is a very critical point in this area, where it can get 40°C during the day. The compressed earth blocks, veranda's on both sides and ventilation pipes contribute to a comfortable inside climate. Also on the floor they use the compressed earth blocks at half thickness and sprinkled it with salt against the termites.



- Architects: Joop van Stigt and Jurriaan van Stigt
- Location: Mopti, Mali
- Contractor: Amatigue Dara, realization in collaboration with students of the Technical School in Sévaré and Inhabitants of Balaguina
- Cost: 41,000 Euro
- Client: Foundation Dogon Education
- Area: 420.0 sqm
- Project Year: 2012
- Photographs: Courtesy of Foundation Dogon Education



Vital in this process was the involvement of the local people, who in this way create a communal responsibility for taking care of the school building. By building together with the local population they gained knowledge and experience in building with the compressed earth blocks and learned to develop their own architectural language. To involve people in all the stages of the building process, there began a collaboration between the local contractor, craftsmen and students of the technical school in Severe.

SOURCES

ArchDaily. (Trans. Quintana, Lorena), <http://www.archdaily.com/369913/primary-school-in-balaguina-joop-van-stigt-and-jurriaan-van-stigt>, 11 May 2013 Accessed January 2017.

Foundation Dogon Education, http://www.dogononderwijs.nl/site/wp-content/uploads/2012/12/121203_SDO_Balaguina_WEBSITE.pdf, Accessed January 2017.

Photographs: Courtesy of Foundation Dogon Education



HIGH SCHOOL THAZIN - ACKERMANN+RAFF

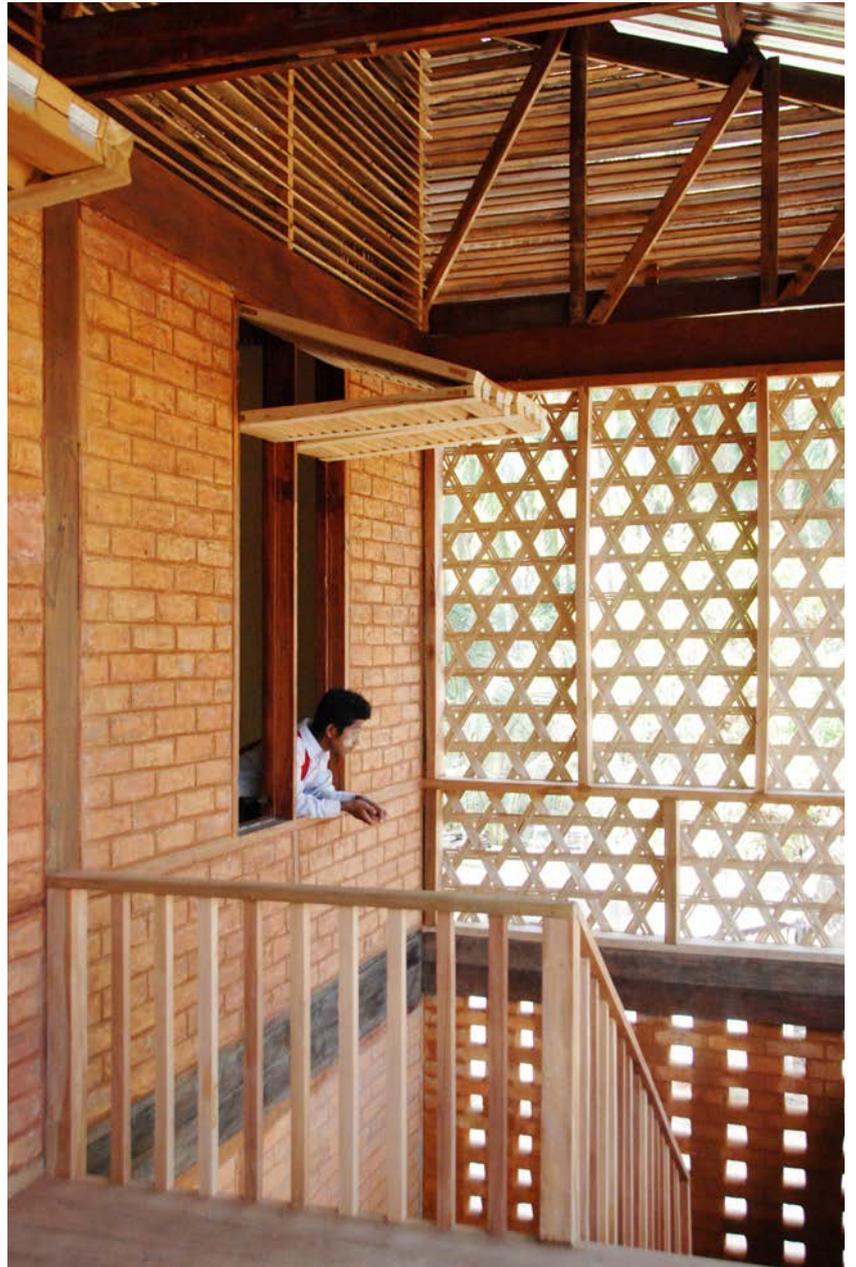
Ngwesaung, Republic of the union of Myanmar,
2014.

A building that is so much more than a standard school, a place that the local people can use as their own and adapt it to their own needs. During the building process sustainable and local materials like bamboo and local brick masonry were used and by hiring only a few highly qualified workers from Patheingyi and Yangon the chance was given to local workers to get training on site while being engaged in the building process. They reused the timber from a previous school and assembled it again as furniture or integrated it in the pavilion and in the new wooden framework. For the skin of the building, they used the traditional 'brick noggin structure', a base structure out of concrete and walls made out of brick masonry. Due to the climate it wasn't necessary to provide windows in the facades, colourful timber shutters are present to protect the interior from rain. Whereas the pergola design made out of bamboo and decorating patterns functions as a protection against the sun. It ensures the building of an excellent air ventilation system and prevents overheating. The colourful pigments used on the doors and windows came from Patheingyi, a city nearby where they are known for making colourful umbrellas.

An important aspect in the process was designing a building that connects the already existing buildings with a new central pavilion. By creating a courtyard with the pavilion, a space was created that can also be used outside the school hours. A place for cultural events, village gatherings, performances, etc. The two-story school building is provided with seven classrooms and a faculty room made out of a traditional way of construction. A community space not only for the children and teenagers, but also for other generations of the neighbouring community.



- Architects: Ackermann+Raff
- Location: Ngwesaung, Republic of the Union of Myanmar
- Cost: 90.000 USD, financed by donations
- Area: 500.0 sqm
- Project Year: 2014
- Photographs: Julia Raff



SOURCES

ArchDaily. (Trans. Quintana, Lorena), <http://www.archdaily.com/534728/high-school-thazin-ackermann-raff>, 7 August 2014, Accessed January 2017.

AMY SCHELLENBAUM, <http://www.curbed.com/2014/8/7/10063284/ackermann-raff-school-in-myanmar>, August 7 2014, Accessed January 2017.

Photographs: Julia Raff

AGRICULTURAL SCHOOL BELLA VISTA - BOLIVIA

TU Berlin, 2015, CODE Prof. Ralf Pasel
270 spm, 40.000€

The task demanded a new agriculture school in Bella Vista, Bolivia. The main challenge was to realize the project within the local circumstances. Especially the construction as well as the materials ought to fit in the environment. During the first semester the design studio of 25 students of the chair CODE of Prof. Pasel was working on different proposals. A wide research about the location, the variety of drafts of the first round and the opinion of the clients served as a basis for our final draft.

In the second semester we all worked together on the new design while taking into account the more and more precise visions and expectations of the client. Furthermore we had to handle the structural engineering, the finances and scheduling. The main component was still the regional origin of the materials and the way of construction. Secondly, the budget shouldn't be exceeded.



fig. 1: Entrance, sliding door, by Andreas Rost



fig. 2: External view, by Andreas Rost

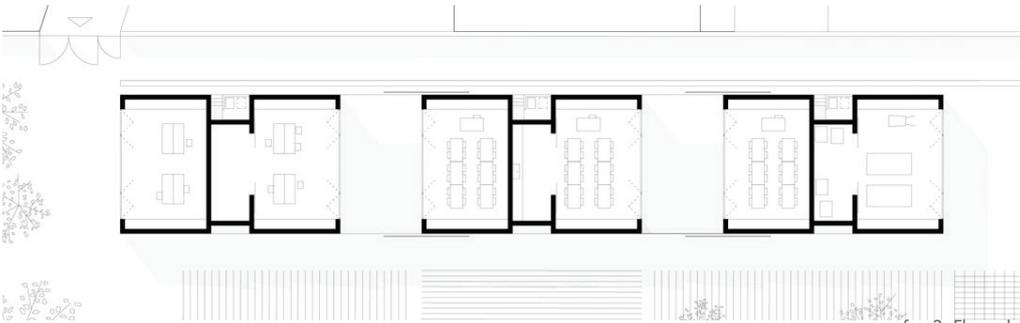


fig. 3: Floor plan

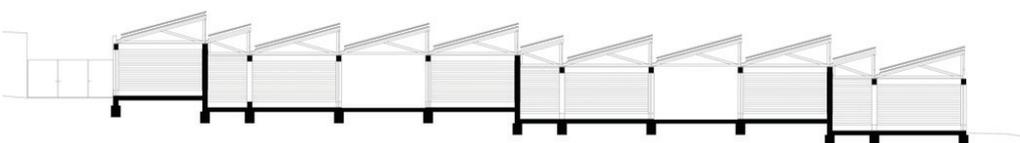


fig. 4: Section 1-1

Finally, the building ought to be modular in order to allow the building to be built step by step. This turned out as a very important fact to realize different working processes. Also the fact that we would not manage to finish the school in ten weeks of staying in Bella Vista, it was still possible to reach a satisfying level of the first module and see the first part as a prototype for the rest of the school. The other modules were later finished by Procasha, a local organization with the supervision of three students from our group.

The building is made out of three stepped modules, which are adapting themselves to the natural site. One module is composed of two back C's with a construction centre in the middle (fig. 2/3). The construction centre contains the laboratories and the dry toilets which are accessible from outside of the building. Two opposite C modules and the patio in-between them forms one large room. The three layers of brick are used to regulate the high fluctuation temperature at day and night. The complete building is covered with one sawtooth roof. This roof structure is made out of wooden trusses, prefabricated by our own in the wood workshop of the school and covered with corrugated steel. The two patios between the module build a shadowed place in the burning sun of Bolivia. This space in between can be used as a separated outdoor classroom or can be connected with two neighbouring rooms to one big room which can be used for different event. The foldable facade allows to open up the rooms, but also to create the needed privacy for the class rooms (fig. 6/7). The entire building can be locked with the big sliding door from the outside.



fig. 5: External view, by Andreas Rost



fig. 6: Patio - classroom, by Andreas Rost



fig. 7: Opening classrooms, by Andreas Rost



fig. 8: Axonometry



fig. 9: Construction site, by CODE TU Berlin

CODE, Prof Ralf Pasel, TU Berlin
 Franziska Sack, Lorena Valdivia,
 Johannes Zix
 Students: Ege Baki, Tessa
 Pooth, Kilian Bloemers, Nicholas
 Schueller, Thomas Boegel, Simon
 Lehmann, Björn Bök, Larsen
 Berg, Laura Heinz, Magdalena
 Boettcher, Vera Burkhardt,
 Michael Kölmel, Ivan Zilic, Bastian
 Landgraf, Markos Lasos, Stefanie
 Lennartz, Charlotte Reh, Mirka
 Bergk, Diana Redding, Anne - Flor-
 ence Seele, Niklas Martin

1-9 (2017): <http://www.bellavista-code.de/entwurf/landwirtschaftsschule/>.

GANDO PRIMARY SCHOOL GANDO - BURKINA FASO

Francis Kéré, 2001
560 spm

Francis Kéré's first project was a primary school in Gando, Burkina Faso— Kéré's hometown. While he was studying architecture in the third semester at the Technical University in Berlin he had been asked to rebuild his village's school which was about to collapse due to the poor building condition. With his first project he raised the foundation „Schulbausteine für Gando“ (Building blocks for Gando's School's) to collect enough money to realize his plans in 2001. To give 120 children a comfortable place to study his draft had to be affordable and realizable. This is why he chose to work with traditional and local construction techniques and materials also to involve the local people to the building process, which was very important for his approach. His design contains a mud brick building with a thin corrugated steel roof, which was the cheapest and easiest solution to realize on site.



fig. 1: Facade and overhanging roof, by Erik-Jan Ouwerkerk



fig. 2: Outside view, by Erik-Jan Ouwerkerk

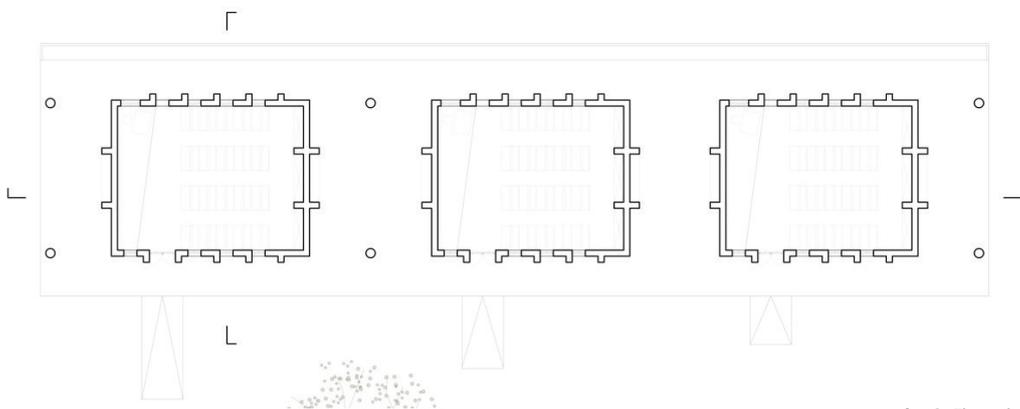


fig. 3: Floor plan

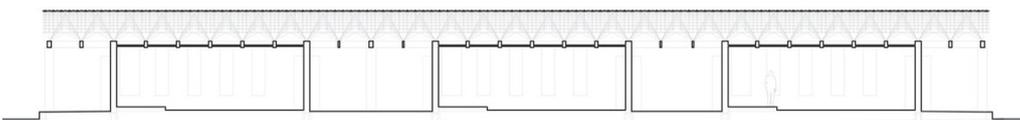


fig. 4: Section 1-1

2013, Francis Kéré - on Architecture of Necessity, Arch+ Think global build social, 2011/2012, June 2013, (Page 1-16)

Kéré architecture (no date)
Available at: <http://www.kere-architecture.com/projects/primary-school-gando/> (Accessed: 4 December 2016)

Since it was very difficult for him to explain his ideas via plans to the local population he decided to build first a mockup model to show and to prove his ideas and in order to make the people trust his structure he climbed himself on top of the model.

Remembering from his own childhood the unbearable heat in his classrooms he designed a very simple but efficient natural ventilation system. The thin roof out of corrugated steel is lifted up to create a gap between the walls and the roof. The dry-stacked perforated brick ceiling allows enough ventilation to avoid any mechanical supporting. Due to the fact that the roof heats up a lot under the strong African sun a natural airflow has been created which brings fresh air in through the windows while the hot air can exit through the gap under the roof (fig. 7). The initial school consisted out of three massive class rooms with an open air space in-between, connected with the overhanging roof which protects from the damaging rains and creates a shadowed zone around the building (fig. 3/4).

Francis Kéré's school is not only a very successful school project but became also a landmark for Gando and an example for many educational projects in the region. During the long discussion about the painting of the school Francis had to return to Berlin. When he came back to Gando after a while he was surprised about the very colorful facade, which was not in the architects mind. But he noticed that every single person was involved in process of deciding for the colors and became so part of the society and made people very proud about it.

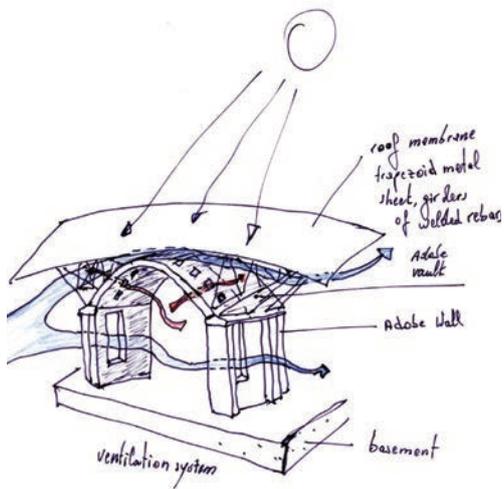


fig. 7: Ventilation system



fig. 5: Classroom, by Erik-Jan Ouwerkerk



fig. 6: Teaching outside, by Erik-Jan Ouwerkerk



fig. 8: Students, by Erik-Jan Ouwerkerk

ArchDaily (2016) Primary school in Gando / Kéré architecture. Available at: <http://www.archdaily.com/785955/primary-school-in-gando-kere-architecture> (Accessed: 4 December 2016)

1-3, 5, 8 (2017): <http://www.archdaily.com/785955/primary-school-in-gando-kere-architecture/5717e992e58ece9e0b000138-primary-school-in-gando-kere-architecture-photo>

4, 6, 7 (2017): <http://www.kere-architecture.com/projects/primary-school-gando/>

EDUCATION CENTER NYANZA RUANDA

Dominikus Stark Architekten, 2010
1000 spm

The design tasks asked for a self-contained school complex to enforce the local education. The site is located on a road between two villages in Ruanda, Kigali and Butare. The complex consists out of three teaching rooms, a library, a language lab, a canteen and an administrative block. All rooms are clustered around the central courtyard with almost no openings to the outside. This courtyard is the heart of the entire projects and gives people a open air space, protected from the environment (fig. 2/5). Only the internet cafe with the included copy shop on the eastern side of the complex opens up the building and create the entrance. In order to create more privacy the architects designed a covered buffer zone between the central piazza and the classrooms, which makes simultaneous uses possible. Only the canteen which is also used for public events like weddings or movie screenings is opened directly to the main centre.



fig. 1: Entrance, by Florian Holzherr

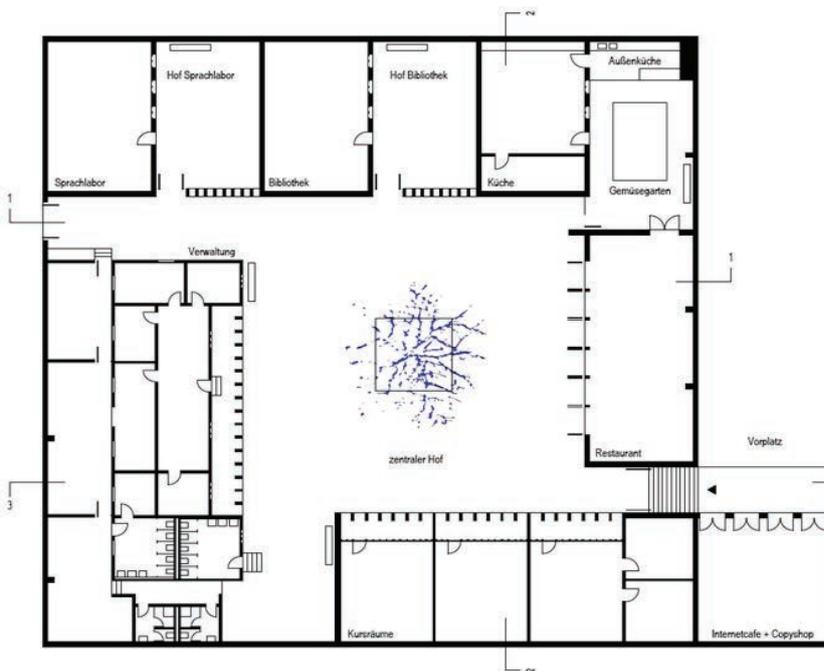


fig.: 2 Floor plan

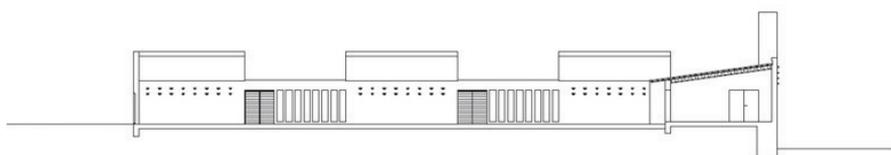


fig. 3: Section 1-1

Education center Nyanza von Dominikus stark Architekten | Schulen (2011) Available at: <https://www.architonic.com/de/project/dominikus-stark-architekten-education-center-nyanza/5100823> (Accessed: 4 December 2016)

The reduction of three main building materials, bricks, steel and papyrus runs through the entire complex and leaves its indelible marks on the site. It was important for the architects to use local materials and traditional constructions methods to integrate the inhabitants of the neighboring villages. Stark Architekten used over half a million handmade bricks for all the structural elements, like pillars and walls, but also the flooring is made out of bricks. The bricks were made in many tiny manufactories closed by and burned later in cooperatives, to strengthen the very long and important tradition of bricks in Ruanda. The finishing of the ceiling as well as the gates are made out of papyrus, prefabricated by local basket makers. Stark Architekten considered that including local people is very important for the longterm acceptance of the building and to support to economic and sustainable building culture. Due to the extreme environmental conditions the dealing with natural sources becomes more needed. The very rare rain water is collected by the mono pitched roof and stored in the courtyard. A pleasant climate has been created by a simple concept, combining massive brick walls and a permanent cross ventilations through gaps between the brickwork. By turning several bricks in the brick walls Stark Architekten created small gaps in the wall to archive a permanent airflow which provides a compatible climate (fig. 7). The mass of the walls shifts the different climates between day and night to cool down during day with the stored coldness of the night in the walls.



fig. 4: Outside view, by Florian Holzherr



fig. 5: Inner courtyard, by Florian Holzherr



fig. 6: Corridor btw. courtyard - calssroom, by Florian Holzherr

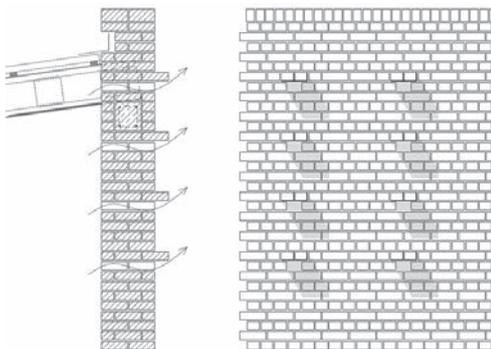


fig. 7: Natural ventilation system

(No Date) Available at: <https://www.dezeen.com/2013/12/10/education-centre-brick-wicker-rwanda-dominikus-stark/> (Accessed: 4 December 2016) (No Date) Available at: <http://www.detail.de/artikel/klare-gliederung-education-center-nyanza-11197/> (Accessed: 4 December 2016)

1, 4-6 (2017): <https://www.dezeen.com/2013/12/10/education-centre-brick-wicker-rwanda-dominikus-stark/>

2, 3, 7 (2017): <http://www.detail.de/artikel/klare-gliederung-education-center-nyanza-11197>

JUNGLE FLOWER | 1+1>2 ARCHITECTS THAI NGUYEN, VIETNAM

It's not an unknown fact that Vietnam is a tough place to live. The country is set in Southeast-Asia. Located on the peninsula of Indochina and borders on China in the North. After more than a 1000 years of Chinese doctrines, in the 10th century, they were declared independent. But even so, today Vietnam has remained a harsh land for its local inhabitants.

Deprivation and misery rule the northern mountain. Local children don't have food nor clothes and seek shelter in old and weary buildings. They study, when possible, but in the worst conditions imaginable.

Most of the mountain-villages are badly connected to the mainland. Lung Luong has the most difficult access in the whole Thai Nguyen Province and that is not all. They struggle with many obstacles. The path to the village is dangerous. It's long, rough and hardly wide enough for two people to cross one another. It is easy to slip and fall down. There are lots of sloping areas in the mountain range, being just a little careless could mean tragedy.

Also a large percentage of the Hmong (Mong or Miao) ethnic people live in that same area and most of them are poor. During the In Indochina Wars, France and the U.S. recruited Hmong people to fight for them in the so called Secret War. They fought against forces from north and south Vietnam. Thousands of them, as refugees, fled and sought political asylum elsewhere. Others returned to Vietnam under repatriation programs, sponsored by the United States. Their position filled during the first and second war is still the cause for conflicts and that makes it even more complex to try and solve the task add hand, the improvement of local health care and education.



Lung Luong elementary school can be found on a rugged peak of the mountain. The weather conditions up there can be piercingly cold and therefore the buildings need the right adjustments. There had been a previous attempted to raise a school project of the ground but it didn't last. The building remained in temporary condition with torn canvas preventing cold draughts in the winter. The foundations were made from soil, the walls out of pallets and the roof was covered by fibro cement and gables were surrounded by bamboo wattle. During heavy rain this structure did not provide good shelter.

Under the guidance of architect Hoang Thuc Hao, Lung Luong elementary school is now, after two years of construction, a jungle-flower-treat. A mixture of fresh and lively colours give the place a modern feel and it has a strong inspiring effect on the children. The classes will never be the same again.

It's goal? Creating a school that strives for optimal insurance against the harsh nature. The design has included all standards of lighting, ventilation and sound insulation. There are enough classrooms, some multi-purpose rooms, a medical facility, a library, kitchen, toilet and even a dormitory.



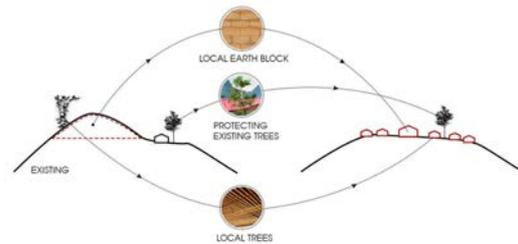
[1] Side view of the school
[2] Top view of the school
[3] View on the playground

<http://www.archdaily.com/801294/jungle-flower-1-plus-1-2>



“A school is a mountain and a mountain is a school” (1): this idea formed the bases for the new and improved school. Which was perfect, because it shows they’re invested. Not only did the architects care about the children or building a place fit for educating. It was them about much more. The foundation of the buildings respect the natural terrain, which means they have to move up and down just like the earth intended it. The classrooms were made compatible with the mountain. Spaces in-between rooms make it look like nature is being framed for pictures. Also the corridor connects all functional areas. Bricks were made out of recycled soil that they got from laying the foundation. The material also allows a balanced climate indoors. It saved them a lot of money and it helped increasing the heat insulation. The rooms adapt accordingly to the changes in the weather, season after season.

Lung Luong elementary shines through the forest like a rainbow on a rainy day. It’s been a beautiful and meaningful gift for the region, but of course the most important benefactors will always be the ethnic children who had struggled so hard before.



(1) <http://www.archdaily.com/801294/jungle-flower-1-plus-1-2>

[4] Section without the colours
 [6] Overview and levelingdetail
 [5][7] View of the classrooms seen from the playground



Jungle Flower school by 1+1>2 Architects (Vietnam)

THON MUN | PROJECT LITTLE DREAMS TAKEO, CAMBODIA

The project is located northeast of Takeo town in Cambodia. It provides free classes so that every household could be able to send their children. It was built with 65 volunteers and local craftsmen.

The Thom Mun school wasn't just realised so that children could have a good study environment. Its goal is to function as a centre. The concept of a school, anywhere you put it, is bringing people together for learning. It is a place situated in the heart of a community where everyone can gather and socially interact. This way it becomes a community centre.

Thom Mun exists of two classrooms. They are raised of the ground and the walls consist mainly of bamboo. Because of the warm climate, the bamboo screens were made porous. They provide shade and keep the interior constantly ventilated. The bamboo on the ceiling connects both classrooms and form a shaded corridor.



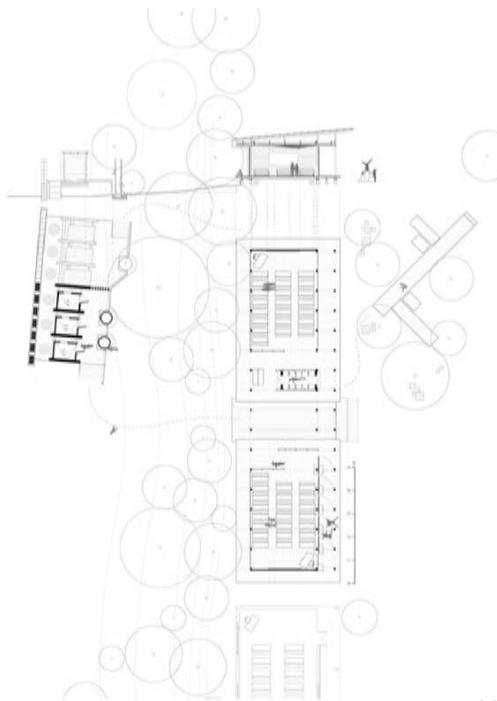
[2]



[1]

In the spirit of tradition and honouring the past, they decided to fill gabion walls with the remains of local temples and used them as the main-structure for the sanitation facilities. These relics were included into the design to show off the efforts of the volunteers. It was meant as a nod to the old and a token for the future.

For less than \$50,000, more than 530 children get the opportunity to learn English.



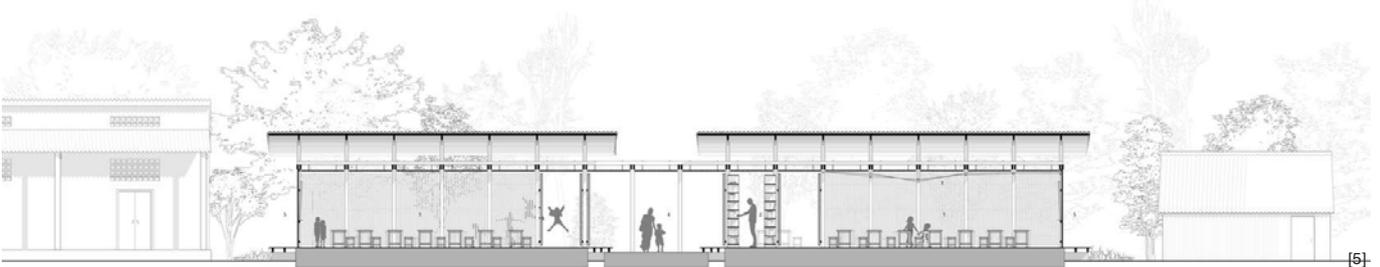
[3]

[1] Bamboo school-interior
[2] Front view entrance
[3] Section + overview

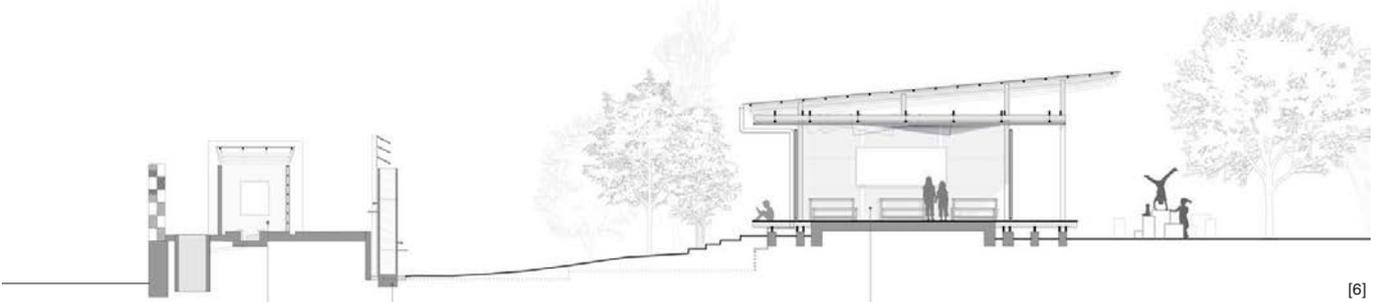
<http://architizer.com/projects/thon-mun-community-centre/>
<http://www.littledream.org/>
Aung San Suu Kyi, 2011



[4]



[5]



[6]



[7]

Project Little Dream began as a group of students that wanted to do charity work. They believe in the universal right of education and see it as an catalyst that has the power to change. "When you have the tools and the knowledge you can build a future"(1). They provide both.

With the help of local and foreign people, volunteers and children from Takeo they have been able to give 630 Cambodian children the opportunity to study. Which equals four schools.



[8]

(1) <http://www.littledream.org/>

- [4] Inside the classroom
- [5] Front section - school
- [6] Side Section - school
- [7] Students and teachers
- [8] Gabion wall on the left

THNOUH | PROJECT LITTLE DREAMS

TAKEO, CAMBODIA

With a local tuk-tuk-ride you will be able to get to the Thnouh School situated south of Takeo. It's the 4th school project taken on by 'Project Little Dreams' and it provides free classes to over 250 children. It offers a lot, not only to the youngsters but also to the whole neighbourhood that can be collectively involved in all activities.

Over a period of 2 years, more than 80 students and craftsmen helped getting the project of the ground. It was completed in the summer of 2015.

The village is one of the least accessible in Takeo. The children take their bikes to get to the nearest school. Cycling goes faster than walking but it will still take them close to an hour to get there. But not enough children go to school. Roughly 20% attends the classes regularly.

Like most architecture in rural Cambodia this idea was constructed through hard manual labour and built with local materials. Thnouh School aims to manifest the progression in the Thnouh Village. Everything comes together through the creation of new building. It is seen as an opportunity that can help further the evolution of vernacular architecture.

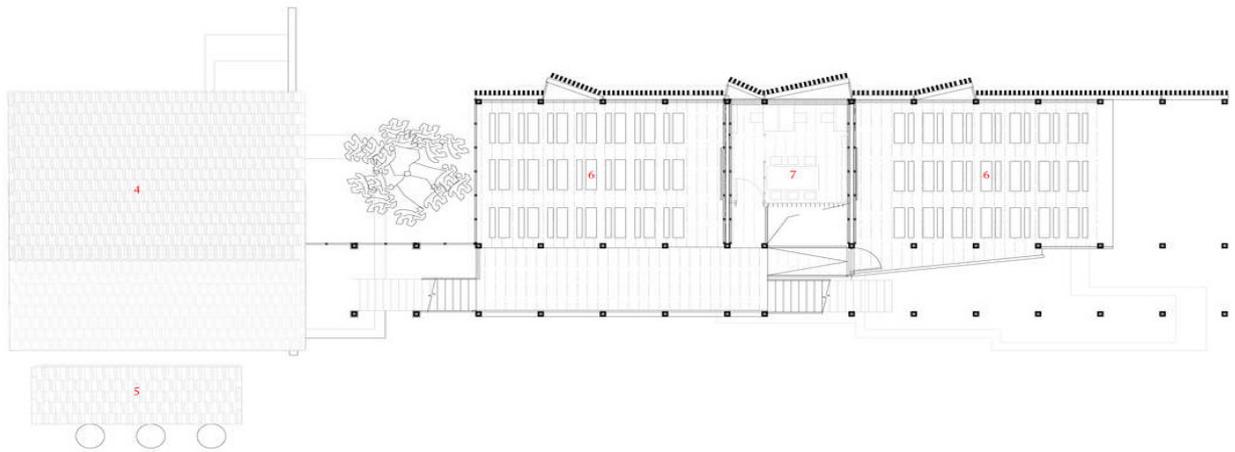


Some of the inspiration for the design was found in the Khmer vernacular stilt houses. In fact, the Thnouh School might be considered to be an extension of the village and its surrounding landscape. It brings together the domestic routines and the social rituals. Which gives the project a very home-like feel. For example, the interior is created around certain typical Cambodian practices. When students arrive at Thnouh, they will take off their shoes. Thus, making the floors very crucial in its design. Throughout the school you will find that the floors differentiate in surface materials and textures. Each of the learning places have their own characteristics, suggesting different modes of learning.

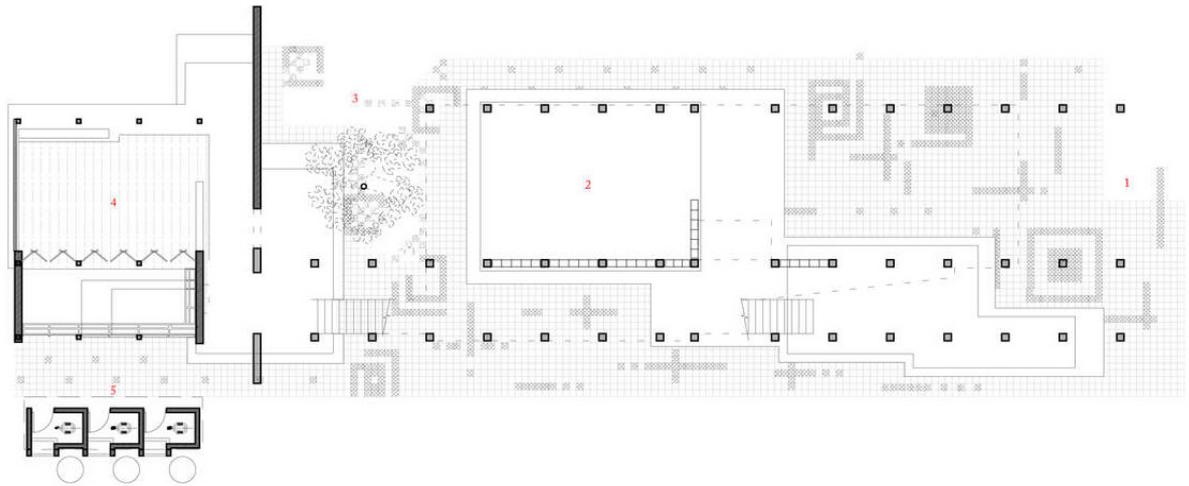


[1] Side view of the entrance
[2] Full entrance + building view
[3] Groundlevel playground

<http://www.architecturein-development.org/project.php?id=433#!prettyPhoto>
http://architizer.com/projects/thnouh-school/#_=_



[5]



[6]



Using local craftsmen, native materials and furthering the basic principles of the well-known stilt houses makes this project a truly great blossoming elongation of its traditional surroundings. This is also the reason for the regional name it has acquired, 'Khmer Home School'. The school offers a real accommodation for the educational needs, sheltered away from the changeable climate.

- [4] View of the classroom
- [5] 1st floor section
- [6] Groundlevel - section
- [7] View on the corridor

MASTERSTUDENTS BAS
SISTER CATHARINA
DAYCARE CENTRE
BREJO CHIMUNDO
MO AMBIQUE
2009



2

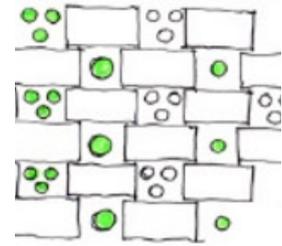
Nineteen architecture students from Bergen School of Architecture, Norway, went to South Africa for five weeks. They had only twelve days to build a school there, in Brejo Chimundo in Mozambique.

Being an architect in a foreign culture is one of the master courses at Bergen School of architecture. The course is about local and social awareness in architecture. The students have to investigate and analyze the surrounding impressions and settings, and the role of the architect becomes a topic of discussion.

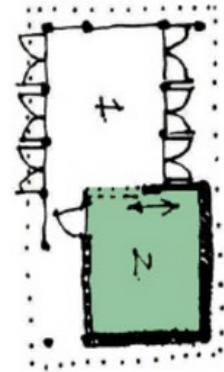
The students built a school building for multi-purpose use as trainee center in the afternoon and as an extended space for children during day-time.

The construction of the building was done in such a way that it was educational for the people who have helped and can be reconstructed later by the people of Chimundo. Almost only local materials and vernacular methods were used, combined with new interpretations.

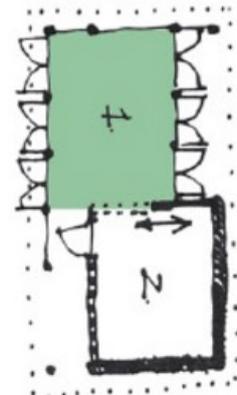
They used earthbags to build walls. Earthbag technology is a wall system, with structures made with the soil found at the construction site. The soil is stuffed inside polypropylene bags. For the foundation there are 2 to 3 courses of gravel bags used on Rubble Trench. Earthbag technology is an inexpensive, simple and sustainable method for building structures. It al started with military bunker constructions. Later on it was used as flood control method. It is very useful to use earth bags in an area where there are often earthquakes.



3



4



5

1
The schoolbuilding
www.archdaily.com

2
Bottles

3
Sketch bricks and bottles

4
Closed room

5
Open room



1



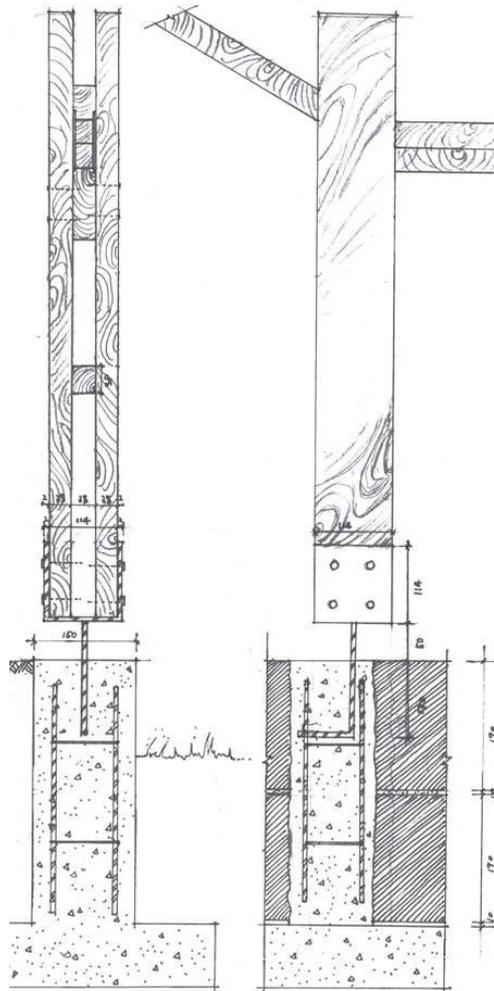
6

One wall is made of a concrete frame filled with sand bags and glass bottles. The glass bottles provide light, and still guarantee privacy. The roof consists of a wooden, self made support structure with a corrugated iron above it. The timber frame is necessary for the ventilation.

The sandbags in the eastern and northern facade serve as thermal insulation in winter. In the summer, the roof prevents from overheating. The roof also collects rainwater in a cistern.

The building has a closed and an open room divided by a large door that can slide from one way to the other.

The closed room provides protection against rain, noise, dust,... and is used for computer classes. The other room, the open room, is meant to organize English classes. It's a more flexible room. The construction from the closed room is much more solid than the construction of the open room. The open room needs less protection and safety, but also gives protection against rain and dust.



7

6
Sandbags
www.archdaily.com

7
People of Chimundo filling the bags
www.architectural-review.com

8
Sketch frame work
www.archdaily.com



8

BC ARCHITECTS & STUDIES AHARA CHILDREN'S CENTER ADDIS ABEBA, ETHIOPIE

CENTER FOR MEDICAL, SOCIAL,
AND EDUCATIONAL SERVICES

Zahara children's center is a centre for integrated medical, social, nutritional, and educational services to help children infected with TB and HIV.

It is a circular building, constructed with earth and bamboo finished with rammed earth, mud walls, bamboo timbers and a roof also made of earth.

BC Studies offers help with locally produced materials for architects, contractors and clients. They are concerned with location-specific production of construction materials. They organize workshops for children, students, architects, developers and contractors - lowering thresholds for using local materials.



2



3

The Zahara Center is being built using local sustainable methods designed by GRAFT architects with oversight from Brad Pitt.

Exterior and Non-Medical interior wall surfaces were designed to a two-layer plaster system. The base layer is earth with coarse sand and plenty of uncut straw, applied in two times. The finish is finer sand, cow manure and lime.

Mixing procedures were very detailed: the base layer would rest with straw for at least 2 weeks until straw started to ferment. The finishing layer's would rest for 7 days with lime in water, after which dry sand was added, just before application.



1

1
Wall of the building
Photo: <http://studies.bc-as.org/>

2
Woman brings mud on the wall
Photo: <http://studies.bc-as.org/>

3
Mixing the ingredients
Photo: <http://studies.bc-as.org/>



4

4
Exterior
Photo: <http://studies.bc-as.org/>

5
Interior
Photo: <http://studies.bc-as.org/>

Interior medical rooms needed to be washable. The same base layer as described before was the first layer. Second was a lime-pumice layer reinforced with cut straw. Third was the lime finishing layer of 3 mm thick.



5

JUN SEKINO
 EARTHQUAKE-DAMAGED
 SCHOOL
 THAILAND
 2014

In May 2014 an earthquake strikes in Chiang Rai Province in Thailand. A lot of schools were destroyed. Without the schools and classrooms the students had nowhere to go to take classes.

Jun Sekino, an architect from Bangkok, designed a new school that would replace the old, destroyed building of the Baan Nhong Bua School. The school has pupils from five to ten years old. They study in a makeshift structure.

He didn't do it alone. There were eight other architects who also worked on the school project. A programme was set up by D4D. D4D stands for Design for Disasters. They helped to build nine schools in total in the earthquake area of Thailand.

The architects explain that the way schools are built in Thailand is not a good way to protect themselves for earthquakes. "The school's building, which was damaged, is considered to possess the same standard and pattern with other schools in Thailand; however, this pattern does not brace for the severe natural disasters,"

The students were very happy with the new building. "Due to the dilapidation of the building, the students were beseeched to study in a temporary pavilion that was not suitable for learning."

The school consists of a steel frame, which is built in a way that it could help with the absorption of vibrations in earthquakes.

The building is built on stilts so that it is protected in case of flooding.

The materials used in the building are not expensive and easy in use. The architects used corrugated



2



3



1

1
 3D-model
www.dezeen.com

2
 Exterior
www.dezeen.com

3
 Classroom
www.dezeen.com

plastic sheeting for windows and room dividers, and cement board for walls and shelving.

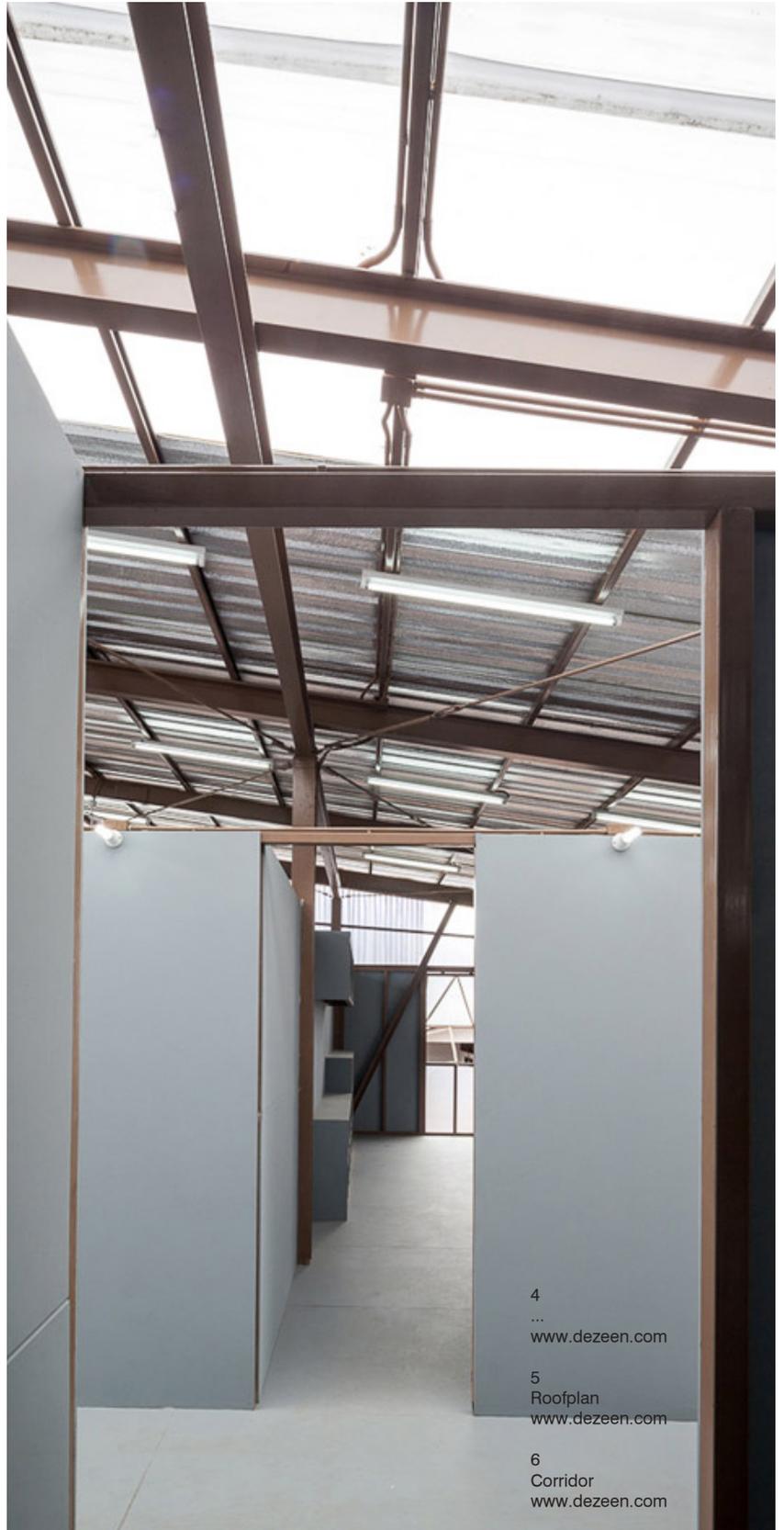
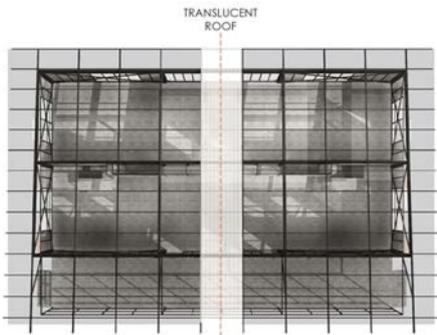
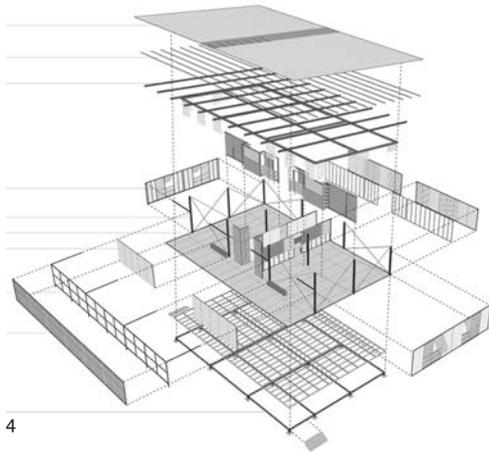
The building carries a mono-pitched roof. The roof serves also as shelter to provide shadow and a veranda. The area under the shelter serves as entrance hall. It is the place where students and teachers take off their coats and shoes.

In the middle of the building is a large corridor. On both sides of this corridor are classrooms.

"The building is designed to correspond with the weather condition of the northern part of Thailand which allows the circulation of natural air, and the penetration of natural light into the building," explained the studio. "The building demanded to have pavilion-like appearance in correspondence with the rural architecture in which the ceiling is elevated in order to allow the natural light to penetrate through the classrooms during daytime."

The idea is that in the future, the students and teachers will adjust the building and its functions to their needs.

Architects Charles Lai and Takehiko Suzuki developed a prototype shelter for earthquake victims in Nepal. They designed a bamboo-framed shelter that could be constructed by everyone in three days.



4
...
www.dezeen.com
5
Roofplan
www.dezeen.com
6
Corridor
www.dezeen.com

METI HANDMADE SCHOOL

It is particularly important to improve the quality of living in the rural areas in order to counteract the continuing population migration to the cities. The primary potential for developing building in the rural areas is the low cost of labour and locally available resources such as earth and bamboo.

The project's main strategy is to communicate and develop knowledge and skills within the local population so that they can make the best possible use of their available resources. Historic building techniques are developed and improved and the skills passed on to local tradesmen transforming in the process the image of the building techniques.

The philosophy of METI (modern education and training institute) is learning with joy. METI aims to promote individual abilities and interests taking into account the different learning speeds of the schoolchildren and trainees in a free and open form of learning.

Designed as an alternative to the typical frontal approach to lessons. The new school/classrooms reflect this principle and provide different kinds of spaces and uses to support this approach to teaching and learning.

On the ground floor with thick earth walls, three classrooms are located each with their own access opening to an organically shaped system of 'caves' to the rear of the classroom. The soft interiors of these spaces are ideal for touching, for nestling up against them, and for exploration. They create personal bubbles which can help to find concentration, for single use or in group.

A brick foundation and damp proof course were fundamental additions to local earthen building skills. The damp proof course is a double layer of local available PE-film. The ground floor is realised as load-bearing walls using a technique similar to cob walling. A straw-earth mixture with a low straw content was manufactured with the help of cows and water buffalo and then heaped on top of the

foundation wall to a height of 65cm per layer. After a drying period of a week the next layer of cob can be applied. In the third and fourth layers the door and window lintels and jambs were integrated as well as a ring beam made of thick bamboo canes as a wallplate for the ceiling.

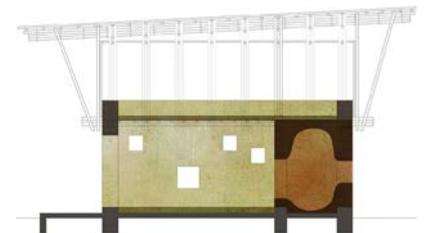
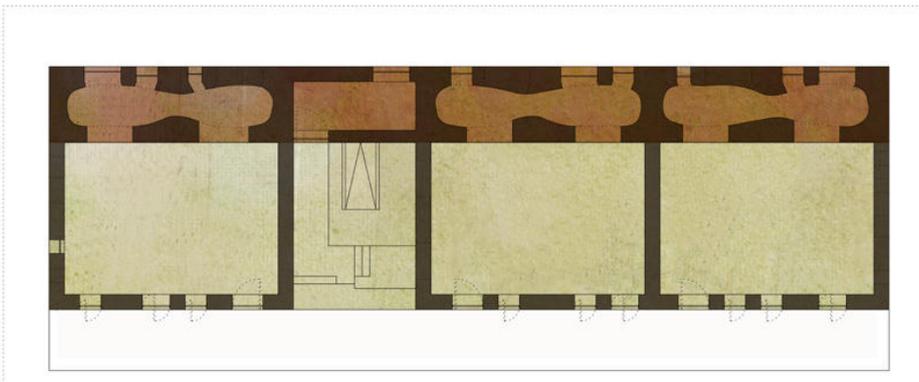
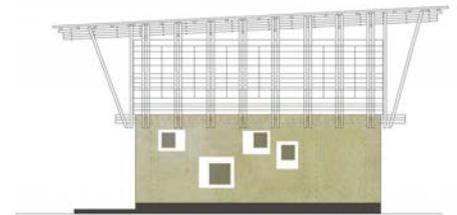
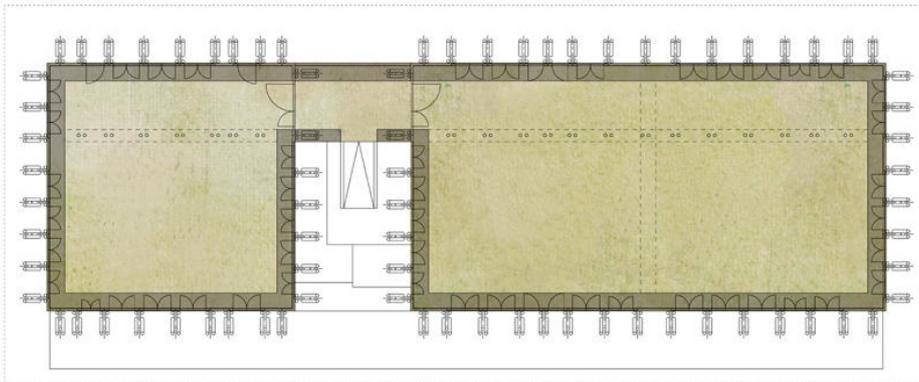


Architects: Anna Heringer & Eike Roswag
Location: Rudrapur, Dinajpur district, Bangladesh
Construction size: 275 m²
Project year: 2007



Heringer, A. & Roswag, E (2006). METI school, Bangladesh. Consulted on 10 november 2016 through <http://www.anna-heringer.com/index.php?id=31>

Archdaily (2007). Handmade School / Anna Heringer + Eike Roswag. Consulted on 10 november 2016 through <http://www.archdaily.com/51664/handmade-school-anna-heringer-eike-roswag>

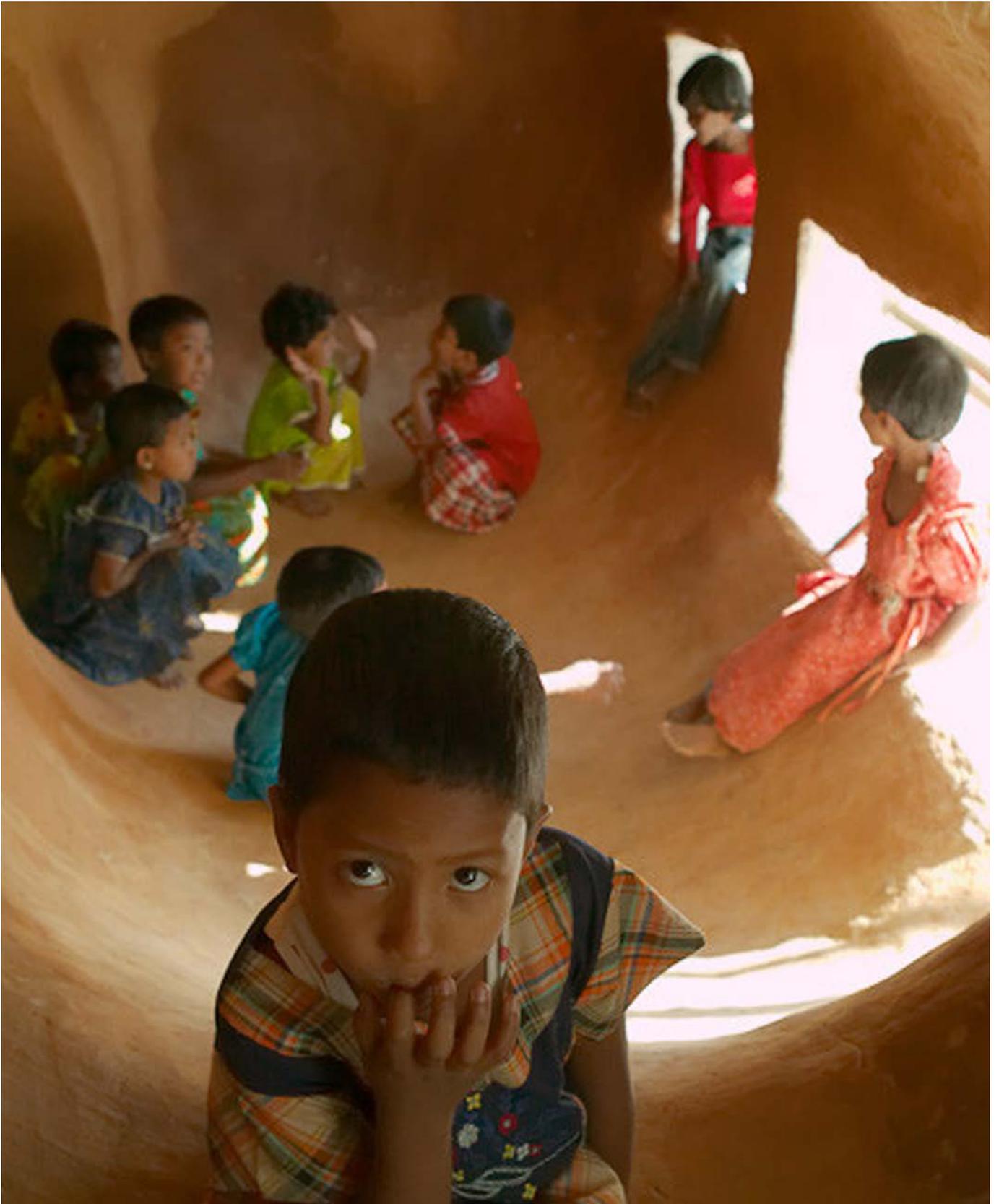


From the plan and section you see a clear division of the classrooms and the “caves” creating the personal bubbles. This project implements three different types of classrooms. The tree types are shown on the interior pictures above. From intimate “caves” to a basic classroom and even further to a covered rooftop classroom open to the air.

What also becomes visible is that every type of classroom creates a different atmosphere and goes from an intimate learning process to a group learning process to an even large group to discuss and learn from each other. Having possibilities to set up different classrooms makes the teaching more suitable for any kind of groups. The different types

of classrooms can also help tackle different topics. Some topics are better in “outside” classroom and others can benefit more from an informal way of teaching. Especially with young children who learn a lot by playing and are not used to sit still and listen for hours.

South Asia/SAARC (2013). Listings Hand-Made School/METI School in Rudrapur, Dinajpur. Consulted on 10 november 2016 through <https://architecture.net/doc/az-cf-166255>.



Meti handmade school by Anna Heringer & Eike Roswag (Bangladesh)

SCHILDERSCHOLTE ARCHITECTS:
PANI COMMUNITY CENTRE, BANGLADESH

This educational building is located in the town of Rajarhat.

The building serves as a community centre for folks from the region, aged from toddlers to elder people.

During the design process attention was mainly focused on weather conditions and locally available materials: coming from within a 15 miles radius

around the site. Bamboo, hand-shaped brick, Mango wood, reused steel, local mortar and wafer-thin recycled corrugated panels are the main materials used in the building.

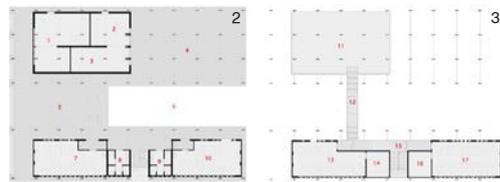
The drive was to encourage locals to become aware on the basic principles of sustainability and durable building concepts.

In effect close to zero electricity or fossil fuels were used during construction and other necessities required for erecting this building. Thus realizing an environmentally friendly building that contributes to the community in a significant way.

The lifted roof above the volumes achieves a big reduction of heat build up in the spaces.

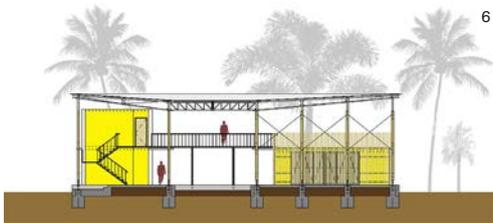
Further cooling is provided by cross ventilation and surrounding vegetation such as trees and the nearby pond.

On the ground floor there is a covered plaza with near collective lavatories.



- 1. Picture during construction phase
- 2. Groundfloor plan
- 3. First floor plan
- 4. U-shaped courtyard garden

At first level, above the workshop, there is a freely accessible assembly floor for public meetings. This part of the building is connected by a footbridge coming from the classrooms. The big U-shaped roof creates interspaces that are open for public use. There is no architectural loss. Although bamboo is seen as an inferior material in the region the architects have chosen to make the whole roof construction out of it. Even the walls and French doors of the workshop are clad with it. The techniques used for this project are easy to learn and diffused by the main contractor, this will contribute to the local construction modernization. The application of local bricks is less expensive and reduces the use of construction wood by combining bamboo with thin concrete floors. This minimizes the use of wood and future maintenance costs..



- 5. Combined use of concrete and bamboo
- 6. Trasversal section
- 7. Children playing with swings
- 8. View of the covered plaza with bamboo pillars and concrete floor
- 9. Overall building view from the nearby pot

ELIZABETH AÑAÑOS TEAM:
PLAN SELVA, PERÙ

Perù is fighting for the preservation of the Amazon rainforest through education, empowering indigenous communities to be custodian of their own land, learning medicine, nutrition and the sustainable use of the rainforest.

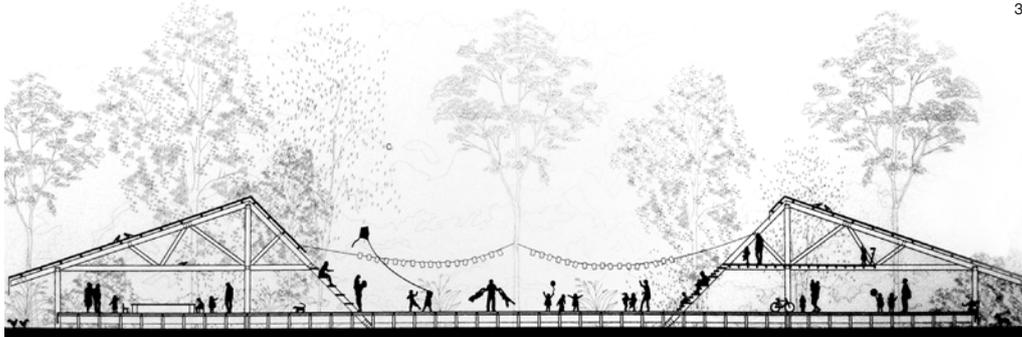
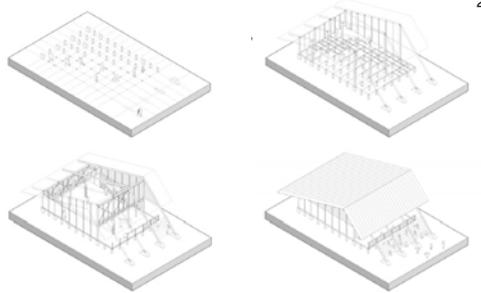
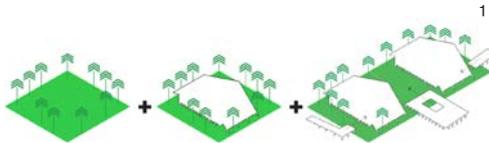
Plan Selva is a large-scale educational public program in the Peruvian Amazon region that relies upon resilient architecture for the construction of hundreds of schools scattered in inaccessible areas, without services.

The aim is to preserve the Amazon rainforest bringing education and services through a replicable, scalable, flexible and quality system: a modular architecture, that considers climate conditions and respects the amazon environment.

These modules are composed of steel structures and wood, making it easy to move to areas of difficult geography, as in the case of forest communities, and easy to dry assemble. It's a flexible system of different units, that allow school's diversity according to their own particular need and education requirements.

The floors of the modules are high because of the heavy rains and possible floodings. The rooms have high ceilings and inclined to shade and resist the rains. They also have adequate ventilation and lighting.

Outdoor space would serve for: forestation, games and recreation spaces, paths between modules, squares, benches...



1. Integration concept

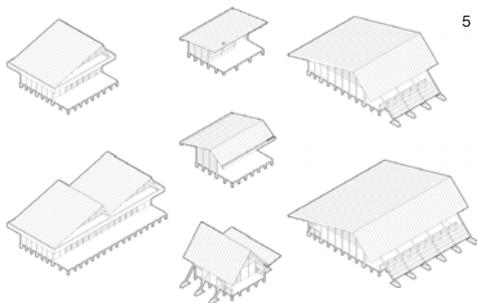
2. Typical module construction stages

3. Drawing of a possible section with combination of 2 modules to create a plaza

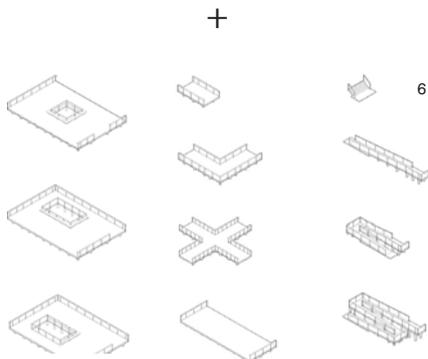
4. On-site exposition of model to the local children

It's possible to divide the models between buildings and connectors, giving multiples variations and different combinations.

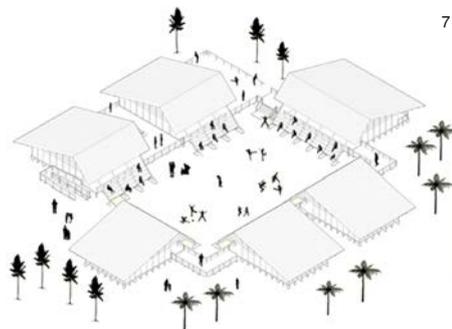
It's possible to create central configurations with courtyards or squares in the middle, L configuration along a corridor with a square or playground, or radius configuration with linear crossing circulation. Every solution is an adaptation to the environment, with his pros and cons.



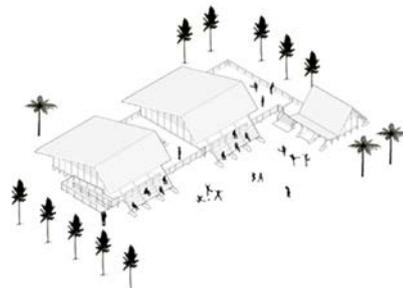
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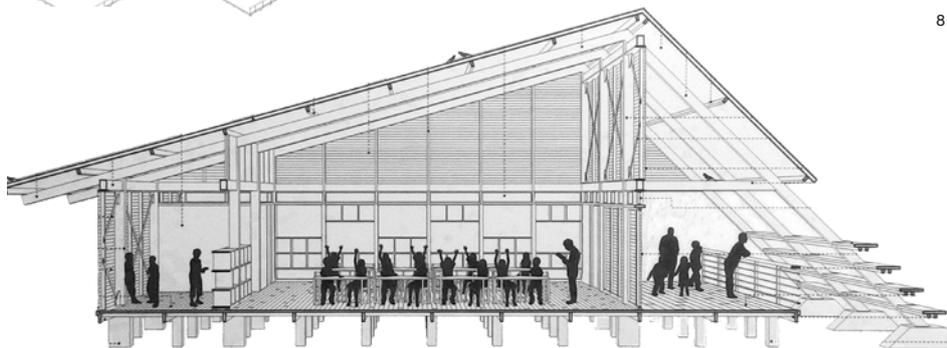
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5. Building modules comprehending classrooms, labs, library room, staff room, bathrooms, cafeteria and kitchen, infirmary

6. Connectors modules comprehending platforms, corridors, corners and ramps

7. Possible configurations like central, L-shaped, radius

8. Section of a classroom

9. Render of a scenario with schools and a football field

10. Render of an interior of a classroom

ALBERT FAUS ARCHITECT: KATIOU LIBRARY, BANGLADESH

After carefully studying the conditions of the plot, the architect proposed locating the library among the Karité trees, where the women sit and sell food and the children lie down in the coolness of the shade.

The programme was developed in one single volume. The wall is made even thicker by constructing shelving on both sides of the room, to thus free up interior space, and placing the reading and consultation tables in the centre. The administration and storage spaces are separated by a wall that does not reach the ceiling.

The support frame is a mixed system combining load-bearing walls and pillars made of BTC (compressed earth brick), manufactured close to the site. These bricks are also used in the room's ceiling, which is supported by stressed rebars



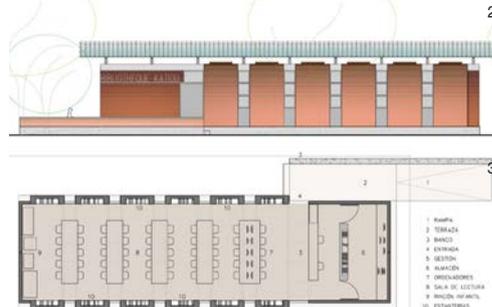
embedded in the reinforced concrete beams.

The pitched upper roof keeps direct sunlight off the walls and swiftly evacuates rain water. The covering is with galvanised corrugated plates along the straight section, and translucent plastic corrugated plates in the central curved section.

The foundation promoting the project had a few dozen translucent polycarbonate windows stored in the village, from the dismantling of a veranda in Madrid. To make use of all the material, they sized the window modules on the façades and internal ceiling in-line with the measurements of the panels and with the manufacture the BTC bricks.

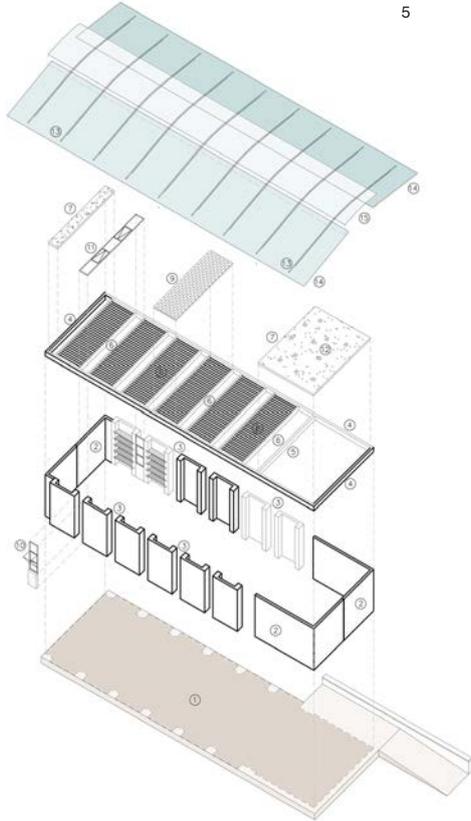
In buildings with budgets as tight as in this one, the frames are usually metallic and simple, without any kind of glass, regulating interior lighting and ventilation with adjustable slats. Having many windows along the façade doesn't automatically guarantee a good level of light inside.

Thus, the natural lighting and the ventilation are enhanced through openings which reuse the translucent, insulating polycarbonate sheets. The windows are set along the north and south façades, as well as in the ceiling, in the form of large practicable skylights, all of the same width. The natural

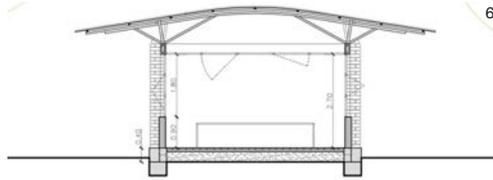


1. Picture of the interior
2. Facade drawing
3. Plan of the room and table disposition
4. Picture of the building

light, passing first through the translucent plastic plates in the upper roof and then filtered through the polycarbonate sheets, makes the skylights look like large diffuse light fittings, ideal for reading. At sunset, when the artificial lighting is turned on, young students sit outside the library below the windows, taking advantage of the building's lighting to do their homework.



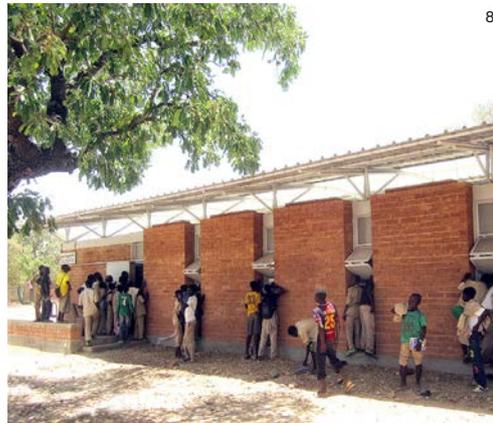
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- 5. Exploded view with floor, wall, first and second roof
- 6. Trasversal section
- 7. Picture during construction phase
- 8. Picture right after the finished works
- 9. Picture of the building inside the context

FLOATING IN THE SKY SCHOOL FOR ORPHANS

Architects: Kikuma Watanabe
Location: Kanchanaburi, Thailand
Area: 125 sqm
Project Year: 2013

LOCATION

The project located in Shangkhabori village, Thailand, located near the border of Myanmar and aims to help alleviate poverty in the area and caters to the town's immigrants and orphans. There are roughly 150,000 Burmese refugees in nine official camps on the Thai-Burma border, some of whom have been residing there for more than 25 years.

Since the outbreak of violence, many children have grown up in these camps notoriously plagued by poverty, attracting NGOs and volunteer efforts to alleviate poverty and educate out-of-school children.¹

DESIGN & MATERIALS

Wanting to provide a better future for these children, the architects hoped that the school would be designed as the realization of their dreams. When one of the teachers asked the children to draw their dream school building, one of the students drew a flying ship, the concept behind the unique design. The architects adapted his idea, and translated his drawing into the architectural design with two main architectural components: the round, earthbag volumes on the ground and the other, a light steel structure finished with bamboo and a grass roof.

The earthbag domes are thought of as a "launching pad" that supplies the ship with the energy



of Mother Earth and the upper steel building as the ship that is soaring in the sky.

The round volumes create a warm interior, fostering a sense of comfort for the children in prayer dome and classroom of earth. The floating level above functions as a buddhist room and learning area. A gentle breeze flows through the thatched roof, giving the feeling of being in a ship. The upper floor connects to the lower earthbag domes through two openings.²

By including the children in the design process, the community take a personal interest in the final result and creates a sense of pride. This also ensures that the structure is well maintained and taken care of.

Despite the low budget, managed to create a learning environment that has become a popu-



References

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2. Floating in the Sky School for Orphans / Kikuma Watanabe - <http://www.archdaily.com>

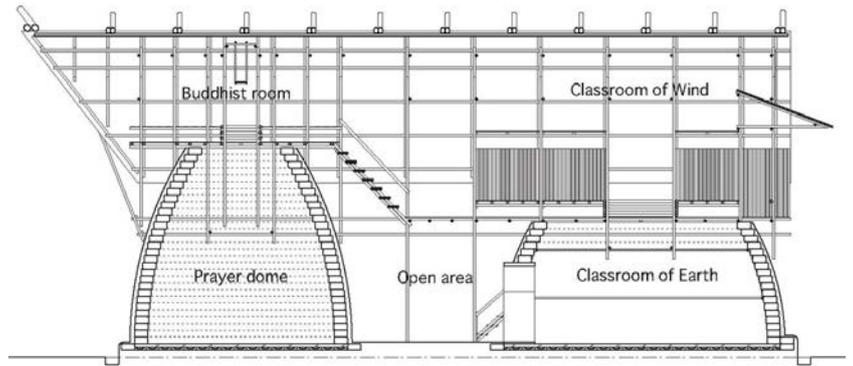
Photographs

Courtesy of Kikuma Watanabe



lar hangout and multi-functional space for the entire community as well as a great place to study and play.

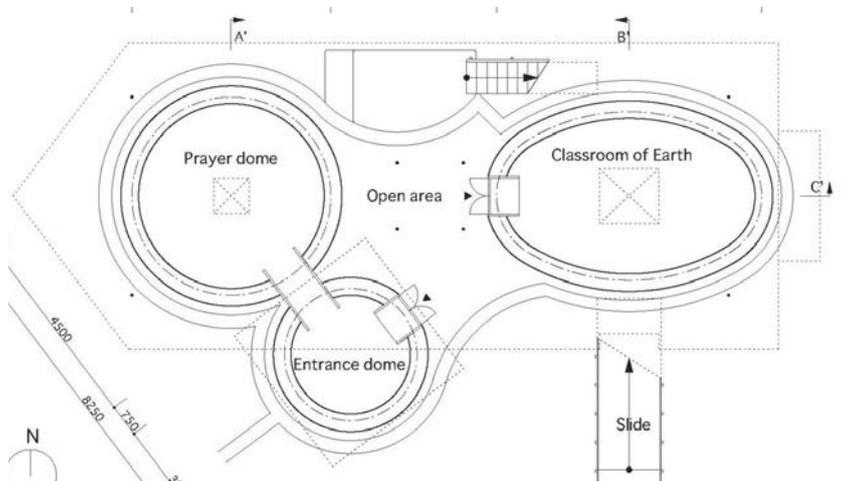
Watanabe notes that the primary materials and methods are “not local original technology,” but rather that they “can be adapted in every area and can be learned by everyone”: “We can get the earth for earthbags on site. We can get steel pipes for scaffolding in the local town near the school. Bamboo-work and grass-roof-work are the traditional technology in this area. So we collaborated this project with mountain people in this area, who could finish this work very quickly.”



EARTHBAG BUILDING

Earthbag buildings evolved from military bunker construction techniques and temporary flood-control dike-building methods into low-tech, enduring, and affordable housing solutions. This type of architecture can be designed to suit a wide variety of climates and also combines well with other natural building materials to create hybrid structures.

By combining versatile, low-cost construction techniques with traditional methods, the School Floating in the Sky offers the best of both worlds. “I can teach local people earthbag building and alternative technology,” says Watanabe. “And I can learn traditional technology from local people. That is very important for the future in poor communities.”





Floating in the sky school for orphans by Kikuma Watanabe (Thailand)

SRA POU VOCATIONAL SCHOOL

Architects: Rudanko + Kankkunen
Location: Sra Pou, Cambodia
Project Year: 2011

LOCATION & FUNCTION

The school was built by the local community from hand-dried blocks of the surrounding soil. The Sra Pou vocational school serves as a business training centre and public hall.

The purpose of the vocational training centre is to encourage and teach poor families to earn their own living. The Sra Pou community is one of the unprivileged communities in Cambodia, who have been evicted from their homes in the city to the surrounding countryside. They lack basic infrastructure, decent built environment and secure income.¹

The new vocational school provides professional training and helps the people to start sustainable businesses together. It is also a place for public gathering and democratic decision-making for the whole community. A local NGO organizes the teaching.

REALISATION OF THE PROJECT

The project was started by young architects Hilla Rudanko and Anssi Kankkunen in an Aalto university design studio in spring 2010. During the studio, they travelled to Cambodia to find a design task with a local NGO. The studio works were imaginary, but Rudanko and Kankkunen decided to organize the construction of Sra Pou vocational school, since there was an



urgent need for it and their design inspired both the community and donors. The firm Architects Rudanko + Kankkunen was founded during the design process. Now, it is an adventurous architecture firm specializing in public buildings in various settings.

MATERIALS & CONSTRUCTION

The school building is made out of local materials with local workforce. The aim was to teach people how to make the most out of the materials that are easily available, so that they can apply the same construction techniques for their own houses in the future.

As the materials are scarce, the beautiful red soil was utilized to make sundried soil blocks.



References

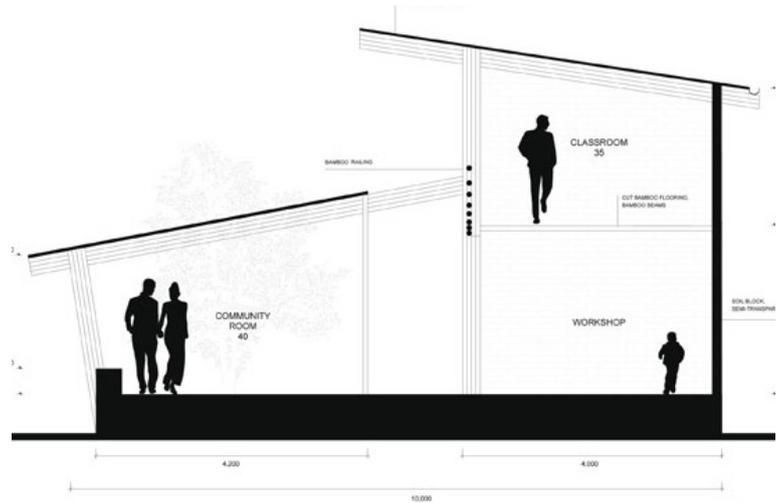
1. Sra Pou Vocational School by Rudanko + Kankkunen - <https://www.dezeen.com>
2. Sra Pou Vocational School / Architects Rudanko + Kankkunen <http://www.archdaily.com>
3. Sra Pou Vocational School, Udong, Cambodia 2010 - 2012 <http://www.ukumbi.org>

Photographs

Courtesy of Architects Rudanko + Kankkunen

The whole school is hand-made: no machines or prefabricated parts were used in the building work. This allowed employing many people from the community, and it kept all techniques simple and transferable.

Using local materials and techniques, the designers have created a beautiful architectural composition. The soil block walls repeat the warm red shade of the surrounding earth. They are laid out with small holes, so that indirect sunlight and gentle wind come in to cool the spaces - and at night, the school glows like a lantern through these small openings. The whole community space is open, providing comfortable shaded outdoor space. The colourful handicraft doors are visible from far away and welcome visitors coming along the main road.²

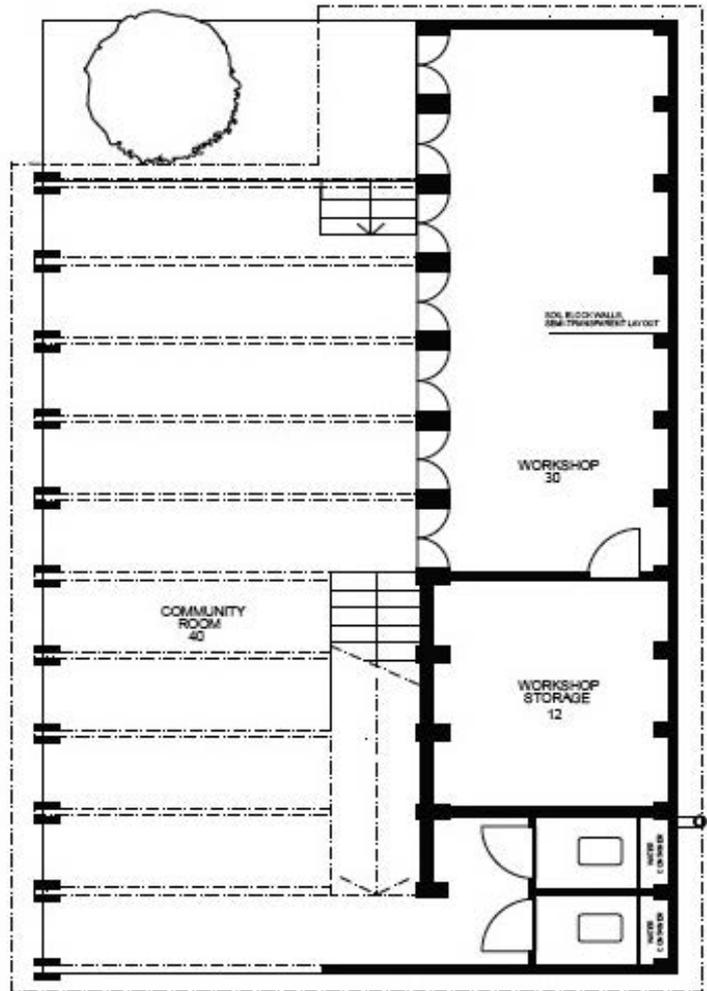


AFTER ONE YEAR

The architects kept in touch with NGO Blue Tent to ensure, that the building still in good condition and serves the community. The locals thought that the building was a gift, so they did not want to make any changes on the building. The Finnish architects found out that the question of ownership is very important.

“This same issue is problematic in all development aid: the transferring of ownership. I think best projects are the ones where the locals are completely in charge so that the ownership does not need to be transferred but it is with the locals from the beginning on.”

The handicraft doors had not been durable enough, so their design was developed further with the local handicraftsmen. They were replaced with solid metal doors which got new colours and artwork in a painting workshop, where community children painted the doors with the guidance of a local artist. The roof was enhanced and the building’s maintenance planned together with the community.³



HIGH SCHOOL THAZIN

Architects: Ackermann+Raff
Location: Ngwesaung, Republic of the Union of Myanmar
Area: 500 sqm
Project Year: 2014

LOCATION

The Irawadi region on the Gulf of Bengal is regularly visited by tropical cyclones in the months before and after the summer monsoon. Zyklon Nagis was particularly devastating, which resulted in 130,000 death tolls in May 2008 and led to floods in the delta of Irawadi.

Since then, the Burmese charitable project “Burma” from Filderstadt has been active in the Burmese population with aid projects on the ground.

DESIGN & FUNCTION

By incorporating indigenous architectural techniques—stuff like ornamental bamboo mesh walls, local brick masonry, and swoopy suspended ceilings made of bamboo and glass wool—German architecture firm Ackermann+Raff aimed to build a school that was sustainable and beautiful, but still, in a way, familiar to its daily users.

The project, done in cahoots with a German organization called Projekt Burma and financed entirely by donations, incorporates what the architects call “traditional brick noggin architecture” (that is, timber frame construction with pretty brick masonry in between) to build a community space used not just by the teenagers who fill its seven classrooms, but the entire neighboring community, who can use its pavilion and library to host assemblies and performances.



The new school building creates space for seven class rooms and a faculty room. An important design idea is the central pavilion which links together the existing elementary school, the library, the headmaster house and the new high school building.

The pavilion creates a courtyard, which can be used by the whole village after school hours for common activities such as cultural events, village assemblies, open-air cinema, dance performances etc.

The two-storey building is based on a simple floor plan typology. The architectural language is developed from the traditional way of construction. The attempt is to build with local materials in order to embed the new building carefully into the surrounding area. It has been crucial to build sustainable with ecological ma-

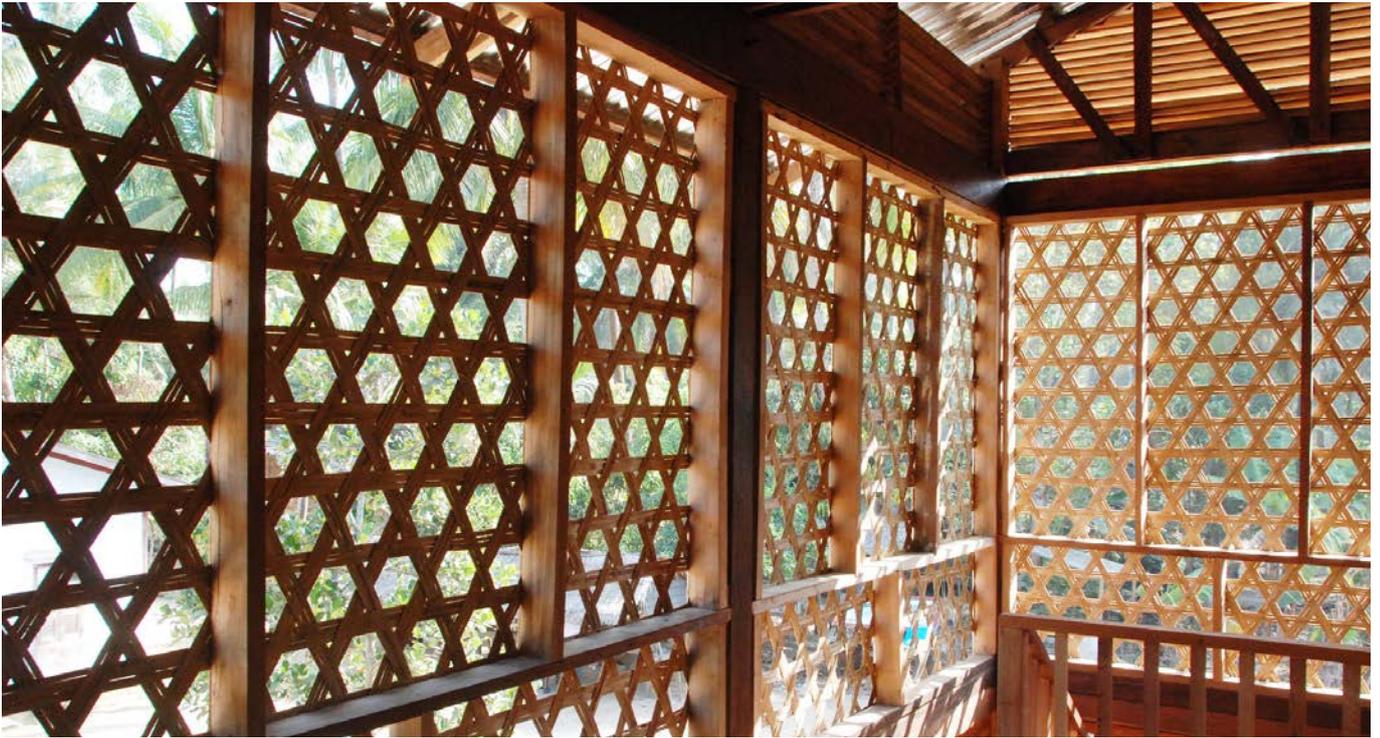


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2. Myanmar School Calls on High Design and Local Technique <http://www.curbed.com>
3. High School in Thazin <https://www.baunetzwissen.de>

Photographs

Julia Raff



materials and at the same time to ensure a strong and durable structure in order to use the building as cyclone shelter.

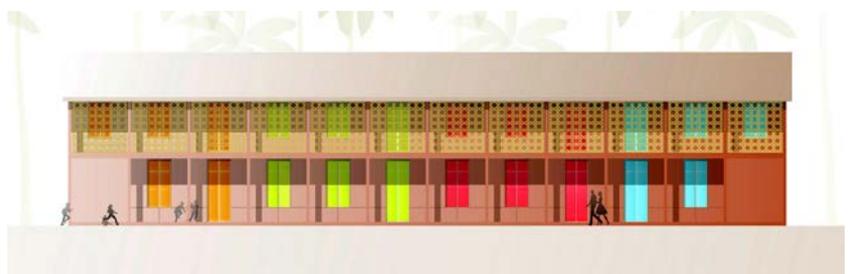
MATERIALS

The school is constructed with the traditional 'brick noggin structure', a timber frame construction with brick masonry infill on a solid concrete base.

The pergola is designed with an ornamental bamboo mesh, which serves as sun protection. Suspended ceilings made of bamboo and glass wool provide good acoustics and create a warm and comfortable atmosphere within the classrooms.

All timber of the previous school is reused for the new wooden framework, for furniture and the pavilion. All bricks are manufactured locally, bamboo and wood work is produced on site. The coloured pigments for doors and windows are from Pathein, a nearby city, which is famous for its umbrella production. The pigments are used for the ornamental umbrella painting.

The project also tried to strengthen the local economy. Only a few highly qualified workers are engaged from Pathein and Yangon. The majority are local workers who are trained on site during the building process.

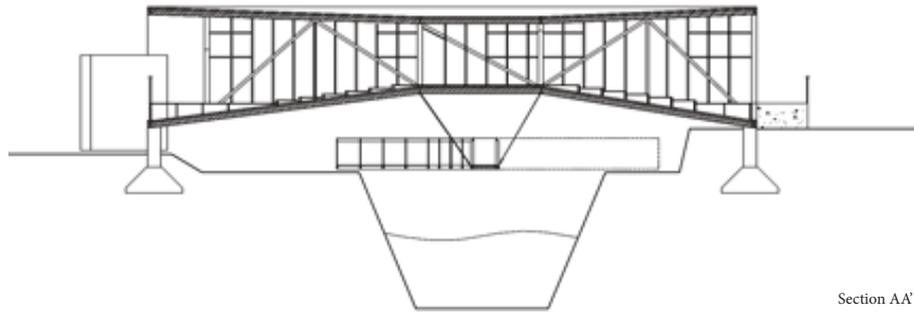


XI XIAODONG

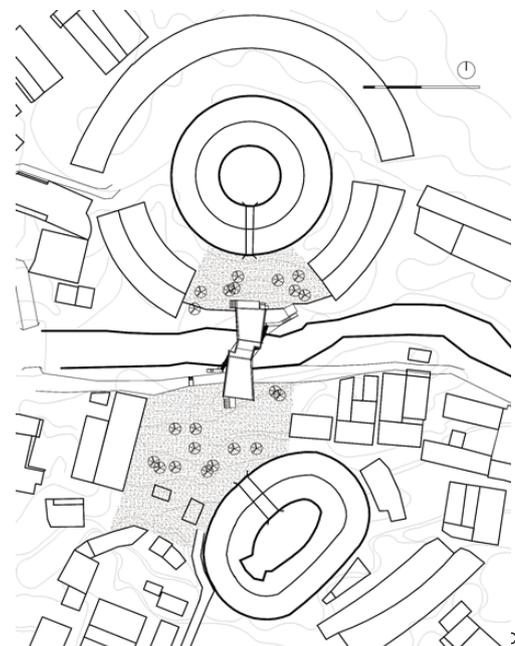
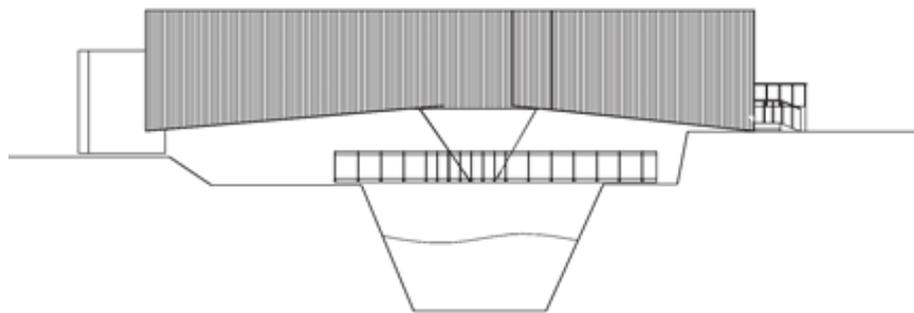
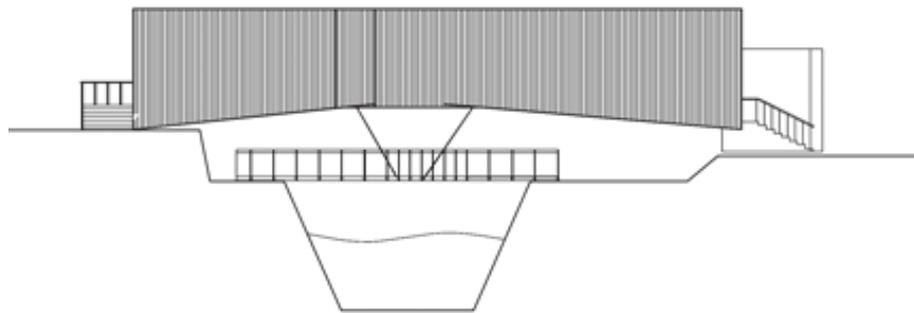
BRIDGE SCHOOL

The bridge school designed by Li Xiaodong atelier in 2009 is located in Fujian Province, China. The main concept of the design is to enliven an old community (the village) and to sustain a traditional culture (the castles). The new design is in big contrast with the old, because the bridge adds a new function. There are few different functions combined into one space, first of all it has the function of a bridge which connects two old castles across the creek, but it's also a school, which symbolically connects past, with the future.

About 200 years ago the people started to move out of the village because of the poor the living conditions. The community life was gone and there were no more public spaces.¹ Commissioned by the town authorities, the infrastructure was to link two monuments representing local history, two 17th century castles situated on either side of the river. The province of Fujian has more than two thousand castles of this kind, which are now Unesco World Heritage Sites. Uninhabited since the early twentieth century and now in poor condition, nevertheless the castles are considered the focus point of the city. Plans are to reallocate the castles into hotels, so they can be re-used again. The broader social aspect of the project was part of the design from



Section AA'

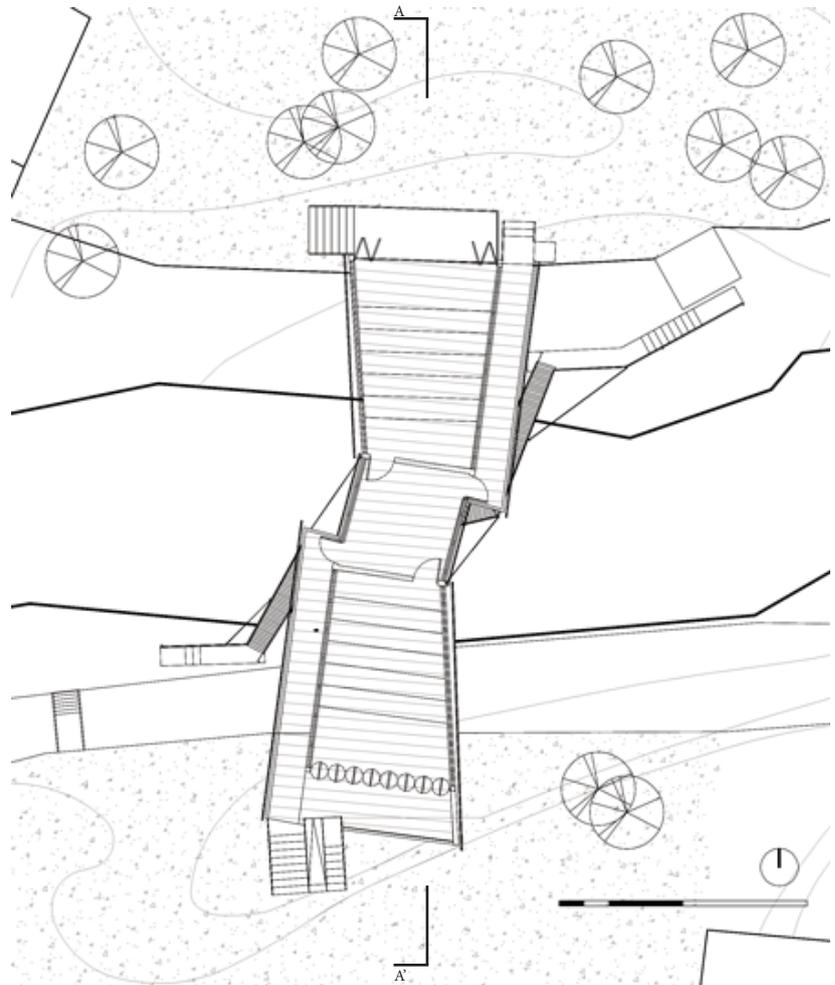


the beginning, the project was developed with the school principal and the mayor to answer not only the needs of a primary school but also the community needs. Which was a place to meet and a place to cross the river, etc.

“The structure is created by two steel trusses that span the creek with the space between them housing the functions of the school. The steel structure is supported on concrete platforms and covered in thin wooden slats.

Containing two classrooms for children aged six to eight on steps, across from each other, with a corridor running alongside them and linked by a small central room which is a place for people to stop, rising into a raised plaza. Cement platforms support a steel and glass structure with wooden sunshade slats all along the entire horizontal face of the bridge/school. The light screenings that attenuates the light and reduces perception of the inside from outside, protecting the children’s feeling of cosiness, does not prevent them from seeing the landscape, which is integrated into the concept of the architecture. Wood, serving a dual function as flooring and covering for the facade, is the material filling the perimeter traced by the metal skeleton.”²

Underneath the structure, running below is a pedestrian bridge for the villagers, so when crossed, the bridge brings each person into visual and auditory contact with the children’s activities.³ The pathway ‘zig-zags’ so the people can see more of the environment, and see the beauty of the two castles surrounded by nature. The bridge has four access points, two for the pedestrian bridge creating a direct walkway from one side to another and then, at a higher level there’s a second pad where the school is located, you can see the children while teaching and playing.



¹ Interview met Li Xiaodong Atelier. *Aga Khan Award for Architecture 2010 - Bridge School*. Online: <https://www.youtube.com/watch?v=-o4udQYFMS8>, last seen on 17/01/2017.

² Mara Corradi. (2010.). *Li Xiaodong and the school on the bridge*. Online: <http://www.floornature.com/li-xiaodong-and-the-school-on-the-bridge-5284/#> last seen on 17/01/2017.

³ Anonymous. (n.y.). *Li Xiaodong atelier: bridge school*. Online: <http://divisare.com/projects/152826-Li-Xiaodong-Atelier-Bridge-School>, last seen on 17/01/2017.

- Image 1: section AA'
- Image 2: side view
- Image 3: side view
- Image 4: staircase with slide
- Image 5: siteplan
- Image 6: floorplan
- Image 7: end of the bridge against the castle.
- Image 8: the bridge

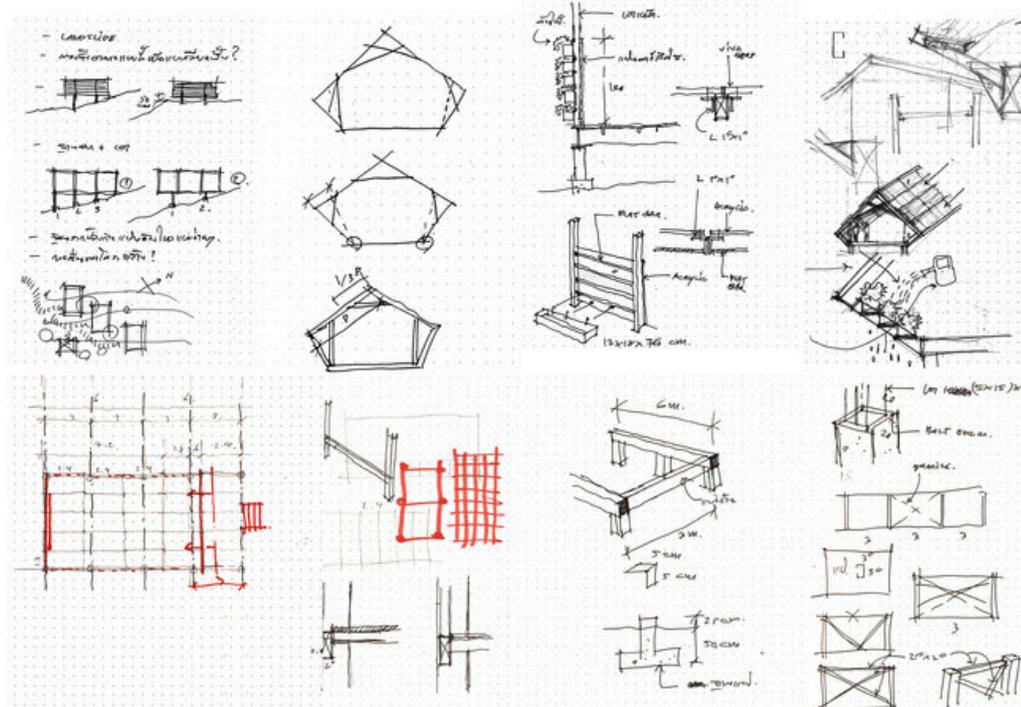
VIN VARAVARN ARCHITECTS

POST DISASTER SCHOOL

Vin Varavarn Architects was in 2015 commissioned to design the Baan Huay Sarn Yaw School (post disaster school). After an earthquake hit the Chiang Rai Province in northern Thailand in May 2014, 73 Schools were destroyed displacing over 2,000 students. The non-profit Design for Disasters (D4D) launched a post-disaster recovery program, the program consist out of Thai architects who designed nine earthquake-resistant schools in the most affected areas. There were some consistencies the designers had to follow:

“ the school needed 3 new standard classrooms for secondary students who come from tribal families. The design requirements specified that the building must be earthquake resistant, easily constructed by local workers and requiring as low budget as possible. Most of the selected building materials had to be lightweight to reduce horizontal momentum caused by the weight of the building during an earthquake. The design principle was not to create typical classrooms but learning spaces to enliven the atmosphere for children who were victims of the disaster.”¹

The architects designed an elongated pentagonal volume, based on a traditional Thai style building. For the interior, they combined three classrooms into one building to minimize the land use. Each classroom is divided by small foyers where students can leave their shoes and bags, it also helps to reduce the noise between classrooms. Originally, the building was designed on a flat



¹Lucy Wang. (2015). *Handsome earthquake-resistant school uses natural cooling in Thailand*. Online: <http://inhabitat.com/handsome-earthquake-resistant-school-uses-natural-cooling-in-thailand/baan-huay-sarn-yaw-school-by-vin-varavarn-architects-8/>, last seen on 17/01/2017.

²Jessica Meirs. (2015). *Earthquake-resistant school in Thailand raised up on stilts by Vin Varavarn Architects*. Online: <https://www.dezeen.com/2015/10/28/>, last seen on 17/01/2017.

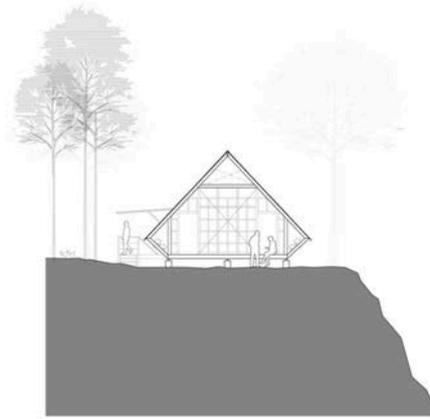
Image1: classroom
Image 2: outside view
Image 3: sketches from designers
Image 4: section AA'
Image 5: section BB'
Image 6: groundplan

surface but the architect chose to move the design to a steep surface. The land slope is used as part of the architectural setting to create an extra semi-outdoor multifunctional space underneath the building.

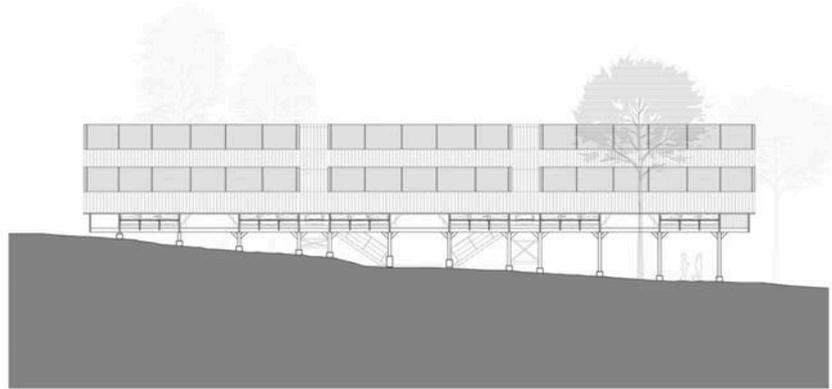
“The lightweight steel-framed building is raised on a series of concrete footings and columns. The floors are constructed from fiber cement boards and solid bamboo batten panels. Elevated on stilts, the structure is topped by a steeply pitched insulated metal sheet roof with alternating bands of translucent resin and bamboo batten. The translucent panels bring natural light to the interior and reduce electricity costs, while the layers of bamboo help protect the school against solar heat gain, rain and hail. The classrooms are furnished with wooden tables and chairs.

The natural materials had been proposed in selected areas to illustrate how local materials can substitute expensive modern materials and at the same time, harmonize the architecture with its context. All the necessary structure elements had been designed to be exposed so as to convey the feeling of solidity and safeness and to reduce unnecessary finishing costs.”²

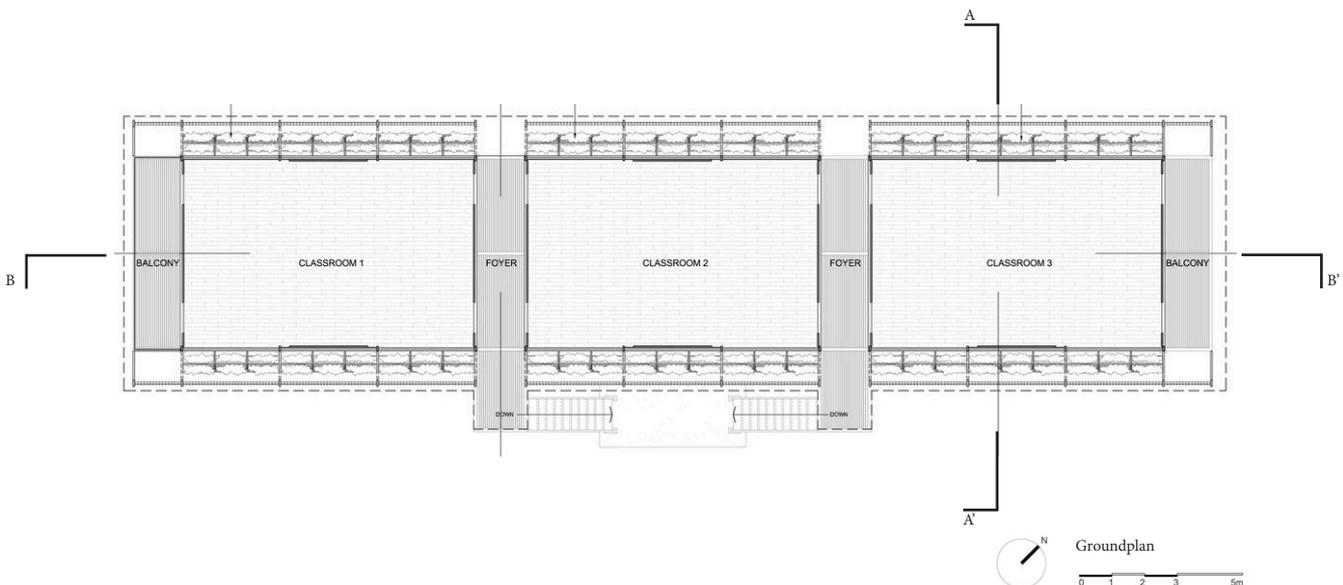
Bamboo shelves were installed along the entire length of the building to provide space for colourful flower pots, for students to take care. The flower pots have to remind the children that even though the earthquake might have destroyed their houses and school, nature also provides beauty and joy. While watering the plants spilled water falls on the ground trough the bamboo, providing water for the grass and flowers underneath to grow. The shelves serve as safety measure preventing children from falling down during an earthquake, as well as to create charming atmosphere with the flowers both outside and inside the building.



Section AA'
0 1 2 3 4 5m



Section BB'
0 1 2 3 4 5m



TEZUKA ARCHITECTS

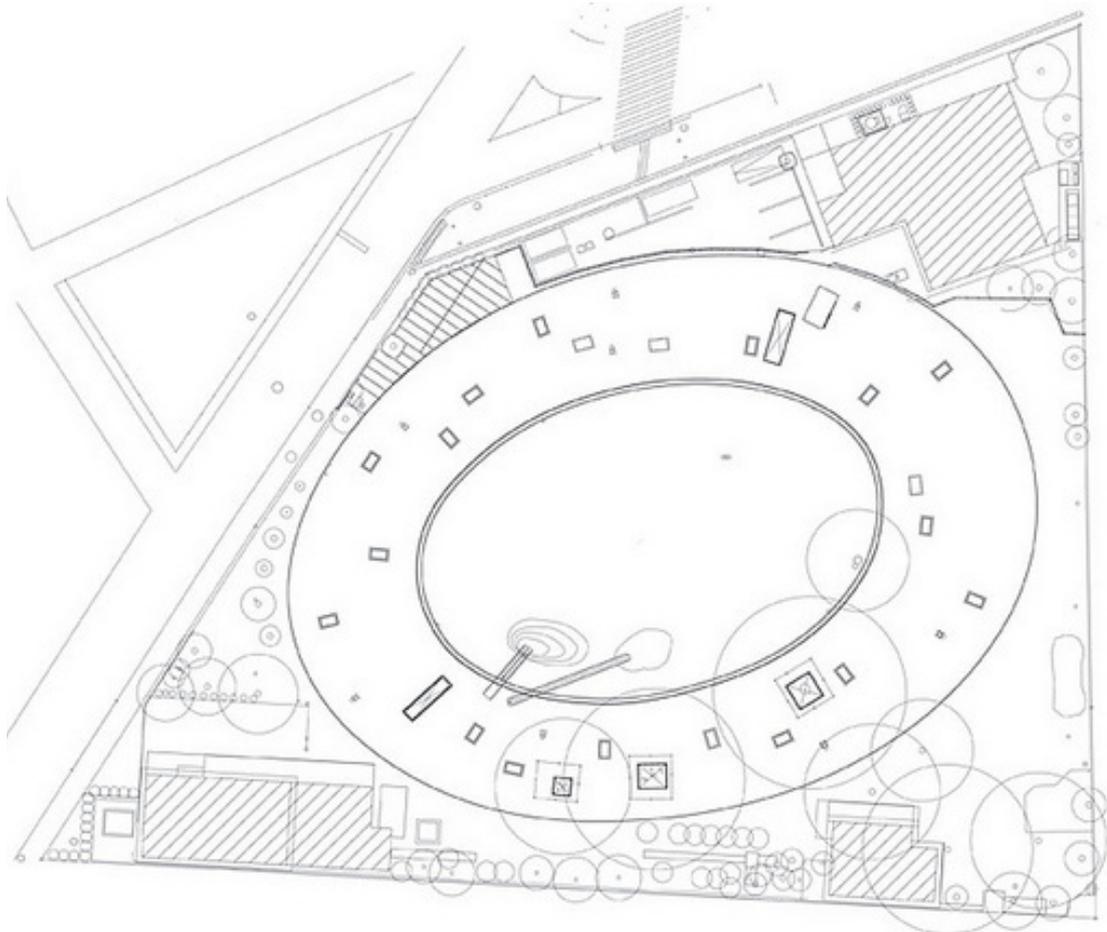
FUJI KINDERGARTEN

Fuji kindergarten designed by Tezuka Architects in 2001. The architects, husband and wife, designed the school having their own children as inspiration. The kindergarten is made for children between the age of 6 weeks to six years, from over 35 different cultural backgrounds, they gather together to play and learn.¹

For the main design of the kindergarten the designers used an oval form, so the children can keep running. The designers put inspiration from their own children, they love running circles while playing, rather than straight lines. Dirt was put underneath the stairs, leading to the roof, so the stairs would be shorter. But the children started taking away the dirt to make mud bowls, 600 kids taking mud away and the mound started to disappear. The school had to keep asking the construction company to put mud back.

The school director didn't want fences on the roof, due to safety issues that wasn't possible, so they chose very thin metal, now the children can shake the fence.

The designers had to build around trees already on the land.

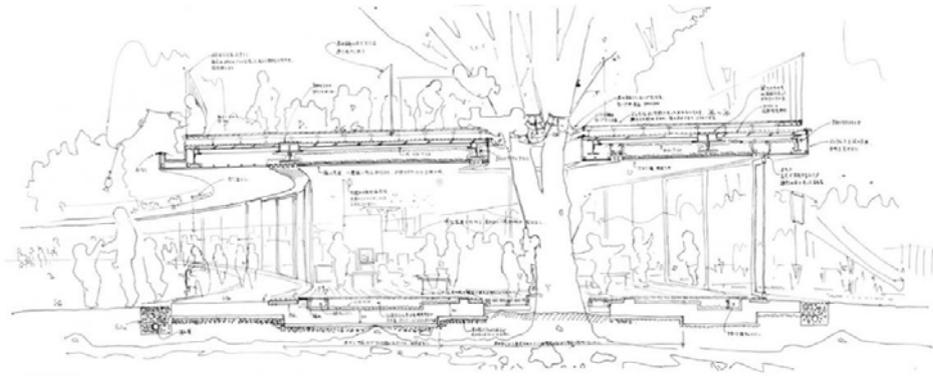
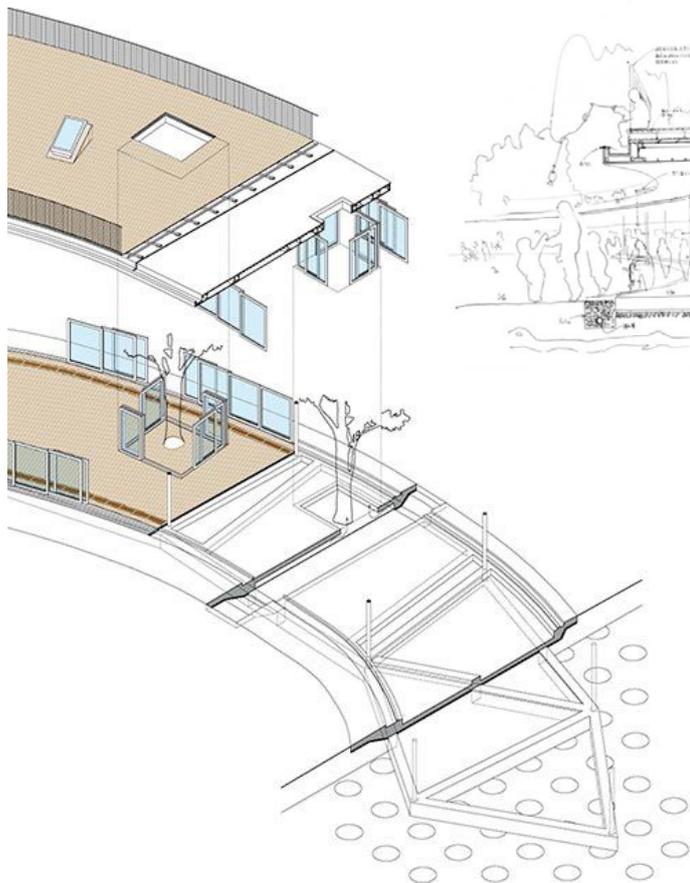


"we couldn't cut the roots, which spread as wide as the tree crowns. We added these safety nets so the students wouldn't fall through the holes around the trees. But I know kids, and they love to play with nets. Whenever they see a hammock, they want to jump into it, to shake it. These were really just an excuse for me to give the kids another way to play."¹

Now the kids are also able to climb the trees. There are windows through the roof, the kids inside the class can look up to the sky and the children playing on the roof can look inside. They can start communicating in different ways, this broadened the kids' way of communicating and let's them play in a different way.

The design is very open, all exterior walls are made of glass, they also used sliding doors to create an open area where children can run in- and outside. There are no interior walls, because the designer believes that when you put kids inside a box, they tend to get nervous, if there nervous they want to hide them. Now if the children do not want to stay, they can leave the room, they will come back when they feel like it. Also according to the architect children can't sleep well if it's quite, they sleep better when it's noisy.

The school is filled with about 600 boxes, which are made from this very light wood known as kiri wood. They can use it if the rooms need to be divided more, but also to present drawings, but they can also use it to play inside. Kiri is a soft wood so it won't hurt the kids if they hit their heads on the corner.



¹ Tuzeka architects about Fuji Kindergarten. (2013). *Fuji Kindergarten*. Online: <https://www.youtube.com/watch?v=Rd7mR3lb3yg>, last seen on 16/01/2017.

² Thu-Huong Ha. (2015). *Inside the world's best kindergarten*. Online: <http://ideas.ted.com/inside-the-worlds-best-kindergarten/>, last seen on 16/01/2017.

Image 1: children playing on roof
Image 2: inside view
Image 3: groundplan
Image 4: top view of roof
Image 5: children sitting on roof
Image 6: technical drawing
Image 7: section sketch

KWEL KA BAUNG MIGRANT LEARNING CENTRE

SCHOOL BUILT OUT OF EARTH AND WOOD

The Kwel Ka Baung school is based in Mae Pa (Mae Sot, Northern Thailand) after having to move in 2014 when the current land owner decided not to extend the lease for the school ground. A.gor.a architects had been asked to design the new school campus and to construct it with the help of the local community. In June 2014 the new school campus opened and the students moved into their new classrooms. The school provides support and education to around 450 migrant children who arrived with their families from the neighboring Karen state, a recent scenario of a civil conflict, across the Thai-Burma border.

A.gor.a architects designed the new school campus with 10 classrooms, one teachers room, 1 dining hall, kitchen facility and a library building. Each classroom provides space to at least 25 students. One of the main objectives was that the migrant communities living close by were getting involved during the construction phases, this to intensify the feeling of ownership and to ensure that future maintenance can be done without external support.



Section
 1. Classroom
 2. Corridor
 3. Court Yard
 4. Large Court Yard
 5. Lotus Pond

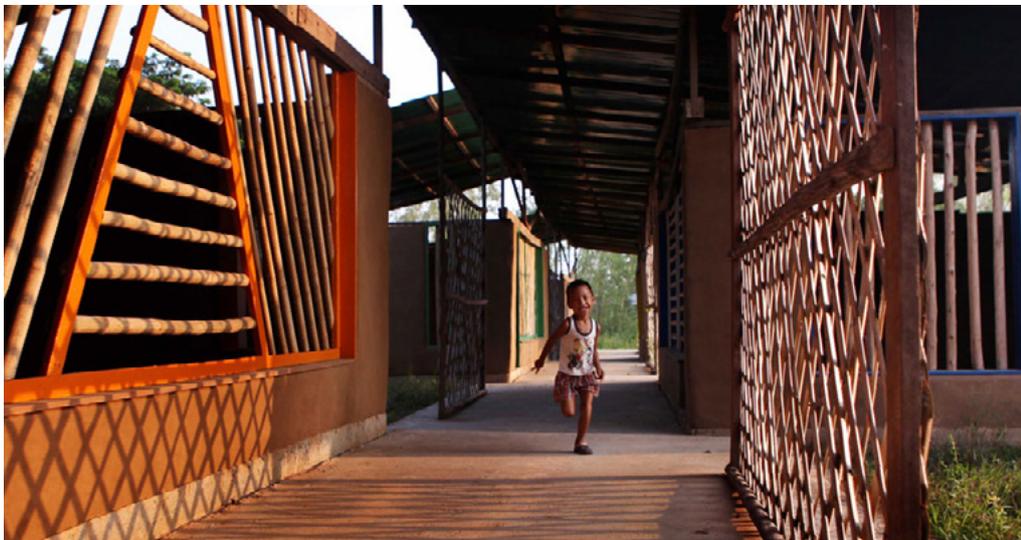


Pictures:
 1, 2, 7: A.GOR.A ARCHITECTS
 3, 4: Franc Pallares Lopez
 5: Abel Echeverria,
 6: Jan Glasmeier

Only local materials were used, this way necessary repairs can be carried out with very little effort. Adobe bricks were used for the walls, beyond the low-cost, adobe has the advantage of being already on site, as a part of the rural landscape of Mae Sot. Even though it's not a traditional building material for Thailand, adobe perfectly meets the challenges of a tropical climate: indoors are kept cool through the day and only little maintenance is needed after the rainy season. The adobe bricks are formed on site by the Karen team, helped by the local community. The preparation is also a satisfying activity for the local community, more local people have now started using adobe as a construction material. The wall thickness and its composition imply a great thermal inertia, which provides the whole complex to stand the temperature climax through the day and to slowly release the collected heat during the night.

On one side a pond can be seen, on the other, the playground and volleyball court, surrounded by the rich vegetation growing at the site. A covered corridor runs between eleven separate classrooms set apart by open spaces that allow the air to circulate and play an active role in the natural cooling of the rooms. Second-hand wooden beams were used for the rafters, topped by tin roofs sloped at an angle, forming a gap that allows the heat in the classrooms to escape. Bamboo and eucalyptus branches are used to form enclosures, combined in different patterns and painted in bright colors. The colors differ according to each classroom, simplifying the orientation while creating a cheerful effect.

The program sets a good example for the community of achievable lo-cost architecture without compromising on spatial quality and maintaining a strong connection to the landscape.



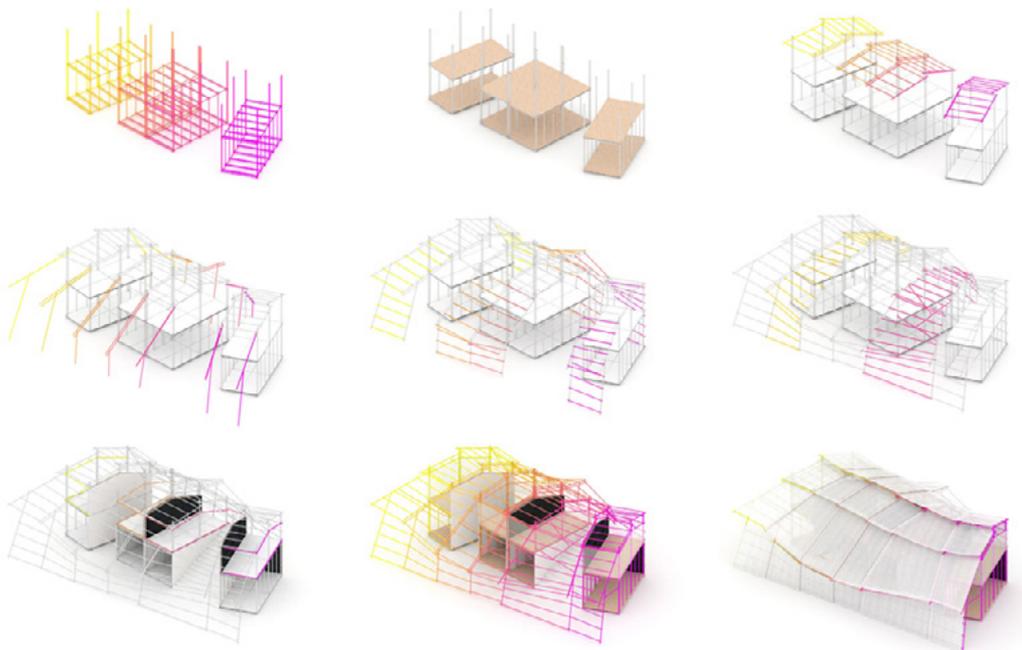
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LOUISIANA HAMLET PAVILLION

PAVILLION TO BE REUSED AS A SCHOOL IN KENYA

SelgasCano's 'Louisiana Hamlet' pavilion was built in collaboration with the international design studio Helloeverything for the exhibition 'AFRICA - Architecture, Culture and Identity' at the Louisiana Museum of modern Art in June 2015. After visiting Kibera, which is the biggest slum in Africa, SelgasCano came in touch with a local architect and visited the Kibera Hamlets School. They committed to help them improve the school and convinced the Louisiana museum, which approached them to create a summer pavilion for its garden in Copenhagen, to design something that could be shipped to Kenya afterwards. The Pavilion has been dismantled and transported in containers to Kibera, where it has been reassembled to replace the existing building, a dilapidated school made of scavenged ribbed iron and timber.

The Kibera Hamlets School provides 600 orphaned children with an education despite having no drainage, toilets, electricity or even appropriate roof to keep out the frequent rain. The school is surrounded by piles of garbage and has an open sewage running alongside its classrooms. The new school cost around £25.000, is made out of low-cost but durable materials including chipboard, polycarbonate plastic and standard scaffolding components, an easy and cheap project that changes the lives of 600 kids.



Pictures: Iwan Baan
Plans: SelgasCano

The 150-square-metre building features a dozen classrooms for nursery, primary and secondary pupils, plus new offices, toilets and a cooking area. The classrooms, offices and toilets are housed in structures of yellow-painted scaffolding clad in transparent polycarbonate. The spaces inside the pavilion provide two floors of classrooms, connected by a large wooden staircase that can also be used as auditorium seating. Rows of standard plastic containers filled with water are used both to anchor the structure to the ground and to provide bench seating around the school.

At night the pavilion lights up like a lighthouse and will change the mentality of the kids who go there. The light aesthetics leave a transparency and respect for the environment. Along with the playful use of synthetic materials, colours are equally important in the design. Colour holds a big power, it's something that most people understand perfectly and immediately.

SelgasCano led the building's reconstruction, with help from a team of 20 local laborer's. In its new role as a school, it is intended to demonstrate how architecture can make a big difference to the world's poorest communities. It can change people's behavior, it can support development and help the poorest. As depressing as the world can be sometimes, it can be shaped by good architecture and good design. The building has become a landmark for the local community. As well as creating a school that children love, it became a venue for evening and weekend events, as well as a focal point for donors and charities.

We think that great design and architecture will encourage people to go the area, spend money and invest. That feedback loop is clearly happening in Kibera and the headmaster is so happy about that. His challenge is to get enough money each month to keep the school alive. This new building means they are talking to a lot more donors, and that is a really nice thing.



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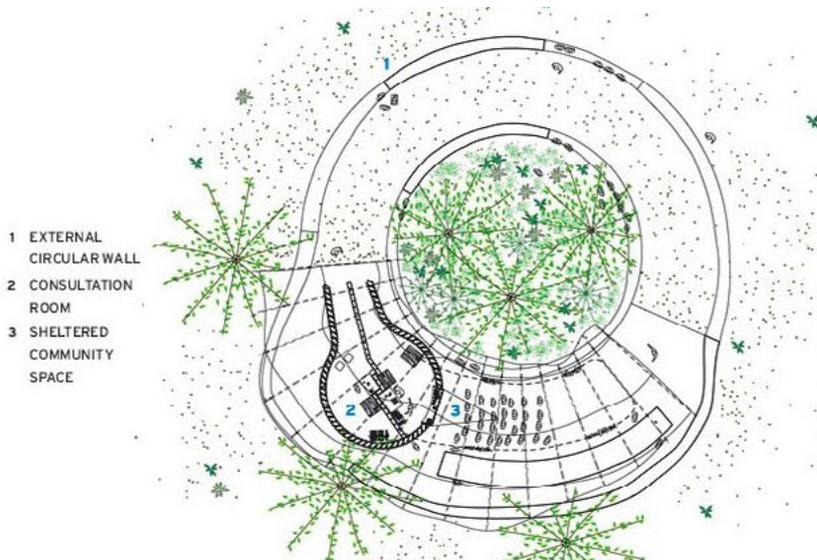
Louisiana Hamlet Pavillion by Selgas Cano Architecture Office (re-used as a school in Kenya)

KONOKONO VACCINATION AND EDUCATIONAL CLINIC

DESERT CLINIC BECOMES GATHERING PLACE FOR NOMADIC POPULATION

Turkana County in northern Kenya is inhabited by a mostly nomadic population. Underfeeding is one of the issues that the Missionary Community of Saint Paul the Apostle (MCSPA), based in the region for more than 20 years, has been trying to moderate. MCSPA runs a vaccination and education clinic, responding to the needs expressed by the community, but its existing small building was inadequate for this purpose and did not offer any protection for visitors in the waiting area. The extreme hot, dusty and dry conditions make this region a difficult and challenging place to live and even survive. SelgasCano worked on the design of the vaccination and educational centre for the nomadic Turkana people along with some students of architecture from MIT. Native materials such as adobe and straw were ruled out as they were too expensive to install and maintain, innovation and cost efficiency was needed. The challenge was described by Selgas as 'exploring the possibilities of working with less, even nothing in the middle of nowhere'. The goal was to develop skills in employing common materials in innovative ways, and to obtain the maximum with the minimum by creatively reacting to a specific material (or even the lack of material).

During the design process, the architect confronted them with basic questions of habitat and design, one that heavily relied on site intuition and onsite experience. The design was completed in a single month, a pavilion that not only trained the local people of efficient building techniques but also explored the culture of



Pictures: Iwan Baan
Plan: SelgasCano

the Turkana people through the aspect of community living and engagement. The pavilion was built with the local people and a few semi-skilled workers. With the approval of the tribal elders they chose the site for the structure between four acacia trees and developed a design that follows the lines of a circle.

The canopy rests on the rounded consultation and office spaces, enclosed in concrete blocks. Low stone walls for sitting complete the circle, providing a 'safe' landscaping environment which forms the community space. When laying the stone used for the seating proved too time-consuming, the team decided to make concrete blocks on-site for the walls. The structural system of metal tubes is fixed in place by adjustable clamps that allow movement in any direction thus accommodating the imbalanced angles of the structural bays. This allows gaps between the overlapping planes of tin to promote air circulation from the roof. An extra layer of vertical sheeting shields the southern and western exposures from the sun, while the structure opens up to the north.

This project focused on the ability for architecture to combat harsh nature with simplified sun shading and public space demonstrated. The design departs from conventional notions of a building, taking the form of a large shading structure whose angled scaffolds and flowing roof imitate the fragile tree canopies that are one of the principal sources of shelter in the region, where the average daily temperatures can rise over 100 degrees Fahrenheit. (37°Celsius) The use of materials as concrete keeps the shaded areas cool, vertical sheeting keeps the southern and western exposures protected from the sun, while the structure opens up to the north of the pavilion. The gaps between the overlapping roof planes promote ventilation, and the adjustable fasteners permit movement in any direction for struts, adjustable to the direction of the sun and it's season.



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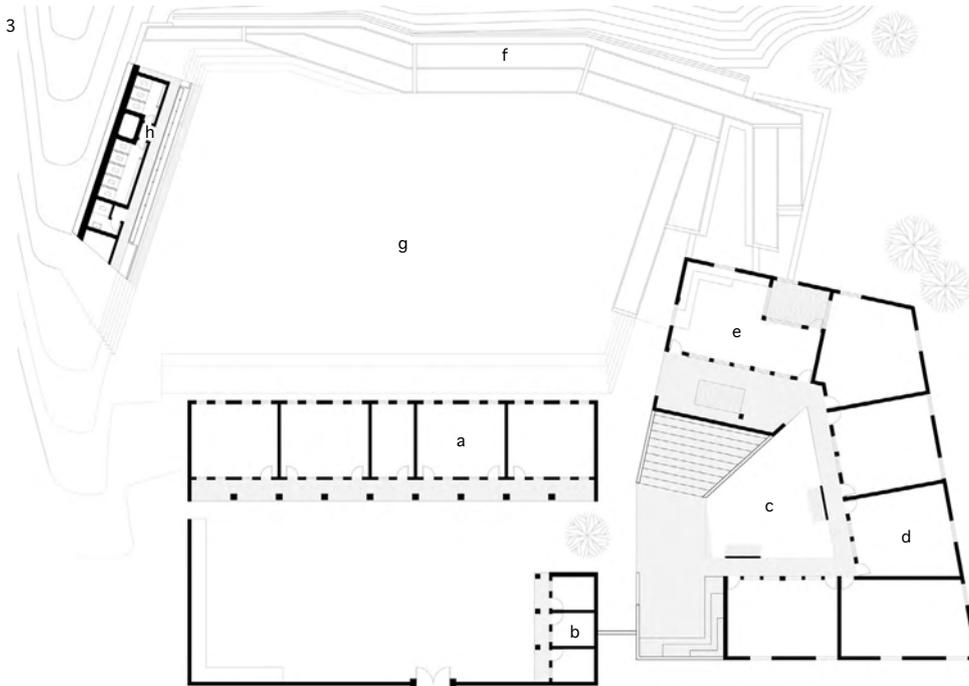
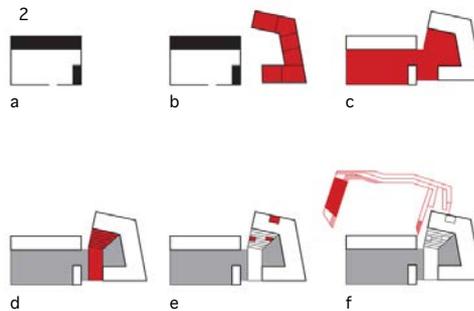
MULAN PRIMARY SCHOOL

BY RURAL URBAN FRAMEWORK, CHINA.

The Mulan Primary School is situated in the surroundings of Huaiji, a county in the Guangdong Province of approximately 100,000 people. The project consists in the expansion of an existing primary school of 5 classrooms; RUF worked along with the local education authority and a Hong Kong based charity to add a new building of 6 classrooms. What motivated this expansion is the government's desire to consolidate the total number of primary schools. In the process, some older schools will have to be demolished and others enlarged to make up for the loss and also to provide for a larger realm of population distribution. The existing school is a simple tiled roof block with an overhanging eave supported on columns. The building

forms part of an edge of a wall, which frames a courtyard. The strategy of the design was not only to extend the school but also to extend the courtyard and organize the site through a series of open, linked spaces.

The new building defines the edge of the site as a U-section with one side of the courtyard left open. The roof plane is a continuous ribbon that rises from the ground as a series of steps forming a new public space and outdoor classroom that then becomes roof, before dropping down again to form a ground plane that defines the edge of the courtyard. The steps are punctuated with small micro-courtyards that continue into the library. The roof is clad in old, recycled tiles collected from numerous villages in the local area. At three moments the roof tiles become vertical walls and help direct run-off water to the ground. A perforated screen wall encourages climbing plants that then cool the air in the hot summer months. Smooth,



1 Picture showing children playing in the courtyard.

2 Diagram explaining the development of the project:
a. Existing school;
b. 6 new classrooms are added as the village expands;
c. The wall is removed to create a continuous open space;
d. The public space is defined by creating a stepped concrete plinth;
e. Voids penetrate the steps and roof to create interior courtyards;
f. The toilet waste water is naturally filtered by a reed bed that retains the slope and provides the edge of the new playground.

3 Plan of the school:
a. Existing classrooms;
b. Existing teacher's block;
c. Courtyard;
d. New classrooms;
e. Library;
f. Wetland garden;
g. Playground;
h. Toilet.

mirror-tiles are deployed on the courtyard façade and on the vertical faces of the steps. This creates visual mirages and distorted reflections that animate as children play in the courtyard and steps. Through the provision of this open public space and library, the school can become a community focal point opened to all as the village evolves.

The project also included the construction of a new school toilet and playground. The majority of school toilets in China are in extreme conditions and Mulan's was no exception, a small brick hut with dirt pits and no running water was the only facility. Three strategies were deployed: to open both sides of the roof to maintain fresh air; to collect rainwater so that the toilets can be flushed regularly; and to develop a septic tank and reed-bed filtration system to filter the water and remove toxins. The reed-bed is built into the slope at the back of the site, reinforcing the earth to prevent

slippage. The channels bifurcate and split apart to create small discovery gardens and play spaces. As they step down, following the natural contours of the site, concrete seats and steps are inserted for viewing the playground and basketball court.

When this second phase of the project was completed, the constellation of open spaces created an educational landscape allowing the life of the school to use these "outdoor rooms" during different periods of the day. The intention was that the school would be open to the community so that they can make use of the open forum, library or any of the outdoor areas. As the urbanization of Huaiji begins to expand and encroach on the village, through the provision of these common, shared areas, the school can become a community focal point and active site for discussions, meetings, study, play or relaxation.



- 4 Aerial picture of the new building.
- 5 Interior view of one of the new classes.
- 6 Aerial picture of the playground and the toilets building.
- 7 Picture clearly showing the pattern of the used tiles.
- 8 Panoramic view of the new building and the surroundings.

SASLE SCHOOL

BY NOEL SAMPSON, NICARAGUA.

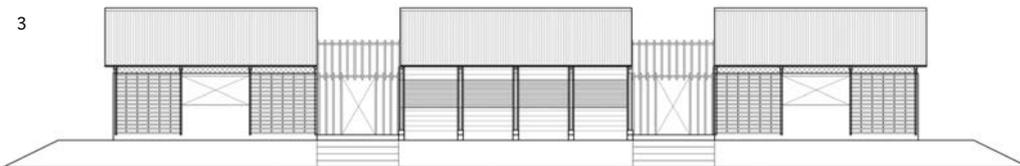
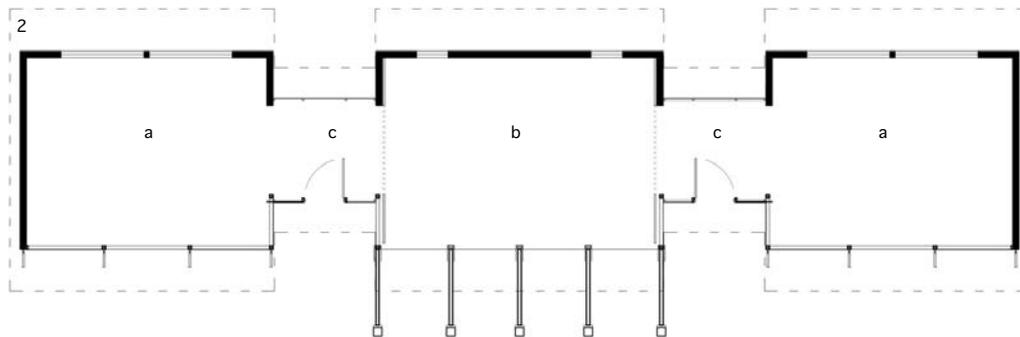
The Sasle School, located in the mountains and buffer zone of the Miraflores Nature Reserve in Jinotega, Nicaragua, serves as the only education facility for this rural community of 1600 people. Since the opening of four years ago, the three classrooms connected by translucent vestibules have seen a steep increase in school enrollment. They currently host 190 primary school students each weekday and 80 secondary school students during the weekend.

The school also functions as a community center and, in case a natural disaster occurs, as an emergency shelter and a warehouse for storing supplies. The community of Sasle is prone to hurricanes, flooding and droughts; in 1998, Hurricane Mitch, that made 10% of

the national population in Nicaragua homeless, caused the overburden of rivers and the destruction of San Gabriel in Jinotega, which left the community uncommunicative for several weeks.

Using a combination of metal and wood cladding the building pays homage to local construction techniques. Maximizing natural ventilation and light was important to keep energy consumption and operation costs low. The school deals with natural ventilation and natural light by using translucent sheets in the two entrance vestibules, wooden elements were designed to help avoid direct solar exposure and brick walls to achieve thermal balance. The selection of materials that were accessible in the locality made the school construction feasible and highly replicable for other rural communities in the department of Jinotega.

The central classroom features an angled wall



- 1 Picture of the main façade.
- 2 Plan of the school:
a. Classroom;
b. Community hall & classroom;
c. Entrance.
- 3 Front elevation.

that also forms a portion of furniture meant for reclining. This classroom serves the local community and NGO's for the organization of meetings and workshops when classes are over. When all doors are opened, the three classrooms are used as a single space.

The school was sponsored by Bridges to Community Canada and built by the Sasle community and volunteers from Bridges to Community. This participation scheme not only reduced construction costs but also created project ownership among local community, which have improve school attendance in the last four years.

Nowadays, the school, as a result of its improved design and facilities, has started to provide secondary education on Saturdays to students from Sasle and surrounding communities.



- 4 Detailed picture of one of the entrances.
- 5 Picture showing a meeting of the local community in one of the classrooms.
- 6 Picture showing children's work to embellish the façade.
- 7 Interior view of one of the classrooms.

LA TERRA DEI BAMBINI KINDERGARTEN BY ARCÒ AND MCA, PALESTINE.

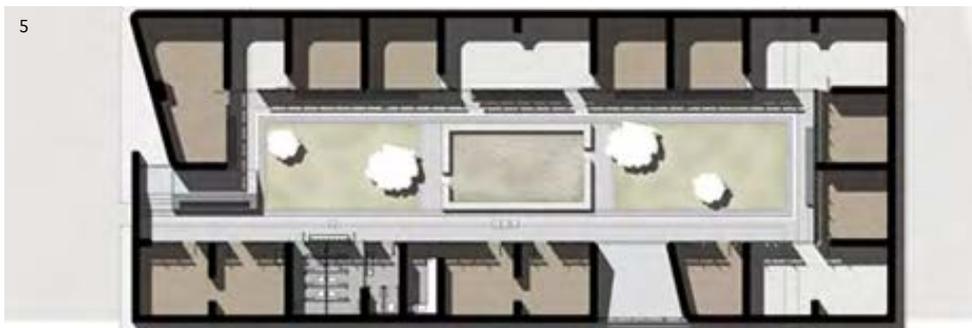
The desire to build the children's center "La Terra dei Bambini" of Um al Nasser (Gaza Strip) was developed in 2011 in response to a request for help from the Bedouin community welcomed by the Italian NGO "Vento di Terra". The objective was to ensure access to quality education and health services to Bedouin preschool children and Bedouin women of the village.

The building is conceived in terms of environmental sustainability by offering innovative technical solutions that reinterpret the culture and local identity. The architectural planning is taken care of by the "ARCò group - Architecture and Cooperation", which deals with sustainability and participation in architecture, and the studio "MCA - Mario Cucinella Architects".

The project aims at reinterpreting the local identity of the Bedouin tent model: a temporary structure with vertical support members that support a decorated cloth, usually made of sheep wool. Its structure is divided internally in two environments: a public one where you carry out common activities and receive guests, and one for the private activities of the family.

The multipurpose facility in Um Al Nasser reinterprets these traditional characters representing them in the form of contemporary architectural elements. The tent will be replaced by a wide coverage which, folding in on itself, recalls the different inclinations of the sheets. The horizontal lines of the typical Bedouin fabrics are reinterpreted through brise soleil wood that allow solar radiation control.

The nursery "grows from the desert": the insulating walls surrounding the classrooms and the central courtyard are made of filled sandbags, which follows the earth-bag technique. The walls are able to preserve the kindergarten's



1 Overview of the school from the courtyard.

2-3-4 Aerial view of the school during the construction.

5 Plan of the kindergarten.

game-educational reality, building a true oasis that protects the students from external conditions.

The child care center is a one-story building, partially underground, with a total area of 400 m², with 6 classrooms, library, direction, teachers lounge, reception area, laboratory for psycho-motor activities, multipurpose space, families counselor, infirmary and toilet. The classrooms have a surface of 25 m² and can accommodate about 25 students each. “La Terra dei Bambini” offers space for families and services, one-stop consultancy and education activities to health and peace.

From the point of view of Eco-compatibility of the intervention, different are the steps that make this building an architecture model for Palestinian construction. The attention was focused on low-tech and low-cost solutions, easy to communicate and implement, able to be replicated in other contexts by the local

community.

The use of the earth and of the wood allows to minimize the use of polluting materials and a high environmental impact. It is an underground building, where the spaces are partially buried. All classrooms have the thermal inertia of the ground and the walls, which ensures lower internal temperatures in summer and warmer in winter. A natural ventilation system allows you to perceive a lower temperature, the double cover system guarantees the activation of convective motions and the recycling of hot air with cooler air coming from the bottom of the room. A rainwater collection system is included and it that takes place through the broad coverage and that is stored in an underground tank. In terms of energy, the installation of a solar panel system realized by exploiting roof inclinations has been foreseen, so as to ensure the necessary electricity.

Unfortunately the school was destroyed in 2014 by one of the Arab-Israeli conflicts.



6 Close up of the shading system.

7 Interior view of one of the classrooms.

8 Overview of the roof.

9 Interior view of the building still under construction.

10 La Terra dei Bambini after its destruction.

SUMMER SCHOOL GUC AND TUB, LEARN-MOVE-PLAY-GROUND, CAIRO

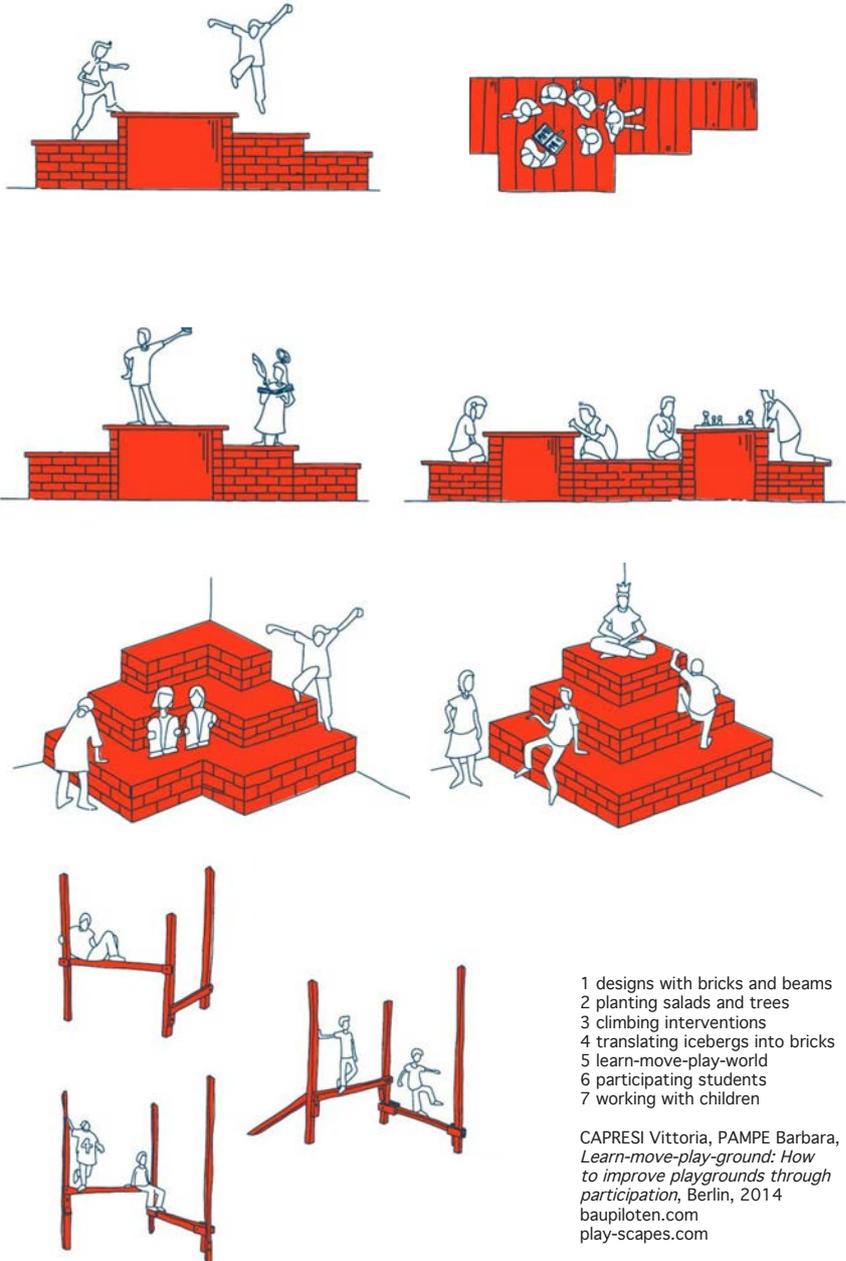
In 2012, the Architecture and Urban Design Program of the German University Cairo (GUC) and the Faculty of Architecture of the Technical University Berlin (TUB) organized a summer school in Cairo. Eleven German and twenty-five Egyptian students participated in a project with the aim to improve courtyards of public primary schools. The proposal on the learn-move-play-ground is the initiative of prof. Barbara Pampe, prof. Vittoria Capresi (GUC) in cooperation with prof. Susanne Hofmann and the Baupiloten (TUB) and is fully financed by the German Ministry of Foreign Affairs through the German Academic Exchange Service DAAD.

The thirty-five students from Germany and Egypt tried to improve two particular schoolyards in Cairo during the twelve-day summer school. Courtyards in Egypt often remain neglected because of lack of time, funds or expertise. During the workshop, the students worked together as a team to better the quality of the schools' outdoor spaces by designing furniture for playing, moving, sitting and providing shade. Learning happens not only through studying books and listening to teachers, but also through moving freely and playing with elements that stimulate the imagination. The school's pupils participated so, that they made collages illustrating their ideas. Their task was to draw and tell how their ideal learn-move-play-world would look like. The architecture students built models of the schoolyards to be able to discuss the desired interventions. As a result, a multifunctional landscape was designed where the pupils are allowed to climb, hide and retreat. The used materials were local and low-cost, as well were the construction methods.

An example that has been built is an "inhabitable iceberg". A tower made of bricks and wooden boards offers a stage to perform on. By creating different forms and heights, they can be used as caves to play hide-and-seek.

There have been created different settings to gather in smaller groups for eating, playing a game, painting... Next to the art pyramid, some dangling balancing beams are built. Vertical beams connected by horizontal ones of different heights foster the experimentation of movements.

After the interventions, the schoolyards were full of activity. This rouses the curiosity of the neighbors and so the schools took their role as social center became clear. Above all, the used architecture fulfilled its role as a social catalyst since the participation process brought people together.



- 1 designs with bricks and beams
- 2 planting salads and trees
- 3 climbing interventions
- 4 translating icebergs into bricks
- 5 learn-move-play-world
- 6 participating students
- 7 working with children

CAPRESI Vittoria, PAMPE Barbara,
Learn-move-play-ground: How to improve playgrounds through participation, Berlin, 2014
baupiloten.com
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FACULTY OF ARCHITECTURE TUM, SKILLS CENTER, NAIROBI

After secondary school, a lot of juveniles from Nairobi, a village in Kenya, face unemployment on the long term. Therefore, two NGO's, the German "Promoting Africa" and Kenyan "Youth Support Kenya", initiated the project of the Skills Centre Nairobi to teach the youth simple craftsmen skills. Eighteen architecture students of the Technische Universität München (TUM) developed designs for the building complex. Together with local workers they built the Skills Centre.

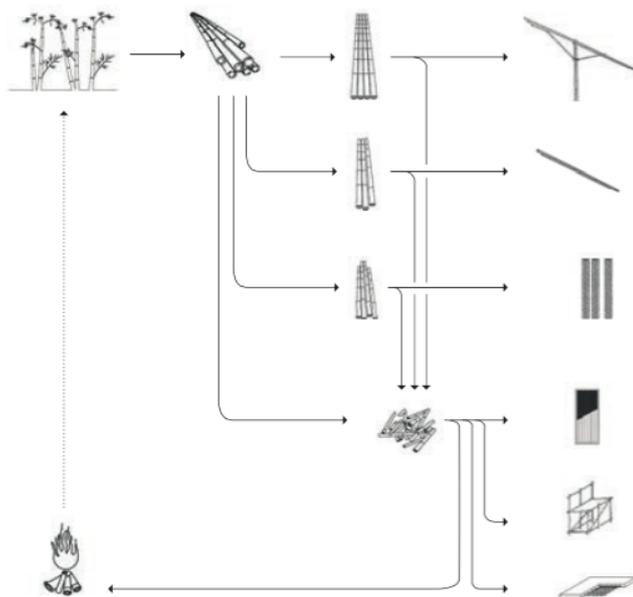
The Skills Centre is composed of four buildings. In between the buildings open spaces of different qualities and spheres are formed. The entrance yard, defined by the dining hall, workshop area and wall, has an open character. Going further to the inner courtyard, one can find a green outdoor space of more private utilization. In front of the dormitories, there are little outdoor spaces providing a quiet atmosphere. The workshop area has a covered open space. This partly roofed terrace enlarges the classroom area.

The used materials for building up the walls are derived from the local natural stone and built up by using the local methodologies. The roofs are covered with iron sheets, laying on a structure made of bamboo. The economic aspect of material is carefully drawn attention to. To waste as little as possible, they made use of a cascade sorting system. They sorted out the bamboo poles into types of declining quality and related applications to be resource efficient. The straightest, longest and strongest poles were used for the structure of the workshop building, which has a span of 6,5 meters and cantilevers of 3,5 and 1,8 meters. A lot of bamboo pales were not suitable for the construction of such a spans or cantilevers. Therefore, a second quality level was used for the structure of the kitchen building, which has only a span of 6 meters. Afterwards, the remaining material could still be used for the dormitory ceilings. Leftovers could be processed in auxiliary construction, as reinforcement of concrete or fillings of doors and window shutters.

The designers wanted to reach a balanced room temperature without making use of air-conditioning or heating. Therefore, a 7 centimeters layer of clay is added to the roof structure of the buildings. This, in combination with glazed windows and closable ventilation openings, provides a comfortable indoor temperature.



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- 1 architectural design
- 2 cascade sorting system
- 3 workshop building
- 4 inner yard
- 5 workshop building
- 6 dormitories
- 7 layer of clay on bamboo ceiling
- 8 bamboo door and column

db.ar.tum.de
holz.ar.tum.de
archaic-mag.com



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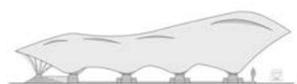
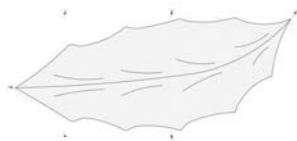
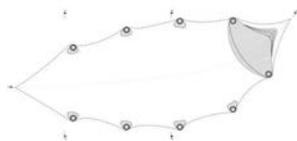
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24H-ARCHITECTURE, PANYADEN SCHOOL, CHIANG MAI

Panyaden International School is a private bilingual school for children in pre- and primary school. The Thai school accommodates 375 students, including 15% of local Thai children funded by scholarships. The initial design is from 24H-architecture, later some subsequent buildings are added by Chiangmai Life Construction.



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The school aims to deliver a holistic education that combines Buddhist principles, green awareness and the International Primary Curriculum (IPC). The school is certified as an international school using the British curriculum alongside the IPC. Its curriculum is taught both in Thai (50%) and English (50%), therefore there are both Thai and native English speaking teachers. In order to remain the Thai culture, experts in various arts, such as traditional wisdom, local agricultural methods and cloth weaving, supervise the kids. In doing so, the students will be the ambassadors to introduce green living into the lives of their communities. Panyaden School is a good example of environmentally friendly architecture. The school buildings are located in the green surroundings of a former fruit orchard in Chiang Mai. The school consists of an informal arrangement of pavilions organized along pathways. The pavilions that make up the school fall into two categories: the classroom pavilion type and the open pavilion type. The classroom pavilion type is built with load bearing walls made of rammed earth, covered with bamboo roofs. The walls divide the pavilion into three classrooms. Thanks to the high thermal mass of rammed earth walls, there is no need for air-conditioning or heating. The curved contours of the bamboo roofs are reminiscent of the mountains at the horizon. The open pavilion type, sala in Thai, is used for functions as the assembly hall, Buddhist chapel, school canteen and covered play area. The sala are completely made out of local bamboo. For the structural support, they set bamboo bundles on large natural stone foundations. This gives a feeling of walking through a majestic bamboo forest. Other sala resemble birds or leaves. Every way, all the designs are inspired by nature elements and daily Thai life.

In addition to the concepts behind an eco-friendly school, wastewater is treated before its re-entry into the environment and food waste is recycled to produce biogas for cooking and as organic fertilizer. Organic vegetables and rice will be grown on the school grounds. To minimize the need for electric lights, skylights are incorporated into the roofs. There have been created different settings to gather in smaller groups for eating, playing a game, painting... Next to the art pyramid, some dangling balancing beams are built. Vertical beams connected by horizontal ones of different heights foster the experimentation of movements.

After the interventions, the schoolyards were full of activity. This rouses the curiosity of the neighbors and so the schools took their role as social center became clear. Above all, the used architecture fulfilled its role as a social catalyst since the participation process brought people together.

- 1 pavilions along pathways
- 2 structure of an open pavilion
- 3 classroom pavilion
- 4 open pavilion
- 5 covered play area
- 6 assembly hall
- 7 students as ambassadors
- 8 bamboo roof

archdaily.com
24h.eu
wikipedia.org



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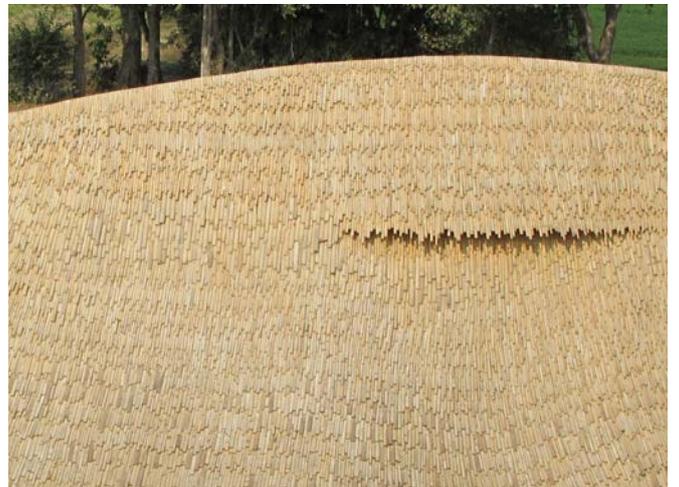
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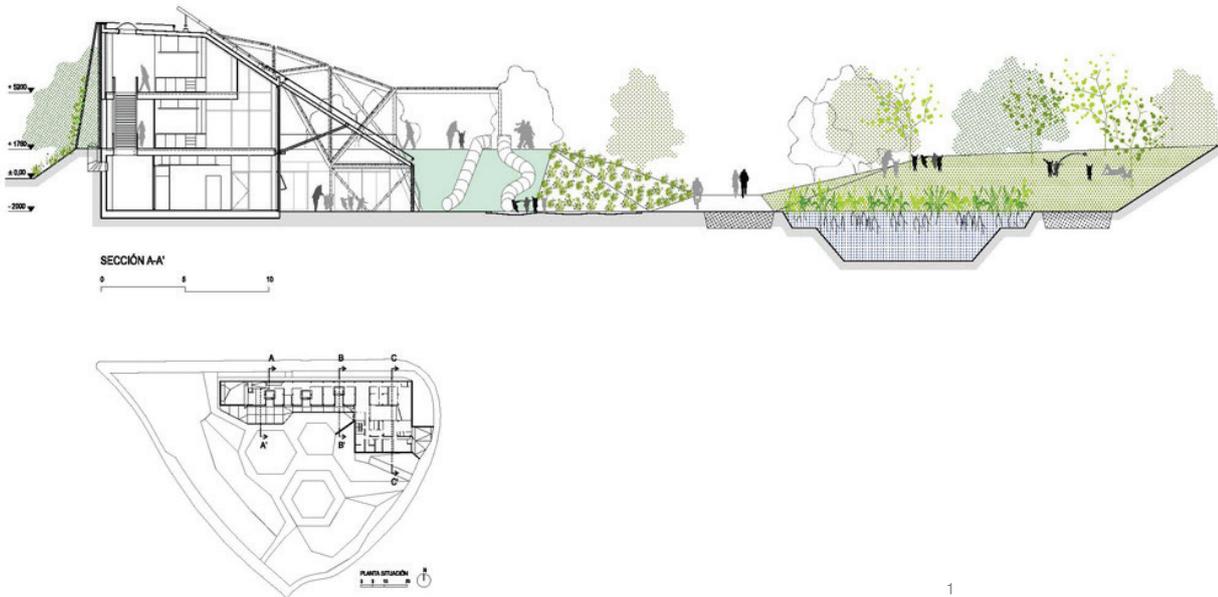
PLAZA EC POLIS | ECOSISTEMA URBANO

MADRID, SPAIN

Ecópolis Plaza aims to become a source of learning for citizens, educating on energy saving and optimization of the natural resources. Located in a vacant lot in the outskirts of Madrid, the project tries to integrate ecology in everyday life with the real physical elements that compose it, avoiding the misperception of being understood as a theme park or a museum. At the same time, these elements come together to shape a space for social interaction, by reconquering the public space through those who are able to make a more unprejudiced and free use of it, not limited by pre-established rules and patterns: children.

Surrounded by transport infrastructures and adjacent to an industrial estate, the project creates a natural barrier that filters the air and buffers the noise inside. At the same time, children can be in contact with nature and learn about it in their school/playing time.

The building extends its limits towards the public space, making some of the processes that usually run hidden in the urban networks of waste disposal more transparent. Visibility of these processes aims to create a greater citizen awareness about the responsible consumption of natural resources (200 liters of water is the daily consumption per person in Europe). The sewage system of the building ends in a lagoon of macrophyte plants that characterizes the public space in front of the children's school.



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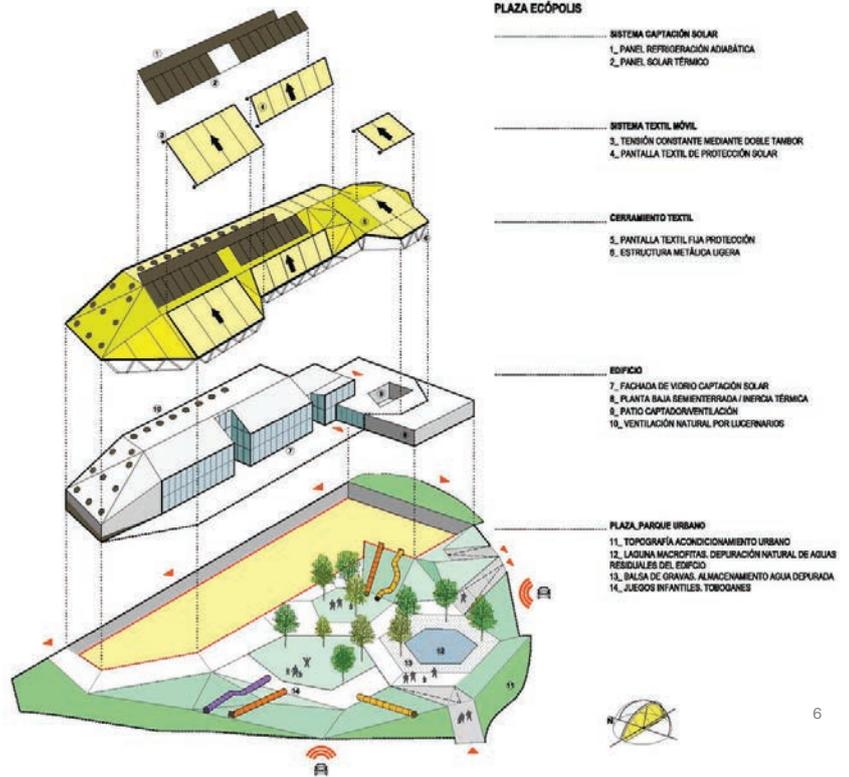
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In the end, the project is composed by a kindergarten, a ludic space for kids, and a public space. This solution combines passive energy saving systems together with active systems, providing the highest eco-label (A grade) of the Spanish law.

All the waste water from the building is naturally purified by a macrophyte lagoon present in the public space, with which the children have direct contact with. This recycled water is then stored underground within a gravel tank and re-used to irrigate the garden. This artificial landscape emulates a natural riverbank. Plaza Ecopolis has received several awards among which is a Best Practice from the United Nations Habitat program.



BARE IN MIND

The project acknowledges that architecture has the power to open and influence children's minds, and that it can become a real example of sustainable practices to them.

Children of the now will be the ones shaping our future. Showing them concepts of freedom and mutual respect towards nature through the school design can influence them to create a better one. This childish gaze offers a new perspective on how to understand the space and transform it, and if taken in consideration, may open new doors to the design of our buildings and cities.

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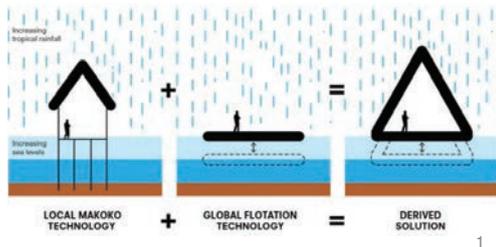
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FLOATING SCHOOL | NLE ARCHITECTS

MAKOKO, NIGERIA

Makoko Floating school is a project integrated on a three-phase plan for the water front community of Makoko in Lagos, Nigeria. This masterplan, inspired in Amsterdam “village” and its boat houses, intends to transform the already buoyant city into a contemporary community on the water’s surface, with independent floating structures built with local materials, reinvented in new ways.



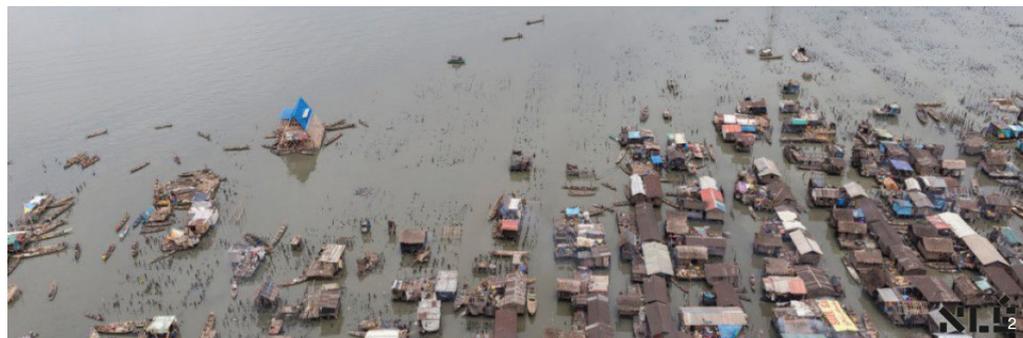
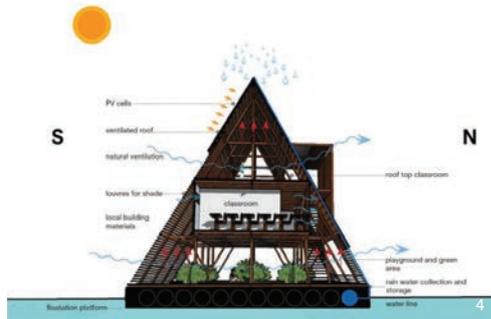
This experimental module is the phase one of the project, the first “seed” of a future aquatic forest. It consists in a triangular module constructed with a parallel series of timber A-frames on a platform supported by emptied blue barrels. The three-storey structure contains classrooms on the middle level inside the enclosed volumes, flanked by public space and a playground below, with an additional open-air rooftop classroom above. However, whenever there are no classes taking place, the building becomes a public free space, used for as many purposes as the population needs.

The design provides natural ventilation and shading in order to adapt to the climate and create a comfortable environment to the classroom. The project also includes rooftop PV cells on the roof that collect solar energy, coupled with water catchment systems, which make the dynamic educational facility partially self sustainable. Slender wooden slats create a shading device along the outer envelope along with well ventilated spaces to maintain a comfortable interior environment.

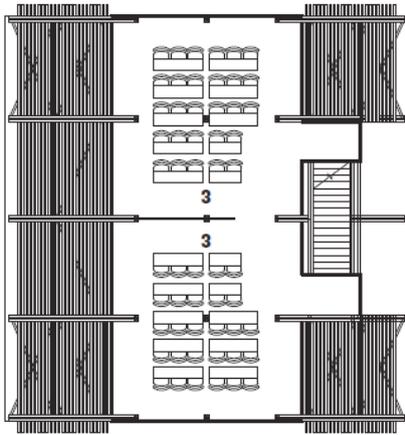


But what’s so special about this project? In the words of Kunle Adeyemi: “The first thing I did was actually to learn from them: how do you build? I spoke to the local experts that had built all those houses, looking at the material that they worked with”.¹ Before starting the project, the architects researched about local materials and techniques that people have been using, their life-style, habits, main services and means of transport in order to develop a cultural-based concept, adapted to the existing conditions.

Beyond the creative structure and the sustainable design, it is important to highlight the process of learning with the locals and the relationship the architects developed with them. “I would love to learn and give back.”² Taking their time to get to know this water city dynamics was for sure a crucial point to the success of the project, resulting in a design that first understands the context, respects it, and only after, tries to add something that makes it a little bit better.



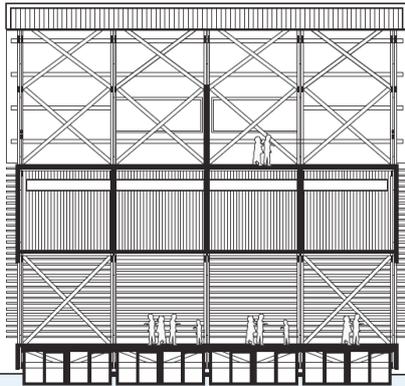
1 . Kunle Adeyemi (founder of NLE Architects), in a presentation about his African water cities research and the Makoko floating school project, as part of the Stad-Forum “Week van de Stad” water cities symposium at the Bimhuis, Amsterdam. Source: https://www.youtube.com/watch?v=u3-0w-_yPsE (min. 17:55)
 2. Kunle Adeyemi (founder of NLE Architects), as part of the Stad-Forum “Week van de Stad” water cities symposium at the Bimhuis, Amsterdam. Source: https://www.youtube.com/watch?v=u3-0w-_yPsE (min. 17:30)



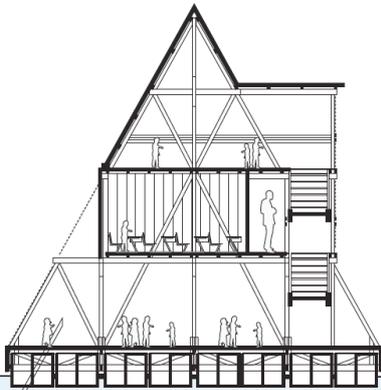
second floor plan



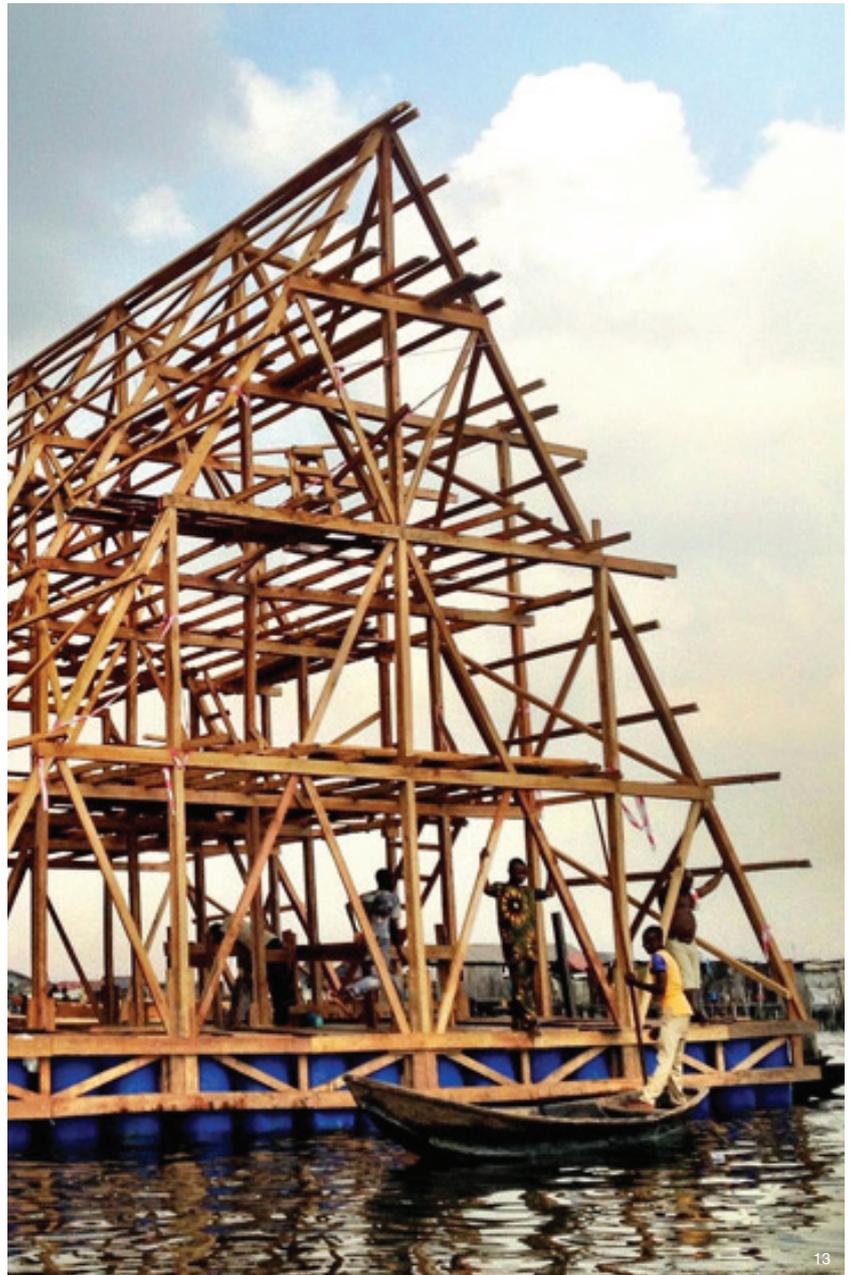
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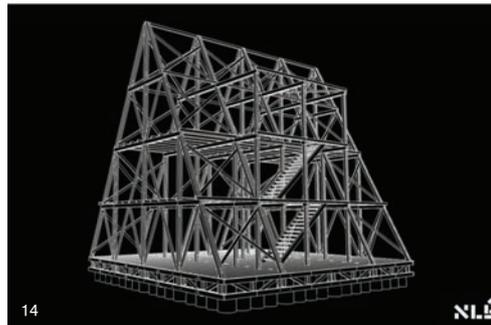


12



13

10 days | 4 builders | 1t of metal | 15t of wood
256 plastic barrels | 220 m² on 3 floors | 1floating structure



14

NLE

Image sources:

3 | 6 - 9 | https://www.youtube.com/watch?v=u3-0w-_yPsE
1 - 2 | 4 | 14 | <http://www.nleworks.com/case/makoko-floating-school/>
13 | <http://www.designboom.com/architecture/nle-architects-floating-school-in-makoko/>
10 - 12 | <https://imageschooldesign.wordpress.com/2014/07/09/makoko-floating-school/>



Makoko floating school by NLé Architects (Nigeria)

ECOLOGY OF COLOUR | STUDIO WEAVE

DARTFORD, UNITED KINGDOM

In order to place emphasis on community engagement and creating a meaningful educational resource, Ecology of Colour brings a public function to a neglected corner of Dartford. The site is a curious rural pocket within an urban context, located at the tip of a wild, wooded peninsula in the heart of the North Kent town.

Acting as a jolly custodian for the re-imagined Ecology Island in Central Park, the humble timber shell becomes a community arts studio, bird-watching hide, and a park shelter with a semi-outdoor tiled classroom and storage space at ground level. The enclosed room upstairs offers views of the River Darent and surrounding trees. On the upper floor, shutters of various sizes allow the hidden wildlife watching and drawing and public events that spill out into the park. The covered space at ground level is used as a drying area for dyeing workshops.

The creation of two different yet beautifully complementary cycles has guided the project: the process of extracting colour dyes and using them for crafts, and the wildlife these plants attract including insects and birds. Since its completion in September 2012, the building has become a resource for visitors to explore and learn about plants, insects and birds in all their splendid colour, the process involved in extracting natural colour dyes, and the applications of dyes in craft and architecture. To achieve this, the architects collaborated with a horticulturist to design a garden that will yield natural dyes. The planting scheme includes traditional plants native from the South of England such as Golden Rod that produces yellow, Alder for a vibrant red and Bugloss, which roots produce a bright blue.

The most characteristic feature of the structure is the hinged 'beak' opening on the upper floor, which allows the entire wall on the east elevation to open in one fell swoop through a simple pulley system. The atmosphere created by this beak is the one of being up in a treehouse among the canopy, with views of the river swirling past.

The building was designed to include the initial series of events (candle making, darning and fabric dyeing workshops) which intend to be followed by the foundation of a friends' group, in order to firmly root the project's activities in its local community. To create a spark to this future project, the Cedar cladding is stained with a pattern called 'Joy', designed by graphic designers Nous Vous, who ran a series of workshops with a team of local residents and artists to paint all of the 144 panels prior to its installation, which form the external cladding.



Text sources:

. <http://www.archdaily.com/457272/ecology-of-colour-studio-weave>

. <http://www.archdaily.com.br/01-173367/ecologia-da-cor-slash-studio-weave>

. <http://www.studioweave.com/projects/detail/ecology-colour/>



5



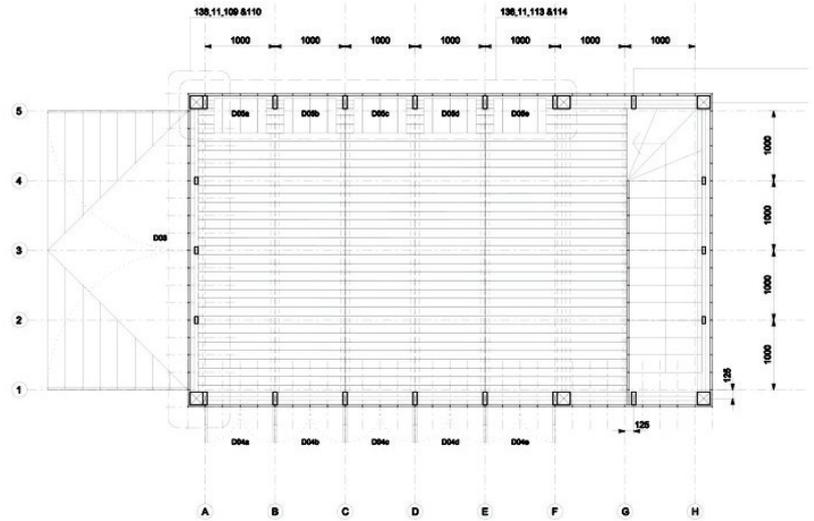
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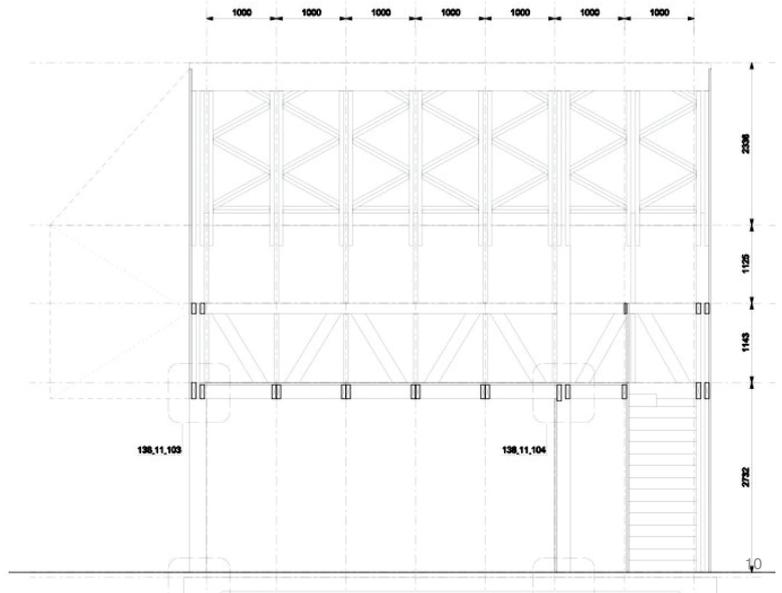
7



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BARE IN MIND

This simple and multifunctional structure brought to life a neglected place by introducing two cycles that improve the local fauna and flora, and allow the community to take something out of it. The functions assigned to the building were well adapted to the needs of the population, and all the matters that are thought and the activities that take place in the classroom correspond to a specific craft that will be useful to the future of the children.

Image sources:

1 - 2 | <https://www.dezeen.com/2013/04/20/ecology-of-colour-by-studio-weave/>

3 - 8 | <http://www.studioweave.com/projects/detail/ecology-colour/>

9 - 10 | <http://www.archdaily.com/457272/ecology-of-colour-studio-weave>

MILLENNIUM SCHOOL

The millennium school is a prototype in Bicol Peninsula around South-East part of Luzon island, Philippines. This is a region that struggling huge tropical storms every year and lacking of educational infrastructures from the government. However, in the local forest, people find many kinds of bamboo using for satisfying their life demands, from making small equipments to buildings.

As a prototype, the architect want to prove the abilities of bamboo in construction by designing a structure which can survive the tropical storms in this region. Besides, there is a need to avoid flooding from heavy rain in raining season in Southeast Asia.

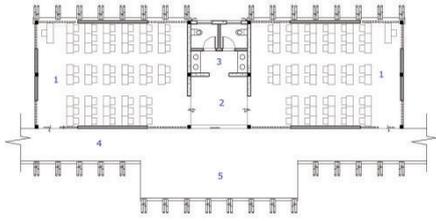
The plan of the school is quite simple, consisting two classrooms with a washroom in the middle. A shaded veranda is in one side of the module functions as a corridor and reducing direct sunlight in inner spaces. This is a typical design in local region and allowing cross ventilation in the building, besides, deep overhanging roof ensures the spaces are well protected from the outside.

In structure and material using, there are two different parts to the building. The classroom structure is a simple reinforced concrete frame in inner space. The outer structure is based on pinned and lashed bamboo culms and together they define the corridor, veranda and roof. These bamboo culms are lowered onto pre-casted steel anchored on top of the inner structure. The connection is secured by injecting lean concrete into the hollow space of the cane and lashed with nylon strings.

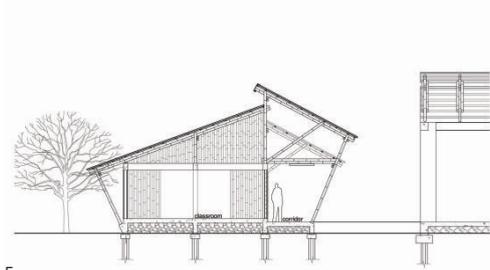


Architect: Eleena Jamil Architect
Location: Camarines-Sur, Philippines
Year: 2011

1. Inner space of the classroom
2. Students are playing with the bamboo structure
3. The school was under construction



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In term of consideration about the hot and humid climate of the area, the classrooms are on a raised concrete platform that keeps the floors dry during the wet season. This design also works to protect the culms from getting wet as moisture normally renders them susceptible to rotting and insect attack.

The veranda is covered by a roof of metal and a woven local reed called “runo”. The overhangs have been made extra wide to provide shaded areas for play.

The Millennium survived all the tropical storms from the time it was built, verifying the suitable characteristic of bamboo as a building material. In case people want to fix or add more structure to the design, they can easily find bamboo in the forest next to the school. The natural cross ventilation also reduced energy consumption for education and raised concrete floor help bamboo structure last longer.



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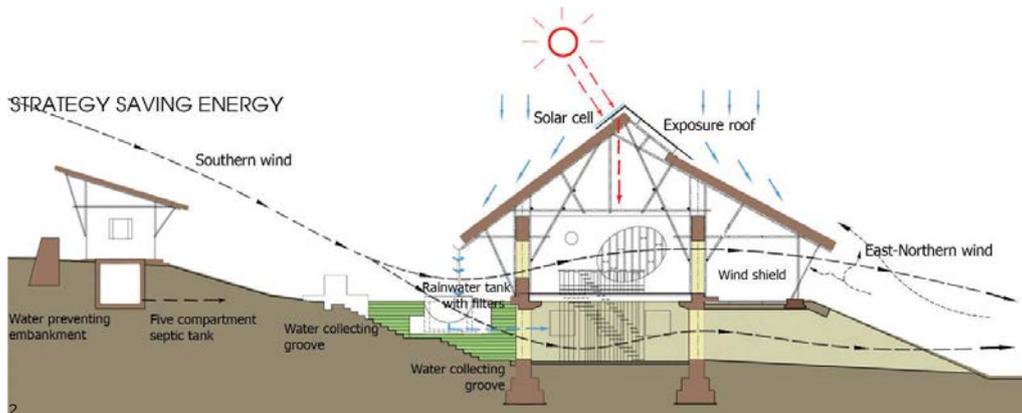
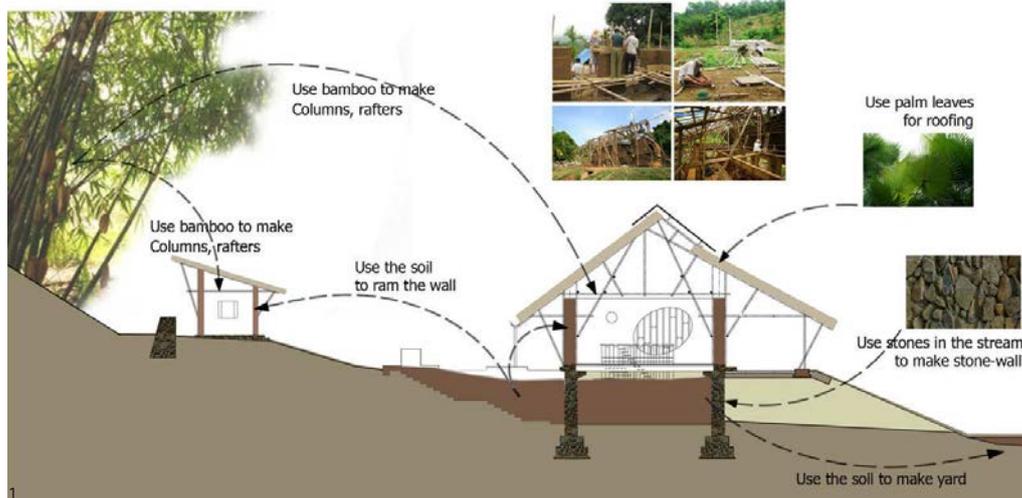
- 4. Plan
- 5. Section
- 6. Connection between bamboo culms and the ground
- 7. The school from the front
- 8. Bamboo structure in the corridor
- 9. connection in bamboo culms and beams

source: <https://ej-architect.com/project-pages/millennium-school-classroom-prototype/>
<http://inhabitat.com/first-full-bamboo-school-in-philippines-stands-up-to-tough-stormwinds/>

SUOI RE VILLAGE COMMUNITY HOUSE

Hoa Binh province located in the mountain in the North of Vietnam, in this small town, in recent years, majority of youngster in this town moved to bigger city to seek for better lives, living behind them a gap between elderly people and their grandchildren, farm lands and its owners and relationship between villagers. Besides, Suoi Re village also lacks of facilities for regional activities such as: library, health-care center and kindergarten; therefore, the need of a new community building is essential.

The architect of this project want to design a flexible building to meet all the needs of villagers for their common activities as well as a house which is adaptable to the mountain climate in this area. In addition, the building cost can not be too high so that all the villagers can manage to contribute to their common house as they desire.



Architect: 1+1>2 Architect
 Location: Luong Son, Hoa Binh Province, Vietnam
 Year: 2010

1: Local material and local workers
 2: Overall Section

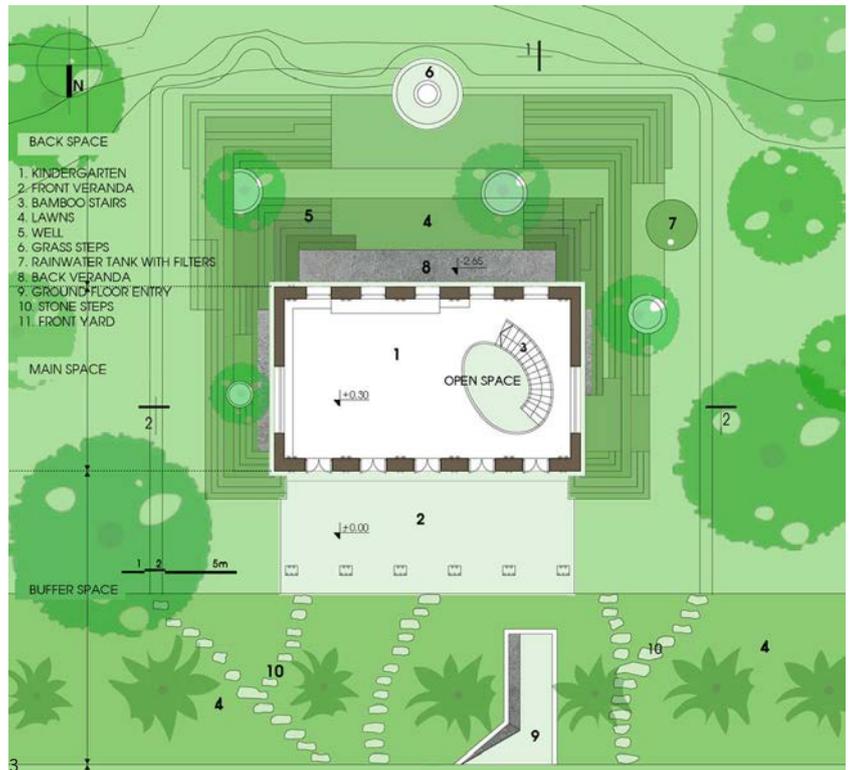
The design consists 3 different parts. The first one is the front space functions as an open court yard for outdoor activities such as volley ball or football.

Next to this is the main living space which is a 2 stories building, the ground floor is the place for villagers gather and sideline, this space is built by rugged-stone wall fitting in the concave slope, utilizing geothermal heat method. The first-floor functions as kindergarten and library, constructing by rammed earth in traditional methods, covering by bamboo structure and palm leaves roof, there is also an open space on the roof to maximize the natural light to the inner space, it was wrapped by PV panels adding electricity for the need of the building.

The last one is a slope garden in behind including toilet and rain water tank.

The design of the community house followed the Feng Shui philosophy so that it can avoid East Northern monsoon in the winter (which is cold and dry) and collect East Southern monsoon in the summer

All the doors, windows and furniture in the building were made by bamboo in the forest located in the back of its garden bring warm felling for the interior and easy to replace in case of impairment.



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The local material used in construction work reduced the cost of the house as well as brought the villagers together during the building process.

The building was designed to meet the climate condition of this area, avoid flash flood in the mountain and reduce the energy need to operate the activities in it.

Flexible spaces are good for the future needs of the villagers.

- 3: Floor Plan
- 4: Library space in ground floor
- 5: Kindergarten
- 6: Building process with local worker

SOURCES:

<http://www.archdaily.com/102639/suoi-re-village-community-house-ki%25e1%25ba%25bf-ni%25e1%25bb%2587t>

<http://inhabitat.com/suoi-re-village-community-house-in-vietnam-features-rammed-earth-and-bamboo/second-pic/>



Suoi Re Village Community House by 1+1>2 Architects (Vietnam)

DRUK WHITE LOTUS SCHOOL

The school located in Ladakh, a town in Indian Himalaya on the Western edge of the Tibetan plateau. This area has “high altitude desert” climate which is very hot in summer and extremely cold in winter.

Ladakhi people were affected by rapid modernization making more and more youngster drifting towards the towns to seek for works and income. The traditional education in this region was based on rote learning and became less efficient for young children in modern world.

By the request from local people and the support of His Holiness the Twelfth Gyalwang Drukpa (the spiritual leader of Ladakh), the main project’s aims was providing high quality education environment for Ladakhi children.

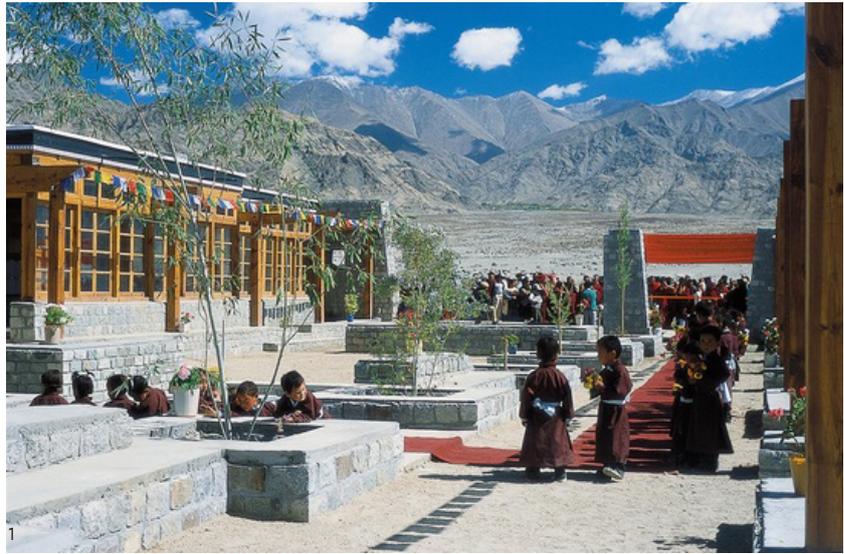
A new school combining nursery, infant school, junior school, dining hall and residential facilities for over 500 students was designed to fit with threads from local climate and lacking of water and electricity condition.

With the intention of maximizing the natural light into class room, all buildings in the education zone in were rotated 30° of the nine-square grid to exploit the morning sun and the back façade in line with the afternoon sun in the North West. Besides, most of the buildings had only one story and were built separated to each other to avoid shadowing and all South-facing surfaces were full glazing, in addition, clerestory windows on the roof also bring in extra daylight to the interior.

All classrooms were planned with two parallel buildings facing each other to form an open space and in the northern side walls were built by a masonry wall to prevent the cold winds during the winter. Open spaces were designed for outdoor teaching area in the summer and can be covered by awnings in the winter for other activities.

The dining hall and resident area belong to a different part of the project supporting by timber structures independent from the wall with substantial timber cross-sections to ensure safety in case of earthquake. The ventilated Trombe wall were used in the resident blocks to store more heat in the winter.

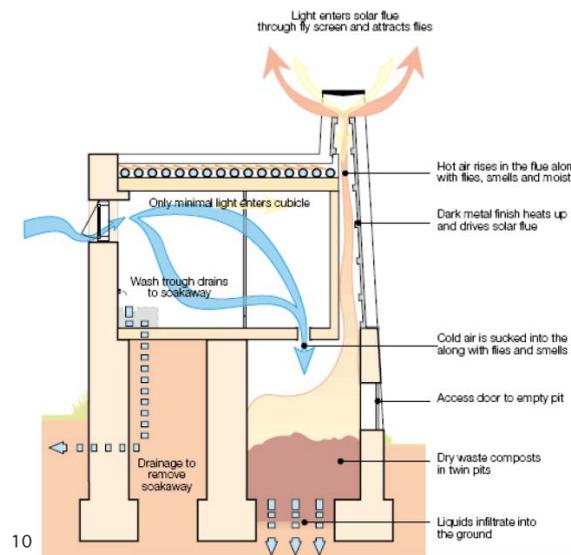
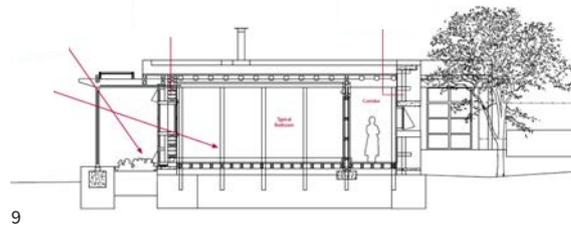
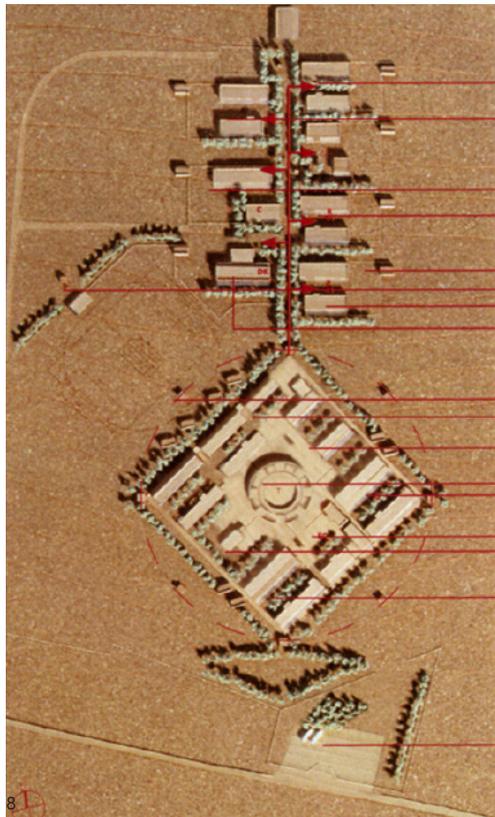
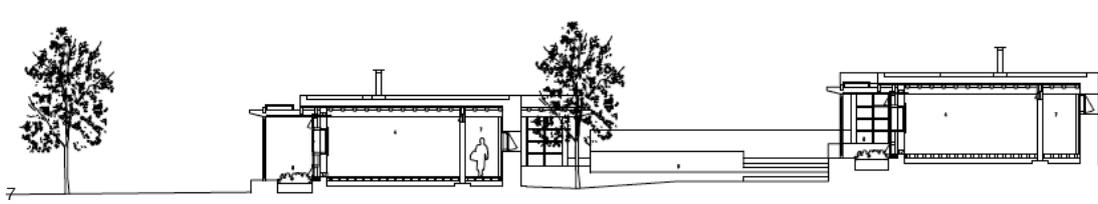
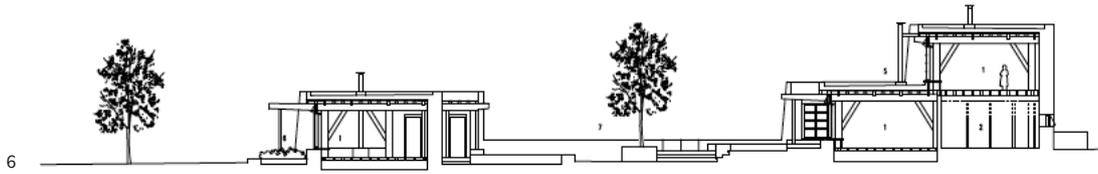
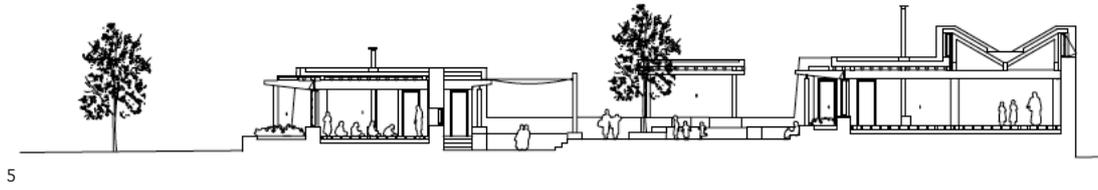
The architect also designed a sewage system for the whole school and special solar-assisted VIP (Ventilation Improved Pit) latrines for the need of reduce the water used in this school.



Architect: Arup Associates/
Jonathan Ros
Location: Ladakh, Shey, India
Design: 1994-2000
Complete: 2003
Area: 1240 sqm

1: Garden in nursery classroom
2: Northern facade
3: Shoes storage in the entrance
4: Nursery school classroom

SOURCES:
<http://www.dwls.org/>
<http://www.arupassociates.com/en/case-studies/druk-white-lotus-school/>



- 5: Nursery classroom section
- 6: Junior classroom section
- 7: Residence section
- 8: Master plan
- 9: Trombe wall function
- 10: Ventilation Improved Pit design

The school was built with the total cost of 424,810 \$ and have been functioned well for 565 students, 40 permanent staffs and 15 laborers till now. It was designed with good calculation to maximize the energy used in the building and reduce as much water waste as possible.

BAAN NONG BUA SCHOOL, CHIANG RAI THAILAND, JUNSEKINO ARCHITECT AND DESIGN, 2015

In 2014, a strong earthquake of 6.3 Richter, struck in the North of Thailand. 73 schools were destroyed and 2000 students lost their schools. D4D (Design for Disasters, an organization that researches and focuses on developing sustainable infrastructure and methodology to better guard against crisis) raised funds for 9 new earthquake resistant schools in the worst affected areas and appointed 9 local Thai architecture firms to be working on this. Junsekino Architects was one of them.

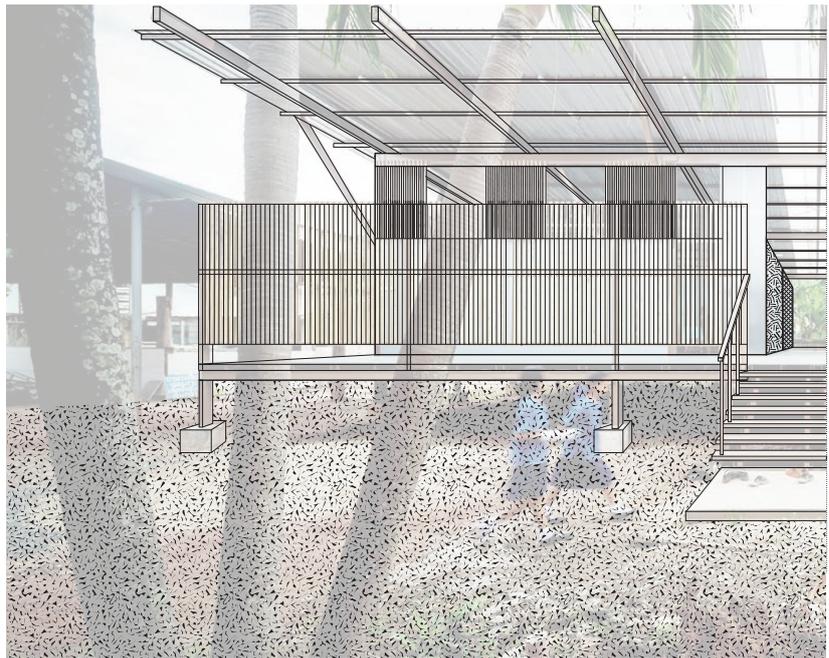
The Baan Nong Bua School is an elementary school for kids from 5 to 10 years old. They requested for 4 classrooms over 48m² and required a central space for the children for non-learning activities such as playing. The classical Thai school pattern was what was asked for, but according to the architects, this is not setup to withstand natural disasters.

The building is very flexible, therefore, the users can adapt it to their demand. For instance, in the future, classrooms can be joined by simply taking away the partitions. Also, whenever there is a flood, the water cannot easily get into the school, because the building is elevated.

The main structure is executed in steel, to have a flexible, non-rigid skeletal frame to absorb the vibration of earthquakes. Also, it is quite fast and easy to construct.

The secondary structure, being the walls of the building, consist of wood cement boards that are easy to put together and can be found pretty much everywhere in the world. These panels are also used as the shelves. They are used in combination with polycarbonate panels, to emphasize the lightness. Bamboo was used here, for partitions and window details, this local material is ideal for this use.

The school works with the circulation of natural air and the penetration of natural light into the building. The ceiling is elevated to allow this to happen. The



01



02



03

01
original image: <http://www.archdaily.com/776074/baan-nong-bua-school-junsekino-architect-and-design>
own adaptation: shows the school was lifted to prevent flooding, also shows the close relation between in- and exterior

02 + 03
<http://www.archdaily.com/776074/baan-nong-bua-school-junsekino-architect-and-design>
open classrooms, close to the environment

humidity is reduced because the building is well ventilated since it is open, thin and light. This allows an interesting relation between interior and exterior to occur as well.

The Thai culture has been taken into account within this project. One example for this is that the users take off their shoes before entering the school building, a space to store them has been designed. Another example is that no one possesses this school, it belongs to the community.

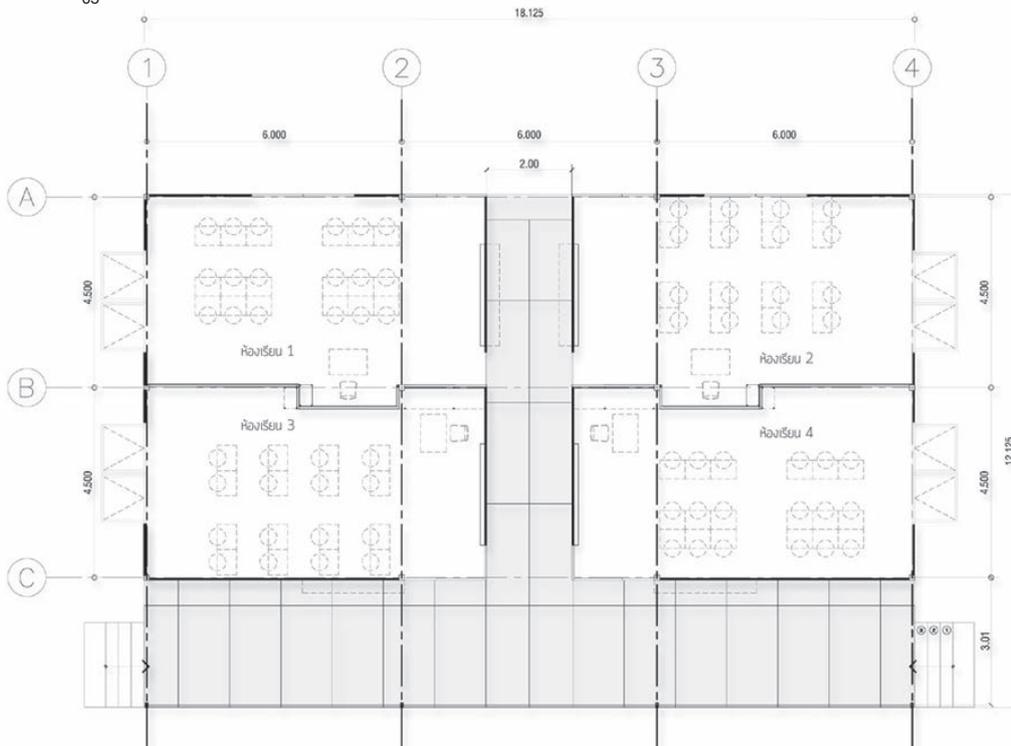
It is a quite simple design, prepared for future adaptation to serve the needs of the users, but also designed to give the children an opportunity to claim the space. This school is built up out of local, cheap materials, again a choice that benefits the users and their community.



04



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04
<https://www.dezeen.com/2015/11/03/baan-nhong-bua-earthquake-resistant-primary-elementary-school-chiang-rai-thailand-jun-sekino/>
 render of the project

05
<https://www.dezeen.com/2015/11/03/baan-nhong-bua-earthquake-resistant-primary-elementary-school-chiang-rai-thailand-jun-sekino/>
 elevation of the school

06
<https://www.dezeen.com/2015/11/03/baan-nhong-bua-earthquake-resistant-primary-elementary-school-chiang-rai-thailand-jun-sekino/>
 plan of the school

5 KINDERGARTENS, GUINÉE-BISSAU, COLECTIVOMEL, 2016

ColectivoMEL is an architectural office from Portugal. They developed a 200m² kindergarten for a small village in Guinée-Bissau.

The concept for the building is very abstract, as is building in Guinée-Bissau in general, a country where architecture consists of inner space and outer space, connected by transitional space codes.

The inner space stands for shelter. It is dark, windowless and small, because the outer space is where everything happens. It is where food is cooked and eaten, where children play and adults talk. It is where they all live and grow up.

The aim of the building is to be the mass and matter at service of the children. A place to stimulate them to play and learn. It was designed for hosting 100 children, divided into two shifts. There is 1,5m² per child which follows the regulations, and ColectivoMEL decided to add 1m² per child covered outdoor space.

5 Kindergartens was developed by looking at all conditions on site. The sun, rain marks, wind and of course the children themselves. This is the reason why it has a North / South axis, which is the best orientation to deal with these conditions. The spaces are interconnected with the surroundings, since almost everything is open or can be opened. This is helpful in terms of heatcontrol. The trees on site are integrated instead of chopped. Their shadow became part of the project.

Guinée-Bissau is very much affected by the monsoon season, which carries a lot of heavy rains. The large sloped roof protects the building itself from these rains.

The chosen materials were picked, based on the local systems and empirical knowledge, which adds a durability factor. It also tackles problems such as flooding or termites, issues the region has dealt with for a long time.



01



02



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01
original image: <http://www.archdaily.com/793599/5-kindergartens-colectivomel>
own adaptation: shows connectivity between in- and exterior

02 + 03
<http://www.archdaily.com/793599/5-kindergartens-colectivomel>
very open facade to ensure ventilation, local materials

04
<http://www.archdaily.com/793599/5-kindergartens-colectivomel>
close to environment, local materials

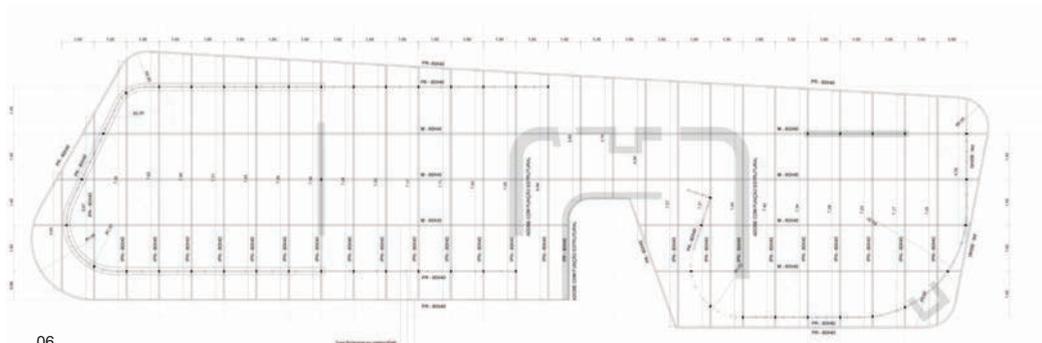
They used a structure of iron and wood profiles that support the thatched cover. All of this adds to the light image the architects wanted to portray.

The 5 Kindergartens project was very much influenced by the community it was built for. The locals were involved from start to finish, because the company wanted to include all the local knowledge. The architects did a lot of negotiating with the community, to be able to answer to their needs in the best way possible. At one point, a workshop was set up to involve the locals.

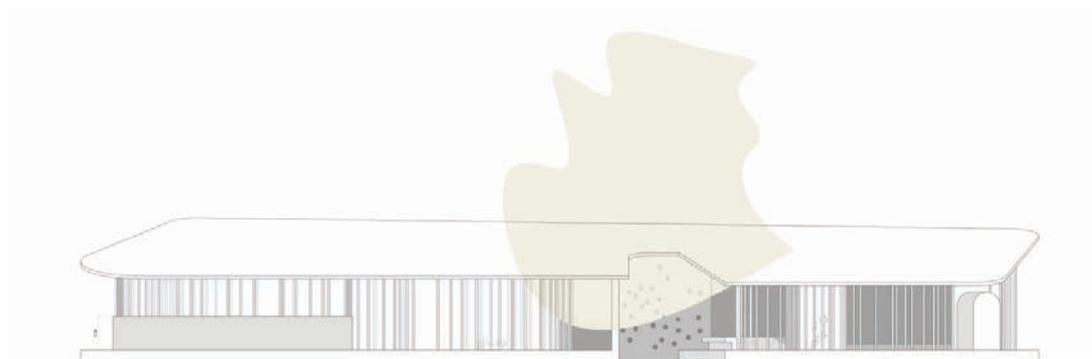
Because the project was setup within a close cooperation with the community, the project has been designed with the cultural background of the village in mind. Historically, teaching in most of Africa has been done outside, often underneath a tree. This is why this project is kept very light and open, as opposed to the more formal kindergartens they are used to, with secluded, separate rooms. This openness was implemented to keep the close connection with the outdoors. This is as well very helpful with climate control, which is extremely important in tropical climates, where the weather is very diverse.



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<http://www.archdaily.com/793599/5-kindergartens-colectivome/>
open vs closed
climate control

06
<http://www.archdaily.com/793599/5-kindergartens-colectivome/>
plan of the kindergarten

07
<http://www.archdaily.com/793599/5-kindergartens-colectivome/>
section of the kindergarten

PRESCHOOL OF AKNAIBICH, MOROCCO, BC ARCHITECTS + MAMOTH, 2014

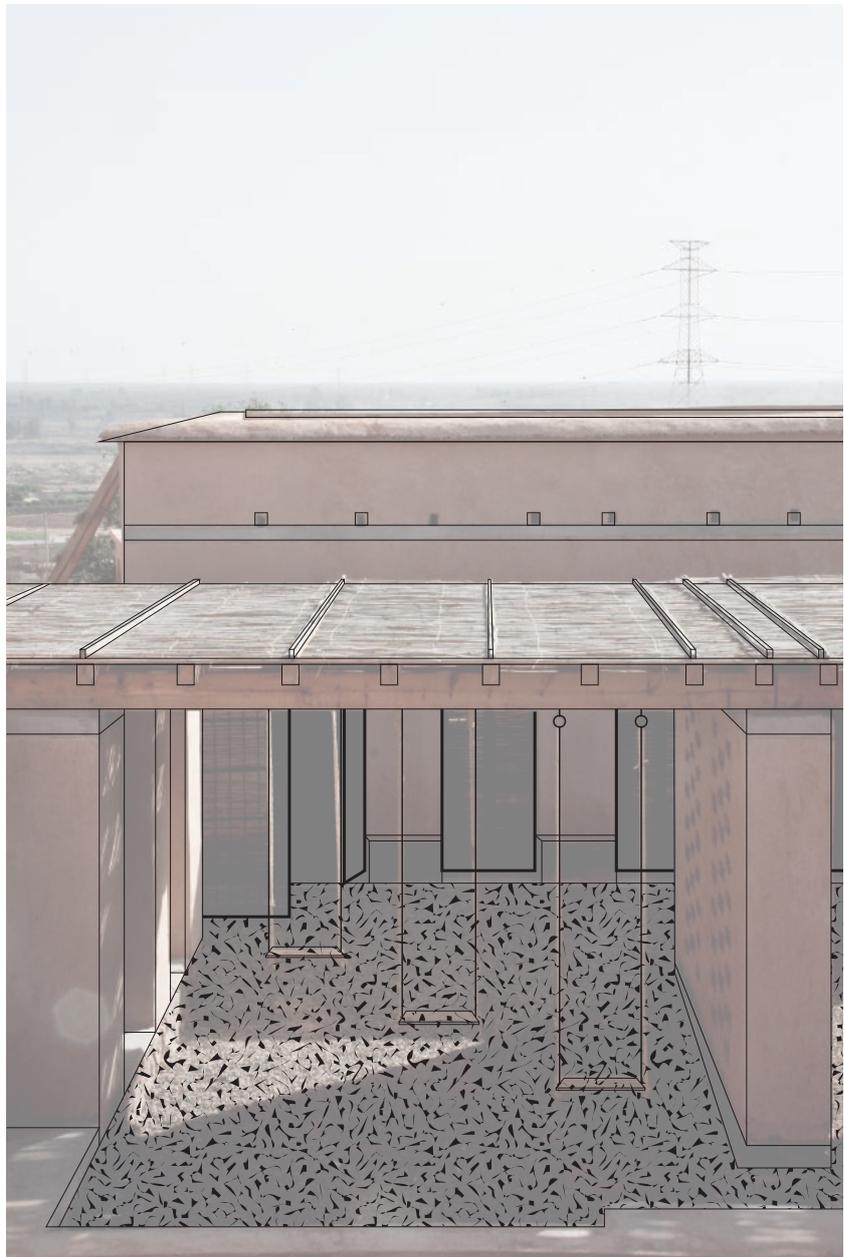
The one classroom, 55m² preschool of Aknaibich, in Fès, Morocco, was designed by the Belgian architecture office BC Architects in collaboration with MAMOTH.

Aknaibich is a small town with great contradictions. The old town is still present, with its earthen constructions and narrow alleyways, while there is also a part that is more modern, more western. This part has concrete houses, built by rural-urban emigrants. The preschool as well is located in this part.

The town was in need of educational facilities and this project was developed within this context. The aim is to create a vernacular design that is adapted to the climate in the best way and that incorporates the dynamic community of Aknaibich. The project borders an existing school, so no compound walls are needed, instead they used argan trees, which are less harsh and give a statement against the deforestation of the region.

The community played a great role in the design process. For instance, a workshop had been set up to try and grasp the town and its community in a better way. The result of this workshop was that the architects chose to search for a dialogue with the existing modern infrastructure, through a so called "new vernacular" style, incorporating mostly local materials and techniques for a building with a contemporary look, that deals well with the climate of its region.

They opted for traditional, local materials such as local natural stone for the foundations, sun-dried adobe bricks for the walls and a wood-and-earth system for the flat roof. The exterior finishing is a mix of earth, straw and sand. The interior finishing is a half-half of earth and gypsum, which becomes a breathable plaster. All of this was executed to diminish the environmental impact of the preschool and yet follow the "new vernacular" style they set up as a framework.



01



02



03

01
original image: <http://architecturelab.net/preschool-of-aknaibich-morocco-bc-architects-mamoth/>
own adaptation: shows the distance between in- and exterior to keep the heat out of the classroom

02
<http://architecturelab.net/preschool-of-aknaibich-morocco-bc-architects-mamoth>
play is inherent to (pre)school

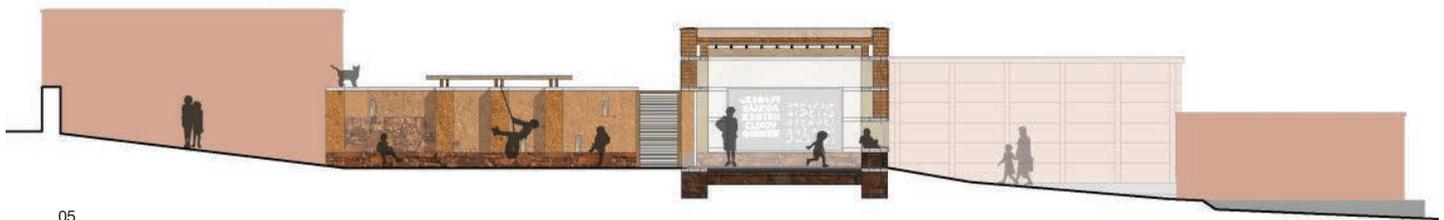
03
<http://www.archdaily.com/572207/preschool-of-aknaibich-bc-architects-mamoth>
material fabricated on site

The east and west facades are fairly affected by the low sun and are therefore made out of a doubled-up cavity wall, whereas the south facade has deep small windows and a big thermal mass to ensure that the building remains cool. This all is in huge contrast with the north facade which is glazed, to have sunlight entering the room.

Here as well, there is a focus on playing. The preschool has an added playground with a pergola. There are playing and sitting elements, which make it a good place to be used as an outside classroom. This again stresses the relation between interior and exterior, being very down to earth and focused on the community and its culture.



04



05



06

04
<http://architects.bc-as.org/Preschool-of-Aknaibich>
 interior of the classroom

05
<http://architecturelab.net/preschool-of-aknaibich-morocco-bc-architects-mamoth>
 section of the preschool

06
<http://architecturelab.net/preschool-of-aknaibich-morocco-bc-architects-mamoth>
 plan of the preschool

THE GREEN SCHOOL (2009)

IBUKU

IBUKU is a team of designers and builders, led by Elora Hardy. She is an American designer who directs Balinese artisans, craftsmen, architects and engineers to create structures in bamboo. They have the tradition to make small models in bamboo initially and to replicate them in 3D-drawings on the computer subsequently. When the design is finished, local craftsmen build the structures.

'The Green School' is located in the village Sibang Kaja (Bali, Indonesia). They designed this building with a specific view: "be local, let the environment lead and think about how your grandchildren might build". The primary structures of both the architecture and the interior architecture are built by bamboo. It is designed in order to have the smallest possible impact on the environment. For example, the trees that they used, are replanted somewhere else. In the architecture they also used other local and renewable materials, such as alang-alang thatch, volcanic stone, rammed earth and traditional Balinese mud walls.



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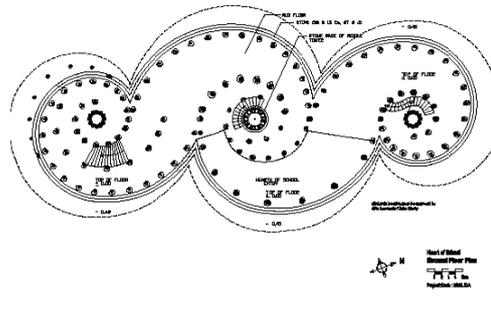
3

- [1] Overview of the school.
- [2] Interior of a classroom.
- [3] An air-conditioned bubble, made of natural cotton and rubber.
- [4] Ground floor.
- [5] First floor.
- [6] Second floor.
- [7] Front of the building.
- [8] Big bamboo tower.
- [9] Veggie garden.

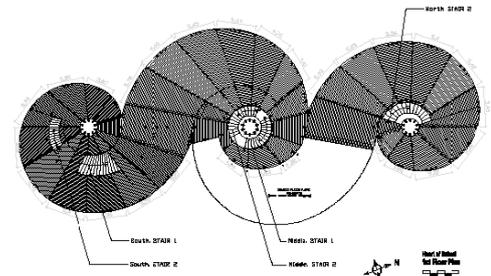
The school is shaped by three spirals which are interconnected. Three nautili spiralling roofs flow over into one another and are supported by three big bamboo towers. The structure is very open, so the classrooms have natural light and fresh air can enter. Even if it is too warm, the students can deploy an air-conditioned bubble, made of natural cotton and rubber. The furniture in the classrooms is made of bamboo, like blackboards, desks (which have organic shapes), etc. The building is provided with green energy produced by solar power, micro-hydro power and biogas systems.

Not only the architecture of the school is specific, but also the way of teaching. The goal of the school is to teach the children that the world is not indestructible. That's why the children made the desks by themselves, so they know how to control their world. Every class has also its own rice field, because rice is very important in the Balinese culture. In the kindergarten, they also have their own veggie garden, so the students learn the sources of food and what to do with them.

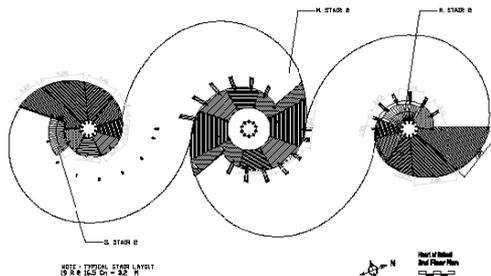
They want to stress that the school is a local school. This means that 20% of the population of the school has to be Balinese. Even the teachers are very diverse and there are a lot of volunteers with different backgrounds.



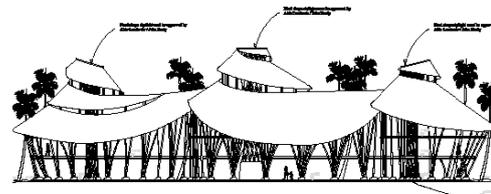
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Sources of pictures:

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NEW HOPE SCHOOL (2009)

AL BORDE ARCHITECTS

Al Borde is a company of four Ecuadorian architects. In their projects, they attempt to improve the local development and to add a social innovation. They realise built projects, workshops, exhibitions, public actions, etc. based on the interaction of many different communities and people of different disciplines and social standing.

The first project of the company was 'Escuela Nueva Esperanza' (New Hope School) in 2009. For this project they worked together with a rural community in the beach town of Cabuyal in Ecuador. Before they started the design of this project, they immersed in this fisher community, since they have a different lifestyle. For example, this community doesn't use money. They have a barter system. The first idea of the architects was to use recycled materials for the school. But these local people do not have waste, because they live in very close relationship with nature. So they decided to work with the materials and techniques of the local community. It was their goal to improve the interaction with the community. So this project served their needs.



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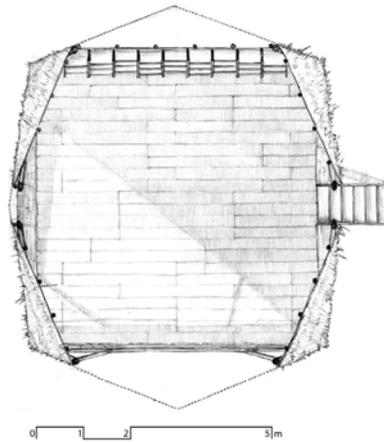


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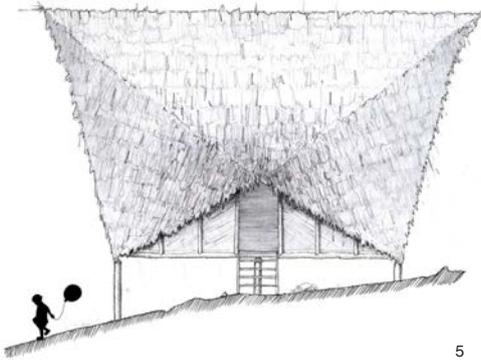
- [1] Overview of the school.
- [2] Building together with th local people.
- [3] Building the school.
- [4] Plan of the school.
- [5] Side of the school.
- [6] The way of entering the class-room.
- [7] Front of the school.
- [8] Interior of the classroom.
- [9] Interior of the classroom.

In contrast with other concrete school buildings in the neighbourhood (where you have the feeling of a prison), they designed a project that is closely connected with nature. They used a timber basis, bamboo walls and a roof made of knitted straw scarf. The roof is formed by an angle of 45°, so it is protected against heavy rain and humidity. It is only one classroom, shaped as a boat, where they try to trigger the children to learn through action. It was very important to create an open space where the children can use their imagination and feel free to be creative. To build this project, they didn't need a lot of money. They only used 200\$.

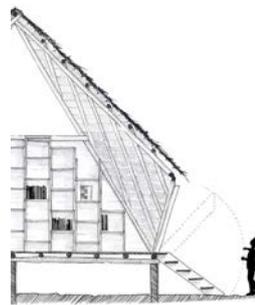
Because the community was very happy about this project, they asked for more. In 2011 they went back to expand the project.



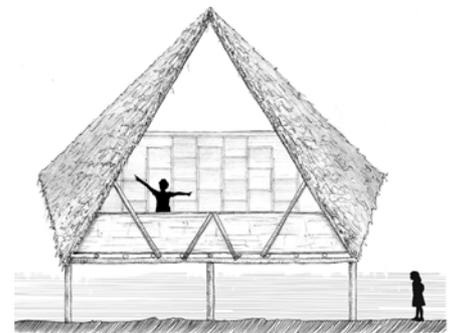
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- Kloppenburg, J. (2016). Al Borde Arquitectos on Practicing Life Through Architecture. Consulted on the 3th of December 2016 via <http://architizer.com/blog/al-borde-life-through-architecture/>.

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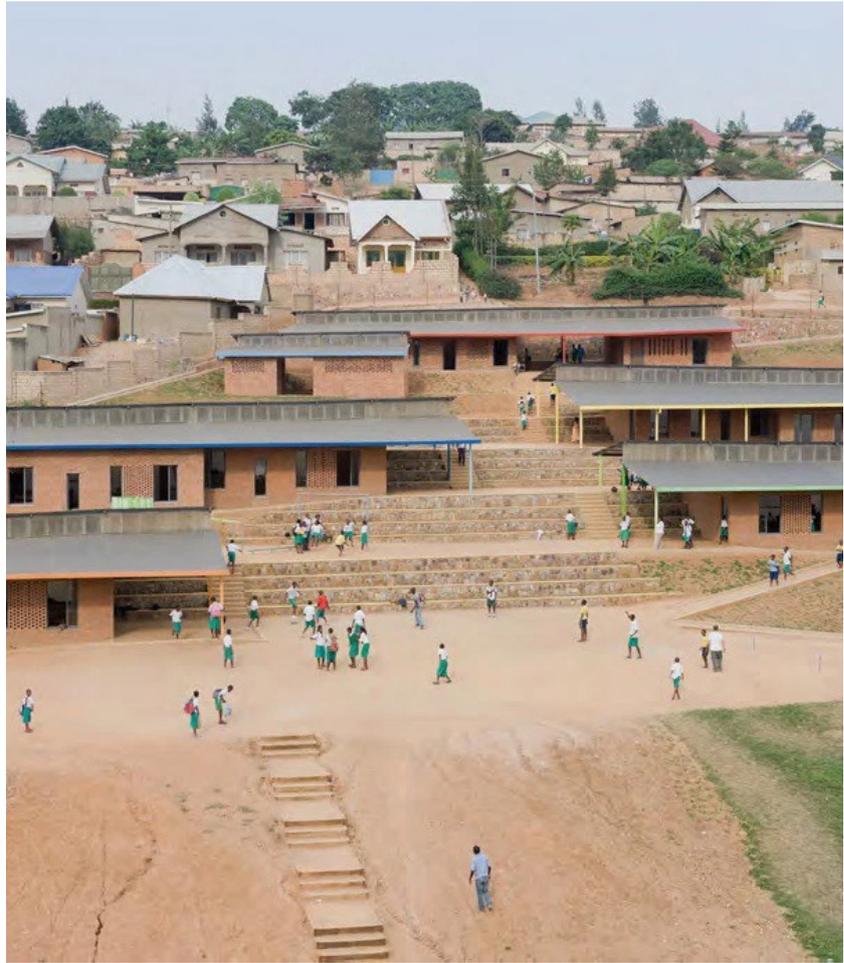
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UMUBANO PRIMARY SCHOOL (2011)

MASS

MASS is an American design group who designs buildings that improve the lives of people. They create environments which interact with the health and dignity of the local people. They prefer to use building materials and construction methods that are locally fabricated and has a small impact on the environment.

In cooperation with 'A Partner In Education' (APIE), MASS built a new school campus in the Kigali neighbourhood of Kabeza (Rwanda). The complex includes five buildings (nine classrooms, an administrative block, two bathrooms and a library), which has the opportunity to give 105 children (the age of 5 to 11) good education. The circulation and the organization of the school building is inspired by the area. It refers to the hills and travelling through an terraces agriculture land. The educational environment is an interaction between classrooms, exterior classrooms and terraced play spaces. There are five platforms, referring each to a specific group of children or activities, to provide possible accidents between the mixed-aged students. The layout of the classrooms enables the children to feel free and to break with the distance between teacher and students. There are big tables, so the children can sit in groups, creating a pleasant atmosphere. The roof is built of corrugated panels that are supported by a steel structure. They provide a plastic clerestory in a double-pitched roof to create natural ventilation and natural light. In the walls they kept consciously holes to create ventilation and an inspiring pattern of shadows. Even the doors are especially designed to create ventilation through the thatched work. They used local materials, like bricks and papyrus reeds, to support the regional economy. To include local expertise, they worked together with local craftsmen.



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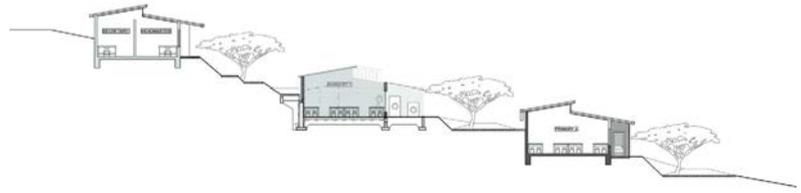


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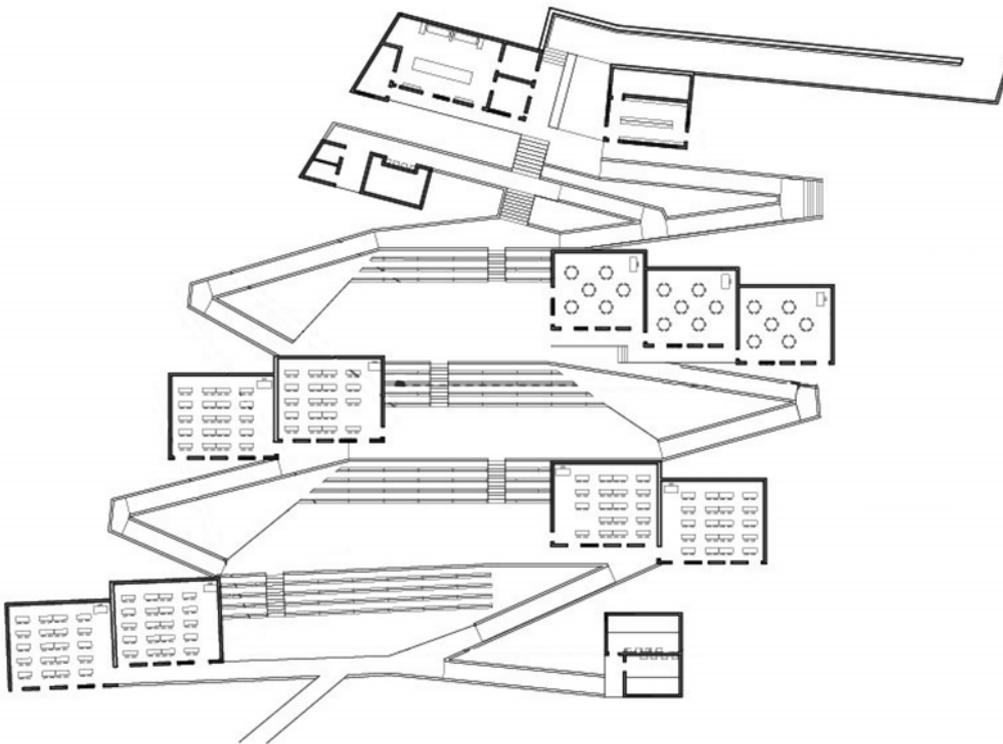
- [1] Overview of the school.
- [2] Platforms as a sitting area.
- [3] Interior of a classroom.
- [4] Section of the school.
- [5] Plan of the school.
- [6] Ventilation through the wall.
- [7] Ventilation through the door.

Thanks to the different platforms, there are open spaces for the children to play. They also planted some vegetation to stabilise the hillside and prevent serious mudslides after a heavy rainfall. The edges of the platforms are covered with limestone, so this creates a unique feeling. Between the different platforms, some footpaths are provided to connect them with each other.

Because of this project, the vision of the neighbourhood changed completely. The government supported the project with electricity and water. The school attracted new people into the village and inspired them to improve the quality of the houses.



4



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References text:

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References pictures and plans:

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SECONDARY SCHOOL ROONG VILLAGE, CAMBODIA, 2014

In 2012, Architetti Senza Frontiere was involved by the Association Missione Possibile ONLUS, who built the primary school in 2005. The objective was building a new secondary school in the Roong village, 50 km south of Phnom Penh, in an agricultural area characterized by a strong industrial transformation.

The design has been focused on the elements that define and separate the different spaces of the school: classroom, distribution and backyard. If the classroom is the place of teaching, the corridor represents a place of encounter and of sociability that, in modern pedagogy, is gaining more importance.

Two open-air rooms are added to the corridor interrupting the sequence of classrooms and enriching the nature of the connective space. During the rainy season or during the hottest months the corridor has become the place to meet and play. The separation between the classroom and hallway is reduced by using a series of large bamboo panels. The separation between the porch and the courtyard is a sort of diaphragm that modifies the visual perception, allowing more permeability in the areas facing the common spaces. At the same time the porch walls protect the inside from the sun and produce a fresh microclimate that filters the transition between indoors and outdoors, even in the hottest periods.

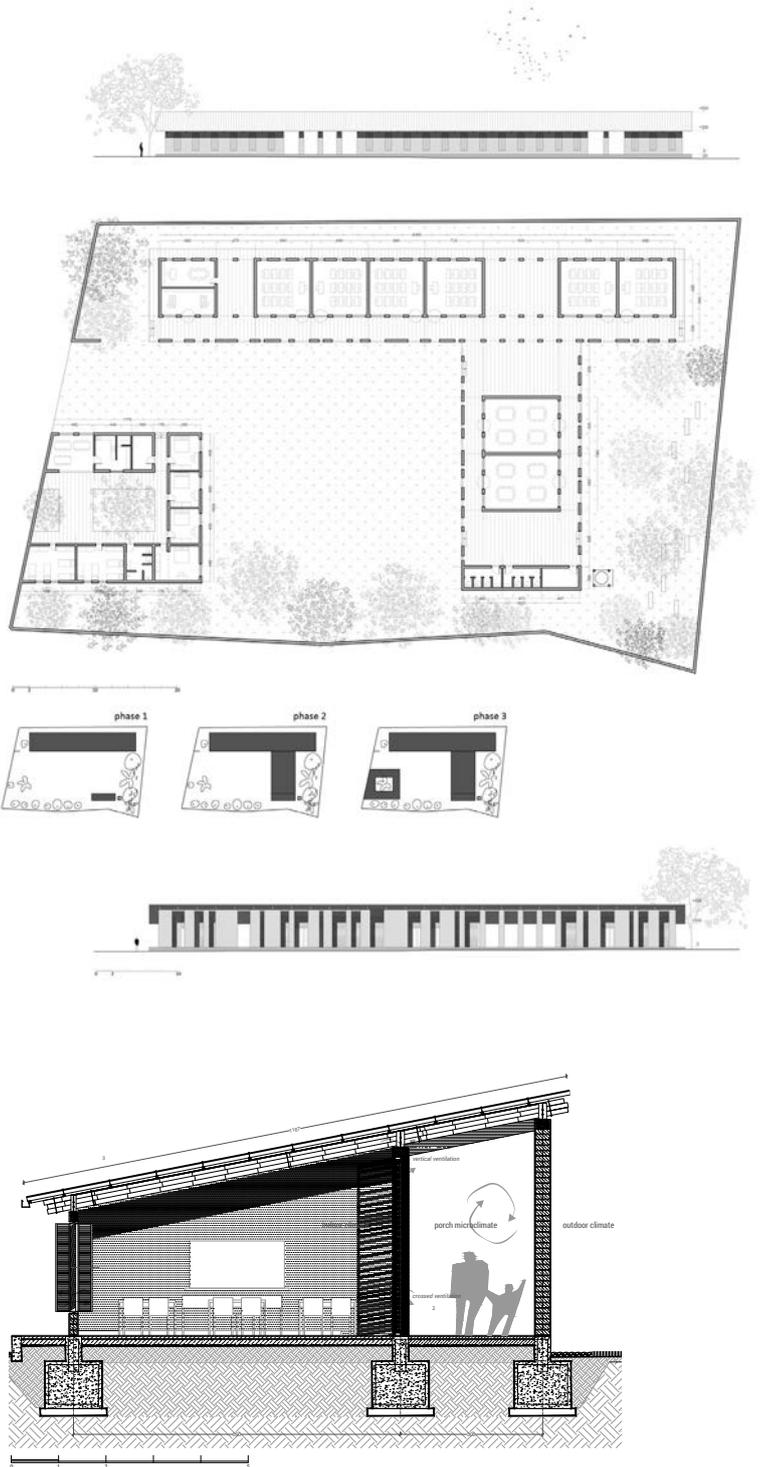
The building process focussed on child protection by using no child-labour. Therefore the architects worked together actively with disadvantaged people or communities. The whole school was hand-made. This allowed them to employ many people from the villages, to teach them new, simple and transferable techniques and to promote the use of natural materials.

The goal was achieved by experimenting with local materials such as bamboo and soil, respecting local tradition. At the same time, they used them on contemporary forms and 'industrialized' constructive procedures, to promote a greater rationalisation of the production process that is easily replicable, economic and affordable for local people.

To cope with the budget that was available on that moment, the project was designed in a way that it could be built in 3 phases, by which in every phase the school could only grow and get better. Currently the school finished phase one. Phase two would foresee workshop spaces and phase three a dormitory for i.a. volunteers.



Architect	Architetti senza frontiere Italia Milan, Italy
Client	Association Missione Possibile Milan, Italy
Programme	The local primary school required a new secondary school. The building, now in phase 1, has dimensions of 62.8 x 10.2 metres and uses local materials. During rain or great heat the corridor has become the place to meet and play. The separation between the classroom and hallway is reduced by the use of a series of large bamboo panels. A sequence of variable size of walls, but with constant structural steps, defines the boundary between in- and outdoors.
Materials	Bamboo, soil blocks, mortar, iron bars, palm leaves, corrugated fiber cement, clay plaster with cement, lime plaster.
Floor / Site Classrooms	740 m ² / 4250 m ² 6
Costs	€ 64.000

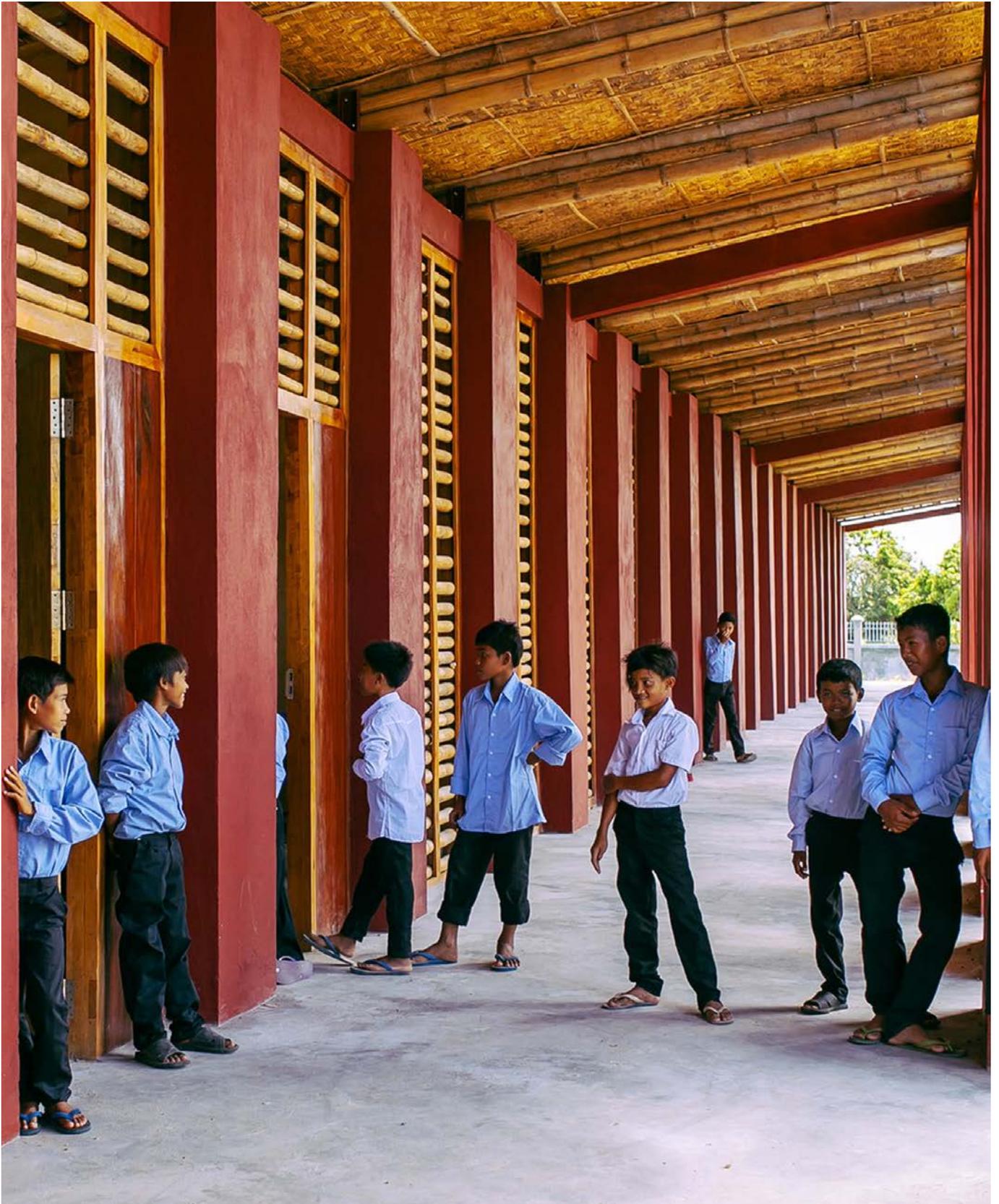


Text:

1. www.archdaily.com
2. www.asfnt.org/ASF-Activity/ASF-AWARD-2015

Photos & drawings:

1. www.archdaily.com



Secondary school Roong village by Senza Frontiere Architetti (Cambodia)

MARIA GRAZIA CUTULI PRIMARY SCHOOL HERAT, AFGHANISTAN, 2010/2011

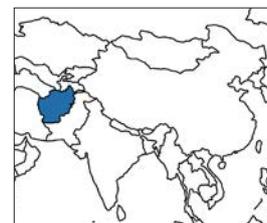
The school, designed by four Italian architectural offices, was donated by the Maria Grazia Cutuli Foundation in 2011. The name of the school and foundation refers to the Italian journalist Maria Grazia Cutuli, who was killed in 2001 when her convoy was ambushed during the US-Taliban war. Initially planned for 240 pupils, the school works with 400 girls in the mornings and 400 boys in the afternoons.

Looking at the school, the composition of the one-storey blocks and raised garden zones could refer to Herat's traditional villages, clustered together as if without conscious planning. The buildings are linked by one long corridor, which gives access to the outside garden areas for each pair of classrooms.

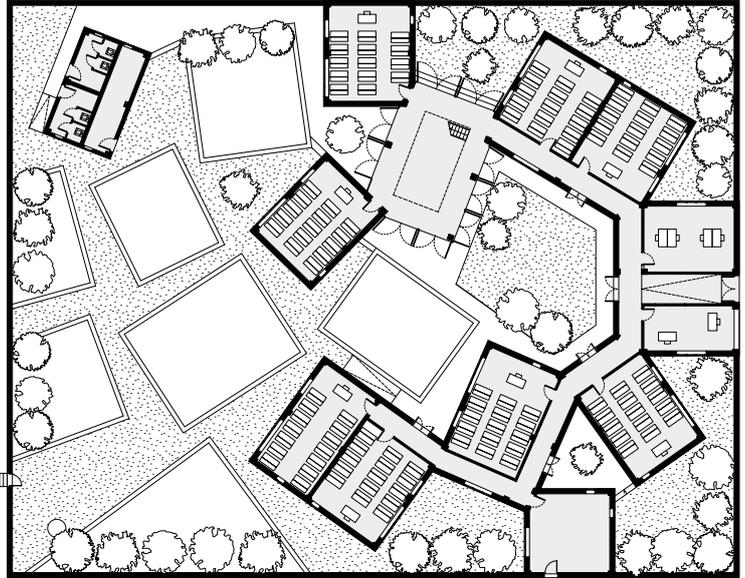
Like a fortified building, a wall surrounds the elevated whole, with one main entrance and two side entrances. The roofs are used for military surveillance and water captation. The double-height library is the only building visible from outside the wall, acting as a landmark. It is intended to be used by the entire village, part of an effort to win local support for the school. The other aim is to point out the importance of culture and the tradition of books in Afghanistan. After the years of war, the library is rather empty. It stands as a challenge for the village and the school itself to try to fill it again with books.

The exteriors of the whole complex were painted in three shades of blue, a reference to the local lapis lazuli pottery. The ultramarine blue is an important colour in the tradition of Afghanistan, which is widely used for decoration for the mosques and other important buildings. The people that live in the area could subsequently link the architecture to something they can use as a symbol after the war.

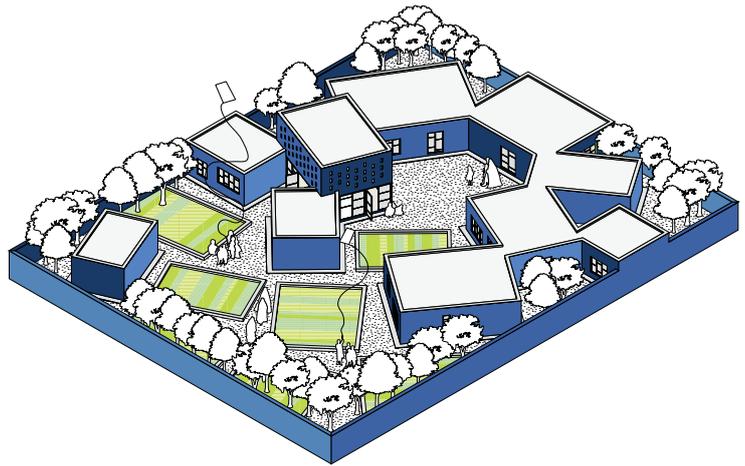
The building process started in June 2010, providing skilled and unskilled labour. The reinforced concrete frames all feature a brick cladding. Local brickworks made these bricks, which are the only reference to Herat's rich heritage of traditional brick architecture. The cladding process started before the structure was on point, which is a normal step of the full building process in these areas.



Architect	22A + P/A, Maria Cutuli, laN+, ma0 Rome, Italy
Client	Maria Grazia Cutuli Foundation Rome, Italy
Programme	Built in honour of Italian journalist Maria Grazia Cutuli, murdered in Afghanistan in 2001, the complex represents an alternative approach to emergency school design for war-torn areas. Like a small village, it is intended to resemble an unplanned juxtaposing of elements enclosed by a boundary wall. It accommodates eight classrooms, various staff accommodation, a double-height library and a garden which acts as a 'green classroom'.
Materials	Reinforced concrete, clay bricks, glass bricks, 'lapis lazuli' and red paint (not rendered, lower cost).
Floor / Site Classrooms	700 m ² / 2000 m ² 8
Costs	€ 177.947



0 2 4 10



Text:

1. www.archdaily.com
2. www.archnet.org
3. MOSTAFAVI, M., Architecture is Life, (2013), Zurich: Lars Müller Publishers

Photos & drawings:

1. www.archnet.org
2. www.archdaily.com
3. www.2ap.it

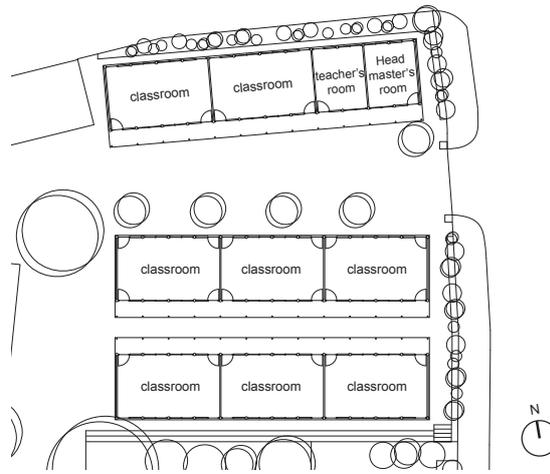
CHENGDU HUALIN ELEMENTARY SCHOOL CHENGDU, CHINA, 2008

On May 12 2008, the day of the Sichuan earthquake, Shigeru Ban immediately proposed a post-disaster project. He contacted Hironori Matsubara, fellow professor at Keio University and Beijing based architect, to make it a collaborative project involving Matsubara's students and his own students. One month later, the team proposed a newly designed, temporary house system in Chengdu. However, the Chinese government had no interest in the mass construction of temporary housing. Shigeru Ban's team thus lost the contract to continue the project. A local NGO remained interested in the team's proposal and asked to design a temporary elementary school building in Chengdu's Hualin District.

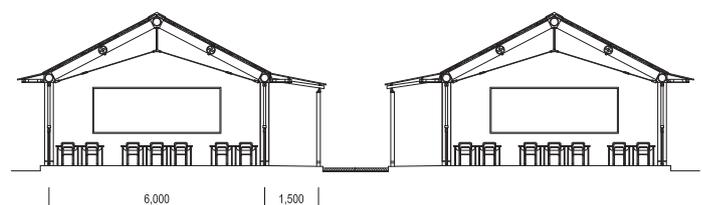
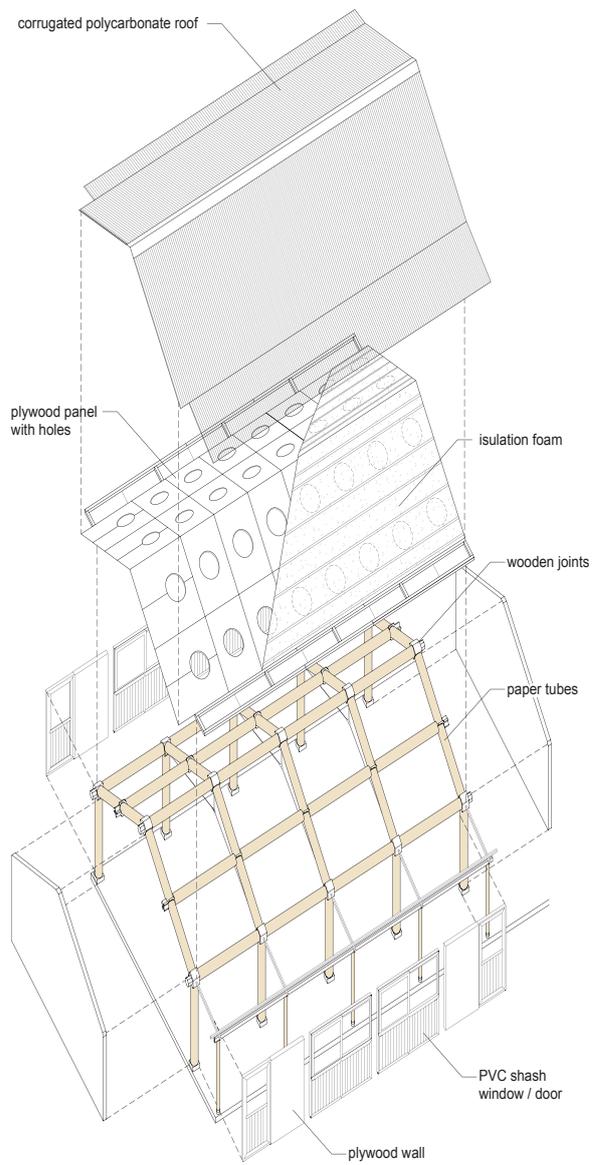
The School asked for nine classrooms and hoped for completion in August. Having only 2 months to design and build, Ban's idea was to use only local and easily obtainable construction materials. He also wanted to minimize the number and variety of individual parts. Using locally manufactured paper tubes and wooden joints, three buildings in a long row house style were designed. Shigeru Ban has developed these methods for paper tube structured architecture for more than 20 years, a material which is manufactured almost everywhere around the world.

Together with the paper tubes, Shigeru Ban uses large wooden joints and a wooden structure for the awnings. As cladding he uses plywood, PVC and polycarbonate panels. The insulation foam of the roof is translucent, so that daylight gets through. The construction of the school took place by Japanese students of Keio university, Students from Chengdu's Southwest Jiaotong University and local volunteers gathered by teachers. Using the foundation of the former classroom, the first paper tube arch was raised on August 8. Overcoming the lack of common languages and values, students from two countries worked equally side by side in great effort to complete the school on September 11, in 40 days.

The original duration for the use of the school was 2 years, however with no major repair work, it is still being used as the classrooms for the children and teachers of Chengdu.



Architect	Shigeru Ban Architects Tokyo, Japan
Client	The Education Department of Cheng Hua District in Chengdu City
Programme	A local NGO called for the construction of nine 6 x 9 - metre temporary classrooms in a two-month period for an elementary school damaged by the 2008 earthquake. The project uses only locally available construction materials and reduces both the number and variety of parts. The design features a base structure for three 6 x 30 - metre buildings on the foundation of the destroyed structures. It was constructed by university students en volunteers.
Materials	Paper tubes, wooden joints, corrugated polycarbonate, plywood, post-and-beam, insulation foam.
Floor / Site Classrooms	614 m ² / 1260 m ² 9
Costs	€ 180.657



Text:
 1. www.archnet.org
 2. www.isthaturban.wikispaces.com/02_Aitzol+Pozueta_Hualin+Temporary+elementary+school+%26+Casa+soe+ker+tie

Photos & drawings:
 1. www.archnet.org

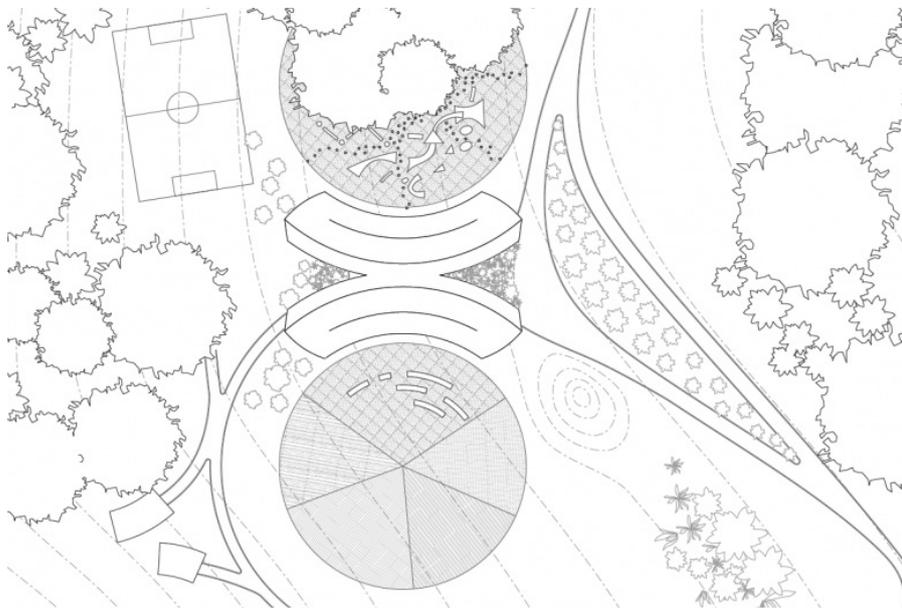
ILIMA SCHOOL
MASS DESIGN GROUP
CONGO
2003

MASS designs innovative buildings that improve people's lives in measurable ways. They create environments that promote health and dignity. Throughout the construction process, they collaborate with the communities the buildings will serve, approaching every project as a chance to invest in their future¹.

MASS design group has completed its first conservation school in the Congolese jungle village of Ilima. The isolated location, as well as the harsh tropical climate, makes the building of permanent infrastructure challenging. Together with the African Wildlife Foundation, Ilima Primary School also serves as a shared community center for the wider region².

Michael Murphy, co-founder and CEO of MASS. "... What becomes really interesting about the conservation of wildlife and the environment is the notion of precise infrastructure—where it should be placed, how it should be built, and who it's supposed to serve."

The design consists of two staked circles that face away from each other. One circle for a demonstration and conservation garden and the other one for a play area. Where the two circles meet each other, a laterite and compacted-soil foundation is built.



¹ MASS design group. About. <https://massdesigngroup.org/about>

² Designboom. (27 May 2015). MASS design group uses materials from Congolese jungle to build Ilima school. Used on the 17th of January 2017 http://www.designboom.com/architecture/mass-design-group-ilima-primary-school-congo-what-design-can-do-05-27-2015/?utm_campaign=monthly&utm_medium=email&utm_source=subscribers

³ AWF Conservation School. Ilima school Democratic Republic of the Congo. Used on the 17th of January 2017

The southern part of the arc exists of three classrooms and a library. The northern arc houses also three classrooms and an administration space. All classrooms will feature views of the forest. A canopy roof connects the two arcs. The roof also provides extra shade from the sun and sheltering during storms and is allowed to catch the rainwater to use it for agriculture. The school walls will only go up two thirds of the way to the ceiling to allow for unrestricted airflow³.

The distance from the headway to the school was a problem to transport materials. So they made a design that can be built with local materials and teach the local labor to work with these materials. A new design for the use of mud blocks is made. These bricks are blended with different mixes of palm oil to make it stronger and stiffer. The roof is made of wood and palm leaf. The local people wanted a metal roof, but metal is difficult to replace and it rust.

The construction was made of community members who were trained and employed throughout the duration of the process. This way of transferring is necessary to keep their school building, ensuring that the building does not fall into disrepair, and leave villagers with practical and employable skills.

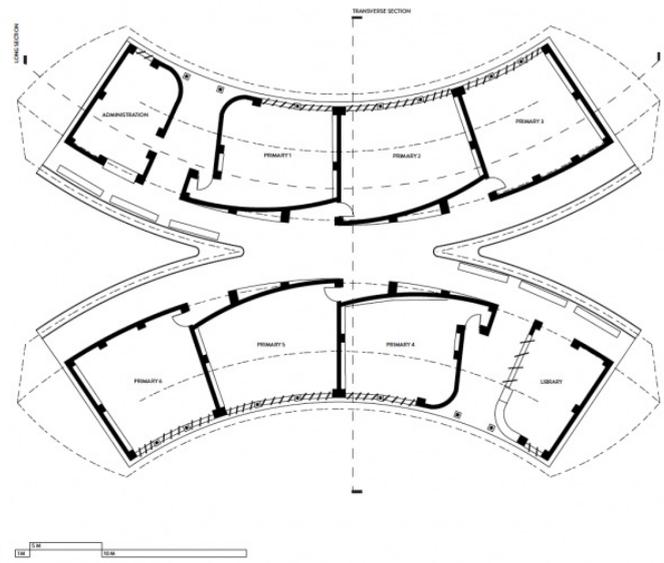


Fig. 1



Fig. 2

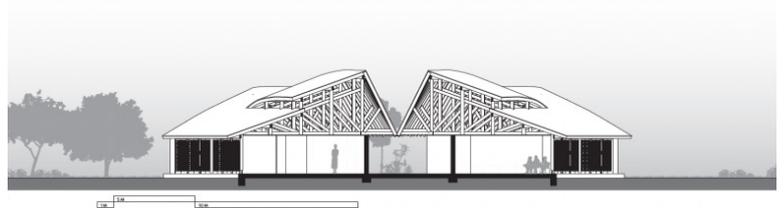


Fig. 3



Fig. 4



Fig. 5

Fig. 1: Plan of the school
 Fig. 2: Long section
 Fig. 3: Short section
 Fig. 4: Interior of the school
 Fig. 5: Exterior of the school

PRE PRIMARY SCHOOLS

ASA STUDIO

RWANDA (AFRICA)

2013

The project, that consists of 7 schools (Gasanze, Nyamiyaga, Gasanze, Janjagiro, Nkanga, Nkungo, Bicumbi), aim is to set the Rwandan standards for the pre primary facilities. The pre primary school is a project that is based on the experience of the Child Friendly Schools standards, that stimulates children under 6 to engage self-learning and stimulation. The materials and techniques, the participatory process of design and construction, and the compound arrangement, are the main components to make a sustainable, innovative, cost efficient and replicable model ¹.

The pre primary school is a standard for pre primary facilities. The government of Rwanda's wants to replicate the standard model countrywide. The school is a project that aims to make the early childhood education better countrywide. The design has the intention to be a standard model to replicate at every primary school on a national level. The key to success of this project is that the community is involved and the costs are efficient. The design should achieve sustainable, creative and comfortable learning spaces for children under the age of six.

Local materials were used to introduce small traditional construction methods for structurally and stimulating facilities that transfer skills to the community. The materials reduce the environmental impact, and allow unskilled labor to learn and grow with the building. The building is simple to understand and his techniques can be used in every other school to improve the built environment. The use of local materials, for example terra cotta, has an enormous impact on the milieu and on the local workers who learn to work with the materials. The use of the fired bricks has a relation with the used materials in the village. The roof, that is made of reed, gives an excellent aesthetic value and keeps the climate in the interior comfortable.



Fig. 1



Fig. 2

¹ - ASA studio. Pre primary school. Used on the 17th of January 2017
http://www.activesocialarchitecture.com/pre_primaries.html

- Arch Daily. (7 May 2014). Pre primary school. Used on the 17th of January
<http://www.archdaily.com/502916/pre-primary-school-asa-studio>

Fig. 1: Interior of the classroom
Fig. 2: Exterior of the school

A school designed where children can feel at home, can play and learn at the same time. Playground materials; general arrangements as water harvesting, clean water points, separate safe toilets; outdoors covered learning spaces that allow for flexible uses year round; different materials, patterns, textures, shapes and colors; the interior organization of the classrooms has several different storage spaces and different corners. All these elements position the facility as an added educator, helping caregivers in their job and fostering the child's self-learning process. The classrooms are designed to engage the children's gross motor, language skills, social interaction and knowledge development.

The participation of all stakeholders is a central piece of the design process, the project is carried out by UNICEF 2008 across the country; ASA has been working with headmasters, UNICEF, engineers, contractors, and community masons to ensure the long-term durability of these facilities.



Fig. 1



Fig. 2



Fig. 3

Fig. 1: Interior of a classroom
 Fig. 2: Exterior of the school
 Fig. 3: Plan + section

Between Walls

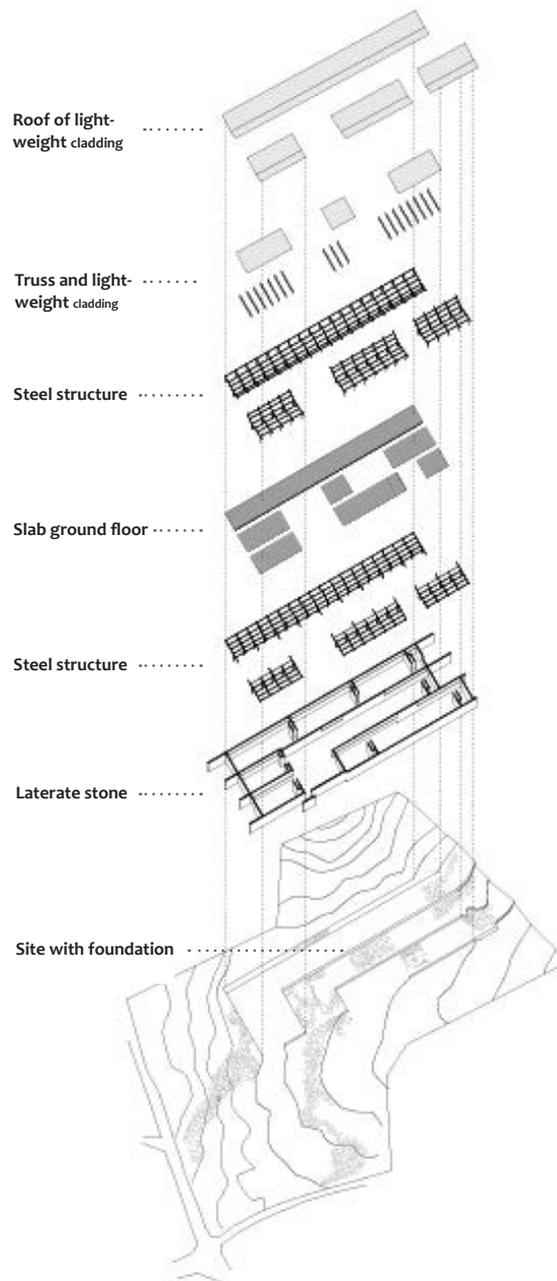
This project has two main objectives: to create a center for human development to benefit the local population, and also to create a replicable model of community participation that can be used for creating other social infrastructure across the region. The community center is a residential school for 400 students, and medical center for 14 villages in the West Singhbhum district. The location for the community center has been carefully chosen along the road that connects these villages.

The project is financed by a mining company as part of its social responsibility program. Lack of social infrastructure and learning opportunities drive many people from the mining dominated countryside into the cities. In spite of its rich mineral base, the region is scarcely populated.

The footprint is limited to 45 x 135 meters, leaving most of the site in a natural condition. The walls serve as the primary structure for the building and define the movement routes, open courts, and access to the complex. The straightforward means are put to work to form a highly adaptable system of walls, openings, access routes, open courts and indoor as well as outdoor spaces.

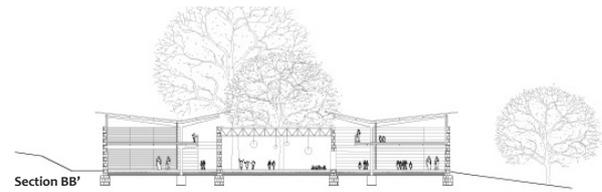
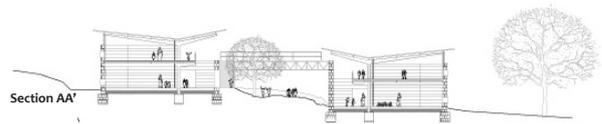
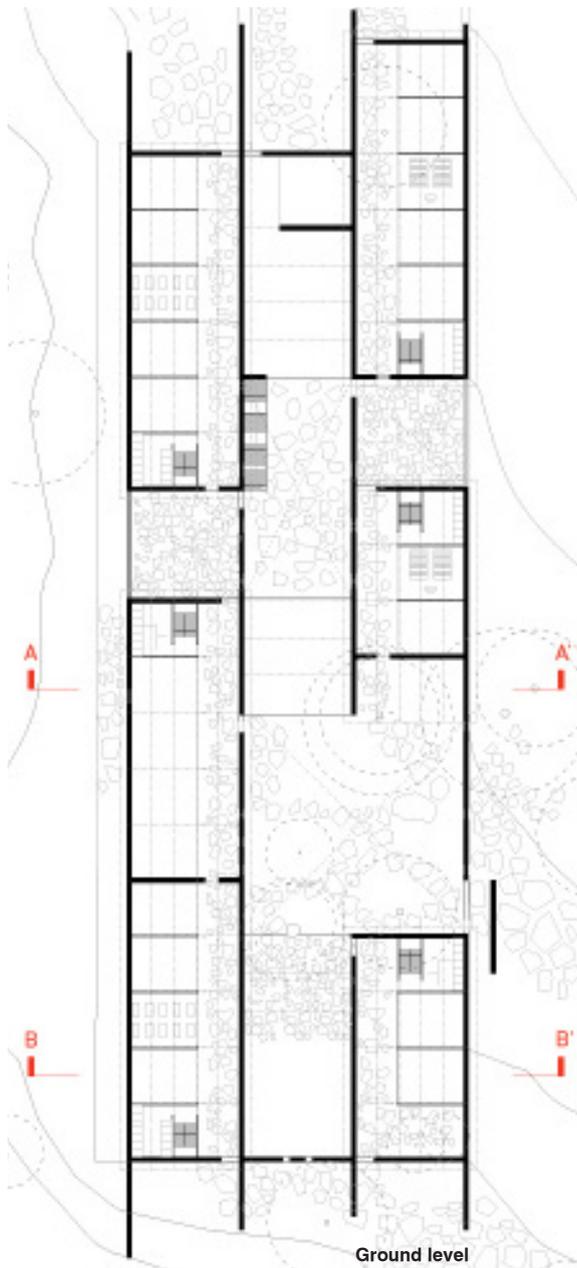
Local rough laterite stone is used as the main building material of the four parallel walls that comprise the building's load bearing structure. The building is oriented along north-south axis, and a light roof with substantial overhang made of industrialized steel ensures shading and natural ventilation.

The low cost structure combines local materials and traditional craftsmanship with modern technology. The project is being hand-built by a group of local volunteers (trainees) and stakeholders, together with a team of professionals from architecture, mining and management.



Architects: Studio made
Location: Tatiba Baraibura, India
Construction size: 4731M²
Project year: 2014 after competition
Holcim award

Chalasanani, M. & Kumar g, S. & Kumar, B. & Kundanam V. & Galiana Liras, M. (2014). Tatiba baraibura social community center (between walls). Consulted on 14 november 2016 through <http://www.studio-made.org/portfolio/between-walls/>.



The challenge of this project is to meet the sustainable needs and aspirations of the locals in an economically- and ecologically- sustainable way.

This project is embedded in topographical site and brings more than only a school to the region. The interior quality of the complex is shaded, cool and airy, creating a shadowed oasis from the climate outside. It has controlled views throughout the landscape and also offers covered space and a save courtyard with a good connection to the different function installed in the building.

Offering a complex with the essentials like medical care, dorms, and vocational training will make a

big difference for the region and will help controlling the migration to the cities. This will help, benefit of course the mining company who is paying for this, to find enough workers. It's a big complex offering a total approach for the region, due to the problem of migration. It's not a complete center, but it makes a big difference for the whole region and can create a boost for all the villages around as an example.

Chalasan, M. & Kumar, S. & Kumar, B. & Kundanam V. & Galliana Liras, M. (2014). Tatiba barabura social community center (between walls). Consulted on 14 november 2016 through <http://www.studio-made.org/portfolio/between-walls/>.

