

# LET'S MAKE IT DIFFERENT!

STEP BY STEP

TOGETHER!

COMPILATION OF **SCHOOL** BUILDING **INNOVATIONS**

RESPECT, ADAPTATION, SUSTAINABILITY, TRADITION, COMMUNITY, HUMANITY, QUALITY, COMMITMENT

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COMPILATION OF **SCHOOL** BUILDING **INNOVATION**



**CIGLER | MARANI** UNLIMITED

2014

RESPECT, ADAPTATION, SUSTAINABILITY, TRADITION, COMMUNITY, HUMANITY, QUALITY, COMMITMENT



... People in Need, a Czech NGO working in Ethiopia for already more than 10 years., and Cigler Marani Unlimited, non-profit section of Cigler Marani Architects studio, have merged their capacities, skills and power to search for school construction innovations “how to make it better”...

The contact between CMU and PIN has been initiated long time ago, but it was in 2013 when the architects has been tending to bring their know how into the process.

This innovation compilation has been issued as the result of prior cooperation and innovation assessment. The design corresponds to the environment of dominant region of PIN activities. The booklet is printed out and used for the negotiations with authorities, clients and donors.

CIGLER | MARANI UNLIMITED





People in Need is a Czech NGO working in Ethiopia for already more than 10 years. It was established in 1992 in the Czech Republic. Over the past 20 years, it has grown into one of the biggest non-profit organisations in central Europe.

Today PIN is focused on four key areas: humanitarian assistance and resilience building, livelihood and environment, social integration and education programmes.

Their mission in Ethiopia has celebrated its 10year anniversary in 2013. The engagement in Ethiopia is said to be one of their most successful ones also because of dozens of school buildings that have been built.

PEOPLE IN NEED

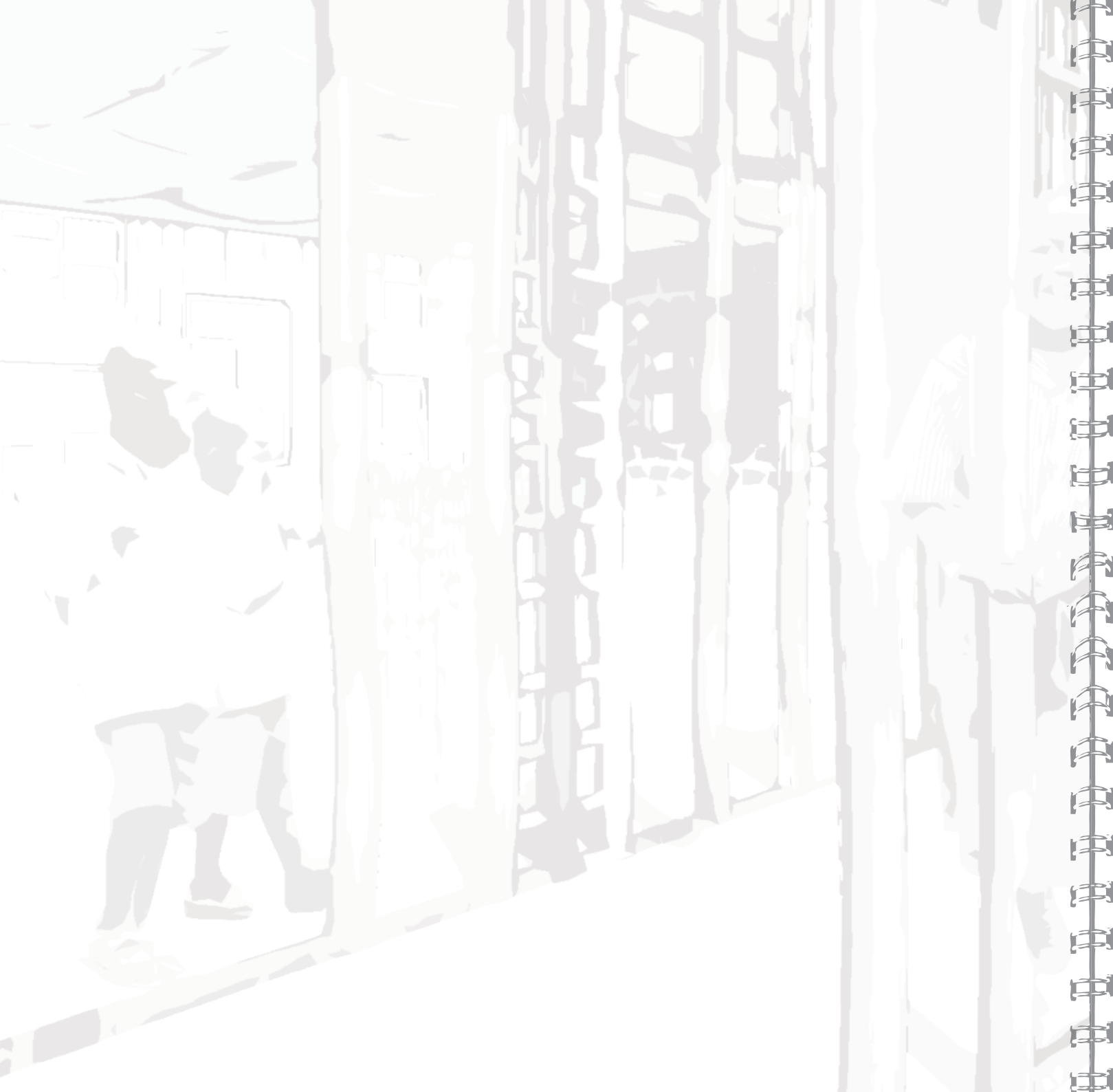




CMU is a section of Cigler Marani Architects studio founded on reflecting the sustainability of worldwide architecture and the good quality design accessibility.

The architecture is more than a design. The architecture of good quality is natural. If it works, it promotes the development. The inspiring environment is the background for the progress. It is not only about a physical protection and shelter. When the basic needs are fulfilled, people search for the motivation and stimulus.

It is clear that the good architecture is not about loads of money but about ideas. The globalization has brought the indifference to sites, traditions, cultures and the effect on people's lives. Many designs ignore the climate and local particularities, which creates the worldwide energy problem. The architecture doesn't have any common language, it shouldn't be simplified, and in contrary it should consider each project individually with respect to vernacular aspects.



## INNOVATION COMPILATION

The following pages present the existing school design that respects local administrative standards, but still offers a room to alternate, adapt, improve and INNOVATE.

Following pages describe an innovative school project corresponding to the rural environment of a region of dominant PIN activities, SNNPR. The final innovation compilation depends on the school site, local community, local authority, focused goals and donor's capacity.

INNOVATION COMPILATION



# CONTENT

15  
25  
65

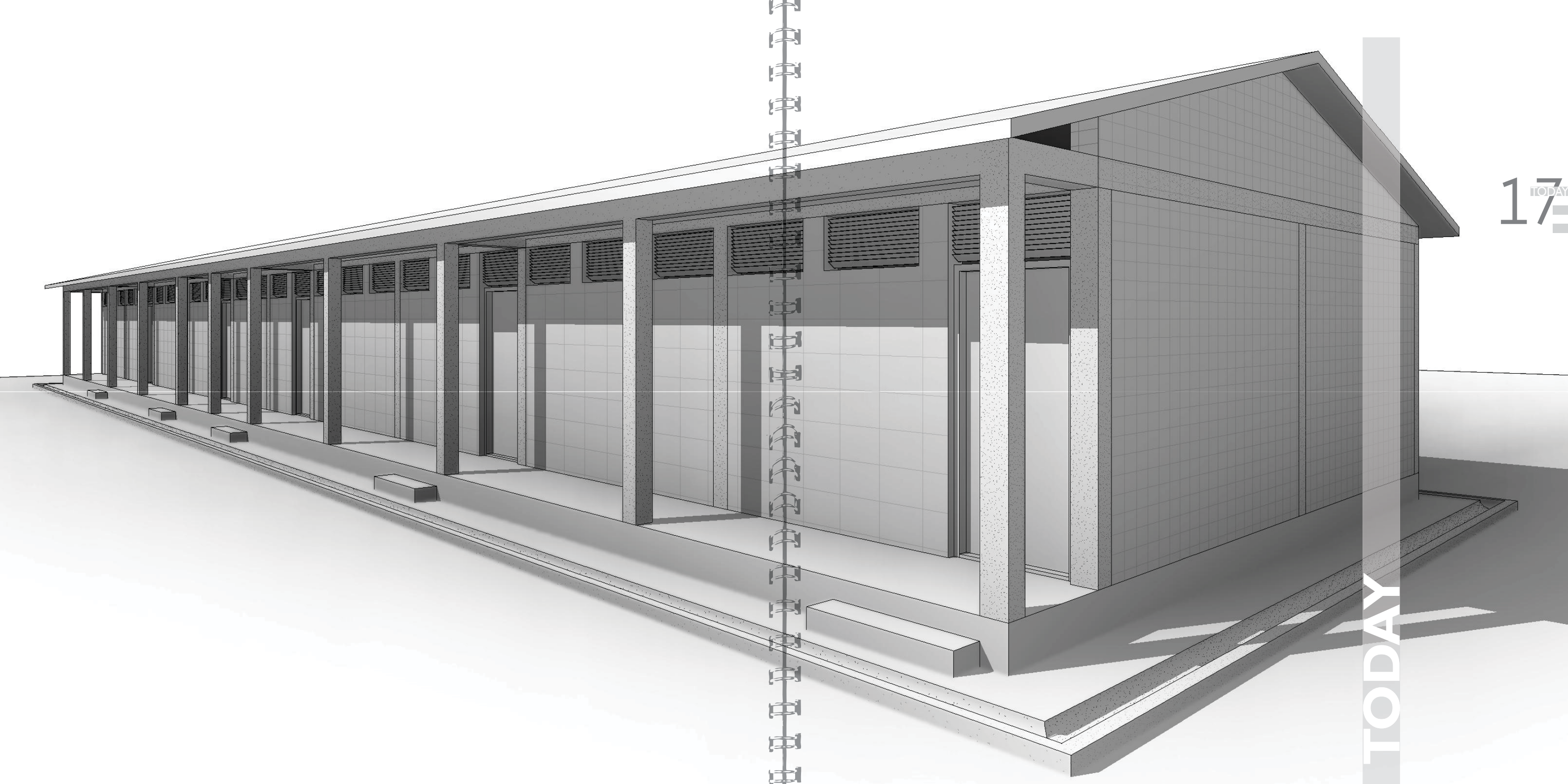
TODAY  
TOMORROW  
AFTER TOMORROW



TODAY

15  
TODAY





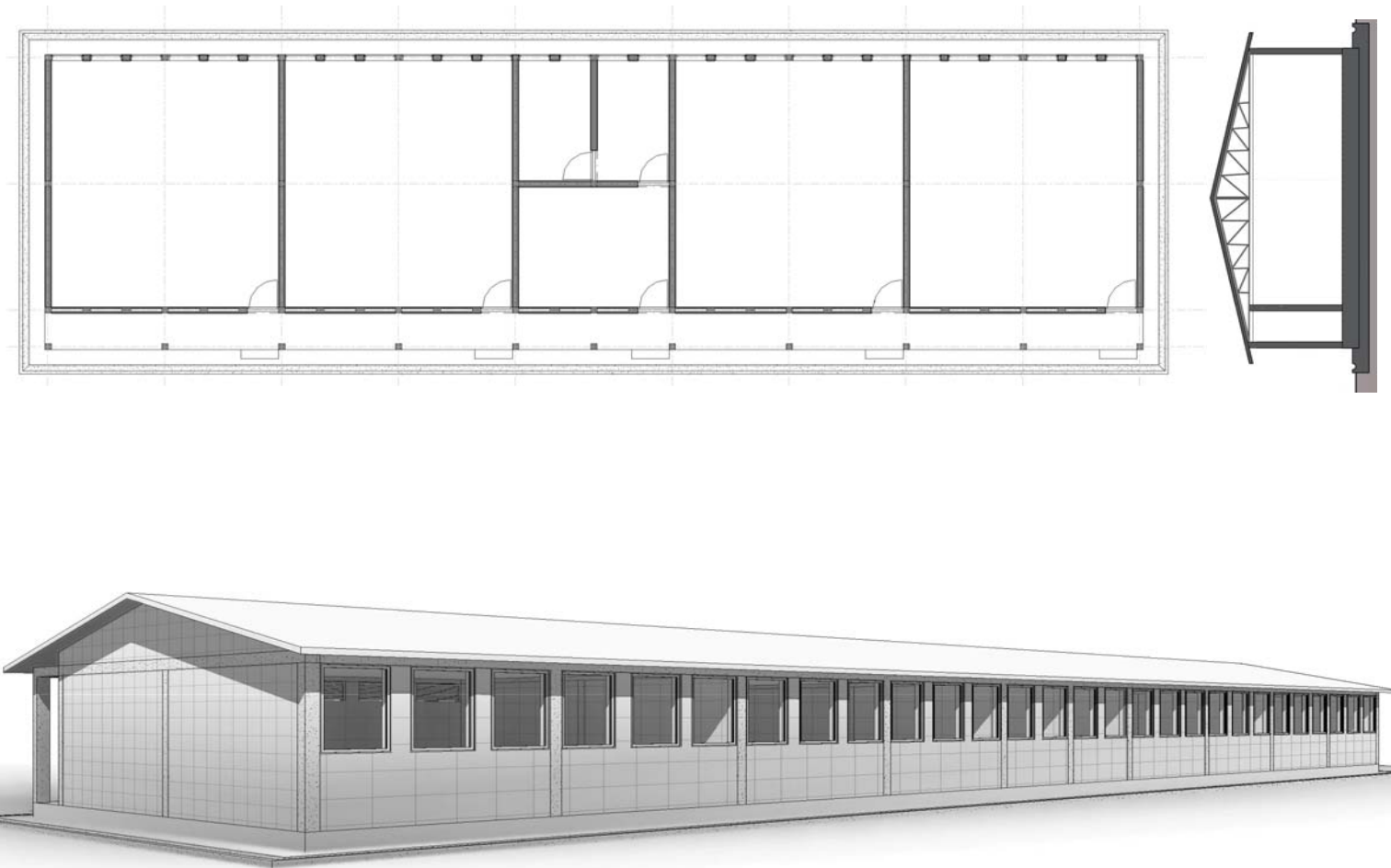
17  
TODAY

TODAY

## EXISTING DESIGN AND ITS QUALITIES

USEFUL SIMPLICITY

19  
TODAY



The existing design has its justifiable **QUALITIES**. That's why it is duplicated again and again all over the world.

The **SIMPLE** disposition permits natural using. At the same moment the **SIMPLE** disposition means **SIMPLE** structure and the **SIMPLE** structure means **SIMPLE** construction process.

These qualities are underlined by the use of "**DURABLE**" material - concrete. Its durability is perceived by eyes of people who live or lived in mud houses that don't resist a single rainy season without consequences.

Appealing fact is that architecture of good quality is evident. If it works, it promotes the development. The inspiring environment is the background for the progress. It is not only about a physical protection and shelter. When the basic needs of community are fulfilled, people search for the motivation and stimulus. They find it in their surroundings.

In many cases the community has improved the "school skeleton" in its own way with its own ideas and means. It is not about loads of money but about **GOOD IDEAS**.





SOMALI R. ETHIOPIA



CHEPEMMA, KENYA



KAMPALA, ZAMBIA



LUFUKU, MADAGASKAR



ZAMBIA



MOZAMBIQUE

## RESPECT TO LOCATION

PARTICULARITY

21  
TODAY

One said that to understand African architecture it is needed to understand climate. Africa is very diverse continent with many different weather conditions. The temperature and humidity vary from region to region even across one single country. So does the vegetation and potential building material. It is the altitude and geographical coordinates that say how the landscape looks like.

So why a man ignores it and tries to impose the same model of building in any environment? Because of the fact that it works in one place it doesn't necessarily mean that it would work in another. The design might be good, but it is the environment that is determinant.

Standing in front of a school one can't guess which region, country or even part of the continent it is. The same model has been built up in humid Ghana, arid Mali, remote Zambia, isolated Madagascar (with its characteristic features of endemic nature species!!!) and even in Ethiopia, in the country with the continent's largest concentration of UNESCO architectural sites...

the time of urgency and capacity building is OVER, we might take charge to think **DEEPER**, to plan **BETTER** and to create **NICER...**

to think **GLOBALLY**, feel, **UNDERSTAND** and deal with **SPECIFIC** environments, with neglected and remoted areas, to respect the local conditions, **RURAL** population, to turn the school into the places **OVERFLOWING** with inspiration and **MOTIVATION**, to **ATTRACT** people to care about it, to make it as an example worth following, to think **PROGRESSIVELY** and **SUSTAINABLY**, to use **LOCAL** materials, to use secondary materials - to **RECYCLE** and **REUSE**, to engage community and its hospitality, to make the community feel the **OWNERSHIP** of the educational buildings, not to create only a school, but the place of the contribution to the **DEVELOPMENT...**

the existing school design follows the administrative standards, but there is still a room to alternate, adapt and improve. Our designed innovations deal with following issues: dispositions, construction, materials, interior, exterior and site plan...

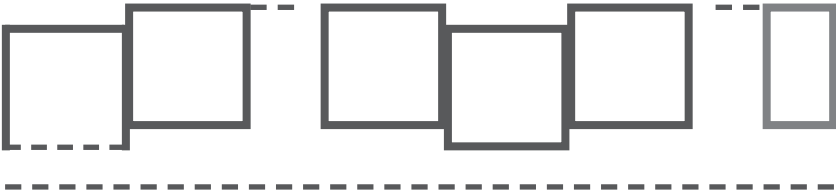
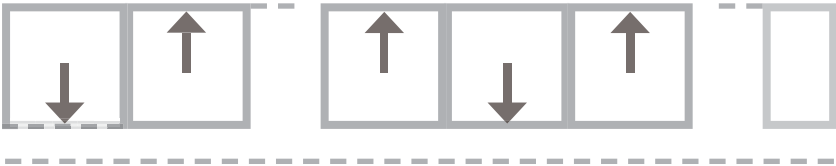
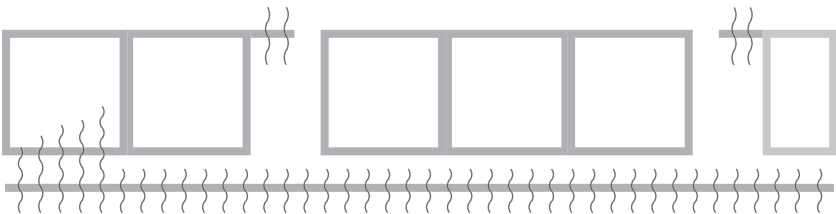


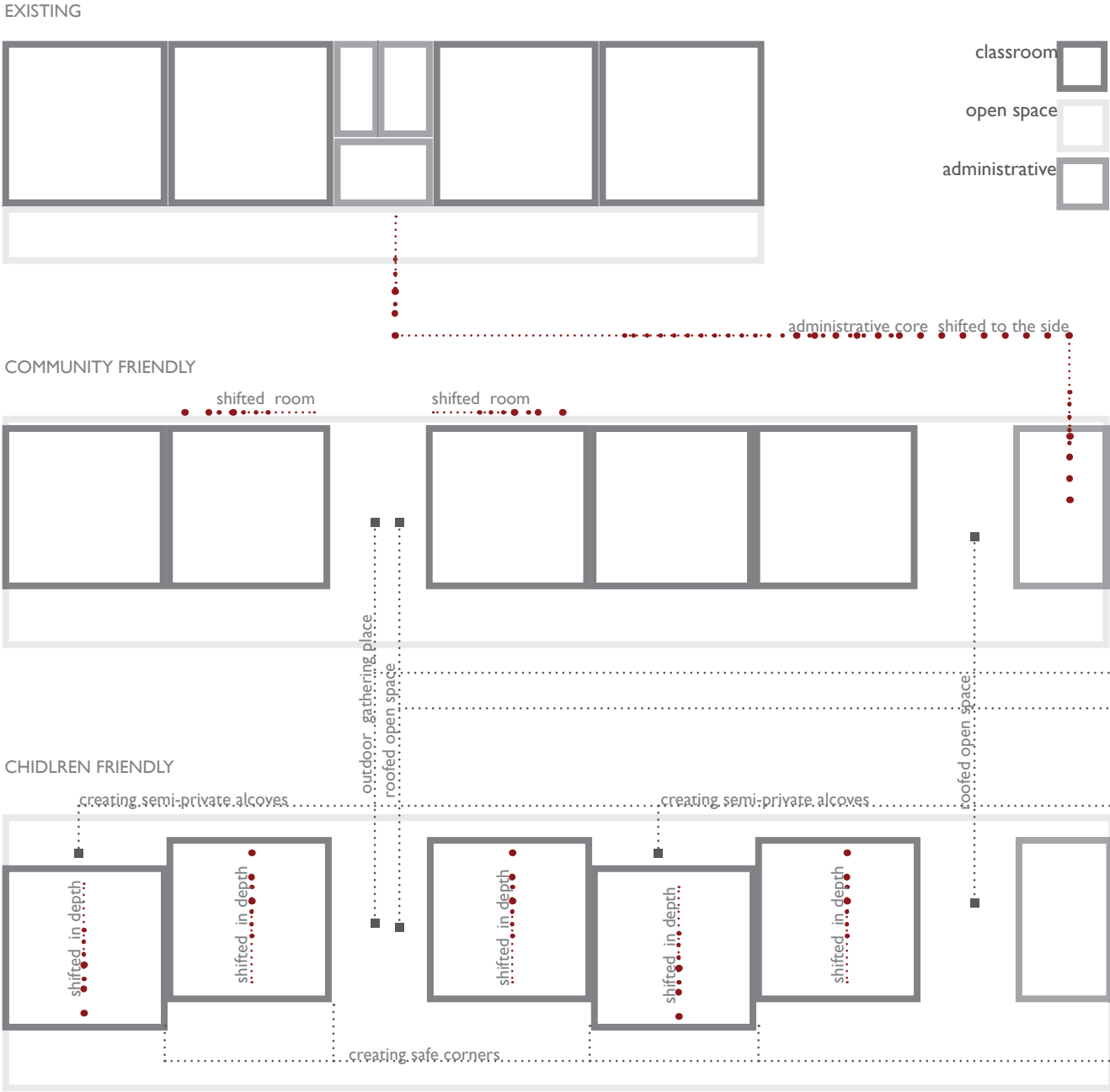


**TOMORROW**



TOMORROW





TRANSPARENCY



LAYOUT

SAFETY

COMMUNITY GATHERING SPACE  
school as a core of the community

School has classes during mornings and afternoons, but it might be used by community as a meeting place. It is advisable to differentiate one room in its appearance from other classrooms so that it might be used for special events. It is possible to employ canopies, shaded pavilions, niches, alcoves or courtyards for these functions.



PRIVACY

EASILY

EXTENDABLE  
PROTOTYPE

OPEN SPACES

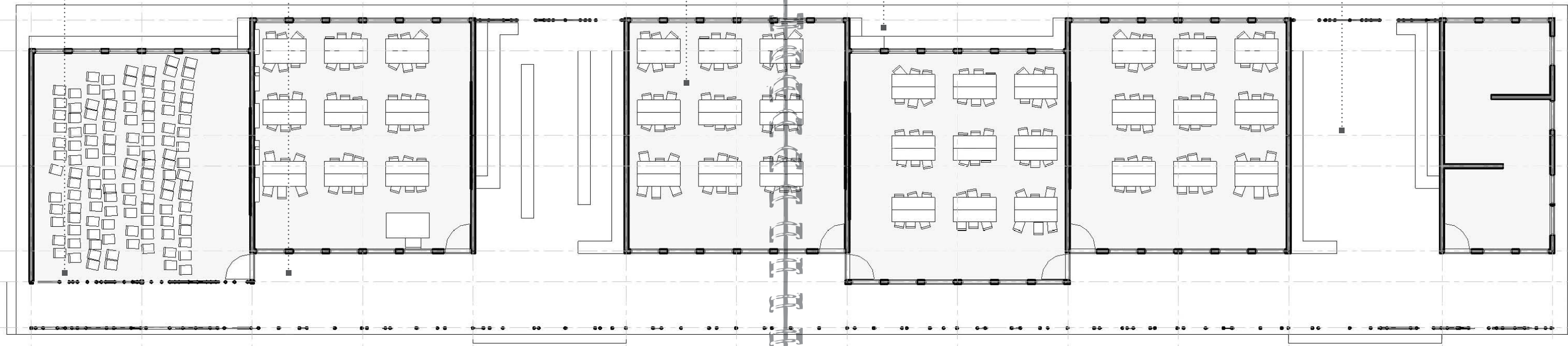
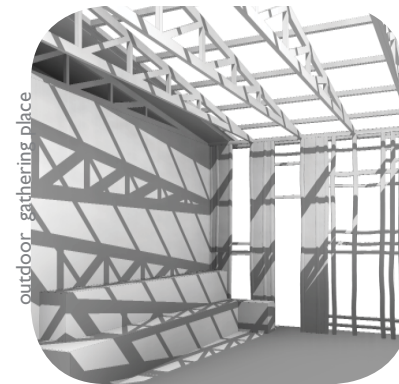
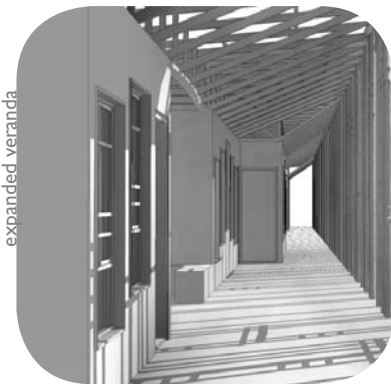
Easy access to open spaces from classrooms allows children to be in close contact with their environment.



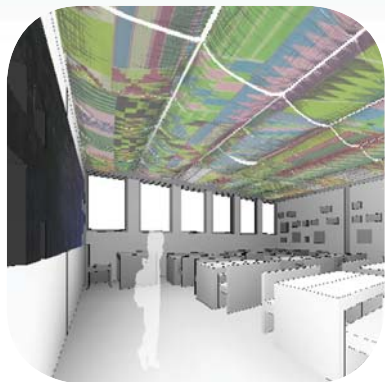
# FORM FOLLOWS FUNCTION

## INTERACTIVE ENVIRONMENT

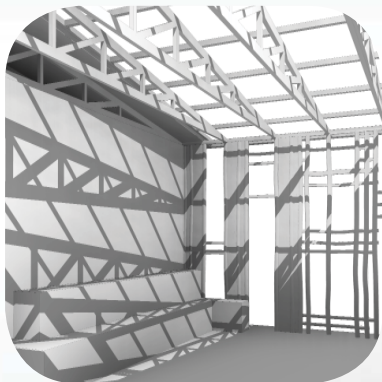
33







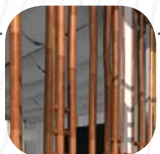
classroom



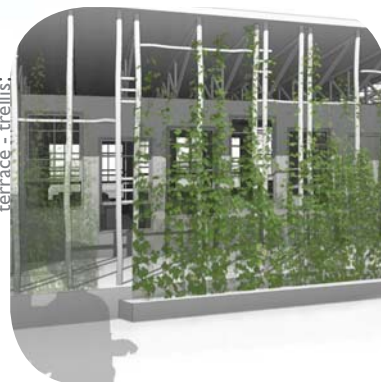
open-space



multi-purpose room



classroom



terrace - trellis:



veranda - terrace



# HALF-OPENED, HALF-CLOSED

## NAKED, BUT PROTECTED



### ROOFED OPEN SPACE

Protected gathering space, accessible for anybody from the community. During school hours it might serve as an open classroom where informal school activities take place and where students of various skill levels would work together. Out of teaching schedule, it would accommodate meetings, trainings and sessions.







wooden structure - eucalyptus, bamboo



straw



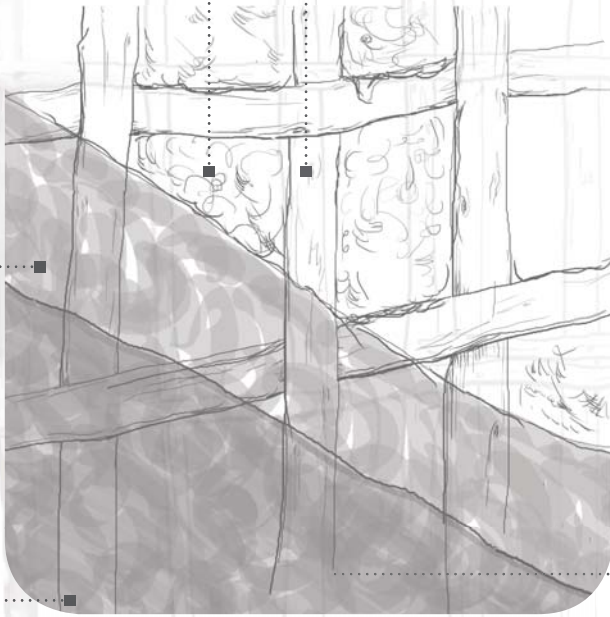
mud



mud plaster



cement plaster



# WATTLE + DAUB + CEMENT PLASTER

GOJOBEIT / TUKUL HOUSE

39  
TMRW

## ADVANTAGES

based on traditional “gojobeit” (in Amharic) / tukul (in Tigray) houses >>> skilled labour and easy community participation

wood sticks and wattle and straw prevent harsh shrinking and cracking

good thermal mass and thermal inertia of mud

fire proof

sound proof - massive structure

ease of decoration

cement plaster - water-resistant layer guaranteeing the protection of the wattle core

non-biodegradable and durable thanks to cement layer

## RISKS

biodegradable - termites attacking wood from the foundation -> antitermite treatment (coating) in foundation

susceptibility to earthquakes

deforestation (?) vs. cement CO<sub>2</sub> print

## HOW MUCH?

1m of the wall = **280 ETB**

**X**

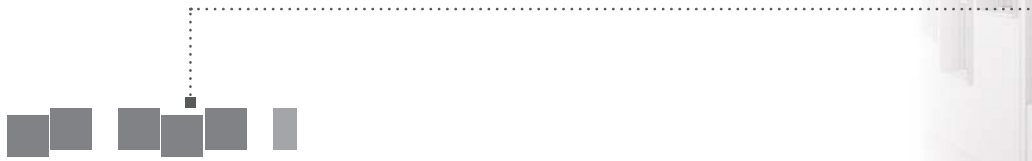
existing design with concrete hollow blocks

1m of the wall = **550 ETB**



HIDDEN, BUT SAFE

SEMI-PRIVATE STUDY-NICHE



SEPARATE STUDY-NICHES

The wattle and daub structure system permits to shuffle the plan. Shifting the classrooms by a meter creates spaces that might be more than appreciated by children and teachers. The spaces where children feel the school atmosphere, the presence of authority, but where they can create their own working spirit during breaks or any extra-curriculum activities.





## MULTIPURPOSE ROOM

### INTERACTIVE SETTINGS

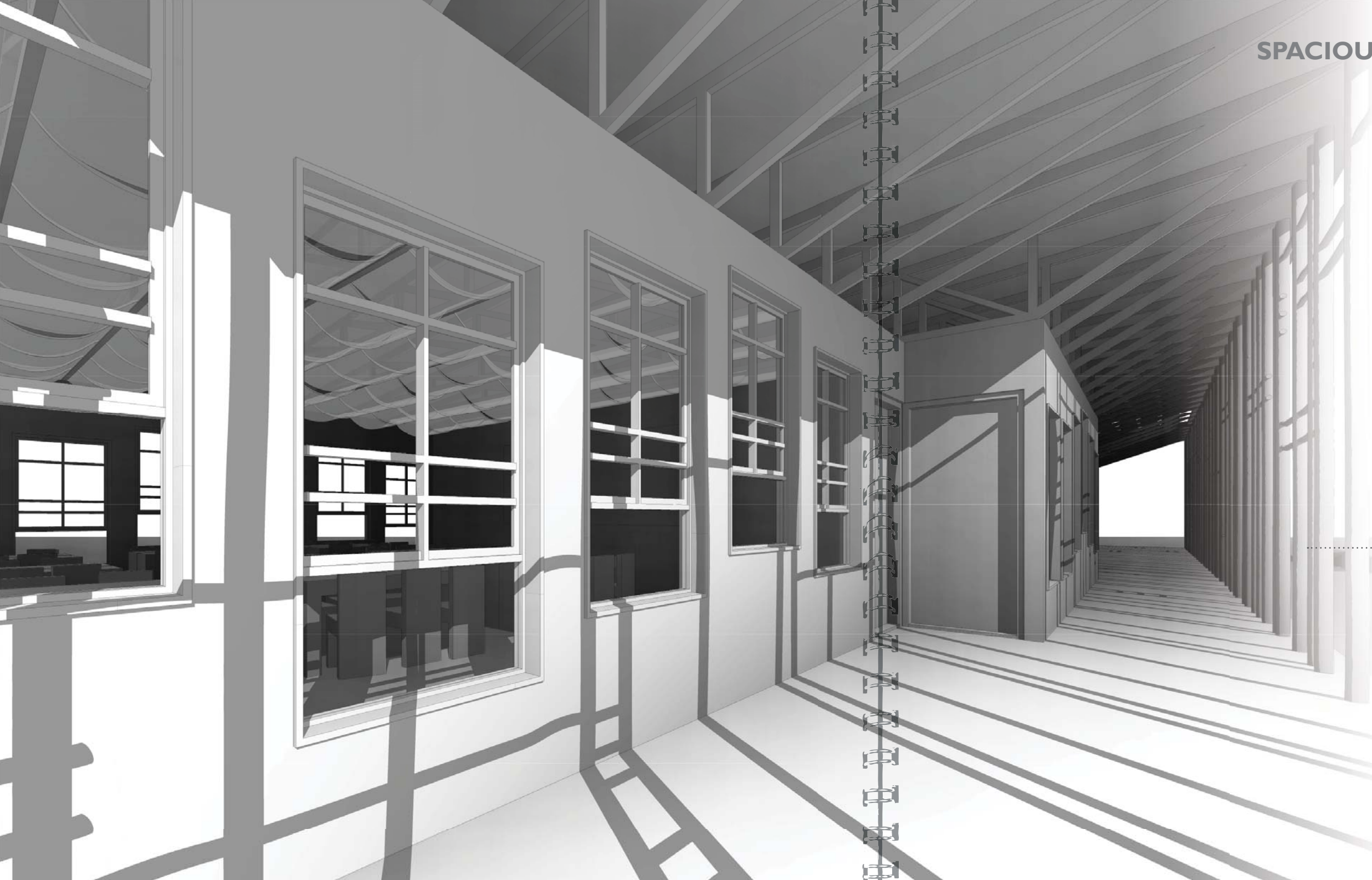
43



#### MULTI-PURPOSE ROOM

The combination of the tail position, different material arrangement and all-purpose size allows the space to be organised as a meeting room, an auditorium for small drama and musical production, a gymnasium or a single classroom when needed. The final decision and settings is up to the community.





## SPACIOUS VERANDA

FULL ADEQUACY

45



### VERANDA - TERRACE

Transition space between formal classrooms and outdoor compound is hospitable thanks to the plan with shifted rooms. Corners, niches or alcoves serve as semiprivate areas with numerous using.

The larger width of the veranda promotes the space up to the terrace, extended indoor space protected from the heat and rain. It extends the learning that begins inside.

The school building is important for whole community and even during the moments when classrooms are locked, it may serve to the people for meetings.

To ensure adequate daylight the window area should be a minimum of 20% of the classroom floor area. For the case of PIN school innovation designs it is 22%.

## WINDOWS COMPOSITION

CAN THEY SEE...?

47

### ADVANTAGES

child-friendly and made-to-measure - respecting the size of children, offering nice view to them

removing monotony and boredom, offering a room for playfulness

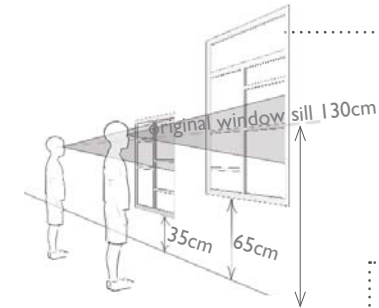
entertaining, attractive and worth exploring - positive impact on enrolment and attendance

suitable for wattle and daub system that is variable because of very small distance between posts and crossbars

transparent and safe

### RISKS

intensive supervision of quality and precision so that prefabricated opening (window and door) panels with glass fillings can be installed



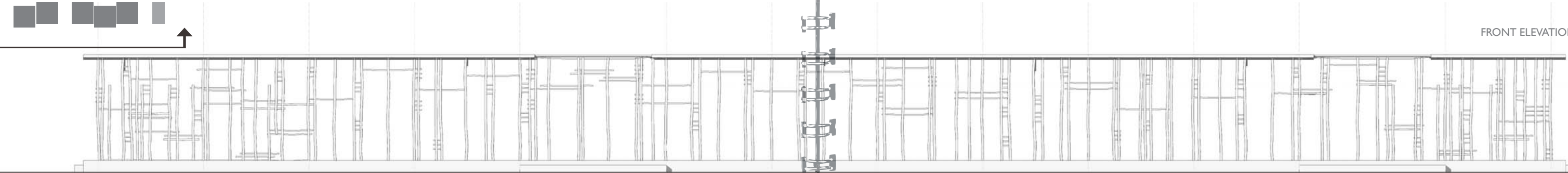
GRADATION ON FACADE  
height of the window sill  
according to children size



FACADE COMPOSITION

CAN THEY SEE...?

FRONT ELEVATION - PORCH



FRONT ELEVATION - VERANDA



REAR ELEVATION



# IMPRESSIO

## LEAVES

# OPUNTIA.

## BRANCHES

W R I N K L E S

# HANDS

# PERBLES TYRES

## TYRES

BOTTLES CEREALS

## CEREALS

## FABRICS

INSPIRATION

## APPEARANCE

# GAME

# CREATION

# RE PE TI TION

# LEAVES

## VEGETATION

# NATURE

## SIGNAGE

## DECORATION

# ORNAMENT

# PATTERN

## PATTERNED SURFACE

## ADVANTAGES

it is possible to imprint ANYTHING to be found in surroundings...

...EITHER

object is attached to the formwork during mud works

...OR

object is impressed on fresh layer of final plaster coating

51  
IMRW

## HOW MUCH?

for FREE





## ORIENTATION

The wall decoration contributes to the space organisation - children and visitors understand what the building, classroom or open space shelter serves for and who the space is meant for.

CANVAS  
SCREEN  
VISUAL  
TOOL

## INTERACTION

DIRECT  
IMPACT

IMMEDIATE

ORDER

PARTICIPATION  
EXPERIENCE

## PAINTINGS AND WALL DECORATION

### ADVANTAGES

- syllabus-related decorations - technique already in use - skilled labour
- job opportunity for local artists
- didactic use - permanent teaching aid
- opportunity to involve children to participate and learn from experience
- long-lasting - the paintings can stand for 10 years with simple maintenance and tiny corrections
- economic aspect - savings on posters and paper teaching tools
- maintenance aspect - teachers do not stick their DIY teaching charts on walls and walls remain decent
- positive impact on enrolment and attendance

### RISKS

- it might seem too simplifying and conceptual >>> the motive has to be carefully chosen in cooperation with teachers and local educational board
- preparation phase shouldn't be neglected to avoid subsequent imperfections - it is necessary to clean the wall, fill the holes and paint the undercoat

HOW MUCH?  
one external painting  
350 ETB/1,5m x 1,5m  
more inspiration - interior project  
Happy Classrooms by boNGO



BOREDOM?  
**ENTHUSIASM**

**TEMPERATURE**  
SYSTEM  
AUTHORITY  
RESPECT  
QUIET

CALMNESS  
**RELAXATION**  
**KNOWLEDGE**  
**WELL**

ASPIRATION  
**NEEDS**  
CONTENTMENT  
ACTIVITY  
RESPONSIBILITY

**HEALTH**  
**SAFETY**  
CONCENTRATION

**WELL**

ANXIETY?  
**COMFORT**  
**GAME**  
EFFECTIVE  
DEPRESSION?  
**PLEASURE**

**DIGNITY**

**COGNITIVE WELL-BEING**

ACOUSTICS OF CLASSROOM >>>

ATTENTION OF CHILDREN

PHYSICAL COMFORT >>>

HEALTHY COGNITIVE DVLPMNT

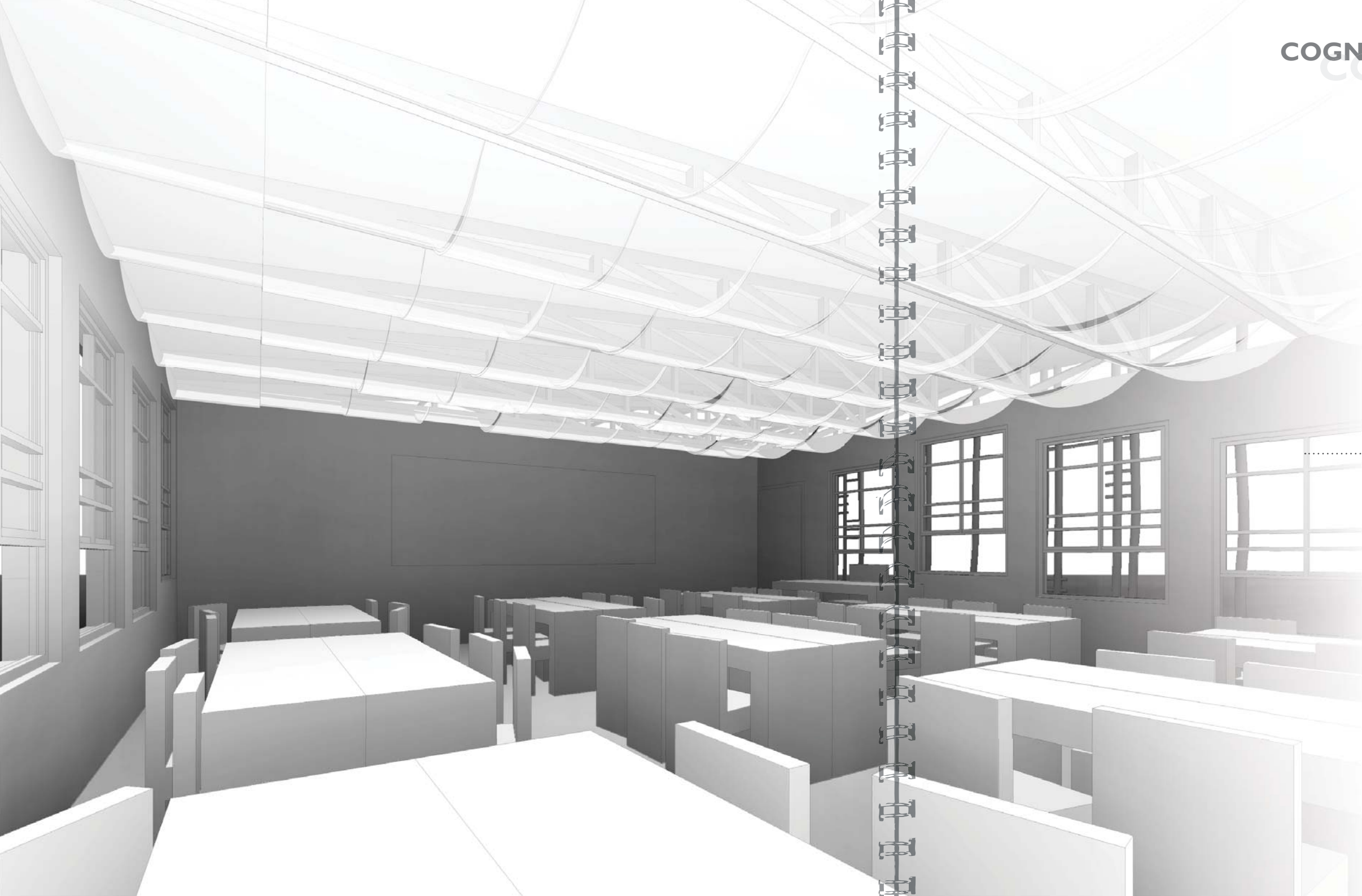
LIGHTING QUALITY >>>

CHILDREN CONCENTRATION

**COMFORT**

TIREDNESS?  
**VIGOR**





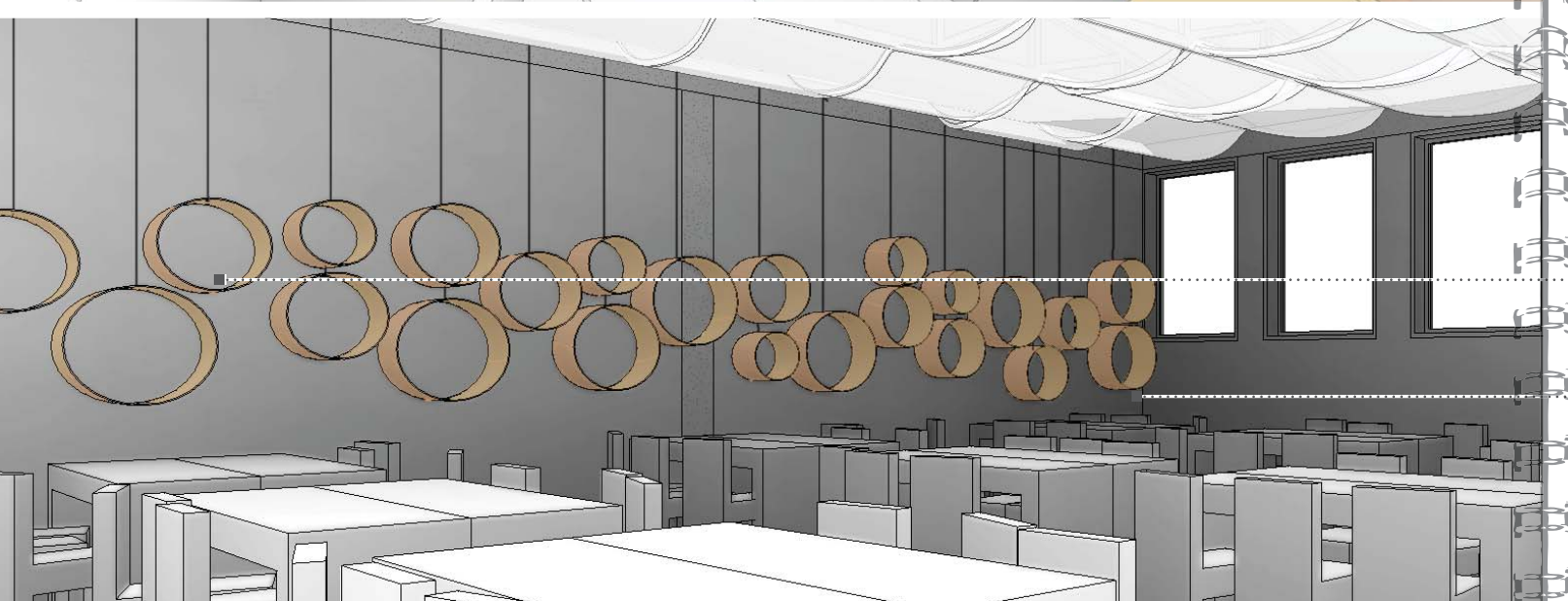
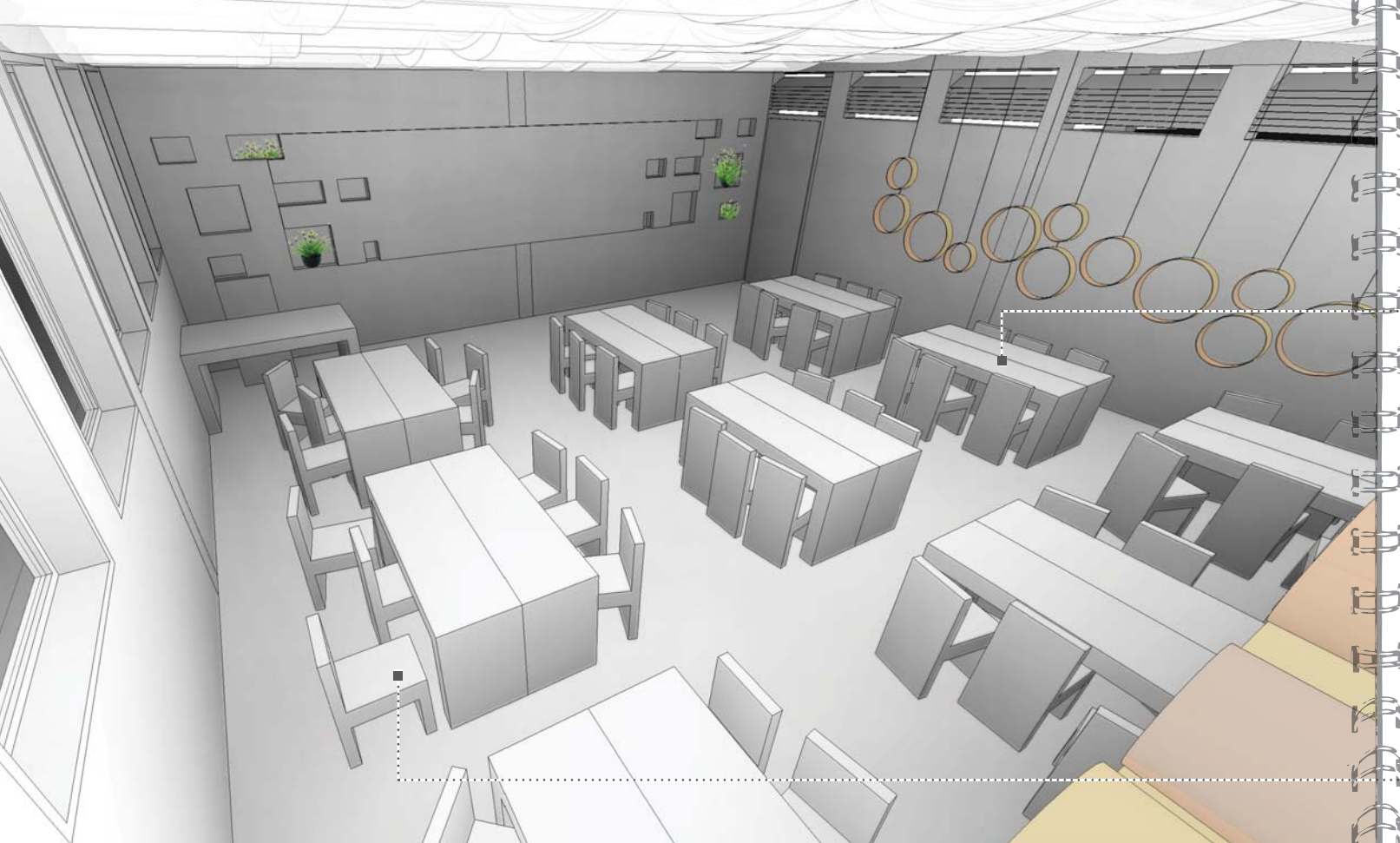
#### COMFORTABLE INTERIOR

If you feel comfortable, you work better. The comfort has a positive effect on learning, human productivity and creativity.

The acoustics, lighting and physical comfort are connected. Breathing (sufficient oxygen) directly influences learning. Comfortable seating leads to better breathing. So does quality air filtration and ventilation.

The ventilation affects acoustics, the structure affects acoustics, the furniture affects acoustics. And the acoustics affects children's attention. Surprisingly children's mind is not distracted by cosy details of furniture or sophisticated structure. The other way round. The less of anonymity makes them feel participative and attentive and safe and important.





## FURNITURE - COMFORT MATTERS

### ABOUT AGE AND NEEDS

59

#### ROOM LAYOUT

Children can work alone or in groups. Chairs or stools are easier to move around than benches. But the benches can accommodate more children at once when number of children is higher than expected. The simple flat chairs are easy to be connected and then fulfill the function of bench.

#### TOO LITTLE STRUCTURE

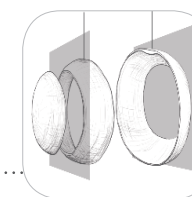
**CHAOS**

#### TOO MUCH STRUCTURE

**BOREDOM**

#### ERGONOMICS

The development of gross motor skills is as important as the one of fine motor skills. The physical growth is affected by furniture that should be designed in accordance with their age - different size for different grades.



#### STORAGE

Shelves and facilities in the classroom for children's class projects, artwork and bags are necessary – even if just a tiny space. It supports the feeling of ownership and care!

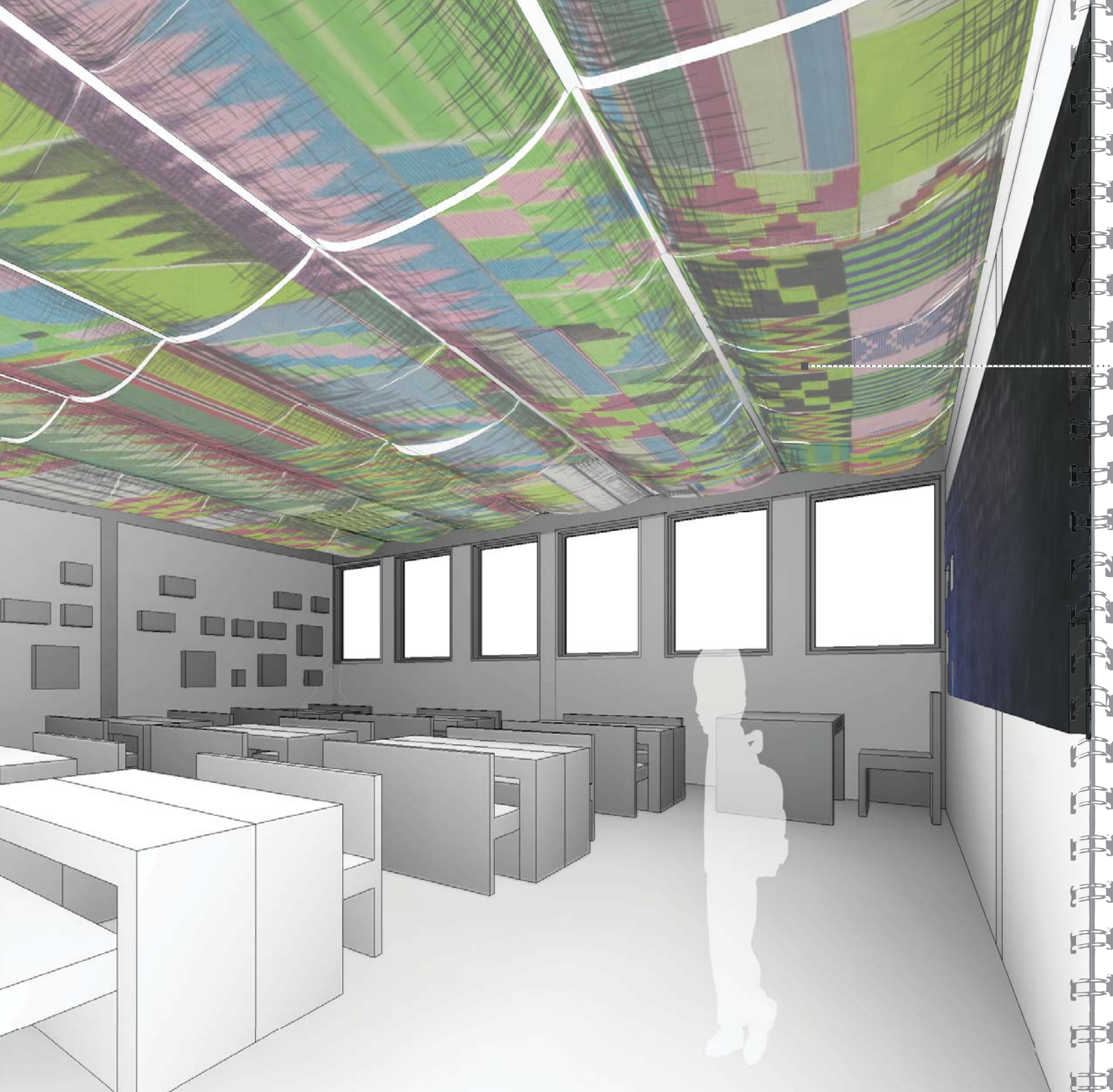
calabash on market, Ethiopia



#### CALABASH

Traditional material used for dishes and musical instruments in southern regions. Often it serves as a food container, why not to employ it as suspended container for children's stuff...





## CEILING CANOPY

HEAD IN CLOUDS

61

### ADVANTAGES

better acoustics - it absorbs undesirable noise reflections

better light conditions - reflects the light coming from light tunnels in the roof

joyful environment - colours should be light, relaxed, not dark, gloomy or dull, but based on local preference

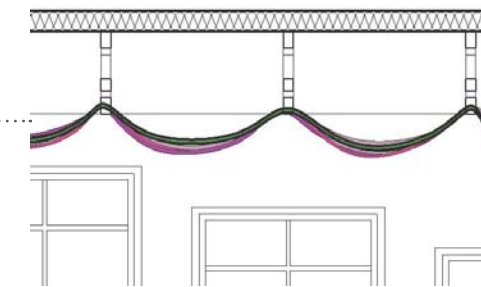
local material and labour - "patchwork" attitude - assembling of collected pieces

easier replacement than in the case of plasterboard suspended plates

### RISKS

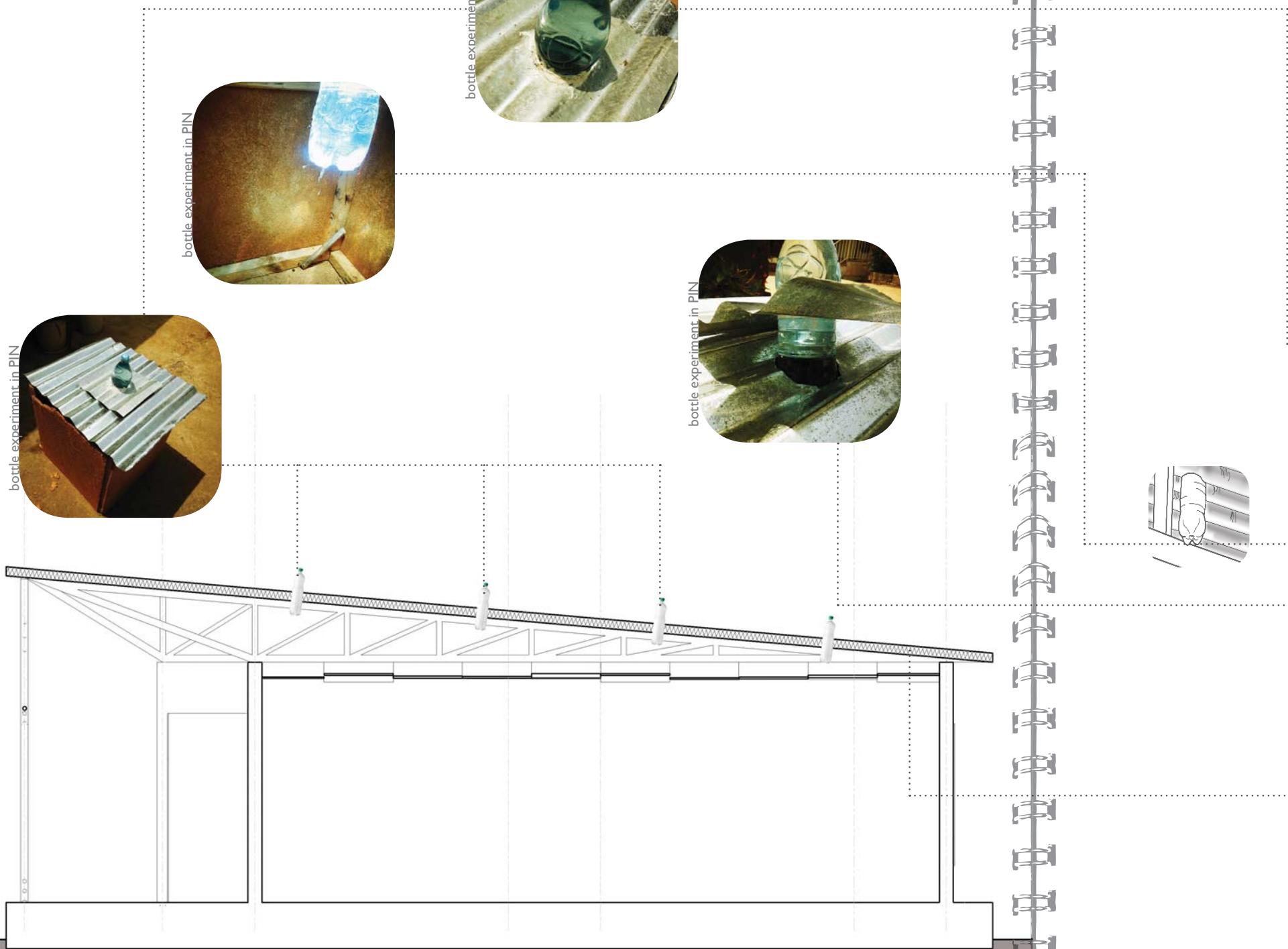
susceptible to the moisture - > impermeable roof structure needed

maintenance -> regular cleaning and flapping especially in dusty environment



### HOW MUCH?

cloth canopy ceiling  
= 200 ETB/m<sup>2</sup>  
**X**  
existing design with painted chipboard ceiling  
= 268 ETB/m<sup>2</sup>



### LIGHT TUNNELS

The light is conducted to the interior with “recycled” light tunnels from the project The Liter of Light. It solves the issue how to bring the light into the room without glaring the interior?

The Liter of Light project was launched 3years ago by the My Shelter Foundation, a Philippines-based NGO which aims to provide light to homes who are without light.

The scheme uses plastic bottles filled with a solution of bleached water, installed into holes made in corrugated iron roofs, which then refracts the equivalent of 55W of sun-light into the room – during the day, at least. It takes five minutes to make, and using a hammer, rivet, metal sheets, sandpaper and epoxy, it costs \$1 to produce.

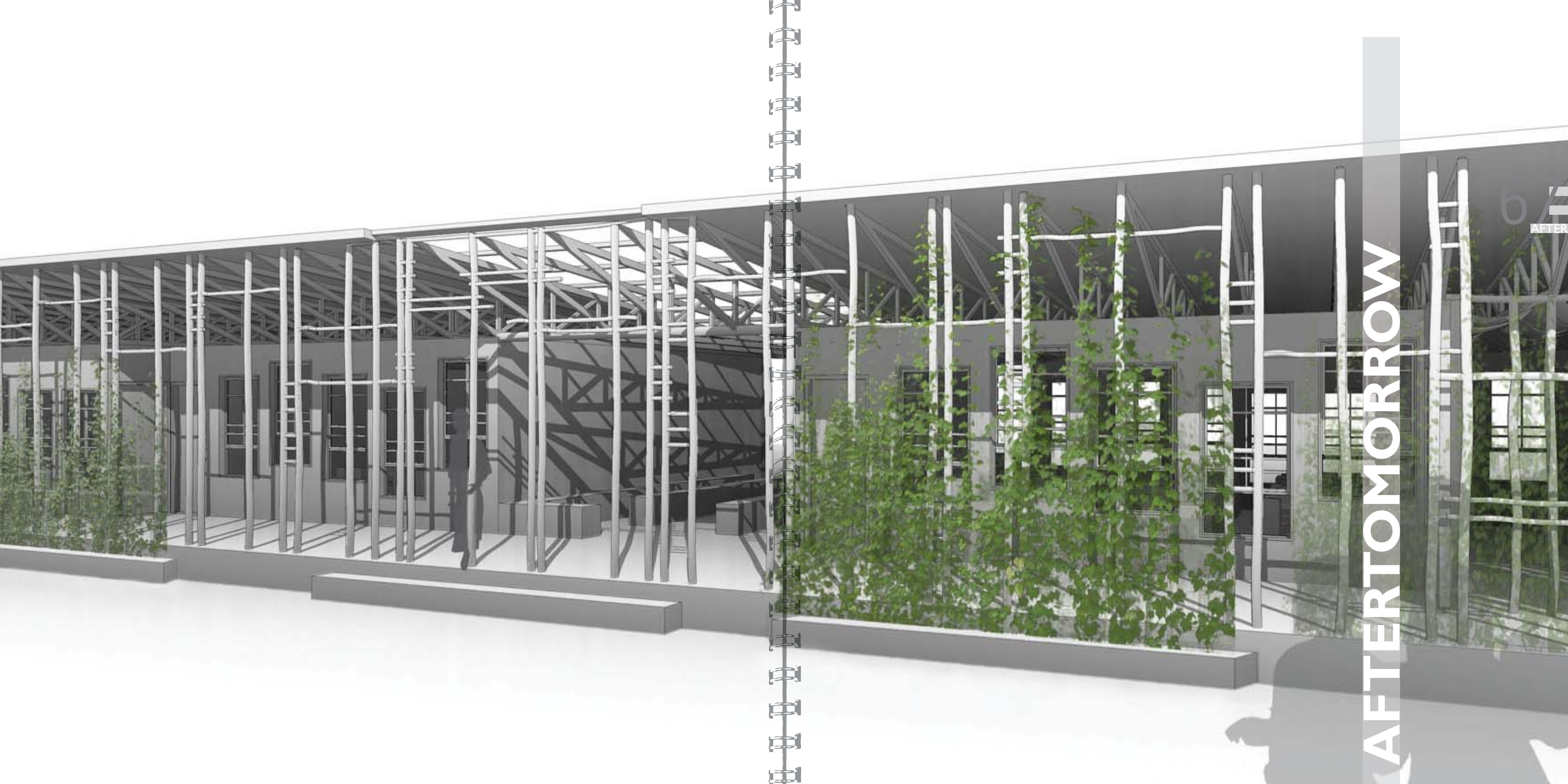
### ACOUSTIC LAYER

The noise of dropping rain on corrugated iron sheets is insulated from the classroom by the absorbing layer - light material with large absorption area, p. ex. EPS boards, straw, fabric shreds, dry leaves - of course well protected from moisture.





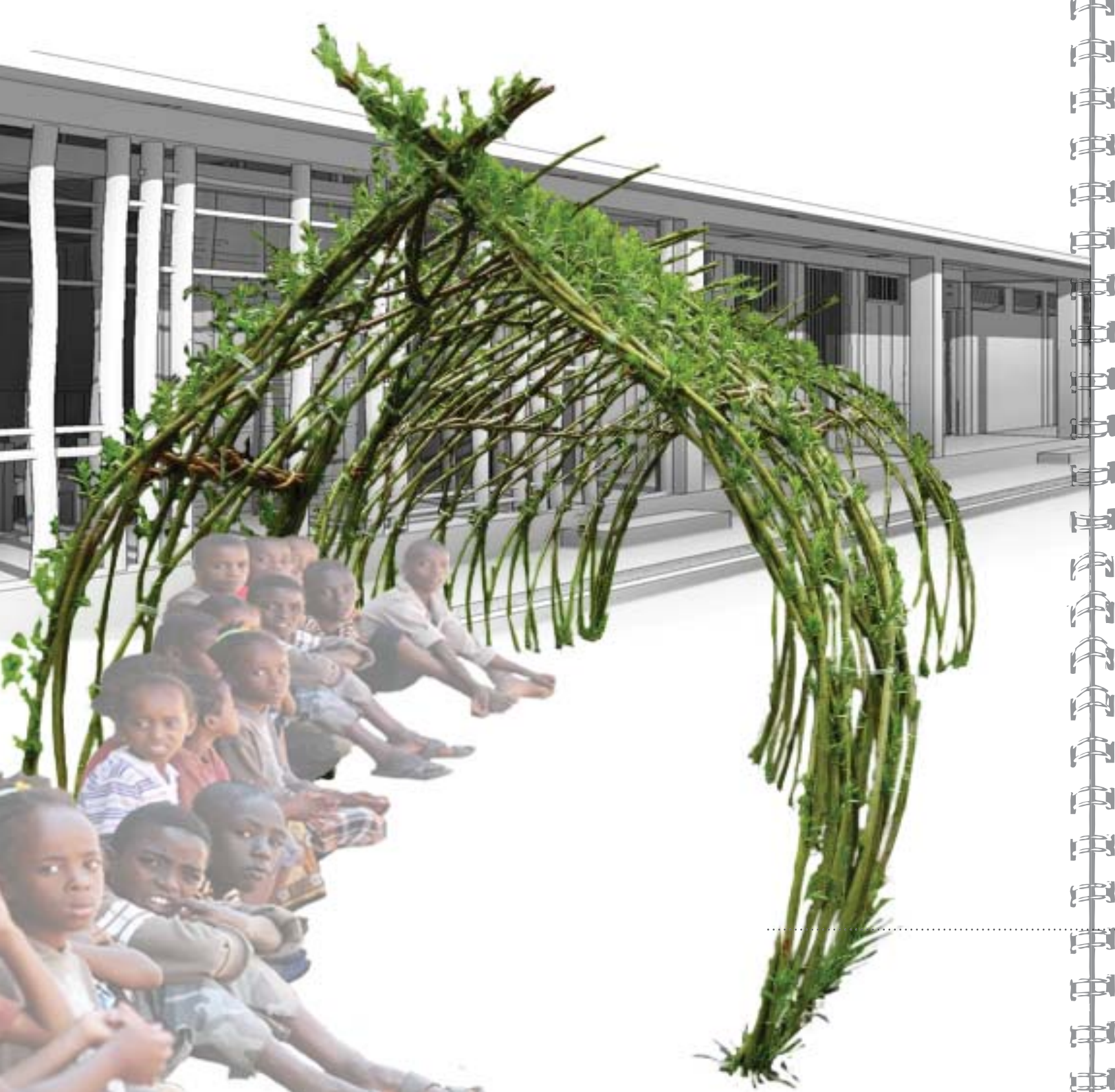
AFTERTOMORROW



AFTERTOMORROW

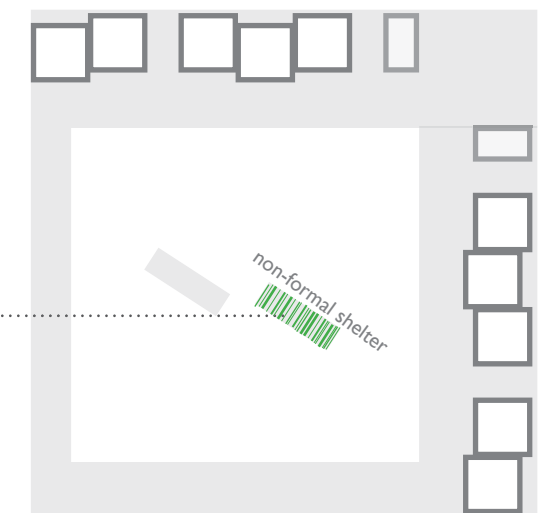
6/7  
AFTER

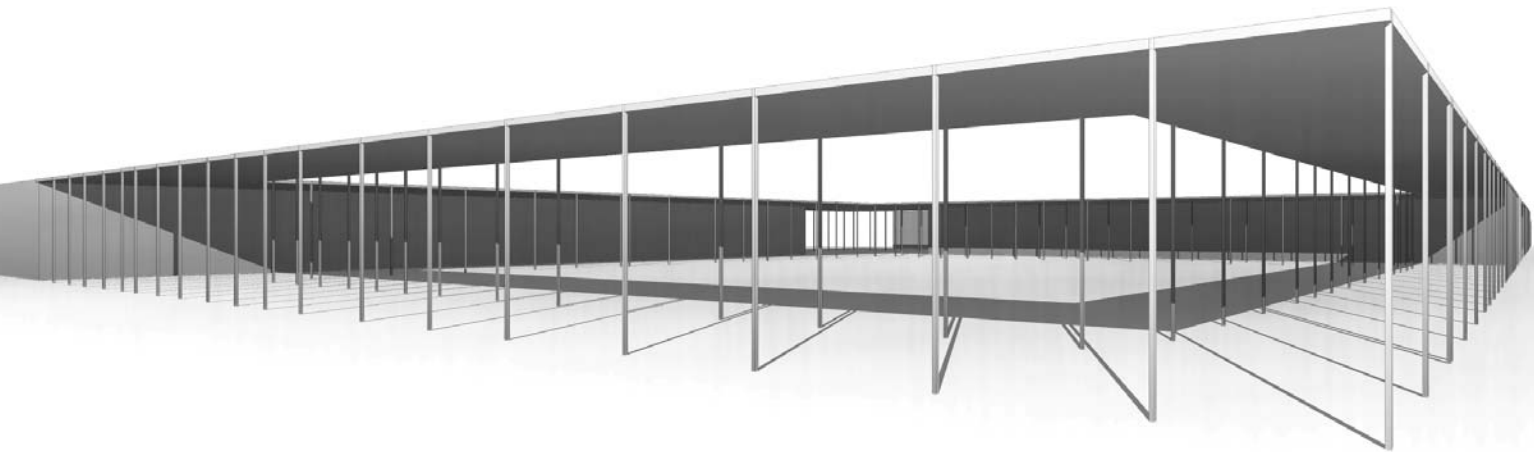




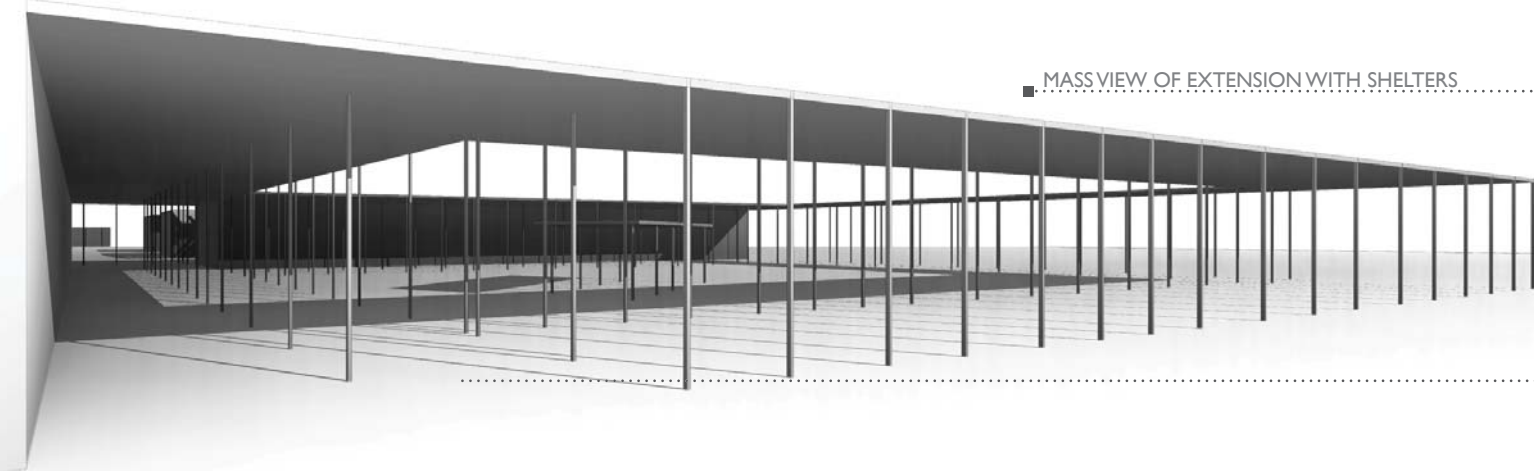
## INFORMAL SCHOOL EXTENSION

### TRANSITION





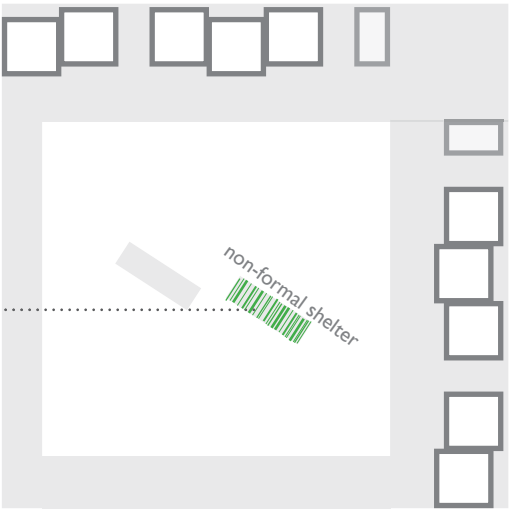
MASS VIEW OF EXTENSION



MASS VIEW OF EXTENSION WITH SHELTERS



solid  
roofed



non-formal shelter



## LANDSCAPING

TERRAIN WITHIN REACH

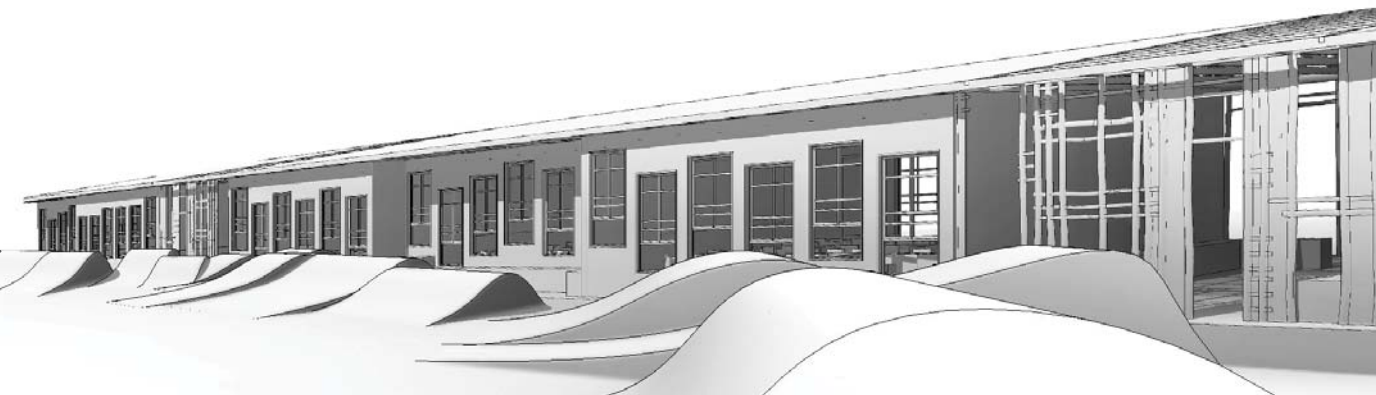
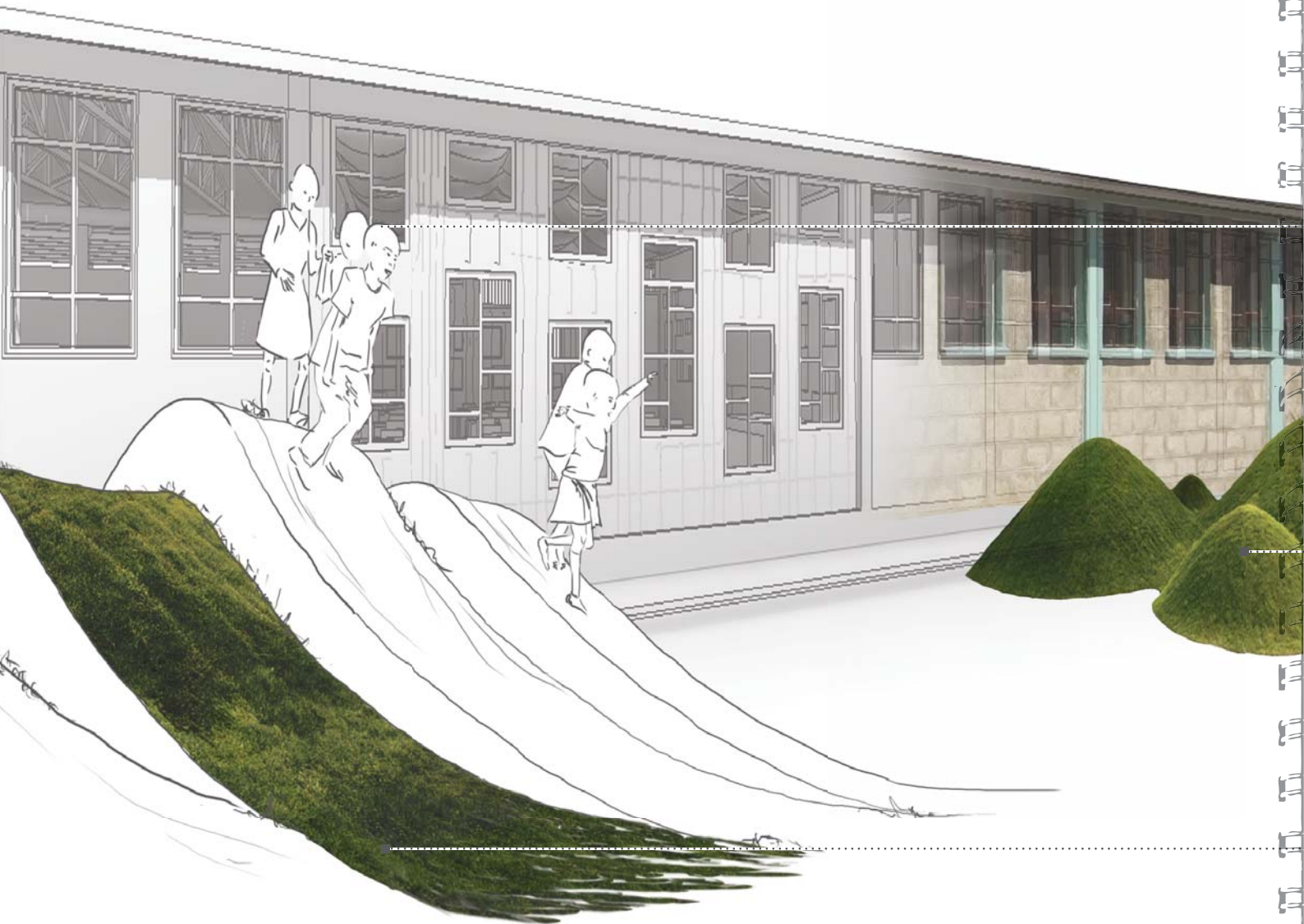
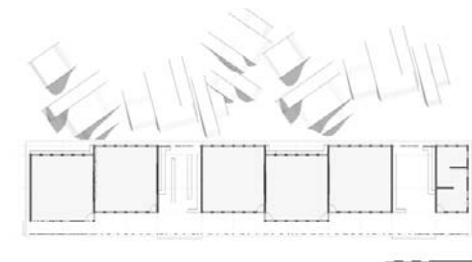
73  
AFTER

### ADVANTAGES

harmonises the building, school compound and whole environment

use of extracted soil and construction rubble - possible material stockage for future construction - cost-saving

supports the physical developpement of children





# PLAYING

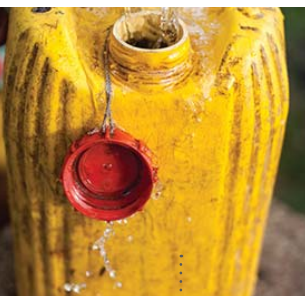
FRIENDS  
**RELAX**  
ACTIVITY



CLIMBING  
**FRAMES**



improvised table tennis in Ghana



BENCHES  
PAVILION

JERRYCANS

Open spaces can be designed as play yards for sports, school gardens, verandas for outdoor learning activities, open performance spaces, wide corridors and courtyards, trellises, canopies, shaded pavilions, niches and alcoves.

TOGETHER

EXTRA  
CURRICULUM

JOY

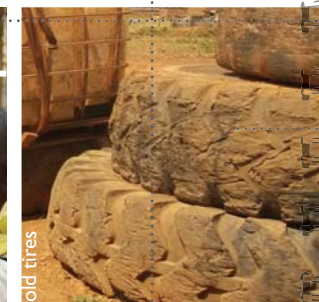
PHYSICAL  
DEVELOPMENT



EXTRA  
CURRICULUM

JOY

MAZE



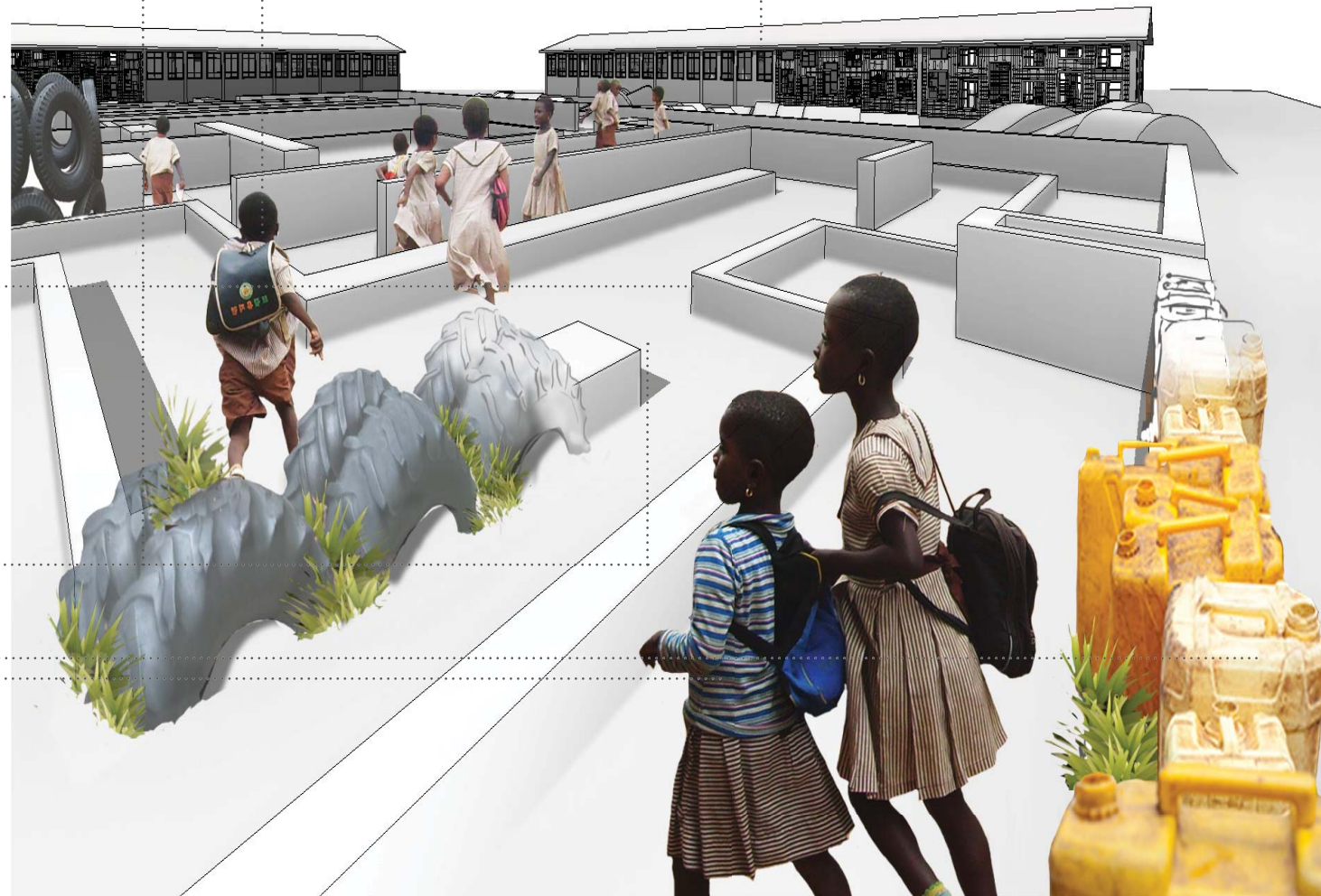
SWING  
SEESAW  
SLIDE

Useful leisure time activities supporting community safety and participation

GAME  
CREATION

LABYRINTH  
LITTLE PLAY MAZE

75  
AFTER





# GARDEN

FRIENDS

RELAX

ACTIVITY



S P A C E  
GREEN



FOOD  
SECURITY

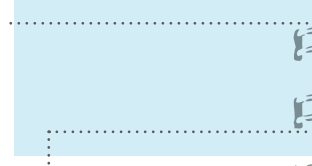
ALLEVIATE  
HUNGER

CONCENTRATION

TEACHING  
AID



HEALTH



HOME  
PROPERTY  
VALUES  
OWNERSHIP

GREEN

RECYCLE

## SUSTAINABLE GARDENING

### ADVANTAGES

- cultivates relation between the school and the community
- harvested fruit and vegetables may be used for the midday meal
- children's participation in the maintenance promotes a sense of ownership
- edible plants in school compound teach children food production and conservation
- environment consciousness - having garbage disposal, compost system contributes to environmental education - supports reuse and sustainable habits
- harmonises the building, school ground and whole environment
- use of natural vegetation strategically planted to improve thermal comfort and to reduce glare (direct light and reflection) in building interior

### RISKS

- active participation of community is needed >>> well determined roles - to avoid problems with organisation, responsibility, distribution and safety
- problems with poor harvest - distribution and drawing a lesson from it

PARTICIPATION  
TOGETHER...

The public building should be the result of a customary use along the time. The design should follow the demand and needs. It should be the outcome of a participation process. In either way - both top down or bottom up.

The top down participation is launched by the public administration and the bottom up procedure is initiated by clients, in our case it means by communities.

