P5 PRESENTATION

BIO SHOP HOUSE

GRADUATION | ARCHITECTURE ENGINEERING | LOUISA DE RONDE | 4087356

CONTENTS

INTRO

ARCHITECTURE ENGINEERING

FIRST PART: TECHNICAL RESEARCH

SECOND PART: DESIGN

CONTEXT - PROGRAM - TECHNIQUE

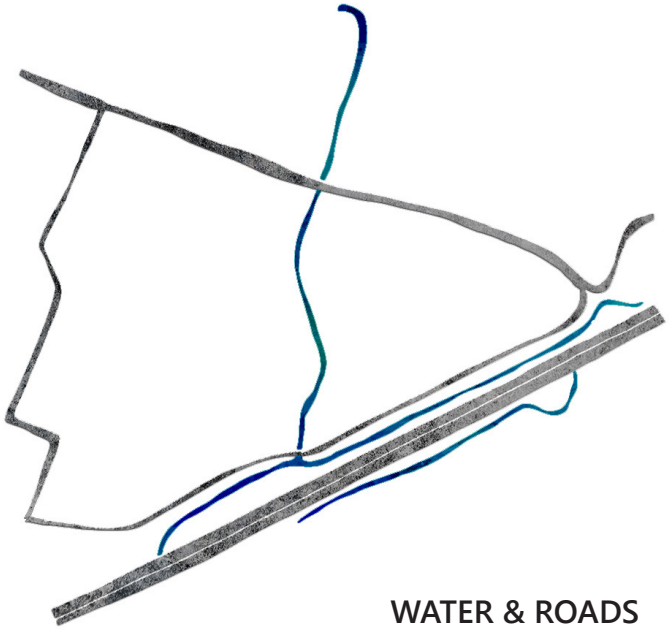

JAVA
BANGUNG
CITY
LOCATION

BANDUNG BEFORE 1960

BANDUNG WAS A SELF SUSTAINING VILLLAGE AND HAD A SMALL ECONOMIC INDUSTRY FOR TEXTILE AND GARMENT PRODUCTION WITH HIGHLY SKILLED CRAFTSMEN. THE LOCAL LANDSCAPE WAS MAINLY OCCUPIED WITH WETLANDS AND CROP FIELDS.

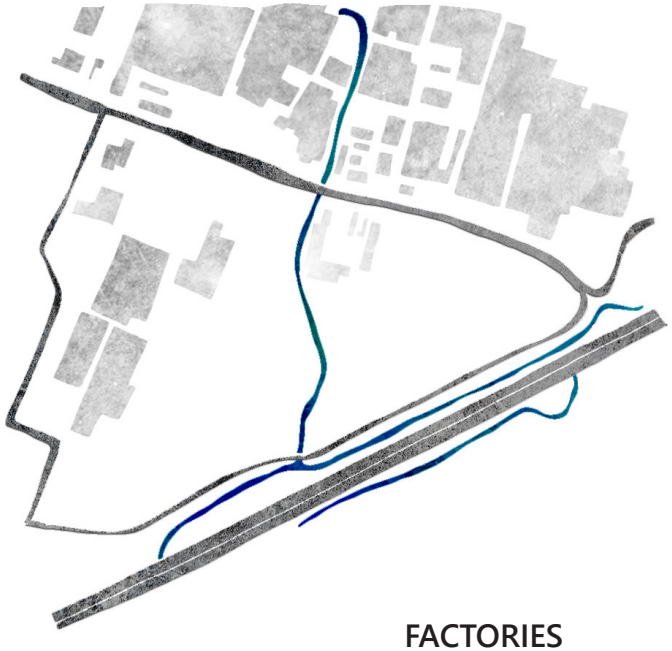
BANDUNG AFTER 1960

THE TEXTILE INDUSTRY GREW VERY FAST UNDER INFLUENCE OF NEW TECHNOLOGIES. AFTER 1980 THE CITY BECAME A LARGE FASHION VILLAGE FOR CHEAP TEXTILES AND CLOTHING. BECAUSE OF THE AMOUNT OF LABOUR A LOT OF WORKERS RENT A SMALL ROOM IN THE INDUSTRIAL KAMPUNGS AROUND THE FACTORIES.

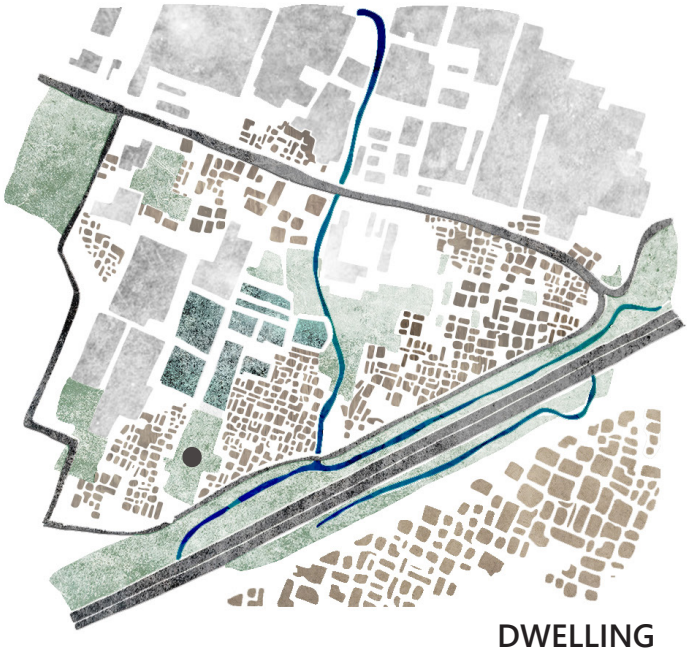


WATER & ROADS

GREEN & RICE FIELDS

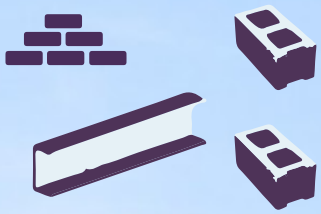


FACTORIES



DWELLING

DISAPPEARING OF GREEN
SPACE AND PUBLIC SPACE



NON SUSTAINABLE MATERIALS

DENSIFICATION & GROWING POPULATION


SUJ

LACK OF SPACE FOR SHOPS OR RENTING ROOMS

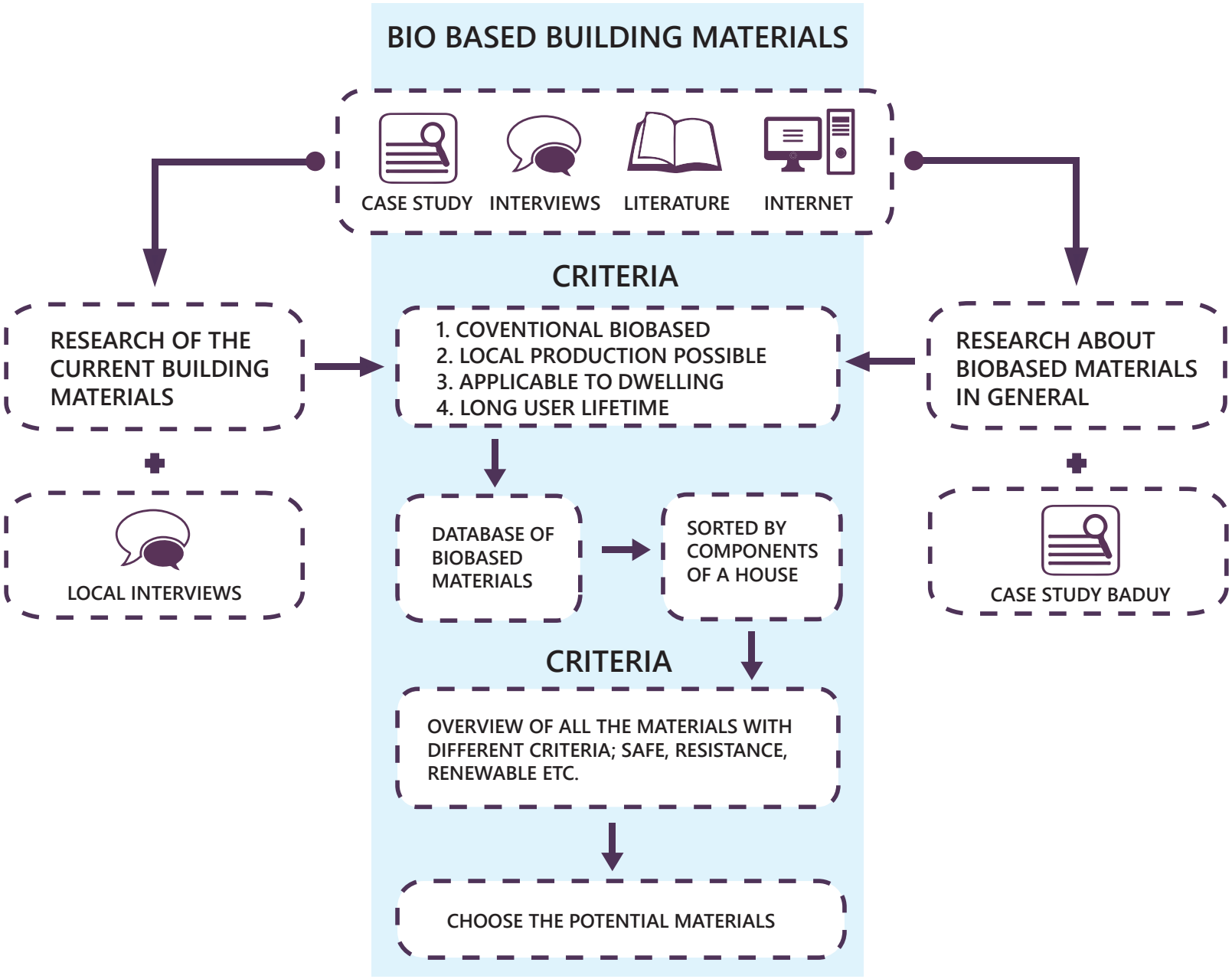
RESEARCH

TECHNICAL RESEARCH QUESTION

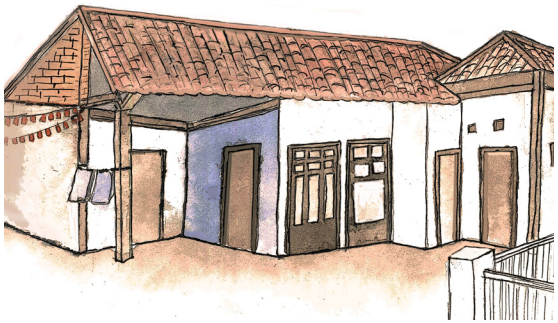
"WHICH BIOBASED MATERIALS CAN REPLACE THE CURRENT BUILDING MATERIALS AND IMPROVE THE BUILDING PROCESS AND METHODS?"

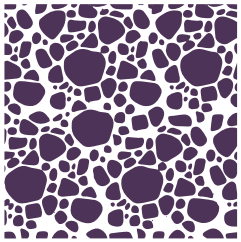
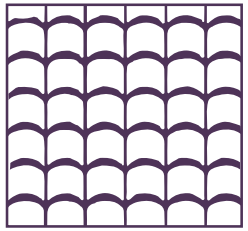
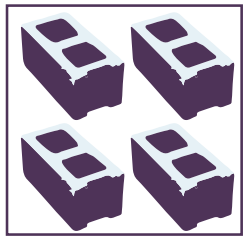
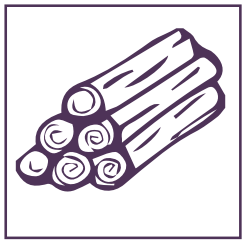
OVERALL DESIGN QUESTION

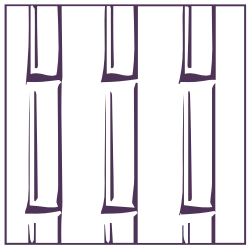
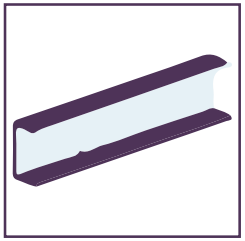
"HOW TO TRANSFORM A POLLUTED FACTORY VILLAGE INTO A SUSTAINABLE COMMUNITY BY IMPLEMENTING A NEW TYPOLOGY FOR SHOPHOUSES?"


BIO BASED BUILDING MATERIALS
CASE STUDY
INTERVIEWS
LITERATURE
INTERNET
CRITERIA
RESEARCH OF THE CURRENT BUILDING MATERIALS
1. COVENTIONAL BIOBASED
2. LOCAL PRODUCTION POSSIBLE
3. APPLICABLE TO DWELLING
4. LONG USER LIFETIME
RESEARCH ABOUT BIOBASED MATERIALS IN GENERAL
LOCAL INTERVIEWS
DATABASE OF BIOBASED MATERIALS
SORTED BY COMPONENTS OF A HOUSE
CASE STUDY BADUY
CRITERIA
OVERVIEW OF ALL THE MATERIALS WITH DIFFERENT CRITERIA; SAFE, RESISTANCE, RENEWABLE ETC.
CHOOSE THE POTENTIAL MATERIALS

CRITERIA	LOCAL AVALIBLE	LOCAL/EASY PRODUCTION	EASY TO APPLY	AFFORDABLE	UV RESISTANCE	WATER RESISTANCE	FIRE RESISTANCE
STRUCTURE							
Bamboo beam							
NON-STRUCURE WALL							
Peat brick							
Cow brick							
Bamboo slabs							
FACADE							
Straw & Coconut							
Plant residues							
Natural fibers							
FLOOR							
Coffee Panels							
Straw Panels							
Banana fibers							
INTERIOR							
Teak Roots							
Mahogany bark							
Coconut							
Coconut							
Flax panels							
ROOF							
n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

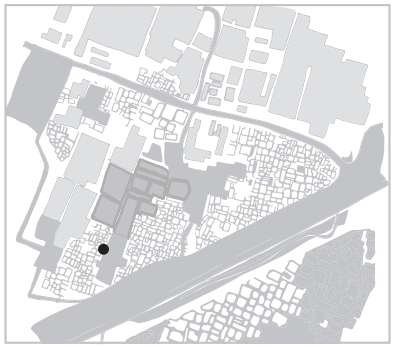


MATERIAL		UNIT	PRICE Rp/€
	CONRETE	1 kg 50 kg	1400 0.10 70.000 4.90
	ROOFTILES	per tile	4000 0.28
	HOLLOW CEMENT BLOCKS	per m3	730.000 51.10
	WOOD	per m3 Jati Borneo Recycled	15.000.000 1.050 5.000.000 350 2.000.000 140

MATERIAL		UNIT	PRICE Rp/€
	WOODEN BLOCK	5x10x 400 cm	65.000 4.55
	BAMBOO	6 m Untreated Treated	5000-12000 0.35-0.84 60.000 4.20
	STEEL C-PROFILE	1 kg 50 kg	1400 0.10 70.000 4.90
	CORRUGATED ZINC SHEETS	one sheet	40.000 2.80

KAMPUNG TYPOLOGIES

LOCATION



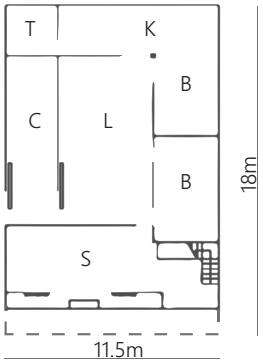
GENERAL INFORMATION

Name/Age	Sanjaya / 33
Family	3 persons
Work	Own business/shop
Income	4.500.0000
Building Year	2011
Extension	2015 shop, bedroom
Area	276 m2

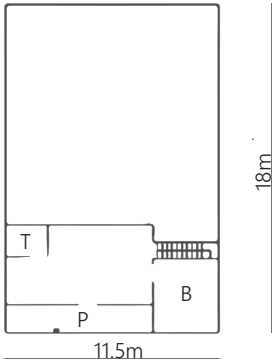
Building Materials: Concrete, bricks, Ceramic tiles, Wooden frames

PICTURE

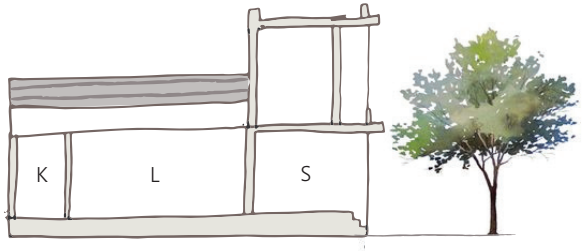
GROUND FLOOR

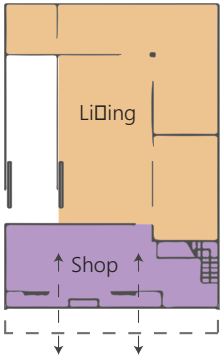


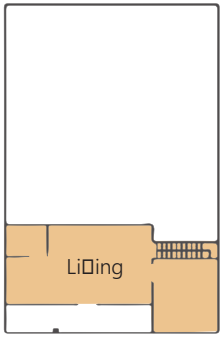
FIRST FLOOR

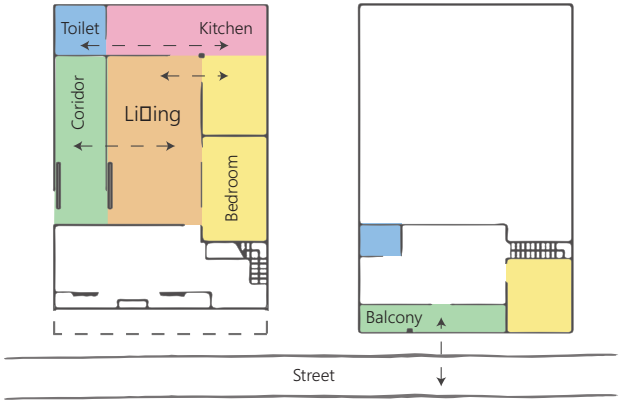


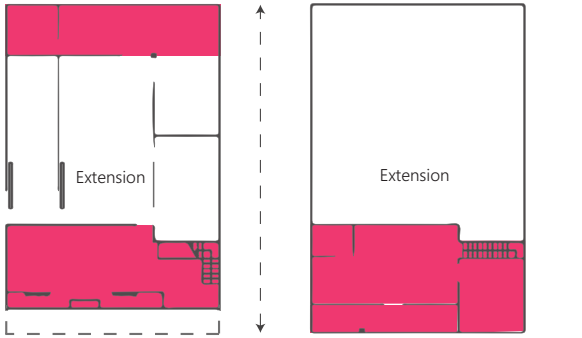
SECTION

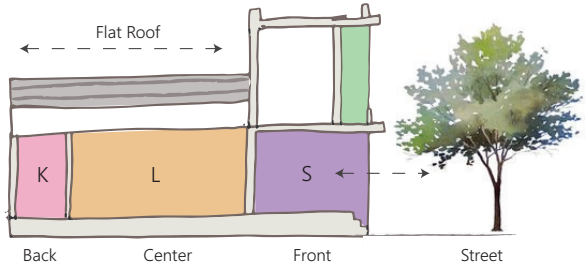






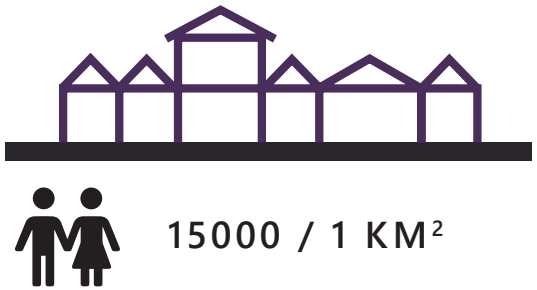






CONCEPT

CURRENT KAMPUNG

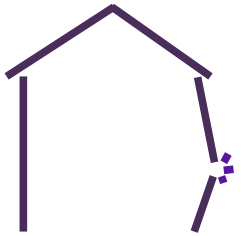


15000 / 1 KM²

STEEL, BRICKS AND CONCRETE

LOCAL CONTRACTORS

DISAPPEARING PUBLIC / GREEN SPACE, CLIMATE PROBLEMS, NON SUSTAINABLE ENVIRONMENT



NOT A CLEAR AND SAFE BUILDING SYSTEM

TRADITIONAL KAMPUNG

1900 / 1 KM²

NATURAL BUILDING MATERIALS OUT OF THE ENVIRONMENT

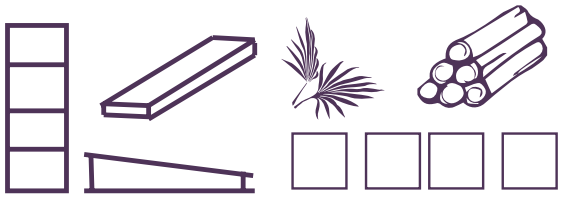
THE COMMUNITY BUILD PREFAB ELEMENTS FOR EACH HOUSE IN THE VILLAGE

WELL CONSTRUCTED HOUSES

WETLANDS AND GREEN SPACE SUSTAINABLE ENVIRONMENT

NEW PERI-URBAN

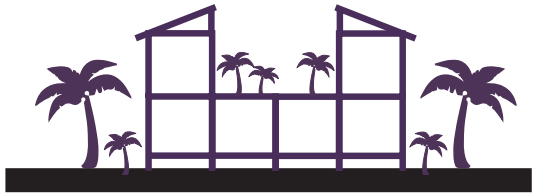
18000 / 1 KM²



PREFAB BUILDING ELEMENTS OF BIOBASED MATERIALS

LOCAL COMMUNITY AND CONTRACTORS

NEW BUSINESS SPECIALIZED IN PREFAB ELEMENTS OF BIOBASED MATERIALS



SUSTAINABLE ENVIRONMENT WITH PUBLIC SPACE

STRUCTURE

WHY PREFAB ELEMENTS ?

1. THE CAST FRAMEWORK SYSTEM OF NADIA IS PRECISE ENOUGH TO APPLY PREFAB ELEMENTS

2. THE PREFAB ELEMENT PROVIDES A CLEAR AND EFFICIENT SYSTEM FOR SELF BUILD HOUSING

3. IT CAN BE EASILY REPLACED AND CONTRUCTED BY THE LOCAL COMMUNITY

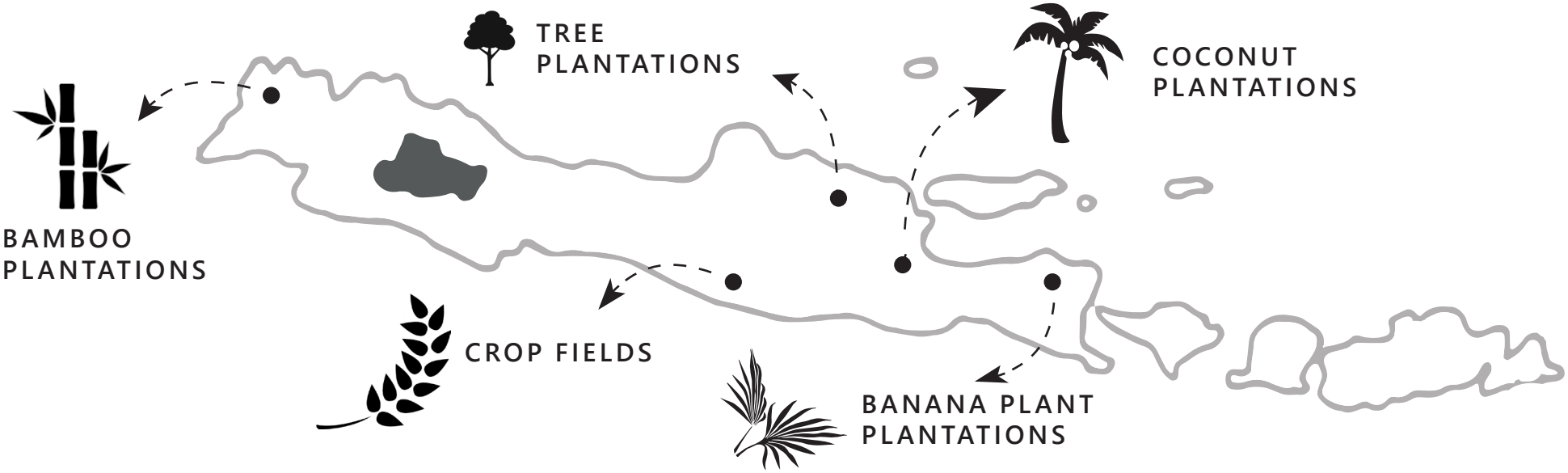
4. PREFAB ELEMENTS PROVIDES FLEXIBILITY

WHY BIOBASED MATERIALS ?

1. JAVA HAS A LOT OF NATURAL RESOURCES IN THE ENVIRONMENT THAT ARE SUITABLE FOR CREATING NEW BIOBASED MATERIALS.

2. THE NEW BIOBASED MATERIALS WILL BRING BACK THE SOCIAL SUSTAINABILITY AND COMMUNITY

3. BY INTRODUCING NEW BIOBASED MATERIALS AND INTEGRATE IT IN THE PREFAB ELMENTS IT WILL CREATE A NEW SUSTAINABLE CYCLE



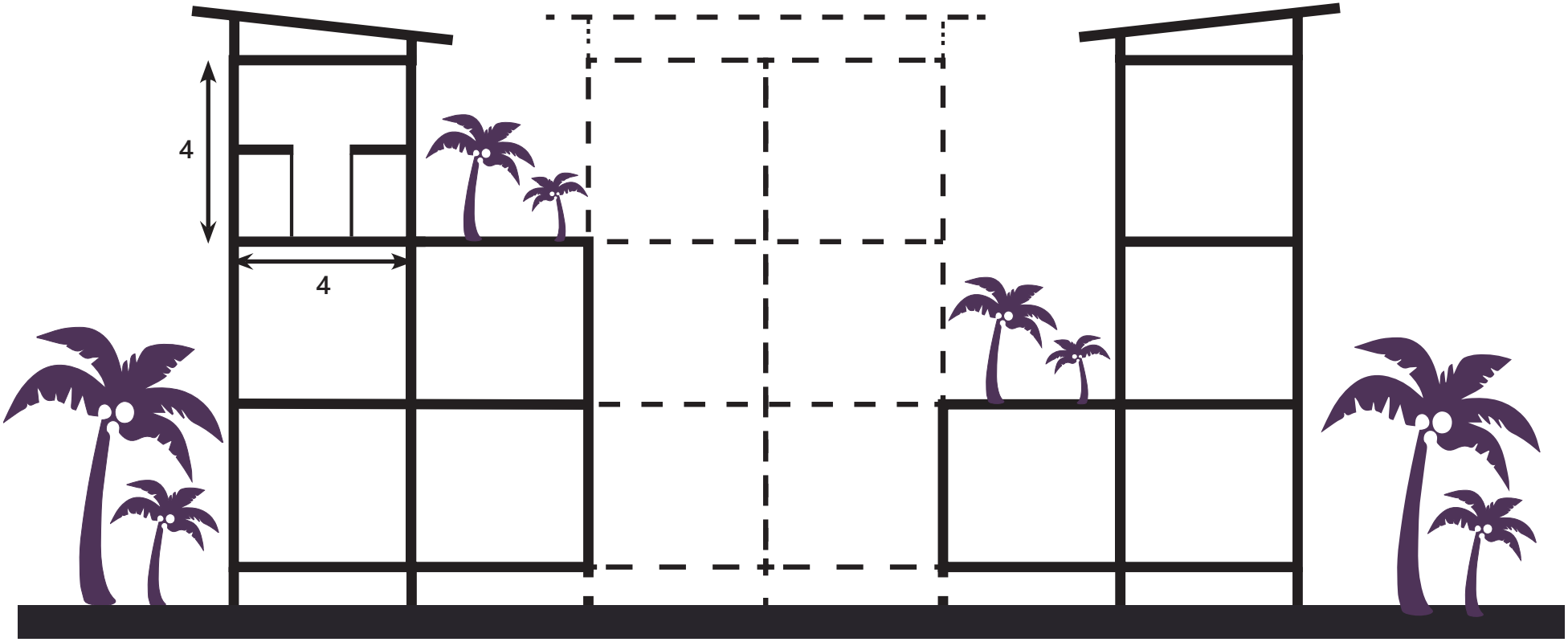
TYPOLOGY

BASED ON A GRID

SKELETON STRUCTURE BASED ON A GRID OF 4 X 4 METER TO EXTEND IN DIFFERENT DIRECTIONS, MORE FLEXIBLE

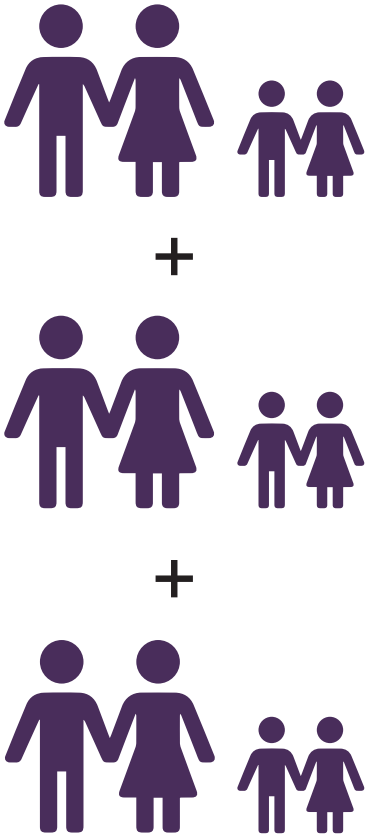
EFFICIENT USE OF HEIGHT

FLEXIBLE EXTENDING



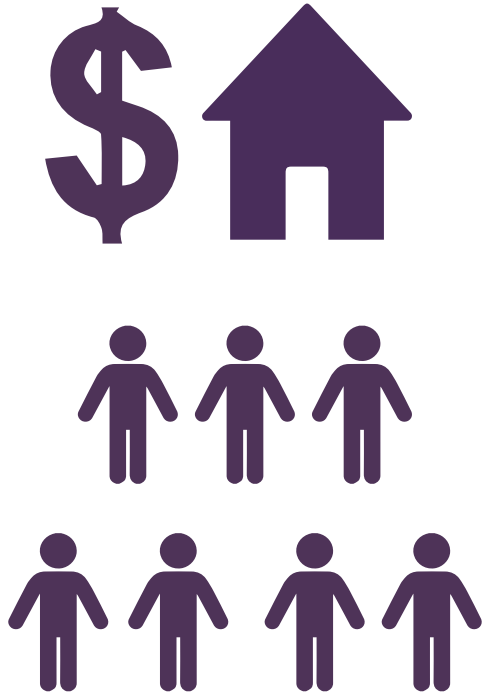
PROGRAM

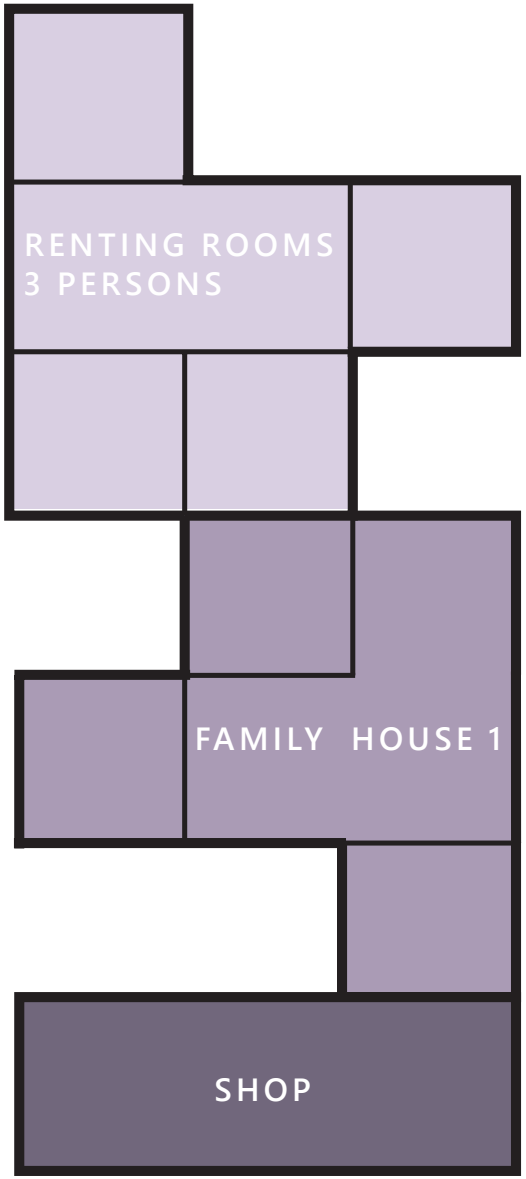
THREE FAMILIES



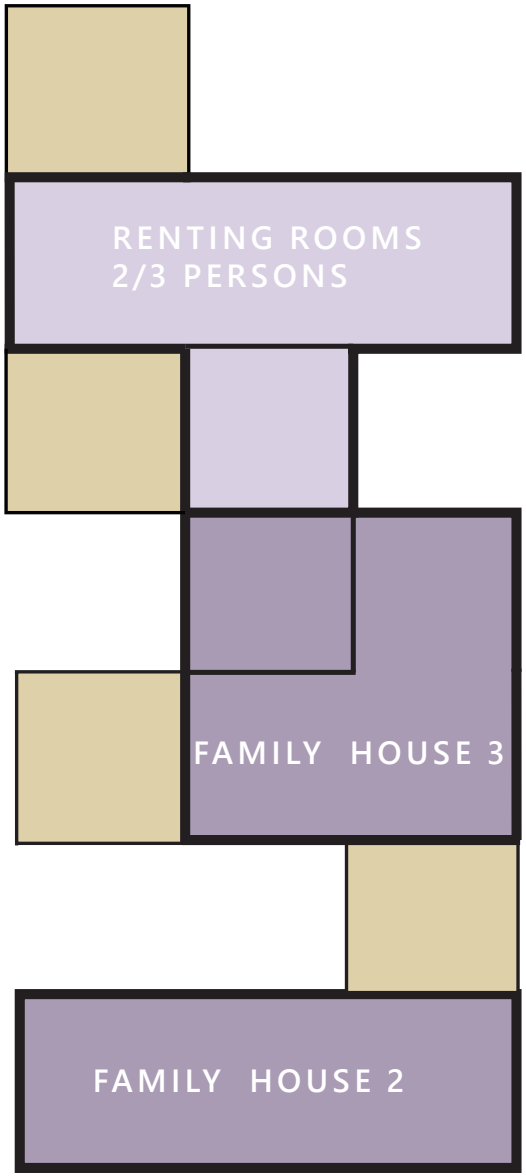
WORKSHOP

RENTING ROOMS

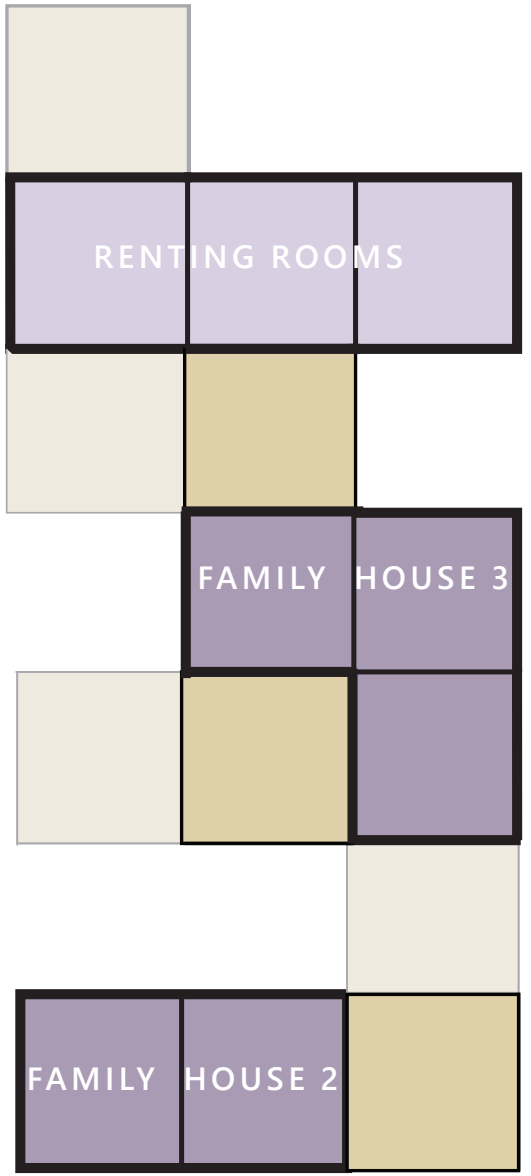




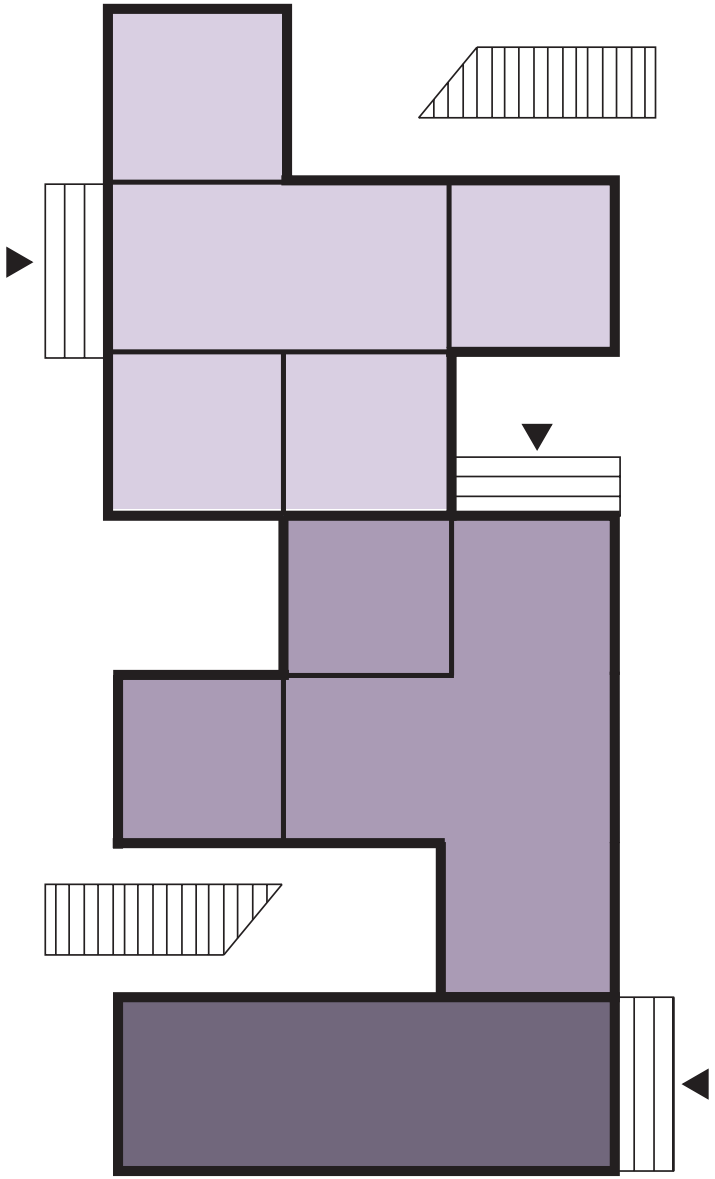
GROUND FLOOR



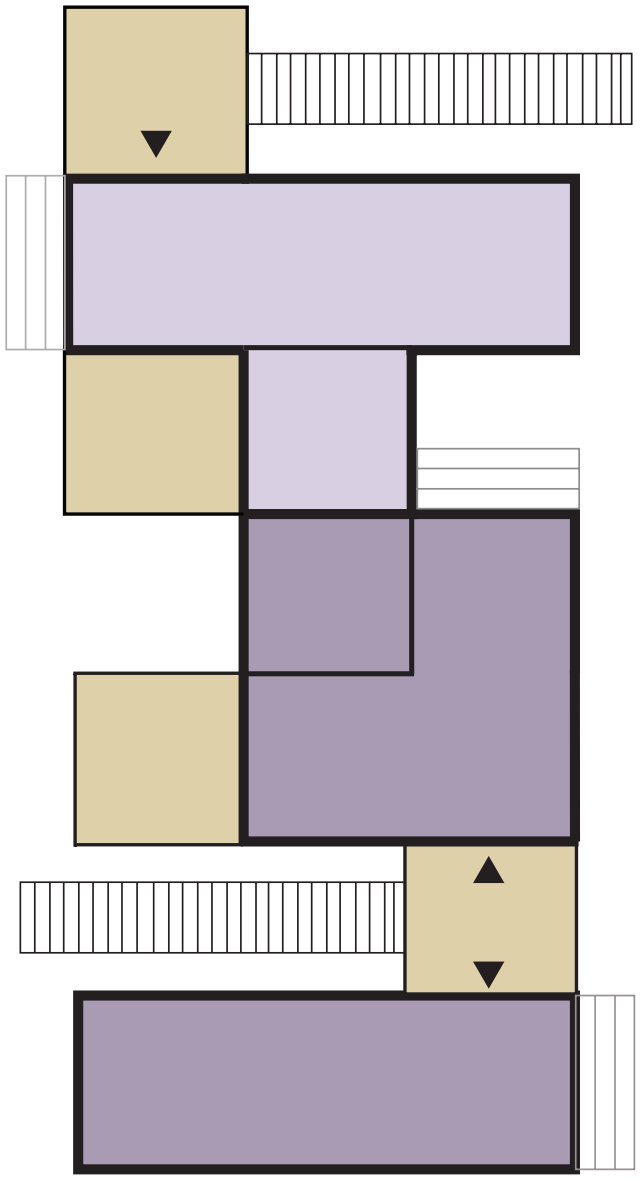
FIRST FLOOR



SECOND FLOOR

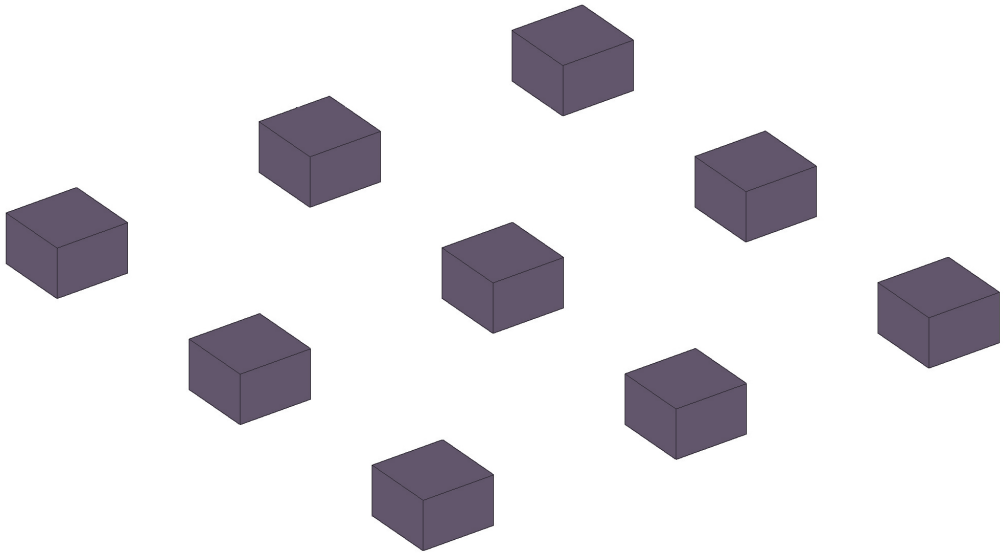


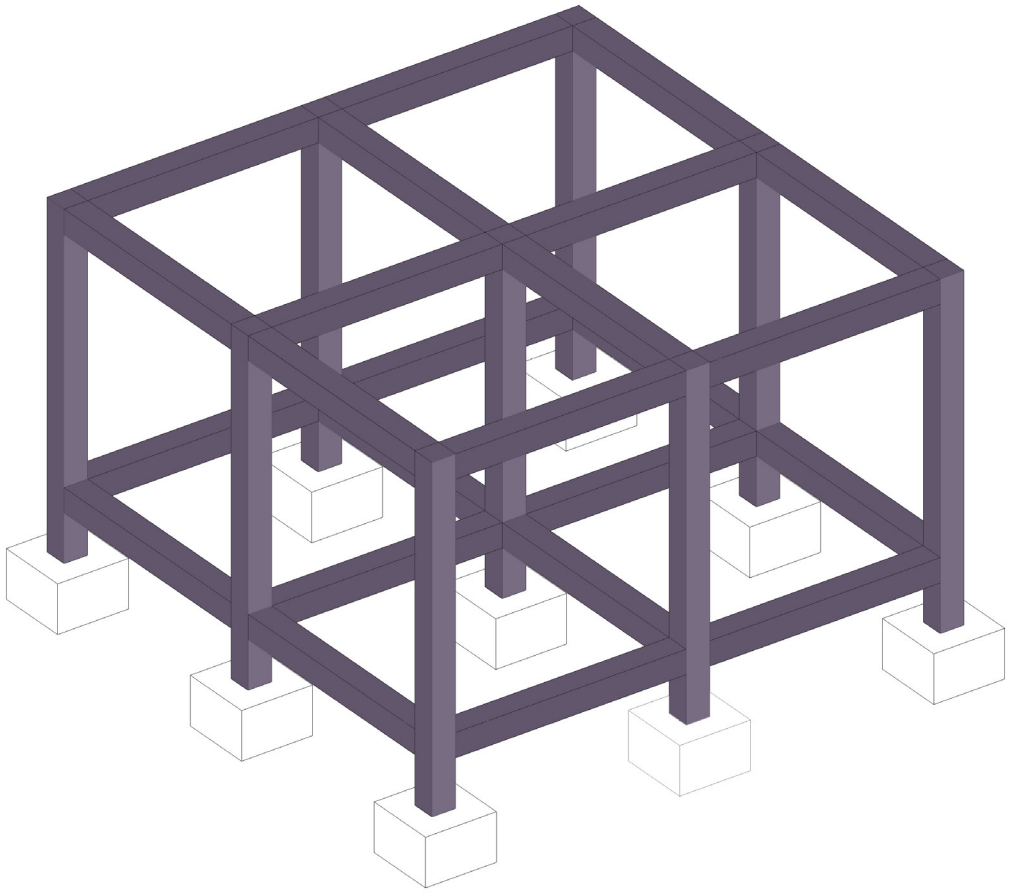
GROUND FLOOR



FIRST FLOOR

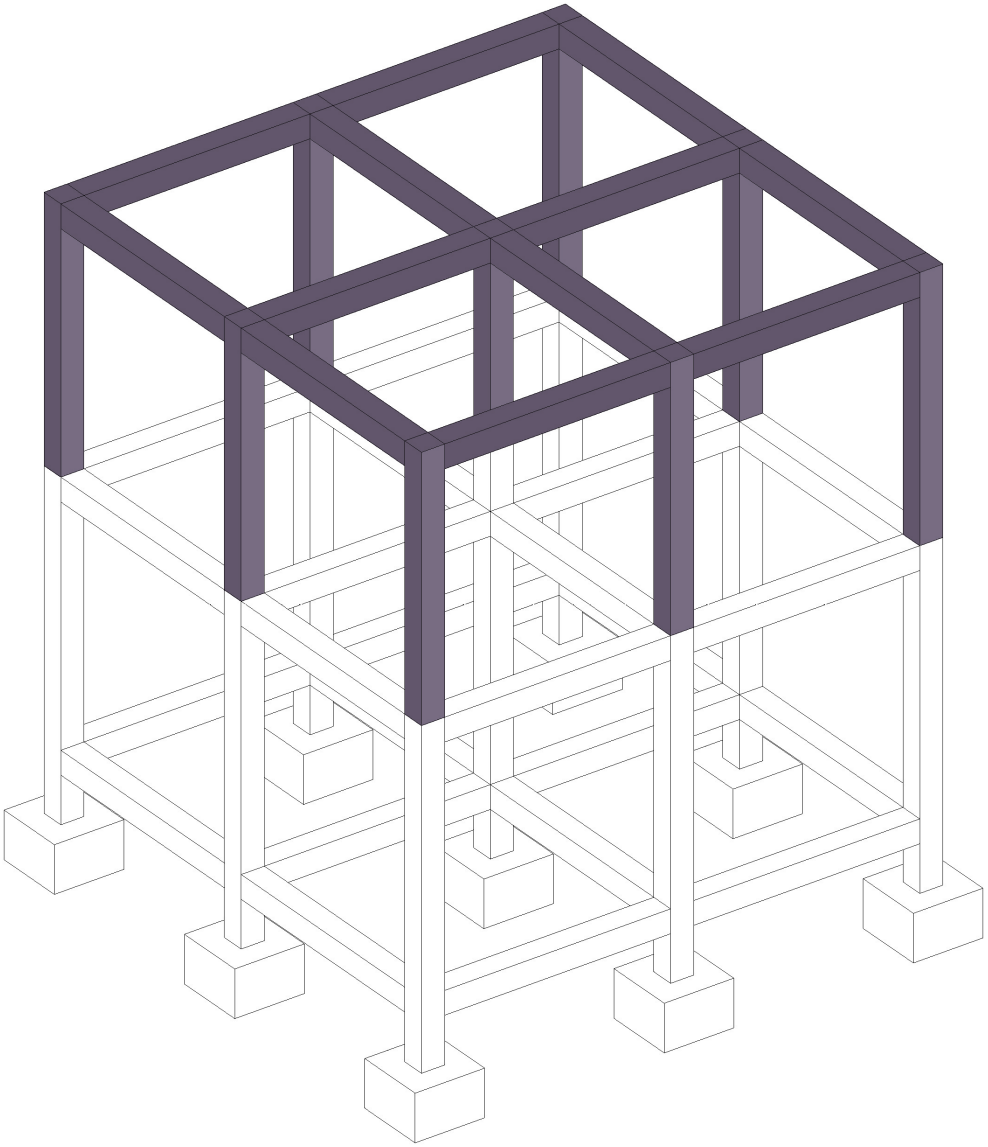
TECHNOLOGY



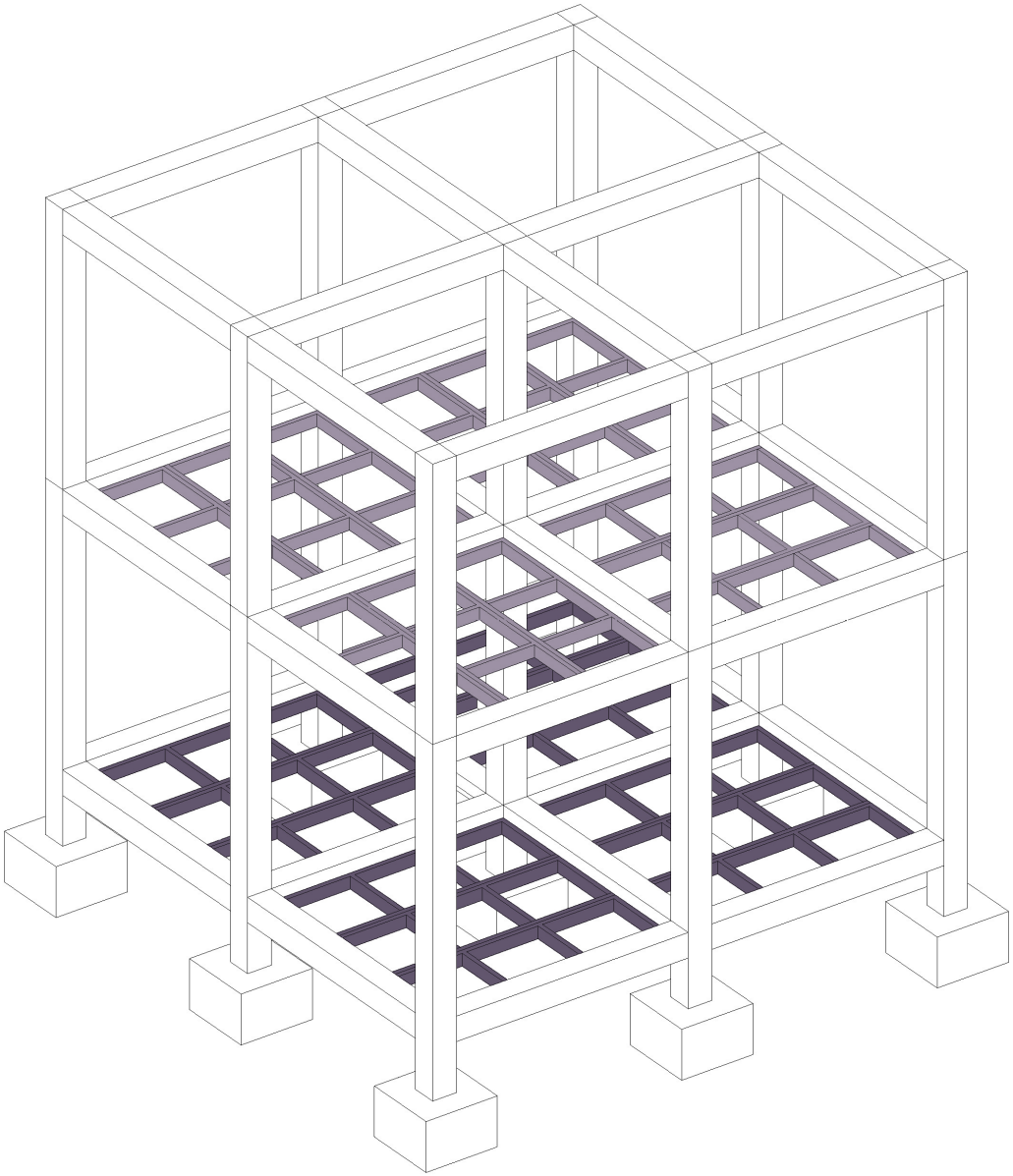


3

REINFORCED CONCRETE STRUCTURE SECOND FLOOR

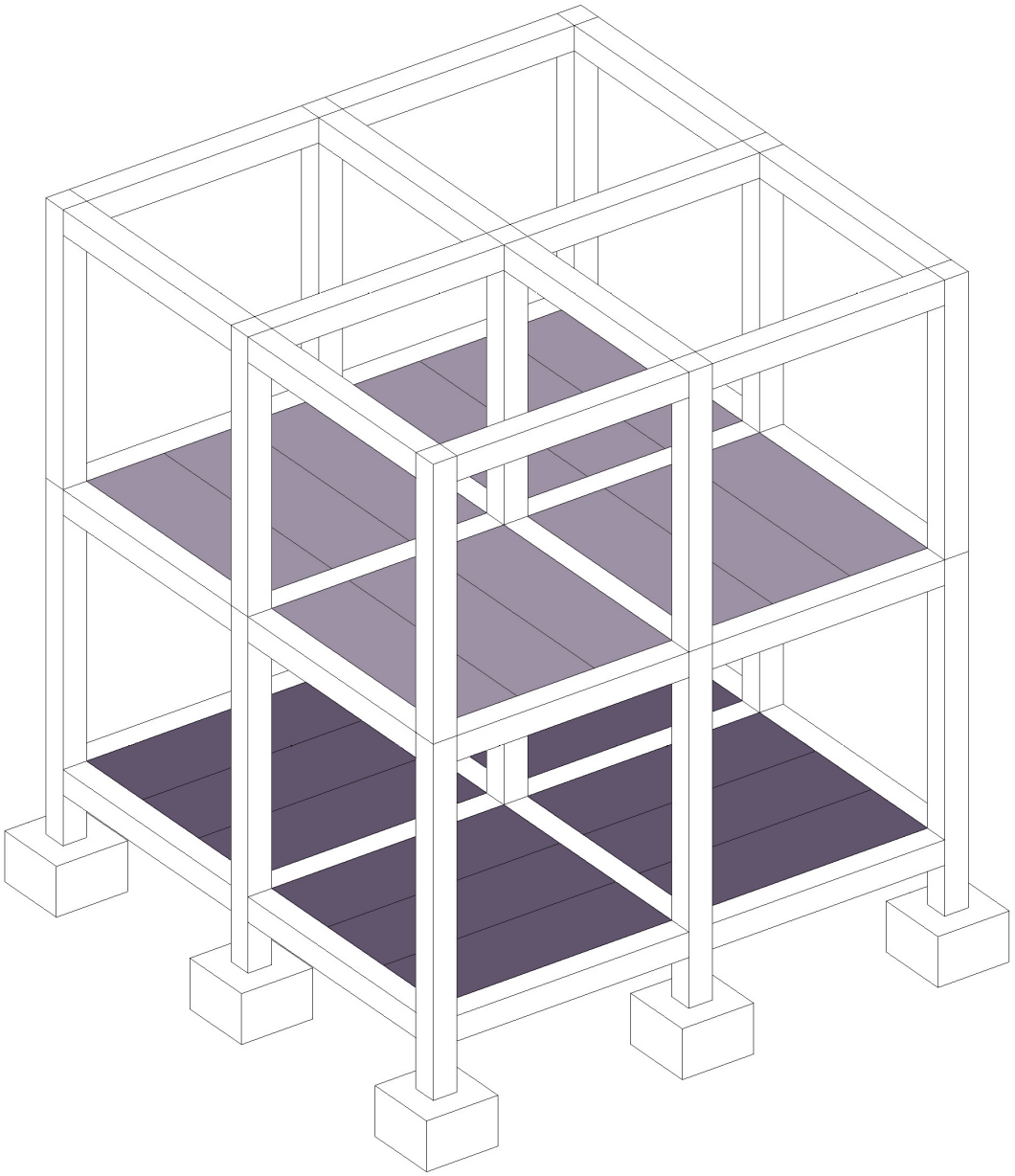


4 SECONDARY BEAMS OF WOOD



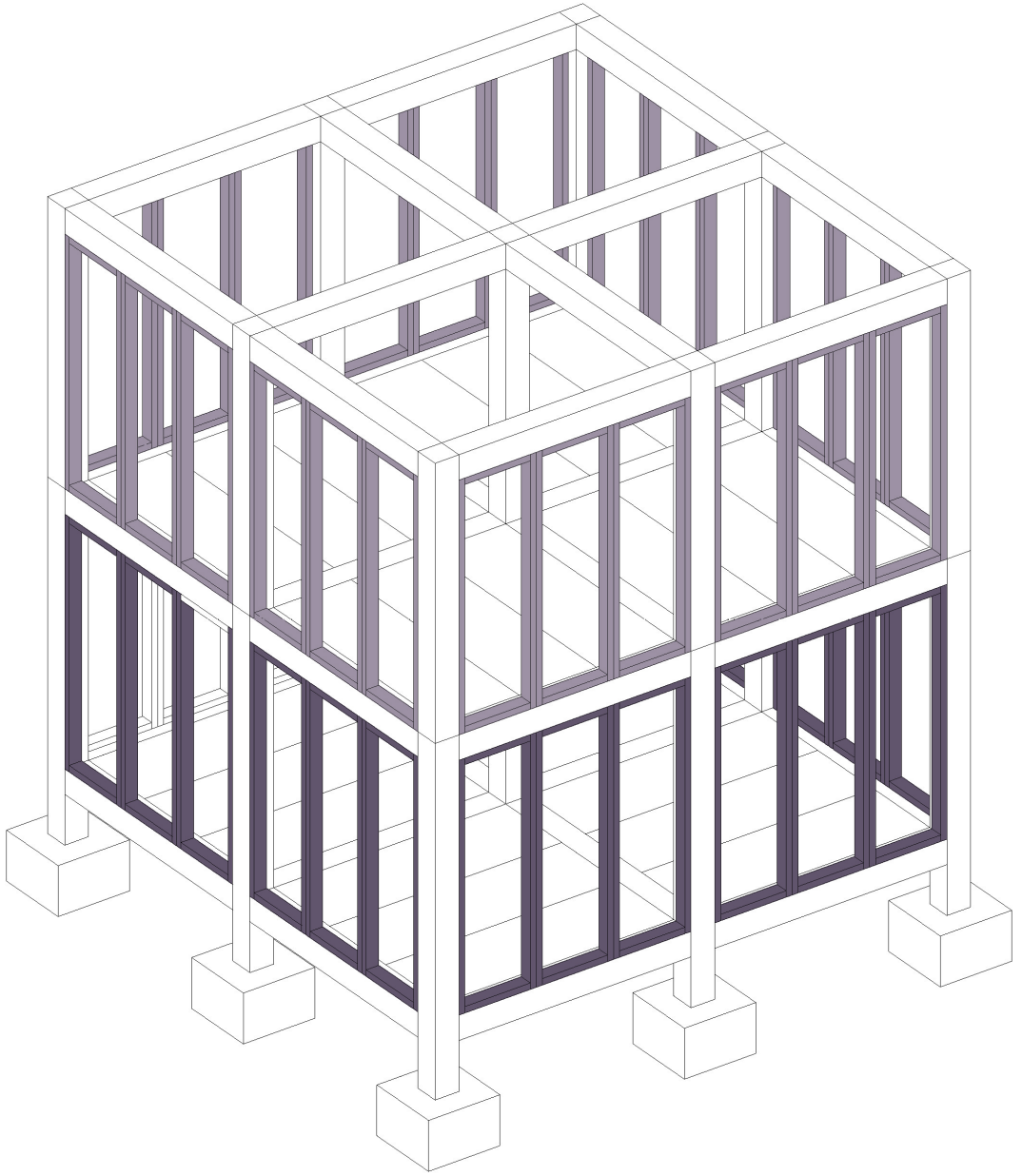
5

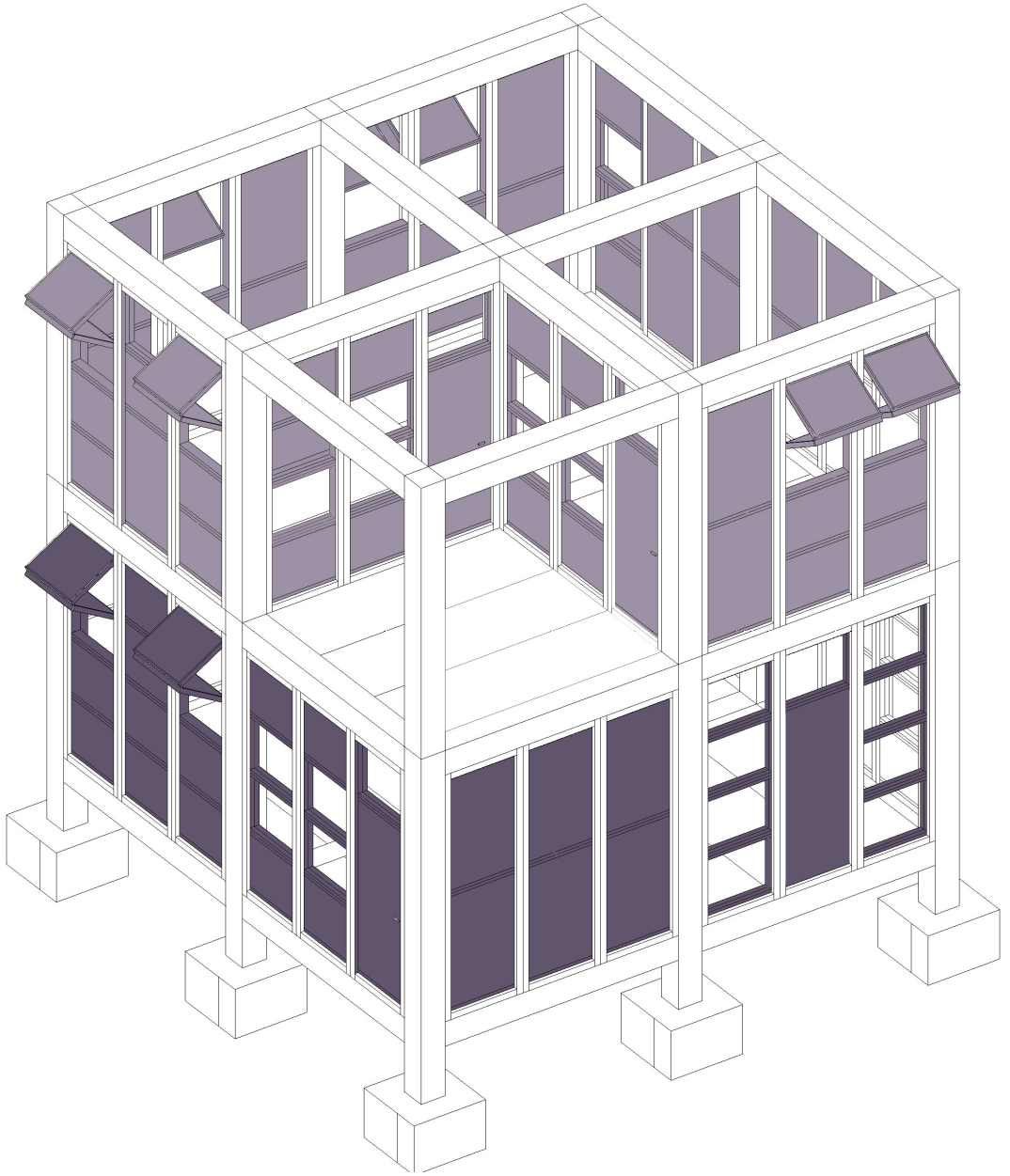
SANDWICH FLOOR
PANELS OF BAMBOO

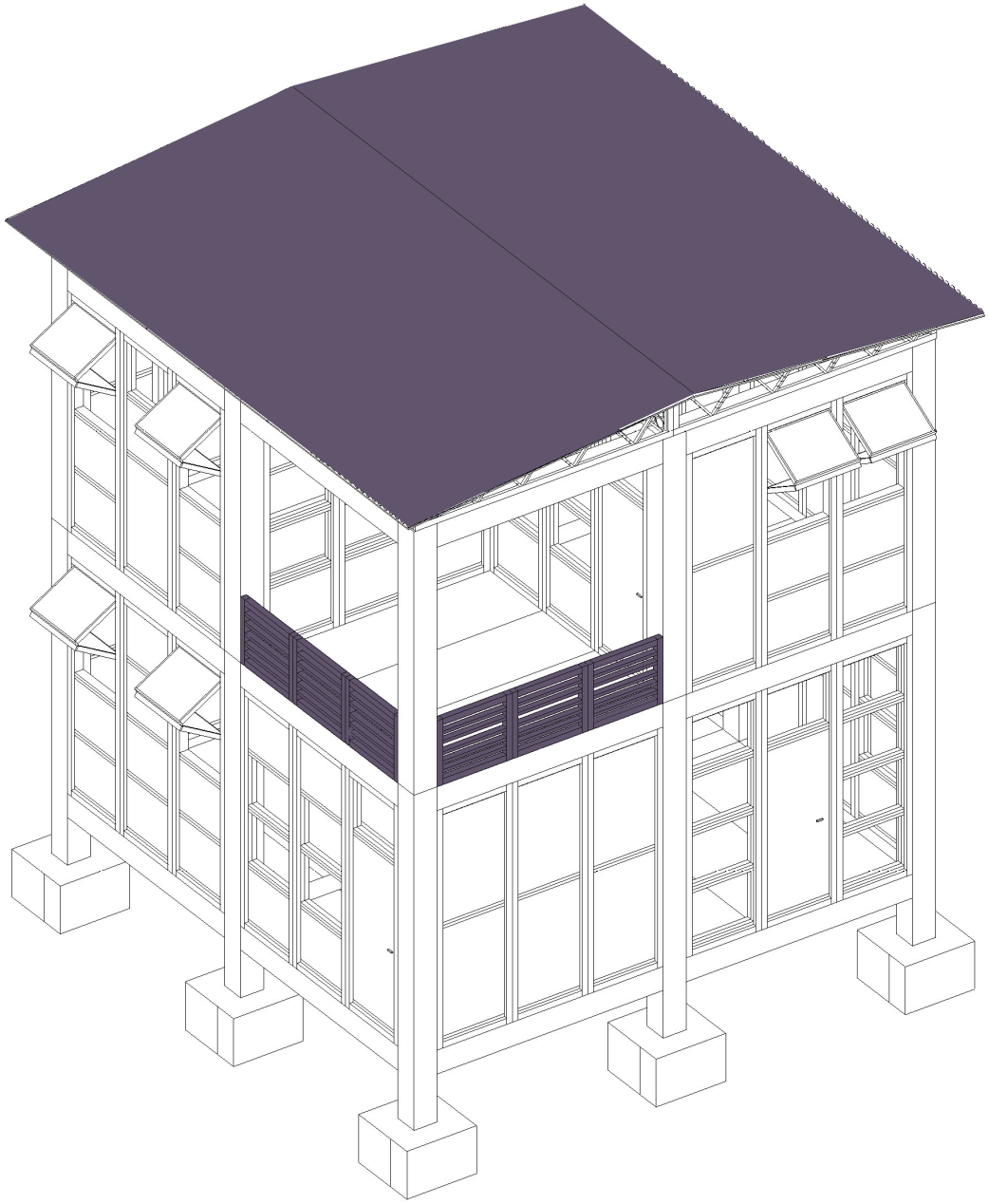


6

PREFAB WOODEN FRAME FACADE







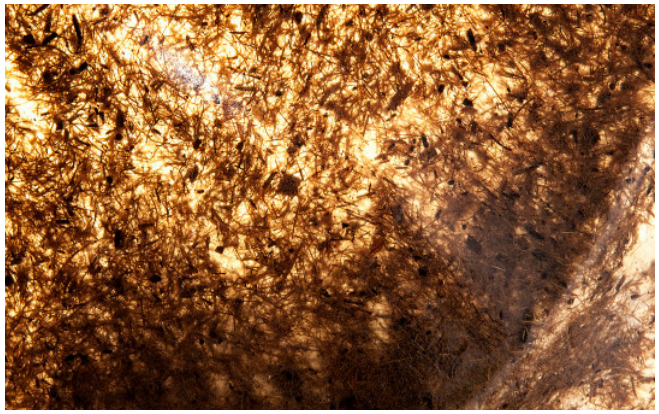
TYPES FACADE PANELS

BIOBASED MATERIALS

LAMPAC-NATURAL STRAW €

BAMBOO €€

CORN LEAF & SEAGRASS €€€



BIO - TRANSPARANT €€€€

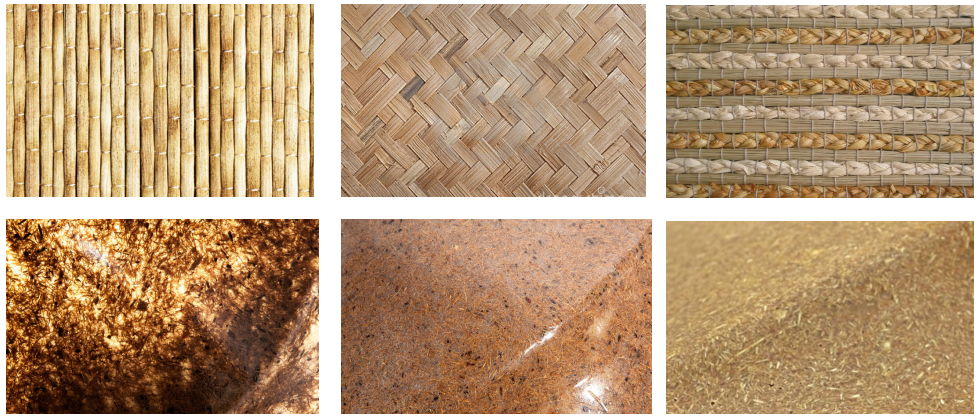
BIO - COCONUT FIBRES €€€€

BIO - NATURAL FIBRES €€€€

PERSONALIZE

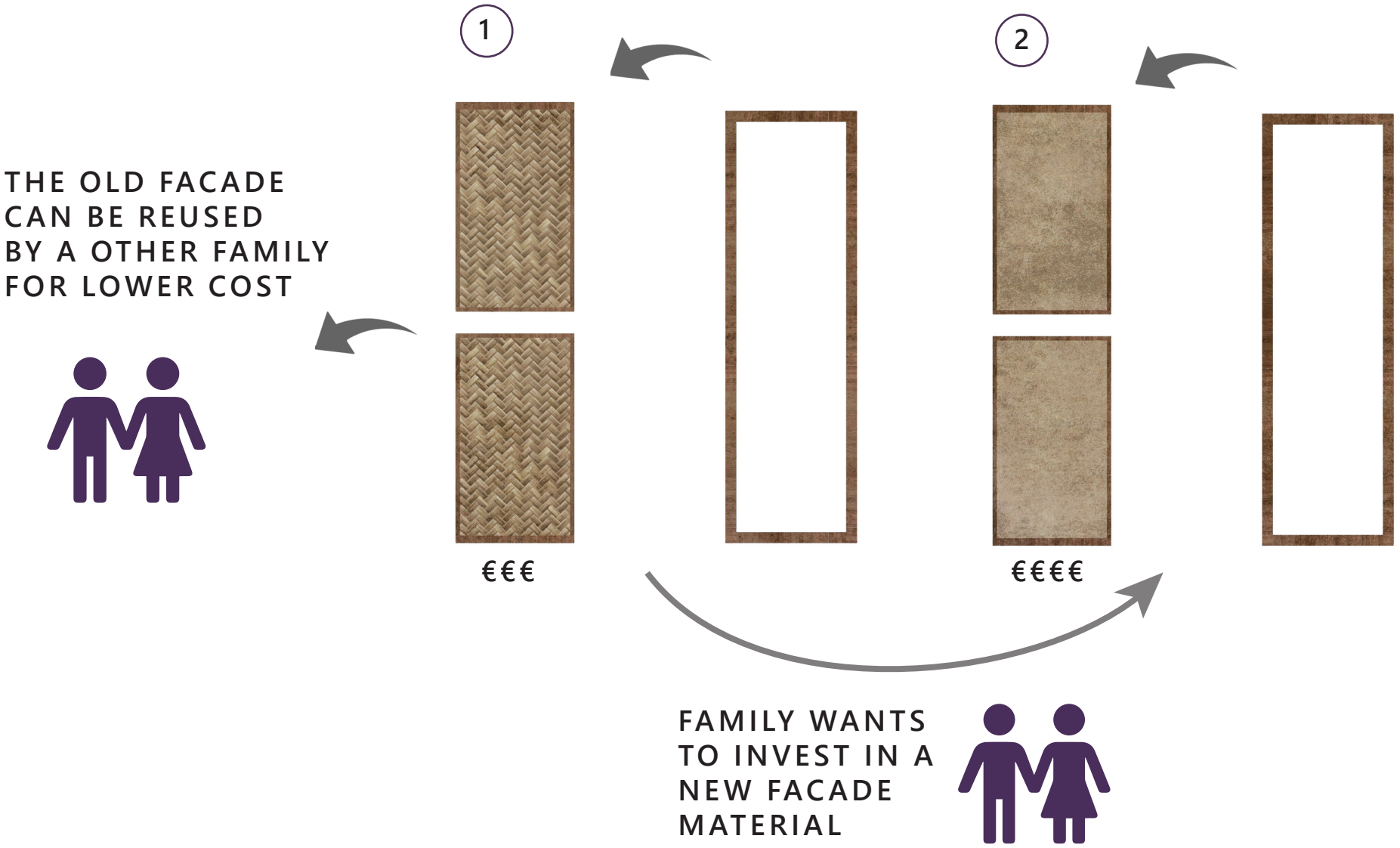
1 CHOOSE THE TYPES OF PANELS

2 ONE MATERIAL FOR OUTSIDE
ONE OR MORE MATERIALS FOR INSIDE

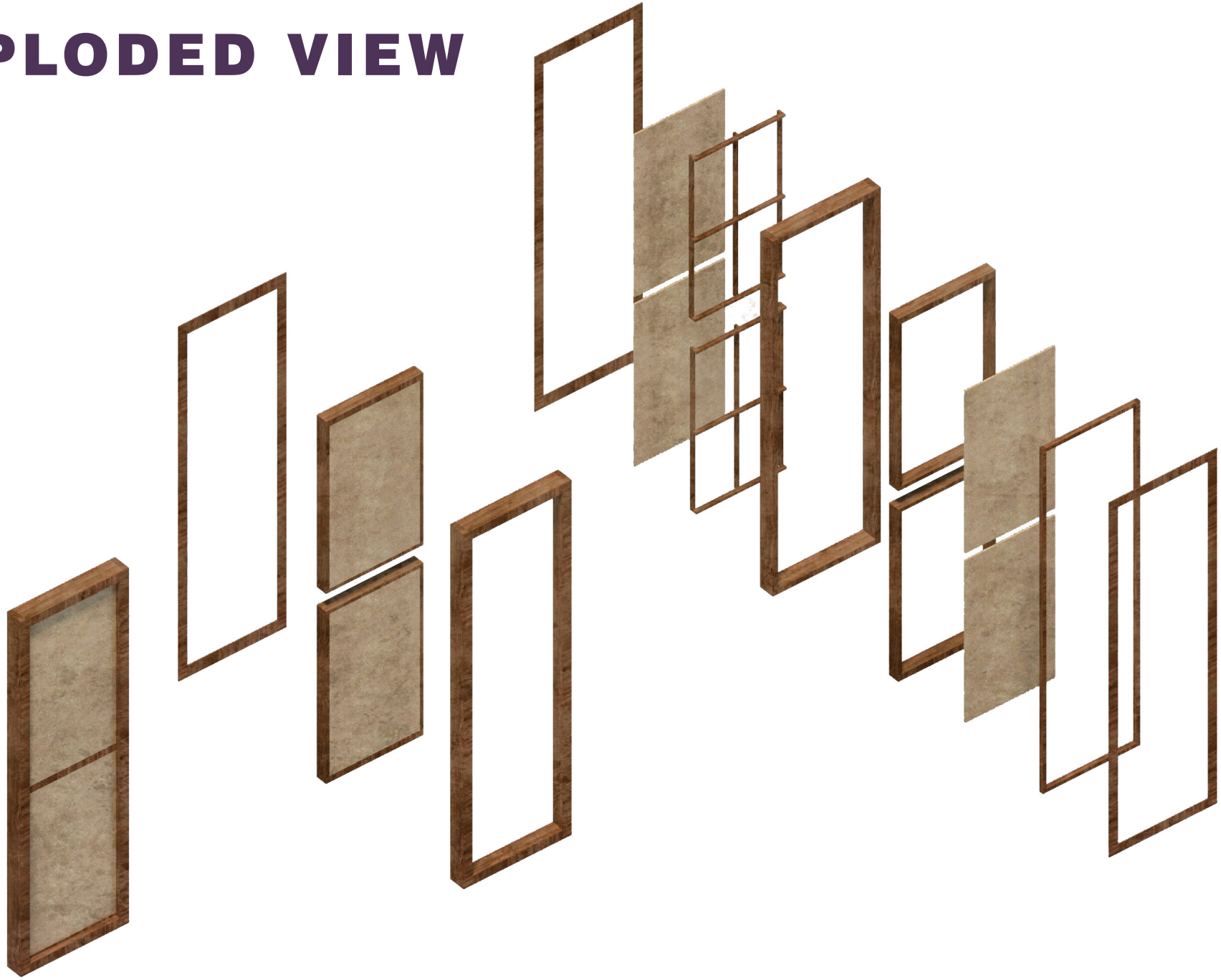


3 AFTER MORE INCOME THE FAMILY CAN
INVEST TO CHANGE THE FACADE MATERIALS

RENEWABLE SYSTEM

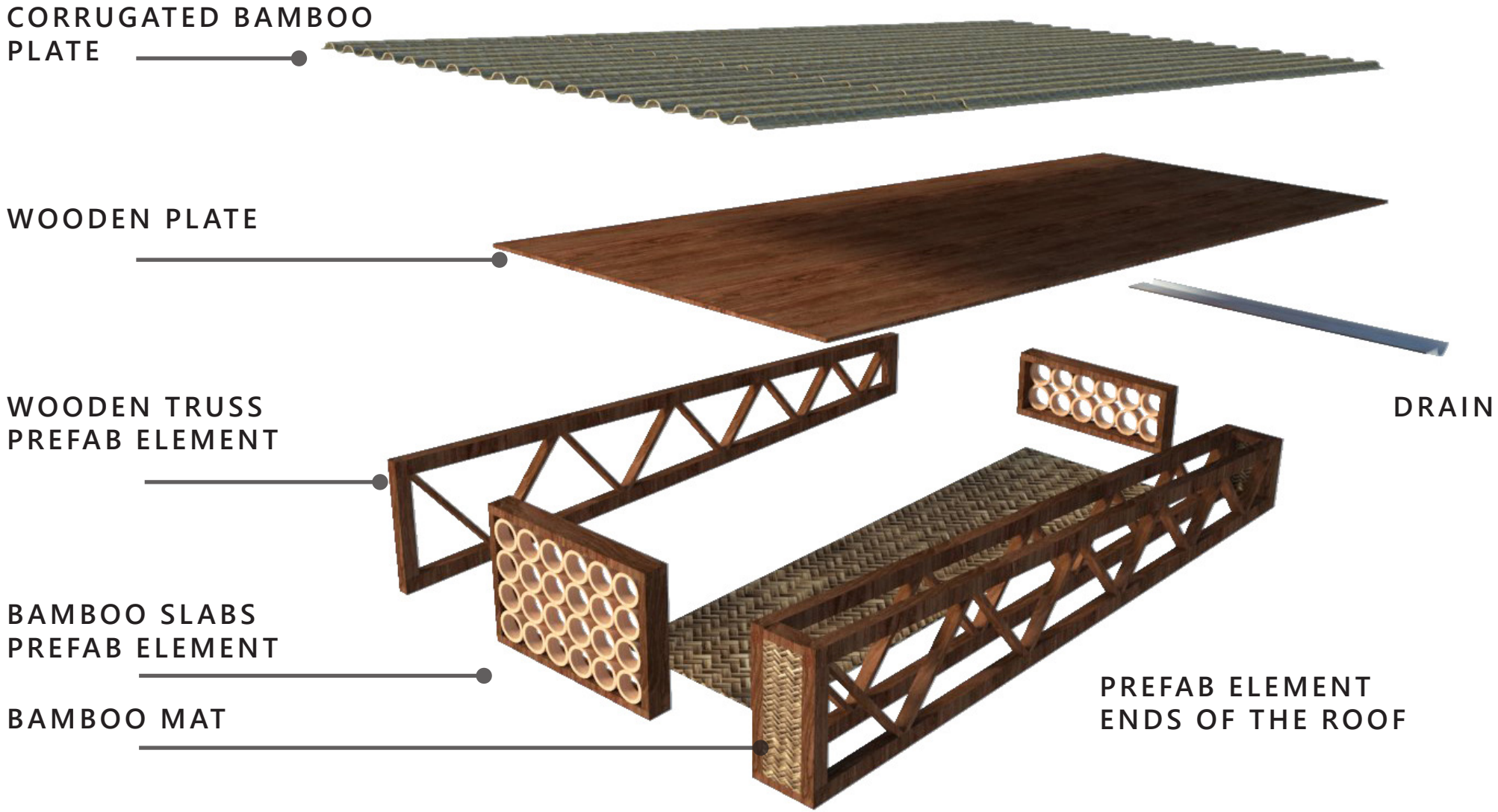


EXPLODED VIEW



ROOF ELEMENT

EXPLODED VIEW

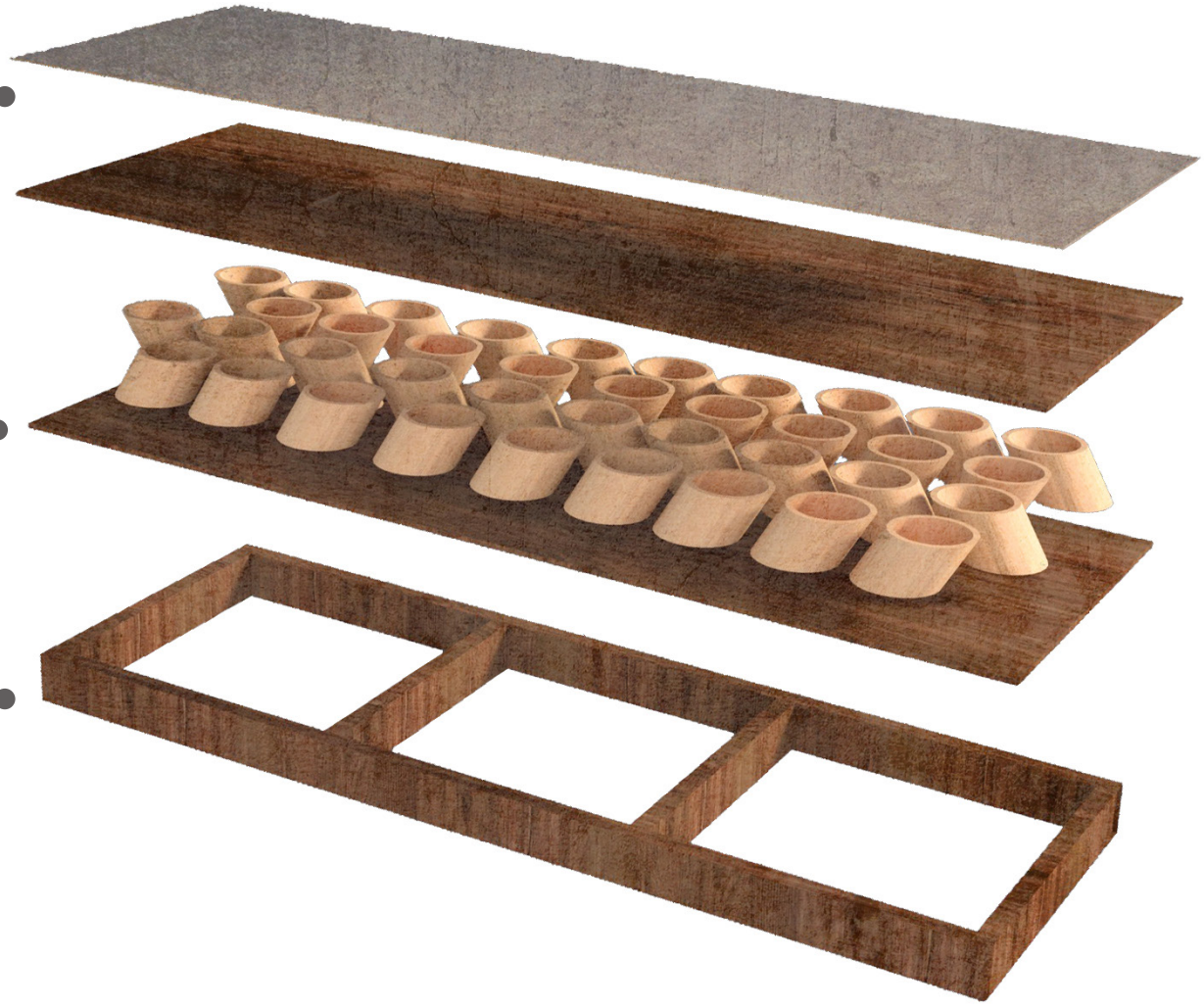


FLOOR ELEMENT

BIOFLEXI FLOOR TILES
OR BANANA FIBRE

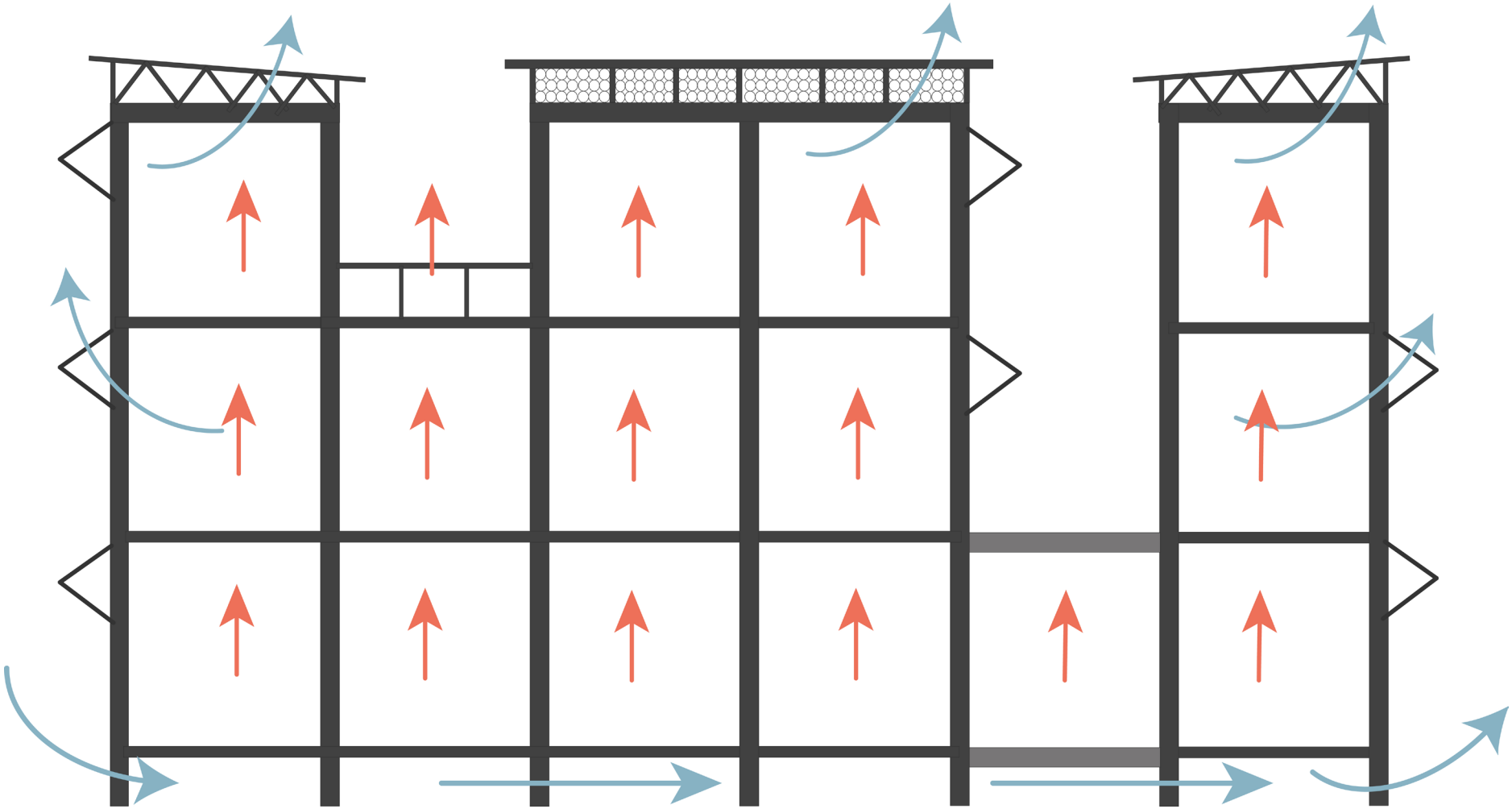
BAMBOO SANDWICH
FLOOR

FLOOR SECONDAIRY
BEAMS

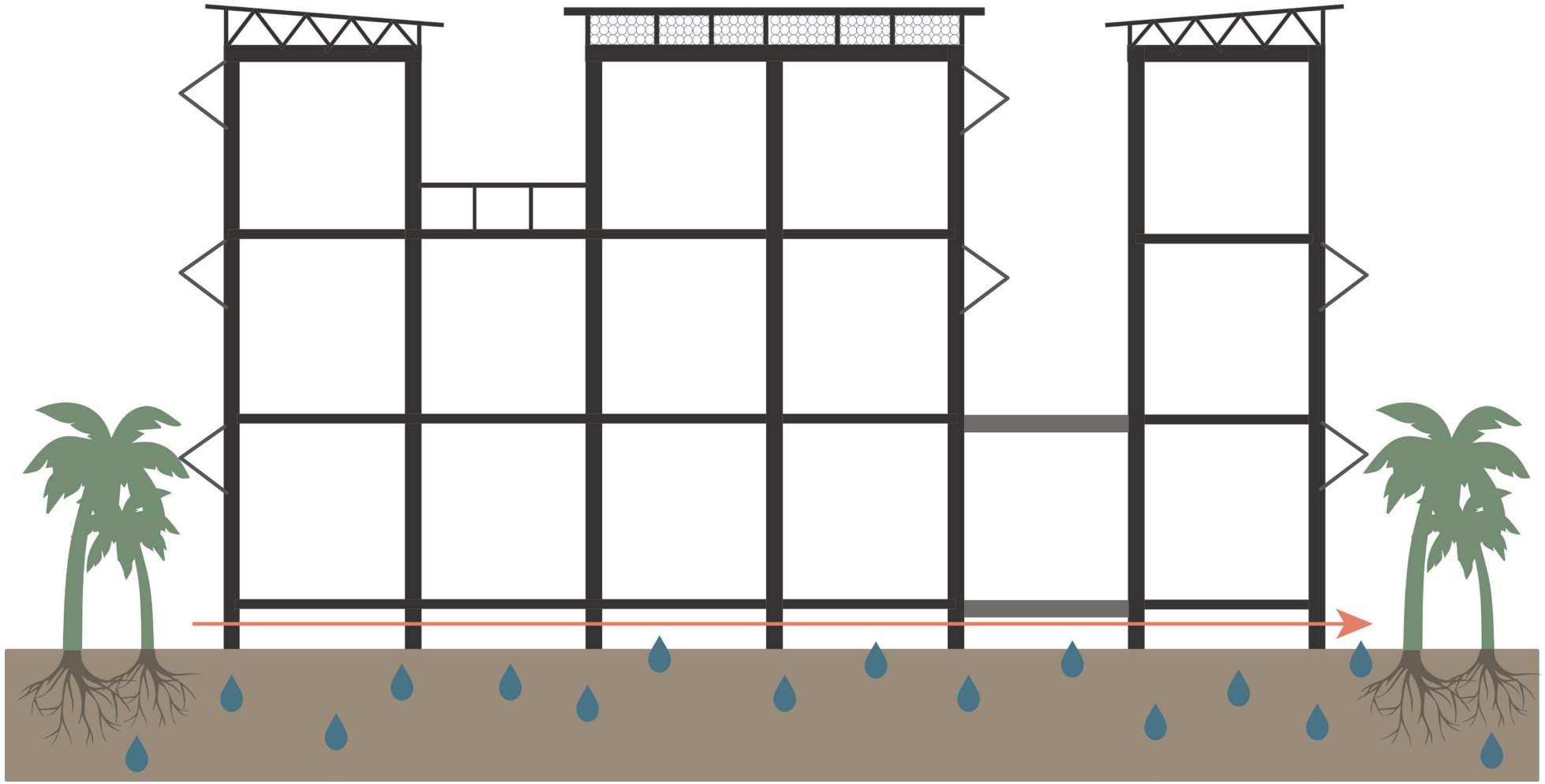


CLIMATE

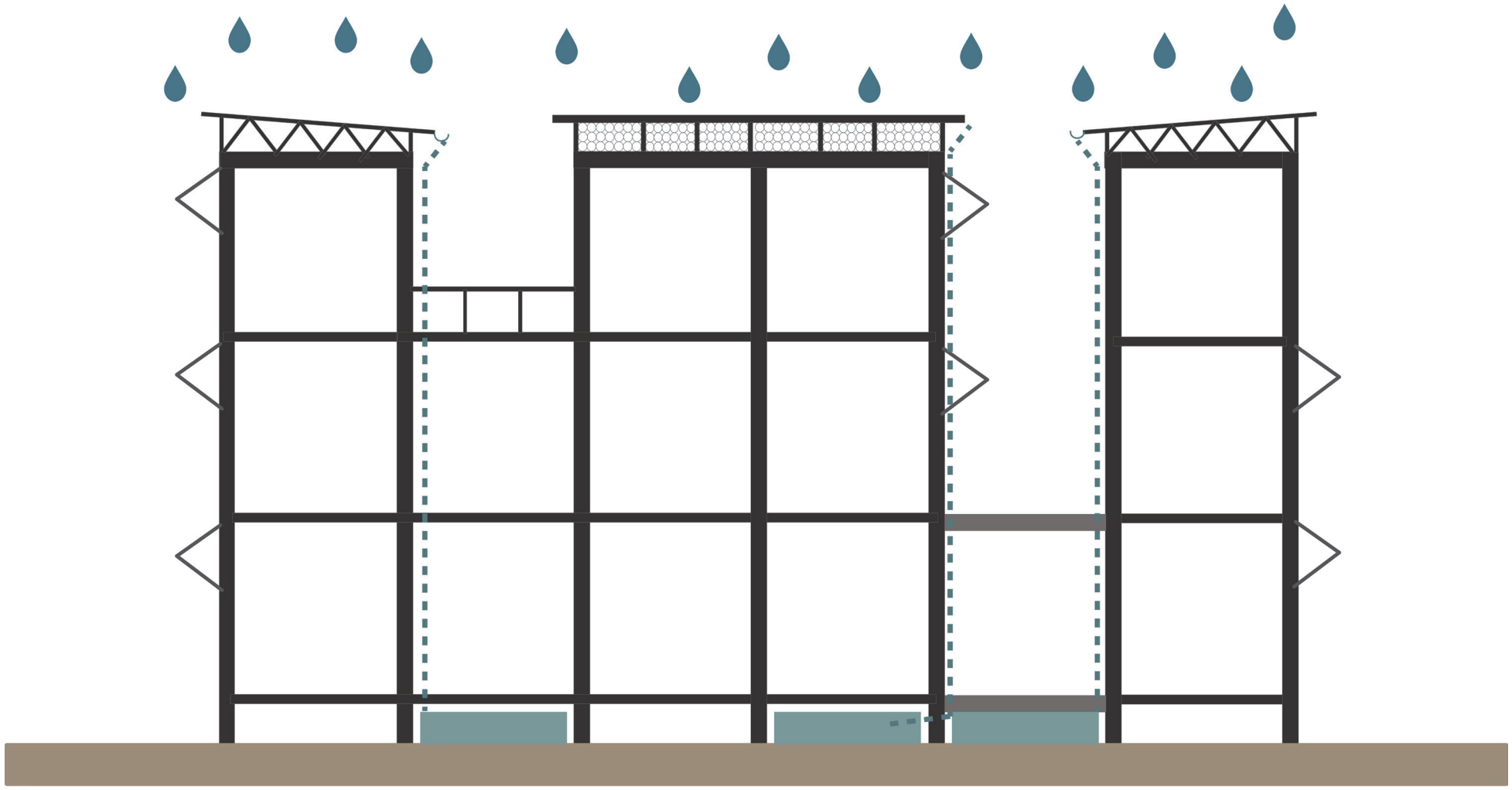
NATURAL VENTILATION



GROUNDWATER & PURIFICATION



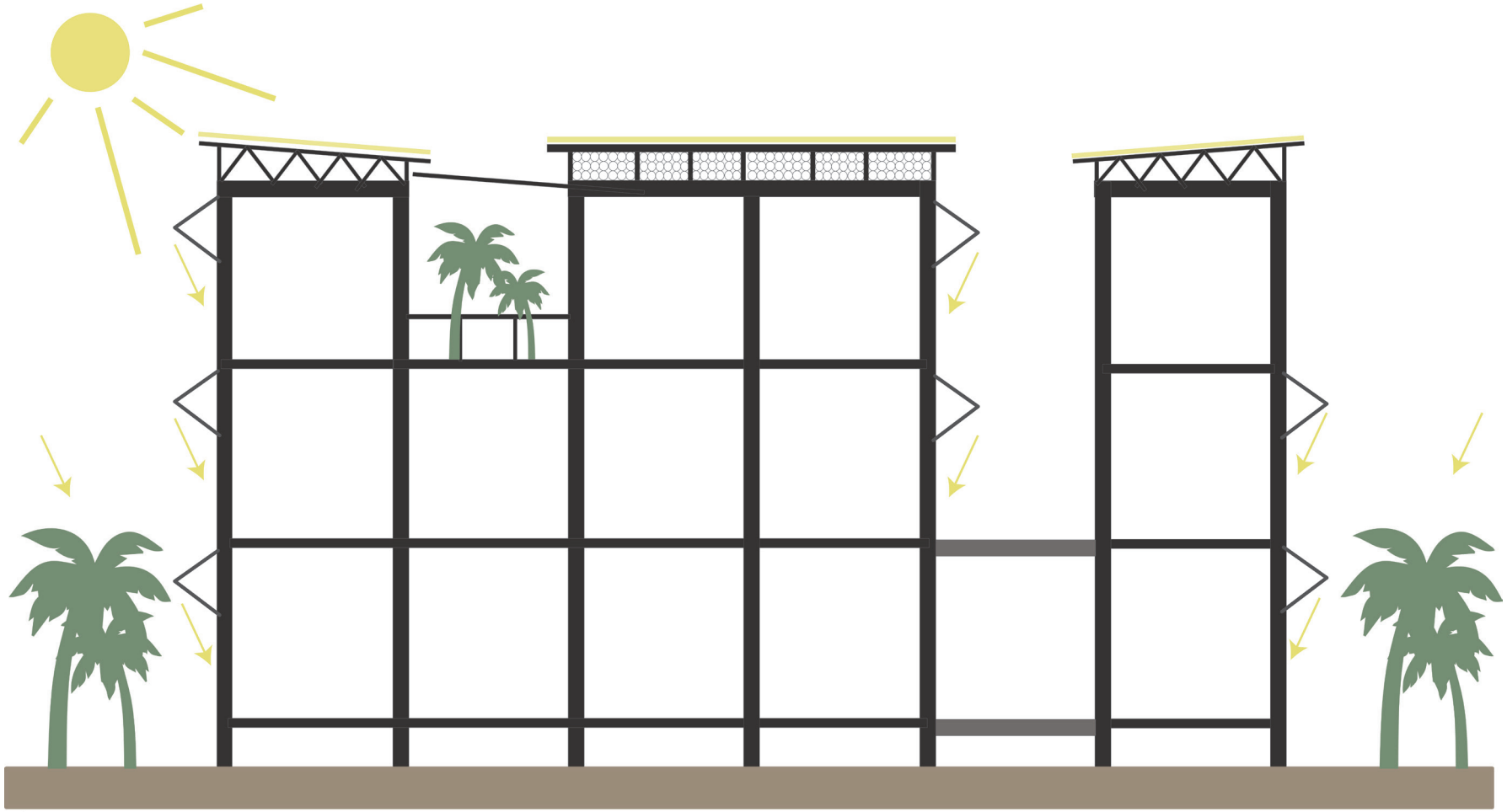
COLLECTING RAINWATER



AVERAGE COLLECTING / DAY = +-1000 L

15-17 PERSONS WATER USE / DAY = 2100 L

SOLAR PANELS (OPTIONAL)



AVERAGE SOLAR ENERGY / YEAR / M^2 = 120 KWH

ONE HOUSEHOLD NEEDS 8 M^2 OF SOLAR PANELS

YEARLY USE / HOUSEHOLD = 925 KWH

THIS TYPOLOGY HAS 5 HOUSEHOLDS

DESIGN

HOW DOES THE PROJECT START ?

1. WORKING TOGETHER WITH THE GOVERNMENT AND START UP THE PROGRAM WITH A ORGANISATION OF SELF HELP HOUSING (KIP)

2. BUILD A WORKSHOP PLACE ON THE LOCATION IN COLLABORATION WITH THE LOCAL CONTRACTORS TO TEACH THE BUILDING METHOD

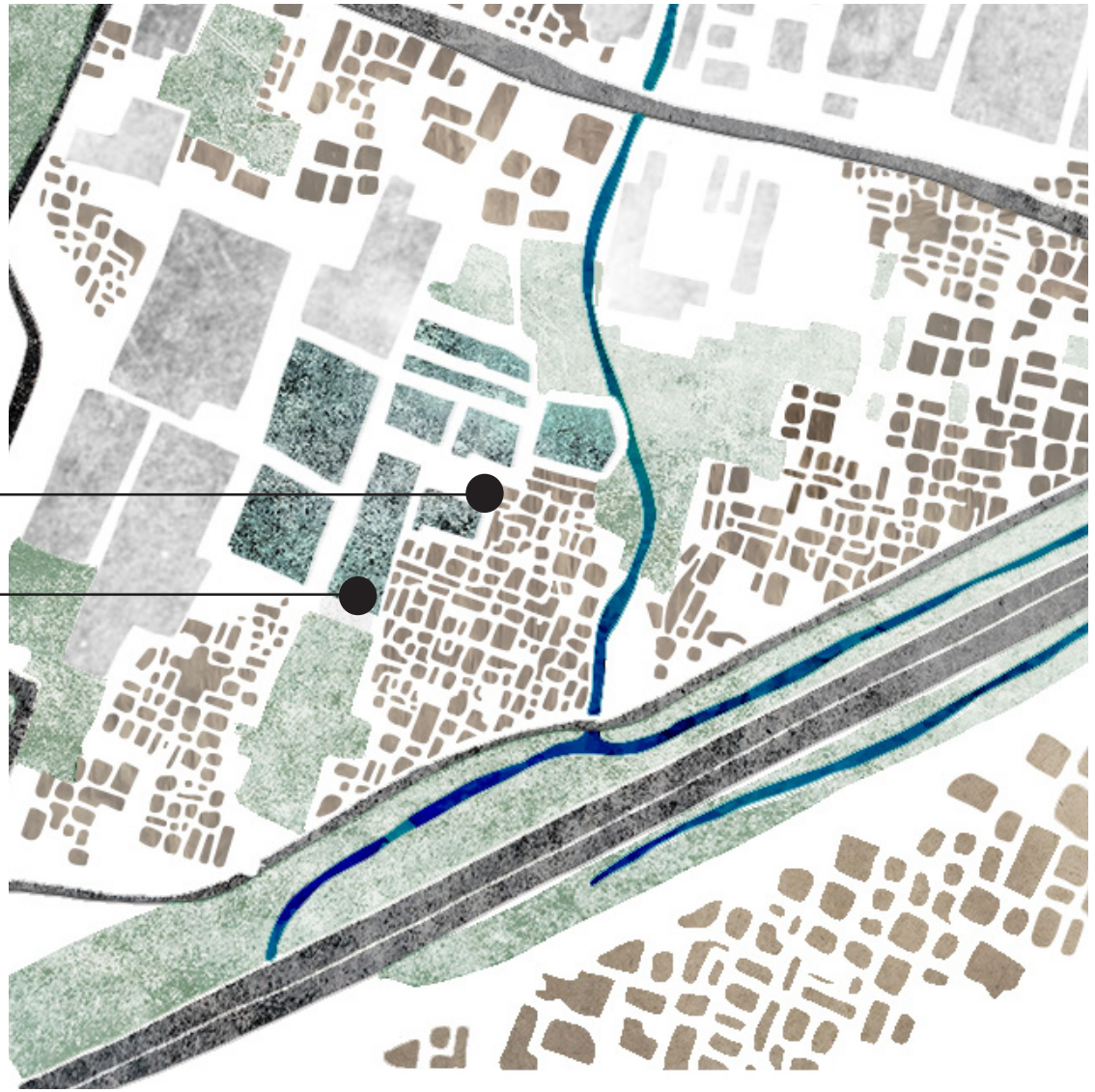
3. SET UP DIFFERENT WORKSHOPS IN THE BUILDING TO LEARN THE COMMUNITY ABOUT THE NEW MATERIALS AND BUILDING METHOD UNDER GUIDANCE OF THE LOCAL CONTRACTORS

4. BUILD THE FIRST TYPOLOGY FOR FAMILIES ON LOCATION

BUILDING LOCATION

FIRST TYPOLOGY

LOCATION WORKSHOPS



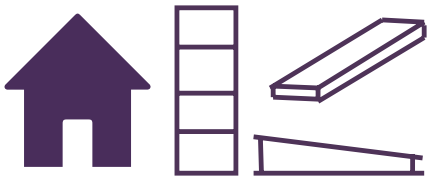
FIRST
TYPOLOGY

PROBLEMS
WITH FLOODING

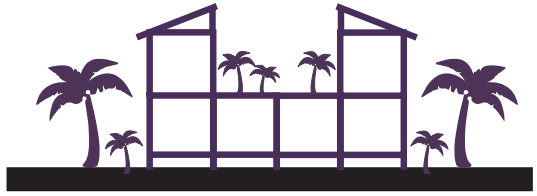
LOCATION
WORKSHOPS
WITH GOOD
ACCESS FROM
THE MAIN ROAD

IMPORTANT
SOCIAL PLACE

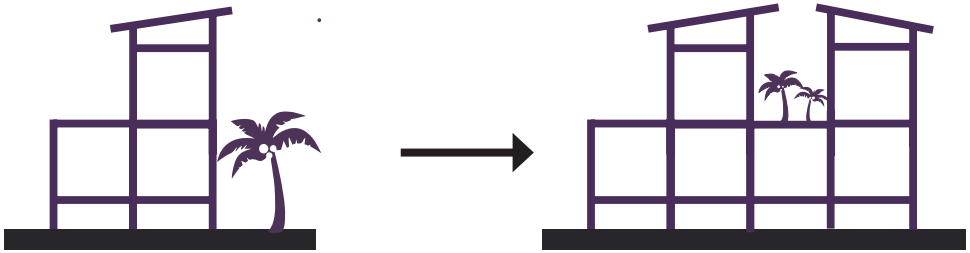
FAMILY WANTS TO INVEST IN A NEW HOUSE BECAUSE OF THE FLOODING ISSUES



BUY PREFAB ELEMENTS AND PERSONALIZE WITH MATERIALS AT THE LOCAL WORKSHOP



STARTS TO BUILD IN FASES; FIRST LIVING PART, RENTING ROOMS, SHOP



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MORE FAMILIES JOIN THE BUILDING AND BUILD THEIR HOME AND SHARE THE SHOP OR RENTING ROOMS


BUANA ABADI


BUANA ABADI


BUANA ABADI

GROUND FLOOR

FIRST FLOOR

SECOND FLOOR

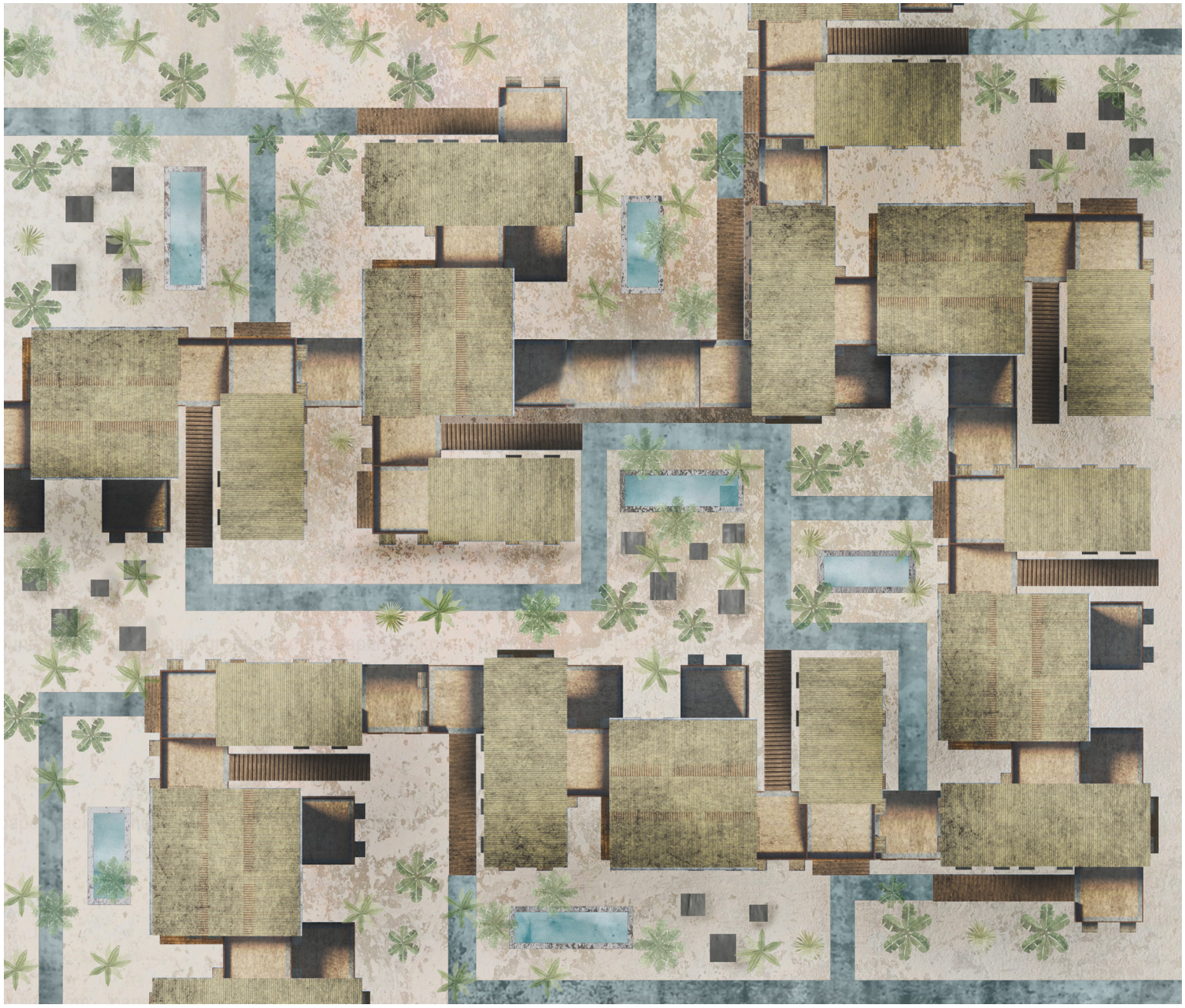
DESIGN // *Section*

HOW TO PROVIDE URBAN QUALITY

1. SET UP URBAN RULES IN CORPORATION WITH THE LOCAL SELF HELP HOUSING ORGANISATION

2. MAXIMUM OF 18 PEOPLE IN A COMMUNITIVE BUILDING TO PROVIDE A HIGH QUALITY LIVING SPACE

3. MAXIMUM OF 70% OCCUPIED BY BUILDINGS AT ONE SQUARE KILOMETER TO PROVIDE 20% PUBLIC AND GREEN SPACE AROUND THE HOUSES



FEEDBACK FROM LOCAL CONTRACTORS

NADIA INTERVIEWED LOCAL CONTRACTORS ABOUT THIS DESIGN AND PROJECT

FEEDBACK FROM LOCAL CONTRACTORS

FEEDBACK FROM LOCAL CONTRACTORS

DO THEY THINK THAT THIS DESIGN IS BEAUTIFUL?
YES, ESTHETICALLY FOR SURE, BUT THE DESING IS QUITE LUXURIOUS FOR THE KAMPUNG, IT LOOKS MORE LIKE A LARGE VILLA FOR A VACATION.

WHAT DO YOU THINK ABOUT THE CONCRETE STRUCTURE?
THE CONCRETE LOOKS VERY GOOD, IT LOOKS LIKE A MINIMALISTIC DESIGN BUT NORMALLY WE PLASTER THE CONCRETE TO MAKE IT PRECISE.

WOULD YOU WANT TO LIVE IN THIS HOUSE WITH A BAMBOO FACADE?
YES, IN COMBINATION WITH THE CONCRETE STRUCTURE IT IS POSSIBLE, BECAUSE IF YOU ARE ABLE TO BUY CONCRETE IT IS NOT ASSOCIATED WITH THE POVERTY.

END

THANK YOU

PRODUCTION BIOBASED FACADE

MADE FROM AGRO-FIBERS AND A PLANT-BASED THERMOSET BIORESIN.

- COCONUT FIBRES
- STRAW
- RICE STRAW

THE FACADE PANELS HAVE GOOD RESISTANCE AGAINST WEATHERING CONDITIONS

1. CUTTING THE FIBRES WITH A CUTTING MILL UNTIL 1 MM LENGTH
2. MIXING THE FIBRES WITH A BIOBASED RESIN MADE OF LINSEED OIL AND ORGANIC ANHYDRIDES FOR 24-48 HOURS
3. MAKING THE MOLDS (CARVING A FOAM BLOCK)
4. PRESSING THE MIXTURE IN THE MOLDS FOR 24 HOURS AT ROOM TEMPERTURE
5. REMOVE THE PANEL FROM THE MOLD AND LET IT HARDEN FOR 24-48 HOURS

PRODUCTION BAMBOO FLOOR

CONVENTIONAL PRODUCTION OF BAMBOO SLABS WASTES UP TO 40% OF THE RAW MATERIAL USED.

THE STABILITY OF A 35 MM BAMBOO SANDWICH PANEL IS EQUIVALENT TO THAT OF A 6 MM STEEL PLATE

1 CUTTING THE BAMBOO IN CROSS SECTIONS

2 THE DIAGONALLY CUT BAMBOO CROSS-SECTIONS ARE GLUED IN ALTERNATE ROWS AND FACING IN OPPOSITE DIRECTIONS BETWEEN TWO PLATES.

PRODUCTION BIOBASED INTERIOR FLOOR

MADE FROM 80%-90% STRAW IN COMBINATION WITH A BIO RESIN AND CEREAL GRAINS (WHEAT, RICE, OAT, RICE STRAW)

- RECYCLABLE
- INEXPENSIVE RAW MATERIAL
- FLEXIBLE

1. CUTTING THE FIBRES WITH A CUTTING MILL UNTIL 1 MM LENGTH
2. MIXING THE FIBRES WITH A BIOBASED RESIN MADE OF LINSEED OIL AND ORGANIC ANHYDRIDES FPR 24-48 HOURS
3. MAKING THE MOLDS (CARVING A FOAM BLOCK)
4. PRESSING THE MIXTURE IN THE MOLDS FOR 24 HOURS AT ROOM TEMPERTURE
5. REMOVE THE PANEL FROM THE MOLD AND LET IS HARDEN FOR 24-48 HOURS

PRODUCTION BIOBASED INTERIOR FLOOR

MADE FROM 100% RESIDUAL MATERIAL OF THE BANANA PLANT.

- STRONG AND LIGHTWEIGHT
- INEXPENSIVE RAW MATERIAL
- FLEXIBLE

1. THE BANANA PLANT SECTIONS WERE CUT FROM THE MAIN STEM OF THE PLANT AND THEN ROLLED LIGHTLY TO REMOVE THE EXCESS MOISTURE
2. IMPURITIES OF THE ROLLED FIBERS SUCH AS BROKEN FIBER ARE REMOVED
3. CLEAN AND DRY THE FIBERS
4. ADDING IT INTO A MACHINE THAT EXTRACT THE BANANA FIBERS
5. AFTER FIBER IS COLLECTED, THE PROCESS GOES TO A YARN SPINNING

PRODUCTION BIOBASED ROOF

MADE FROM WAVED BAMBOO MATS

- ABSORBS LESS HEAT IN COMPARISON WITH STEEL
- DURABLE AND STRONG
- HIGH RESISTANCE WEATHERING
- EASY TO APPLY
- HIGH STRENGTH

1. CUT THE BAMBOO WITH A SLIVER IN STRIPS
2. THE BAMBOO STRIPS ARE WOVEN INTO MATS
3. THE MATS ARE SOAKED IN ADHESIVE RESIN
4. THE MATS HAVE TO DRAIN AND DRY
5. THE MATS ARE GLUED TOGETHER UNDER HIGH PRESSURE AND CAN BE CUT TO THE FINAL SHAPE