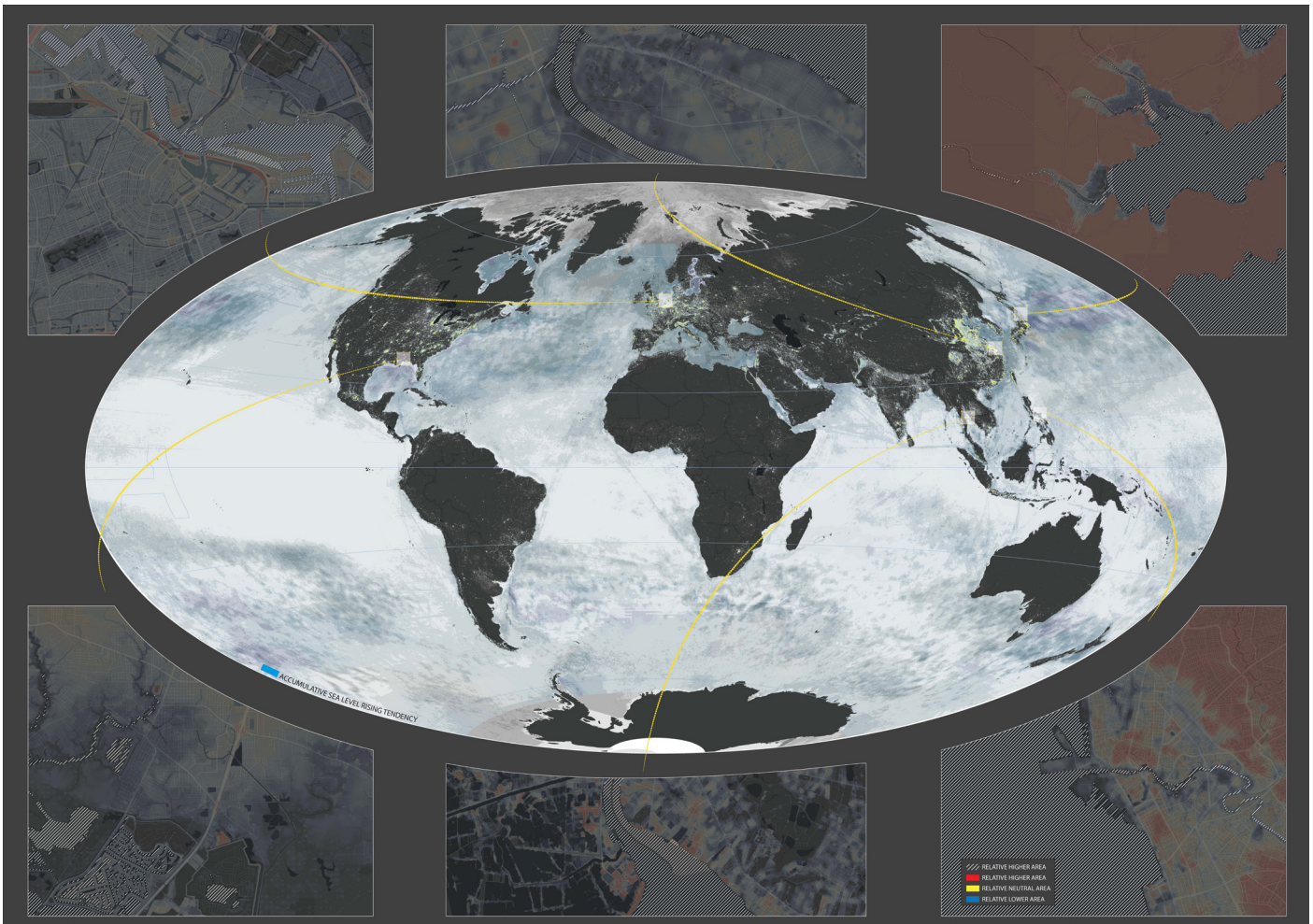
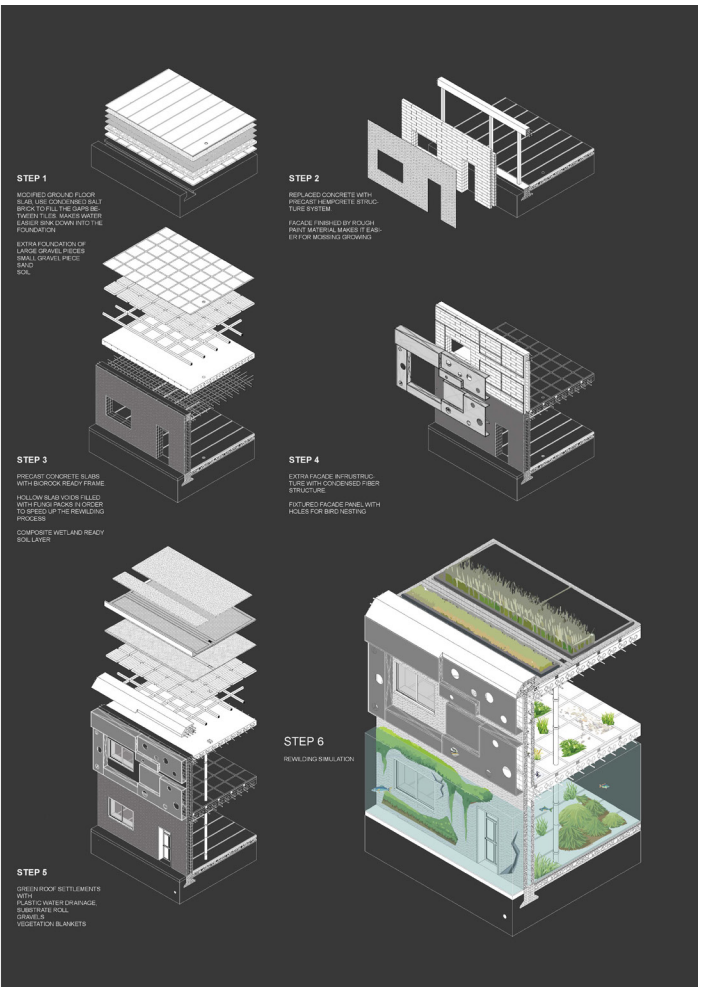
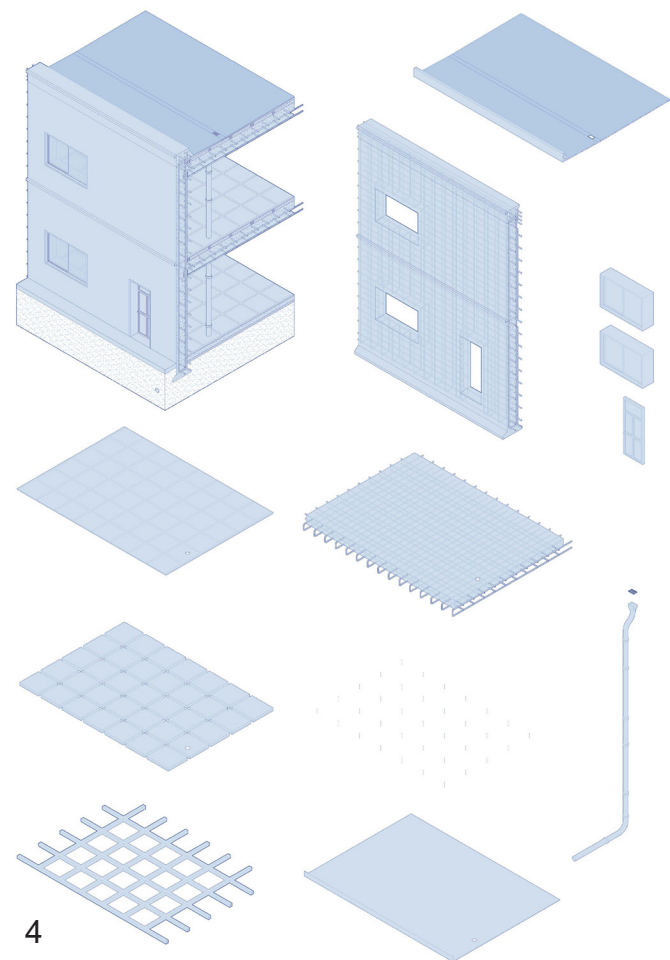
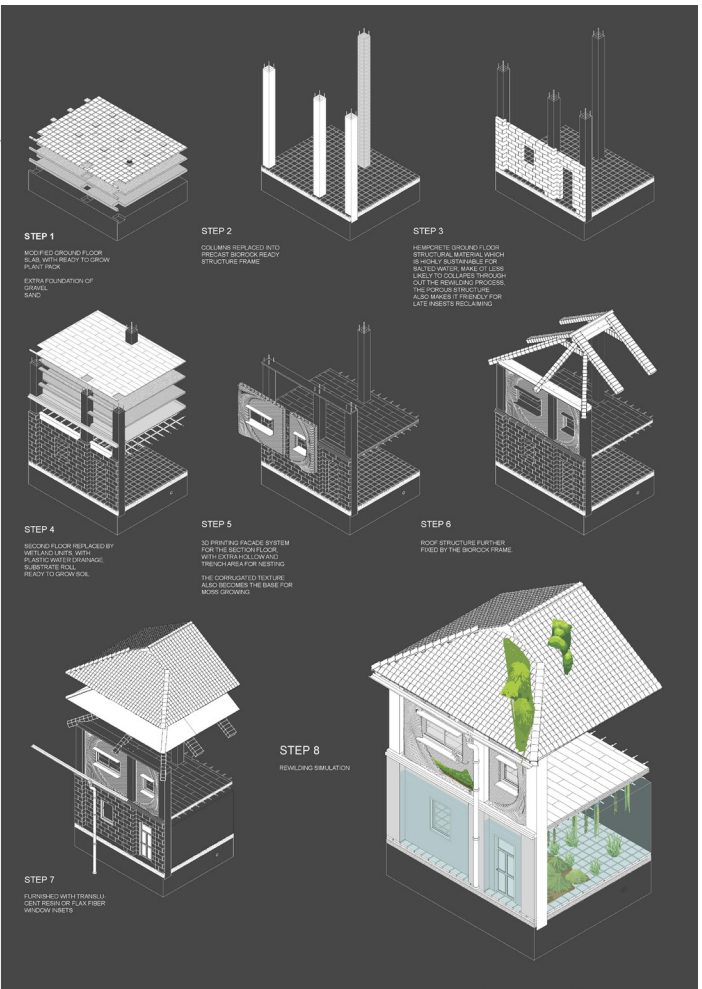
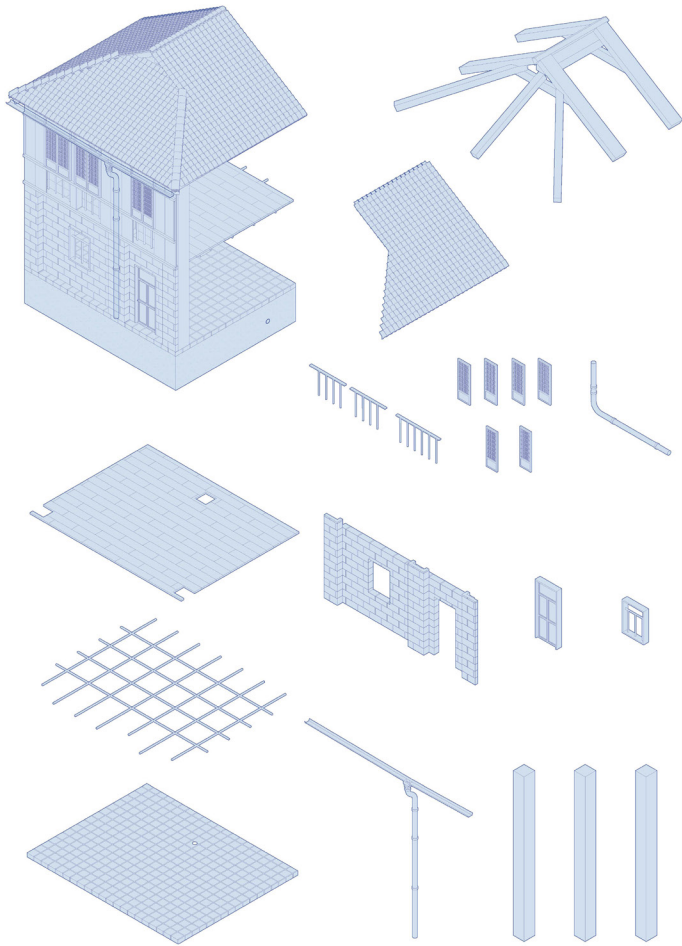


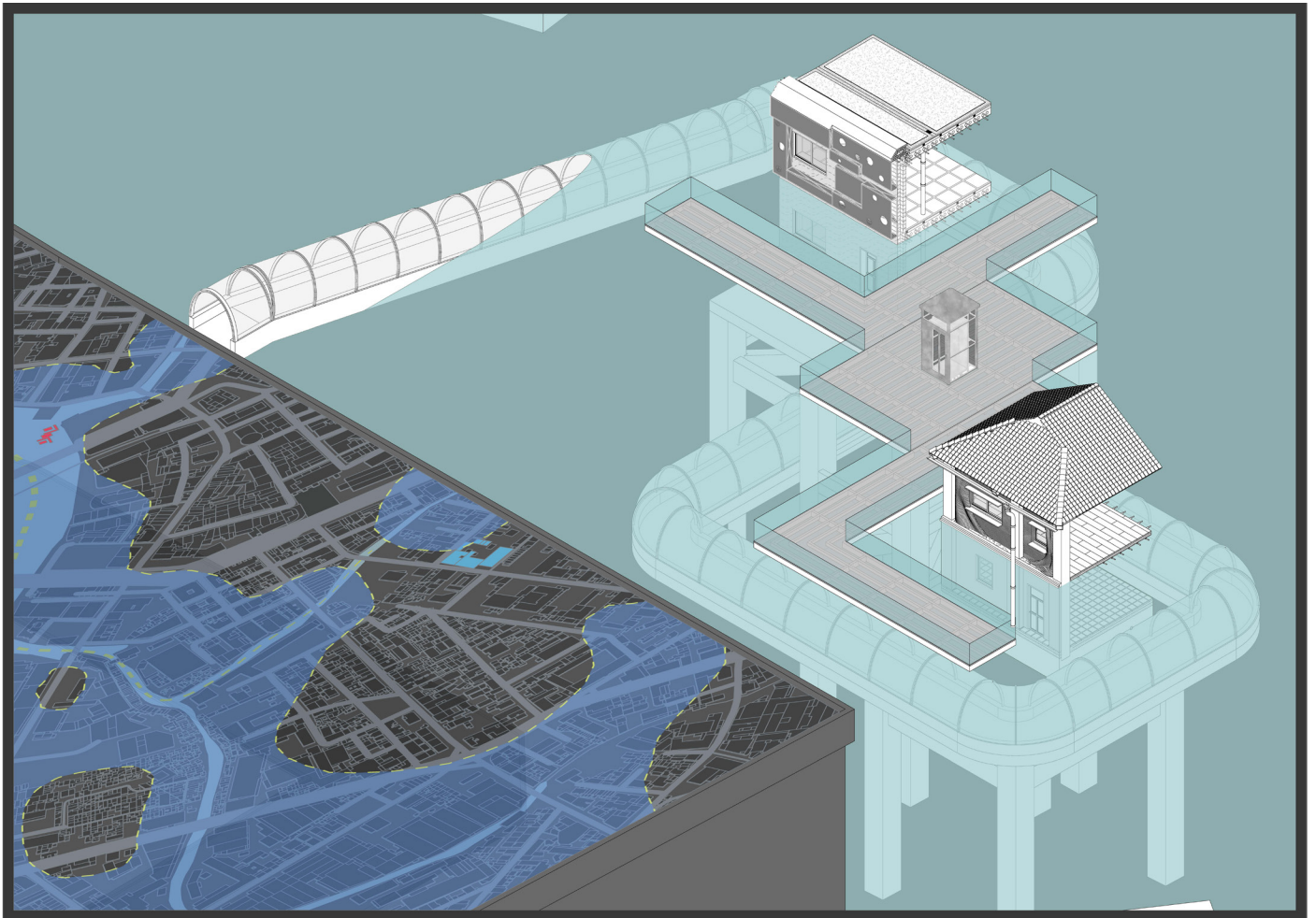


This design responds to the inevitable rewilding caused by continuous sea-level rise. As coastal buildings become flooded, unsafe, or no longer useful for humans, many of them will eventually be abandoned. Instead of seeing this abandonment as a failure, the project treats it as a future condition that architecture should prepare for.

The design does not try to stop sea-level rise, but asks how buildings can still have a role after humans leave. By modifying walls, floors, openings, cavities, and surfaces, the abandoned structure can slowly become a habitat for plants, animals, insects, water, and other natural forces. In this way, the building changes from a human-centered object into an ecological framework that helps nature return.



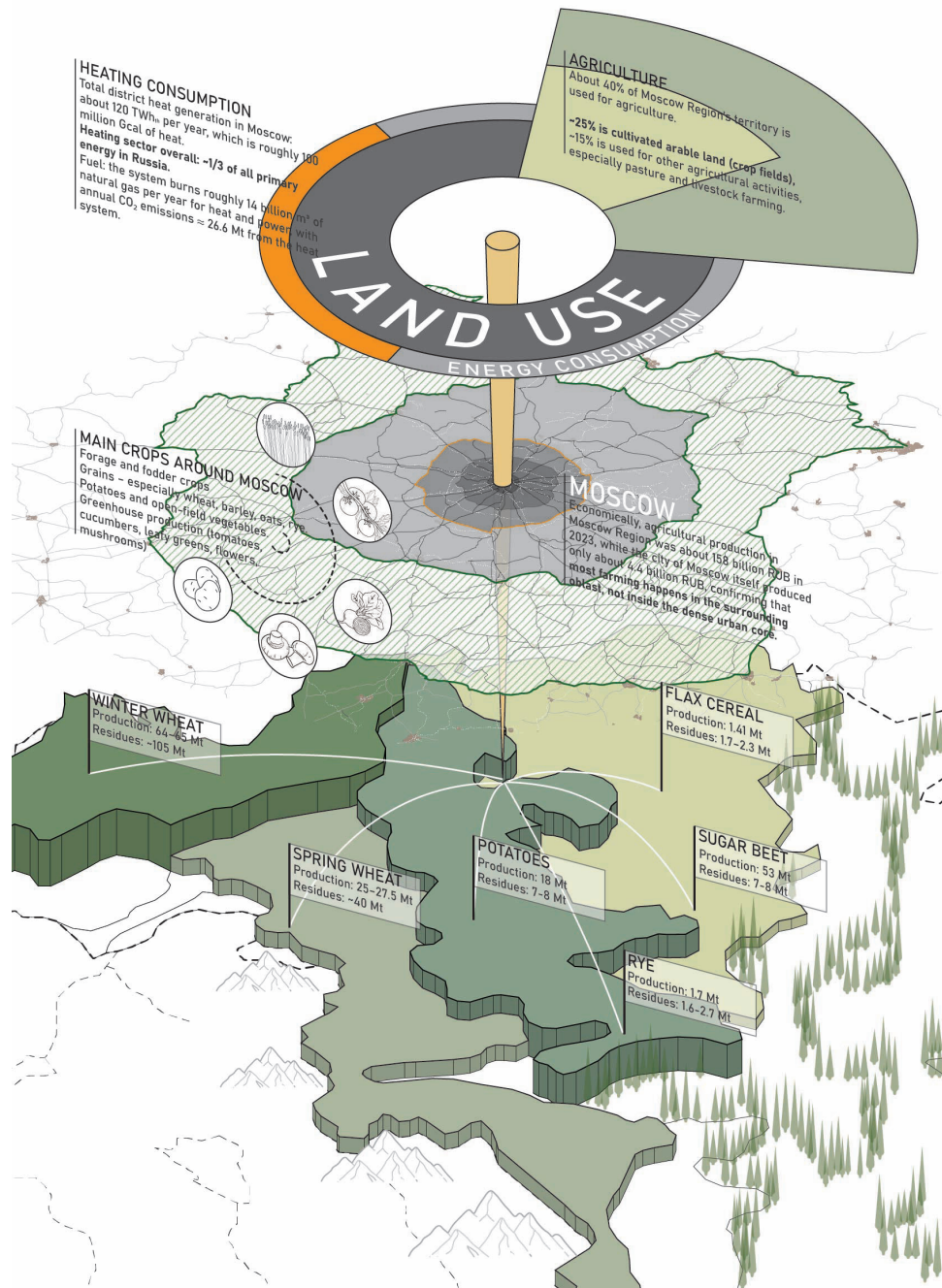




Focusing in the actual site Manila, Philippines, where is most likely to be effected by the sea level rising issue.

By disassembling two main housing type: reinforsted concrete and traditional Bahay na Bato housings, the design intends to find the rewilding sustainability of these existing building in the future flooded condition by replacing or refining the minimum level of current structure.

The samples chunks will be settled and exhibited in the river mouth of Manila Bay, the visitor would be able to get under the water surface and have a more intuitive way of seeing how these buildings will be reclaimed by the nature after human beings are moved out.



Moscow's energy use is highly shaped by its long and cold winter. Because buildings need heating for many months, winter heating becomes one of the largest parts of urban energy consumption. Most buildings depend on district heating systems, which distribute hot water from large energy plants across the city. Although this system works efficiently at an urban scale, it still relies heavily on natural gas, meaning that keeping buildings warm also produces a large carbon footprint.

This design responds to that condition by connecting material production with building heating. The project uses pyrolysis to transform biomass or agricultural waste into biochar, a carbon-storing material that can be used in construction. During pyrolysis, the reactors constantly produce high-temperature waste heat. Instead of releasing this heat, the building captures it from the basement production area and circulates it through floors, walls, and air systems. In this way, waste becomes material, and waste heat becomes winter energy.

PLANT
FARMING

AGRICULTURE
WASTE

Straw
Stubble
Husks
Shells

MYCELIUM

Substrate
Moisture
Oxygen (Rich Carbon Dioxide)
Warmth
Time

DIRECT
REUSE

WASTE
MANAGEMENT

MACHINERY
TREATMENT

PYROLYSIS
KILN

BIOCHAR

CONSTRUCTION

LIVING
SYSTEM

ENERGY
7

HARVESTS

CLEAN
AIR

THERMAL
OXIDIZER

H₂ (Hydrogen)
H₂O (Water)
CO₂ (Carbon Dioxide)

Thermal oxidizers are used to destroy hazardous air pollutants (HAPs) and volatile organic compounds (VOCs) from industrial air streams.

Environmental protection and pollution reduction.
Resource conservation.
Economic benefits.
Enabling a circular economy.

CO (Carbon monoxide)
VOCs (Volatile organic compound)
H₂
CH₄ (Methane)
Pyrolysis gas is a mixture of gases produced from the thermal decomposition of organic materials in an oxygen-free environment

PYROLYSIS
AIR

HEAT

Pyrolysis works by heating organic materials to high temperatures in the absence of oxygen, causing them to decompose into three main products: a liquid oil (bio-oil), a solid char (bio-char), and a gas (syngas)

Locks up carbon: Turns waste biomass into stable carbon stored in the building.
Lightweight + insulating: Porous structure cuts weight and improves thermal/acoustic performance.
Moisture & air quality help: Buffers indoor humidity and can adsorb some VOCs/odors.
Fire-friendly filler: Char-forming, non-melting; can improve fire behavior in plasters/renders.
Circular + local: Made from residues; supports regional supply chains and can reuse process heat.

CHARLOOP RESIDENCE

RENNOVATIVE INSULATION PANEL

Panel size: 1 m²
 Number of panels: 336 piece = 336 m² total
 Panel thickness: 0.15 m
 Density (assumed): 100 kg/m³
 Mix: 50% mycelium + 50% biochar (by mass)

Composite emission factor: -1.11 kg CO₂e per kg
 (A1-A3, incl. biogenic storage)

Conventional insulation (A1-A3, per m² of same
 R-value):

XPS ≈ 103 kg CO₂e/m²
 Mineral wool (low) ≈ 16 kg CO₂e/m²
 Mineral wool (high) ≈ 38 kg CO₂e/m²

Composite footprint per m²

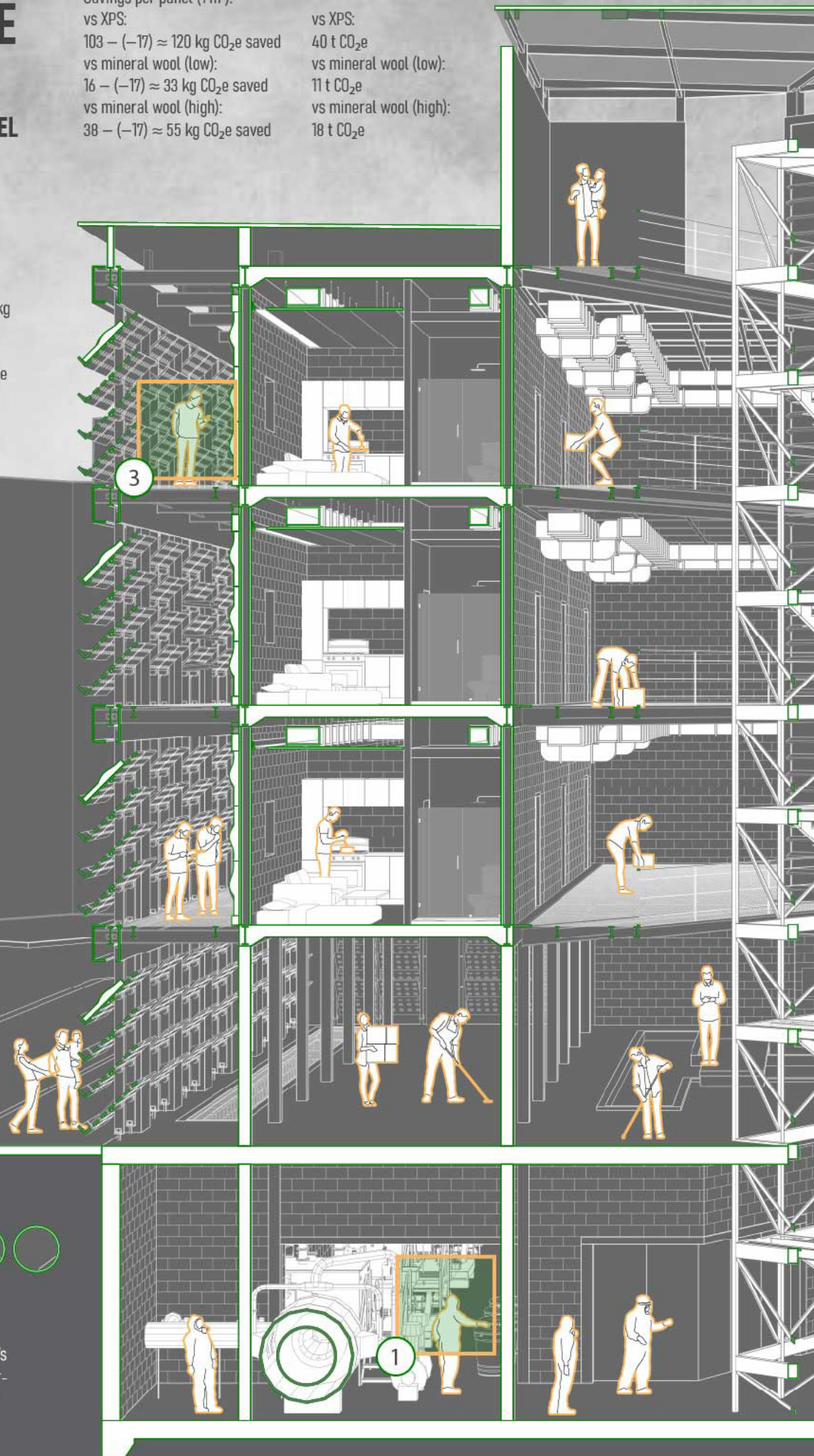
Mass per m²
 = density × thickness
 = 100 kg/m³ × 0.15 m
 = 15 kg per m² panel

Embodied carbon per m²
 = 15 kg × (-1.11 kg CO₂e/kg)
 = ≈ -17 kg CO₂e/m²

CARBON SAVINGS

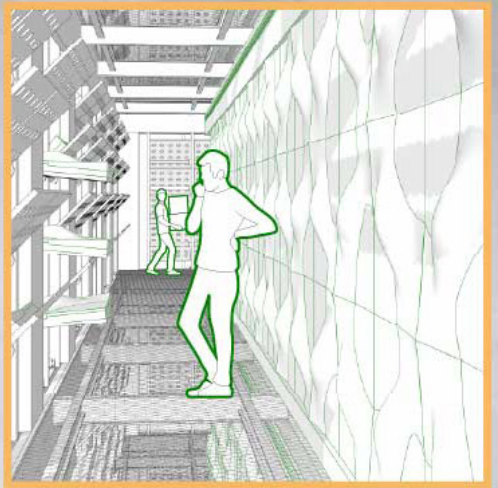
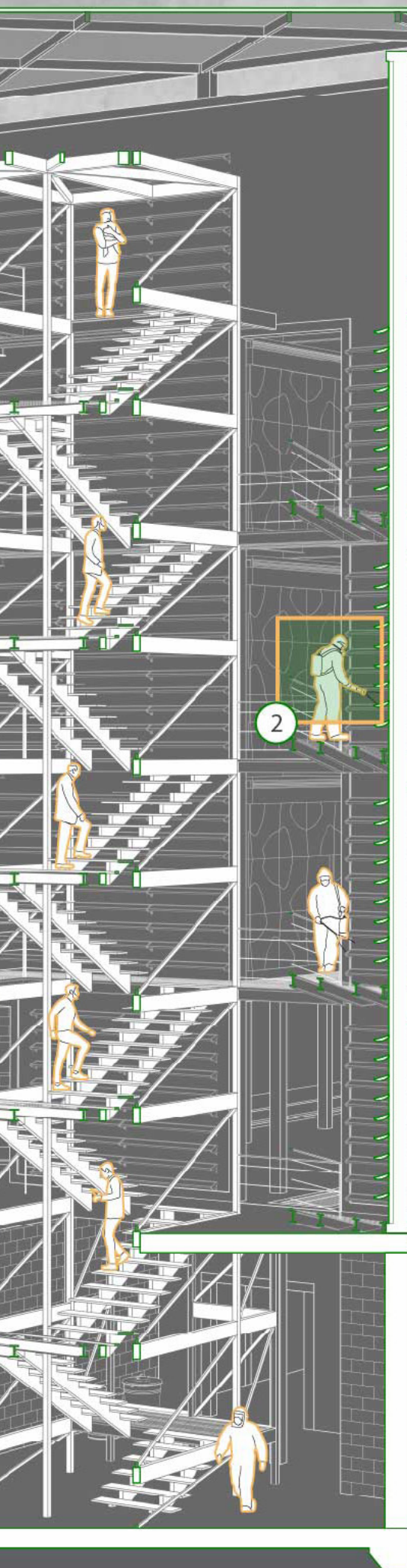
Per 1 m² panel
 Savings per panel (1 m²):
 vs XPS:
 103 - (-17) ≈ 120 kg CO₂e saved
 vs mineral wool (low):
 16 - (-17) ≈ 33 kg CO₂e saved
 vs mineral wool (high):
 38 - (-17) ≈ 55 kg CO₂e saved

For all 336 panels (336 m²)
 vs XPS:
 40 t CO₂e
 vs mineral wool (low):
 11 t CO₂e
 vs mineral wool (high):
 18 t CO₂e



WASTE HEAT

Nine basement pyrolysis 'ovens' running on local biomass act as a permanent hot core: even without engineered heat-recovery, their natural heat release can offset roughly 20-50% of a typical Moscow apartment block's heating demand (≈ 40% in our central scenario), avoiding on the order of 150 tCO₂ per year of fossil heat for this one building.



Scene 3
Panel Drying Shelf

While the general area in the building are heated up by the pyrolysis lab in the basement, the hot air will be moving across the spaces due to different air pressure. Wind will be caused during this process. Shelves are settled here to utilize the wind for drying up the hybrid biochar panels, and they will be settled up as soon as they are fully drought and ready for using.



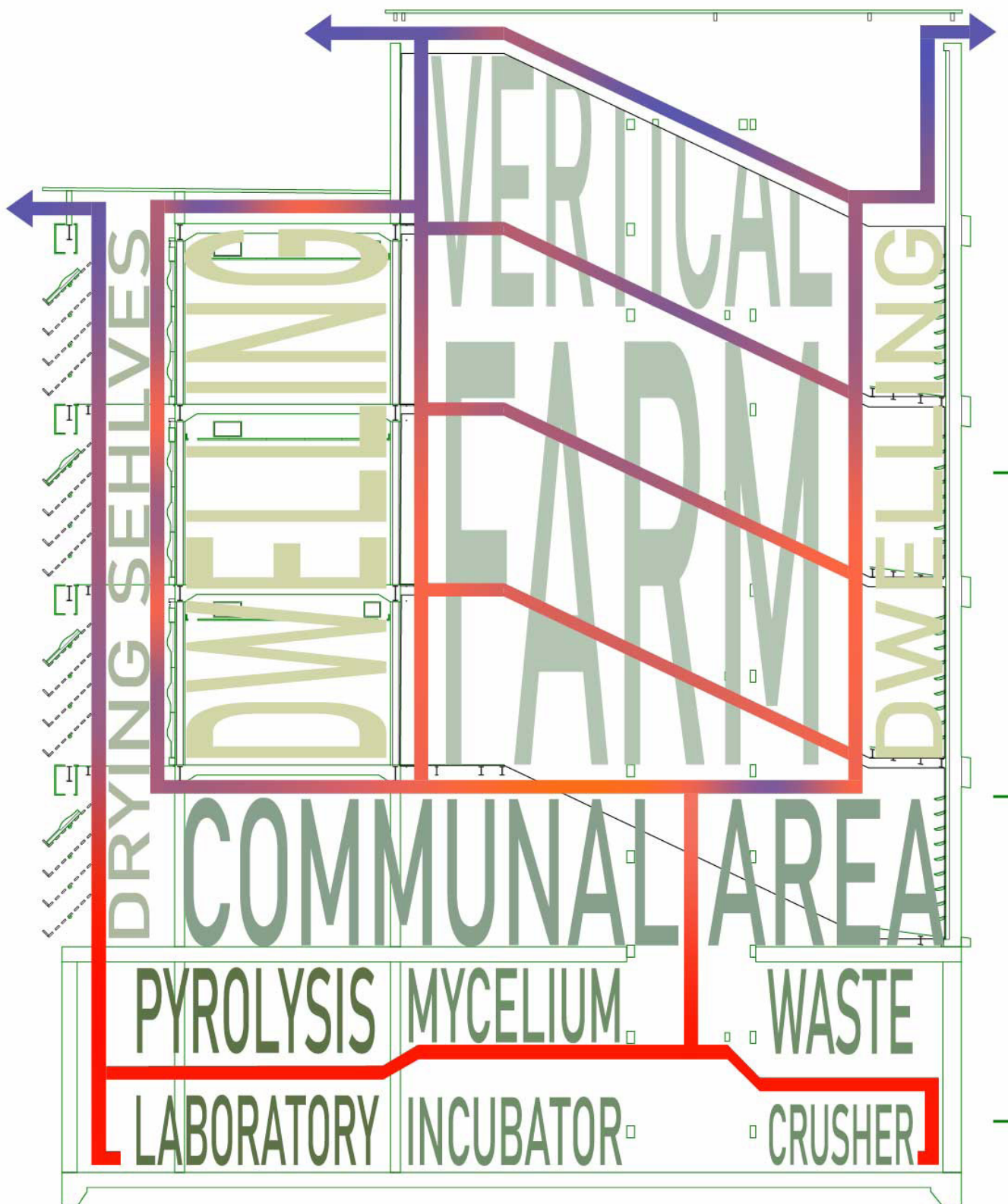
Scene 2
Vertical Farm

Utilizing the purified air and waste heat from pyrolysis machines, the walls become perfect foundations for growing plants. The plants further helps adjust the humidity and air quality to provide better living circumstance for the residents.



Scene 1
Pyrolysis Lab

Waste will be gathered and assorted in the pyrolysis lab, the organic waste will then be put into the pyrolysis to be manufactured into biochar.



Low



Dv

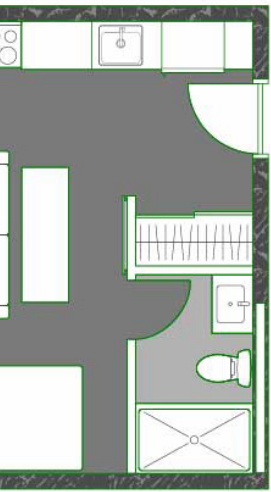
G

-A

-Pyro

Thermal Altitude

High



Dwelling Unit Plan

FLOOR 2-4

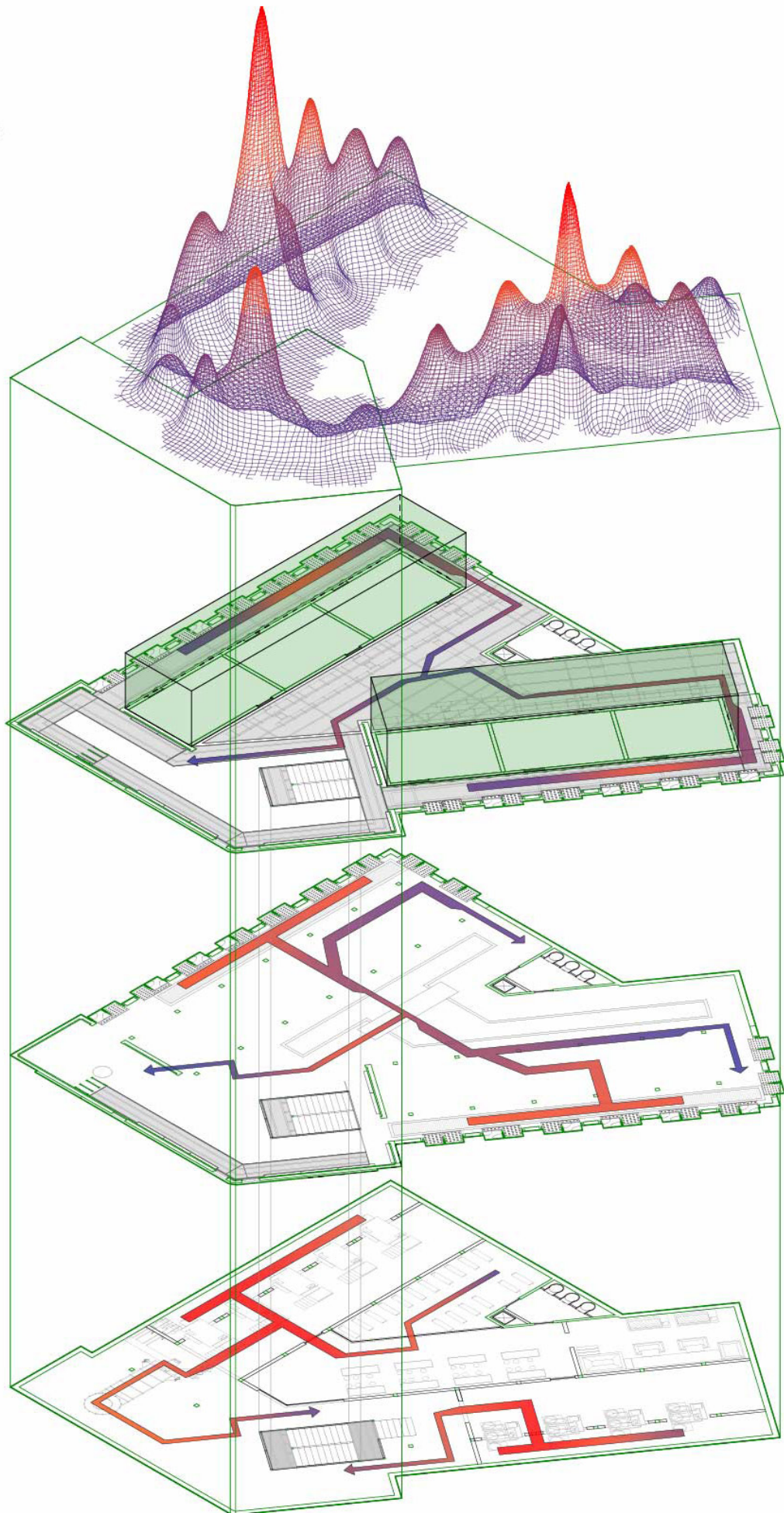
-Dwelling Units
-Vertical Farm

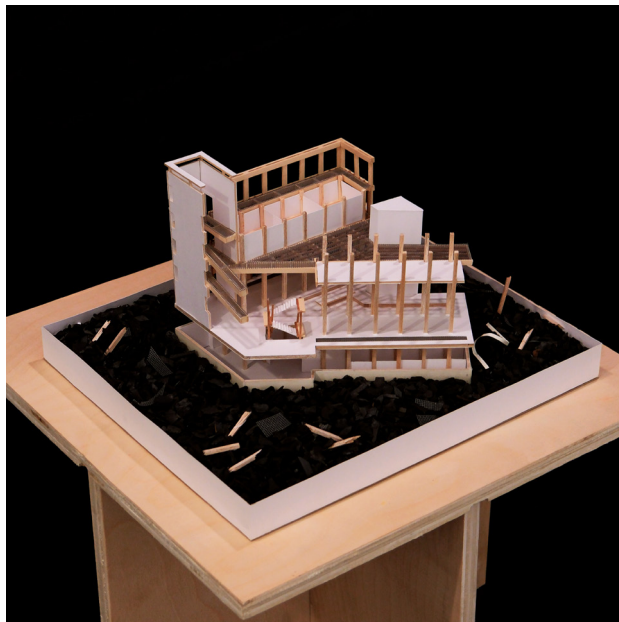
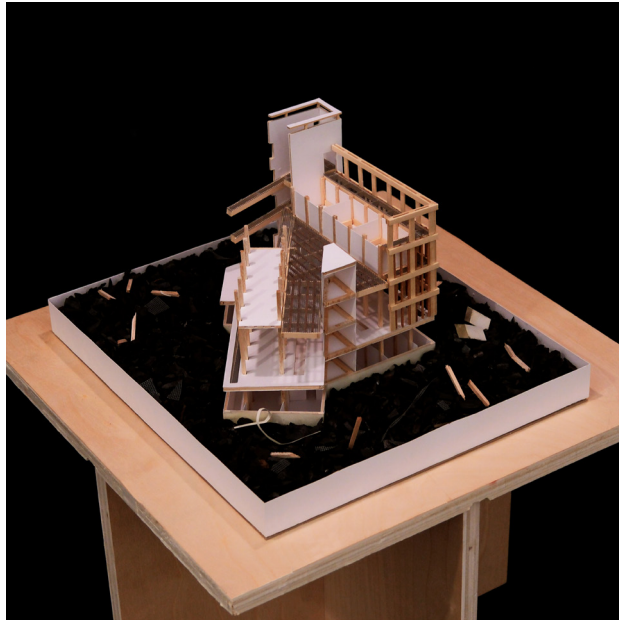
GROUND FLOOR

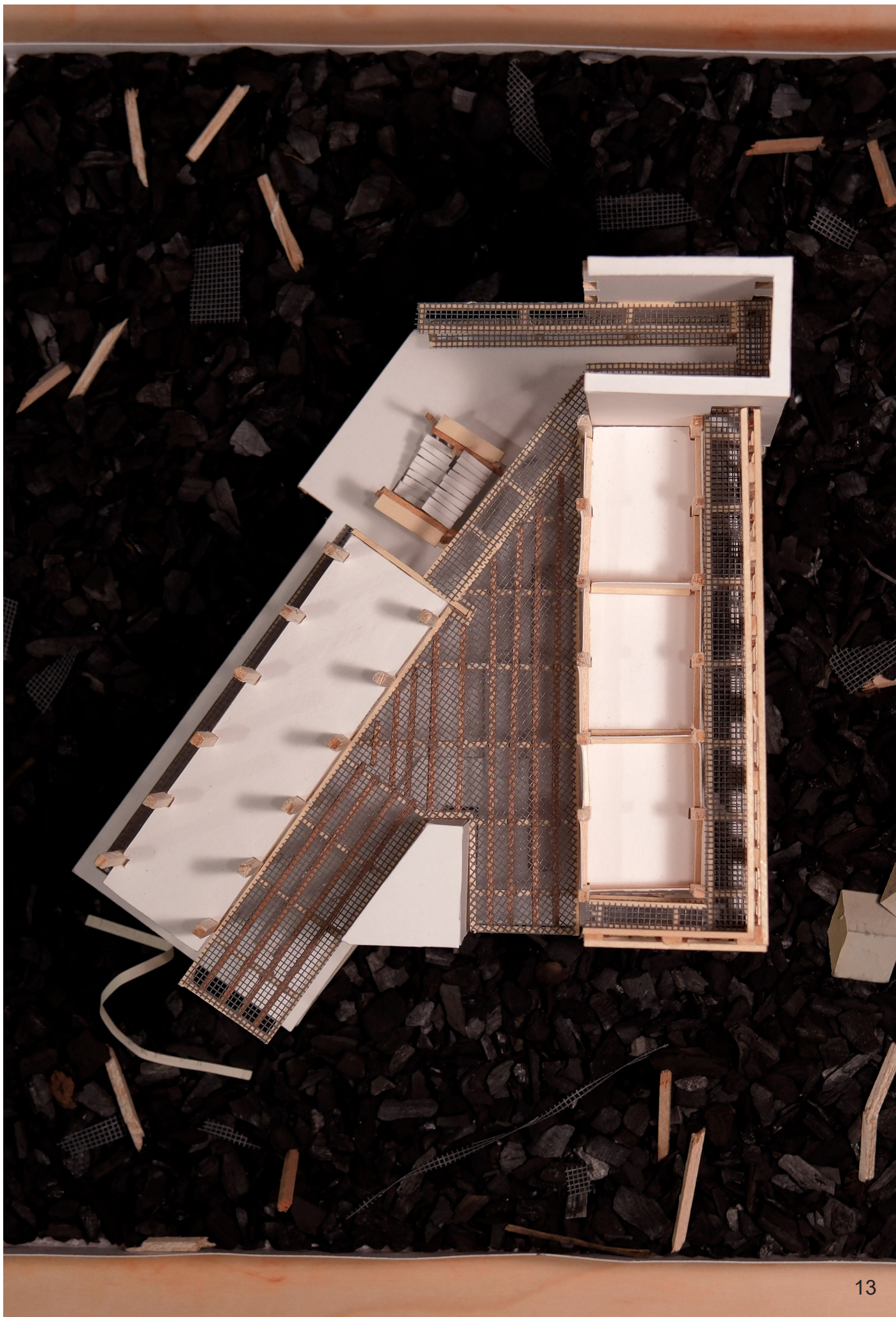
Atrium Flower Bed
Communal Space

BASEMENT

Analysis Lab (Thermal oxidizer)
Thermal Reactor
Mycelium Lab







COFFEE GROWING

- 1 Seeding
- 2 Plant Development
- 3 Flowering
- 4 Cherry Development & Ripening

COFFEE PROCESSING

- 1 Harvesting
- 2 Assorting and Drying
- 3 Skin shedding and Storing
- 4 Grinding

BAMBOO PROCESSING

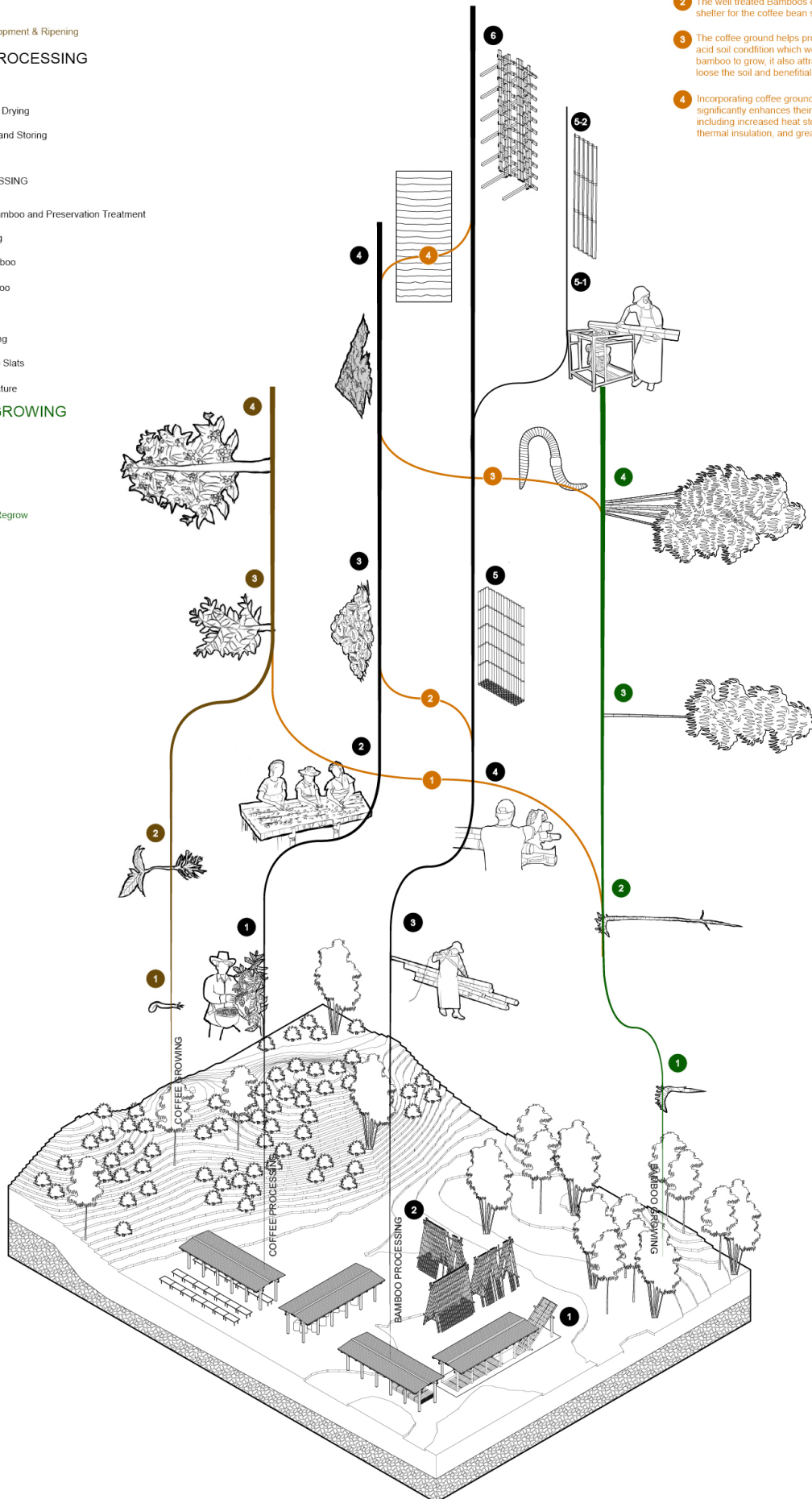
- 1 Puncturing Bamboo and Preservation Treatment
- 2 Sun Bleaching
- 3 Washing Bamboo
- 4 Cutting Bamboo
- 6 Storage
- 5-1 Extracting
- 5-2 Bamboo Slats
- 6 Building Structure

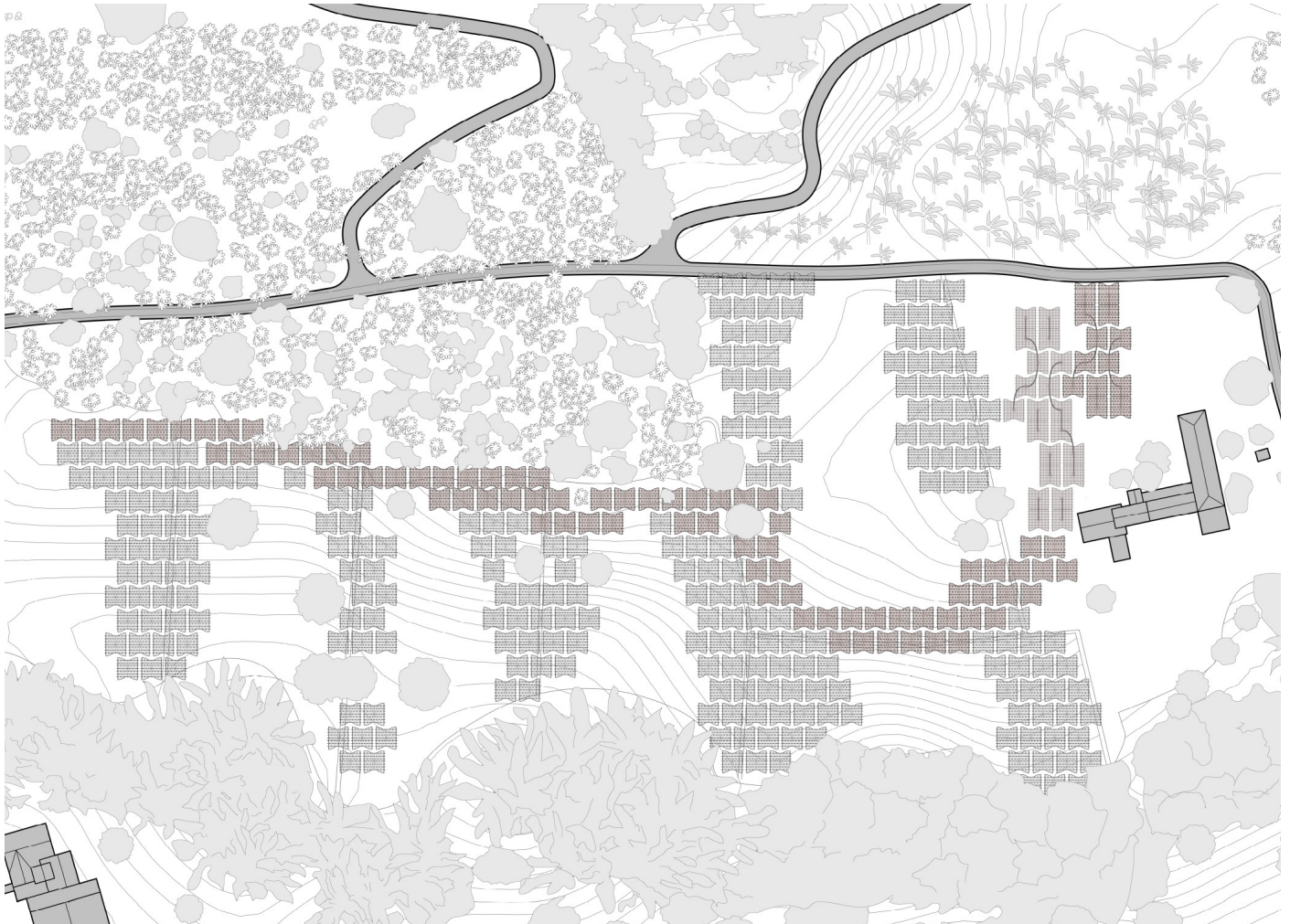
BAMBOO GROWING

- 1 Culms
- 2 Shoots
- 3 Clumps
- 4 Harvest and Regrow

Mutual Influence

- 1 Rooting System of Bamboo helps Providing stable soil Condition for the Coffee Tree growing.
- 2 The well treated Bamboos can be used for building shelter for the coffee bean storage.
- 3 The coffee ground helps providing fertilized and acid soil condition which would be suitable for bamboo to grow, it also attracts earthworms which loose the soil and beneficial for the bamboo growing
- 4 Incorporating coffee ground into cob building materials significantly enhances their hygrothermal performance, including increased heat storage capacity, improved thermal insulation, and greater compressive strength





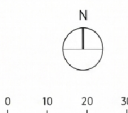
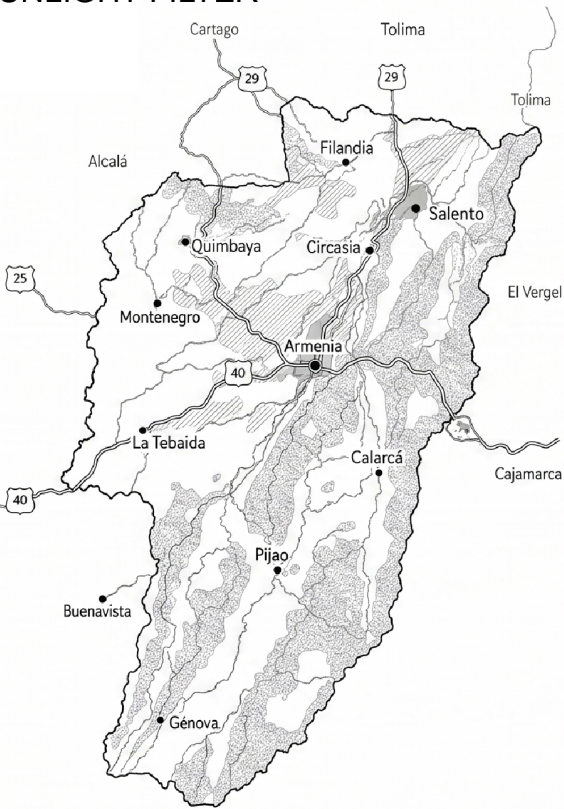
Guadua bamboo and coffee can work together as a shared growing system. Coffee grows better with partial shade because shade reduces heat, keeps more moisture in the soil, and creates a healthier habitat for birds and insects. Guadua bamboo is useful in this system because it grows quickly, has strong roots that help hold the soil, and can reduce wind and erosion on mountain coffee farms. When they are combined, bamboo becomes both a natural shade plant and a building material: it protects the coffee field, improves the microclimate, supports biodiversity, and can also be harvested to build shade structures, resting shelters, and animal-friendly habitats. So the project is not only about growing coffee and bamboo together, but about creating a productive landscape where plants, people, architecture, and animals support each other.

BAMBOO SUNLIGHT FILTER

Quindío Colombia, sits within the Andean Coffee Cultural Landscape, where steep volcanic slopes, humid mountain air, regular rainfall, and mild temperatures create one of the country's most productive coffee environments. Its valleys, bamboo forests, cloud cover, and highland ecosystems make coffee cultivation part of a larger living landscape rather than a purely agricultural field. However, the expansion of sun-grown coffee has begun to simplify this ecology: removing shade trees exposes soil to erosion, reduces habitat for birds and insects, weakens biodiversity corridors, increases heat and water stress, and makes coffee farms more dependent on chemical and technical inputs.

This problem reflects a broader Anthropocene condition in which productive landscapes can become "haunted" by the ecological relationships they have erased, a concern also discussed in *Arts of Living on a Damaged Planet*.

In response, Colombian coffee institutions such as Cenicafé and the National Federation of Coffee Growers promote agroforestry and shade-grown coffee systems, where trees are combined with coffee to conserve soil and water, regulate microclimate, support biodiversity, and maintain long-term production. Cenicafé specifically frames Colombia's coffee agroforestry as a system that associates tree species with coffee for soil and water conservation and sustainable family farming, while FNC reports large-scale tree planting in forest and agroforestry systems as a way to capture carbon and conserve biodiversity. Therefore, shade-grown coffee is not only an agricultural technique but also a landscape strategy: it reconnects coffee production with the forest-like conditions that originally made Quindío's coffee territory fertile, resilient, and ecologically rich.



QUINDÍO AT A GLANCE

AREA
1,845 km²

POPULATION
~600,000

AP. ALTITUDE
1,200 – 2,000 m

ANNUAL PRECIPITATION
1,200 – 3,000 mm

TEMPERATURE
18 – 24 °C

MAIN ECONOMY
Coffee, Tourism, Agriculture

LEGEND

- Department Boundary
- Municipal Boundary
- Main Road
- Secondary Road
- River / Stream
- Urban Area
- Coffee Cultivation
- Guadua & Bamboo Areas
- Forest Cover

In Colombia, both Coffee and bamboo are very important products. In the meantime, they can form a co-living agroforestry environment where each plant supports the other. Coffee grows better with partial shade, cooler soil, and protection from strong wind and heavy rain, while bamboo can provide this upper shading layer through its tall, flexible structure. Bamboo roots also help hold the slope, reduce erosion, and keep more moisture in the soil, which protects the shallow roots of coffee plants. At the same time, the coffee field gives bamboo a productive landscape to grow within, turning it from a separate material crop into part of the farm's ecological infrastructure. Together, coffee and bamboo create a layered system: bamboo protects and stabilizes the environment, while coffee benefits from the improved microclimate, soil condition, and biodiversity.

Carrying on with this co-living system idea, the designed shading system responds to the difference between sun-grown and shade-grown coffee by creating an artificial forest-like layer above the coffee field. Instead of leaving coffee plants fully exposed to direct sunlight, the system uses a bamboo structure to filter light, reduce heat, slow down rain impact, and protect the shallow coffee roots from drying and erosion. At the same time, the shading system is not only for plants, but also becomes a shared structure

for the farm: it provides resting space for workers, supports biodiversity, and creates small habitats for birds, insects, and small animals that can help control pests. In this way, the design transforms coffee production from a single exposed crop field into a layered agro-ecological environment, where bamboo, coffee, soil, animals, and human activities work together as one system.

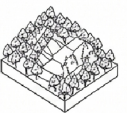
With the intention of reintroducing "shade-grown coffee" back in Colombia's coffee industry, the bamboo structured shade temples located on a hillside aim to achieve the eco-sustainability by bringing back a mutual polyculture system among coffee, birds, and coffee workers.

- 1) The shades slow the wind speed, help defend rain droplets, together with the bamboo made branching structure, and ultimately provide shelter places for local birds to nest.
- 2) Shading, together with the birds which feed on coffee-harmful insects help providing a more suitable living circumstance for shade coffee trees.
- 3) Designed according to the sun-path in Colombia during the harvest season (Sep to Dec), the shades give local coffee farmers a more comfortable working condition compared with directly exposed to Colombia's strong sun lighting.

LANDSCAPE COMPONENTS



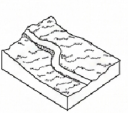
TOPOGRAPHY
Steep hidden viques and valleys



COFFEE LANDSCAPE
Patchwork of farms and shade systems



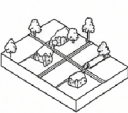
GUADUA RESOURCE
Native bamboo in narques and riparian areas



HYDROLOGY
Dames river network and auxubrides



ECOLOGICAL CORRIDOR
Connecting forests along waterways and shade trees



HUMAN NETWORK
Forms, roads and settlements structure the territory

