



THICK 2D CAIRO

PROGRAMMING THE URBAN SURFACE

Haoyuan Wang & Xinhui Zhang

A. Food Crisis: Farmland occupied by city



2008



2012



2020

B. House Crisis: Illegal settlement / High Density / Low Quality Urban Life



C. Site Condition: Typical & Representative



CAIRO

FOOD CRISIS / LAND CONFLICT

Our exact site is in the southwest periphery of Cairo, on the west bank of the Nile. Notice the low-quality, high-density dwellings that currently exist on the site.

The arable land in Cairo is limited within several kilometers from the Nile river in the urban periphery. But over the past three decades, the growing urban population has encroached upon the agricultural land, thus making the city more dependent on other food sources.

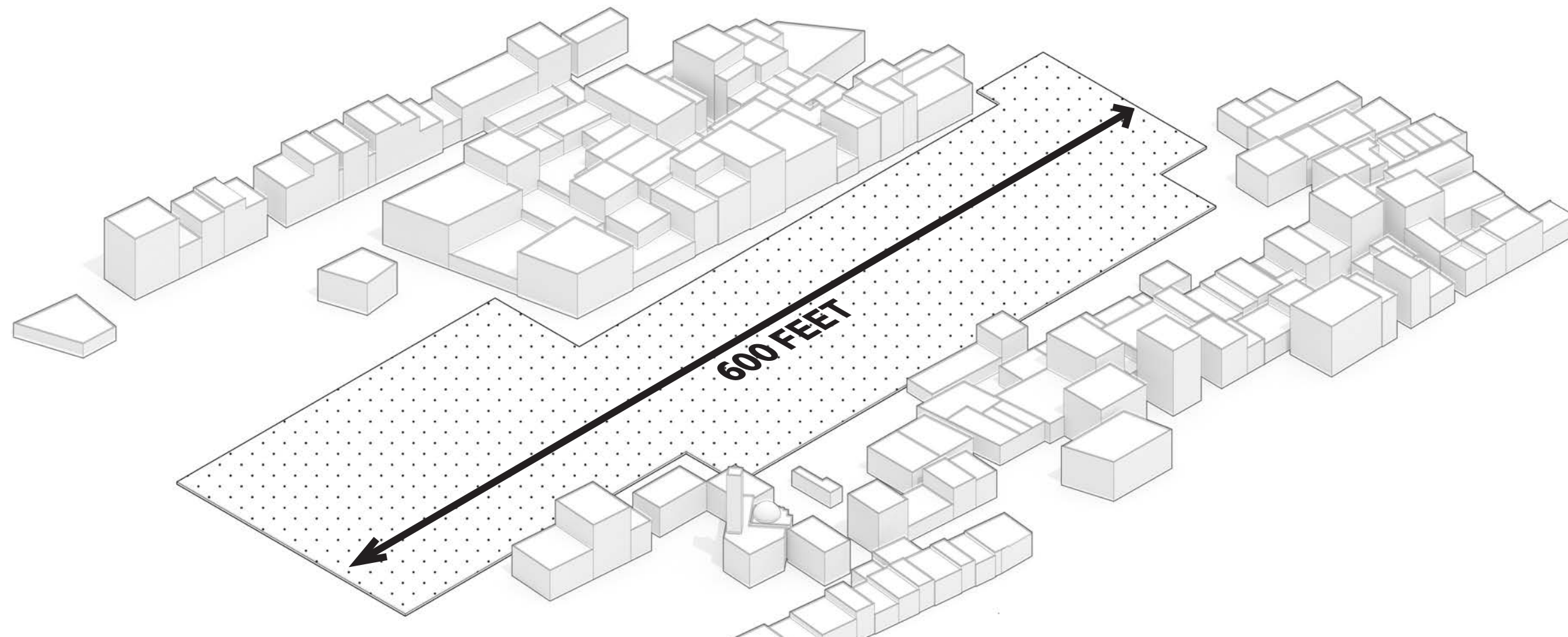
I. SCALE THRESHOLD

“This overall intensity based on repetition and accumulation suggests that there is a **scale threshold** below which mat building effects are not visible. Mat building cannot be isolated as an object (figure to ground); instead it activates context to produce new urban fields.”

The first feature of the thick 2D is scale threshold. Thick 2D architectures are NOT small, they're large-scale works that penetrate existing architectures. Therefore, our project spans over six hundred feet within an interior courtyard that penetrates existing residential architecture at the site.



Applied to Design



II. DIVERSE PROGRAMS

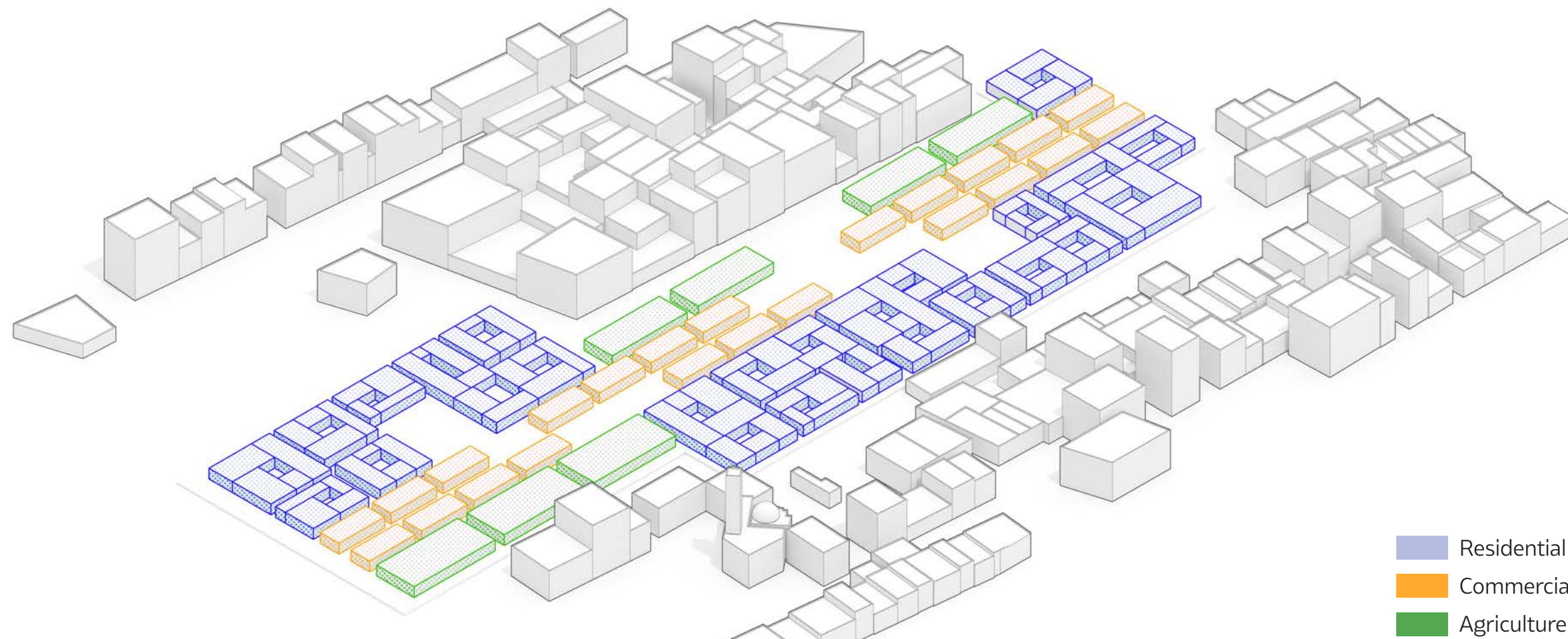
“ Its job is not to articulate or represent specified functions, but rather to create an open field where the fullest range of possible events might take place...”

... In mat buildings, functions and events configure space, rather than the architectural frame, which remains relatively neutral. ”

Thick 2D architectures have diverse programs. A mat building is not to represent any specific functions but a field allowing ranges of events to happen. Our project provides three major functions: residential, commercial and agriculture uses.



Applied to Design



Residential
Commercial
Agriculture

III. CONNECTIVITY

“Internally, nearly all exhibit a porous interconnectivity, in which **transitional spaces are as important as the nodes they connect**. Externally, they are loosely bounded. Their form is governed more by the internal connection of part to part than by any overall geometric figure. They operate as fieldlike assemblages, condensing and redirecting the patterns of urban life, and establishing extended webs of connectivity both internally and externally.”

Mat urbanism is connective. It brings together diverse programs as well as new and existing architectures at the site.

Applied to Design

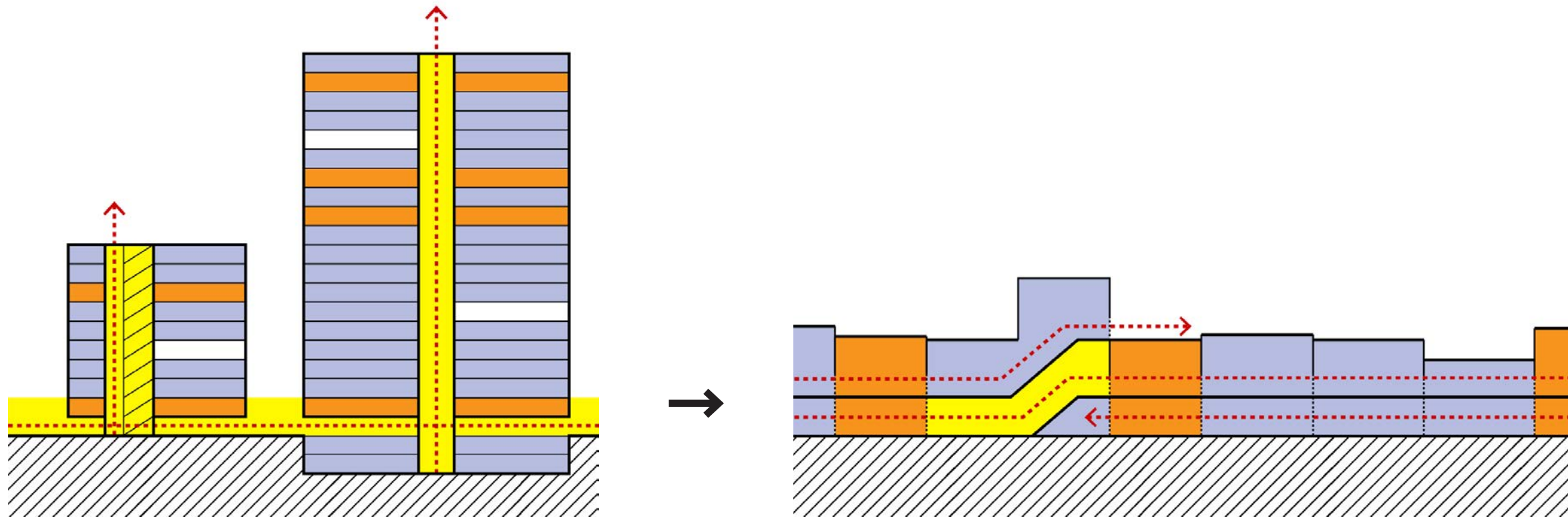


IV. HORIZONTALITY

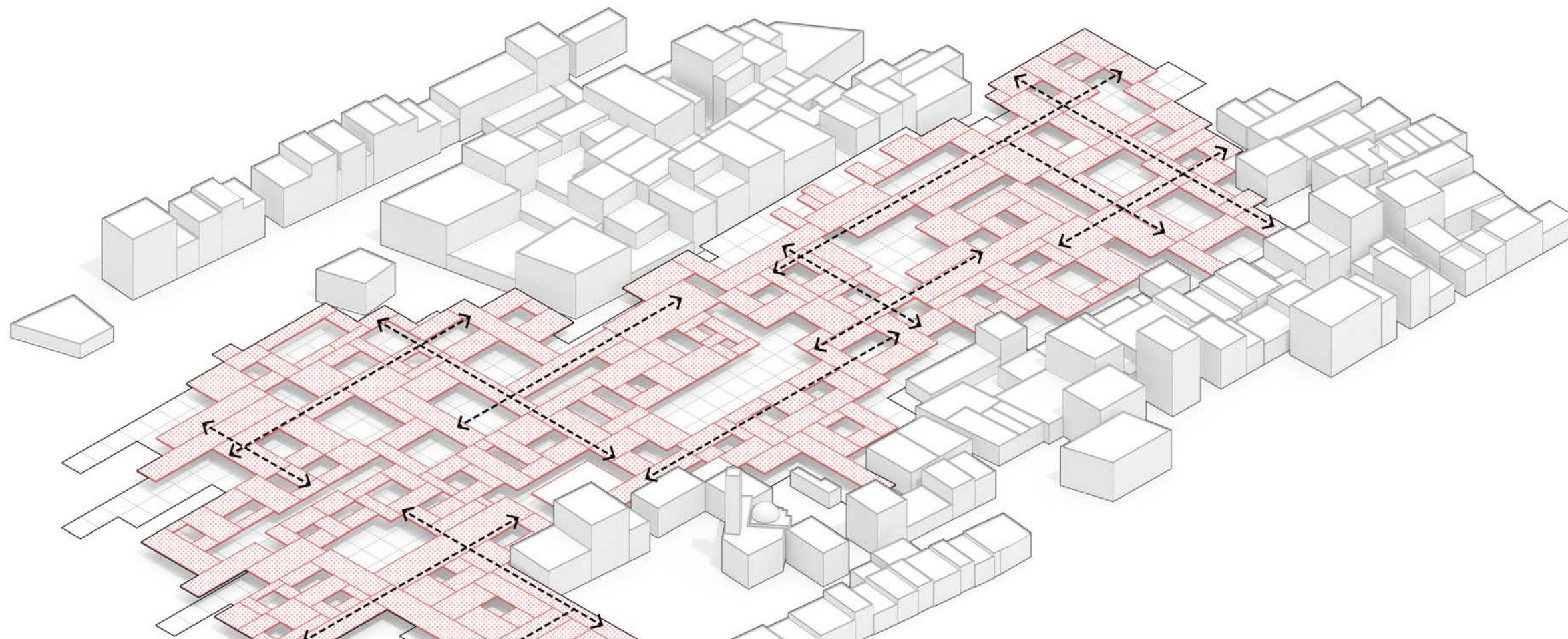
“ Mat building is traced back to the close-grained, cellular organization of the Islamic city: ‘ a **broadcast of houses**, mosques, bazaars, with a current-bun consistency.’ This implies a fundamentally horizontal space, with a specific architectural character: a “**low enclosure carried lightly above the user ... with a high degree of connectedness to allow for change of mind and the in-roads of time.**”

Mat Urbanism also emphasizes the horizontal movement between interconnected space rather than vertical movement inside individual buildings. We found that this aspect of mat urbanism responded to traditional architectures in Ciaro, such as the bazaars – which similarly emphasize horizontality.

One thing that we learned from this project is that certain features of thick-2D architecture are not new, but are actually typical of historical buidlings at our site.



Applied to Design



V.

NON-HIERARCHY / FLATNESS

“ Their form is governed more by the **internal connection** of part to part than by any overall geometric figure...

... Mat building is a studied response to a fundamental urbanistic question: how to give space to the active unfolding of urban life without abrogating the architect's responsibility to provide some form of order...

... Mat building instead proposes a loose scaffolding based on the systematic organization of the parts.”

Applied to Design



Non-hierarchy is another important feature of mat urbanism. There is no more classified primary or secondary space or zoned programs, but all space mixed together and treated equally, loosely formed as several clusters with similar uses distributed on site.

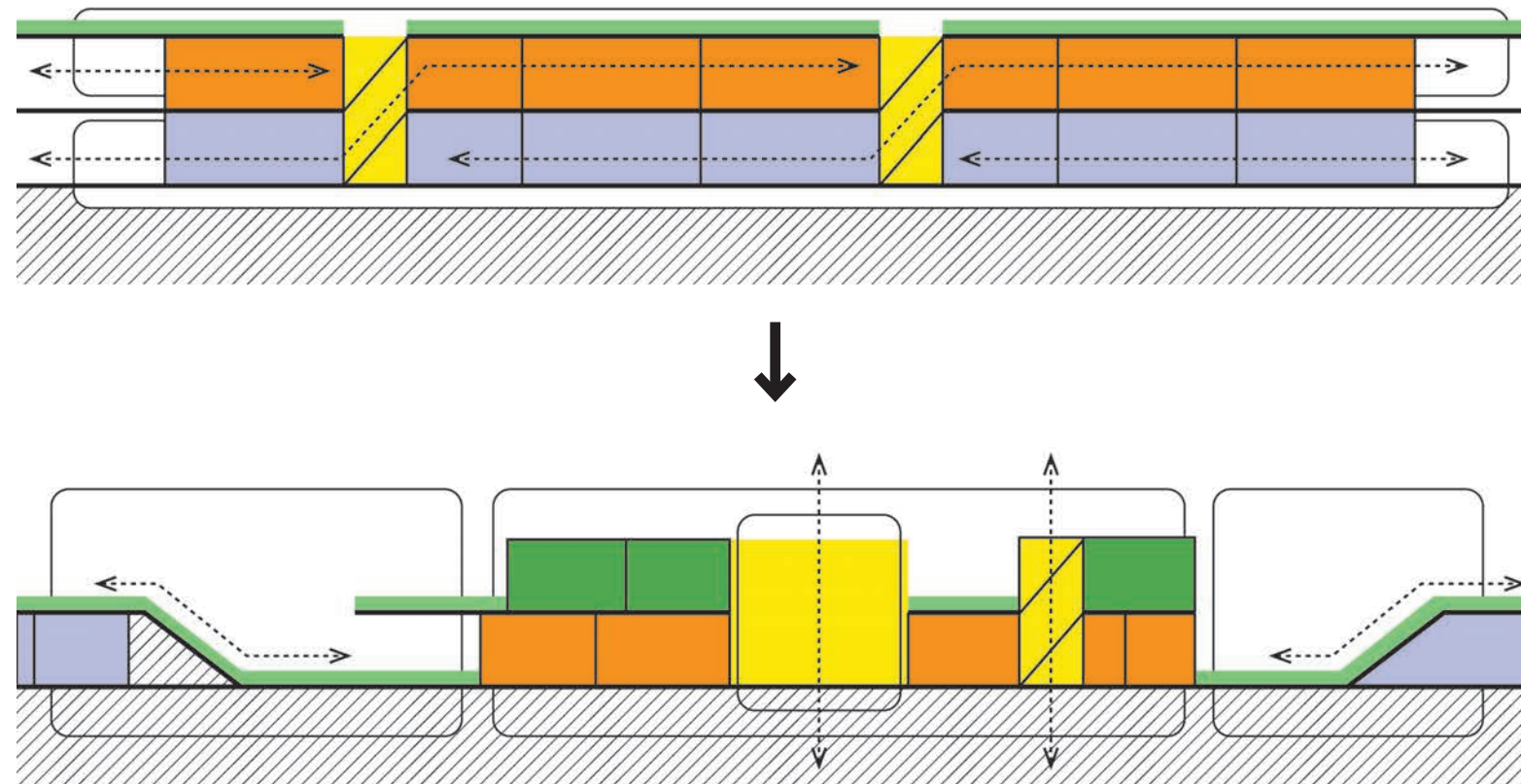
VI.

NON-STACKING

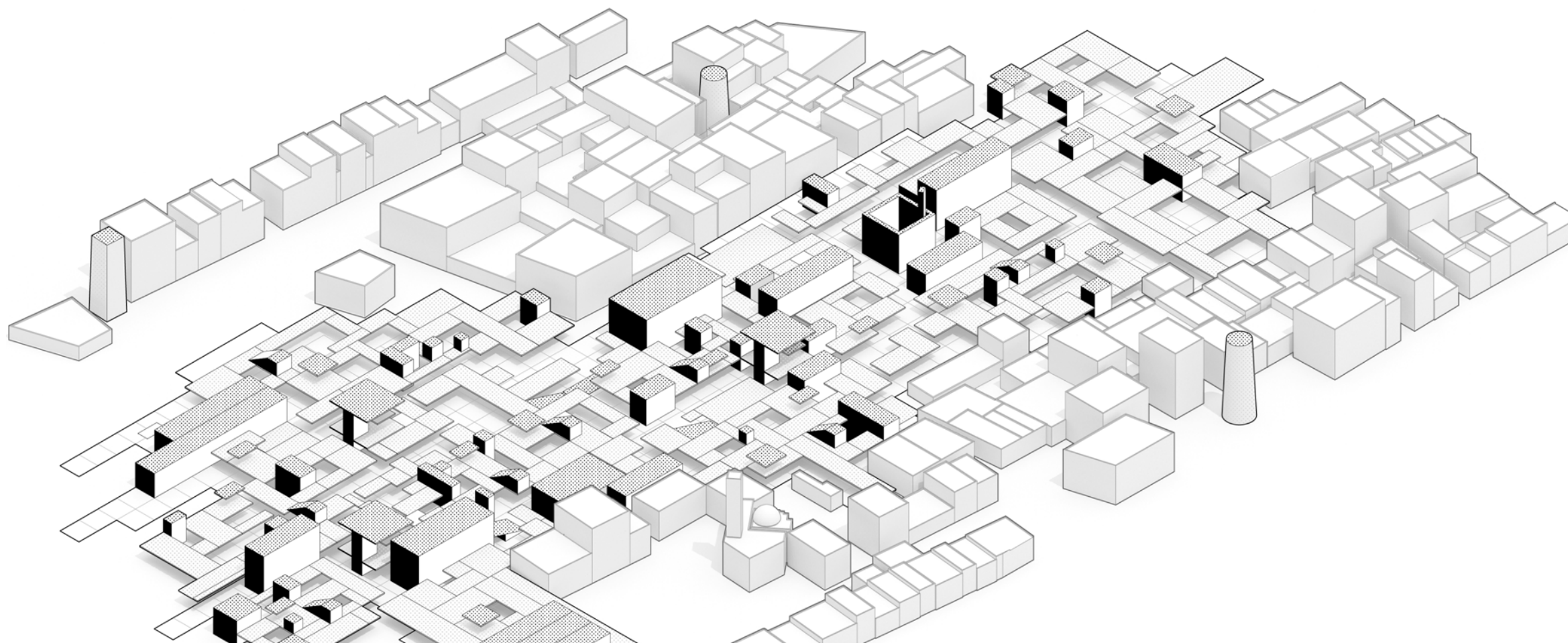
“ The natural ecology of a meadow, field, or forest exhibits horizontal extension in the macro scale, but at the micro scale it forms a dense mat, a compact and highly differentiated section...

...In mat configurations, section is not the product of stacking (discrete layers, as in a conventional building section) but of **weaving, wrapping, folding, oozing, interlacing, or knotting together.** ”

Finally, the mat building also shows a feature of non-stacking through its section. Rather than stacking layers it's more keen to weaving, wrapping, folding, oozing, interlacing layers. For this reason, we were especially sensitive to vertical movement through our building. We connect floors in multiple ways, including through slope, greenery, path, and stairs to merge the two layers.



Applied to Design





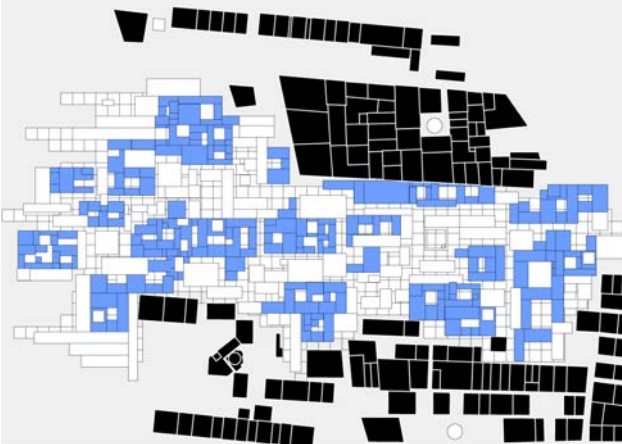
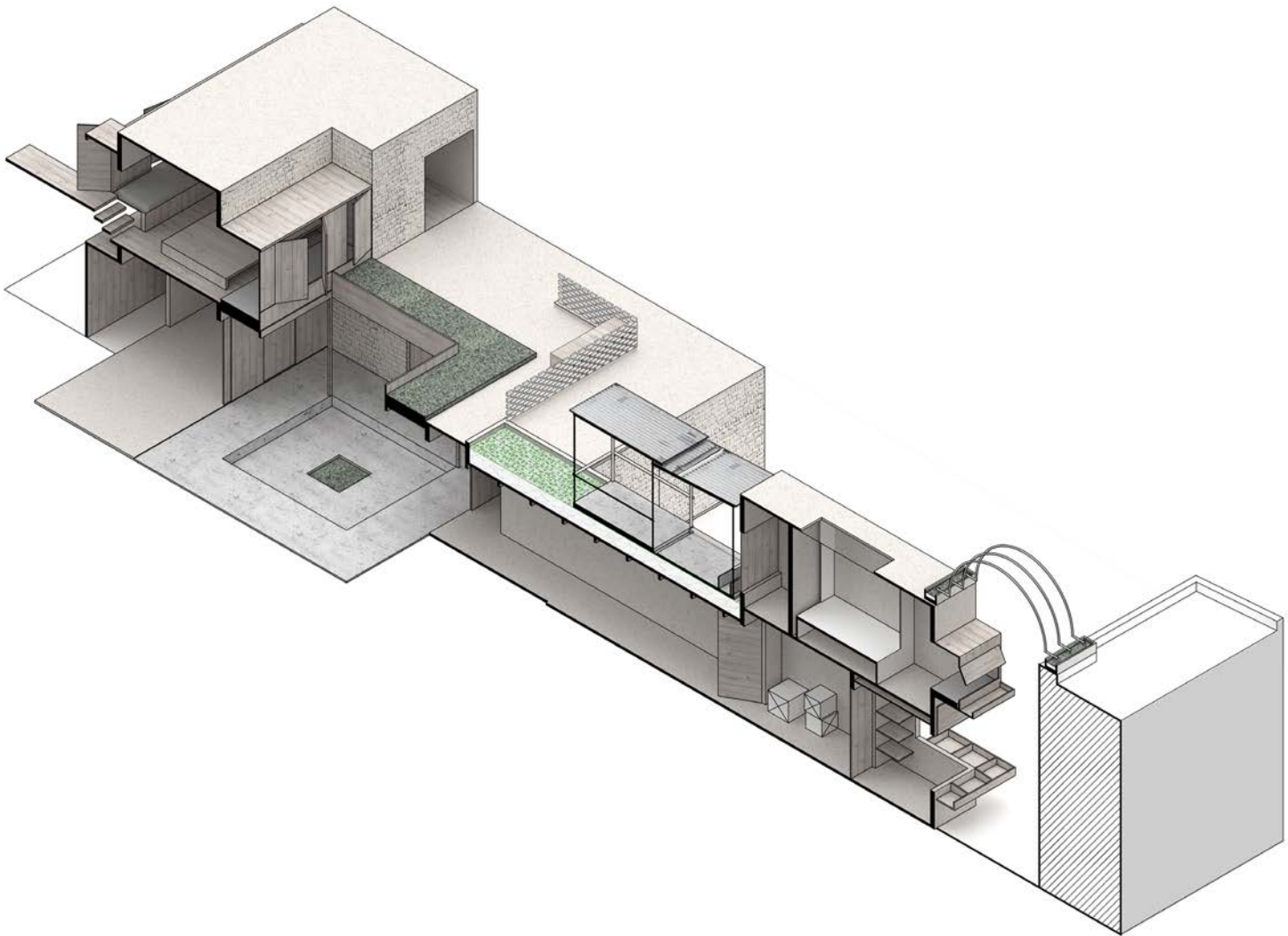
I.
RESIDENTIAL
RESEARCH / DESIGN

A main feature of local residential buildings is the interconnected consistency in a lower enclosure spread on ground like a mat, that each of them has a basic form of a courtyard house. Such form well responds to sten allen’s claim on connectivity, so that our residential space also formed in such basic courtyard house units and connected.

The program of such a courtyard house would have a semi-private guest room as a transitional space between other houses, then enter a more private courtyard, which is surrounded by other private space. Such a house could serve an expanded family or multi family base on its scale.

And a unique feature of Cairo residential are their wooden balcony which works like an extension of the internal space. Such a type is adopted in our design as an extended resting area above the ground floor.

Applied to Design



KEY MAP:
RESIDENTIAL PLACE

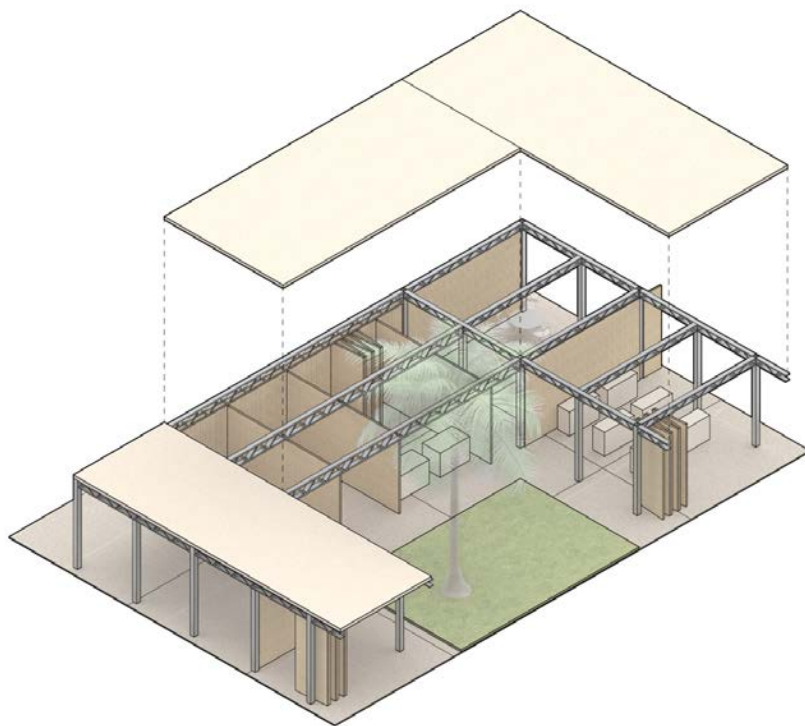
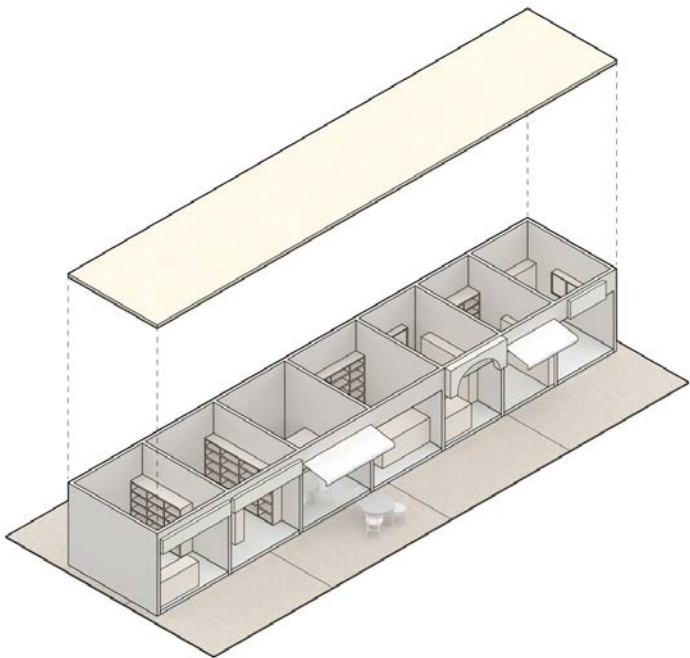
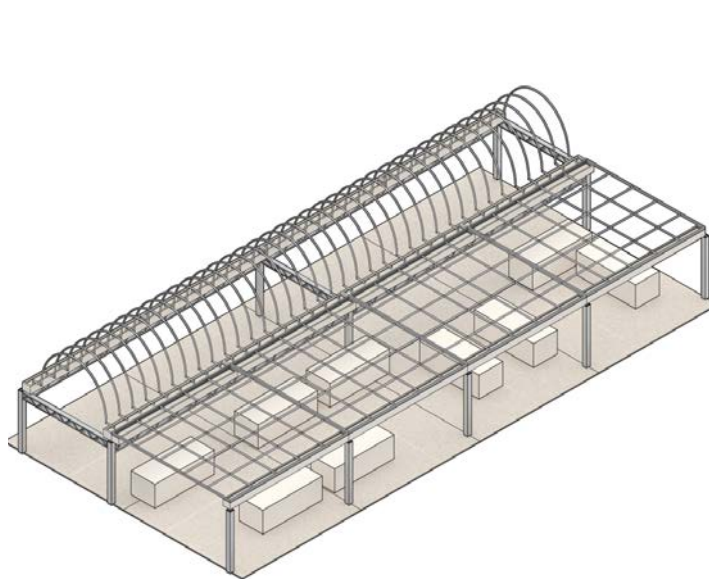
TYPE A.TEMPORARY STANDS



TYPE B. STREET LOTS



TYPE C. COURTYARD



II. COMMERCIAL RESEARCH / DESIGN

The commercial life in Cairo can be categorized into three forms, and we have an adaptation design for each of them. The first one is purely temporary. Vendors usually use carts to carry goods, and they either randomly stop on a street or gather in an open place, which then becomes a bazaar. For this type, we provide a covered open space that can also serve other public activities.

The second one is the commercial lots, which have a linear arrangement and have more fixed facilities. But compared to the lots here, those in Cairo more often extend the storefronts beyond the building into the street. This is done by temporary fixtures like canopy and shelves. For this type, our adaptation basically keeps the original features and expects the extension to happen.



KEY MAP:
COMMERCIAL SPACE

0.

GARDEN DESIGN OVERVIEW

Then we focus on the agricultural components to examine how they are more efficiently combined with the residential and commercial life. Other garden components that immerse in daily life are also discussed in this session.



KEY MAP:
GREEN COMPONENTS

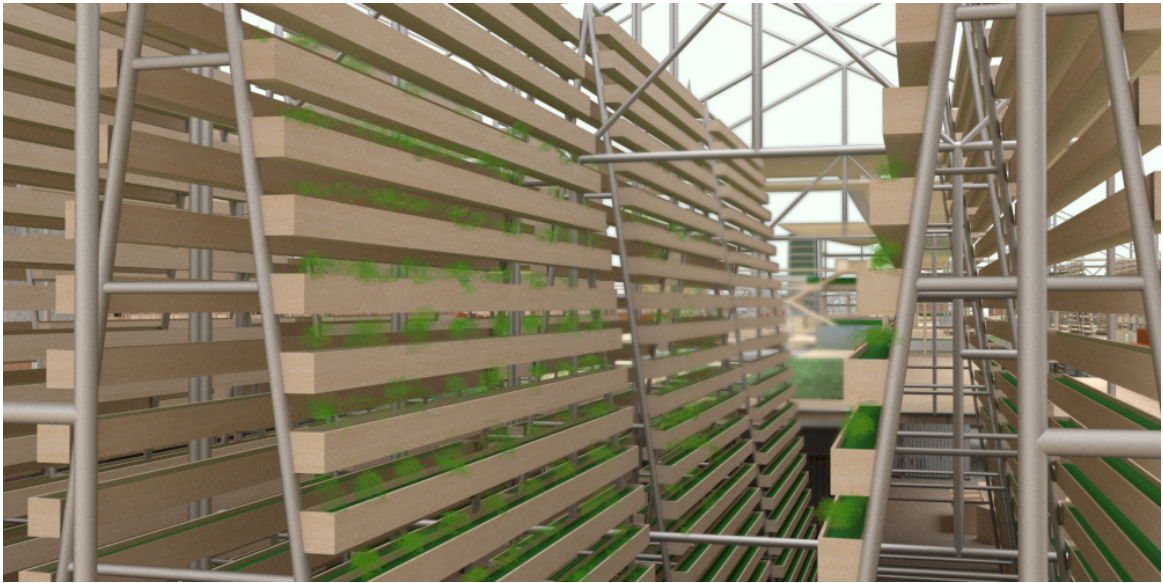
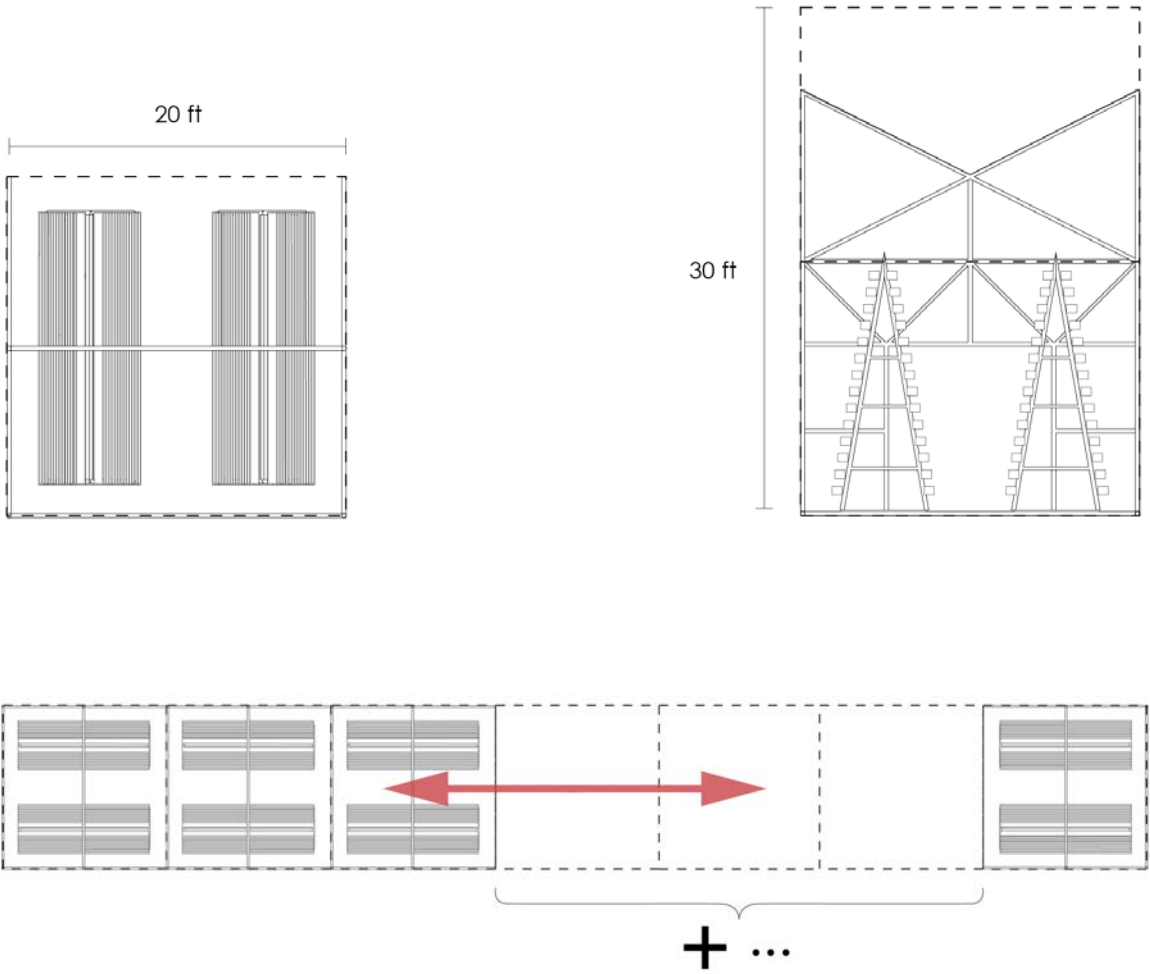
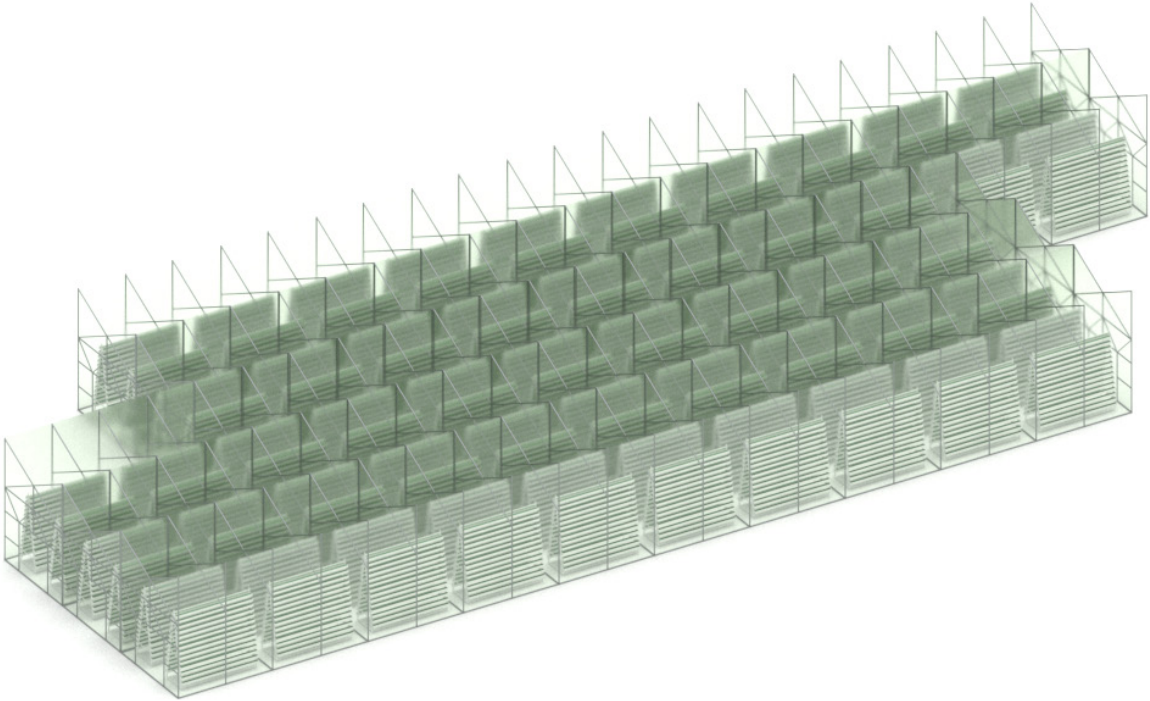
1.

FARMLAND: VERTICAL FARM

The basic module of a vertical farming is a 20'x20'x30' module. The height can increase wherever the condition allows. A matrix of these modules are arrayed to form a vertical farm.

A-frames are used within each module, over which the vegetable containers can rotate around so that each container gets daylight evenly.

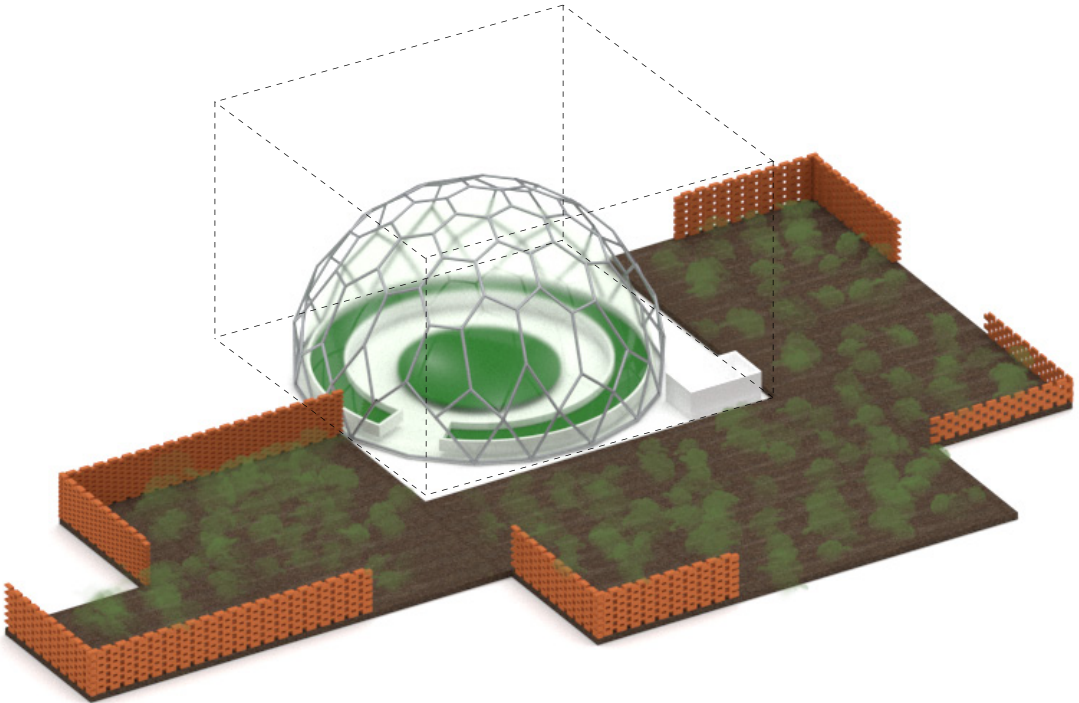
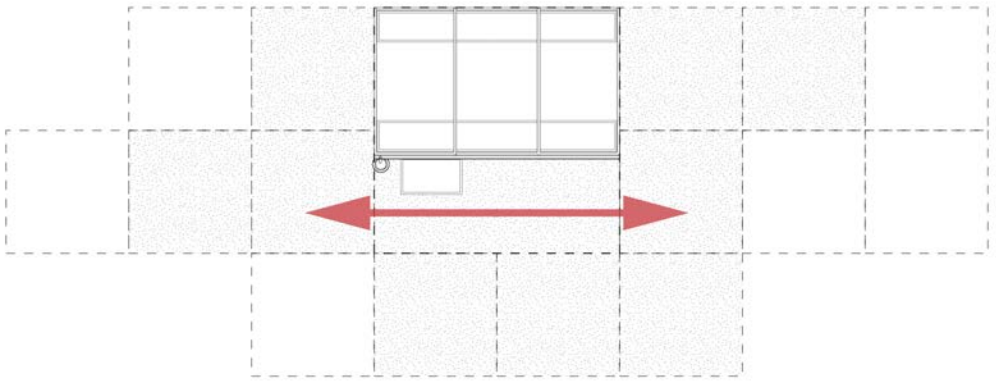
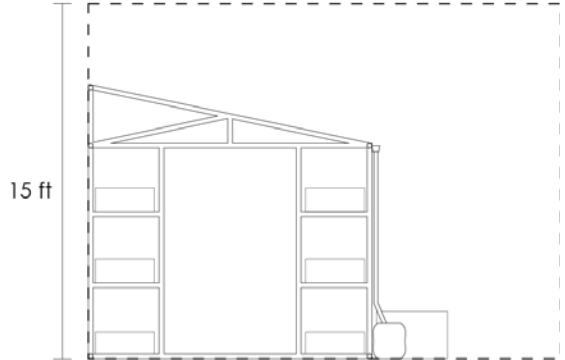
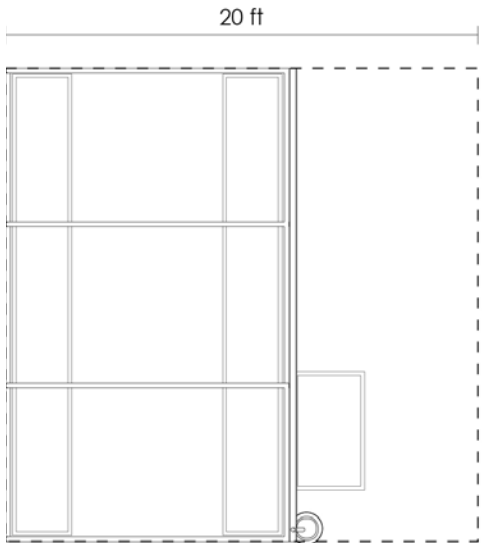
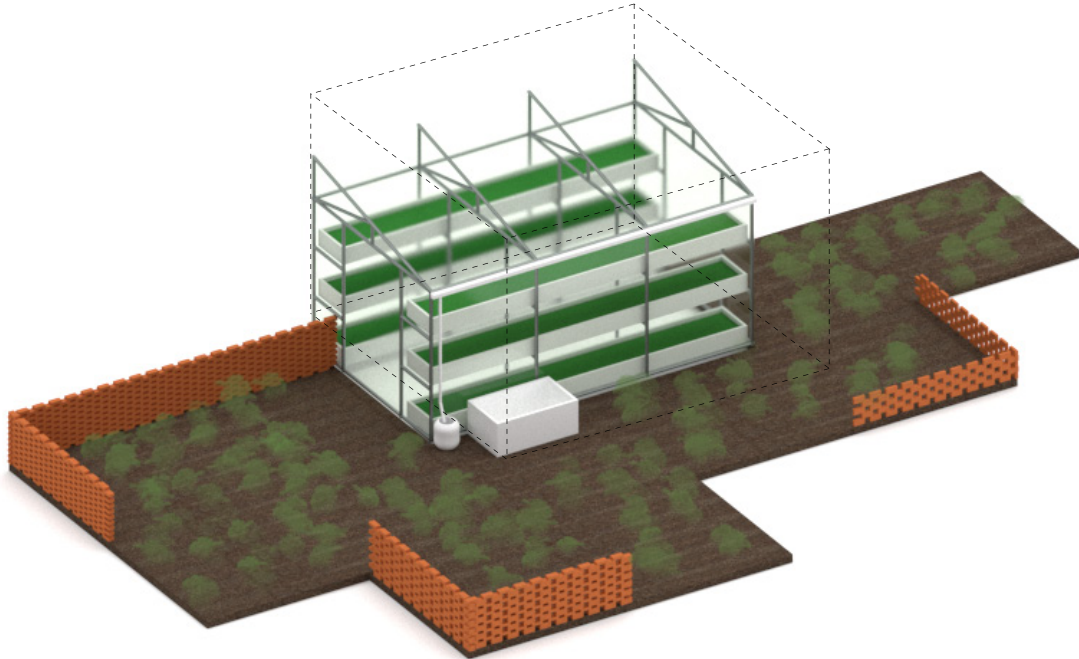
Several types of local vegetables are suitable for vertical farming, including watercress, onion, zucchini, pepper, eggplant, cucumber, etc.



2.

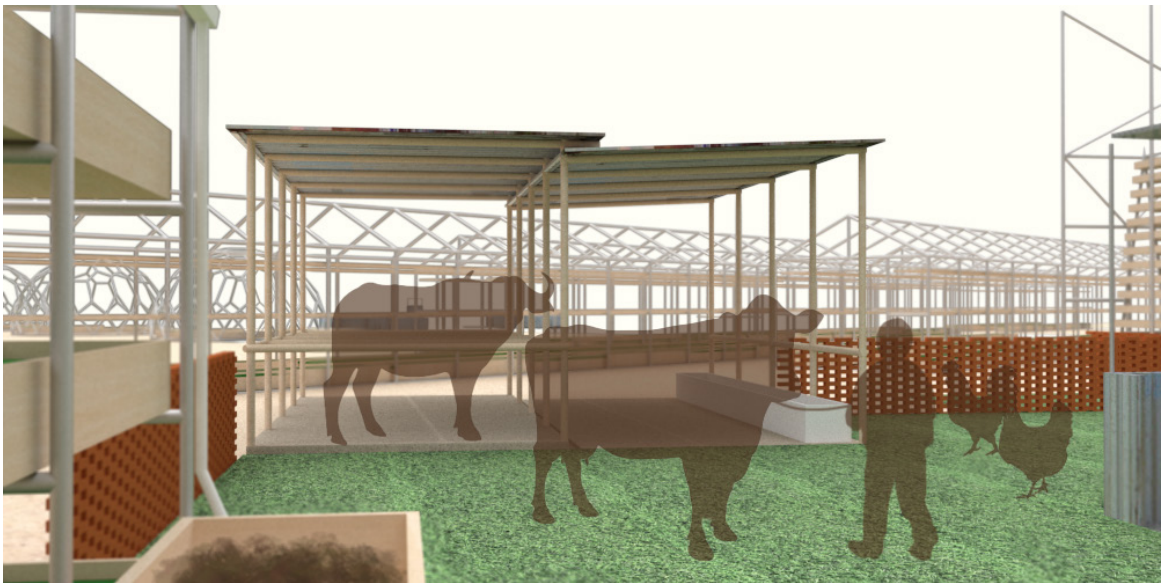
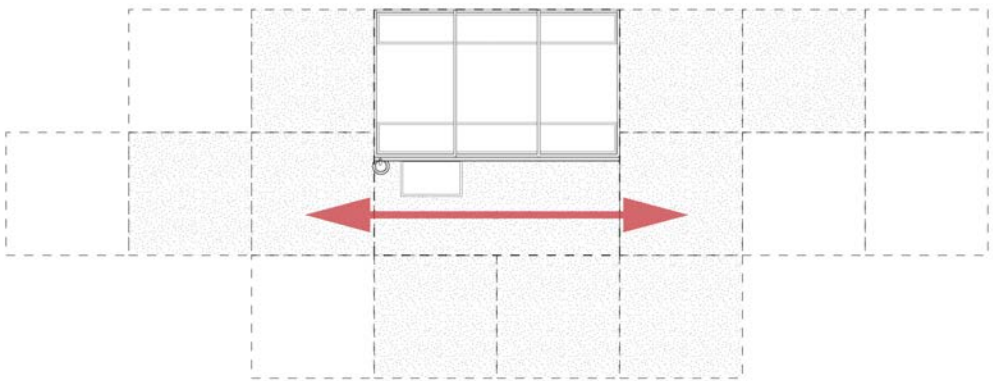
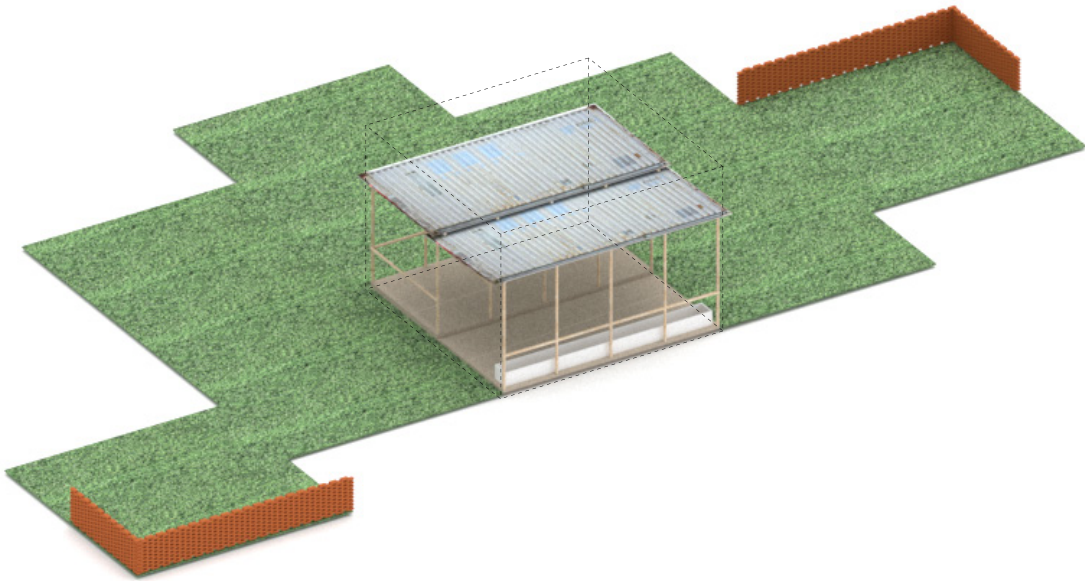
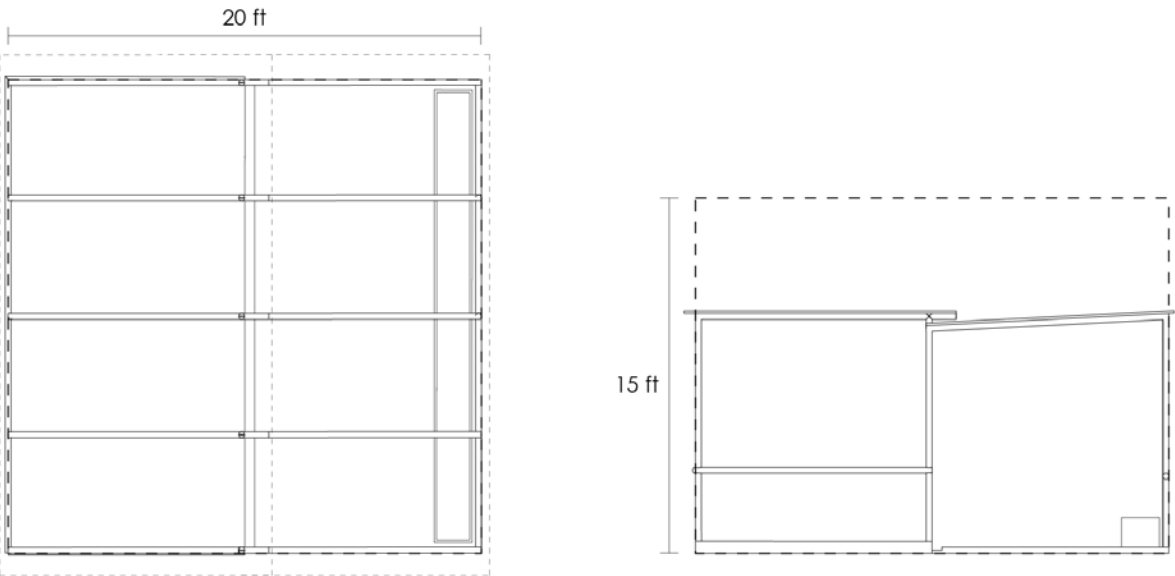
FARMLAND: DOMESTIC FARM

The domestic farm is supposed to supplement the family's diet, and it is more efficient than a traditional garden. But at the same time, soil panels where vegetables are grown traditionally can be added around the domestic farm. The expanding pattern is encouraged to follow the main direction of the 2.5-D design.



3. FARMLAND: COWSHED

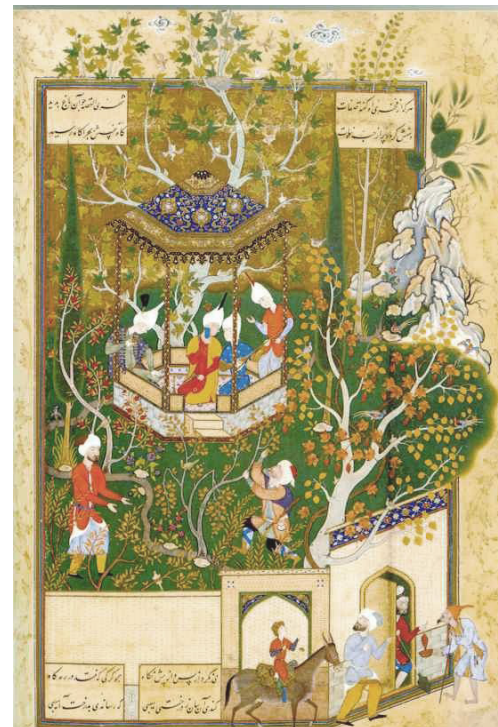
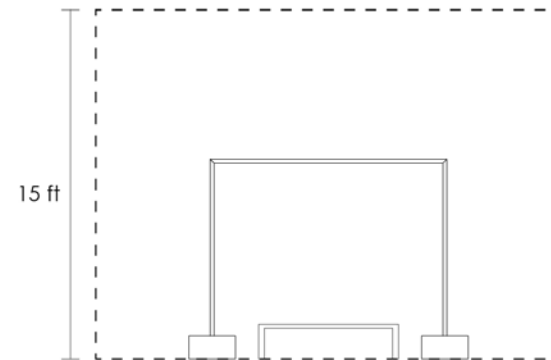
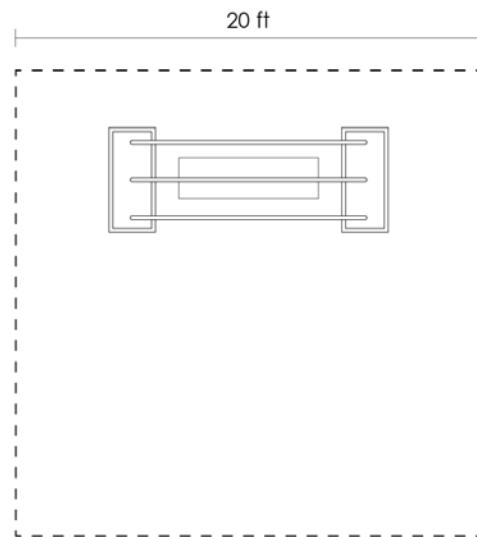
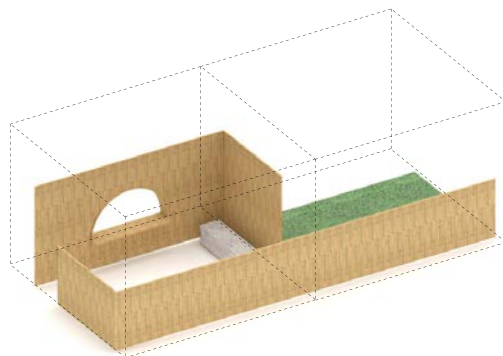
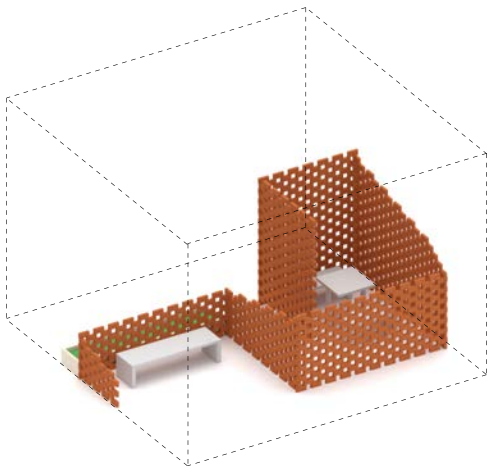
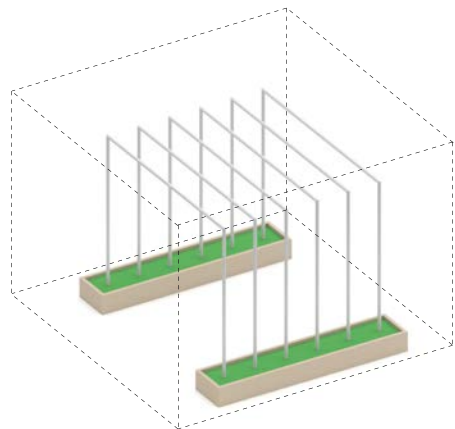
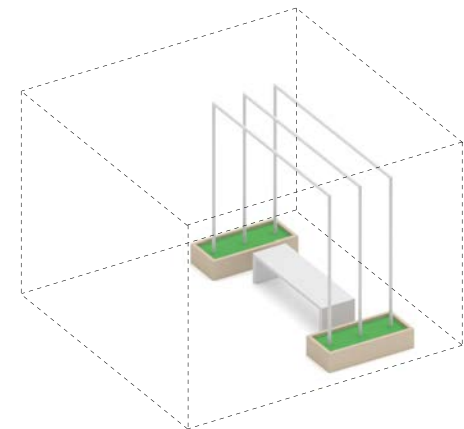
The cowshed is another version of the domestic farm. This module better responds to local families that raise cattle either for farming or for meat. A certain number of vegetation panels are supposed to be added around the shed in the same way as the domestic farm. The forrder for the cattle, such as alfalfa and corn, can be grown on these panels.



4. GARDEN: PAVILION

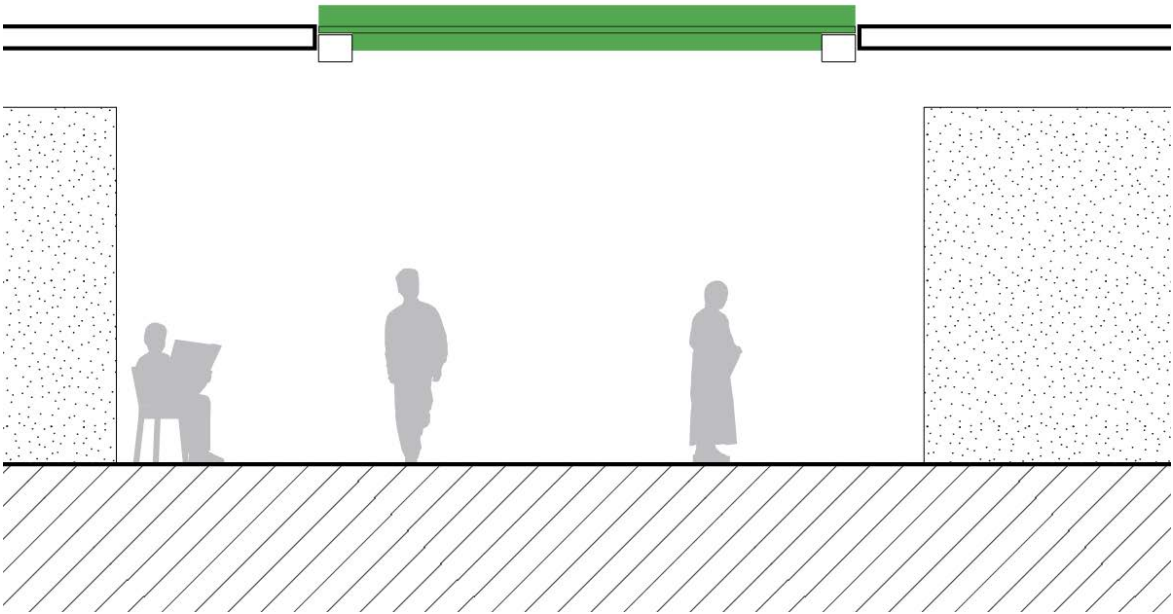
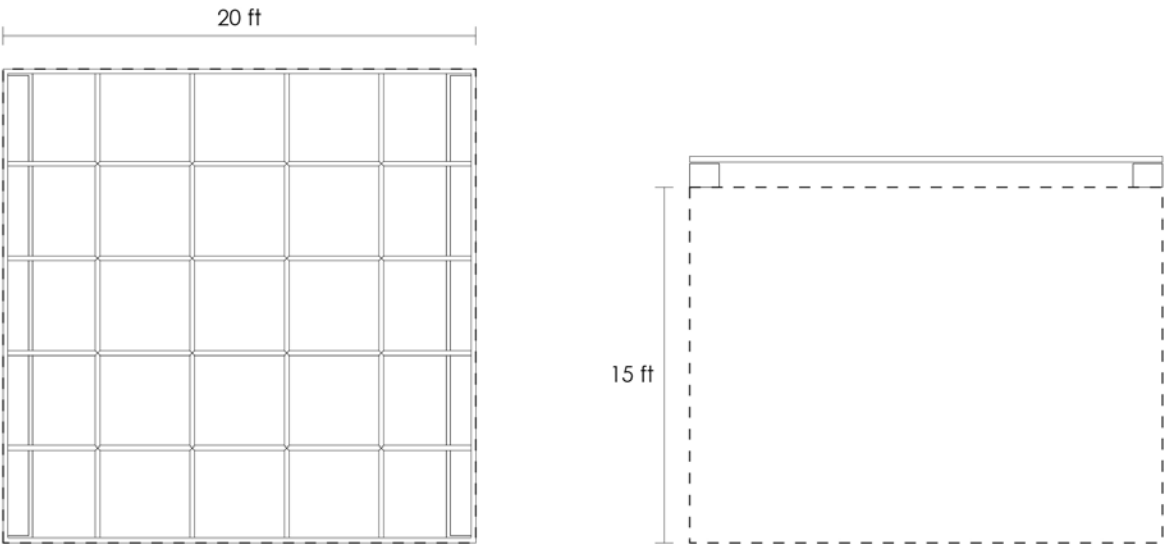
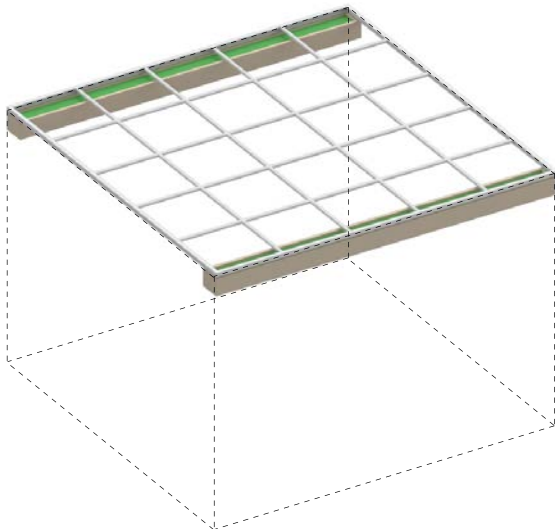
Pavilion is a critical element in the traditional Islamic garden. The pillars together with a cover above head circumscribes a special space within the garden.

In 2.5-D Cairo design, there are several alternatives of the pavillion module. The first two versions use the plant trellis with the vine around it to hint the boundary, while the last two use local materials, like brick and papyrus stems, to create vertical separation only.



5. GARDEN: GREEN CANOPY

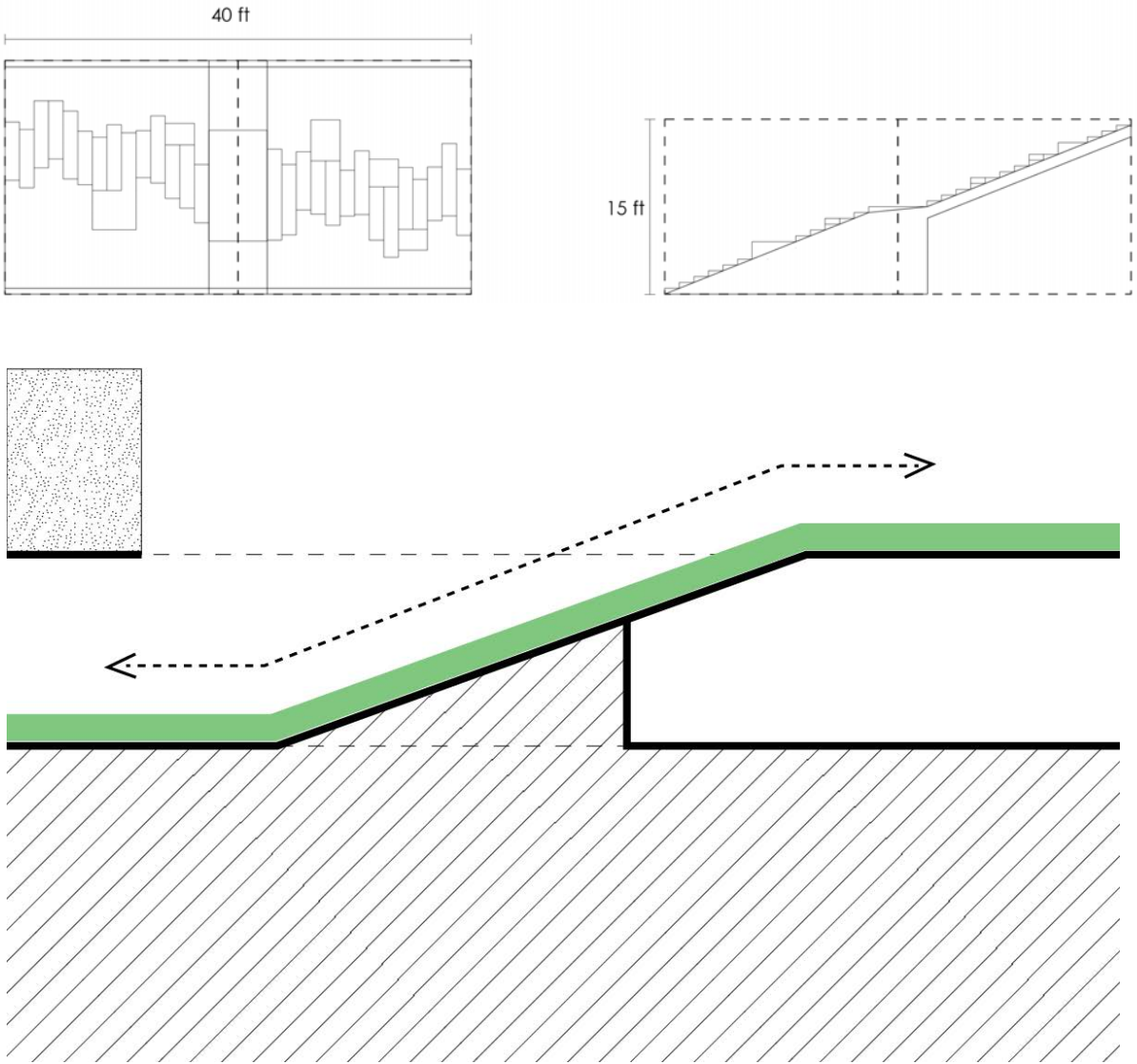
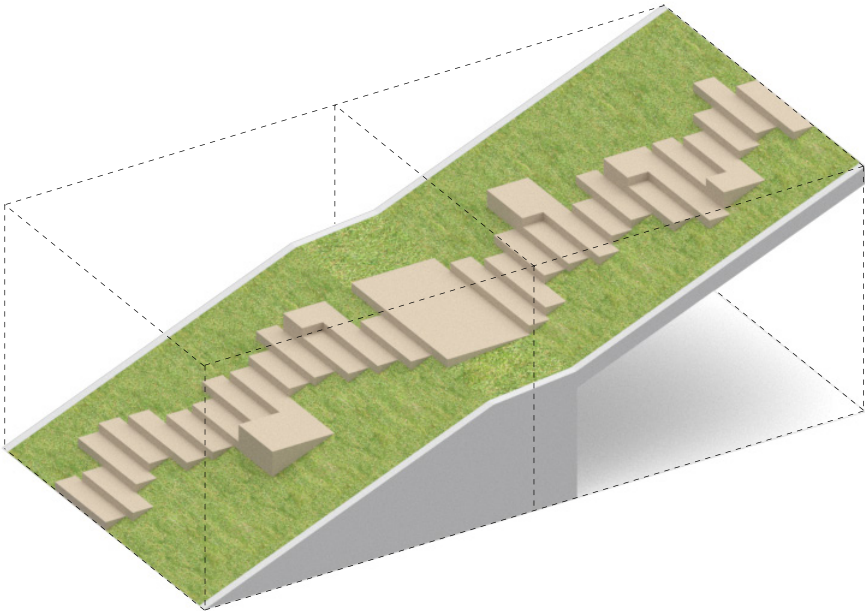
The Green Canopy borrows its idea from the common street scenes in Cairo, where the canopy, cover, or decoration are hung about one-floor high from the ground. This canopy adds the thickness to the surface.



6.

GARDEN: GREEN SLOPE

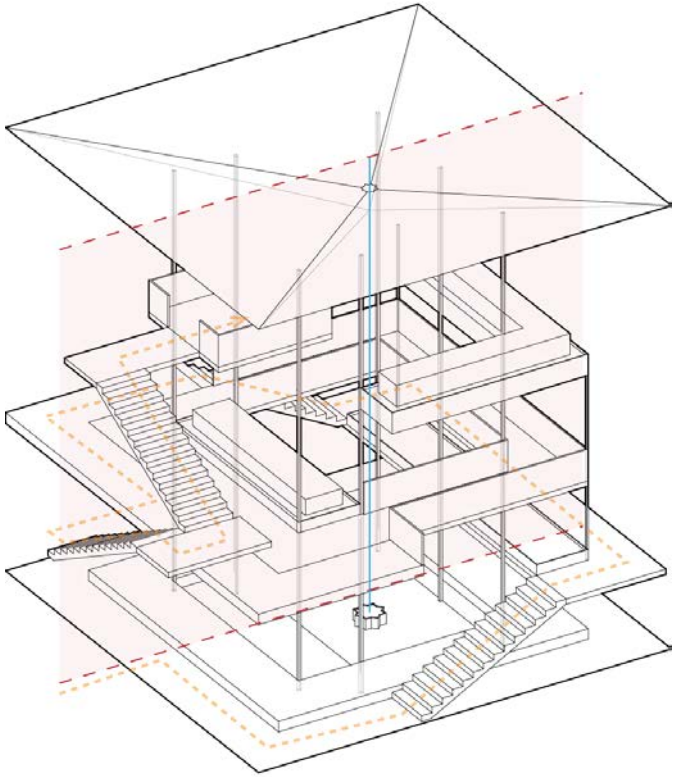
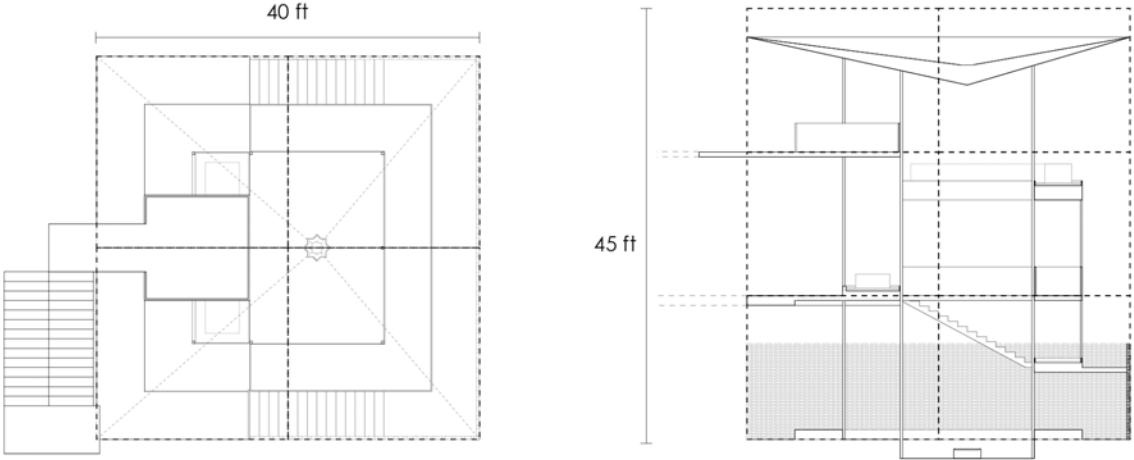
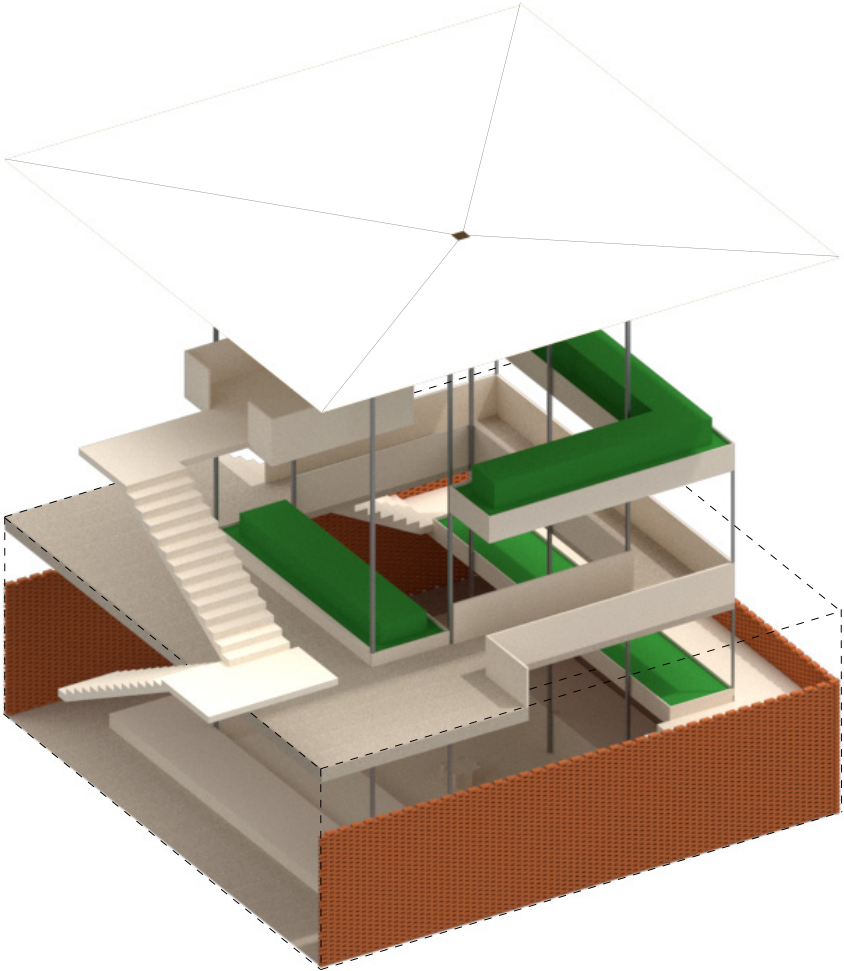
The Green Slope connects the two levels of the 2.5-D surfce with a big planted ramp. The ramp itself, as well as the public circulation it enables, is one example of the non-stacking sectional relationship of the 2.5-D design.



7. GARDEN: VERTICAL GARDEN

In traditional Islamic gardens, the four water channels are a critical element, as they represent the four rivers in paradise.

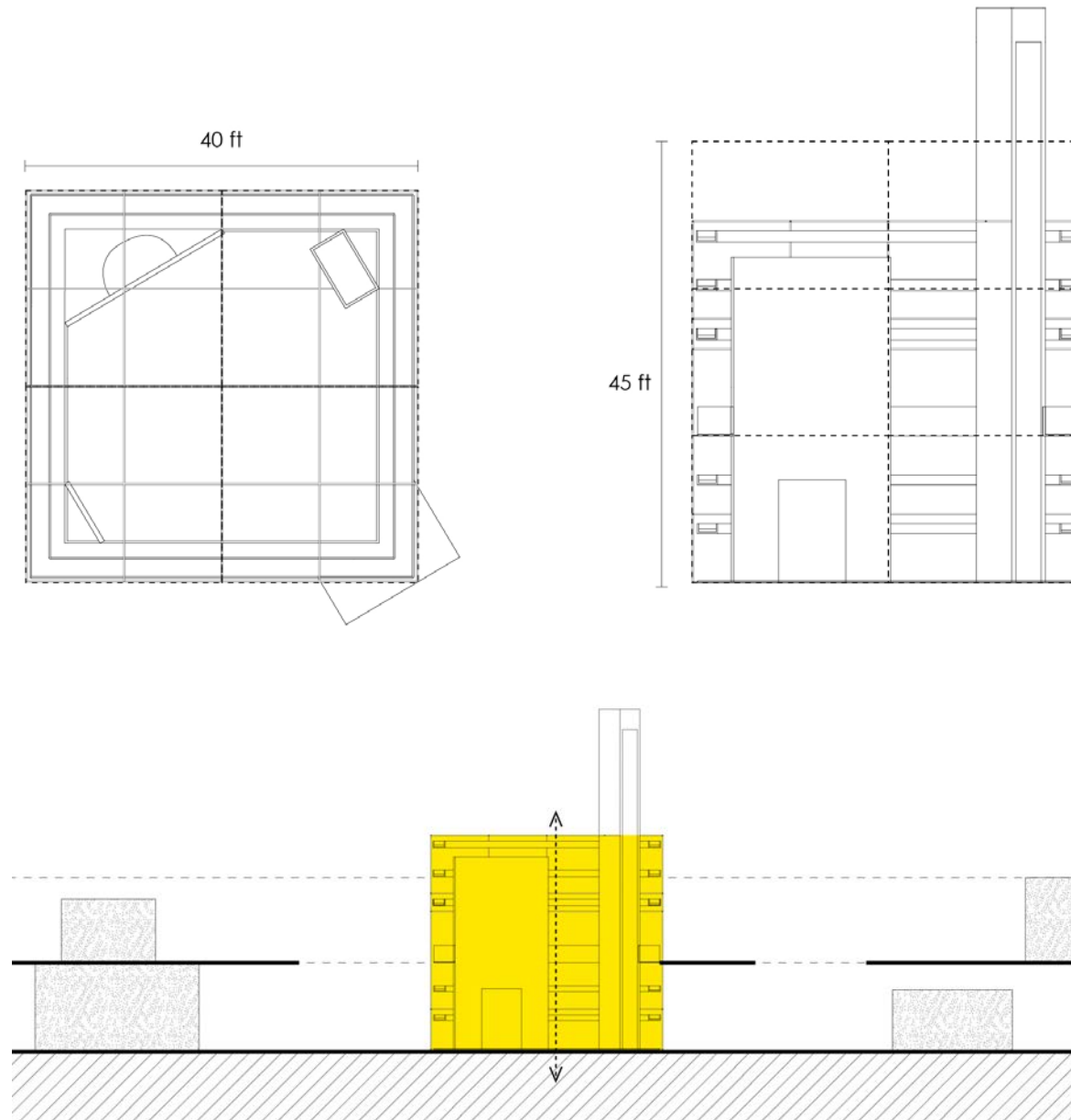
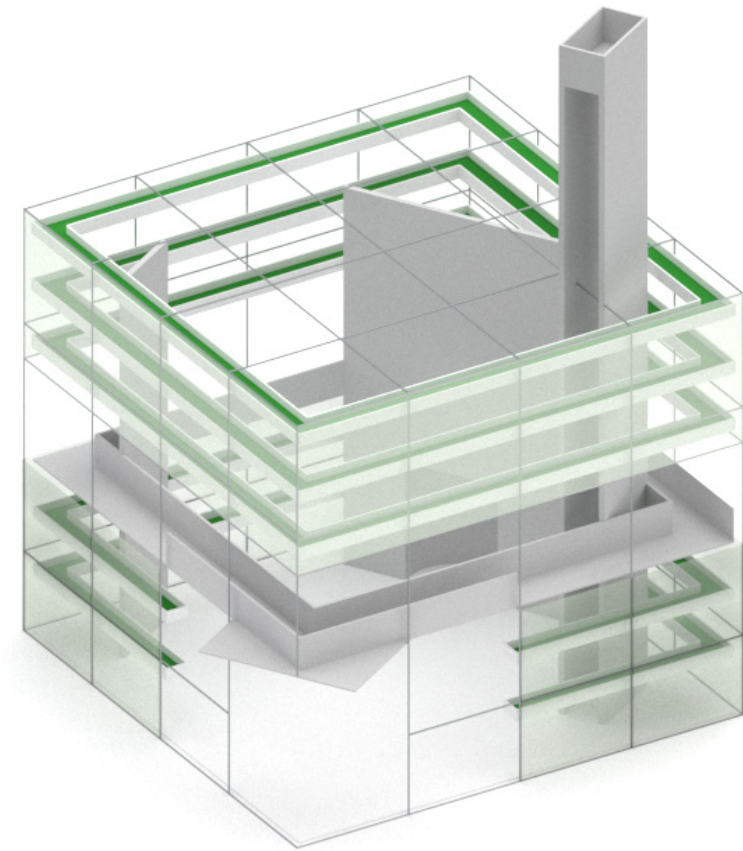
For this Vertical (Islamic) Garden module, a vertical string of water and the central axis represent this feature. An upward circulation is reminiscent of the traditional Islamic garden as the paradise on the earth.



8.

GARDEN: GREEN MOSQUE

The Garden+Mosque module is another example of the non-stacking sectional relationship in the 2.5-D design. Besides, as the circulation and structure is outside the module, the module itself is not an independent object, but rather a portion, or a special condition of the whole 2.5-D design.



9.

GARDEN: OASIS LIGHTHOUSE

On one hand, the Oasis Lighthouse is an extension of the 2.5-D design into its dense context, which acts like a pin; on the other hand, it is also acts as an advertisement of a different lifestyle.

