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THE WETLINES

A Multifunctional Landscape at Bint Jbeil

MARIAM BAZZI

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INTRODUCTION

Bint Jbeil is an extreme southern village located at 112 km away from Beirut and 5 km away from the Palestinian borders. Bint Jbeil is also the center of Bint Jbeil District. This geographical position of the city was a blessing at certain times because it made it a center of different regions which helped in its development and prosperity. However, this city was affected in most of the times with the regional conflicts which also affected its resources, economy and social layer.

What characterizes this village is its richness in the different layers. First, the village has an important historical background which was directly related to the history of the region and all the conflicts that passed through history, and especially the Lebanese - Israeli conflict. This gave Bint Jbeil a significant political importance, being called by some people “the capital of Resistance in Lebanon”. Also, this historical background left an important impact in the cultural layer of the village still showing through the different cultural elements that persisted till now, the most important of which is “the Souk”.

Moreover, the old village with its stone houses and small allies still speak of the long history of the village. Another important layer to study in this village is the water resources which also have their cultural importance, such as the “berke”- the artificial ponds and the wells. The most important of them which is still existing is the main artificial pond called “Beket Bint Jbeil”. However, many factors are affecting the water resources in this village including the destruction followed by wars, pollution as well as the urban expansion. This makes the village now suffer from water deficiency and stress.

Several attempts were taken by the municipality to solve the issue, including pumping water from the Litani river. This method failed because of long distance issues and corruption. It made them again of water harvesting ponds resembling the existing one.

Moreover, ecologically speaking, the historical timeline of the landscape mosaic shows that a fragmentation and breaking up of the larger habitat into dispersed patches occurred due to human disturbance. This disturbance is represented by the urban expansion and the introducing of several roads and highways which serve as barriers that subdivide the population of species into meta-populations.

Agricultural wise, the city used to be known for the famous Tobacco cultivation that was also common in the southern villages. However, in the late 1970s (following the Israeli wars against Lebanon) a huge number of the citizens immigrated to various countries all over the world especially the US. This minimized the agricultural practices in the village , and now a few agri-

METHODOLOGY

The method adopted to carry out this project relies on several phases as stated below:

First, the main issues present in the town were studied and analyzed.

Second, a deep study on the opportunities present in the town to solve the issue was conducted.

Third, case studies were researched to find similar situations as the ones in the site. Case studies gave a general view on the different techniques used and how the water harvested was used.

Forth, a large scale strategy was developed for the town targeting four layers of water infrastructure, agriculture, culture, and ecology.

Finally, the design focused on zoom in areas where different systems meet together.

REVIEW

Stormwater is a vital part of the hydrologic cycle involving management practices to insure infiltration, control runoff pollution, reduce thermal impacts and control peak flows. Its management process puts landscape into work by using the elements found in nature. Moreover, the public is beginning to accept that bodies of water, wetlands, and floodplains are best used as permanent open space, protected through land use controls. Therefore, Stormwater management measures and riparian lands can be integrated to form a functional riparian “greenway” or open space system. (Tourbier, J Toby, 1994).

Integrating a land-suitability analysis with open-space conservation principles, based on watershed physiographic and soil characteristics, to derive a low impact design would improve prospects and functionality of the space. (Xinhao Wang, William Shuster, Chandrima Pal, Steven Buchberger, James Bonta, and Kiran Avadhanula). Moreover, forming corridors of natural areas would enhance wildlife protection and passive recreation. (Tourbier, J Toby, 1994).

Case Studies

Minghu Wetland Park - China

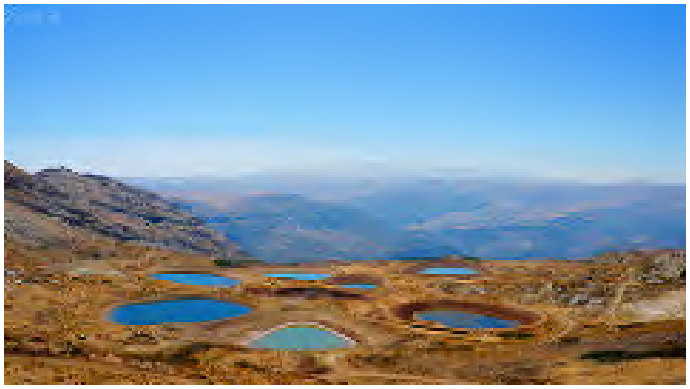
Project Statement: "Through a series of regenerative design techniques, particularly measures to slow down the flow of storm-water, a channelized concrete river and a deteriorated peri-urban site have been transformed into a nationally celebrated wetland park that functions as a major part of the city-wide ecological infrastructure planned to provide multiple ecosystem services, including storm-water management, water cleansing, and recovery of native habitats, as well as a creation of a cherished public space for gathering and aesthetic enjoyment."

The project was meant to tackle different issues such as water pollution, flood and storm-water inundation, and the creation of public space. This lead to the creation of a wetland park that addresses the above mentioned issues.

Medellin Reservoir Tanks

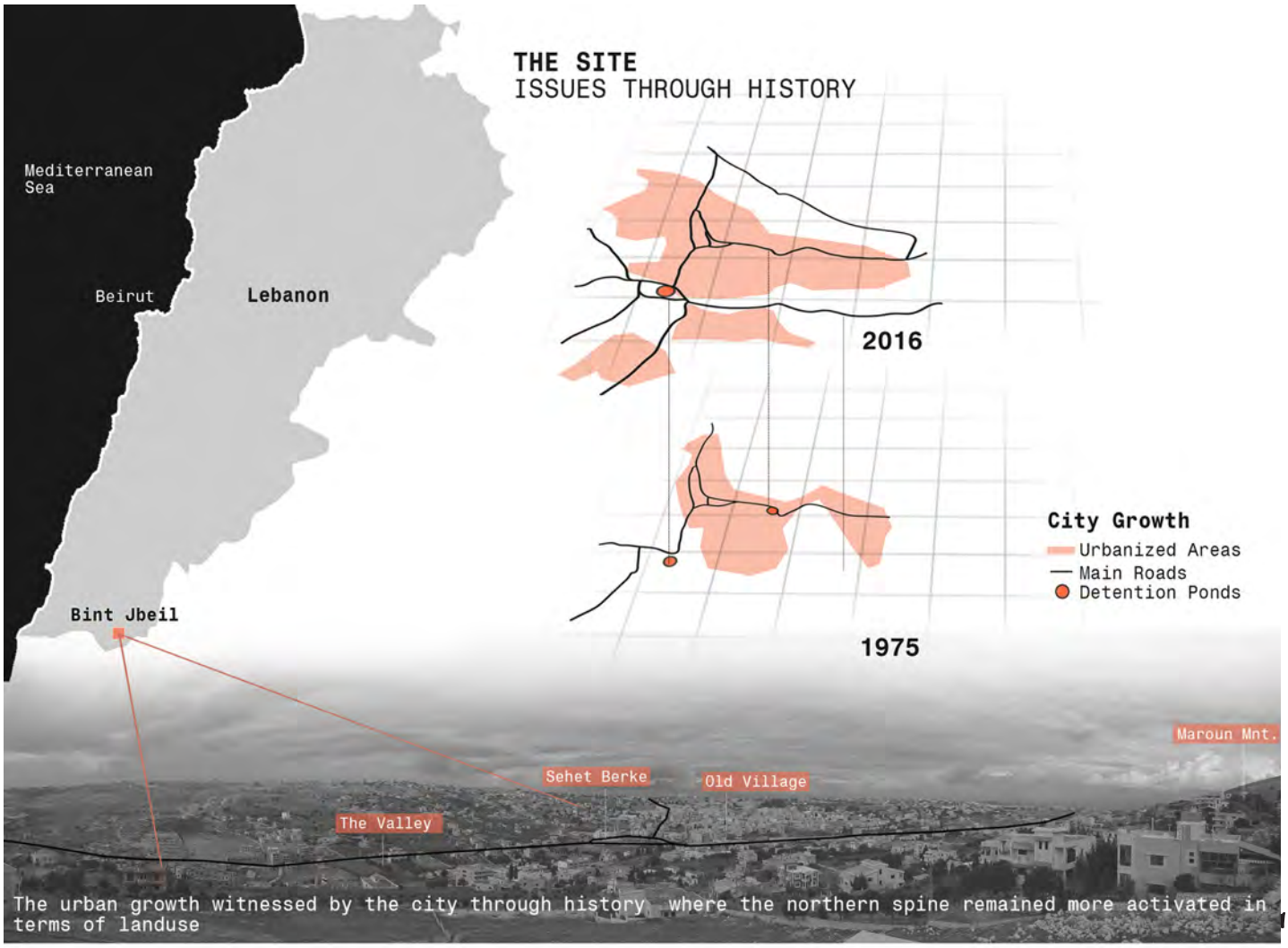
Using reservoir tanks for water collection

The site is located In a residential context. The reservoir tanks were used as water collectors and then they were transformed into public spaces.

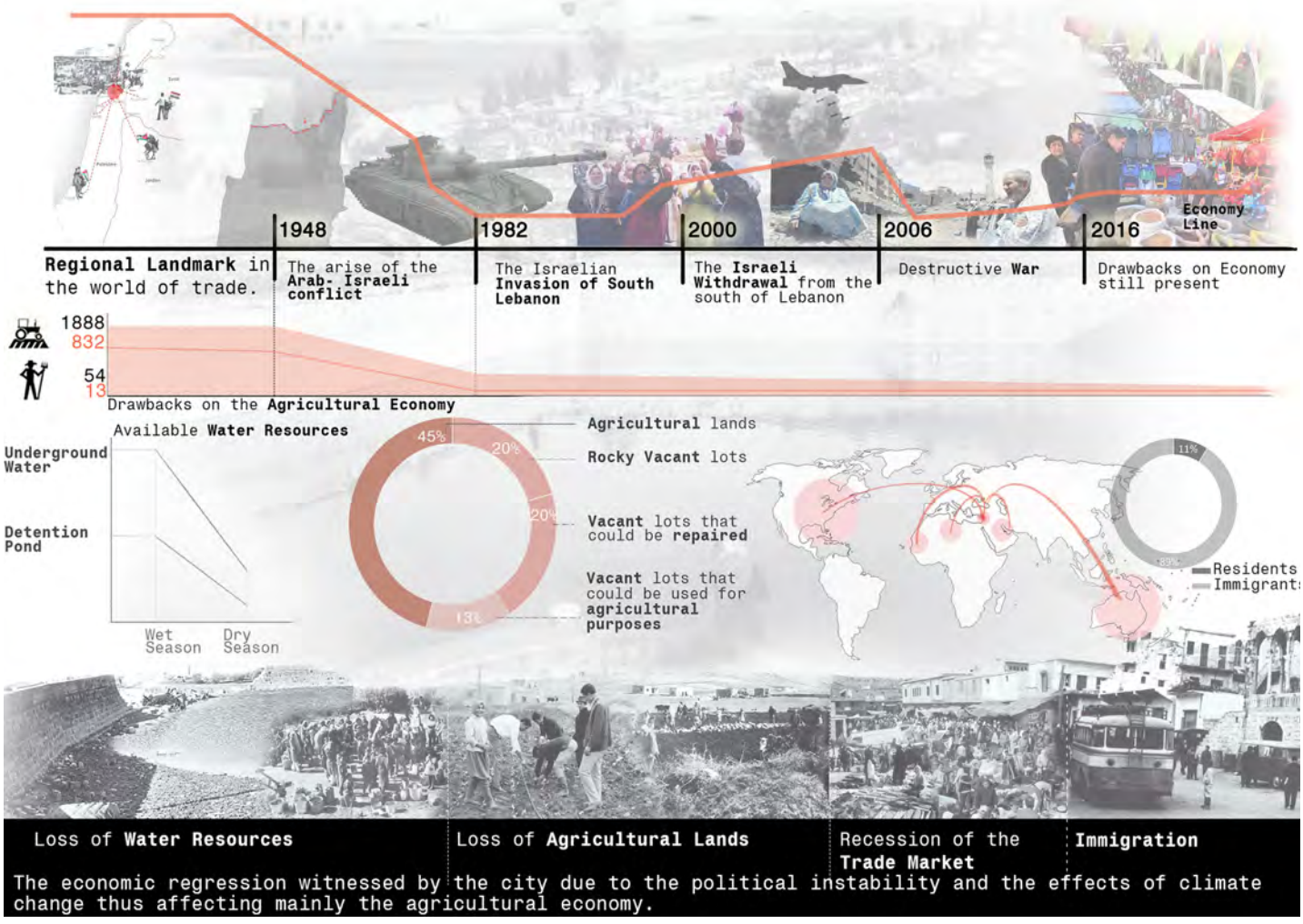


Qunli Stormwater Park
A Green Sponge for Water-Resilient City
The project works on revitalizing the wetland ecosystem in an urban context, as well as collecting, filtrating, and storing stormwater. The main cincept was to leave the nature alone and work on the peripheries.
Minghu Wetland Park - China
Project Statement: "Through a series of regenerative design techniques, particularly measures to slow down the flow of storm-water, a channelized concrete river and a deteriorated peri-urban site have been transformed into a nationally celebrated wetland park that functions as a major part of the city-wide ecological infrastructure planned to provide multiple ecosystem services, including storm-water management, water cleansing, and recovery of native habitats, as well as a creation of a cherished public space for gathering and aesthetic enjoyment."
The project was meant to tackle different issues such as water pollution, flood and storm-water inundation, and the creation of public space. This lead to the creation of a wetland park that addresses the above mentioned issues.

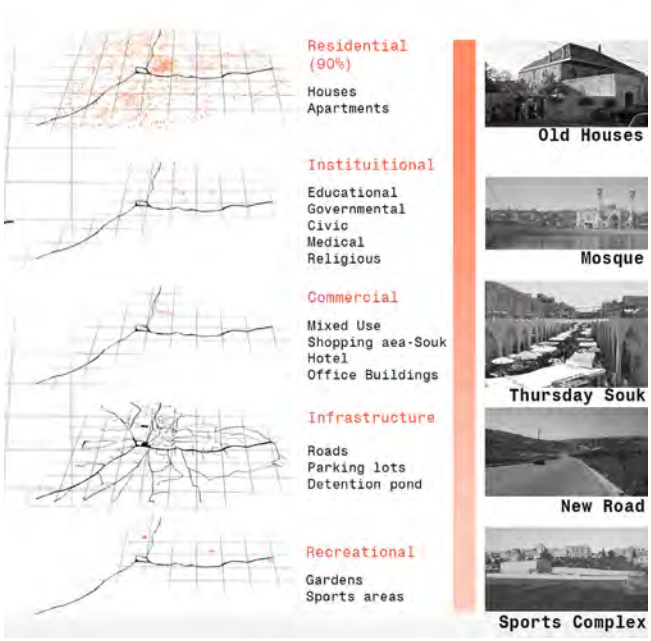
Laqlouq Hill Lakes
Several hill lakes were built on the high elevations of Laqlouq-North Lebanon for water storage.



The urban growth witnessed by the city through history, where the northern spine remained more activated in terms of landuse



The economic regression witnessed by the city due to the political instability and the effects of climate change thus affecting mainly the agricultural economy.



Site Selection & Background

Bint Jbeil is a rural town located in the south of Lebanon. This town has witnessed a growth in its urban fabric however, there are main landmarks that punctuated the village cross the years such as Sehet el Berke, old village and the valleys. Moreover, this town has also witnessed a steep regression in its economic and demographic growth due to an overlap of political instability characterized by several destructive wars, and the drawbacks of Climate change affecting temperature and water resources. The city now depends on underground water and a detention pond however, these resources get dried during the dry season causing a serious issue to the village. This overlapping of issues is affecting severely the agricultural economy, the trade market, and also affecting the demography of the village also leading to a rise in immigration.

Site Analysis

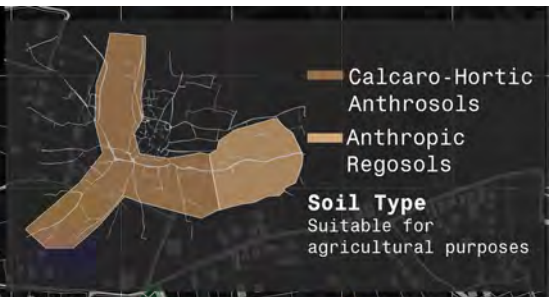
The Dual Opportunity given by the Y-shaped Valley

Departing from these conditions, the project studies the opportunities present in the village to revitalize it. The first opportunity is the dominance of vacant lands in the 235 acres Y-shaped valley of the village and the adjacent slopes. This serves as an opportunity in terms of bringing back agriculture to the village at two different scales; at a large scale where the vacant lands occupy large areas of the valley and slopes and on a small scale where they occupy spaces between buildings in more urban areas.

The Y-shaped valley creates a dual opportunity to the village, where the topography of this village creates a huge opportunity for water harvesting due to the huge amount of rain that falls on this watershed during the wet season. Therefore, the arms of the Y become water corridors during this season.

STUDYING OPPORTUNITIES
AGRICULTURE & WATER HARVESTING

THE Y-SHAPED **VALLEY:**
VACANCY IN THE VILLAGE



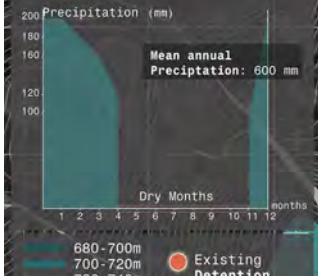
Olives Cultivation
Vegetables cultivation
Remnant patches
Potential for small-scale Agriculture
Potential for terraced Large scale- Agriculture

0 100 200 300 400 500m

Strategy for agriculture
small scale → community gardens
Large scale → on slopes → terraces
on valleys → fields

The predominance of the vacant lands in the Vallyes as an opportunity for agriculture

THE Y-SHAPED **VALLEY:**
THE **WETLINES OF BINT-JBEIL**

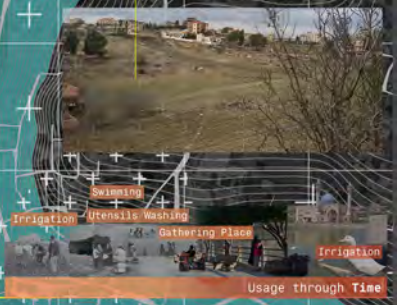


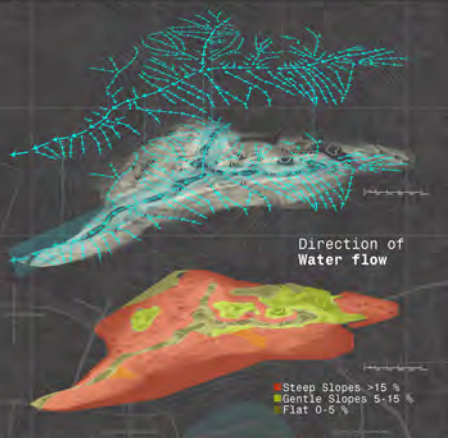
680-700m
700-720m
720-740m
740-760m
Altitudes

14.5 m3/s
10.1 m3/s
9.5 m3/s
4.9 m3/s
Peak discharge

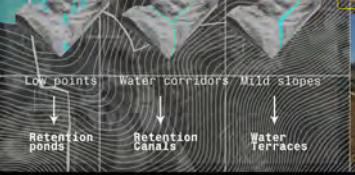
Existing **Detention pond**
Strategic points for **Water collection**
water corridors

0 100 200 300 400 500m





Water Harvesting Strategy



The special topography as an opportunity for water harvesting in the Y-valleys

PROPOSAL

The Multi-functionality of the Landscape Proposed

The project aims to turn this Y-shaped valley into a natural landscape that will reactivate the vacant lands of the village by creating a system of water infrastructure that will harvest rain water and renew the agricultural matrix. This system will be the trigger of the entire transformation of the village and will help improve its economic status. However, this landscape will not only be a productive one but it is also inscribed in a cultural network where it takes the cultural areas of the city and extends them out to the agriculture matrix and renew the intimate connection of people to the landscape. The system will also be an ecological corridor and a habitat for wildlife species due to the presence of the wet areas and ponds as well as the native wildlife tree buffers. The wetland areas will be also attracting migrating birds during the migration season.

A MULTIFUNCTIONAL LANSCAPE
INTEGRATED LANDSCAPE SYSTEMS

ECOLOGICAL CORRIDOR

CULTURAL NETWRORK

AGRICULTURAL MATRIX

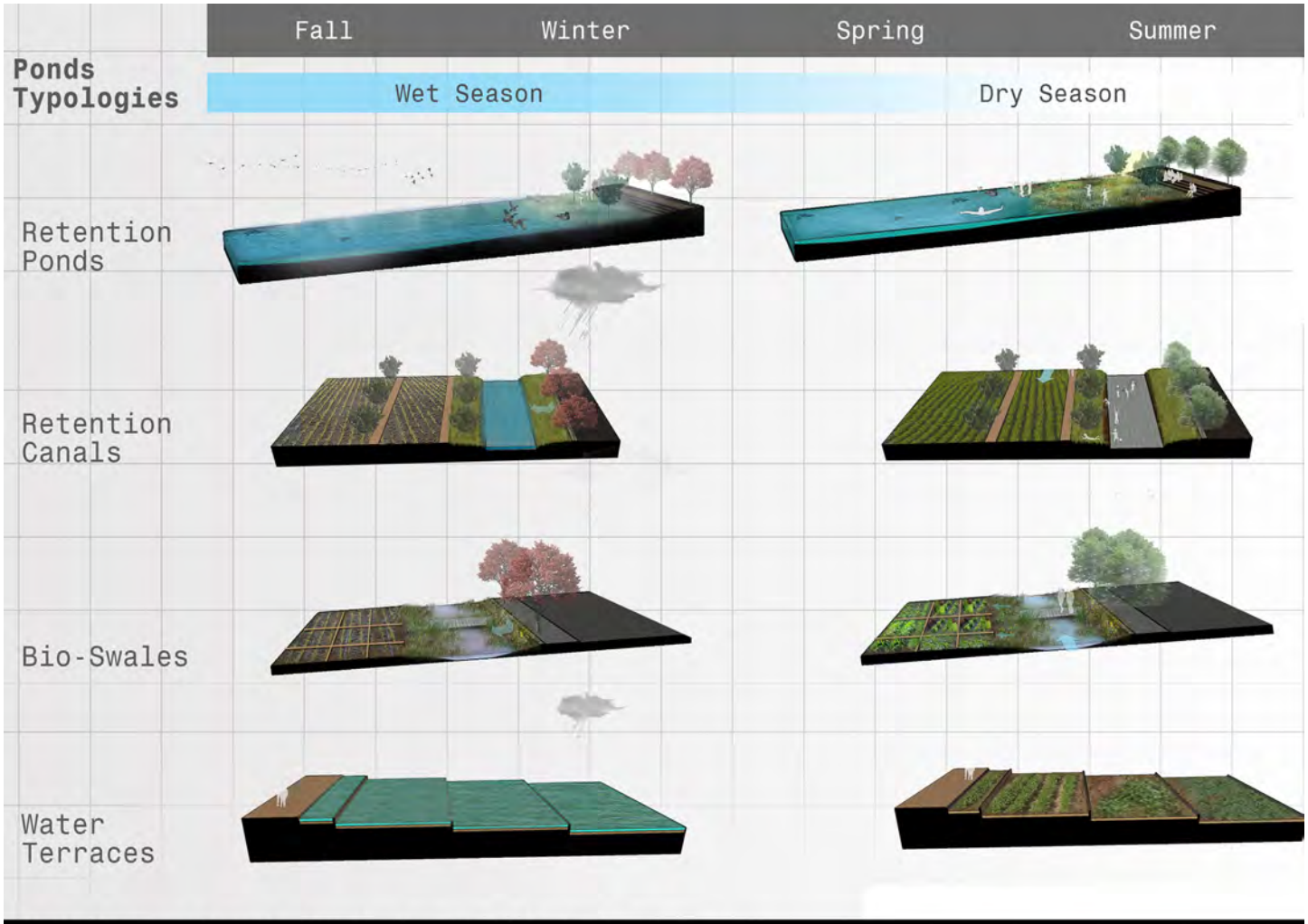
WATER HARVESTING SYSTEM

The multifunctionality of the landscape created

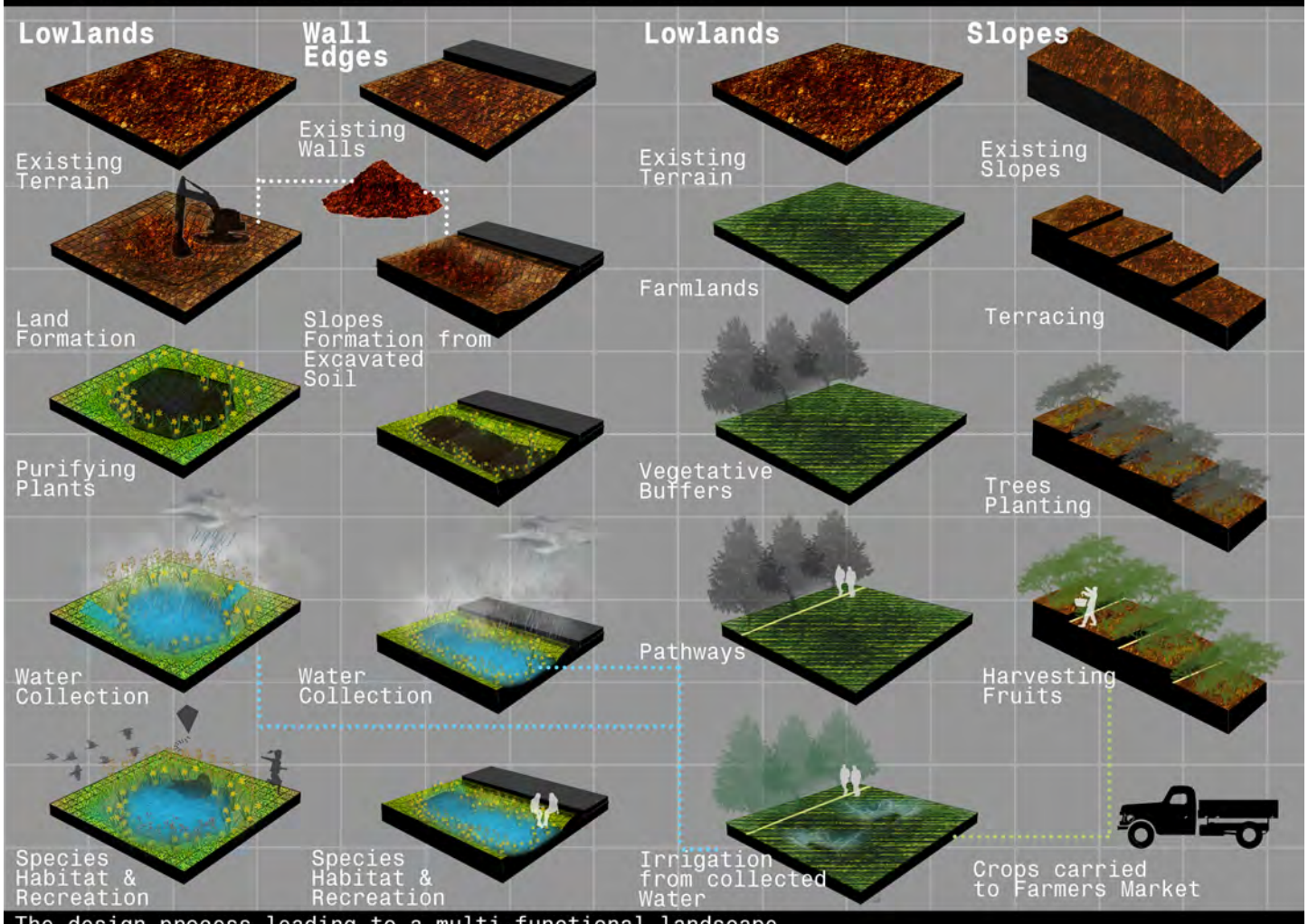
Water and Agriculture as new economic and cultural basis for the town

The water infrastructure and elements will strategically reoccupy the vacant low lands and water corridors in the valleys through different typologies. The system combines retention ponds, canals, bio swales and water terraces. The behavior of these typologies differs during the changing of the seasons. In the wet season, all different types of water infrastructure will collect storm water. The estimated volume of water collected is 200,000 m3 which will be used for irrigating the existing as well as the introduced agriculture. However, in the dry season, as the ponds and terraces dry up they will create passive recreational and agricultural activities depending on their type. Concrete ponds in the urban areas are designed to form seating areas and playscapes as they dry up. In more natural settings, ponds are designed from geotextiles and surrounding plants, where the meadows extend into these areas as the ponds dry up. Also, during the dry season the water canals will be activated, where they take water from the ponds and irrigate the adjacent agricultural lands.

As for the agricultural matrix, in lowlands where it is closer to water resources, farmlands are added. Fruit orchards are also planted in terraced areas in higher elevations.

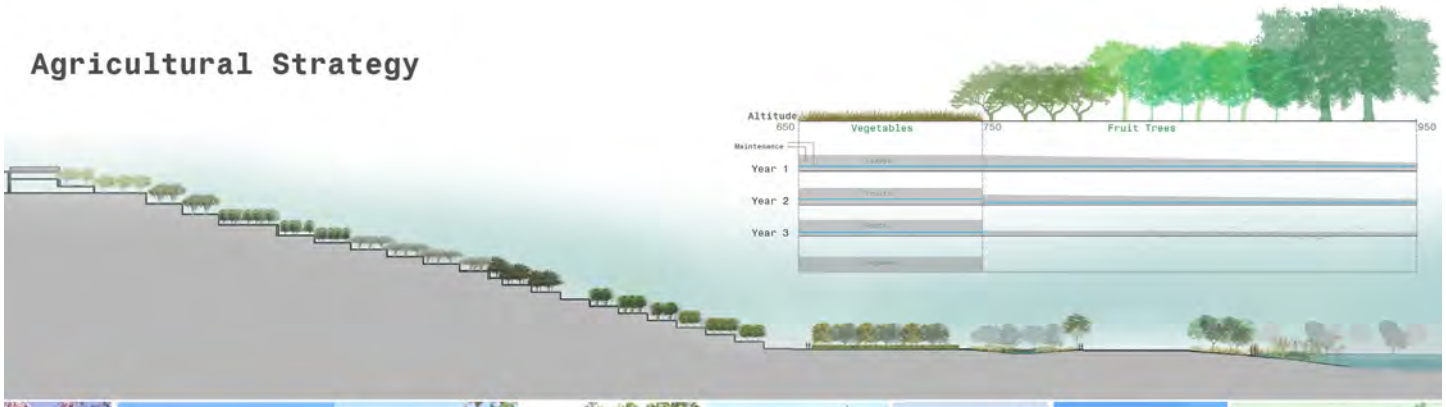


The behavior of ponds typologies in different seasons

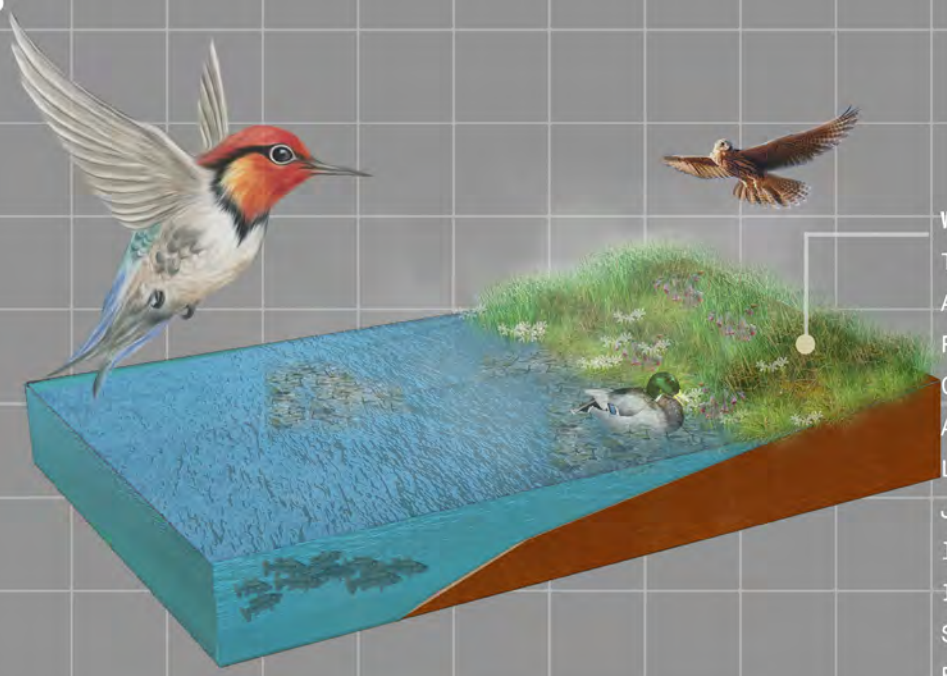


The design process leading to a multi-functional landscape

Agricultural Strategy



A HABITAT FOR **SPECIES**



Wetland Plants:

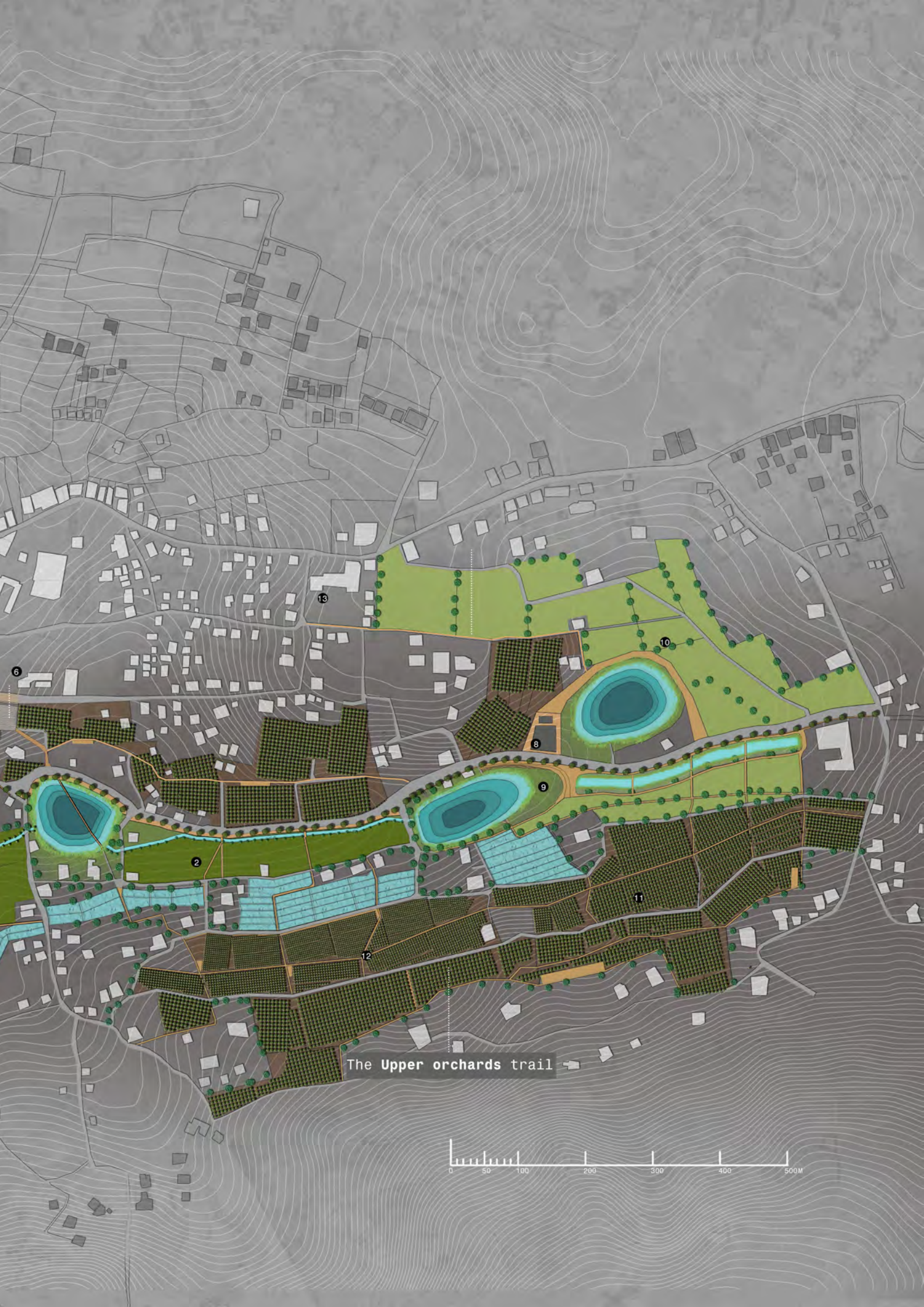
Typhacae
Alismatacae
Poaceae
Cyperaceae
Aracaea
Lemanacae
Junacacae
liliceae
Iridicaea
Salicaceae
Polygonaceae
Ranunculaeae
Malvaceae

The overlapping of the different layers created will form two important trails in the village; the wetland trail and the upper orchards trails. The wetland trail departs from Sehet el berke which will become a cultural hub for the village where it will contain a farmers market where local products and crops are sold, a plaza that can host cultural and religious events, and an introduced multifunctional pond. Along the trail, a 1.5Km sidewalk will lead the pedestrian flow to the wetlands and orchards. The trail also connects the valley to the old village and school areas from one side and to the orchards from the other side through introduced pathways and stairs. Then, gathering areas, meadows and food hubs will surround the ponds areas.

Agriculture as a cultural landscape
Countering the notion that agriculture is a mere productivity space, the upper orchard trails will infiltrate the cultural network into the agricultural matrix. Pathways and harvesting nodes will transform the agricultural areas into cultural ones, thus integrating harvesting seasons in the cultural calendar. Harvesting festivals will take place in spring where locals will participate in the harvesting of fruits. Also, observation platforms are introduced in higher elevation for people to enjoy the beautiful landscape created by the grids formed by orchards and agricultural lands.

Master Plan

1. Sports & Recreation Complex
2. Community Gardens
3. Famer's Markets
4. Cultural Hub
5. Old Village
6. Civic Area
7. Plaza
8. Food Hub
9. Meadow
10. Agriculture Lands
11. Fruit Orchards
12. Harvesting Nodes
13. School


13
10
6
8
9
2
11
12
The **Upper orchards** trail
0
50
100
200
300
400
500M

The **Wet Season**

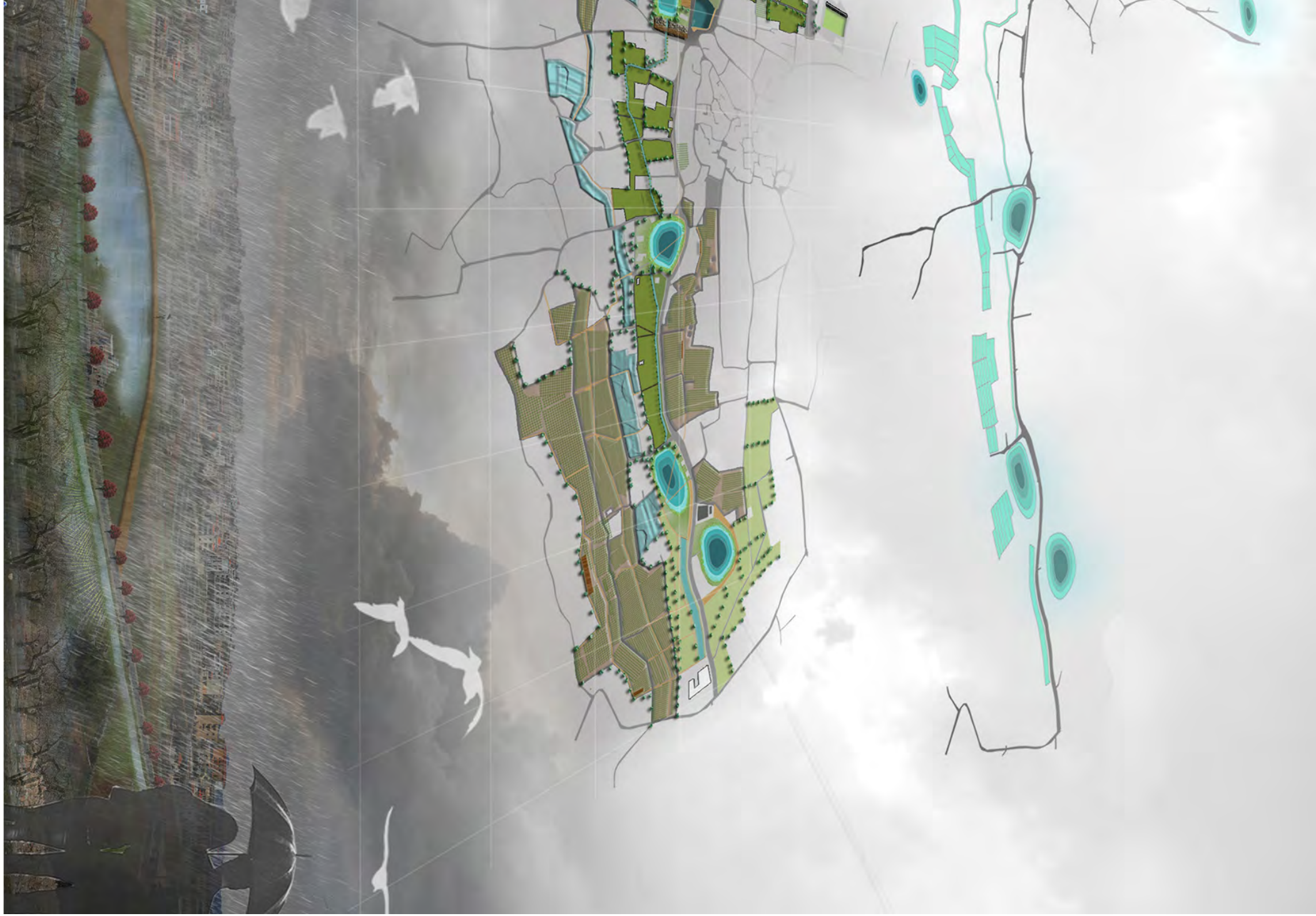
Water Harvesting Process

Expected Storage:

200,000 m3 of water

Ponds, terraces and swales **collect** stormwater

Water Collection during the wet season



The **Dry Season**
Harvesting Festivals

Water in the **Ponds**
are used for iirigation

Water Channels
are activated through
pumping water
from the ponds

Water Terraces become
Agricultural

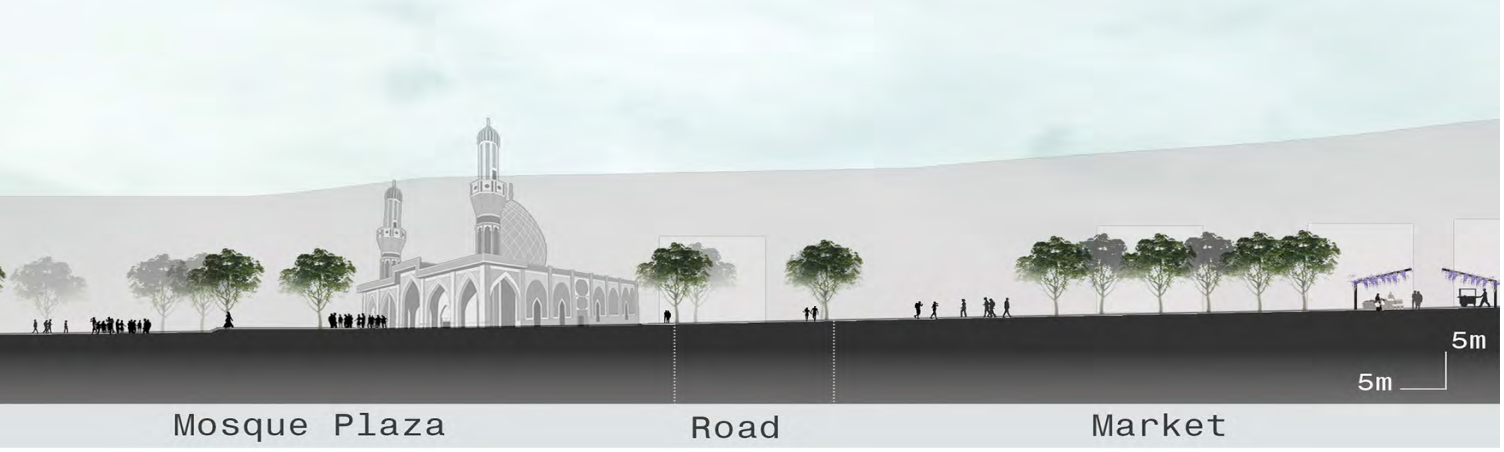
Fruit Harvesting
Season begins

Harvesting events during the wet season

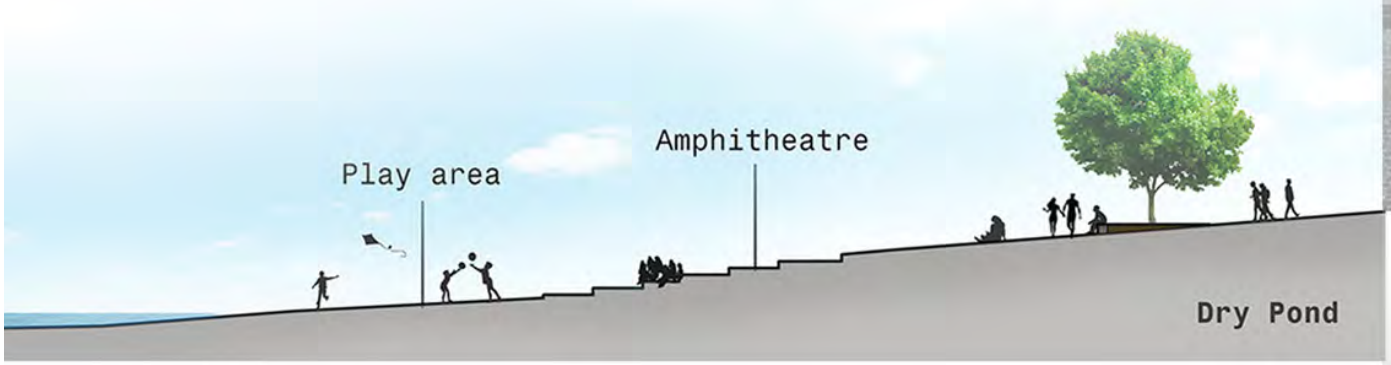
Harvesting
Square

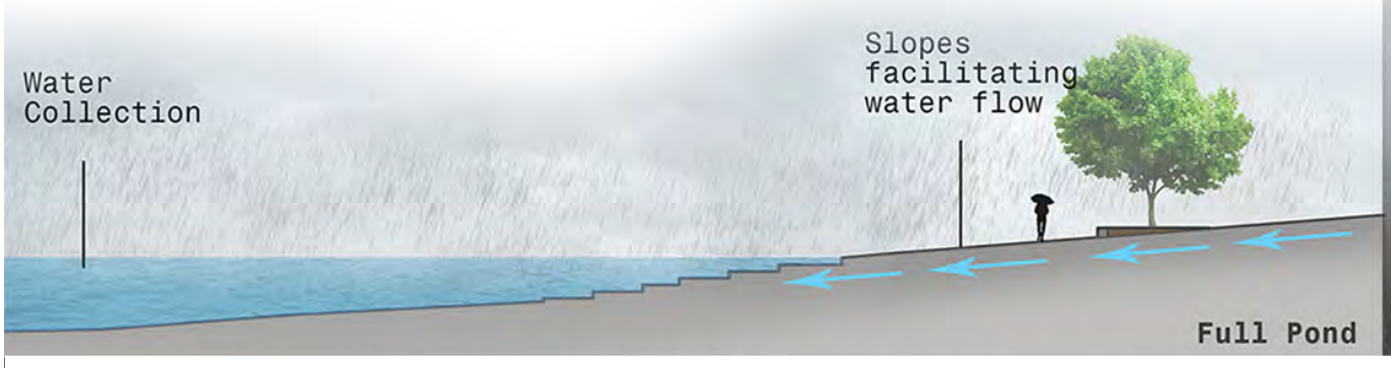
Sehet EL-Berke
The Cultural Hub

Market
Mosque
Plaza
Pond
Agricultural area
0 10 20 30 40 50 M


5m
5m
Mosque Plaza
Road
Market

The Multi-functionality of Ponds

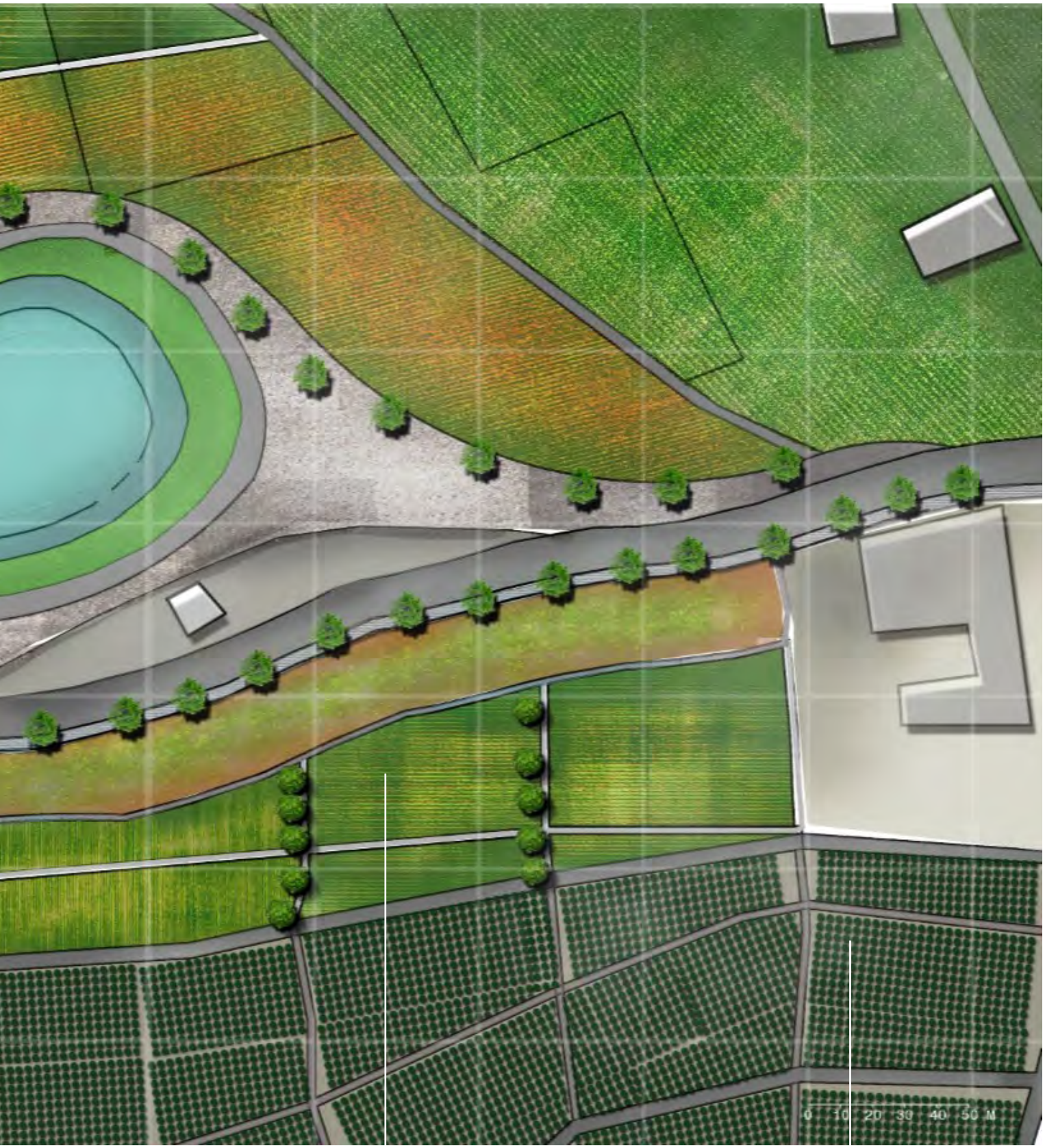




The Agricultural Area

Pond

Plaza



Agriculture

Fruit Orchards

Afternoon at the **Meadow**

Native Street
Trees
Engaging
Public Space

Acknowlegments

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