[Re] **Birthing Rural Areas**

A Journey Towards Environmental Rejuvenation and Social Progress

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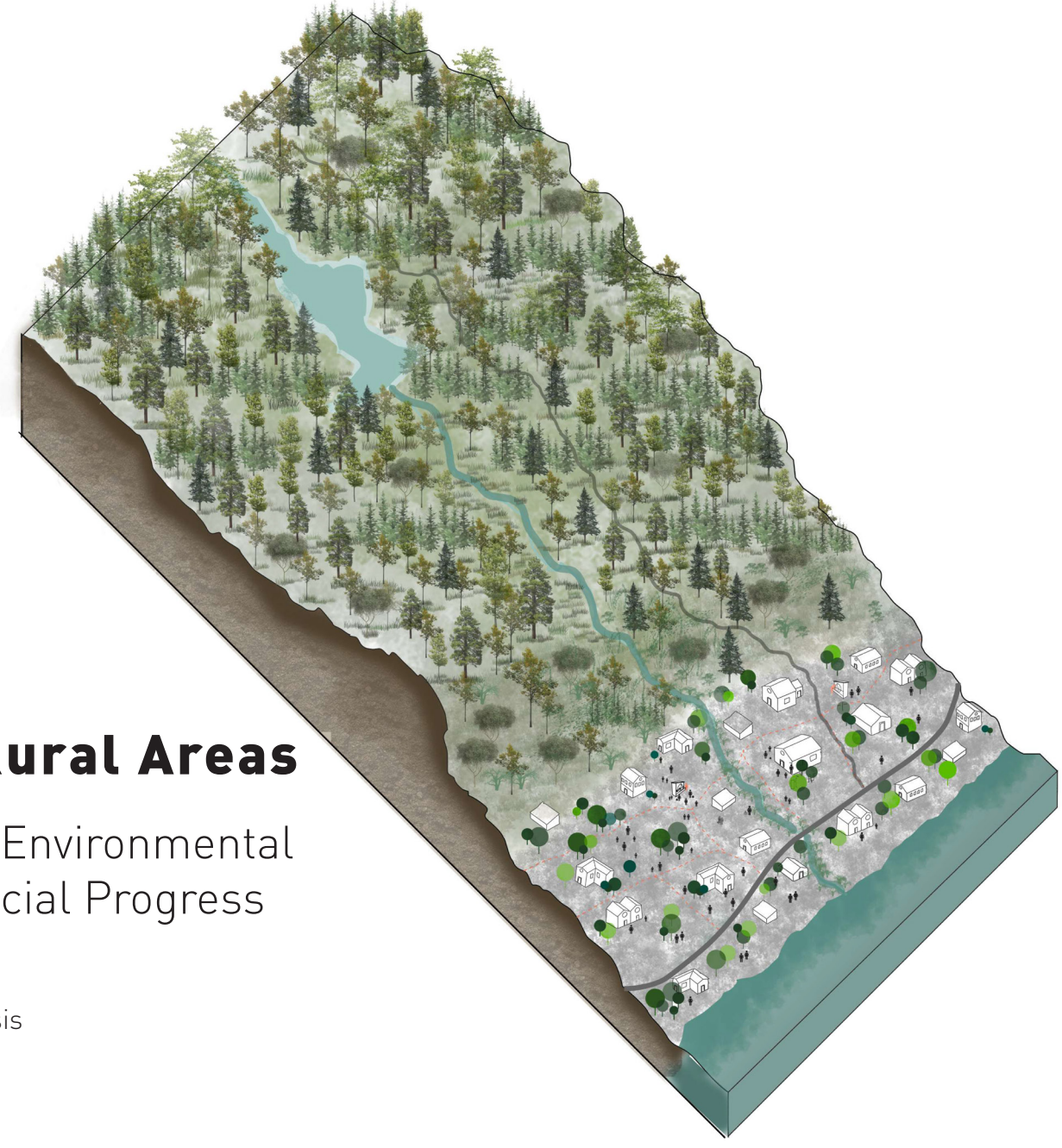
Landscape Architecture MSc Thesis
Delft University of Technology



[Re] Birthing Rural Areas
A journey Towards Evironmental Rejunevation and Social Progress

Master thesis

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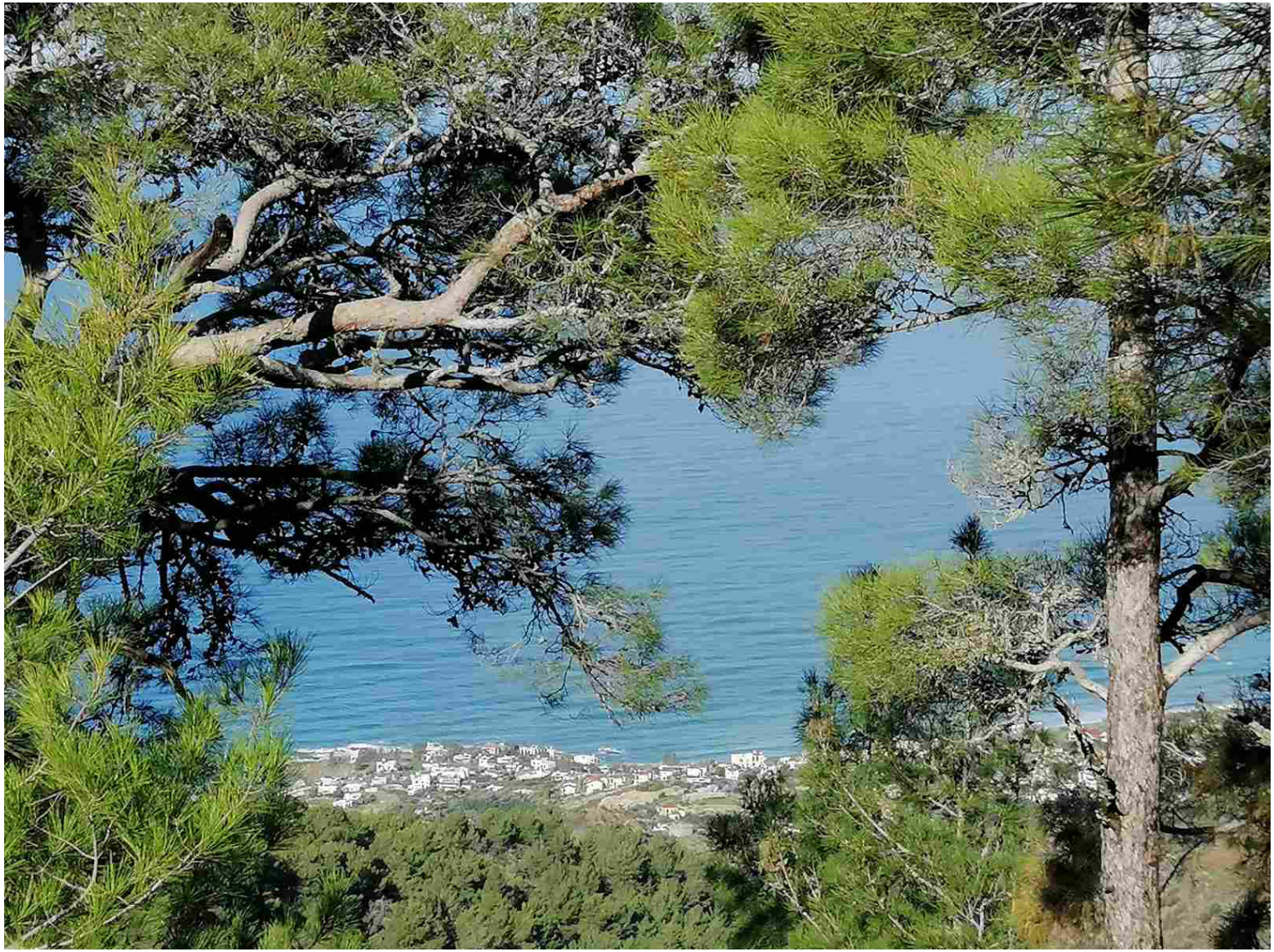


Abstract.

This graduation project in the field of Landscape Architecture, conducted over a period of 9 months at the Circular Water Stories lab in Flowscapes studio in TU Delft, focuses on addressing water scarcity issues on the Greek island of Cyprus. The primary objective is to explore how local communities can actively contribute to alleviating water shortages while simultaneously raising awareness about the importance of preserving the natural habitat in a rural area in Paphos city.

Initially, an extensive investigation was carried out to examine the historical water systems on the island, aiming to gain insights into how the residents coped with water scarcity. Cyprus, having been ruled by various conquerors, benefited from the introduction of advanced water management practices. Notably, the water source was located distant from the settlements, necessitating the transportation of water to households through aqueducts, street taps, conduits, and similar means.

Furthermore, the focus of the thesis revolves around a rural region on the island. Specifically, the research site pertains to a valley situated alongside a seasonal river that incorporates a dam. This area is predominantly dedicated to agriculture, which greatly influences the overall landscape. Examining the local water management system aids in comprehending the spatial organization of the village, thereby contributing to a deeper understanding of its structure.

However, alternative ways of irrigation in order to combat the dryness of the area are proposed, so as not to be anymore independent on the dam. The raise of awareness is proposed through the interaction of the visitors with the environment and water, in order to involve them in the natural process. Especially, the concept is to begin with an experimental phase, initiated by a local farmer who takes action after engaging in discussions and interactions with the author. Over time, as the positive outcomes of these interventions become apparent in the farmer's cultivation practices, other farmers in the area are influenced and begin adopting similar approaches.

As local authorities strive to offer unique experiences to visitors, competition among the villages intensifies.Therefore, new infrastructure for educational and commercial purposes are introduced. Particularly, the local council takes the initiative to financially support village farmers by promoting their products. Furthermore, recreational activities are incorporated, providing opportunities for both children and adults to engage with the water and environment, particularly during weekends.

The project introduces a unique and unparalleled characteristic to the entire island, making the area a magnet for residents and visitors alike. The extension of water presence in the region not only enhances the flora, fauna, and soil, but also serves as a catalyst for positive change and improved sustainability.

Key words : Cyprus island, Pomos village, raise awareness, landscape, farmers, agriculture, seasonal river,

CONTENT

01 .Introduction
Introduction
Geomorphology and precipitation
Historical Background
Study site

02.Theoretical Framework
Problem Statement
Research Question
Methodology

03. Analysis
Background framework
Village Development
Current Situation
Downstream
Midstream
Upstream
Local Water system
-before 1940s
-during 1940s
-after 1950s
Biodiversity
Seasonal river activation & dam
Tourist attractions

04 .Proposal
Concept
Design Strategy
Water Management
Design components
-Reservoir
-Infiltration pond
-Terraces
-Zoom-in area
Incremental Development
Experience route

06. Conclusion
Research Conclusion
Reflection
Project Relevance

Appendix
References

01. INTRODUCTION

Introduction

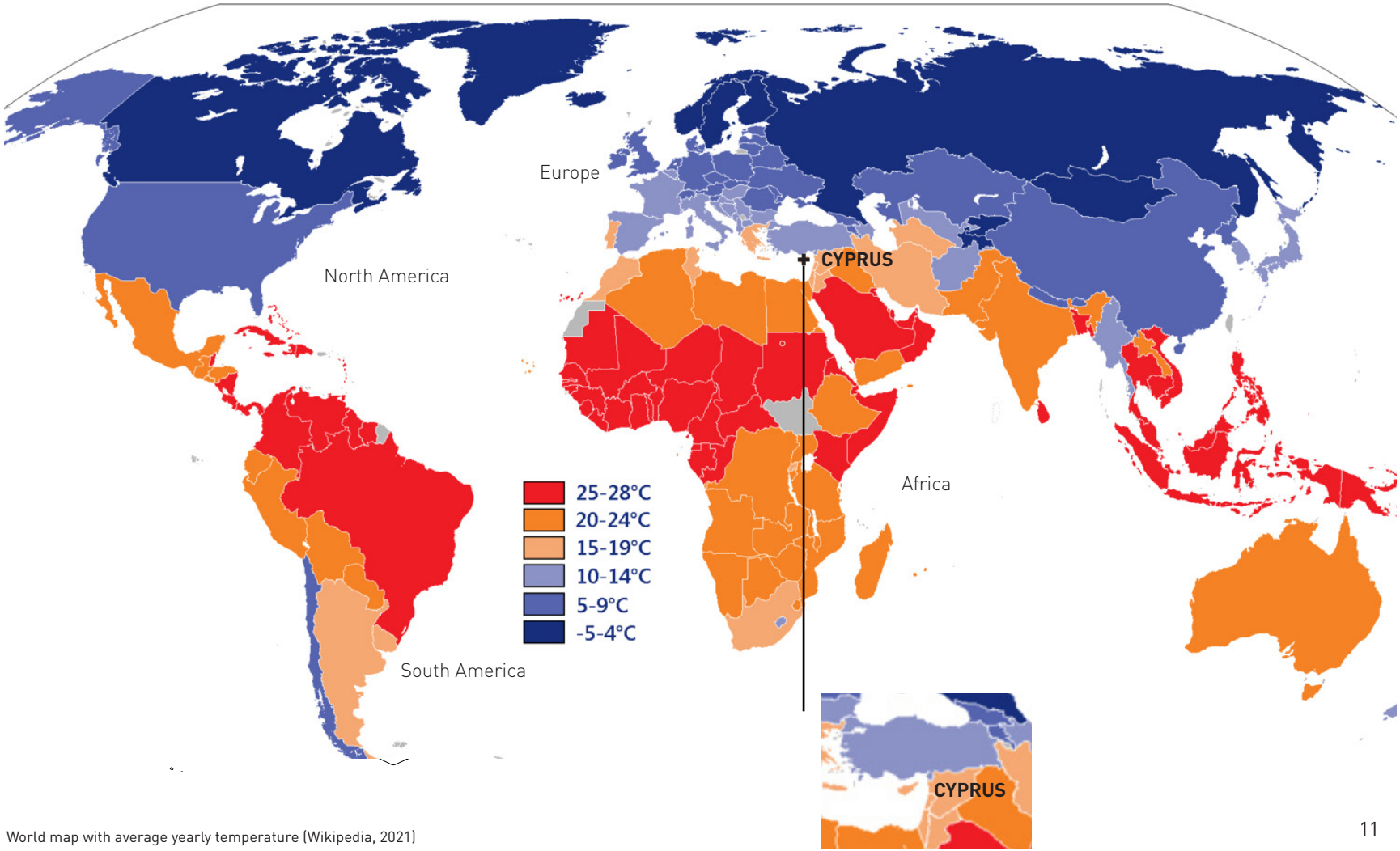
Cyprus is the third biggest island in the Mediterranean Sea, located in South-East Europe, adjacent to Turkey, Syria, Israel and Lebanon, with an area 9,250km^2. The island is well-known for copper productions since ancient times. It joined the European Union in 2004, and consists of Limassol, Larnaca, Kyrenia, Famagusta, Paphos and Nicosia, which is the capital city. In 1960 the island became independent of Britain as a Republic of Cyprus. However, due to the turkish invasion, 37% of Cyprus is occupied since 1974. Likewise, a small portion of the island is still under the British rule.

However. Greek Cypriots were traditionally a largely rural people, and the shift from the rural areas to the cities commenced in the beginning of 20th century. This situation changed in the northern part of the island, since 1974, due to the Turkish invasion. 180,000 Greek Cypriots refugees from the north part had to resettle in the south part of the island, which it was a Turkish-free controlled area. There is a "Green Line" that divides the island in the north (occupied) and south part (Greek part).

Land ownerships are mainly small, scattered and occur according to the tranditional laws of inheritance. The basic crops in the Greek part comprises grapes, deciduous fruits, potatoes, cereal grains, vegetables, olives and carobs. The fishing industry is limited in the island, thanks to deficient water in the nutrients and associated plankton. (Kolakowski, 2020, "Cyprus," Encyclopedia Britannica, https://www.britannica.com/place/Cyprus/History)

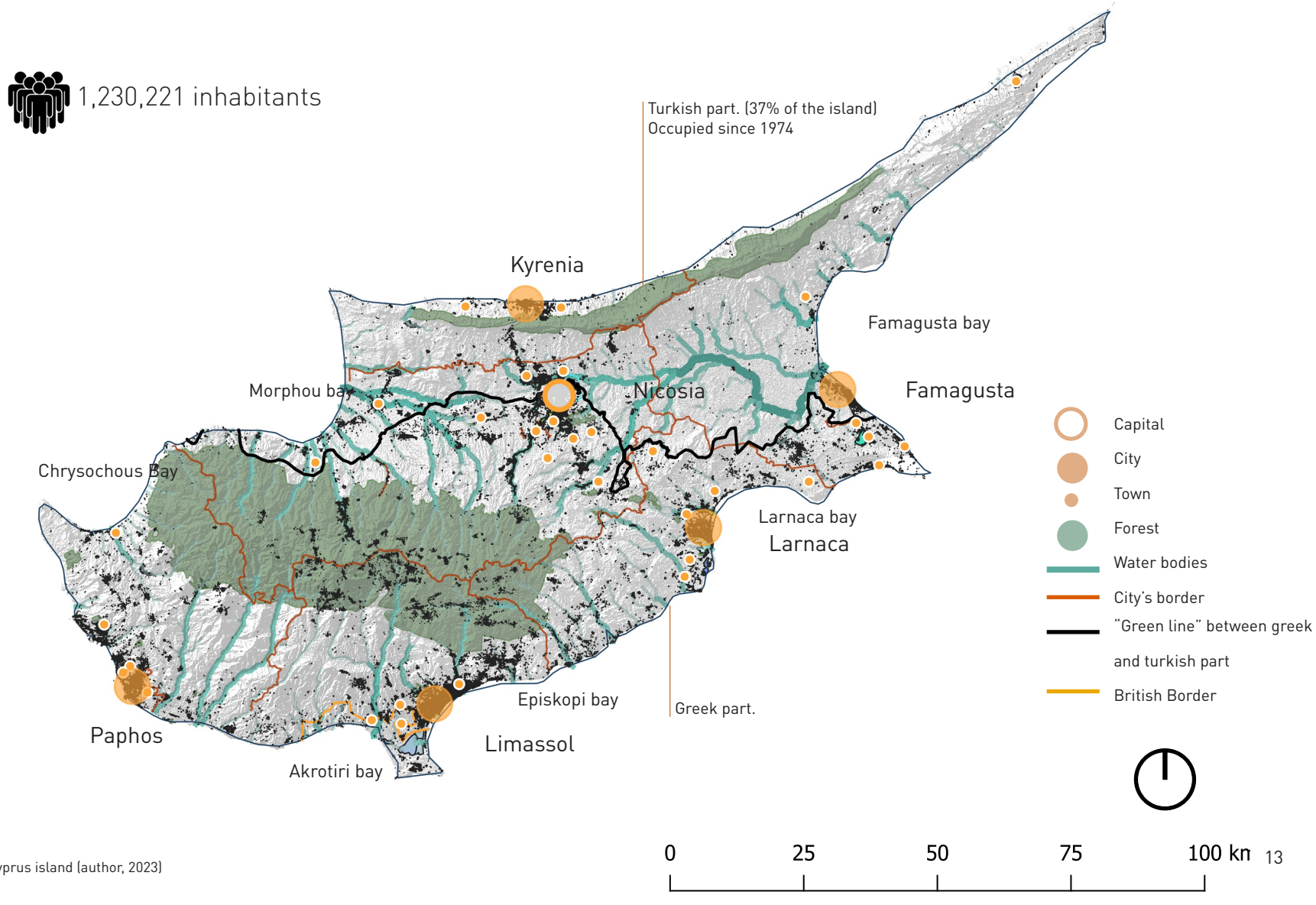
Even though the agriculture aspect is prevalent in the island, the perennial water shortage issue still exists in the country. Moreover, Cyprus adopted new methods the last year in the agricultural aspect for water and waste management, smart farming, environmental protection, and improvement on animal welfare. The country emphasizes on protecting and promoting the local traditional products worldwide, in order to get their own identity and recognition abroad. European Union contributes to the agricultural aspect upgrade in the island with funds and several programmes. (Cyprus Profile, 2021, "Agriculture and Food," Cyprus Profile, https://www.cyprusprofile.com/sectors/agriculture-and-food)

Nevertheless, the graduation project takes place in an agricultural village in the north-western costal side of the island, called Pomos. In particular, the study site consists the village, which dominates the coastal line, the agriculture landscape, which exists in a valley closeby a seasonal river and the dam, which is the main water source for the cultivations. The mission of the project is to contribute to the water scarcity. Especially, suggesting ways to deal with this issue and also approaches to take advantage of the wet season, in order to benefit the area during the dry one. Besides, the project's gloal includes the humanity raise of awareness for environmental topics. For instance, how important is to protect the local flora and fauna, since it consists the identity of a place but also to spread the knowledge about the water and its value in our life. In this way, the new interventions tend to revive and develop the rural area, but also to transform it as a pole attraction for the residents of the island.



World map with average yearly temperature (Wikipedia, 2021)

Cyprus with neigbor countries (Google earth, 2022)



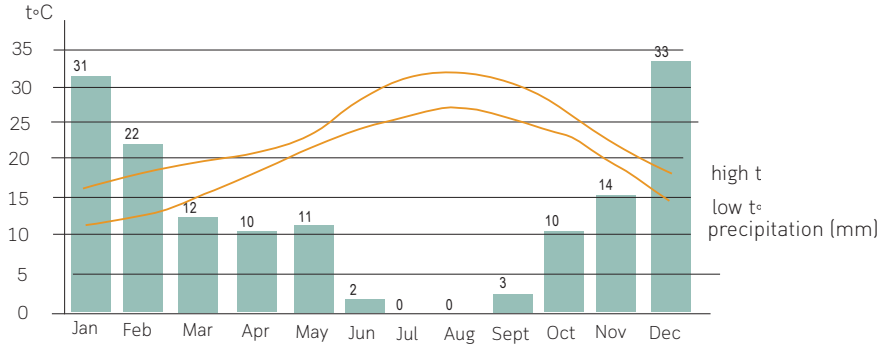
Cyprus island (author, 2023)

Geomorphology& Precipitation

Cyprus encompasses tall mountains, fertile valleys, wide beaches, and countless worth-visiting natural and cultural monuments.

Moreover, two mountain ranges dominate the island, the Troodos mountains and the smaller Kyrenia range(well-known as Pentadaktylos).Between the two ranges is located the Mesaoria plain, where, the longest island's river,Pedieos. Troodos mountains cover the most of the southern and western parts of the island, and the peak of it concerns the Mount Olympus at 1.952m. Kyrenia range lies substantially less area, and elevations are lower, reaching a maximum of 1.024m.

Cyprus has an intense Mediterranean climate with the typ -ical seasonal rhythm strongly marked with respect to temperature, precipitation and weather in general. Hot dry summers from mid-May to mid-September and rainy, rather changeable, winters from November to mid-March are separated by short autumn and spring seasons of rapid change in weather conditions. The mean annual precipitation is 690 mm. The lowest rainfall occurs in Nicosia (350mm average annual precipitation) and the highest one concerns Mount Olympus with 1,050mm. Snowfall is observed in the highest parts of the island, such as Troodos range.



Temperarture and amount of rainfall (Climate Change Knowledge Portal, (n.d.), Retrieved from https://climateknowledgeportal.worldbank.org/country/cyprus/climate-data-historical)

Map of precipitation (mm) (Climate Change Knowledge Portal, (n.d.), Retrieved from https://climateknowledgeportal.worldbank.org/country/cyprus/climate-data-historical)

Aphrodite's rock beach, Paphos

A rural settlement from above, Paphos city

Archaeological site. Paphos

Avakas Gorge, Paphos

Milliomeri waterfall, Limassol

As it has been already mentioned, the study site is located in the north-western part of the island, an area which is connected with Paphos forest. Although, the village dominates the coastal line of the area, the agricultural domain lies along the seasonal river. The area consist of a hilly landscape, especially in the upper level, since the landscape nearby the village is really smooth.

Notwithstanding, despite the fact that there are countless valleys similar to the study site in the surrounding area, the choice of the specific village owes to my interest for the particular one. More detailed, the birth place of each person has different meaning for himself, since it consists an area that one is familiar to it. Specifically, the study site is located closeby an area, where I have memories since my childhood age, and I comprehend the mentality of the people as well as the local culture. As a local, I understand as well as recognize how the things work in that place, and I perceive how the people react and behave in specific circumstances.

Moreover, after a personal contact with village inhabitants, they informed me about two the failed attempts of the authorities to revive the area, either with actions by themselves but also with the assistance of a designer. These two factors consist my main challenge. After studying their research and actions, I realized aspects and factors that they might did not take into account. Additionally, meeting inhabitants of the village and discussing with them about their needs and preferences was an additional contribution to my assignment. It is worth-mentioning that their interest and willingness to get involved in the proposal stimulates my passion and enthusiasm. They are even willing to realise the porject or part of it, after the completion of my the studies in TUDelft, and this aspect is an unexpected fact of the thesis journey. It is more than a pleasant for the designer to see his drawings and effort be realized.

Historical Background.

within water supply

Cyprus, a small island with rich history, which is divided in two sides was always dealing with the drought. Water shortage is not a nowadays issue of the island, but a perennial one. Cypriots as well as the island's conquerors was always trying to contribute to the elimination of the island drought (See appendix). They brought their knowledge about the water management and how to deal with the water scarcity.

Countless techniques and approaches have been carried out, which are still visible and properly function. Wells and springs were mainly located far away from the settlements, especially in the foot of mountains, consist some of the main water sources for the human-beings those period. Sometimes, the peolpe were provided by water by transfering it from the non-local spring to their household through donkeys. They used to walk some kilometres to reach the spring, fill the jugs with water and return back to their house. Some years later, the transportation from the springs to the settlements were realized through aqueducts, chain-of-wells, conduits.

However, during the British occupation the residents of the village were ensured with water by the street taps in central points of the villages. This system consists a fundamental component of the cypriot culture. This turns out through dances and songs by famous artists. Particularly, pupils in the primary and high school are beeing taught about this water system, through wearing the traditional costume and performing those days in the ceremony in the end of the year.

Notwithstanding, another environmental issue has been added after the declaration of island independence in 1960. As it will be analyzed in the next chapter, which is part of the issue of the study site. Particularly, the construction of the dam, as reservoir for the dry period of the island caused severe issues to the natural habitat of the island.

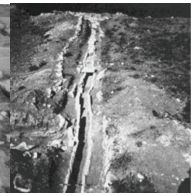
On the one hand, by taking advantage of the wet season of the island through reservoirs, in order to be well prepared for the dry one consists an effective way of thikning. Especially, the reservoirs provide both irrigation and drinking water. The water surplus is essential for the summer period, which the temperature is really high and humidity as well.

On the other one, this approach could be carried out completely different without causing any issue to the flora and fauna of each region. The construction of the dam interrupts the flow of the river, in order to transform it into a seasonal one. Especially, the water body is divided into two parts, the upstream and the downstream, which suffers the most, especially during the dry period.

Water system Photos

Kissonerga well.

Choirokoitia settlement



Channeled stone conduit in Amathus and Kourion respectively

	Neolithic Age 8500–3900 BC	Chalcolithic Age 3900-2500 BC	Bronze Age 2500-1050 BC	Geometric Age 1050-750 BC
General Information	-People were working with : agriculture animal breeding fishing hunting	-Trade with Egypt and Crete(Greece)	-Trade developed with Near East, Egypt and Aegean. -Mycenaean Greeks settled to the island as merchants. -Spread of Greek language, religion and customs. -Greeks took the control of Cyprus -Establishment of the first city-kingdoms : Paphos, Salamis, Kition, Kourion	-Cyprus consists a greek island with ten city-kingdoms.
Water supply	-They were living in well-organized small communities close to springs & rivers- access to the water. -Example of Settlement : Choirokoitia & Kalavasos settlements -Once the river would dry out, they were digging wells for water supply. -For example: Kissonerga well in Paphos..	-Same water supply as the previous age	-Water demand grew, since the the settlements were expanded. -Transfer larger quantities of water from the springs to the settlements -Construction of channelled stone blocks inside the settlements	-Same water supply as the previous age -Settlements water demands were satisfied by the water flow through the stone conduits

Channeled stone conduit in Amathus and Kourion respectively

Stone conduit in Amathus (sculptured stone water pipeline) with a small aperture used as an inspection hole covered by a flat stone and sealed with time mortar.

-Trade developed with Near East, Egypt and Aegean.
-Mycenaean Greeks settled to the island as merchants.
-Spread of Greek language, religion and customs.
-Greeks took the control of Cyprus
-Establishment of the first city-kingdoms : Paphos, Salamis, Kition, Kourion

Bronze Age
2500-1050 BC

-Water demand grew, since the the settlements were expanded.
-Transfer larger quantities of water from the springs to the settlements
-Construction of channelled stone blocks inside the settlements

-Cyprus consists a greek island with ten city-kingdoms.

Geometric Age
1050-750 BC

-Same water supply as the previous age
-Settlements water demands were satisfied by the water flow through the stone conduits

-Several conquerors invaded the island : Assyrians, Egyptians and Persians.
-In the end, the island became part of the empire of Alexander the Great,king of Macedonia.

Archaic & Classical Period
750 -325 BC

-Further development of the water supply : areas without water supply, especially outside the settlements, water was provided and carried through water carriers. Specifically, horses and cattle pulled carts carried big containers of water to sell it.
-All springs had goddesses associated with them, the Water Nymphs called “Anerades”
-Thus, any underground structures or sites in the Greek world were natural caves that had a spring of running water, where the nymphs were worshipped.

-Cyprus came under the control of Greek Alexandrine control and Paphos became the capital of the island.
-Destructive earthquakes hit the island, which destroyed towns and settlements.

Hellenistic Period
325 - 58 BC

-Not a lot of remains about the water supply due to the destructive earthquake and tsunami that hit the island.

Roman aqueduct and cistern in the ancient city of Salamis.

Bekir Pasha, known as Kamares in Larnaca city.

-Roman Empire invaded the island.
-The cities were rebuilt by reusing the structures and materials of the previous age.

-After the division of Roman Empire, Cyprus was invaded by the Eastern Roman Empire, known as Byzantium.
-People move in less vulnerable areas from the coastal areas for protection from attacks by different nations

Roman Period
58 BC - 330 AD

Byzantine Period
330 - 1191 AD

Frankish (Lusignan) period
1191–1489 AD
&
Venetian period
1489–1571 AD

Ottoman period
1571 - 1878 AD

-Increase of terractora pipes for the water distribution.
-Outside the settlements water conduits cut in the rock, or constructed of channelled stone blocks or terracotta pipes have been found. Masonry or rock-cut cisterns and chains-of-wells connected by tunnels, aqueducts were also used for the water supply.
-The source of water supply were springs in the foot of the mountains, far away from the cities, such as Kephalovrysos spring close to Kythrea (in the foot of five-fingers moutnain)
-The water was stored in cisterns and the overflow were delivered to the sea through channels.

-People were settling close to water source, such as shallow wells or springs in the mountains.
-Teracotta pots and wineskins (storage containers made of animal skin) were the two means of water transportation from the spring to the household.

-Productive lands and organised large farms were the main feature of this period.
-Aqueducts were constructed for agricultural pruposes
-Old wells and aqueducts were used for irrigation, whereas the domestic water supply remained the same as the last age.

-Chain-of-wells were constructed for domestic use. The wells were covered and frequently inspected.
-Two well-known chain-of-wells:
1)Arab Ahmed-4km-for the Nicosia water supply
2)Abu Bekir-3.2km-for the Larnaca water supply
-Turks sold the water for irrigation and domestic purposes, under the terms of the Ottoman Civil Code “Mejelle”.
-17th+ 18th century- Turks and Greek Cypriots generated associations for water use, such as they sell water to individual and several communities.
-The Bekir Pasha aquduct for Larnaca’s water supply is constructed during the Ottoman period.

Chain-of-well in Nicosia city.

Public fountain in Choulou village,Paphos

Pomos dam,Paphos

-Cyprus gained its independence since 1960.

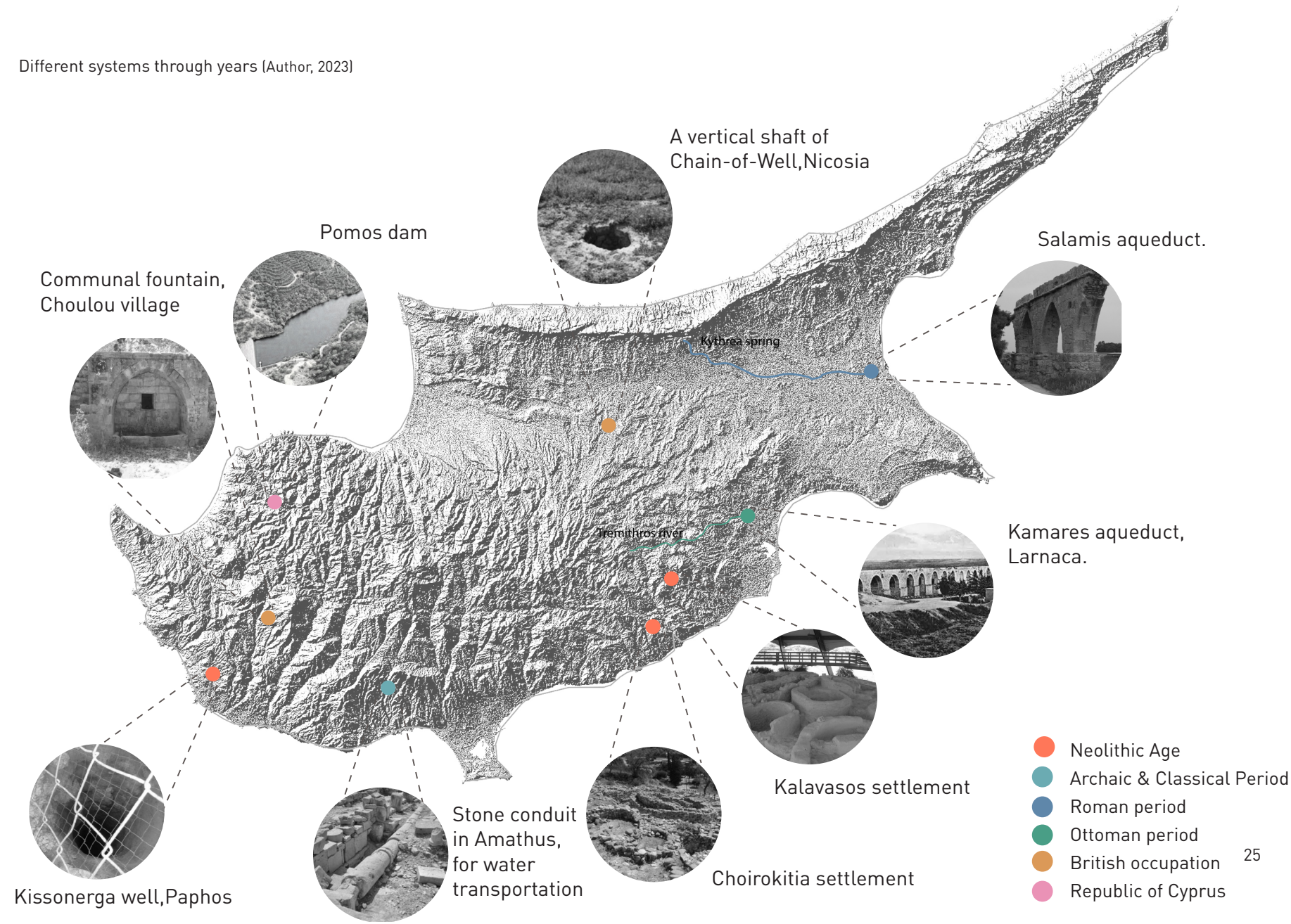
British Occupation
1878-1960 AD

Republic of Cyprus
1960 AD - now

-During the period between 1878 and 1949 of the British occupation little consideration was given to providing villages with drinking water. Poor pipes and materials shortage was one of the reasons.
-Many villages, mainly the poor ones, were still using unprotected contaminated wells in the village square for their water supply.
-In the case where the source was a shallow well or a non-local spring, the residents used to carry the water through their farm animals in terracota pots.
-Wealthier villages, had public taps in the centre of the village, where the water was transported through galvanised iron pipeline. The water source was outside the village, close to the mountains
-There were also chain-of-wells and aqueducts. The most well-known chain of well is located in Morphou.
-The main sources of water of this period were springs, chain-of-wells and boreholes.
-The aqueducts had been replaced by pipes.
-From 1950 onwards, more attetion was given to the village water supply.

-1967 onwards- all villages and towns were supplied with piped water.
-The water from the different sources were transported in storage tanks and reservoirs close to the village or town through pipes, and then to the houses via distribution network.
-Dams, desalination, and wastewater plant have ceen constructed for irrigation and domestic purposes.

Different systems through years (Author, 2023)



Study Site

#Pomos village

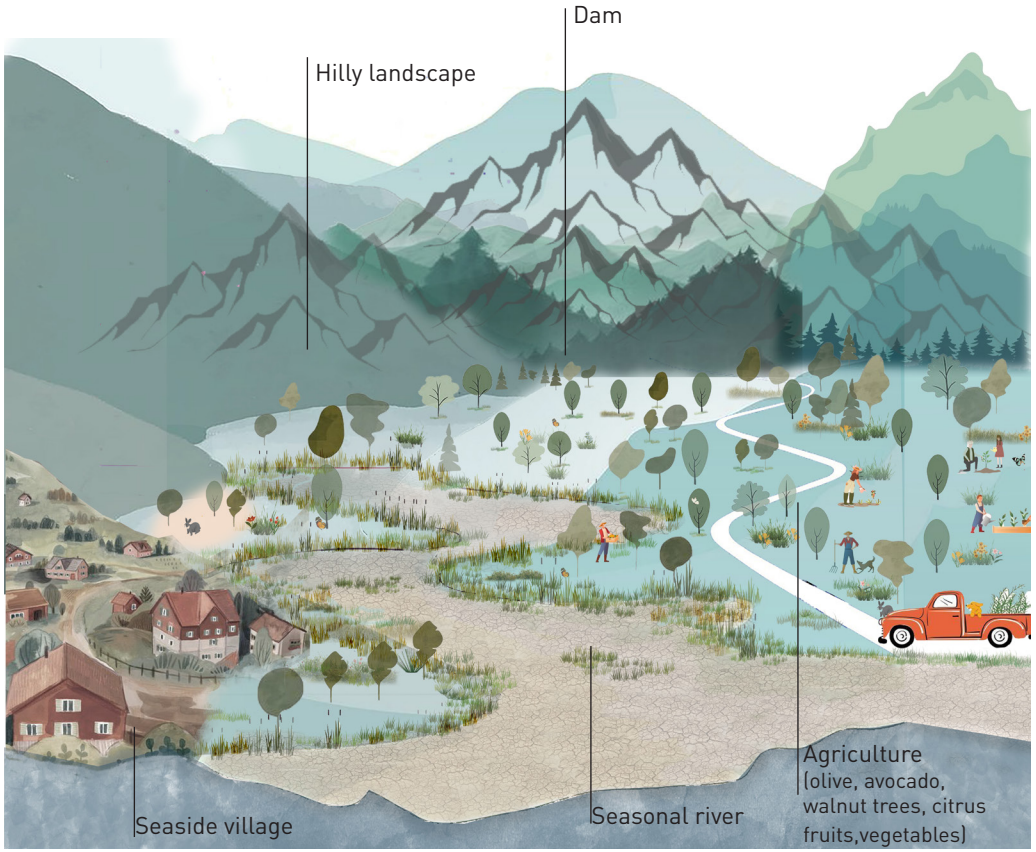
Following an extensive investigation of various systems in Cyprus, my attention turned towards an agricultural valley situated along the northwestern coastline of Paphos city. This particular valley held personal significance for me, as I was born in a nearby location and possess a deep understanding of the local mentality and the village's dynamics. However, the decisive factor behind choosing this valley was the two unsuccessful attempts made by an architect and the Water Development Department of Paphos to revive the area. Despite the existence of similar valleys in the vicinity, the knowledge that I would be contributing to the revitalization of a region that had previously experienced two failed endeavors posed a significant challenge. The area spans approximately 3 kilometers in size.

Study Site

#Pomos village

General Information :

The graduation thesis takes place in a rural area, which is called Pomos. It is a seaside village in Paphos city, where the south part of the village is included in the Paphos forest and consists an intense landscape, due to the mountains of the area. The dam of the village is located in the gorge of the forest, and consists the main source of agriculture irrigation. The main purpose of the dam is the water storage during the wet season, in order to use the water during the dry one. The dam was constructed after the island's independence, in order to contribute to long-lasting drought of Cyprus. It divides the river in downstream and upstream. The projects focuses on the downstream, which is dry the most of the year, and it is being activate once the dam overflows, mainly during the wet season. Nevertheless, the village is considered a rural area, where the citrus fruits, bananas, almond trees, avocados, walnut, olive trees and vegetables are possible to grow. The area has touristic facilities, such as a national historical museum next to the sea, and a busy beach during the summer months.



Site features.(Author, 2023)

Photos from the study site have been taken throughout the year, in different seasons, in order to perceive the changes in the landscape due to the absent of the water.

Especially, the water level in the dam is really low during the dry season.

August 2022.

December is the beginning of the rainy season in the island. The introduction of the water in the area is reflected through the changes in the landscape.

December 2022.

The rainy season of the island consists a beneficial season for the flora and fauna of the area. The dam overflows and the water dominates the whole area. In this way, the enrichment of biodiversity and the lively scenery is visible.

April 2023.

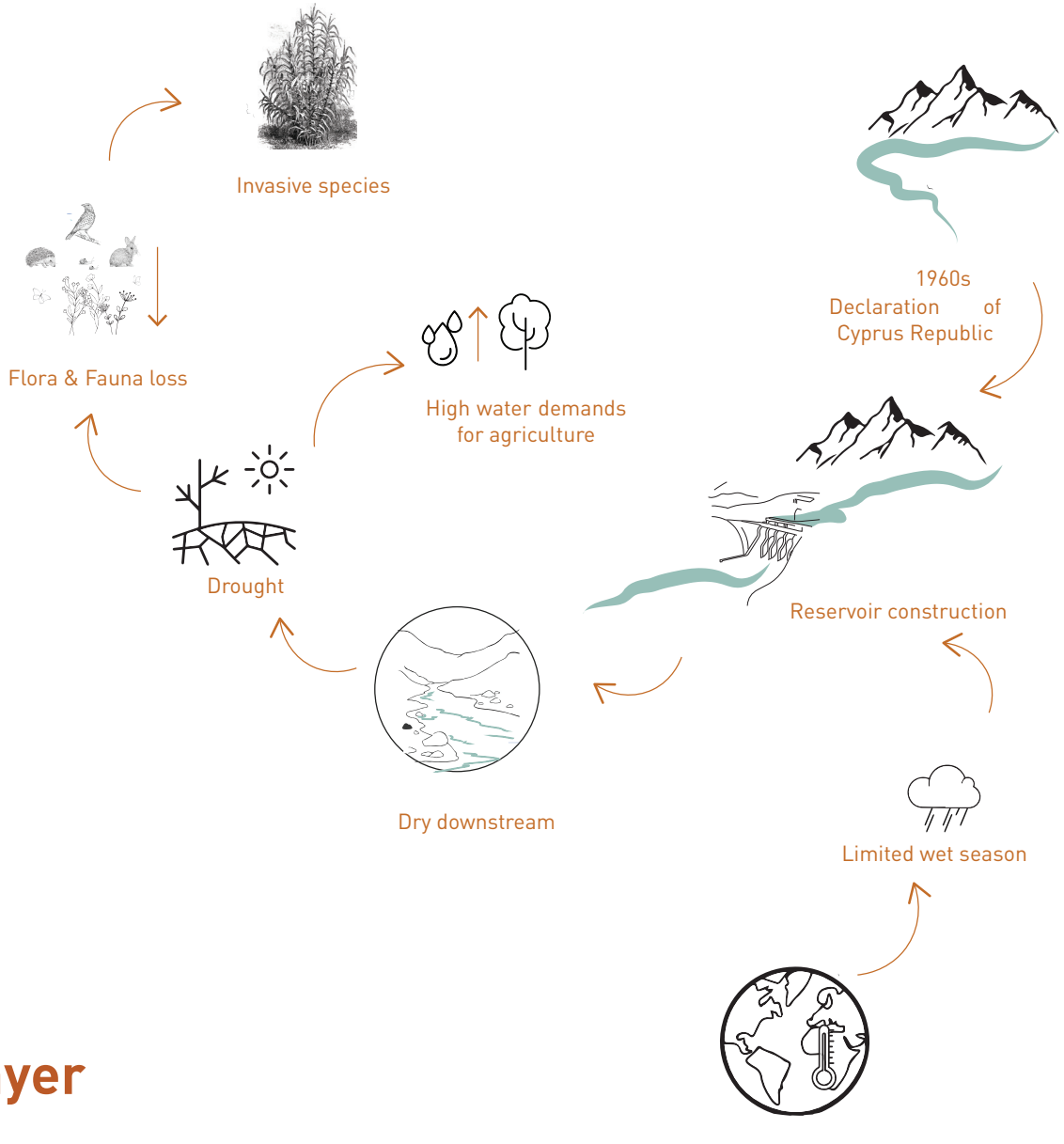
02. THEORETICAL FRAMEWORK

Problem statement.

The island had water scarcity issues since the beginning of civilization and countless techniques have been carried out to secure the water supply. Cyprus went through the control of several conquests since the first settlements in the island and each of them brought their own water management knowledge to the island. Some of them are still visible in the Cypriot landscape and function properly for the water supply either for irrigation or drinking purposes.

After the declaration of Cyprus independence, in 1960, over 100 dams have been constructed as reservoirs for the dry season. Especially, the dams have been constructed to interrupt the river's flow, thus the river has been divided into the upstream and the downstream. As regards the downstream transformed into a seasonal river, which is active only during the rainy season of the island. In other words, the water of the dam has to overflow, in order to fill water the seasonal river. The study site, a seasonal river in a seaside village, called Pomos, is an example of this case. The river passes through the village and ends up in the Mediterranean Sea.

On the one hand, due to the climate change, the reduction of the rainfall leads to the the low water level in the dam , which it is used for only irrigation purposes. Thus, the seasonal river is mainly dry, especially during the summer. This fact causes several issues to the enviornment, such as the local biodiversity loss. The scenery is being modified as an abandoned landscape. It also causes the territolization of the river and the riparian zone.Additionally, there is a wetland in the river's estuary, along the seaside part of the river, which is dry due to the water shortage and provoke ecology troubles to the area. On the onter hand, once there are heavy rains, the dam overflows, and flush floods are happened in the area, that provoke serious troubles to the village and in the river surroundings. For example, tion of the river and the riparian zone.Additionally, there is a wetland in the river's estuary, along the seaside part of the river, which is dry due to the water shortage and provoke ecology troubles to the area. Especially, the agriculture aspect suffers the most, since there are species that have high water demands in the area.



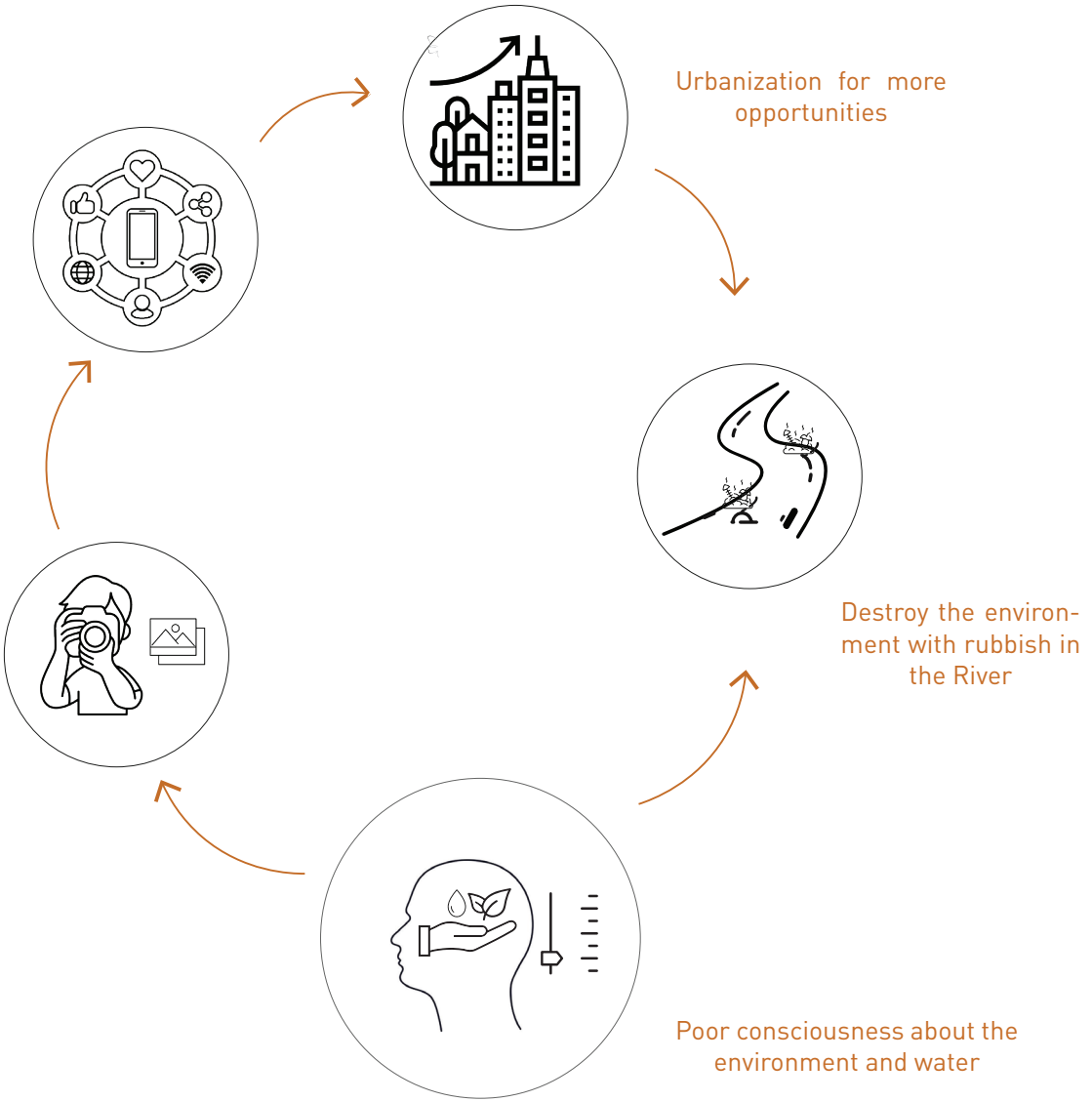
Nature Layer

Notwithstanding, the cultural layer is inevitable part of the concerns about the area. Most of the people are endangered from the nature, especially the ones, who are city's residents since they do not have any contact with the nature,compared to the village's ones, who are dedicated to the nature as it consists their main source of income. The poor people's consciousness about the environment leads to really serious issues, such as not appreciation of the natural scenery and attempting to abandon and ruin it. Specifically, rubbish have been observed in the river that discontinue the water's flow or they harm it. People have little understanding about the significance of nature and water and their value in our life. Technology have already dominated our life and transformed everything in a superficial way.

Additionally, countless rural areas have been abandoned by the locals, in order to move in the city for more job opportunities. It is widely known that cities include more options, in terms of education, recreation, healthcare etc. The village's population is highly decreased compared to the past. The urbanisation leads to the overpopulation, and this fact has again negative impact on the environment. Furthermore, the most of the rural areas in Cyprus are cut off from the cities, since there is tiny development compared to the towns, in terms of options. Especially, the elderly people are the population majority in these areas.

Last, but not least, the aforementioned issues,both natural as well as cultural issues do not concern only this specific rural area,but also countless regions of the island that deal with similar problems. Therefore, this is the reason that motivates me to explore this area and to provide recommendations to transform it into a meaningful and qualitative landscape. By discovering the different layers and components of this land, and how to deal with the extreme weather condtions we can propose new way of thinking and actions that can effectively contribute to the nature and cultural layer.

Cultural Layer



Problem Statement :

"The excessive water amount during the wet season and the water shortage during the summer months as well as the people's low consciousness about the natural habitat and water value in our mental and physical health leads to the environmental degradation".

Reasearch Question:

After the investigation about the issues of the area, the discussions not only with the locals but also the authorites of the village about the needs and their preferences, I ended up in the below research question:

“How can the landscape architecture aspect contributes to deal with water in the drought area of Pomos village in Cyprus in such a way that people can interact with it, understand, and experience its value for life and biodiversity on the island?.”

Sub - Research Questions :

Q1:“How can the rainwater and the dams overflow be stored for as much as possible in the landscape, so as to prevent any drop flows to the sea?”.

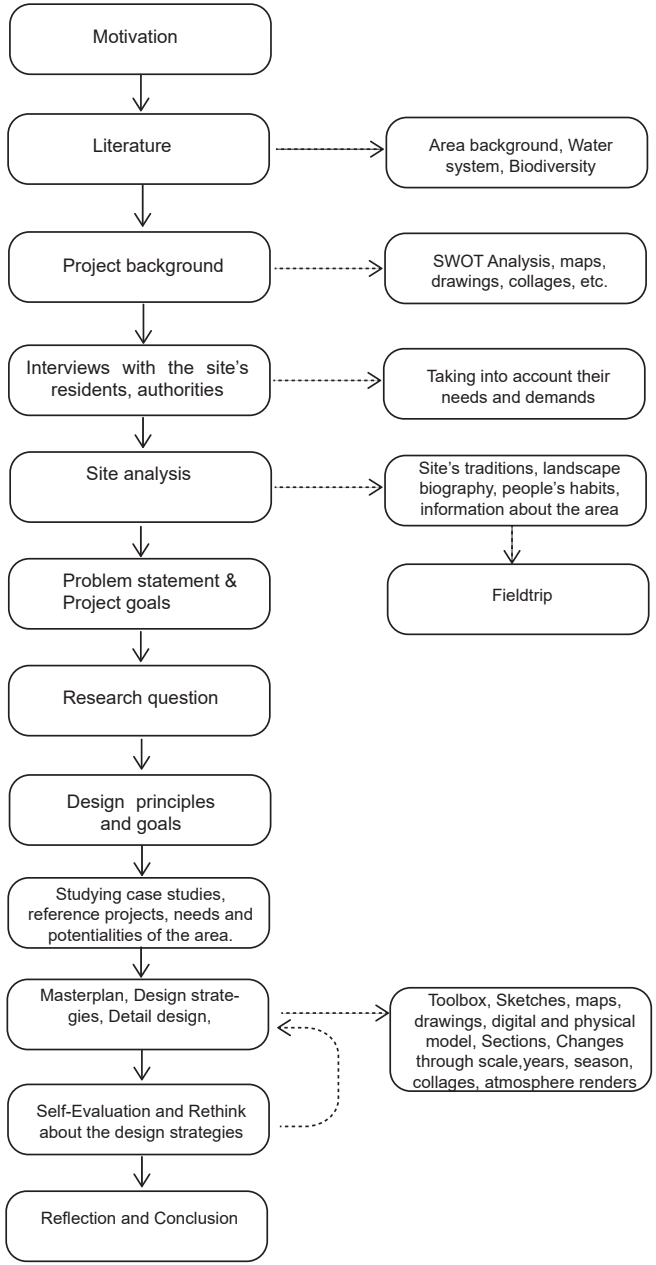
Q2: “What kind of activities could be implemented for people’s interaction with the water and the nature, for their awareness raise?”.

Q3: “What kind of actions have the local farmers to take, in order to contribute to the water shortage of the area ?

Methodology.

First of all, it is essential to investigate the area background within the traditional water system, the landscape, the relation among people and the nature, the agriculture etc, by studying literature. The SWOT analysis method is a way to analyze the area's possibilities, weaknesses, threats and strengths, in order to perceive the real needs and features of the region. The results of the investigation about the area background are maps, charts, diagrams and collages. A regional, city and village scale analysis will take part, by maps and drawings, so as to understand the area's landscape ingredients. In addition, communication with the residents of the village and taking into real account their recommendations and needs is also another fact that is crucial for the design process. Specifically, researching the traditions and customs of this village, such as songs, dance, elements which are related to the water supply and landscape is another crucial aspect of the analysis. Following this, the analysis of the site will take place, through mapping, drawings, and collages. The ecology, climatic and social aspect have to be analyzed and illustrated. After these strategies, we will end up in the methods, such as models, drawings, maps, collages in order to present the findings. Through the research about the site information as well as the issues and the biography of the area, the problem statement as well as the research question of the project is getting clear and defined. Nevertheless, design principles and aims will be presented through the researching of case studies as well as reference projects, not only for provision more knowledge, but also for inspiration.

Next step, the design will take part, by drawing master plan, sections, design strategies, detail design, making model (physical + digital). The changes of the site through the seasons, time and scale will also be illustrated, in order to reveal that the landscape is about a continually change that is never the same. Moreover, an evaluation of the design intervention will take place in order to perceive if the area's and resident's needs as well as the demands have been covered. Last, but not least, reflection and conclusion consist the last step of my method.


Motivation
Literature
Area background, Water system, Biodiversity
Project background
SWOT Analysis, maps, drawings, collages, etc.
Interviews with the site's residents, authorities
Taking into account their needs and demands
Site analysis
Site's traditions, landscape biography, people's habits, information about the area
Fieldtrip
Problem statement & Project goals
Research question
Design principles and goals
Studying case studies, reference projects, needs and potentialities of the area.
Masterplan, Design strategies, Detail design,
Toolbox, Sketches, maps, drawings, digital and physical model, Sections, Changes through scale,years, season, collages, atmosphere renders
Self-Evaluation and Rethink about the design strategies
Reflection and Conclusion

03. ANALYSIS

Background framework

It is highly important to understand the context of the country ,in order to take meaningful and feasible decisions. Knowing the context helps ensure that the project aligns with the specific needs, challenges, and priorities of the country. It allows you to tailor the project to address local issues effectively and efficiently.

1.Urbanization:

According to National Geographic Society "Urbanization is the process through which cities grow, and higher and higher percentages of the population comes to live in the city." (National Geographic, 2021) It is widely known that cities include more job opportunities, more life quality, social mobility, better transportation, entertainment, education etc. Thus, as regards Cyprus island, these are some of the reasons that countless people, even though they grew up in the villages, choose to move in the cities for better life.

Rural areas are the regions that include really low number of population, and the buildings are scattered. The main characteristic of these areas is the agricultural aspect. The majority of the people work on farms and ranches. (National Geographic, 2021) In constrast with the urban development, the rural areas have not maken any important progress since the past. Likewise, the popoulation of these regions is increasingly decreased through the years. The options about education, entertainment, healthcare etc. are really limited and sometimes the locals have to travel to the neigbor village to cover their needs.

As concerns Cyprus island, was traditionally inhabited in the rural areas of the country. It was common for all the families to have their own farmland, and their own cultivations, which was their main income. People used to have pieces of land to grow crops and animals such as oxes to plough the land. A type of urbanisation started during the 20th century in the island, and was increased after the turkish invasion in 1974, when the island was divided in the north and south part. In this way, thousand people were forced to emigrate to the respective part of their ethnicity. (Statistical Service of the Republic of Cyprus, 2017) Particularly, the Greek-Cypriot people had to move in the south part and the Turkish-Cypriot to the north one. The refugees moved into the areas that did not have any relationship with, and they were trying to "build" their life again. They abandoned their birth places,thus their properties, such as houses, land ownerships, have been left in the other side of the island, which is illegaly occupied. Likewise, they did not have any attachment with the new places of living. (Russel, K, Ladbury, S. (1982)

Nowadays, the island has still an agriculture cultural, since the people still work on the farms, either as their main job or as hobby during the afternon after their main work as well as the weekends. The human-beings that moved into the urban areas for a better life quality, they usually have regular visits to the rural birthplaces in the greek part of the island. The majority of them are still attached to the rural areas due to their ownerships of land pieces, where they grow crops, fruit trees, etc. Especially, the products from the cultivations provide to the landowners goods for their family or commercial use. As one could perceive, the involvement and interaction with the landscape makes the people attached with it. These land pieces consist legacies that their parents left. Thus, these land owners will be transferred to the new generations, with the hope that the cultivations will keep growing.

Meaning : " I left my soul inside. Open" . It is written out of the ghost city of Famagusta, which is uninhabited. (Ecocity Project, 2020)

2.Climate change

Weather represents the conditions of the atmosphere-the temperature, humidity, wind, rainfall, etc. Climate change is called the long-term changes in temperature as well as weather patterns. (United Nations, 2021) It can happen thanks to natural processes, such as changes in the Sun's radiation, volcanoes or internal variability in the climate system, or due to human actions such as shifts in the composition of the atmosphere or land use. However, the climate change occurs since the beginning of the planet, but the global warming have been obersving the last 150 years because of the human's influence. Industrial revolution consists the birth of global warming with the release of millions of metric tons of carbon dioxide and other greenhouse gases into the atmosphere, doubling the quantity of CO2 present in the atmosphere compared with the past.Particularly, human actions, such as burning fossil fuels and damaging forests for building purposes, contribute to the climate change with negative impacts. Utilization of coal, oil and gas consist the main greenhouses gas emissions. Additionally, deforestation also contribute to the climate crisis, since the beneficial absorption of carbon dioxide by the trees from the atmosphere is eliminated.

The effects of the global warming are already obvious. The planet temperature raised by 0.98 °C and more increment is expected by 2030, unless drastic actions are taken. Additionally, shrinking of arctic sea ice and increase of sea water level are some more consequences. Extreme weather events are also observed, such as cyclones and floods. They regularly happen in unpredictable moments of the year and cause countless damages, both in human and nature aspect. Droughts also occur in areas that are threated by chronic aridity, such as East Africa. Thus, flora and fauna move regularly in new ecosystems, thus an unpredictable destruction occurs to the global natural habitat. (Enel Green Power, 2021)

According to "Research Centre of Excellence for Eastern Mediterranean Middle East Climate & Atmosphere (CARE-C) is expected a temperature raise by the end of the century in Eastern Mediterranean and the Middle East countries. Furthermore, rainfall reduction is foresee in northern parts of the Middle East, Turkey, Greece, Cyprus and southern Italy. Most of the precipitation decrease predicts in the spring and summer months.

As regards Cyprus, the period drom 2020 to 2050 is seen a significant increment during the warm period, with temperatures exceeding 38 ˚C for a further two weeks per year, compared to the existing high temperature summers. Additionally, warm "tropical" nights will be introduced in the island, with minimum temperatures above 25˚C for a further month, compared to nowadays. Thus, the use of air-conditioning and room cooling will increase, provoking more electricity cosumption. Precipitation reductions is already observed for the last 30 years and it will keep reducing 10-15% over the 2020 to 2050. This fact leads to the raise of drinking water and irrigation demands, which will end up in a vast need for further seawater desalination plants and focus on finding alternative ways of water storage and utilization that are more effective.
Some other effects of the climate crisis in the island is the lengthening of the growing season due to the milder winters; but there are some negative impacts, such as the high temperatures, which cause soil moisture reducation, thus depletion of the agricultural yields. (Cyprus Institute, n.d)

To sum up, government and the population of the island has to take into real account the climate change and contribute for the reduction of the global warming. Such a small island has to take part to the mitigation of environmental issues, by adopting beneficial as well as broad approaches.

3.Environmental unconsciousness

It is widely known that humanity and nature are one in itself. Nature can not exist without human influence, and humanity can not survive without environment and its components. These two aspects are interrelated.

Humanity is the main actor for environmental crisis, and the major dominant over the nature. Regrettably, human-beings consider the environment's ingredients as granted, without any respect. Despite the fact that nature provide us the essential and most simple ingredients for our everyday life, such as the air, we tend to contaminate it with pollution, smog, chemical,etc. Furthermore, detrimental actions have been done by the humanity, in order to interrupt the ecological cycle of the natural habitat, intentionally or not. Factory farming is another crucial human intervention that provokes several environmental problems, such as waste of bacteria, chemicals, antibiotics etc. This altitude leads to our separation from the nature, and it is placed against us,instead of "standing" by us. We all have to perceive that we are dependent on the nature, since our unconscious behaviour return back to us. and nature is the main driver of our existence. Thus, the environment is the major actor in quality and duration of human life on the earth. (Humans and Nature, 2021)

To sum up, being detached from the nature, which is the mother of our existence, is self-destructive. Natural habitat and its components consist the main ingredient of our mental and physical health. We have to raise our awareness about the nature, and learn how it affects us if we abuse it, since what hurts nature, hurts humanity as well. People have to enrich their knowledge about the significance of respecting the environment and the reasons from early ages. It is essential to raise children with environmental consciousness, since the new generations are the main actors of the climate change. They consist the main hope for the change of this mentality, since they will take over this earth with our actions effects.

3.Traditional rural architecture

Rural Settlements

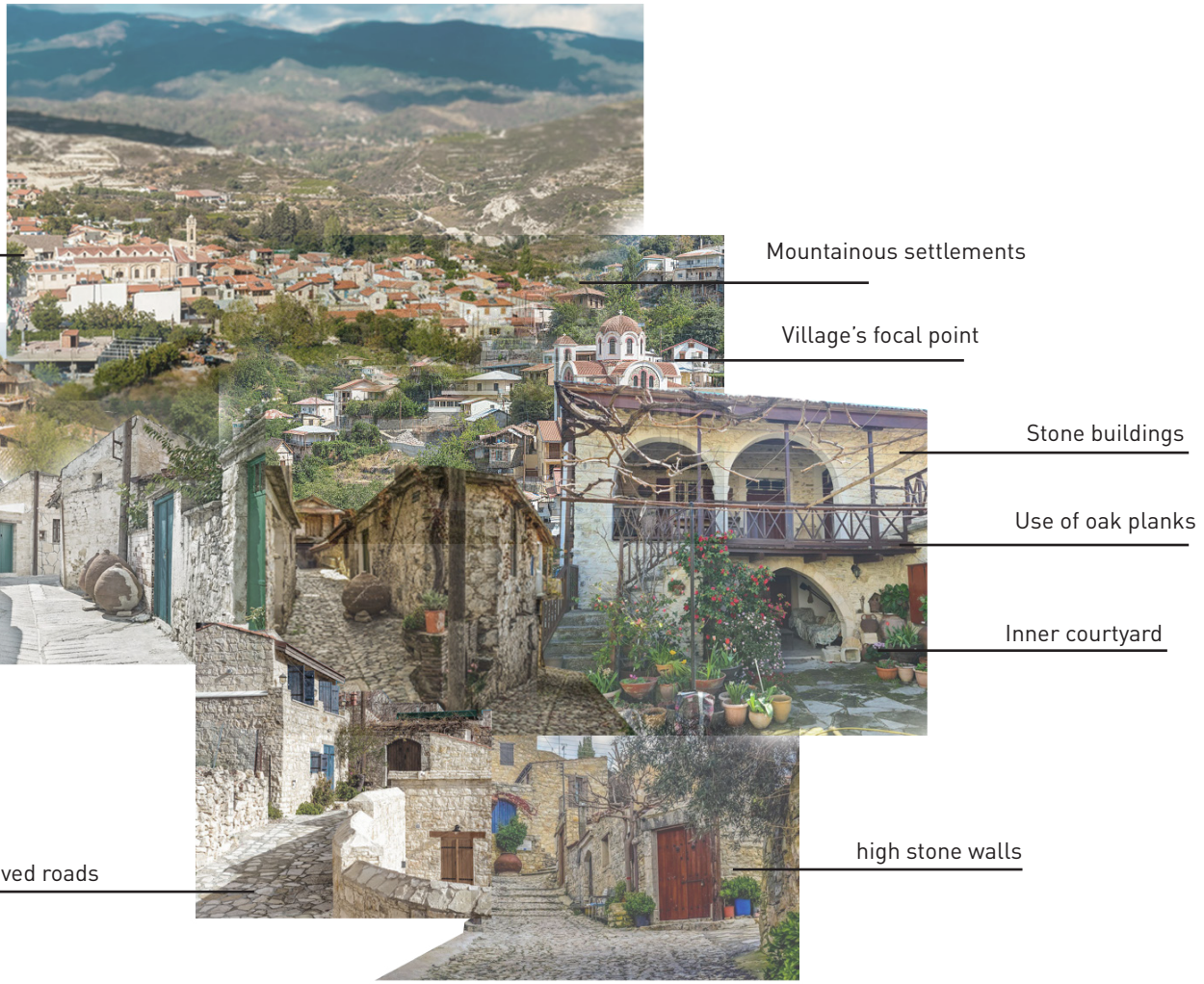
The history of the island, in terms of the architecture is signaled by important masterpieces. The settlements were originally located in the mountainous areas, in order to cover their basic needs, especially to ensure the water supply. The settlement's organisation was according the topography of the land, the climatic conditions, the materials and propertis. Rural areas were developed in steep mountains, rounded hills or plains, adjusting the manmade environment into the natural one. The village's dwellings were linked with earthed or stone-paved streets with the agricultural fields at its outkirts. The local church was a focal point for the village, especially consists a meeting point for the locals.

Rural Dwellings

The households were built according the family needs, they did not follow any set plan. The introverted culture of the inhabitants was reflected in the way they organise their shelters. An enclosed inner courtyard was the most important part of the house, since it consists the major living and working space for people. The house was consisted of two or three makrinaria (narrow long rooms), cellars and/or dichora (double space rooms). The different parts of the building were linked on rare occasions, thus their doors ofter oppened in to the courtyard. The iliakos (sun-room) was another significant component of the traditional

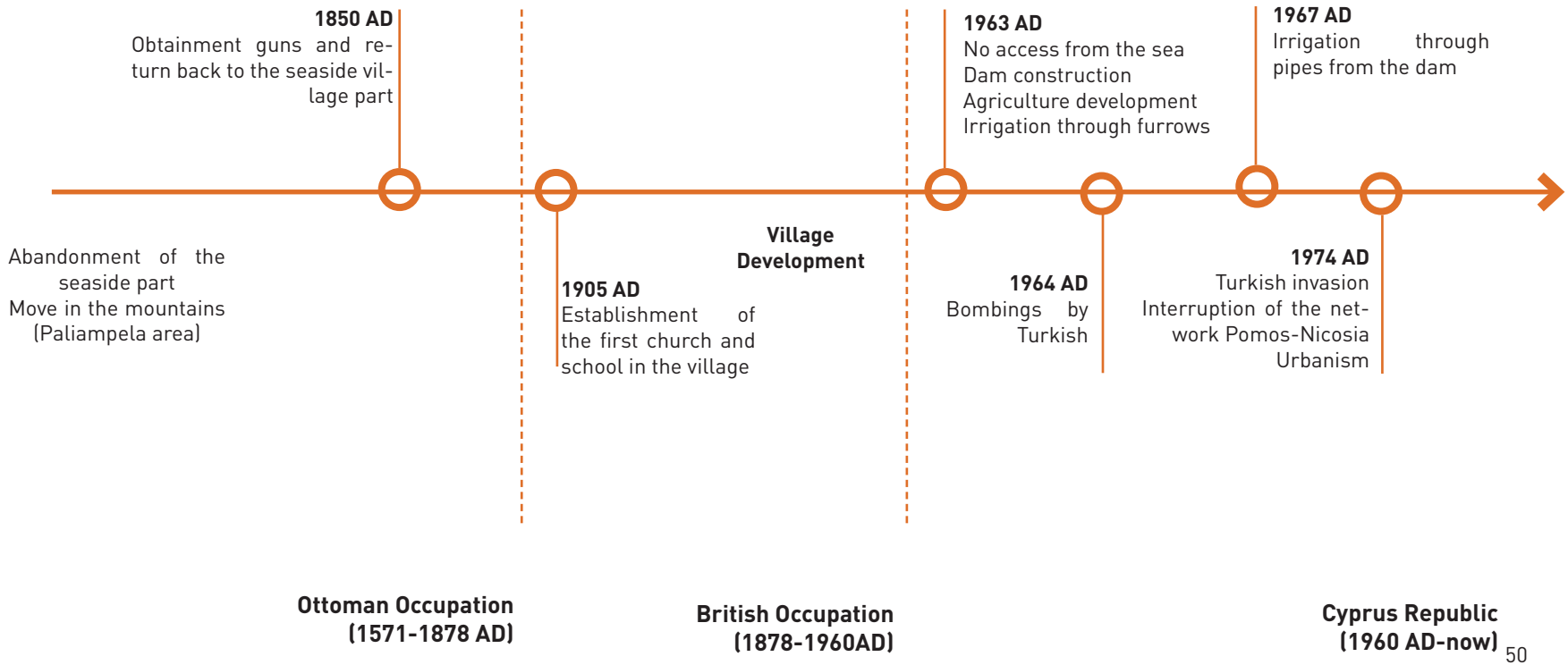
dwelling. It was a semi-closed space built to face the sun, with open the one side, where arches or beams on poles were formed. Iliakos consists the buffer zone among the different other parts of the house. It was also a repetition in the higher floor. The doors and windows were quite small, not only because of the structural building materials, but also to prevent the outside cold to enter inside. The household was located in such a way, in order to absorb sun-light, espeicially in south or east. A second floor was built, in order to extend some spaces, and it was accessible through an outdoor stone or wooden staircase, which is located in the courtyard. The staircase ofter leads in a small covered wooden baclony (Philenews, 2021).

As regards the materiality, the households were used to build by stone from the river or sea,wood or plinth (flat brick). This way of construction was influenced by Roman and Byzantine architecture. The roof was made of reed and bamboo sticks, clay and every now and then made of oak planks (DOM, 2021).


settlements organisation according to the landscpae
Mountainous settlements
Village's focal point
Stone buildings
Wooden openings
Use of oak planks
Inner courtyard
high stone walls
stone-paved roads

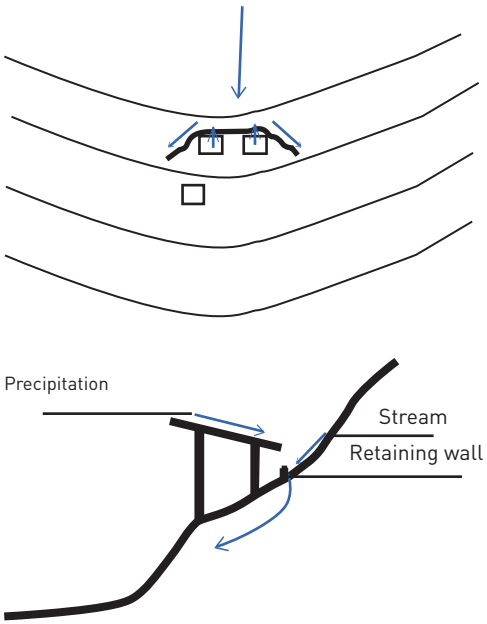
Village Development

#Pomos village

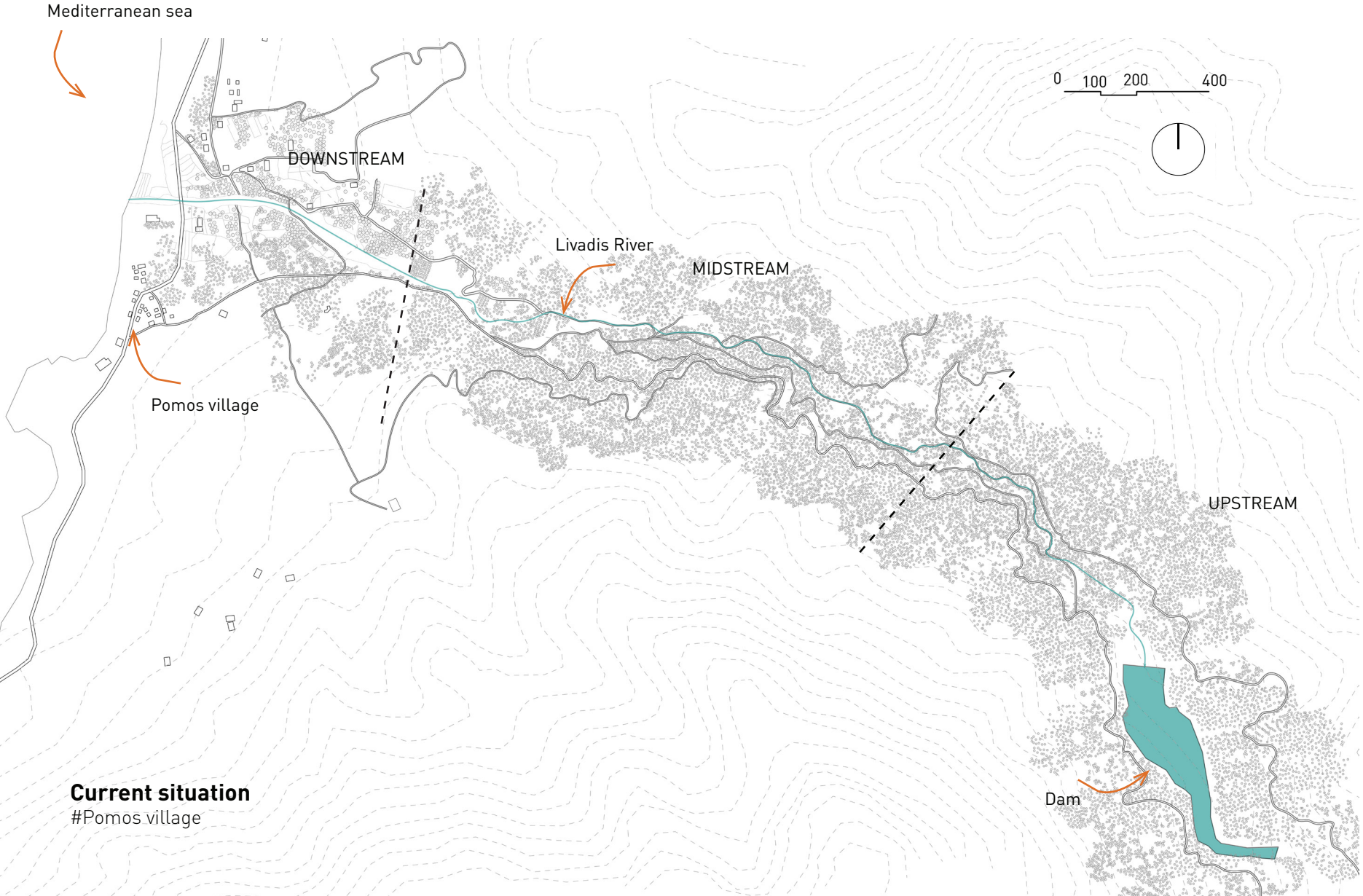


The urban tissue of the village is located closeby the sea. . The stone buildings with wooden openings are the characteristic of the architecture in the rural areas of Cyprus.

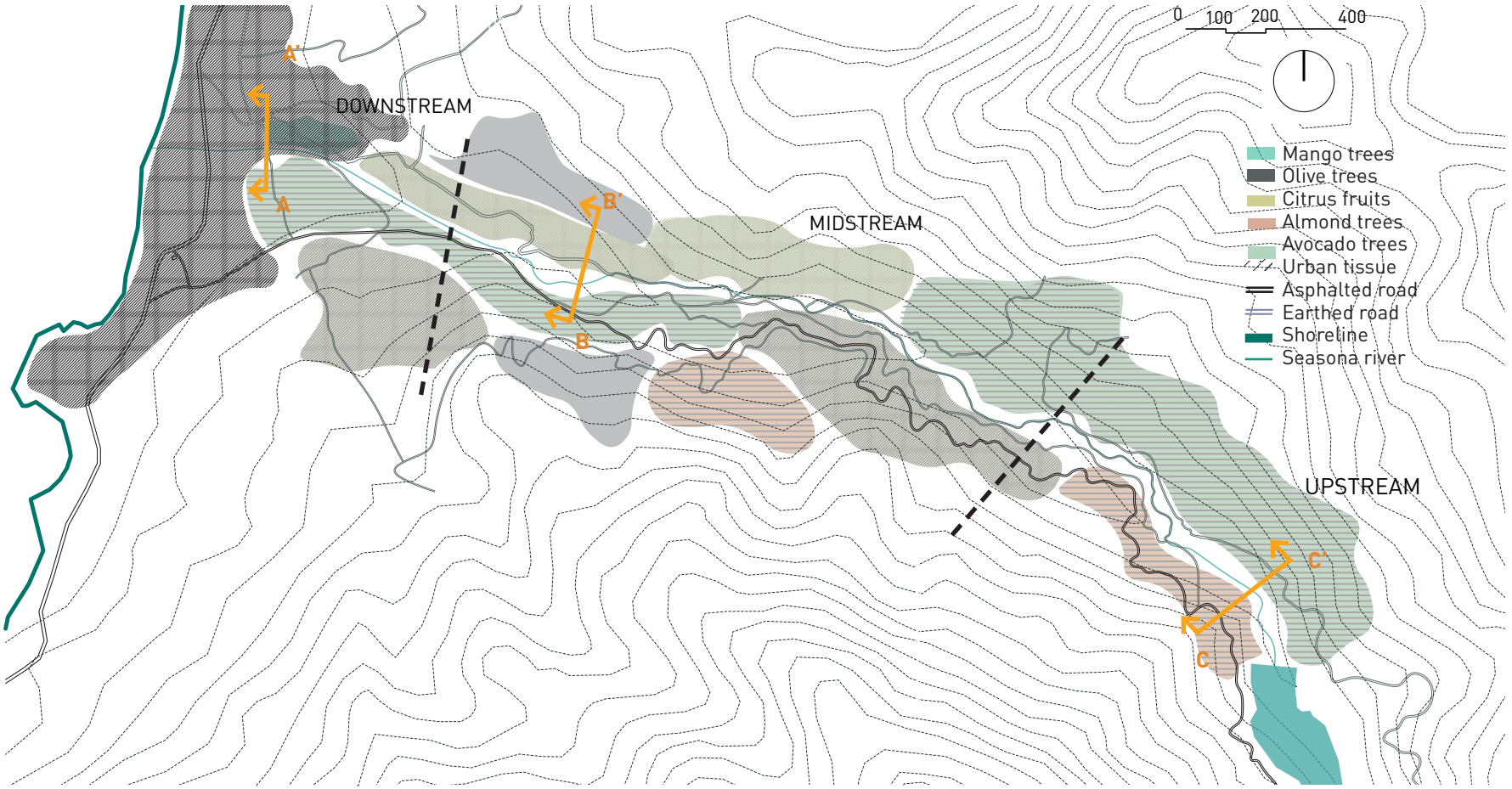
As regards the old households in the study site, there are still some remnants built closeby the seasonal river observed in the vicinity. Following my interactions with the local residents, they shared fascinating insights into the construction of these structures. Notably, the houses were strategically erected on the slopes of the region, offering protection against potential adversaries arriving from the sea. They featured slanted roofs designed to divert rainfall away from the dwellings, aided by a stone retaining wall. The old houses were mostly buildt by stone from the River or Sea.



Schematic section and plan of the old households in Pomos village. (Author, 2023)



Current situation
#Pomos village



Current situation - agricultural use
#Analysis

Section 2-2'

The study site is divided into three distinct sub-regions, each characterized by unique landscape features. It is crucial to observe the differences in the three sub-regions according to the season.

The first sub-region is known as the downstream called "A journey across the flatlands of the valley", which encompasses a flat terrain and includes the charming seaside village. During the dry season, the downstream area faces the challenge of invasive species dominating the river banks and posing a threat to the native flora and fauna. In contrast, the wet season brings about floods, particularly in proximity to the Natural museum and the community board building.

Moving on to the midstream "The Glorious Flow", the landscape transitions from the previously flat terrain to include gentle slopes. The invasive species persist in dominating the river banks, particularly when water levels recede. This level of the seasonal river encompasses certain areas with smooth topography, making them highly susceptible to flooding during the wet season. Additionally, erosion occurs when precipitation takes place, particularly perpendicular to the hillside streams.

Transitioning to the upstream region, which can aptly be described as "The Undaunted Rapids of the River," we encounter the third sub-region defined by its imposing steep slopes and a vast reservoir that amplifies the grandeur of the landscape. In this area, erosion reaches its pinnacle, showcasing the most severe effects compared to the previous sections.

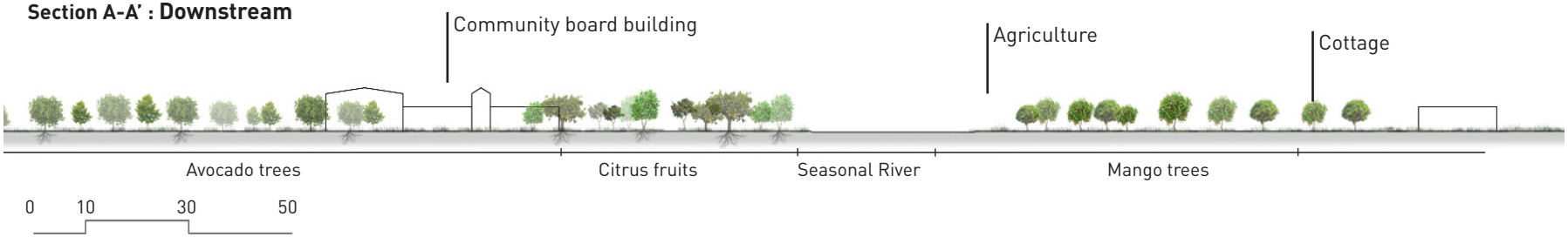
It is important to highlight the significant role of agriculture across all three sub-regions, contributing to the overall visual appeal of the landscape. The valley is adorned with a variety of fruit-bearing trees such as mango, olive, citrus, almond, and avocado. To facilitate access for farmers, there are well-maintained earthed roads that traverse the area. These roads ensure improved accessibility, enabling farmers to efficiently navigate the landscape and tend to their crops.

Downstream

"A journey across the flatlands of the valley"

Dry period

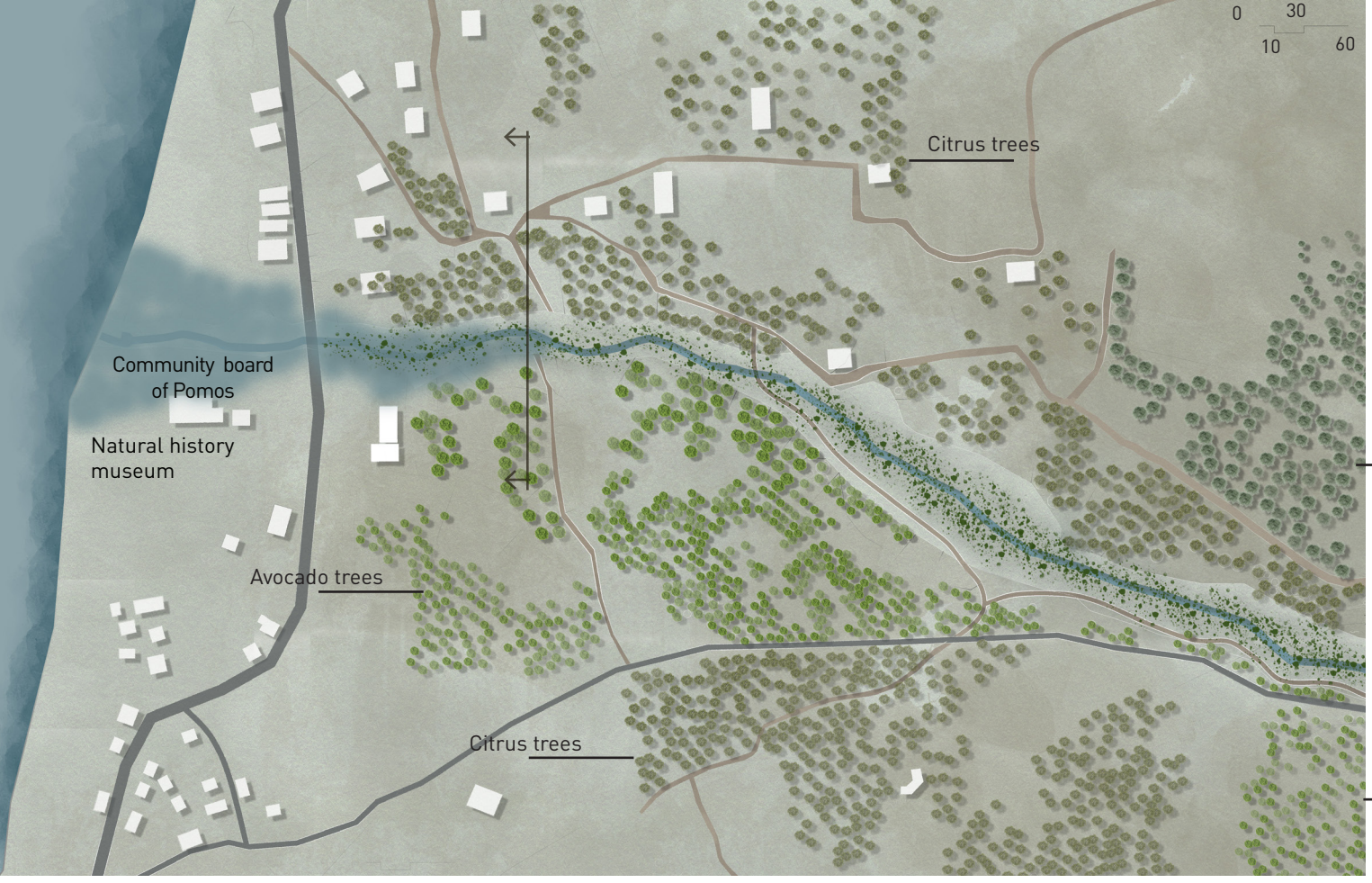
Section A-A' : Downstream



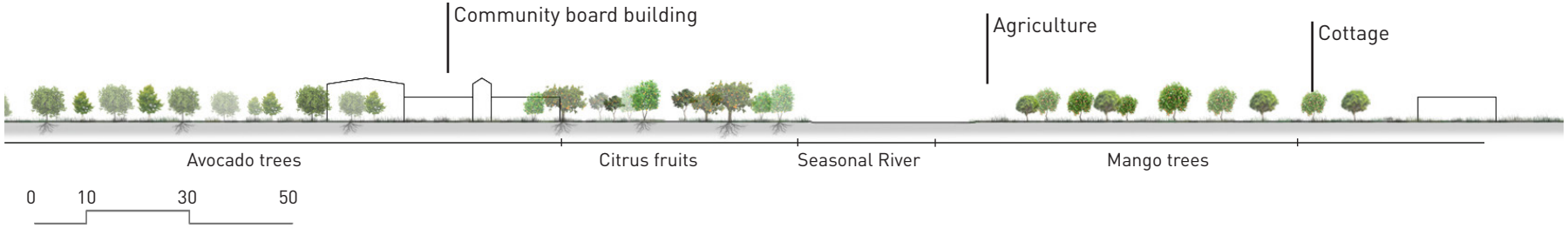
Downstream

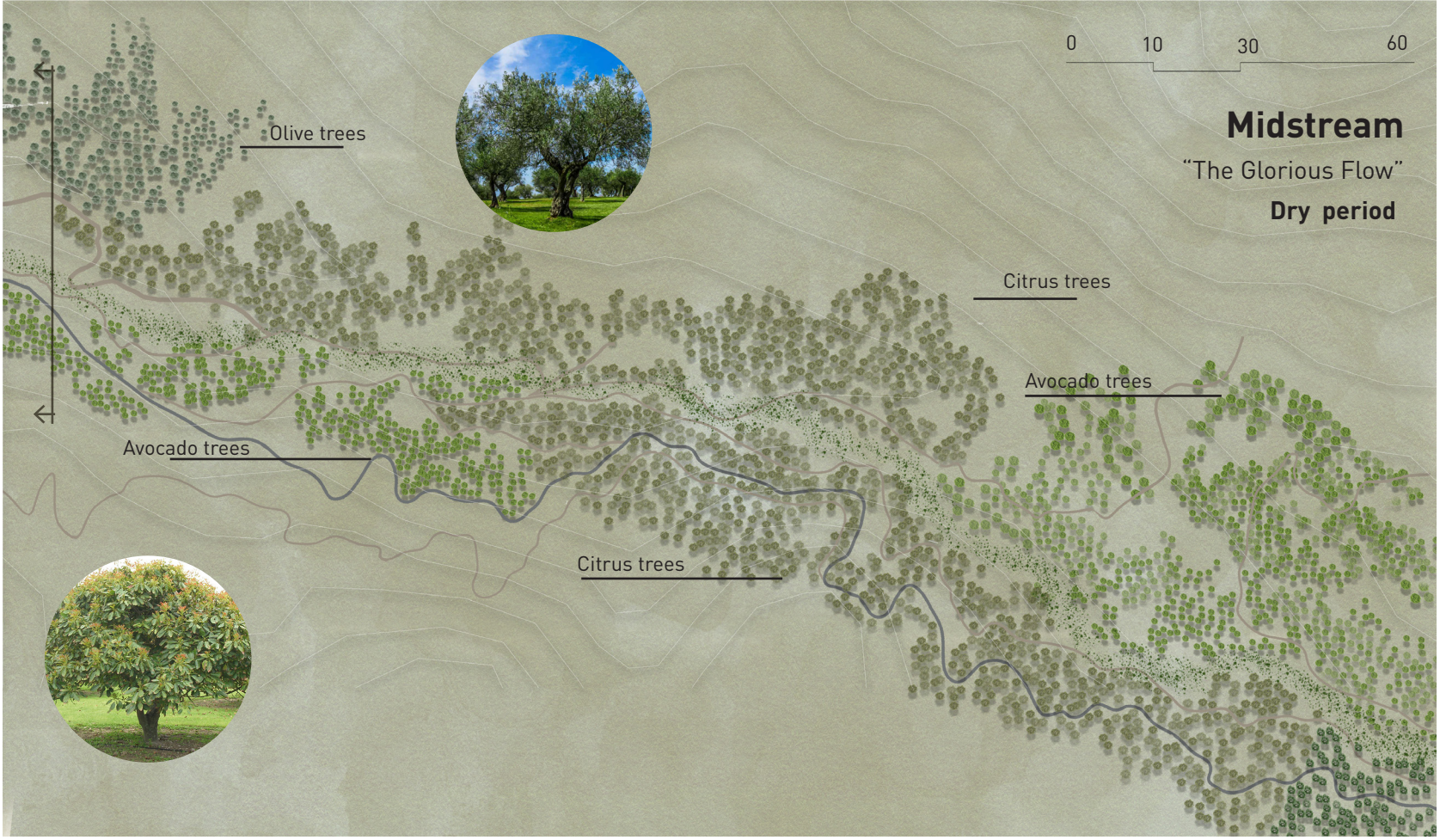
"A journey across the flatlands of the valley"

Wet period

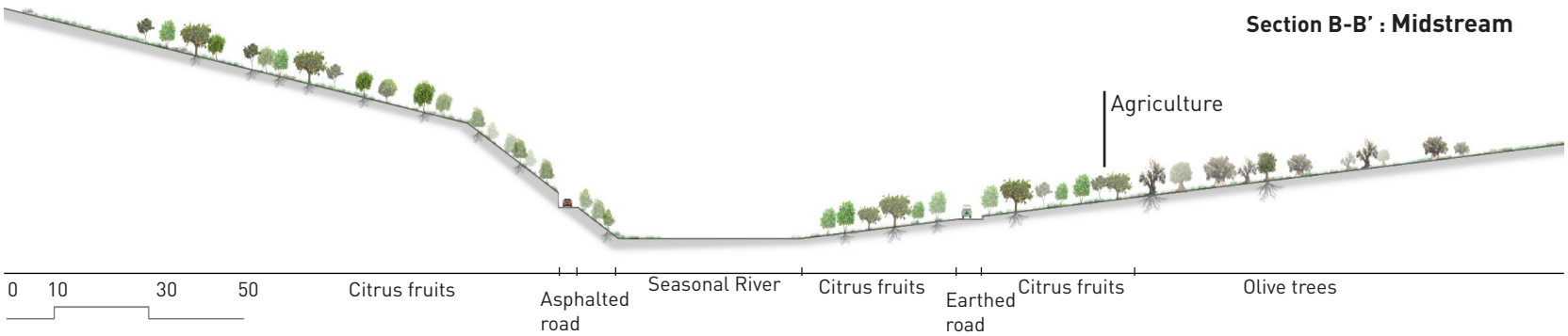


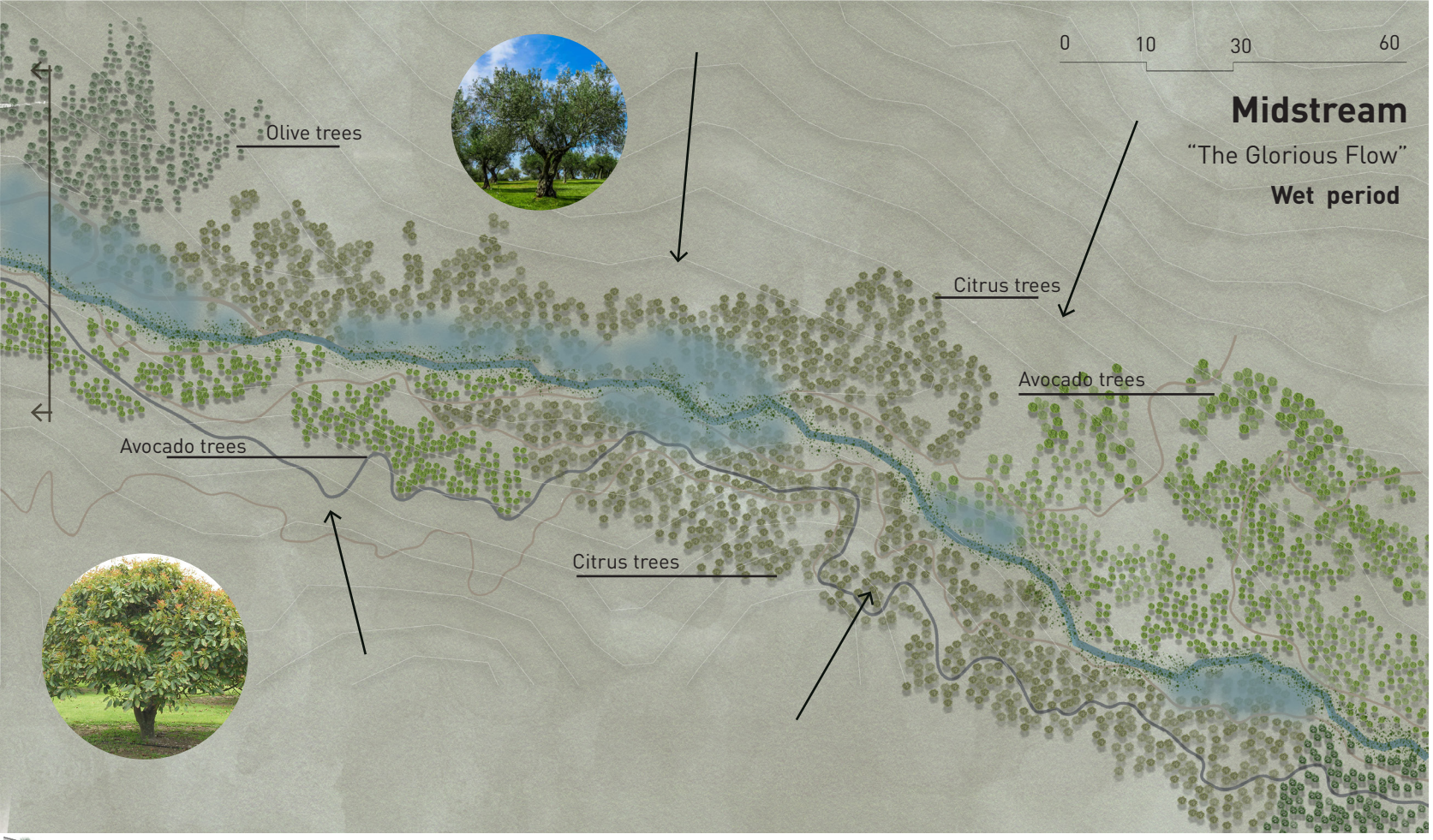
Section A-A' : Downstream



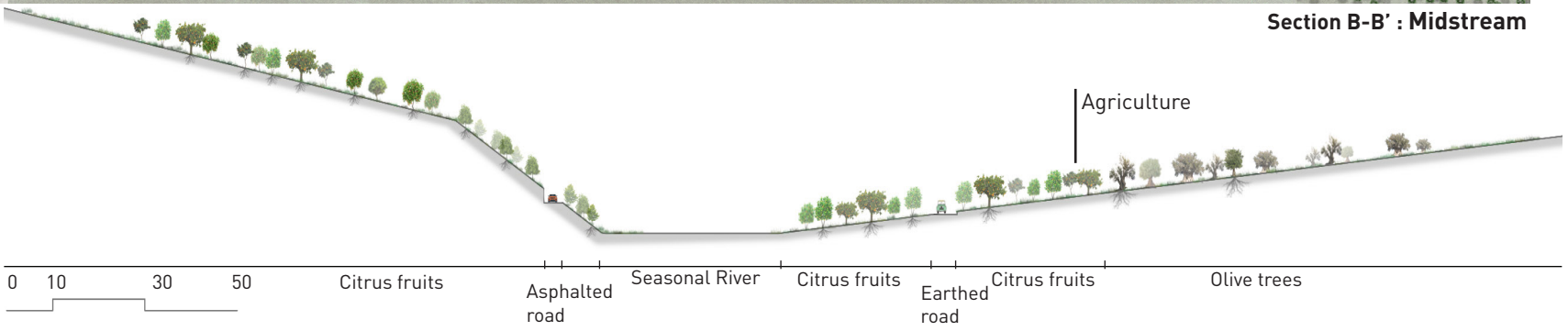


Section B-B' : Midstream





Section B-B' : Midstream

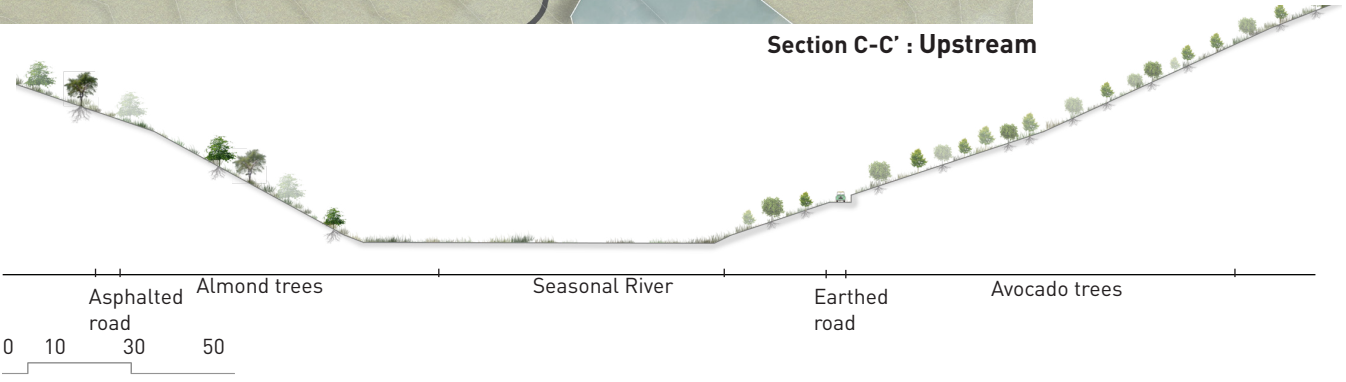


Upstream

"The Undaunted Rapids of the River"

Dry period

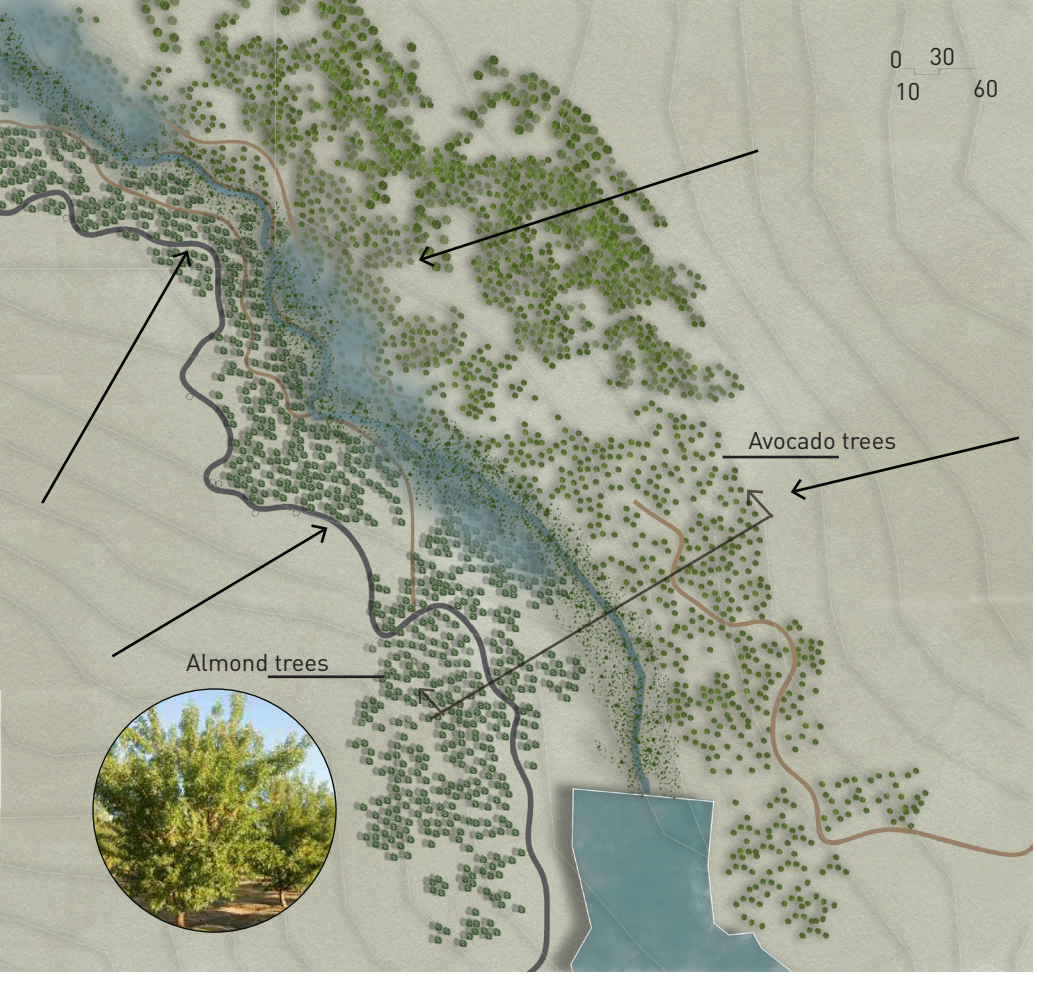
Section C-C' : Upstream



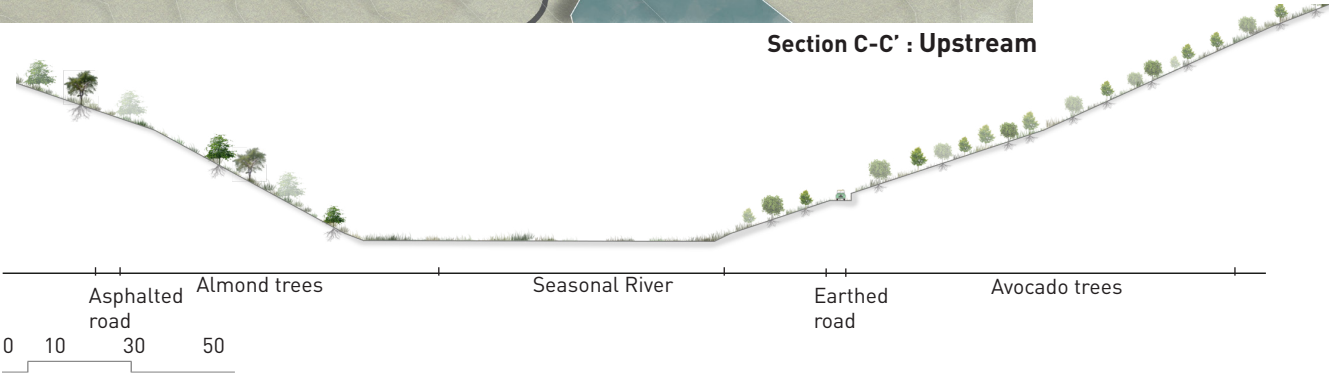
Upstream

"The Undaunted Rapids of the River"

Wet period



Section C-C' : Upstream



Local water system

As mentioned, the local water system holds immense significance for my graduation project. Water scarcity has always been a significant challenge for the inhabitants of Cyprus Island. Understanding how the locals coped with this issue in the past can provide valuable insights for my graduation project. Historically, the people of Cyprus employed various methods to address water shortage and sustain their communities. Therefore, it is crucial for design strategy and my proposal to investigate the local water system and how this one has been developed through the years.

As regards the local water system **before 1940s**, through my research, I uncovered an intriguing piece of history related to the primary source of drinking water on Cyprus Island. The local inhabitants relied on a non-local spring called "Teratsia," located at the base of Paphos Mountain. To access this precious water resource, people would embark on journeys with their donkeys, transporting the water in terracotta jugs. People used to store the water in big terracota jugs in their households. These jugs played a crucial role in ensuring a steady supply of drinking water for the community. Today, they serve as nostalgic reminders of the past, often showcased in households for decorative purposes.

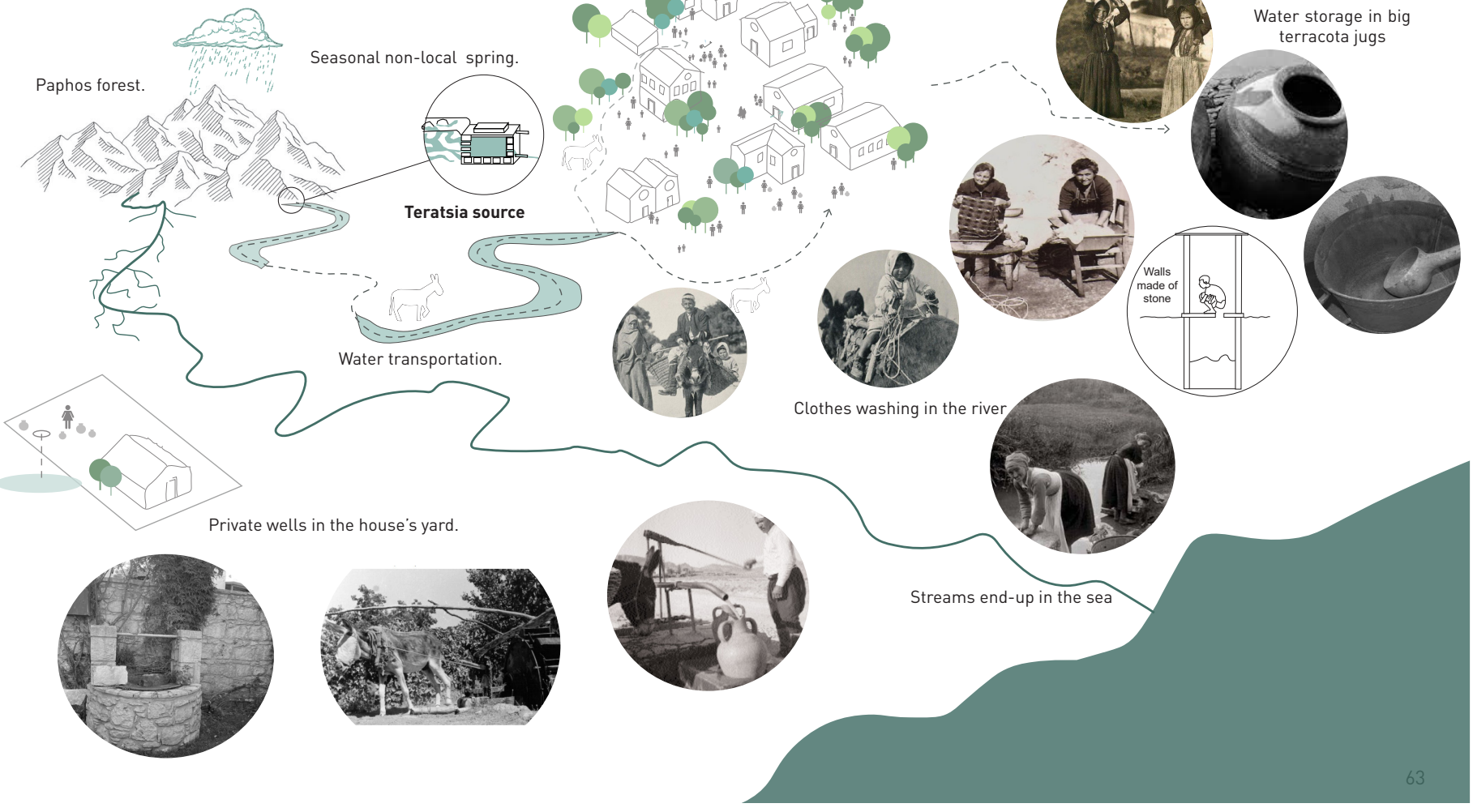
Interestingly, in addition to Teratsia, some households took initiative to establish their own wells in their backyards. These wells, which are still visible in their gardens to this day, were once vital sources of water for daily activities. While their functionality has evolved over time, they serve as nostalgic relics, evoking a sense of history and tradition.

Notably, women in the community would gather at nearby rivers to wash clothes, highlighting the resourcefulness and adaptability of the locals in utilizing water for various needs.

Local water system before 40s.

Private wells and non-local springs.

Domestic use



Additionally, equally interesting is how the water system has been developed **during the 1940s**. Especially, significant advancements took place in agriculture on Cyprus Island. The seasonal river became a reliable water source for irrigation. Agricultural activities flourished along both sides of the river, with open channels serving as conduits for transferring water from the river to the cultivated fields.

Simultaneously, changes occurred in the domestic water supply system. The non-local water source "Teratsia" used to deliver water to the local communities through public fountains strategically located at central points within the villages. This system involved underground pipes that transported the water to elevated tanks. From these tanks, the water was then distributed to the public fountains, where women would gather each morning to collect water.

This water system was an achievement of British people and it has become the subject of stories, songs, and dances. The water system symbolized a vital lifeline for the community, fostering a sense of communal identity and appreciation for this essential resource. At the public fountains, women would fill their terracotta jugs, which they would then carry home to store the water for various household purposes. The sight of these women gathering at the fountains, exchanging stories and sharing their daily lives, became an integral part of the cultural fabric and collective memory of the villages. The developments in agriculture and the establishment of the water supply system brought significant changes to the lives of the locals. The reliance on the river for irrigation and the introduction of the public water system transformed the agricultural landscape and daily routines, ultimately shaping the social and cultural dynamics of the communities.

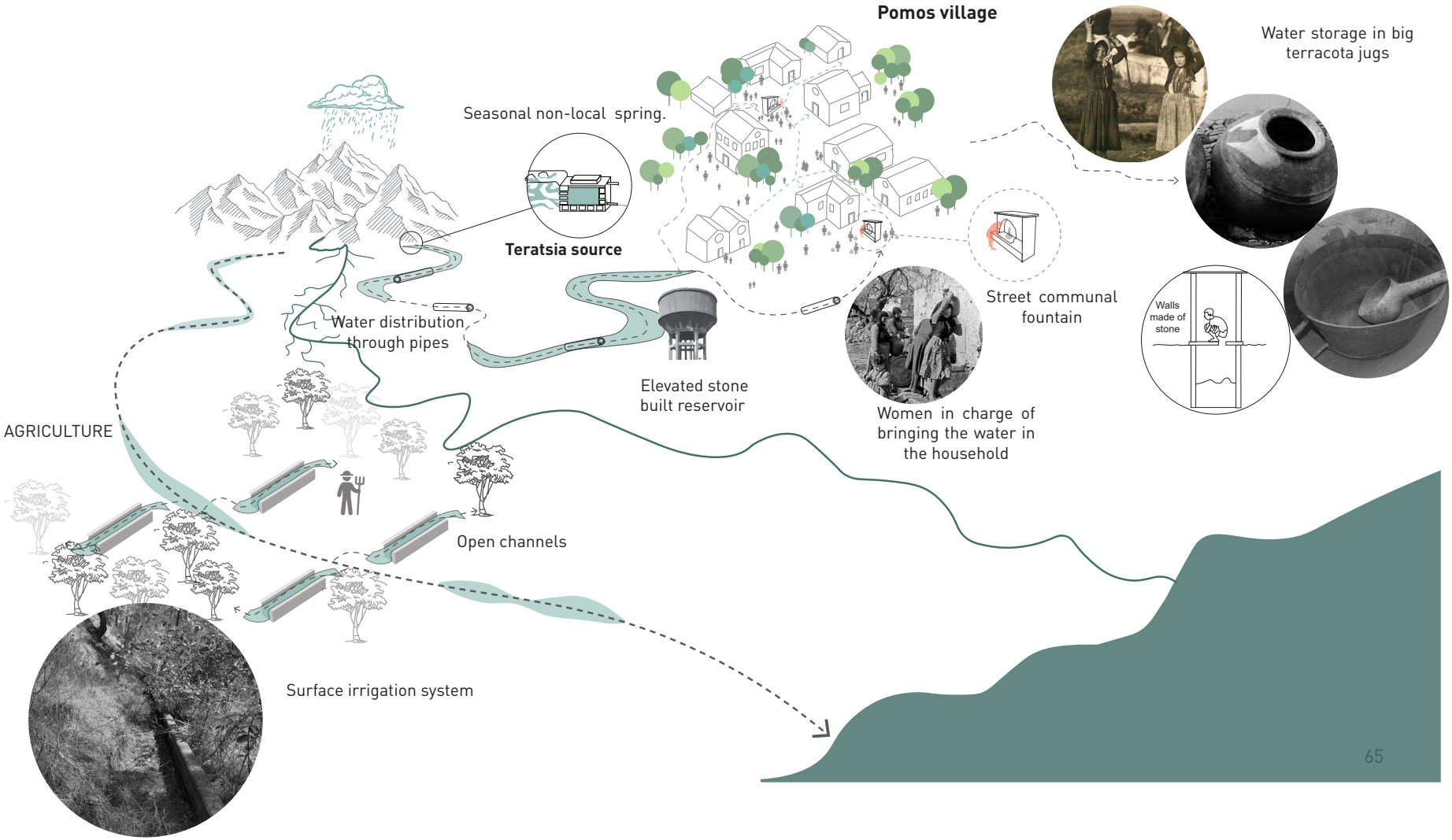
This rich historical narrative emphasizes the interplay between water, agriculture, and community, illustrating the profound impact of water systems on the lives and traditions of the people.

Local water system in 40s.

Introduction of public taps in the rural areas.

Irrigation

Domestic use



Following Cyprus' independence in the **1950s**, efforts were made to address water scarcity by constructing dams as reservoirs. In the study site, the dam serves a vital role in irrigation, with water being transported through a network of pipes to support agricultural activities.

For domestic water usage, the village relies on different sources depending on the season. During the rainy season, a source located in the forest provides the village with drinkable water. This water is stored in an elevated tank, serving as a storage facility for the community. However, during the dry season, the water supply is supplemented by boreholes situated near the river. Underground pipes ensure the delivery of water direclty to each household, after storaging in the elevated tank.

These strategic measures reflect the continuous efforts made to manage water resources effectively throughout the year. By leveraging both natural sources and technological infrastructure, the village can maintain a reliable water supply for various purposes, adapting to the seasonal fluctuations in water availability.

The construction of dams as reservoirs demonstrates a long-term approach to water management, enabling the storage of water during periods of abundance for use during drier seasons. The combination of natural sources and engineered solutions, such as elevated tanks and boreholes, showcases the adaptability and resourcefulness of the community in ensuring a sustainable water supply.

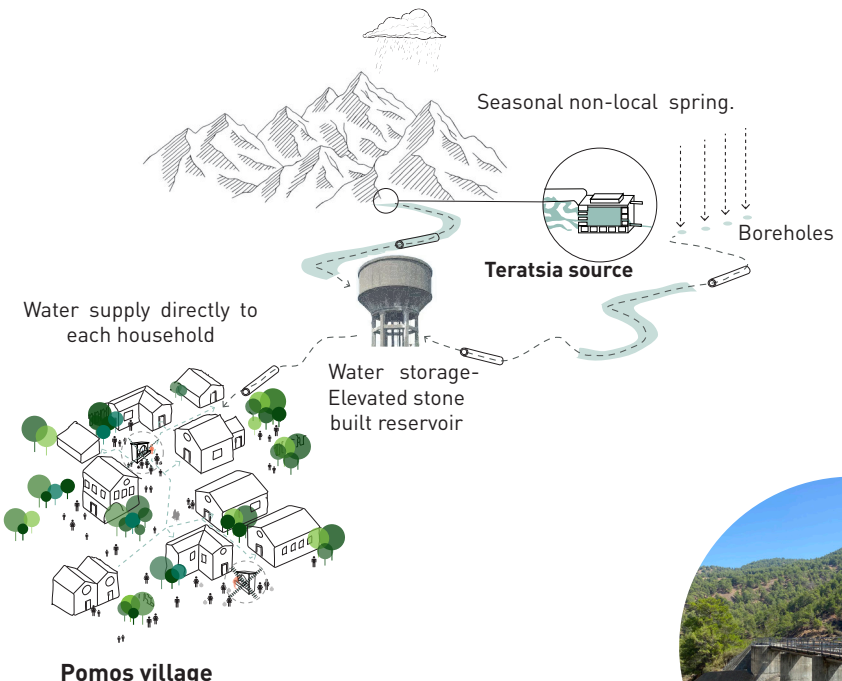
Overall, these initiatives exemplify the village's commitment to mitigating water scarcity and underline the importance of a diversified water supply system that can accommodate the varying demands and challenges posed by different seasons

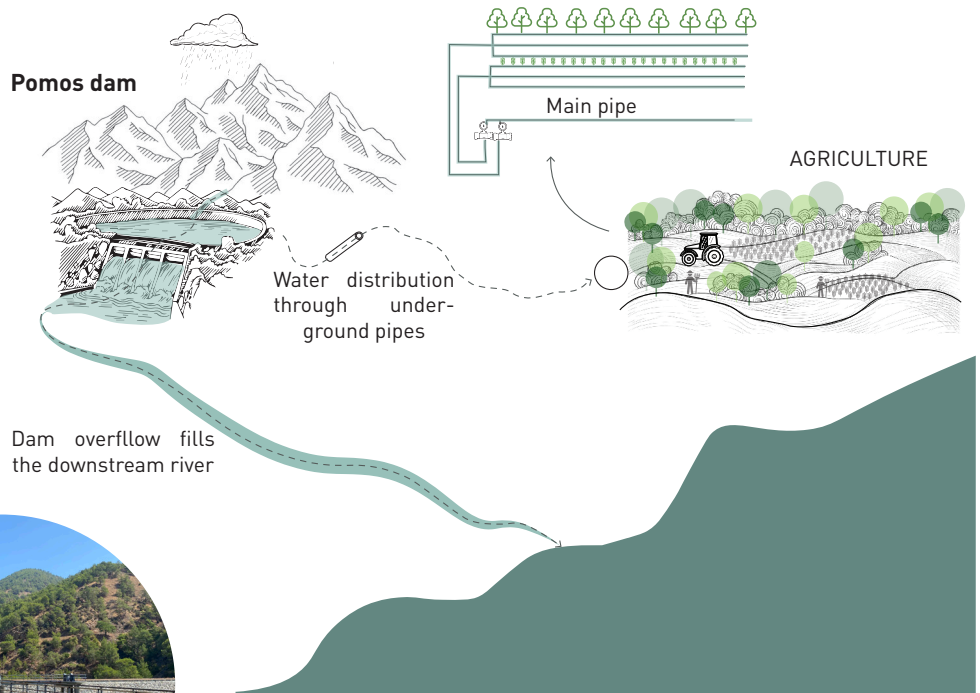
Local water system after 50s.

Construction of the dam, drilling boreholes and water distribution directly to the houses through pipes.

Domestic use

Irrigation





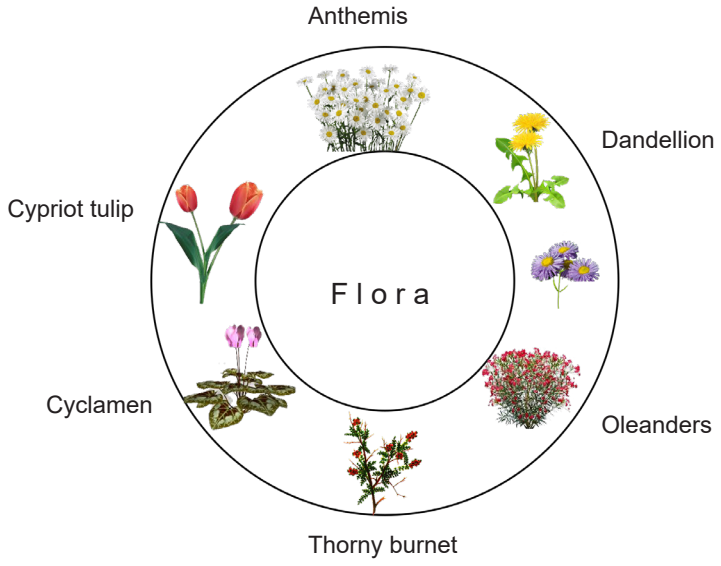
Biodiversity

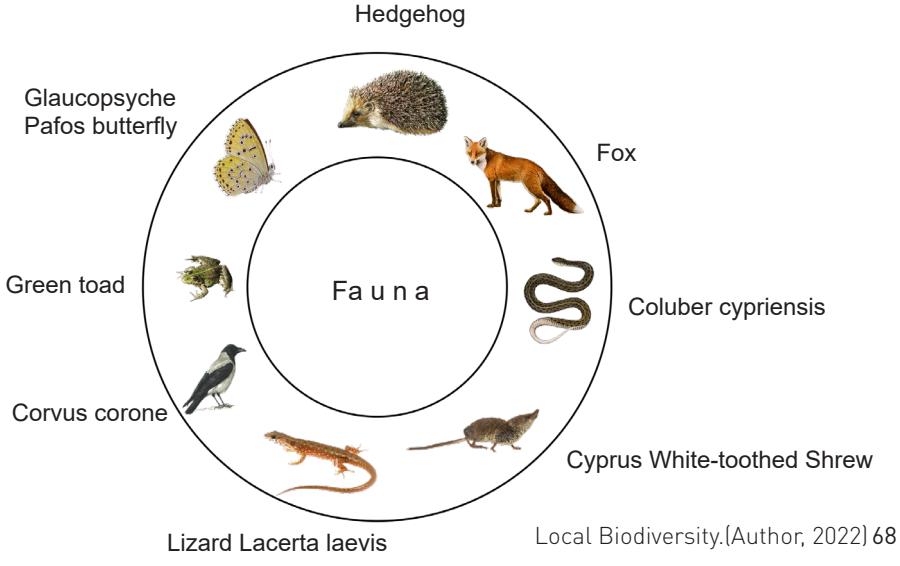
As evident from the provided pictures, it is evident that they were taken during the summer season when the local biodiversity experiences a noticeable decline. The scarcity of water during this time has a significant impact on the once thriving flora and fauna of the region. It is truly disheartening to witness the absence of the vibrant and diverse ecosystem that exists during other seasons.

The water shortage takes its toll on the local biodiversity, leading to a reduction in plant and animal life. The once lush vegetation and colorful array of flowers give way to dry, barren landscapes. Wildlife that depends on the availability of water sources for survival and sustenance becomes scarce as well, seeking refuge in areas where water is more abundant.

The loss of such a rich and diverse flora and fauna due to water scarcity is indeed regrettable. The local ecosystem, which would typically be teeming with life and ecological interactions, suffers greatly during the summer months. It serves as a stark reminder of the delicate balance between water availability and the thriving biodiversity that depends on it.

Efforts to mitigate water scarcity and promote sustainable water management practices are crucial not only for human needs but also for the preservation of the local ecosystem. By ensuring the availability of water throughout the year, it becomes possible to support the diverse flora and fauna that contribute to the region's natural beauty and ecological harmony.





Local Biodiversity.(Author, 2022) 68

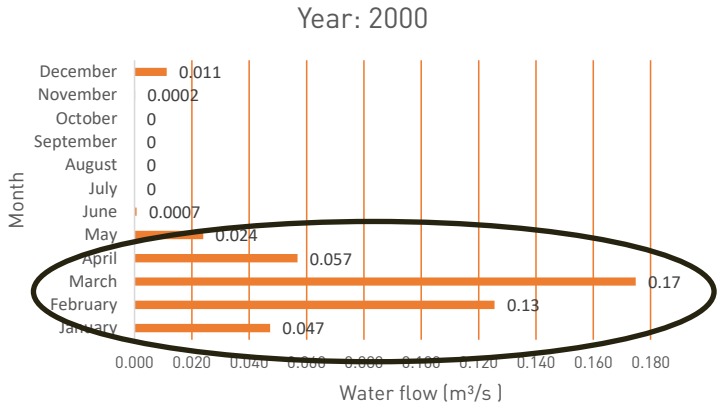
Site features in August 2022.(Author, 2022)

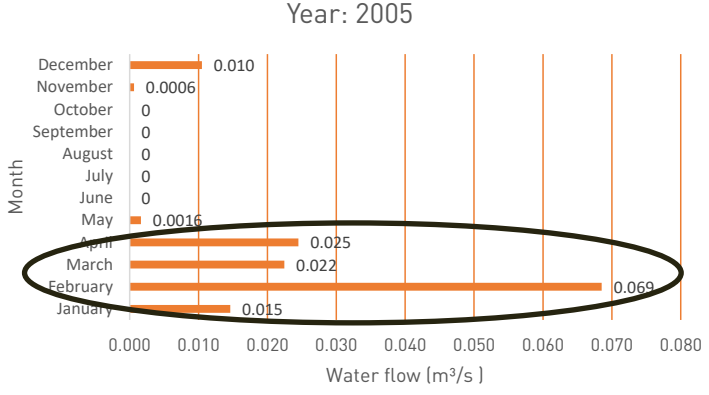
Seasonal river activation & dam

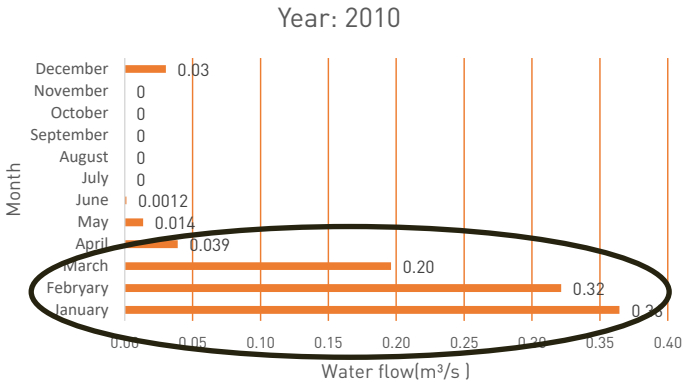
The bar charts indicate the amount of water flow in Livadis River in pomos through the years. Especially, the year of 2000, 2005, 2010, 2015 and 2020 are presented. As it stated, the River is being filled with water once the dam overflows during the wet season of the island.

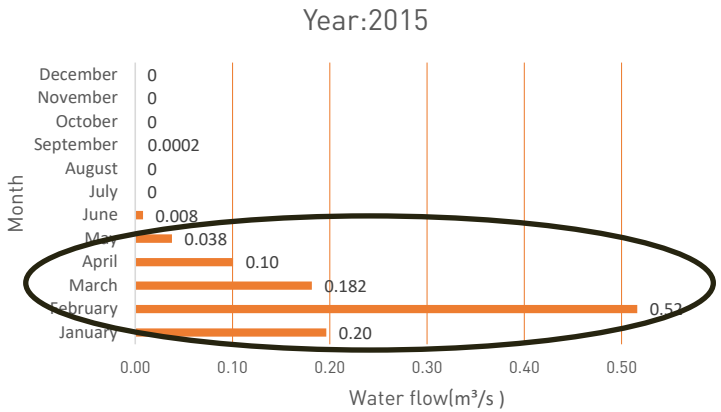
As it stands out, the months that the River is active concern mainly the month of January, February, March as well as April. Particularly, the first position with the highest amount of water in the river is possessed by March and February in all years. These are the months that the river become active and the dry situation is transformed into a wet as well as lively one. The first days of the dam overflows Cypriots are used to celebrate it, since this fact means a lot for the locals.

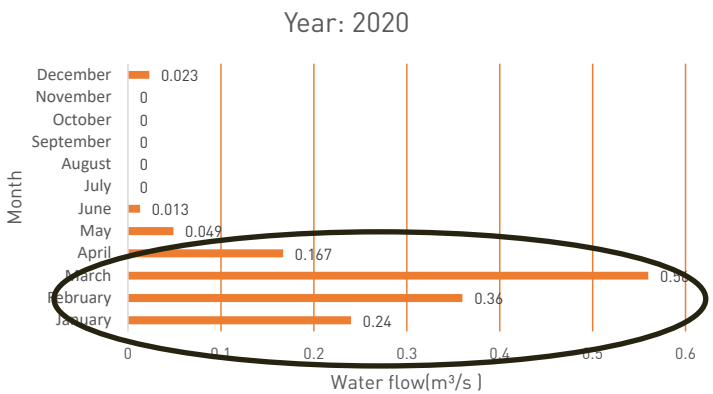
On the other hand, the situation is completely different during the dry season. In particular, during the summer and sometimes the autumn the river is completely dry, since there is no enough water in the dam to overflow. This season, is the worst one for the biodiversity of the area, since the water is absent.






Year: 2010
December
November
October
September
August
July
June
May
April
March
Febryary
January
0.03
0
0
0
0
0
0.0012
0.014
0.039
0.20
0.32
Month
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
Water flow(m³/s)


Year:2015
December
November
October
September
August
July
June
May
April
March
February
January
0
0
0
0.0002
0
0
0.008
0.038
0.10
0.182
0.20
Month
0.00
0.10
0.20
0.30
0.40
0.50
Water flow(m³/s)

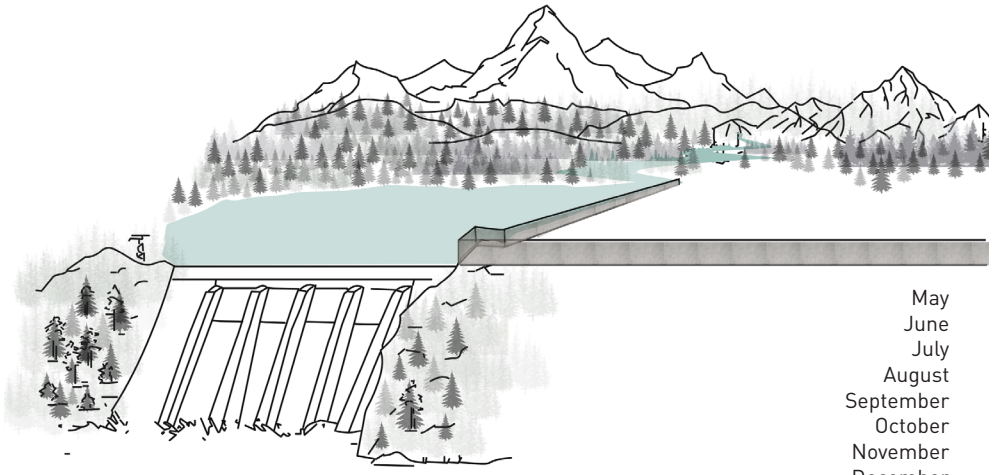

Year: 2020
December
November
October
September
August
July
June
May
April
March
February
January
0.023
0
0
0
0
0
0.013
0.049
0.167
0.36
0.24
Month
0
0.1
0.2
0.3
0.4
0.5
0.6
Water flow(m³/s)

As it has already been mentioned, Cyprus suffers from long-lasting droughts and a rainfall consists a blessing for the island. The dam consist the main source of storage water during the wet season for domestic and irrigation purposes.

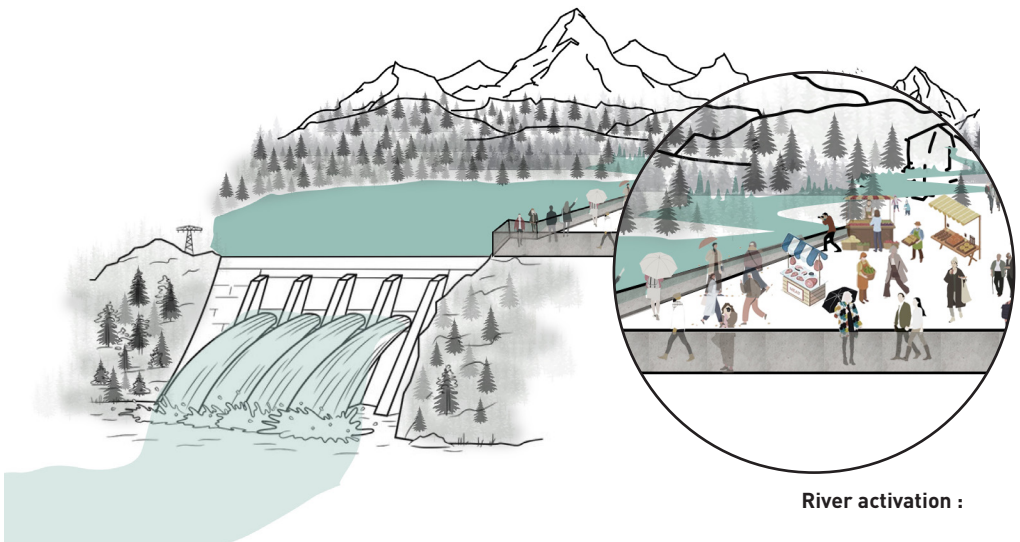
Once the dam overflows, means that there is enough water for the whole year. Cypriots are used to celebrate the dams overflows with small festivals in each dam. Specifically, people usually travel to the places, where the dams exist, in order to enjoy the scenery and to celebrate this event. Several hawkers also organise mini-markets with traditional food for the visitors.

Additionally, this is the case in Pomos dam. Every winter the dam overflows, and human-beings visit the site for observation as well as celebration.

This festival is a common thing for Cypriots, since people suffers from the water shortage, especially during the dry season.



May
June
July
August
September
October
November
December



River activation :

January - February - March - April

One example of this dam's celebration :

Asprokremmos dam in Paphos town overflowed in February 2022 and a lot of people from all over the island traveled to the site enjoying the scenery.

Hawkers were also there to sell some traditional cypriot foods. Some of their comments are presented below :

People gathered to observe the dam's water overflows.

Comments from **visitors** :

"Άρχισε και υπερχειλίζει, να δώσει πλούτο στον τόπο μας."

Translation : "The dam overflowrs, to give wealth to our region"

"Πήγαμε πολύ καλά φέτος, ώσπου βλέπεις το νερό χαίρεσαι, φτάνει που γέμισε."

Translation : "We did very well this year, until you see the water you are happy, as long as it is full"

Comments from **hawkers** :

"Είμαστε πανέτοιμοι, λοκουμάδες, σιάμιση, Ρέσι, παγωτό τα πάντα."

Translation : "We are ready, lokumades, siamisi, Resi, ice cream, shushuko and everything.."

"Έχουμε λοκουμάδες, παγωτά, κρέπες έχουμε παξιμάδια μαγικά. Περιμένουμε το φράγμα αν γεμίσει, και έρθουν από την Πάφο να το δουν ακόμα και από τη Λευκωσία."

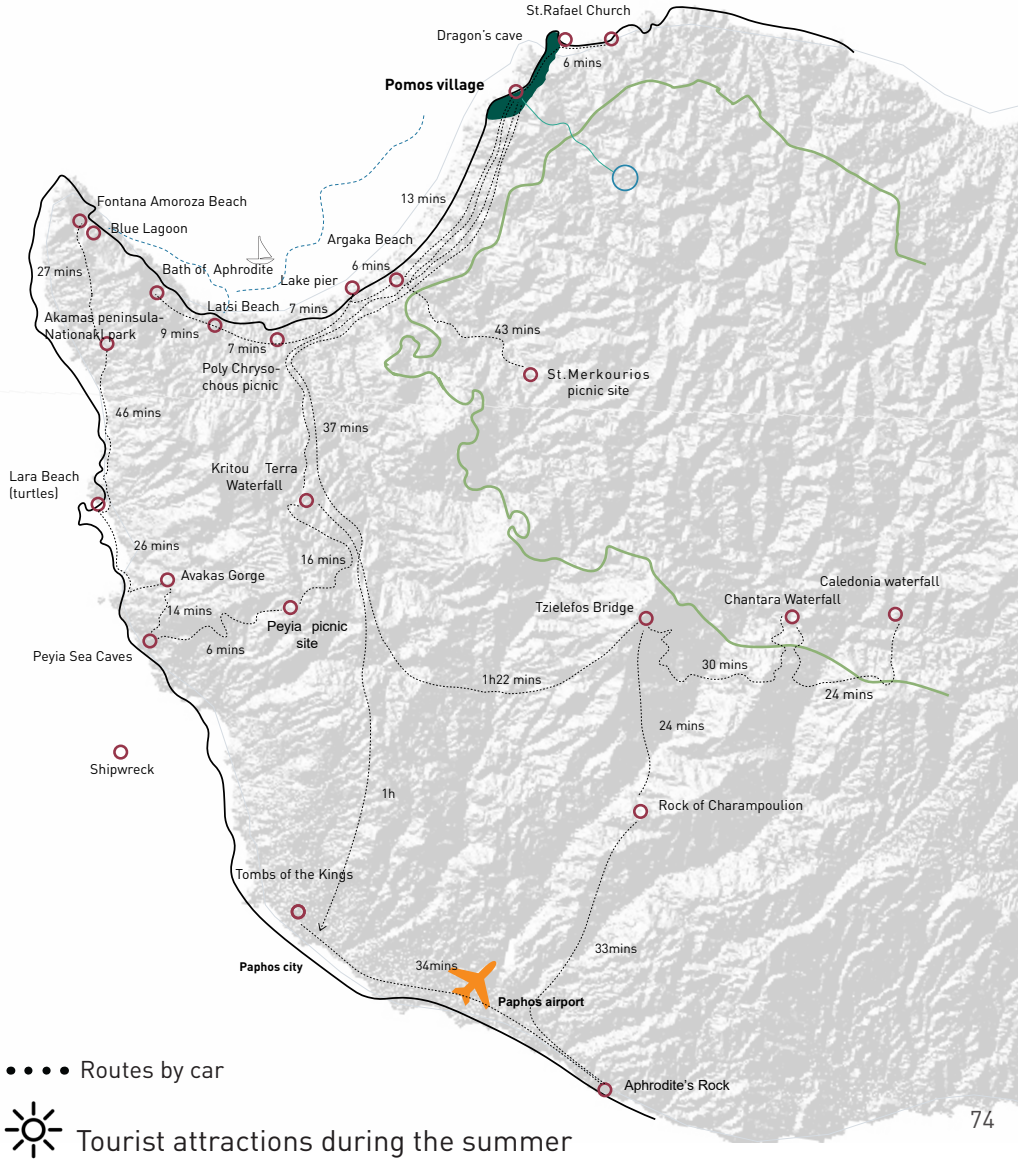
Translation : "We have lokumades, ice creams, crepes, we have magical nuts. We are waiting for the dam to fill up, and people will come from Paphos city to see it, even from Nicosia."

Tourist Attractions

The study site - agricultural valley is not a touristic attraction yet but has the potentialities and perspectives to become one. However, there are several pole attractions nearby the valley.

Specifically, the maps illustrate the tourist attractions during the summer and winter within Paphos city, especially within the study area. People often organize trips during the weekends, once they do not work, in order to release the daily's stress.

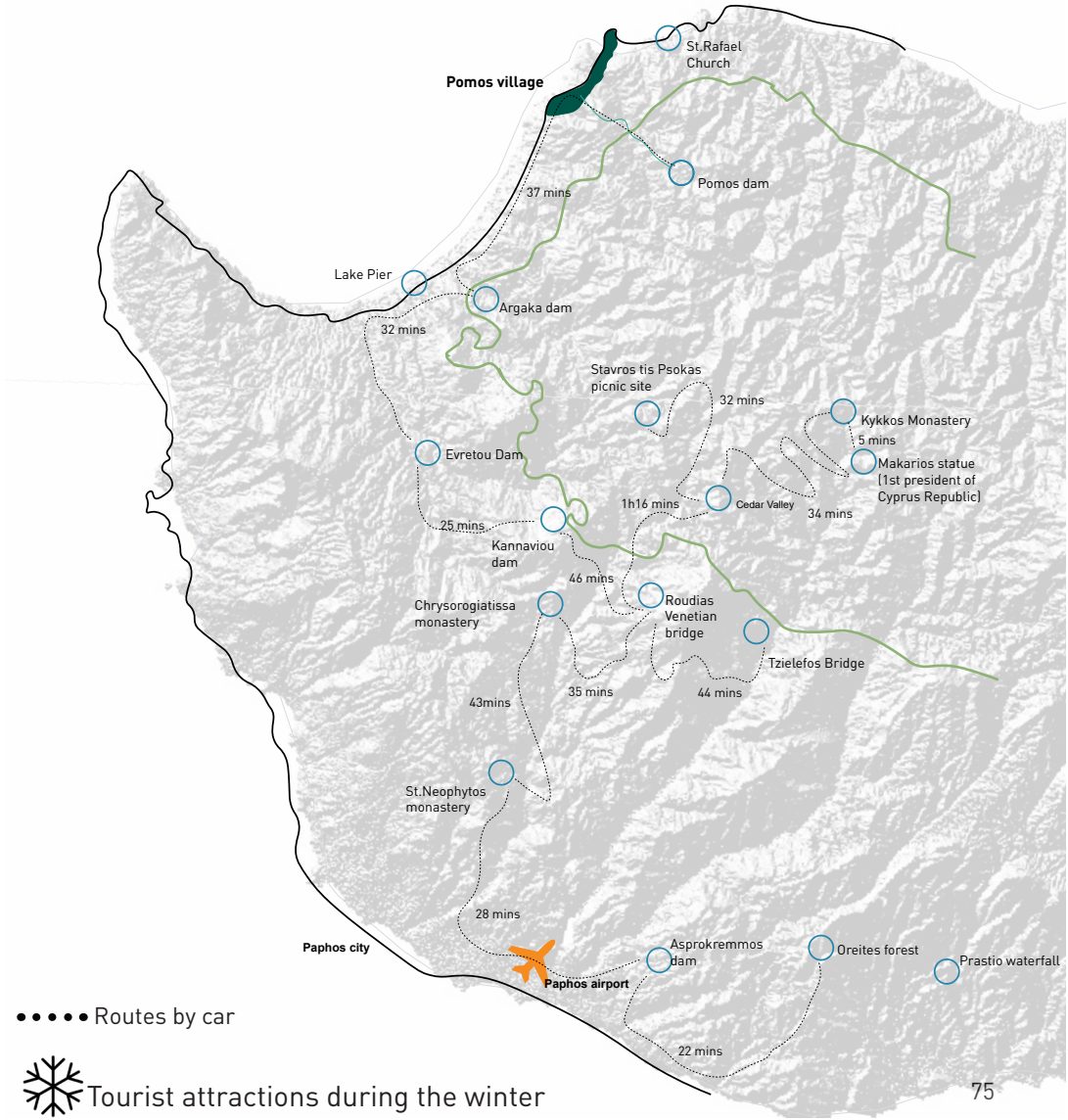
As far as the summer is concerned, people prefer to spend their time in the sea especially during the weekends, when the temperature is really high. The sea in the north part of the Paphos city is really famous, due to the crystalline water. It is a common habit during the summer's Sundays for habitants to visit the Latsi Port in Paphos to take the boat to spend their day in Blue Lagoon for swimming. Countless visitors from other towns appreciate this scenery and visit it every summer, since consists a unique diamond of the city. However, human-beings enjoy the natural scenery close to the water bodies, such as historical bridges above the river, waterfalls etc. Sometimes they enjoy the landscape close to the water body in the mountain or some others close to the sea. They enjoy go for camping next to the sea during the warm days, especially in the weekends.

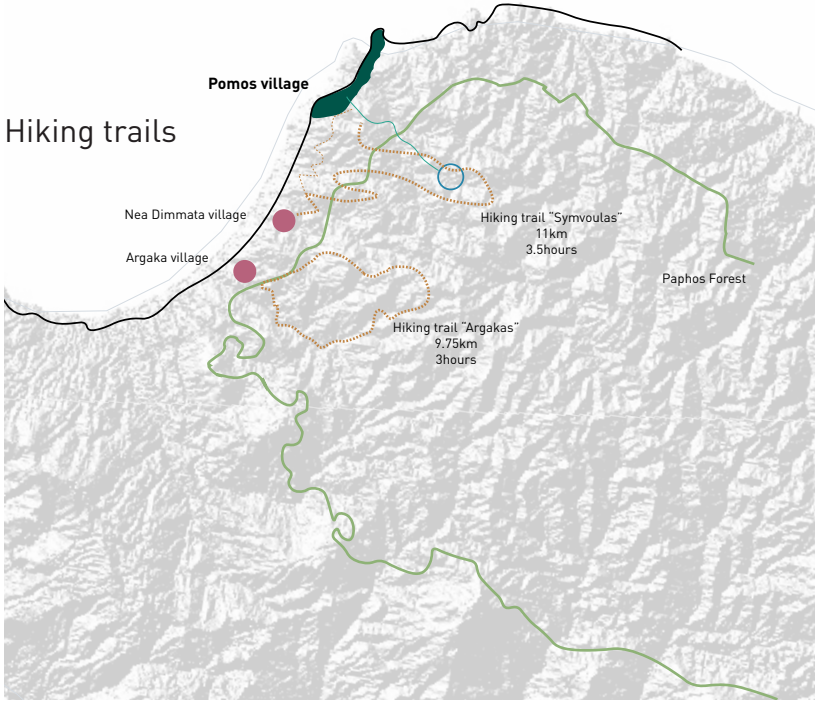


Notwithstanding, the people's habits are not completely different during the winter. They usually visit monasteries and churches in different villages, since some of them are extremely religious. In this way, they explore new villages and areas within their country, since the distances are not very far. They also visit natural sceneries, such as rivers, natural paths, forest etc, during this period. The dams are the most famous destination during the January-February-Marche, once they overflow.

Moreover, the hiking trails are really appreciated all over the year, but mostly during the winter. There are several hiking paths in the whole island, especially in the mountains, which explore the natural habitat of the city and people interact with it. There are two hiking trails nearby the study site, the Symvoulas and the Argakas one.

Lastly, people appreciate and enjoy the nature of our island. Especially, they always desire for destinations close to water elements. This is might be the relationship among Cypriots and water. For instance, they always escape from the city to visit rivers, well-known bridges above water bodies, natural sceneries, forest, waterfalls sea etc. As it has been already mentioned, the celebrations once the dam overflows reveals the people's enthusiasm about this fact. Although, they appreciate and visit them to admire them, they do not respect them as much as they could.





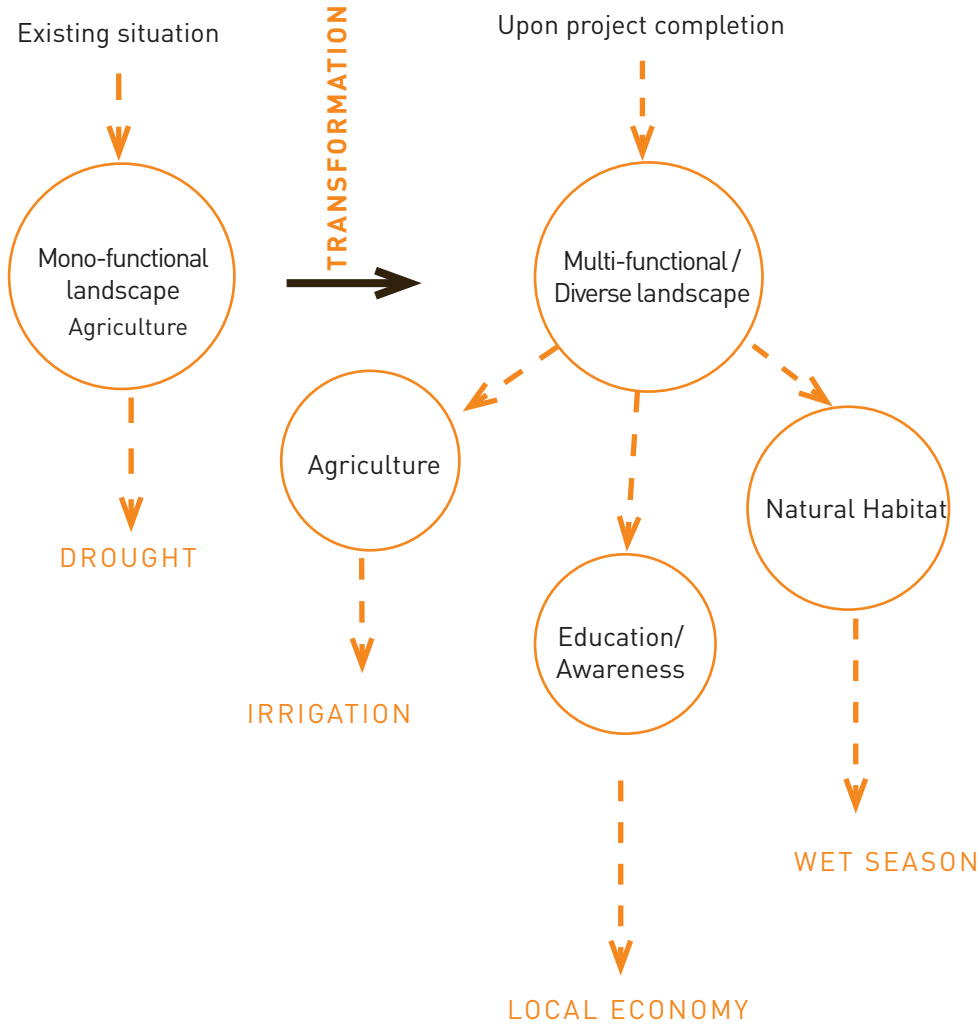
Hiking trails :

1)"Symvoulas" trail
Route: From Nea Dimmata to Pomos village
Lenght: 11km
Time: 3.5hours
Level: Medium
Type: Linear

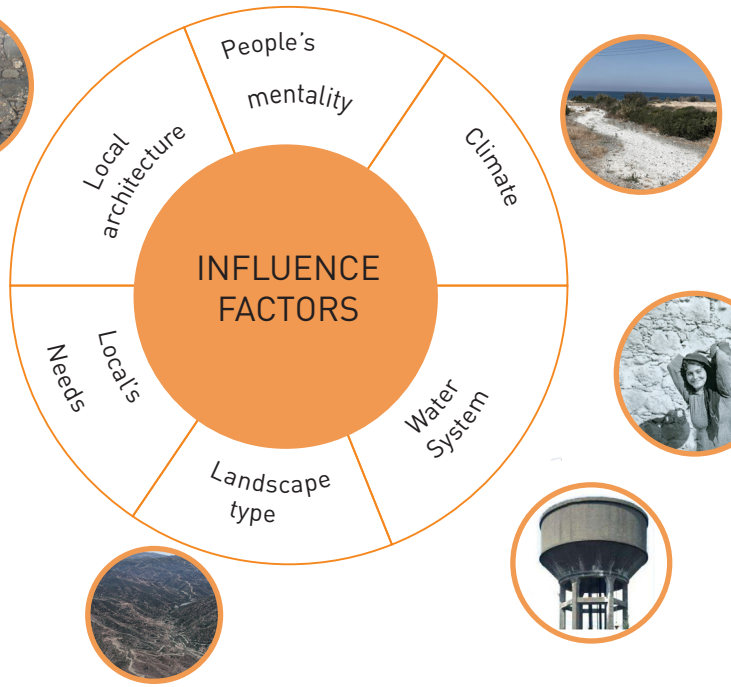
2) "Argakas" trail
Route: Begins and ends to Argaka village
Length: 9.75km
Time:3hours
Level : easy
Type: Loop

04. PROPOSAL

The ambitions of the graduation project is to transform the current mono-functional landscape, which includes the agriculture aspect, into a diverse one with educational and natural habitat restoration ingredients. Particularly, one of the goals is the environmental sustainability, by extending the water stay in the area and to propose alternative smaller scale ways of reservoirs, instead of agriculture depending only on the huge scale dam. Education programs for awareness raise is part of the aims, either with directly workshops and seminars or outdoor activities by interacting with agriculture, water and veggetation. A proper area design is essential, since this future lively region will consist the common space for the locals and the visitors as well. The visitors can be the main actors to the area, by contributing to the agriculture or just experiencing the landscape. It is essential for the young generation to get in touch with the nature and learn its value in our life, both physical and mental health. The raise of the local economy is another goal, since such a development will attract people from other villages and cities of the island.Furthermore, an island with long-lasting drought has to find solutions for circularity of water, in order to prevent the water waste. Likewise, the historical background and the biography of an area are the main components that make a place unique from other. Thus, it is crucial to remind people their roots with old landscpae experiences, in order to learn the new generations and the tourists the local history.




AMBITIONS
People's awareness
Social aspect
Water Management
Water Circularity
Local Economy
Environmental sustainability


INFLUENCE FACTORS
People's mentality
Climate
Water System
Landscape type
Local's Needs
Local architecture

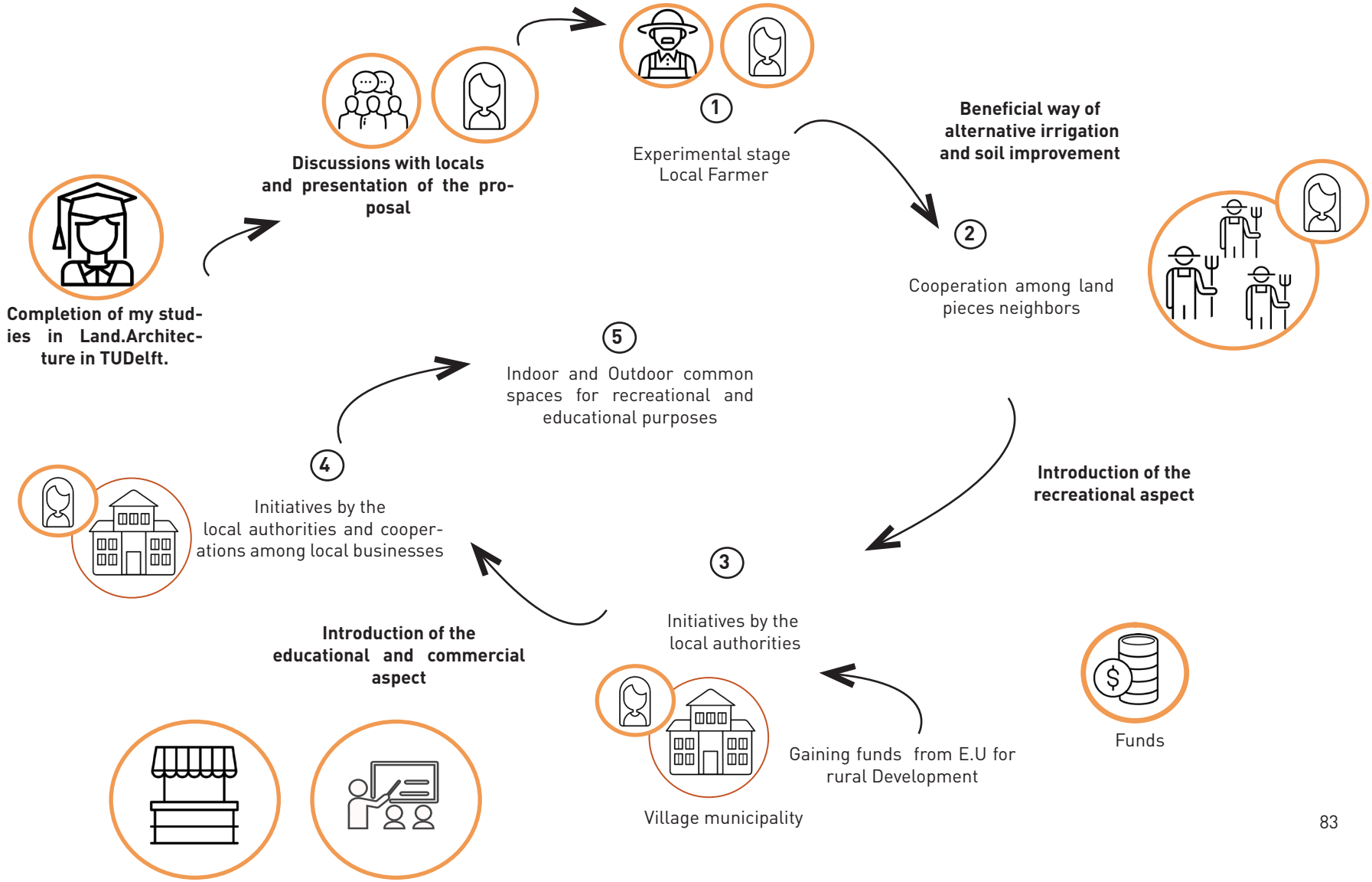
Concept

First things first, the completion of my studies in Landscape architecture track of TUDelft is signals a new era for my life. The main goal is to realize my graduation project. Particularly, through the process of the assignment, countless discussions with people from this place have been done for better understanding the place and the needs of the locals. Therefore, a presentation of the graduation project will take place in the village. An experimental intervention with the assistance of a local farmer, Aris, will be the first step. Specifically, a small reservoir for rainfall collection and irrigation purposes will be located in the land piece of the farmer, in order to be independent on the dam. Additionally, some terraces with the remains of the old houses will be also implemented, in order to prevent the erosion and transform the soil healthy.

Moving on, 3 years later, the changes to the landscape and to the cultivations are visible. The rest farmers are influenced by this transformation and they realized how beneficial are these interventions for their cultivations. They decided to make cooperations among the land pieces neighbors for built reservoirs, in order to share the collecting water.

Moreover, the European Union offers funds to her members for different purposes. Some of them are for rural development. The goal is to develop the countryside, by providing new opportunities for both locals and visitors and prevent the urbanization. The authorities take some initiatives to make new intervventions., in order to transform the village as a pole attraction, due to the high competiveness among the villages. These actions have to contribute to the natural habitat restoration as well as to the finding alternative solutions for the long-lasting droughts. Likewise, the educational aspect has to be introduced for the people's raise of awareness. The authorities also take initiatives to support the local products by introducing commercial infrastructure. Some years later, the results of the extension of water stay are visible to the area and more and more people visit the village, new initiatives are taking. Specifically, the authorities decided to make indoor and outdoor spaces for the visitors, not only for recreational purposes but also for educational one. In particular, these new interventions will be in vacay land among the cultivations in order not to eliminate the local agricultural local character, , and the land owners will financially be supported by the authorities and E.U as well. The investors of these new interventions will be the farmers, who will rent the new spaces to the visitors for the weekends.

To sum up, the village is being transformed as an attractive landscape with new activities for all the people. In this way, they have blast but also learn to respect the natural habitat and its value in our life.


Completion of my studies in Land.Architecture in TUDelft.
Discussions with locals and presentation of the proposal
1
Experimental stage Local Farmer
Beneficial way of alternative irrigation and soil improvement
2
Cooperation among land pieces neighbors
Introduction of the recreational aspect
3
Initiatives by the local authorities
Gaining funds from E.U for rural Development
Funds
Village municipality
Introduction of the educational and commercial aspect
4
Initiatives by the local authorities and cooperations among local businesses
5
Indoor and Outdoor common spaces for recreational and educational purposes

Design strategy


Oak


Clay


Stone

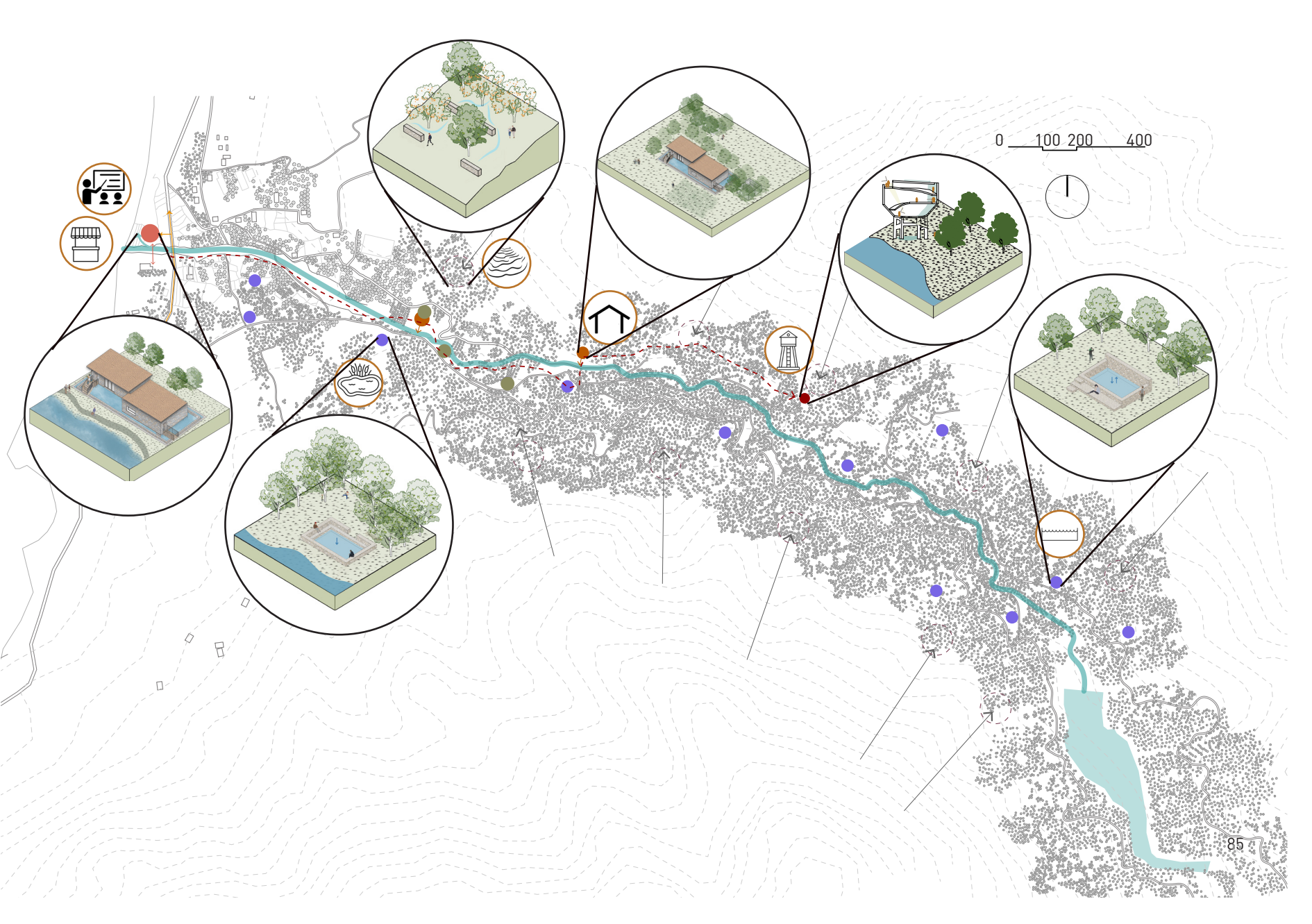

Forest shelters in Paphos forest.

0 100 200 400


Earthed infiltration pond,
Ezousa river, Paphos,Cyprus


Reservoir in
Galatarka village,
Paphos, Cyprus

- Connection
- Recreational path
- Streams
- Infiltration pond
- Indoor common space
- Terraces
- Reservoirs
- Lookout point
- Educational & Commercial infra-structure


0 100 200 400

The design strategy will be elaborated upon, incorporating carefully selected components that best suit the rural area. To ensure an informed decision-making process, an analysis of similar projects in Cyprus was conducted, focusing on integrating shelters, reservoirs, and infiltration ponds within the study site.

Moreover, afted deciding the different components, a design strategy was followed, for the better integration of the different elements in the area. Especially, the different activities are implemented in the landscape according to the function.

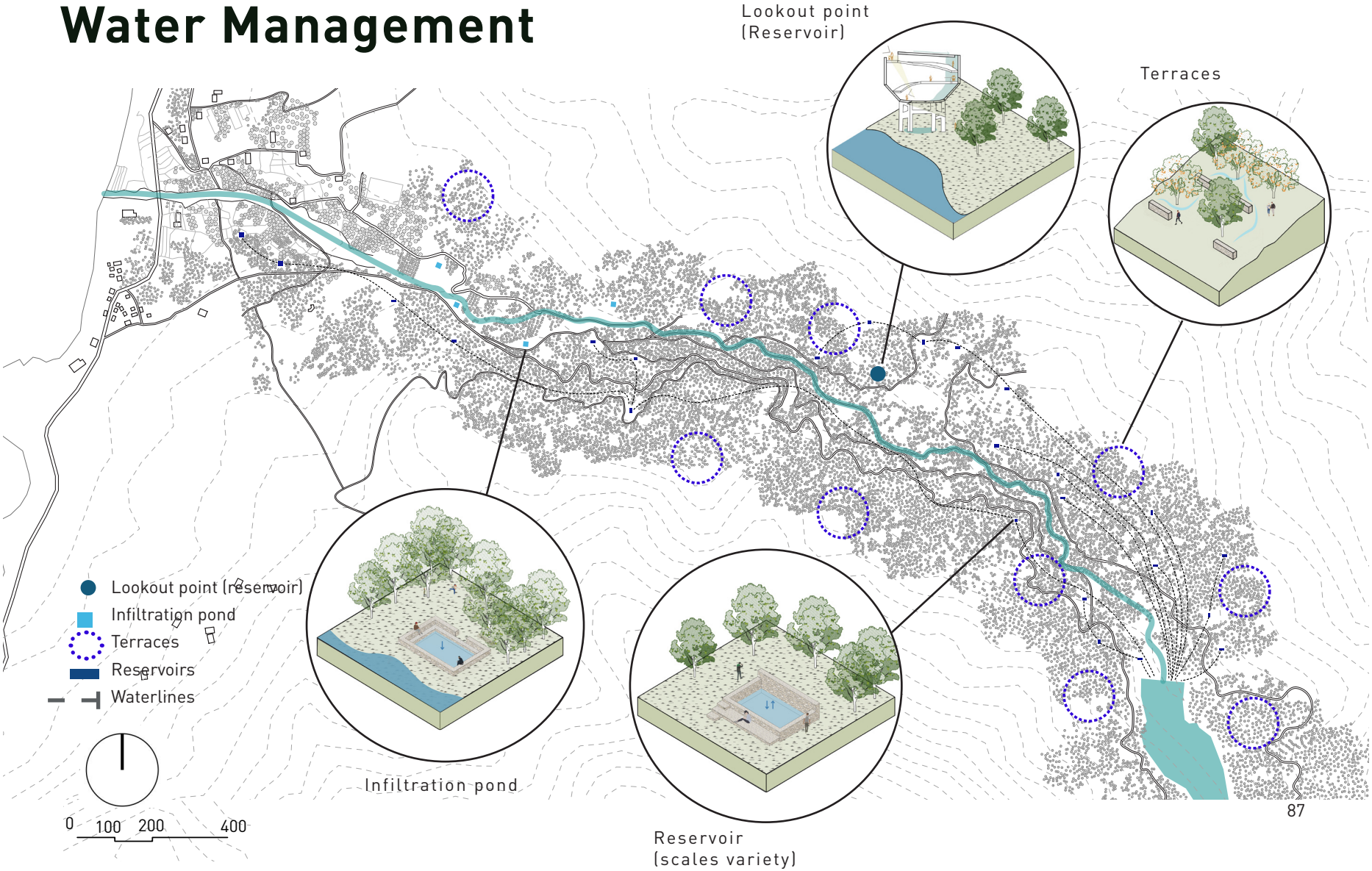
In the upstream section, characterized by steep slopes, various small-scale reservoirs, varying in size, are strategically placed in areas with high water demands, particularly where avocado and almond trees thrive. Terraces are also established in this area to accommodate multiple streams during rainfall events, taking advantage of the natural topography. They are located prependicular to streams, in order to prevent the soil erosion in case of heavy rains.

Moving to the midstream section, common indoor spaces, infiltration ponds, and a lookout point are situated, respecting the character of the area and ensuring no disruption to the farmers' cultivations. The common indoor spaces are positioned in flat areas to provide convenient gathering spaces, while the infiltration ponds are strategically placed at higher elevations than the boreholes to ensure effective recharge of the underground water table, particularly during the dry season. The lookout point offers a vantage point to observe the surroundings.

Finally, in the downstream section where the village is located, the educational and commercial infrastructure are placed. This area is easily accessible by both car and foot, serving as a hub for community activities and offering convenient amenities for residents and visitors alike.

A recreational path connects the different activities of the proposal, which passes through enclosed areas-agriculture ones- and leads to the open spots, where the activities are located.

Water Management



The Water management layer presents the water basins as tools, in order to take advantage of the wet season of the island

.

First things first, the infiltration ponds are located in higher elevation from the boreholes. They include a sitting area, in order for the people to observe the process and also to interact with it. The ponds harvest the rainfall, in order to recharge the underground table.

The different scale of reservoirs are located scattered in the field and provide a resting area as well. They are connected through underground pipes with the dam. They collect the rainfall, in order for the farmers, to use the water without any limitation in terms of amount and time. Once there is drought in the area, especially during the summer, the dam supplies the reservoirs with water.

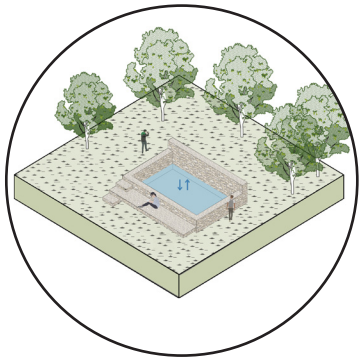
The terraces are located perpendicular to the stream direction especially on the steep slopes in the upstream

The Lookout point is located in the area before the river direction changes, in order to have an overview of the landscape.

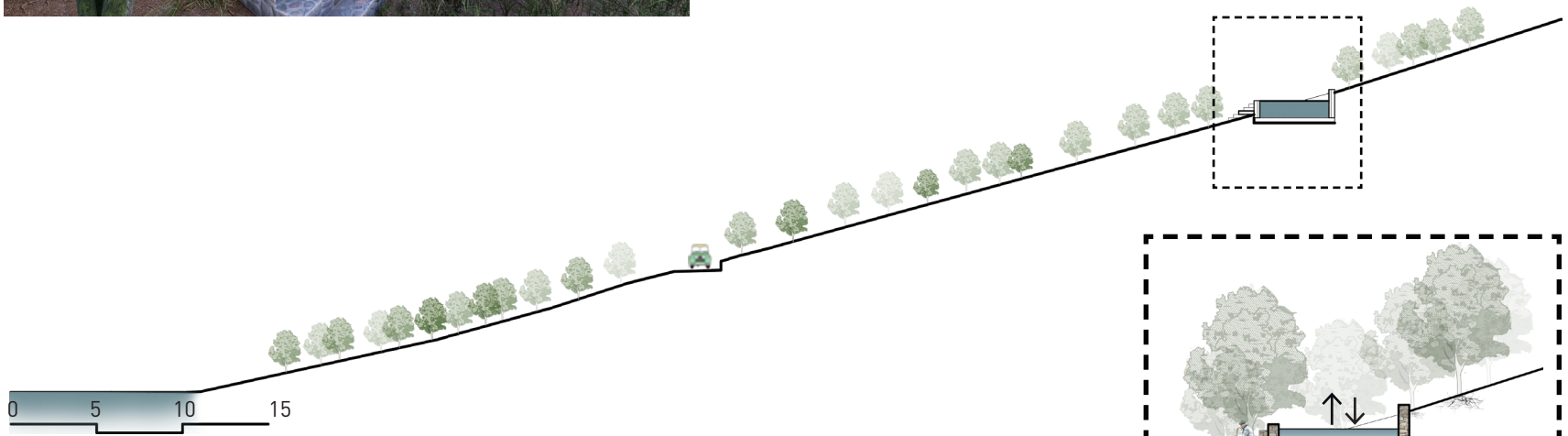
Design components

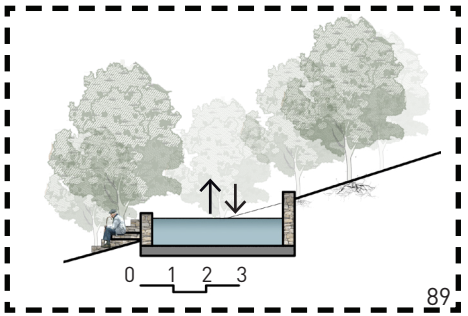
Reservoir

A crucial element of the proposal is the reservoir, which will be built by the owners of the landpieces. It will be strategically implemented in open areas. To minimize evaporation and provide shade, new trees are planted around the reservoir. This not only helps to conserve water but also creates a pleasant atmosphere for visitors. The reservoir also serves as a sitting area, offering a tranquil space for visitors to relax and enjoy their surroundings. To enhance its aesthetic appeal, the reservoir is constructed using stones sourced from the nearby sea or river, adding a natural and harmonious touch to the overall design.



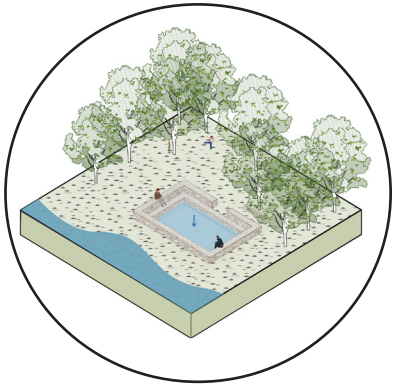
Reservoirs (scale variety)



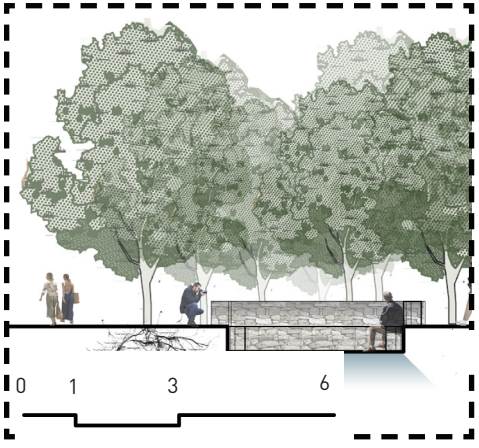


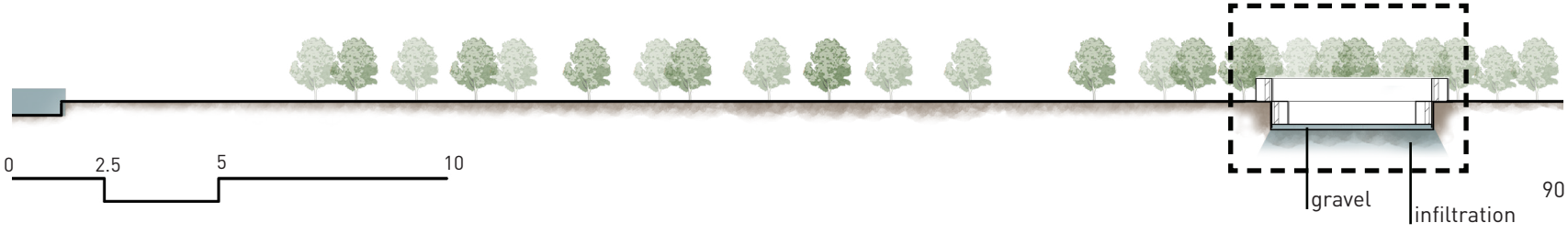
Infiltration pond

The primary purpose of the infiltration pond is to replenish the underground water table, particularly during the dry season. Constructed using stones sourced from the nearby sea or river, the infiltration pond not only serves its functional role but also offers an opportunity for visitors to sit and observe the water, especially during the wet season.



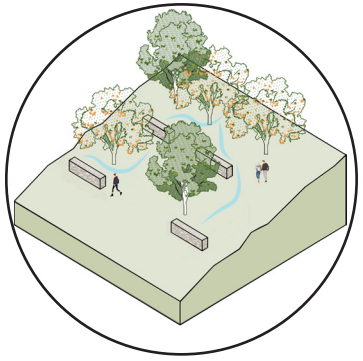
Infiltration pond

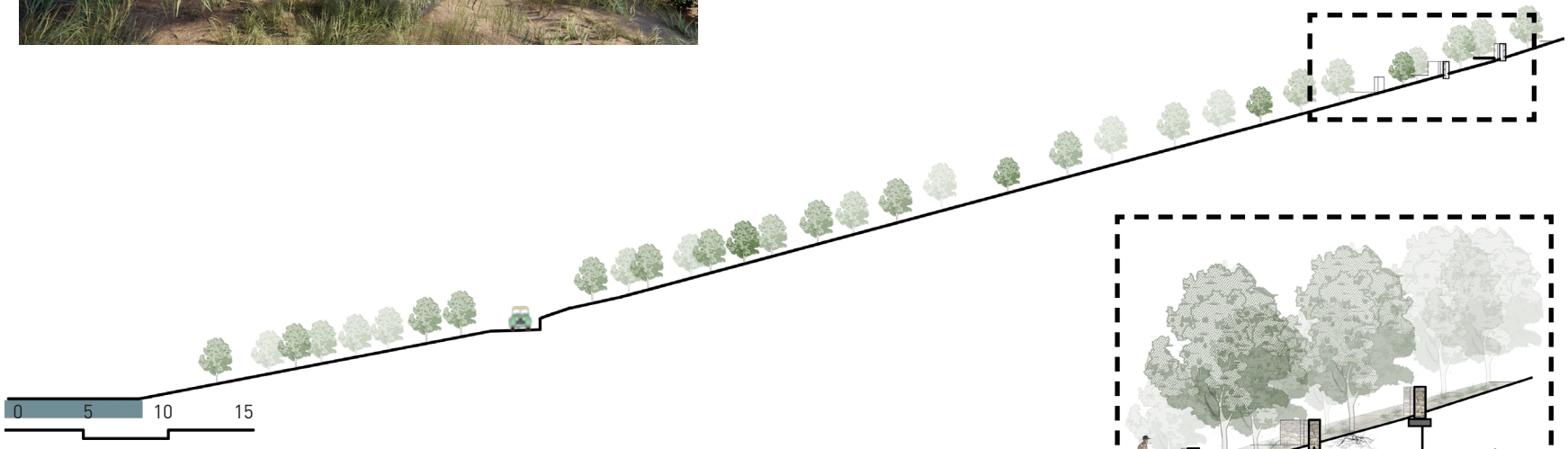


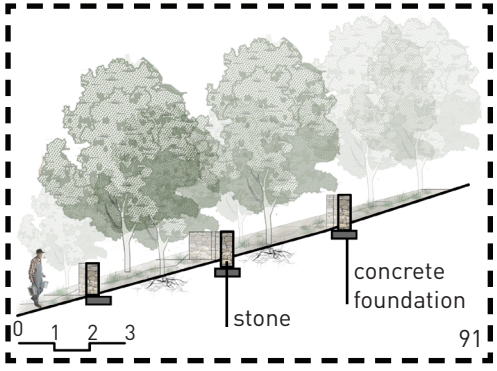


Terraces

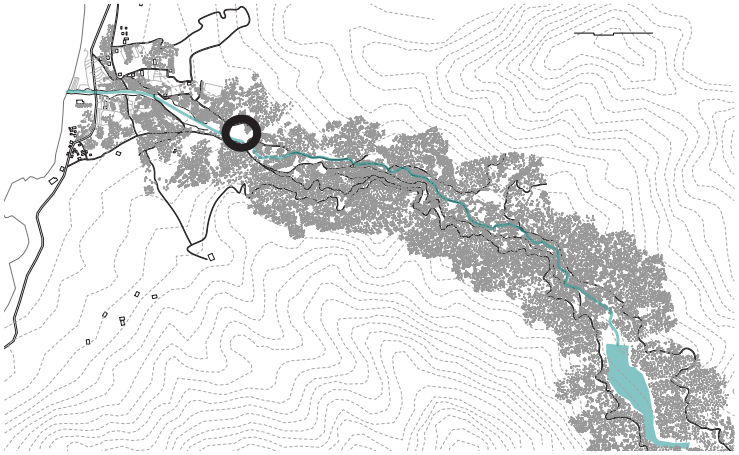
The inclusion of terraces is an integral component of the design, as they play a vital role in maintaining soil health. They will be constructed by the land owners. Especially, the builders will maket these terraces by constructing some barriers. made of the remaining stones from the old households in the slopes.This approach not only preserves the historical elements but also ensures sustainable land management and supports the overall ecosystem.



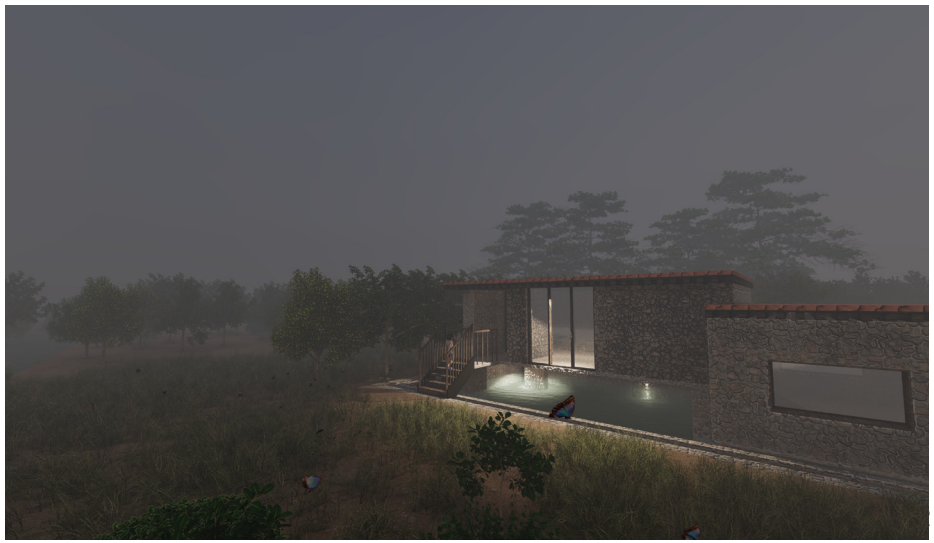


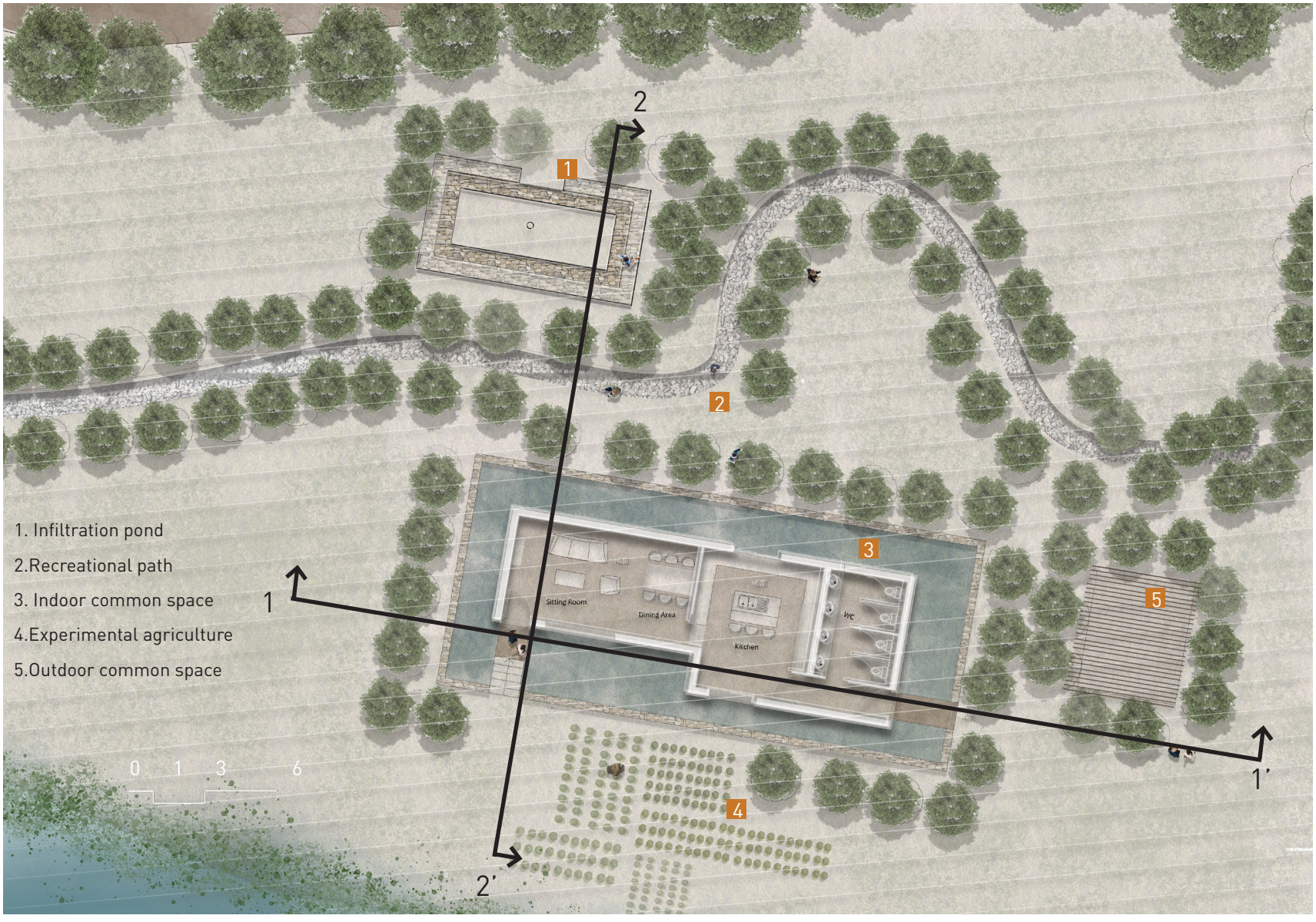


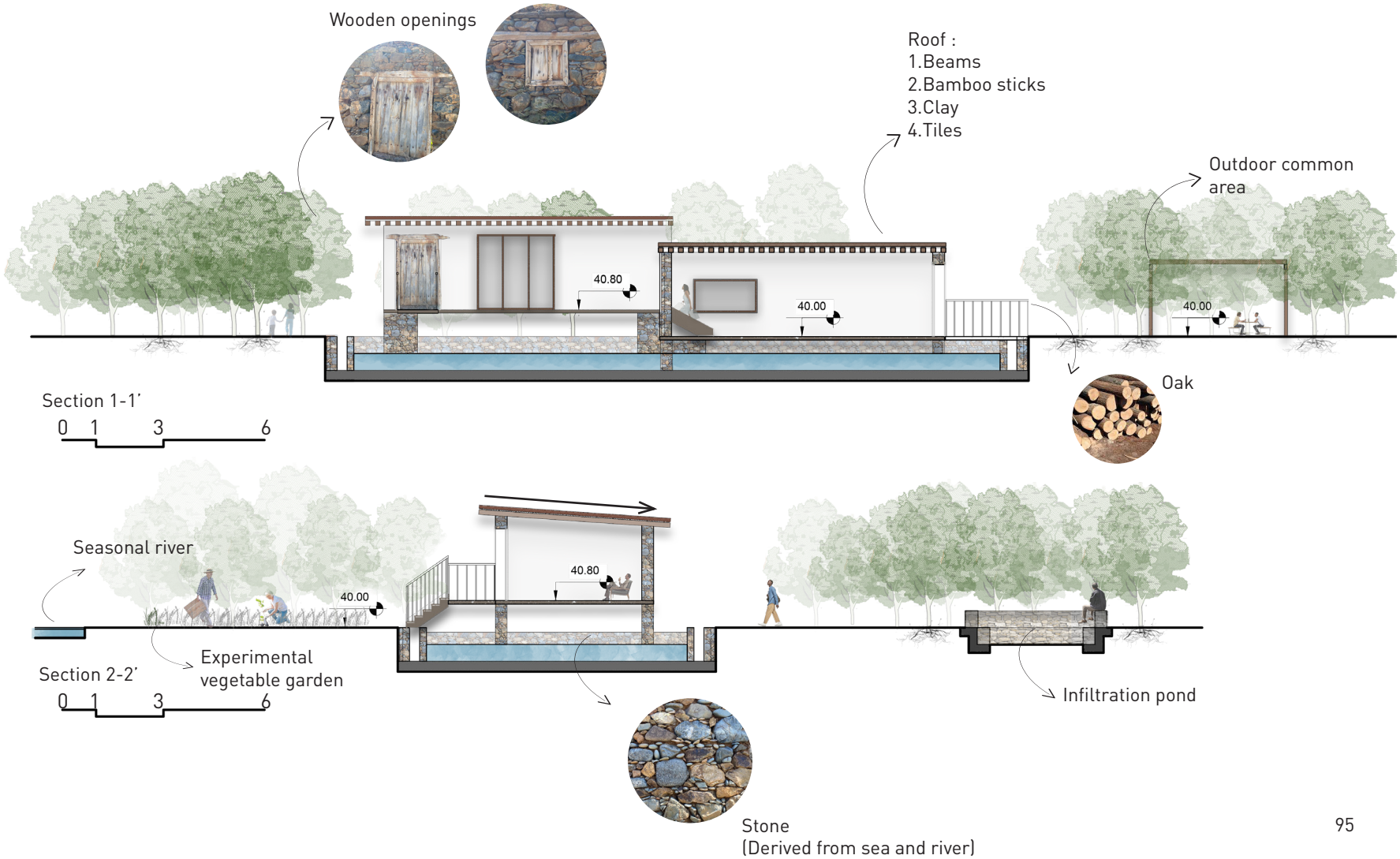
Zoom-in area



The zoom-in area concerns the region which includes the indoor ,outdoor spaces and the infiltration ponds. The big side of the building frame the opposite mountain and the river next to it. The building is located above a water storage reservoir, where the precipitation is stored for irrigation purposes. An amount of water is reused in the building for the flushing toilets, washing machine etc.The infiltration ponds are located in the side behind the building, in order to be in a distance from the river. The hidden outdoor space with the communal fountain is located next to the indoor space. An experimental vegetable garden is located nearby the indoor space for educational purposes. Additionally, the recreational path starts from a dense vegetation, leads to the open area where the buildings are located and then moves on again in an enclosed area.




1. Infiltration pond
2.Recreational path
3. Indoor common space
4.Experimental agriculture
5.Outdoor common space
0 1 3 6
1
1'
2
2'
1
2
3
4
5
Sitting Room
Dining Area
Kitchen
W/C

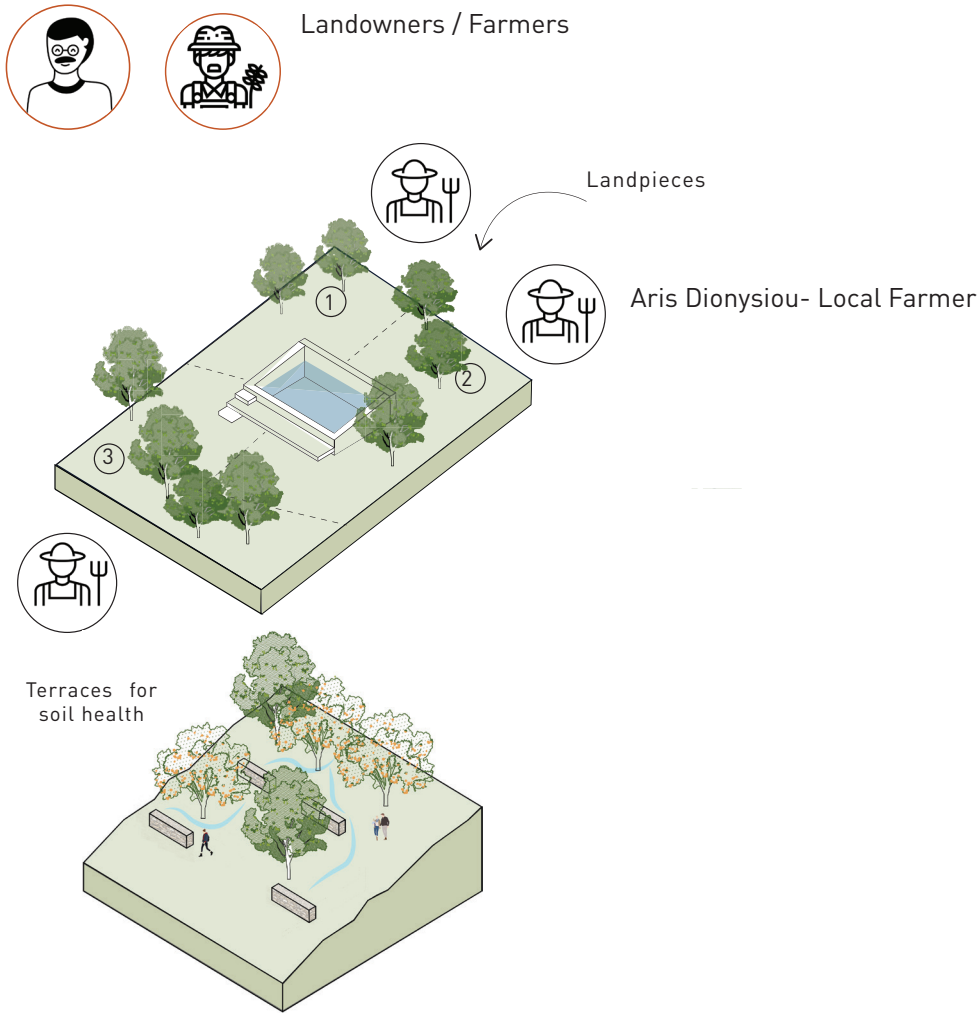

Wooden openings
Roof :
1.Beams
2.Bamboo sticks
3.Clay
4.Tiles
Outdoor common area
40.80
40.00
40.00
Oak
Section 1-1'
0 1 3 6
Seasonal river
40.00
40.80
Experimental vegetable garden
Section 2-2'
0 1 3 6
Infiltration pond
Stone
(Derived from sea and river)

Incremental Development

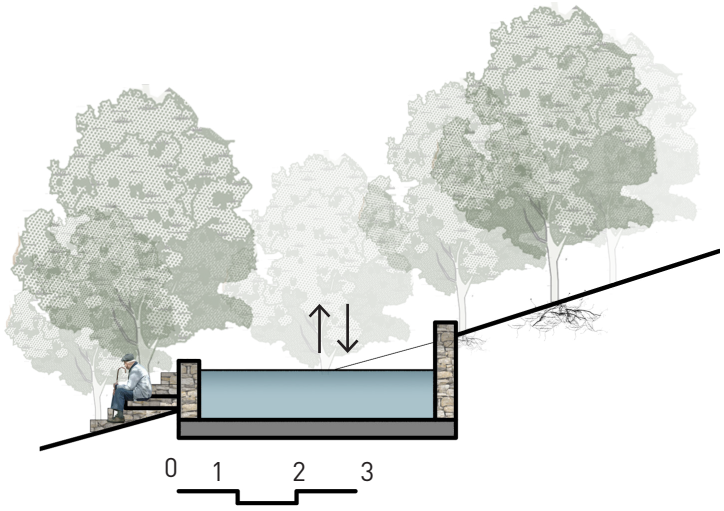
The intervention consists an incremental development, which will be completed in 10 years. There are some steps in order to achieve the result that it have been already presented.

Firstly, the first two years is the experimental phase, where a local farmer and myself try to realize a part of the proposal. Specifically, due to the water shortage decide to take over the built of small reservoirs in his land pieces in order to be independent from the dam. Additionally, we will construct some infiltration ponds in his land pieces to recharge the aquifer in order to be supplied by water during the summer. The terraces is another way to transform the soil of their cultivations healthy and to prevent the current erosion. The connection between reservoirs and the dam is also easily feasible, since the underground pipes exist in the area.
The results of the first changes are already visible. The presence of water for longer time in the area enriches the flora and fauna and new species have been appearing. The farmer can use the water from the small scale reservoirs whenever he wish and for unlimited time amount. Erosion happens in smaller extent compared to before.

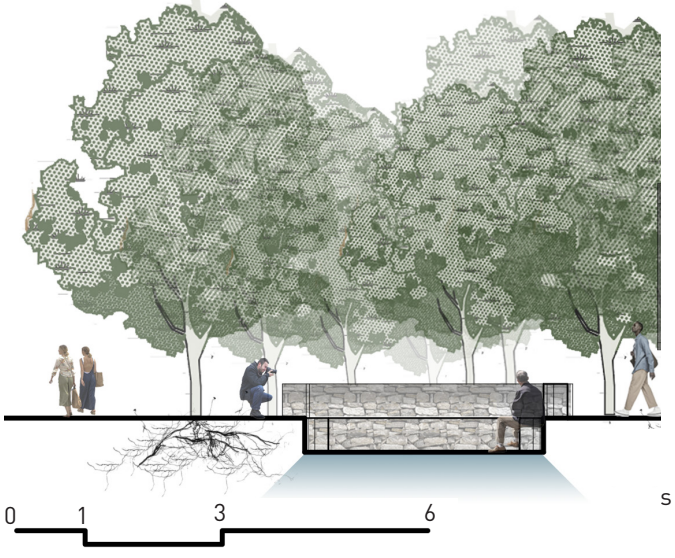
0-2 years



Experimental stage



Reservoirs (scale variety)



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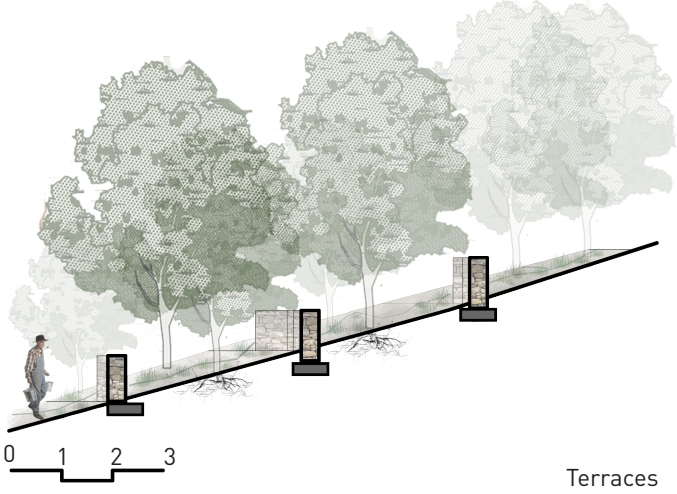


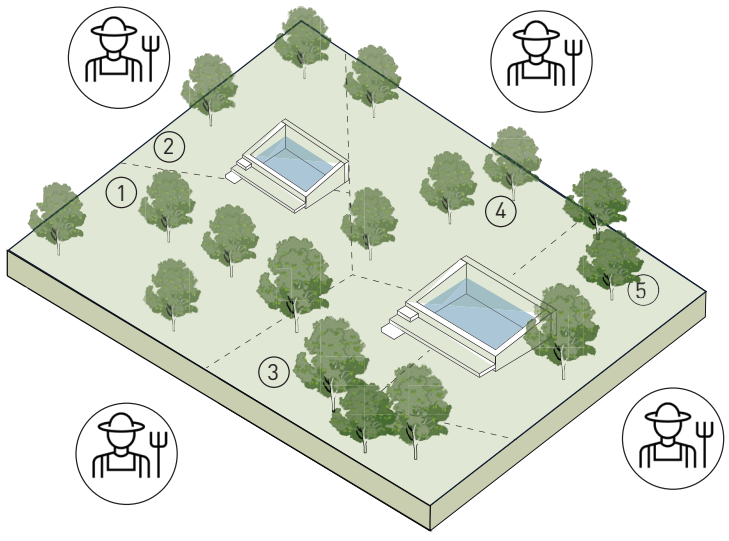
Terraces

3-5 years

Village municipality

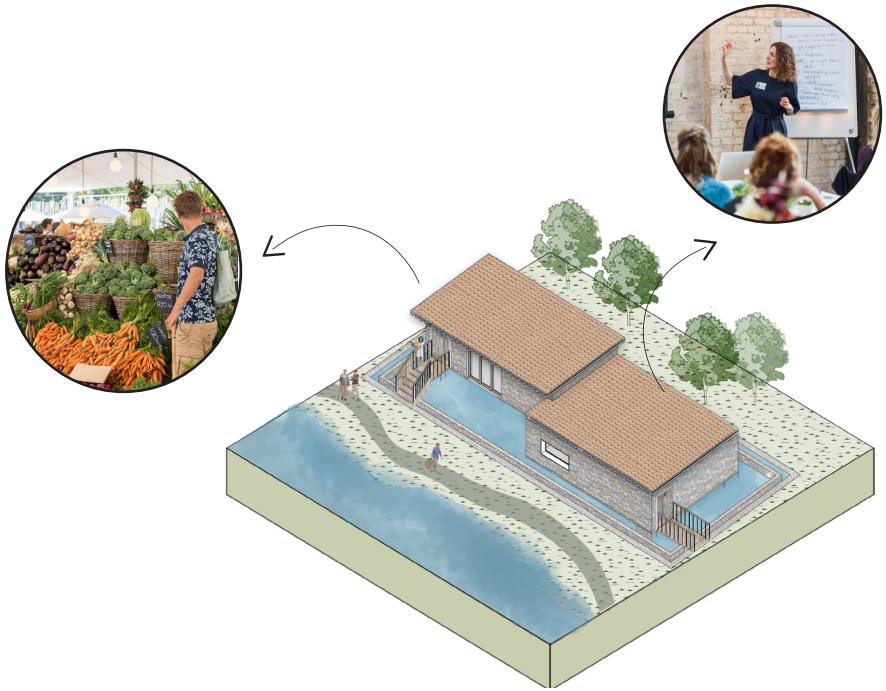
Following this, the next 3 years (3-5 years) the changes are intensely visible. The biodiversity varies through the years, since the area obtained water for longer period and in different spots of the area. However, the current trees as well as vegetation is growing more and more and new trees appear in the area.

Additionally, the rest farmers are influenced by the new interventions and desire to make new small scale reservoirs in their land pieces, in order to become independent on the dam. There are cooperations among the neighbor land owners, in order to share the water and the expenses of the construction.



More farmers join the built reservoirs proposal

Some years later, the authorities of the village took initiatives to support the local agriculture and the economy, therefore, they suggested some commercial and educational infrastructure close to the natural museum of the village, for accessibilities purposes. The educational seminars and workshops take place every weekend, when the people spend their time in the rural areas of the island. The actors in these events are local farmers or individuals that want to spread the knowledge and inform the visitors about the village history, the agriculture, the local tradition etc. In this way, they would like to raise the awareness of the visitors about the environmental aspect, the local products, and the history of the village but also to promote the farmer's products. The recreational paths are visible in the area to provide the visitors the agricultural experience.

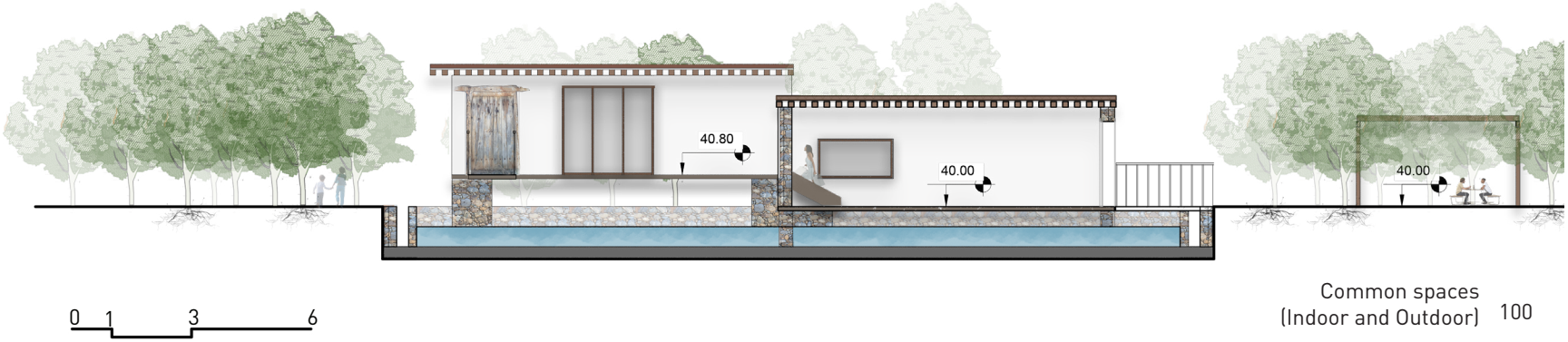


Commercial & Educational infrastructure

Recreational paths

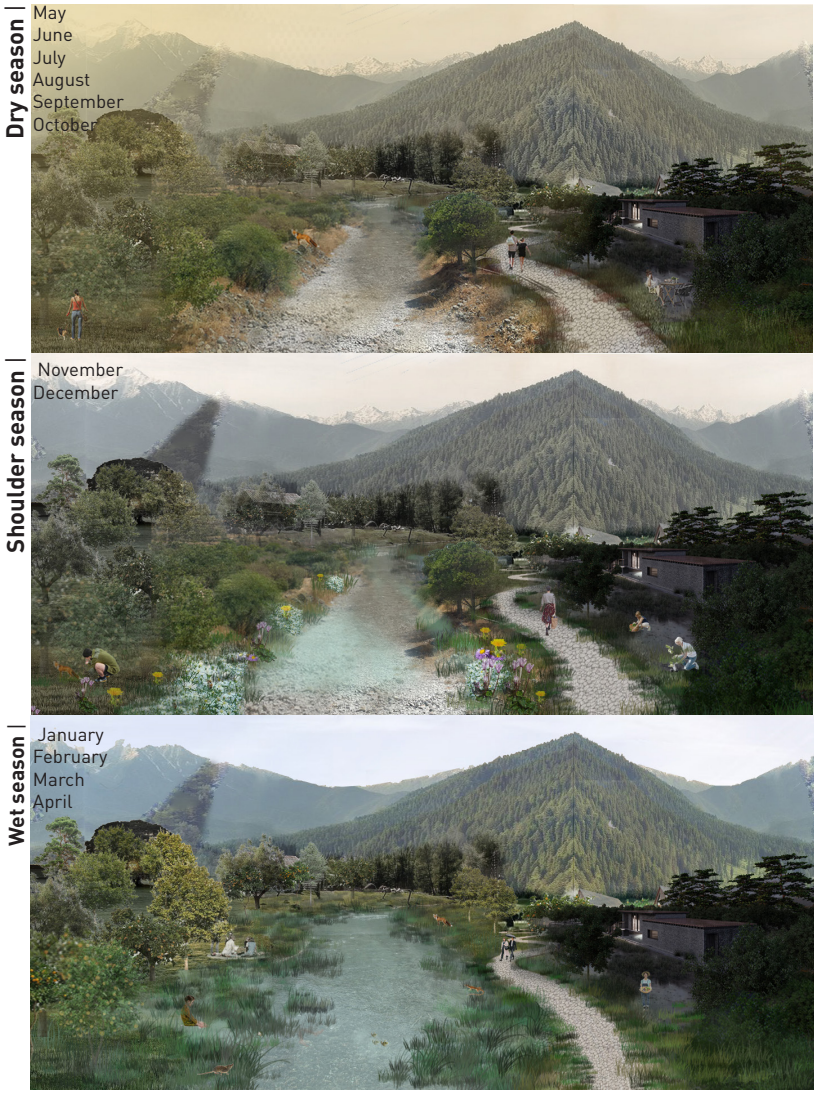
5-10 years

Notwithstanding, (5-10 years) the natural habitat is quite mature and the native species have been restored. Additionally, the authorities decide to make new interventions to attract more and more people to the area. Therefore, indoor and outdoor common spaces are scattered built in the agricultural landscape. They can be rented by the visitors, if they wish to cook their lunch or dinner with local products after gathering them from the experimental gardens. These buildings include the water circularity, by harvesting it as a reference to the past. Otherwise, they can just experience the landscape and be provided with feelings and atmospheres by the environment. Experiences from the past, in terms of water system are also visible, in order to remind visitors the historical background. However, there are some hidden by trees outdoor common spaces, which can be used by people from the same gender. These areas include the communal fountains as a reference to the past. The introvert culture of the past is reflected into these areas. Infiltration ponds are present in this area, close to the building and it consists another outdoor sitting area, where people can observe and sit next to the water.



Common spaces
(Indoor and Outdoor)

Seasonal changes



In order to fully understand my proposal, it is important to examine the atmosphere and scenery throughout the year. The illustrations on the left depict the area during different seasons. The first image portrays the dry season (May to October) when the temperature remains high and the landscape appears completely dry. The yellowish hue represents the island's drought conditions.

The following period (November-December) marks the onset of rainfall and the subsequent enrichment of biodiversity in the landscape. Flora starts to emerge, adding vibrant colors to the area.

The most captivating season is the wet season, which is particularly interesting. During this time, the dam overflows, filling the seasonal river with water. The landscape becomes more appealing and attracts more visitors. People spend their time interacting with the water and participating in various activities.

Experience route

The experience route provides a glimpse into the daytime scenery of the area during the rainy season, specifically in the months of January, February, March, and April. The natural habitat undergoes a captivating transformation, imbuing the surroundings with vibrant colors and a lively atmosphere. People relish their leisurely walks through this enchanting environment, engaging with the water and vegetation along the way. The route encompasses both open and enclosed spaces, which are influenced by the flourishing flora. Additionally, visitors have the opportunity to harvest crops from the nearby experimental garden, conveniently located near a communal indoor space where they can cook and enjoy their freshly picked produce.

05. CONCLUSION

Research conclusion

This research project has aimed to address water scarcity issues in the rural region of Pomos village, in Paphos city, Cyprus, while simultaneously raising awareness about the importance of preserving the natural habitat. By exploring the historical water systems on the island, I gained valuable insights into how local communities coped with water shortages in the past and how those practices can inform contemporary solutions.

The proposed alternative irrigation methods offer a viable approach to combat the dryness of the area, reducing dependence on the dam and promoting sustainable water management practices. Through active engagement and interactions with the environment, visitors are encouraged to participate in the natural processes and develop a deeper appreciation for the significance of water conservation.

The involvement of local farmers in the experimental phase has the potential to create a ripple effect, inspiring other farmers in the area to adopt similar approaches. The support of the local council, both financially and through promotional efforts, further strengthens the project's impact by facilitating economic opportunities for village farmers and enhancing the overall competitiveness of the region.

Moreover, the incorporation of recreational activities provides opportunities for residents and visitors of all ages to engage with water and the environment, fostering a sense of connection and creating a unique attraction for the area. This extension of water presence not only contributes to the revitalization of the region but also has a positive impact on the flora, fauna, soil quality, and overall environmental sustainability.

By working closely with the local community, gaining insights into their culture, traditions, needs, and problems, this research project is aligned with the aspirations and desires of the inhabitants. Learning from the past failures of the local authorities, this project offers a fresh perspective and a comprehensive approach to the revitalization of the area.

In conclusion, the implementation of the proposed strategies has the potential to transform the rural region into a sustainable and thriving environment, attracting residents and visitors alike. The extension of water presence serves as a catalyst for positive change, promoting water conservation, enhancing the natural habitat, and fostering economic growth while preserving the cultural heritage of the local community.

Through the collaborative efforts of the author -landscape architect, local authorities, farmers, and the community at large, we can create a resilient and harmonious relationship between water resources, human activities, and the natural environment. This project offers a valuable blueprint for addressing water scarcity issues in similar contexts, emphasizing the significance of community engagement, sustainable practices, and the preservation of local heritage.

Overall, this graduation thesis contributes to the field of Landscape Architecture by presenting an innovative approach to water management and community engagement, ultimately offering a model for sustainable development in water-scarce regions.

Reflection

- **The relationship between research and design.**

The main goal of the project is to suggest solutions and alternatives to combat the water shortage in the island, and specifically in a rural area of the country. The study site consist an agricultural landscape, where variety of cultivations are growing and they are dependent on the dam, which exists in the upper level of the area. It is highly meaningful to understand how the irrigation system works and how it used to work before the construction of the dam. In this way, we can better understand the water system of the area and based on the historical background, we take decisions that are beneficial for this specific area.
However, the research of the area has been done on site but also after personal discussions with people from the place, which they consist a meaningful contribution for the new intervention.

- **What is the relation between your graduation, your master track, and your master programme (MSc AUBS)?**

This graduation thesis is part of the Circular Water Stories lab of Flowscapes studio, the graduation studio of the MSc Landscape Architecture of TUDelft. The graduation thesis investigates the historical water system of the area and how this has been developed through the years. It also explores spatial, societal and environmental issues. The biography of the landscape is equally crucial, in order to learn from the past but also to be informed about the "previous layers" of the region. Moreover, the graduation thesis related to the Landscape Architecture track, since it is expected to create quality spaces, where the redefinition of the relationships between human-beings and nature will be achieved. The project is expected to generate a multifunctional space, where the users will be provided by several sensations and feelings, while they go through it. Particularly, a seasonal river water corridor- plays a key role to the whole transformation of the area, since the interaction between people and nature and all the activities will take place around the river. Nevertheless, several disciplines will be combined in this project thesis, in order to provide the best result, and benefit not only the society but also the natural habitat. Additionally, there will be common spaces as small scale buildings for the visitors, which they will provide circularity, in terms of water. Lastly, architecture, landscape architecture, water management and ecology are the most important aspects that will be included into this graduation project. As it has been already mentioned, the main aim of this project is to provide a new space, inspired by its historical background and nature, so as to constitute an attraction and an "education" area for human-beings.

- **Elaboration on research method and approach in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the wor.**

As it has been already said, the graduation project is part of the Circular Water Stories lab, which explores traditional water systems around the world. My project takes place in Cyprus Island, therefore my assignment was to explore and investigate the biography of the local system. Countless unexpected aspects have been explores through this journey that I haven't imagined they exist. Nevertheless, the research of the local water system and how this used to work was a beneficial knowledge for my assignment, since it provided me with new insights about my country but also inspiration about the design. One of the goals of my project is the raise of awareness about the environmental field, but also to remind people their roots and their historical background through the new intervention. It is worth-men

tioning that the history of each place consists its identity.

- **What is the relevance of your graduation work in the larger social, professional and scientific framework?**

Social contribution:
As aforementioned, the graduation projects intends to raise the people's awareness about the natural habitat and water and their value in our life but also to propose alternative ways of extending the water stay in the area. It proposes to make quality spaces, where the people could interact with the nature and water as well. They will become part of it, in order to better understand their importance in our life, and they will learn to respect it and raise their awareness. It aims to provide inclusive green spaces with local flora and fauna species, where the water element will be visible in different ways. The new intervention will also benefit the agricultural as well as the environmental aspect, since it proposes to take advantage of the limited wet season of the island.

Professional and scientific framework:
This graduation projects deals with a seasonal river in a county with small amount of precipitation, where the scenery is almost abandoned especially during the dry season. The flora and fauna is completely disappeared during this period. The challenge is to modify this area into a lively one in both, wet and dry season. Likewise, to raise the people's awareness and consciousness about the environment, since they tend to be completely estranged from the rural landscape. This strategy could also be applied in several regions of the island, since this case is not unique. Countless downstream of the island suffer from the drought, and people have abandon them, especially during the dry season. This approach and design intervention will combine different disciplines, in order to achieve its aims. It will reveal how different sciences can interact with others and generate a quality space. Additionally, the project will contribute to the dealing with drought areas in a rural landscapes as well as how the people could be part of it and learn to take care of it.

- **Ethical issues and dilemmas I might encountered :**

To begin with, the thesis journey can be represented as a hilly landscape, with ups and downs. The ups consist of the periods that everything is going as you wish, but the downs are the times that the difficulties are around the corner. From my personal experience, the most difficult part of my thesis was to find and collect materials, since such a tiny island like Cyprus, it was not easy for me to find not only information but also maps and data.

Additionally, as a local and resident of this country (Cyprus) I perceive that some of my suggestions within my graduation project are one step too far from the locals. The locals, especially the ones grown in rural areas could not be characterized as open-minded and willing to accept something completely different to the one that are familiar to. On the other hand, there are people in this island that want to improve the conditions and also to contribute to the implementation of new infrastructure in the island. Some of the dilemmas were how the landowners would accept interventions in their land pieces and why to invest to this proposal. From my point of view, If the new proposal could benefits themselves but also bring them profit, it would be acceptable and can be realized in the long-run. Furthermore, the new intervention aims to change the mentality and raise the awareness of people about the environmental aspect. It is well-known that this goal is something that will take time to be realized. However, I am quite optimistic that once the people from early age are taught about the importance of the natural habitat in our life, they will respect and realize in what extend the granted aspect, such as the environment consists an inevitable part of our life.

Relevance:

Social Relevance :

The graduation projects aims to raise the people's awareness about the natural habitat and water, especially for their value in our life. It proposes to make quality spaces, where the people could interact with the nature and water as well. They will become part of it, in order to better understand their importance in our life, and they will learn to respect it and raise their awareness. Likewise, elements from the traditional water system of the area will be included, in order to remind the people the area's background and roots.It aims to provide inclusive green spaces with local flora and fauna species, where the water element will be visible in different ways. Additionally, it will consist an area where the human-beings will interact with the natural habitat as well as will obtain new knowledge through their experience. Furthermore, the educational and touristic infrastructure will provide new opportunities for the locals and for the tourists. New stimulus will be given after the village development. This project could be an inspiration proposal for other rural areas of the island, in order to give a second life to these regions. To sum up, an attemption to solve social and environmental issues of the area is proposed, in order to redefine the relationship between people and nature.

Academic Relevance :

This graduation projects deals with a seasonal river in a county with small amount of precipitation, where the scenery is almost abandoned especially during the dry season. The flora and fauna is completely disappeared during this period. The challenge is to modify this area into a lively one in both, wet and dry season. Likewise, to raise the people's awareness and consciousness about the environment, since they tend to be completely estranged from the rural landscape. This strategy could also be applied in several regions of the island, since this case is not unique. Countless downstream of the island suffer from the drought, and people have abandon them, especially during the dry season. This approach and design intervention will combine different disciplines, in order to achieve its aims. It will reveal how different sciences can interact with others and generate a quality space. Additionally, the project will contribute to the dealing with drought areas in a rural landscapes as well as how the people could be part of it and learn to take care of it.

Appendix 1:
Water Systems

The Mediterranean island of Cyprus had always to deal with the droughts and water shortages since the first settlement of the civilization. The inhabitants were forced to find proper ways to face efficiently the water scarcity, in order to ensure the water supply for irrigation and domestic purposes.

There is a myth about St.Helen and Cyprus island, where she assisted the serious issues that water scarcity caused. Specifically, while St.Helen was heading back to Constantinople after she found the True Cross in Jerusalem during the 4th century,she passed by Cyprus to build a monastery and she found the horrible living conditions of people due to the drought. This fact forced the Cypriots to abandon the island and the ones that remained had serious issues. Not only they suffered from hunger, but also they were struggling with the venomous snakes that flooded the island. St.Helen decided to bring cats to the island from Palestine and Egypt, in order to fight the snakes. Additionally, St.Helen prayed for rainfall and then the heavens opened, and a storm flooded the thirsty island. A rainbow appeared for the first time in the sky, - 'belt of St.Helen- as it is called by Cypriots.

Neolithic Age (8500-3900BC) :
There are no evidences about the first settlements in the island, but the oldest attestation about the human life in the island is an achaelogical remains in Akrotiri, Limassol, which dates back to 8500BC.

Choirokoitia and Kalavassos settlements during the Neolithic age consist another example of the first settlements in the island during the 7000BC. People were working with fishing, agriculture, animal breeding and hunting. They used to live in well-organized communities in the north and south coasts of the island, in order to ensure the water supply. Other settlements were located close to streams, rivers and springs, where the water was accessible. Once the river or the spring would dry out and there is no surface water, they used to dig wells, in order to find underground water. An example of this period's well is the one in Kissonerga, which dates 10.000 years ago.

Chalcolithic Age (3900-2500BC):
Most Chalcolithic settlements were located in the western Cyprus, where fertility cult had been developed. During this period, copper was discovered and trade with Egypt and Crete was flourished. As regards the water supply domain, there are no main differences compared to the previous age.

Bronze Age (2500-1050BC):
The island is famous for its copper resources, which provided wealth to its inhabitants during the Bronze Age. Relationships between Cyprus and Near East, Egypt and Aegean were developed due to the bronze. Mycenaeans (Greeks) reached the island as merchants after 1400BC. More and more Greeks reached the island and they spred the greek language, religion and customs as well. They took control of the Cyprus and they founded the first city-kingdoms of the island- Paphos, Salamis,

Remains of the old settlement in Kalavasos village on the top of the hill. There is a stone wall as a defence one surrounded the settlement. The structures were either curvilinear or circular with domed or flat roofs. The varying size of the excavated structures suggests that they were dwellings, storages, or outbuildings. (Big Cyprus, 2021, "

Well in Kissonerga,Paphos, (A,A. K,L. K,D. M,N. (2012)

Kition and Kourion. The demand for water was raised due to the settlements expansion. Water conduits cut in the rock were developed,in order to convey large quantities of water from the springs to the settlements. Channelled stone conduits were constructed for the water distribution into the settlements. People used rock-cut and ceramic baths regard to the excavations in Amathus and Palepaphos. Additionally, there were settlements on high fortified places, because of the fear of raids. In these settlements, stone conveyors were used for storage and collaction of the water. Specifically, these settlements were established close to wells, springs and river, where they could deliver the water. Some settlements were really densely populated and had serious problem of water lack so, there was an organised network of collection of rainwater from each house. The water was collected in earthen conveyors and was kept in cisterns in the yard of each house.

Geometric period (1050-750BC) :

Cyprus became a greek island with 10 cities. The cult of goddess Aphrodite was flourished in Cyprus,where is considered her birthplace. The amount of water through the conduits to meet the inhabitant's needs during this period. There are no main differences as regards the water supply, compared to the last period.

Archaic and Classical period (750-325BC) :

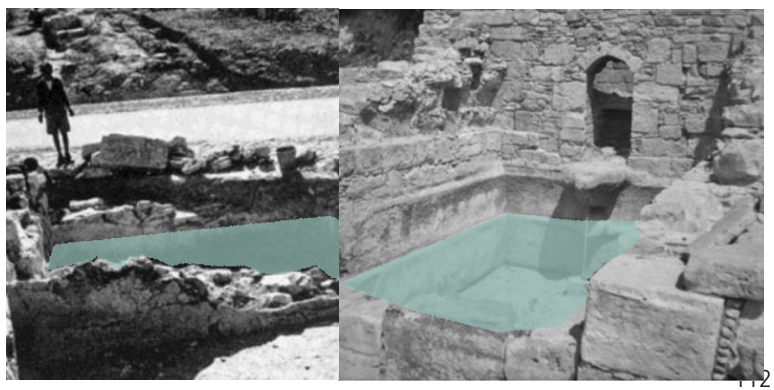
Several conquerors dominated the island, such as Assyrians, Egyptians and Persians. In the end, Cyprus became part of the empire of Alexander the Great, king of Macedonia. The prosperity continued to the island and the water supply was extended. Specifically, water carriers provided

water supply to the ones that did not have acces, such as the ones that were living out of the settlements. Big containers full of water were carried, in order to be sold by horses and cattles. All the springs had goddesses associated with them, the Water Nymps called "Anerades". A cult area called Nymphaeum of Amathus was discovered under the ancient city of Amathus. Lamps and coins were also discovered and the whole assemblage of objects
indicated that the cult place was used in the Classical and Hellenistic periods.

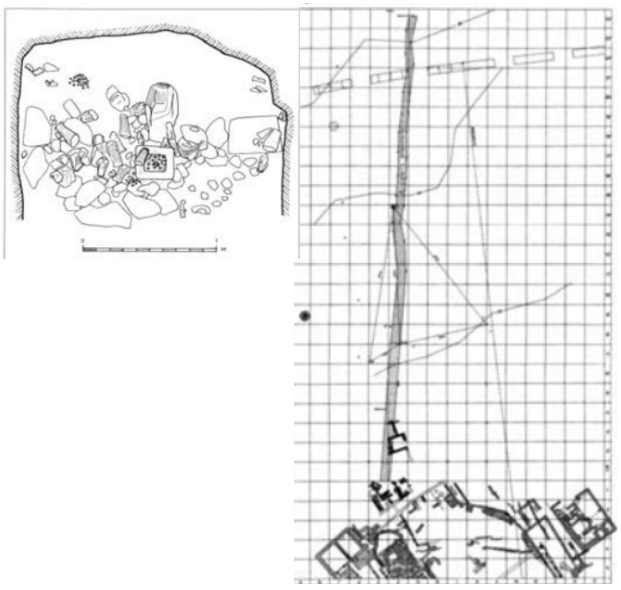
Underground areas, where divities were worshipped are quite rare in Cyprus. Usually, this kind of places are located over t he ground. Any place or structure undergound in the Greek world were natural cave, with a spring and running water, where the Nymphs were worshipped. Only two structures of this kind underground cult places have been discovered, the Nymphaeum of Kafizin (Nicosia) and the one under the ancient city of Amathus (Limassol).

Hellenistic period (325-58BC) :
Cyprus became part of the Greek Alexandrine world , under the Hellenistic state of Ptolemies of Egypt. The city-kingdoms were abolished and Cyprus was unified. Paphos became the capital of the island. Limited testimonies have been discovered about the water supply this period due to the destructive earthquakes that hit the island.

Roman period (58BC-330AD) :
Cyprus was dominated by the Roman empire in 58BC, when they rebuilt the cities. Romans used the materials from the ruined structures and they built their own constructions, in order to cover their needs. The archaelogical remains of Kourion, Paphos, Salamis etc. threw light to the changes of this period. For many kilometres around these areas are to be found roads and water conduits cut in the rock, or constructed of channelled stone blocks or terracotta pipes for the water distribution. Masonry or rock-cut cisterns and chains-of-wells connected by tunnels have been also found. Especially, cities that did not have springs or rivers nearby, they constructed chain-of wells for drinking and irrigation purposes. However, the sources of water supply were mostly springs, which sometimes were located far away from the city.
For instance, Kurion ensured the water supply through Ypsimasikarka and Souni spring. The water gravitated into a group of large cisterns and fountain houses through the pipelines and aqueducts. In each ancient city there were conduits serving a number of fountains, several buildings, the baths and the stadium. Another example is, Kythrea spring was supplying the inhabitants of Salamis city with water through an aqueduct. The water storage and distribution were mostly underground.



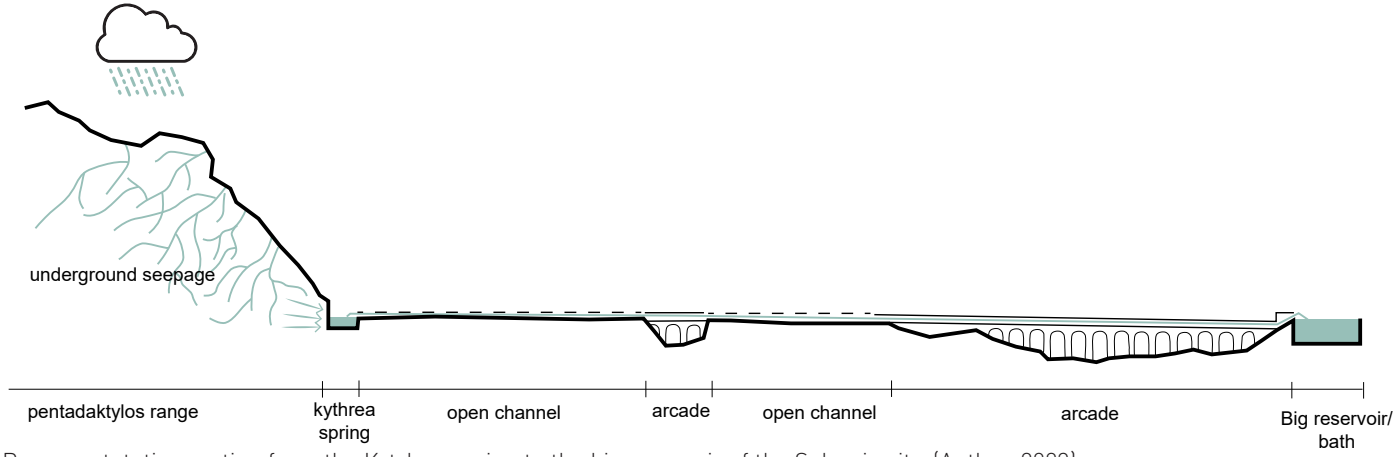
Roman cisterns in Kourion and Amathus city. (Youtube, 2021)



The Underground Nymphaeum of Amathus, Ancient Tunnel: (a) Plan, (b) Longitudinal Section.
European Environment Agency, 2010

Remains of the old aqueduct from Kythrea spring to the ancient city of Salamis.
Roman Aqueducts, 2021)

Stone channel of water between the main and the smaller reservoir in Salamis town.
Roman Aqueducts, 2021)



Representatative section from the Kytrhea spring to the big reservoir of the Salamis city. (Author, 2023)

Byzantine period (330-1191AD) :

Roman Empire was divided during this period, and Cyprus became part of the Eastern Roman Empire, known as Byzantium, with capital Constantinople.

The inhabitants of Cyprus became poor and a new way of life started. Several attacks reached the island from the sea, and the inhabitants were forced to move into the areas that are not visible from the sea. The water supply was realized through springs in the mountains and shallow wells in the lowland. People used to transfer the water from the wells and springs through terracota pots or wineskins (storage containers made out of animal skin). Animals were used to lift the water from the wells by the Persian Wheel. Some households had wells in their yards and the water was drawn by hand.

Hand pumping; this is a water-lifting device that can be operated manually to withdraw water. (Ministry of Agriculture, Rural Development and Environment, 2018)

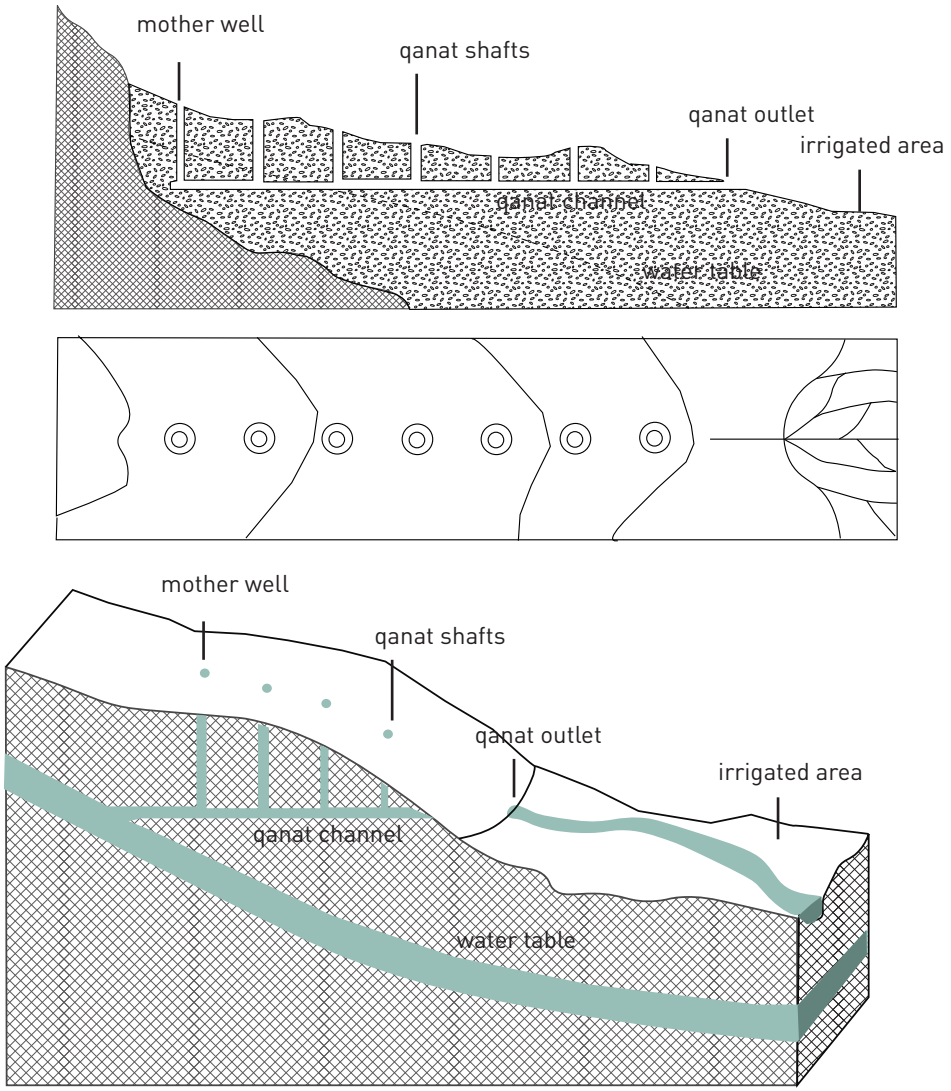
Mechanical system driven by cow or donkey to deliver groundwater from shallow wells. (Ministry of Agriculture, Rural Development and Environment, 2018)

Frankish (Lusignan) period (1191–1489 AD) and Venetian period (1489–1571 AD) :

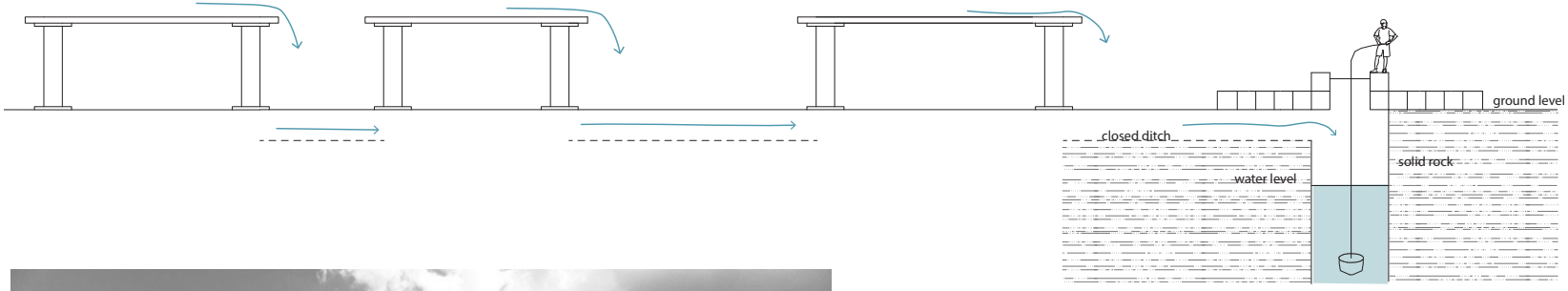
During this period, the conquerors contribute for the development of productive land and large farms. The agriculture was developed, due to the use of aqueducts for irrigation purposes. The domestic water supply remained the same.

Ottoman period (1571-1878AD):

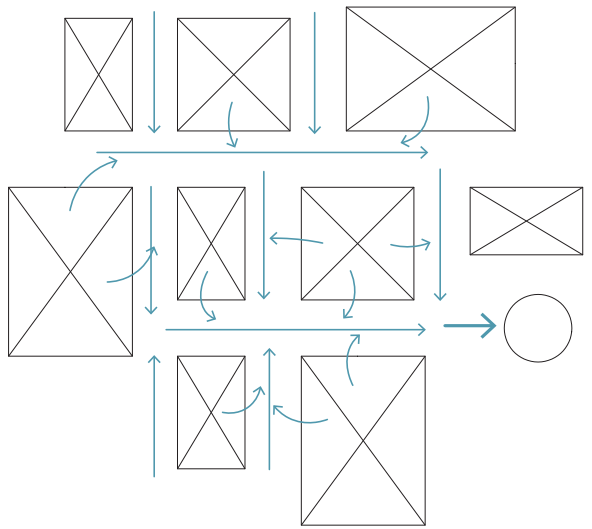
Once the Turks came to the island, they found organised towns and productive land. The constructed countless chain-of-wells (Qanats), which was the main source of water during this period. Two famous chain-of-wells were : the Arab Ahmed chain-of-wells (4 km in length), which was used for the Nicosia water supply, and the Abu Bekir chain-of-wells (3.2 km in length), which was used for Lar naca water supply. Their names are taken from their constructer "Pasha"-Ottoman ruler. The chain-of-wells usually have 25-30m depth and 5km lenght. The chain-of-wells were used for irrigation and drinking purposes. The connecting tunnels between the wells were as big as it is necessary for the individuals to crawl. A channel is thus formed which conveys the water to a reservoir constructed at the foot of the last well, and it is thence raised to the surface by a water-wheel; or in some cases the level of the ground admits of the channel being brought out on the surface. A Qanat is a fairly simple way to bring groundwater from one place to another. Initially appeared in Iran centuries ago, but soon expanded to a various countries more noticeably in Middle East and the North Africa where it is known by a number of names; kanat, khanat, kunut, kona, konait, ghanat, and ghundat. They are still very much in use today.



Representation of Section, Plan and 3D-Section of chain-of-well. (Author, 2023)



Cistern in the ancient city of Salamis.(Freepik, 2021)



Network of run-off stored in the cistern. (Section & Plan)
(Author, 2023)

British period (1878-1960AD) :

British had as the main purpose to solve the problem of city water supply. Little consideration about the village water supply was given in the first years of the British occupation (1878-1930).

The new conquerors started repairing the old chain-of-wells, aqueducts, small irrigation works and water distribution systems of domestic water. The dominant water sources for the island towns (Limassol, Nicosia, Larnaca, Famagusta, Paphos, Kyrenia) during this period for domestic water supply was chain of wells, springs and boreholes.

Additionally, aqueducts were used for water supply for Nicosia city by 1933, then they were replaced by pipes. Even, another water sources for Nicosia city included the Arab Ahmed and Siliktar chains-of-wells. Later, after 1935 new sources, such as wells and boreholes out of the city contributed to the water supply of Nicosia.

Nevertheless, Famagusta obtained the water supply,through Panayia spring and old well for Varosia area and the old city respectively. An aqueduct was the main way for the water transportation from Panayia source to the Varosia area, with 16km length. The half amount of water from the spring was lost because of the evaporation, infiltration, leakages and illegal consumption before it reached the town during the dry season. It was costly to replace the aqueduct with pipes, so the municipality of the town decided to drill two boreholes close to the city.

Moreover, Ayia Eirini spring as well as Kitromili, Chiflikoudkia chain-of-wells were the main sources of Limassol water supply. The water was distributed to the city reservoir through terracotta pipelines.

Likewise, an old chain-of-well was the main water source for Larnaca city, which was constructed by Abu Bekir Pasha in 1745, during the Ottoman period. The water reached in Larnaca through aqueducts, which were replaced by pipes during 1941.

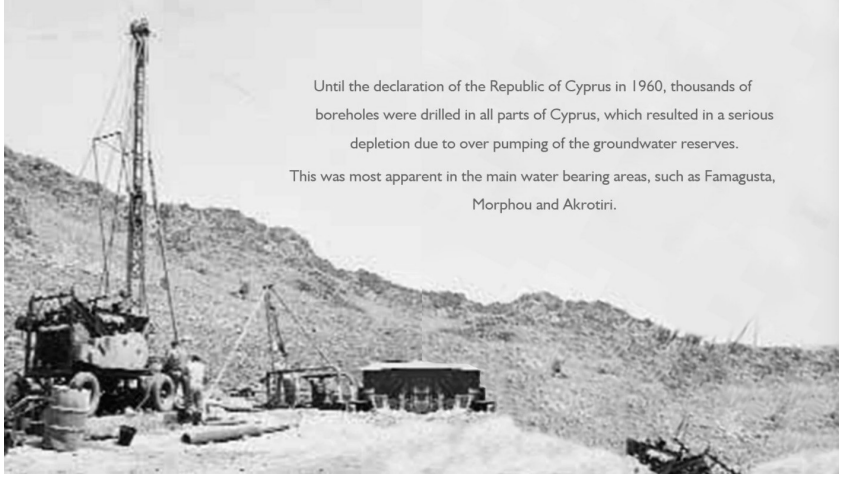
As regards Paphos town, two springs, Kourkas and Kalamos as well as Mesoyi chain-of-well provided the water supply, through pipelines.

Kyrenia had three chain-of-wells for the water supply, which were contaminated, due to the building close to them. They replaced by drilled boreholes in 1940 and 1945.
(A,A. K,L. K,D. M,N, (2012)

Furthermore, several engineers and geologists visited Cyprus, in order to find alternatives and solutions to the water shortage of the island. They suggested to obtain water water through drilling boreholles in Mesaoria plain, which is concerned a beneficial artesian watershed. This proposal was interrupted, due to the high cost and lack of technical means. Some more proposals of British engineers took place in different areas in Cyprus, but they did not turn out efficient. Then, in 1921 another scheme was suggested for drilling boreholess on a private basis, by offering loans to the farmers. During the 1940-1950 the responsible Department about the water management of the island carried out small scale irrigation projects in different districts throughout the island. This strategy includes the use of surface water, small diversion dams, small water reservoirs

and distribution channels, mainly made of concrete. By the end of the British occupation, severe problems were caused in the whole island due to the vast amount of drilled boreholes. This fact led to prostretion, because of the overpumping of the groundwater reserves. (WWD-TAY , 2003)

As regard the water supply in the villages, more attention about the water supply was given during the 1950-1960. The inhabitants were ensuring the water supply through contaminated wells in the village square. There were cases that the water source was a shallow well or a spring far away from the village. In this case, the people were carrying the water in terracota jars, through donkeys. Other water resources were chain-of-wells and aqueducts. Later, the water was distributed to the several villages from the springs, through pipelines in the **public fountains** in central spots in the village.



Drilling boreholes. (Activate Zone, 2021)

Chain-of-well during the 19th century.
(A,A. K,L. K,D. M,N. 2012)

1.1 Public Fountain in the villages:
During the British occupation

A fountain is a combined public standpipe, trough and drainage soak-pit. These taps, were located on the streets of a village every 150-200 m, depending on the number of residents of each neighbourhood. With these new water supply schemes, for which the source of water supply was outside the village, and with galvanised iron pipes, the water flowed into the fountain house or street fountains. This scheme consists a vast change in the life of the village's inhabitants. Especially, they obtained clear, safe water and public health was improved. Between 1940 and 1945, out of a total of 647 villages, only 100 had a satisfactory water supply.

Generally speaking, some villages had springs, but not very close to the centre of the village during the beginning of 20th century. They used to provide their households with water, by filling water the jugs from the non-local spring and carrying them with a donkey to their house. It was their daily routine for their water supply.

However, during the British occupation the villager's water supply scheme were essential, as the need for water had been increased and drastical actions had to be taken. In early 50's, especially in 1948-1959 three notewrothy village's water supply scheme had been realized. One of this scheme includes the Appidhes source, which provided freshwater to many villages.

Communal tap in a central point of Chloraka village,Paphos.
(Author, 2023)

Public fountain as a meeting point for the housewives.
(Ministry of Agriculture, Rural Development and Environment, 2018)

A village water supply scheme would include the development and protection of a source, the laying of a main pipe line to the village, and the installation of a piped distribution system such as storage tanks and public street fountains in the village. The water of this source could be used for domestic or irrigation purposes.

Moreover, It could provide water in countless villages, and not only in one. The water would be storaged in tanks and then would be distributed to the village's taps. The storage tanks were circular and made of concrete and sometimes was elevated for more pressure.

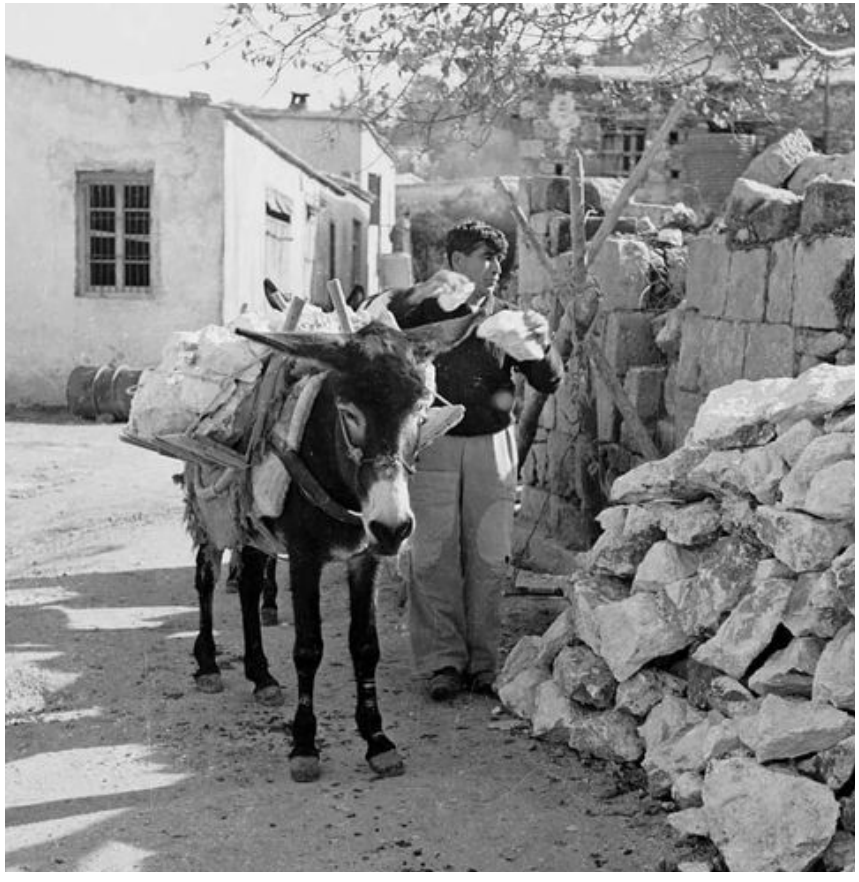
Furthermore, cypriot artists have been influenced and inspired by the process of supplying water in the household through the public taps and they wrote poems and songs talking about this. Additionally, a traditional dance had been generated about the the water supplying from the fountain to the household, where the women used to weat their traditional costume.

For instance, a traditional song, which is written in the cypriot dialect is presented below:

Στείλε με μάνα μάνα στο νερό
Send me, mother, oh mother to (bring some) water

να σου το φέρω δροσερό
to bring you fresh water

τζι᾽ αν δε στο φέρω φέρω καθαρό
And if I will not bring, bring you clean water



Donkey was the main mean of water transportation from the water source to the household. (Europeana, 2021)

την νιότη μου να μεν χαρώ.
may I not enjoy my youth.

[...]
Στη βρύση μάνα μάνα μου έφτασα
After I got, mother, oh mother to the fountain

τζαι το σταμνί μου γέμωσα
and after I filled up my jug

τζι άξαφνα παραπάτησα
Suddenly I misstepped

τζαι το σταμνί μου τσάκισα.
and I broke my jug.
[...]

1.1.1. Appidhes spring.

Appidhes source is located close to the Paphos forest and the scheme for villages water supply was commenced in August, 1952. The first ten villages that would participate in the first phase were : Pano Panayia, Asproyia, Phalia, Lemona, Amargeti, Ayia Marina, Simoy Stroumbi, Tsada and Kili. 7 more villages have applied for inclusion during the secod phase : Drousha, Ina, Pano arhodes, Dhrymou, Eledhiou, Pendalia and Kannaviou.

This village water scheme was consisted of 99 miles pipes, 27 storage tanks and 185 street fountains. It is the largest village water supply scheme in its kind in Cyprus.

Each village used to have at least one street communal fountain in the main square, where consisted the meeting point of the village women, who were struggling with the water, in order to ensure that their house will be provided with enough water. Specifically, they used to wake up from early morning to collect the water from the "meeting point", where they meet the other housewives and would discuss about what was going on. They were responsible to bring the water to their household, through a circular clay jar-known as "stamna" in greek. Long queus would form around the communal fountains, since it was the only source of water.

Nevertheless, this water system had some issues. One of the main complication of the system, was the transport of pipes in the mountains. Another problem was caused by a high ridge running across the direct route of the main pipeline from the spring to Panayia, where they built a long tunnel through hard igneous rock, in order to shorten the pipeline.

Details :

1.1.1a.Traditional Cypriot Jug :

As it has already been mentioned, housewives used to bring the water from the public tap to their houses, through a traditional cypriot jug. The jug was made of clay and the main use of it was to transport the water. Its shape was especially designed to serve the transport purposes. The clay was well-known that it has the ability to keep the water cold.

As regard the shape of the jug, the bottom part was designed as a big spherical in order to store and keep cold the water. The upper part (neck) was taller and thinner than the bottom one, in order to prevent the spilling of water out. This had a handle that connects the bottm part to the middle of the neck. Additionally,

Big clay jar for water storage located in each household.(Author, 2023)

the upper part was designed, in order to be convenient for the housewives to hold and carry it on their shoulder. There were many sizes of this traditional jugs.

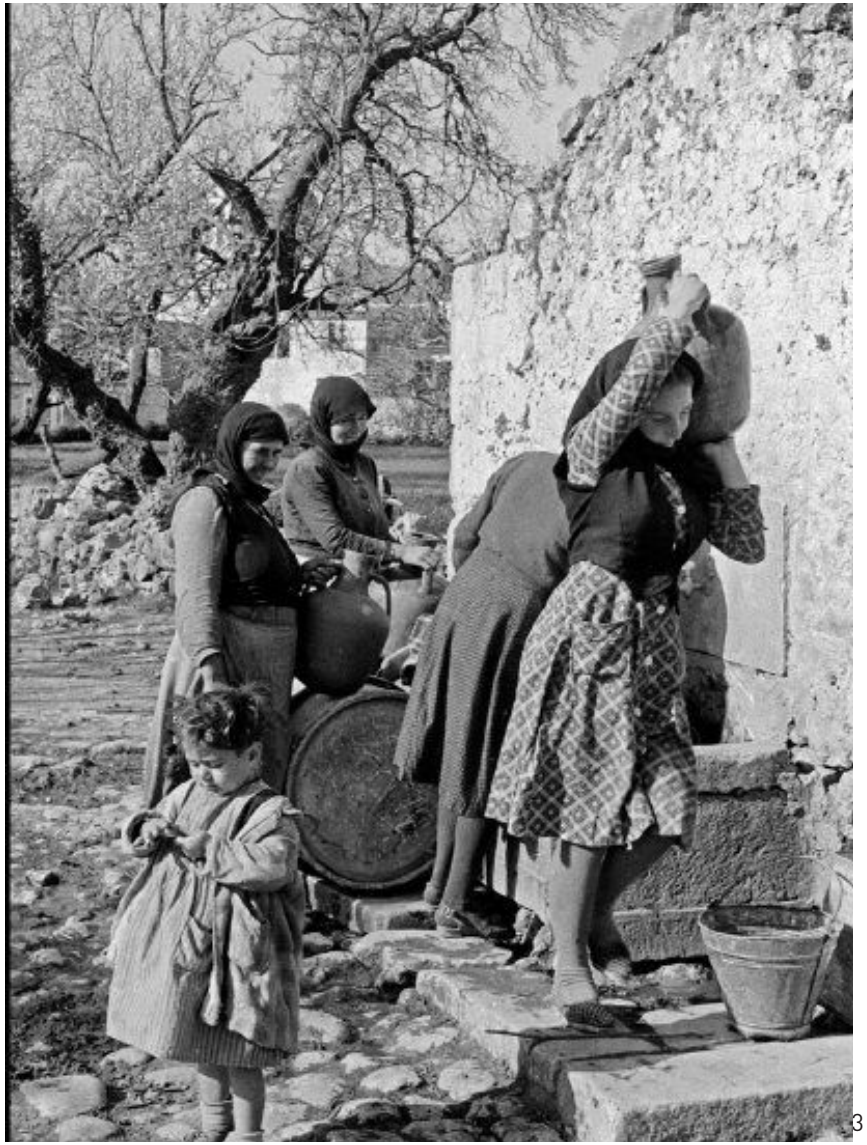
Nevertheless, after bringing the water home, they used to store it into big clay jars, known as pitharia in greek. In this way, they save as much water as possible and the big jar kept the water cold.

Nowadays, a lot of people keep the big and small jars to their houses for decoration purposes, in order to keep the memory of this history alive.

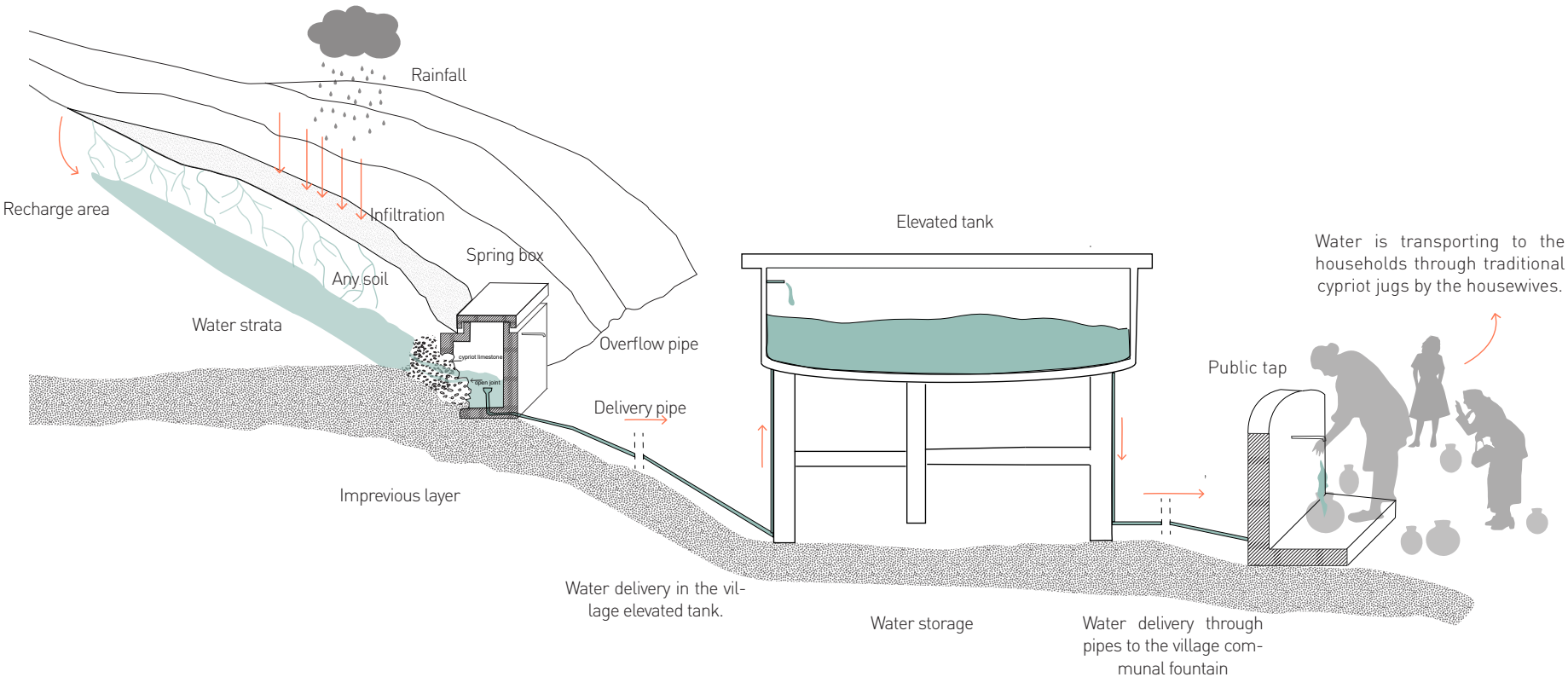
1.1.1b.Public fountain shape :

Each village had at least one fountain in the main square of the village for the water supply. Most of the fountains were made of cypriot stone (limestone) and the upper part, where the tap is located, had arch shape.

People used to build arched hallways, doors, opening and archway in their households. This feature express the wealthy of some people, because it cost more money to form the arch. Villages used to say that if the arch was used, they call the house "palace". However, people applied the arch shape on the fountains as well. It consists an artistic approach.



Housewives are filling their jugs in the communal fountain.



Section for the communal fountain system during the British occupation. (Author, 2023)

Republic of Cyprus (1960AD-now) :

Cyprus obtained its independence in 1960 and emphasis was given in the improvement of water provision and development. Since 1967 the whole island, both towns and villages have been ensured with piped water supply. Several sources provide drinking water to the villages and towns, which is stored in reservoirs and storaged tanks, and from there the water is conveyed to the households through a distribution network with pipes made of asbestos cement pipes, unplasticised poly-vinyl-chlorides pipes and galvanised iron pipes. The reservoirs or storage tanks are made of reinforced concrete. The water consumption is recorded by a water meter, which exists in each household. At the end of each water consumption period, which is usually two or three months, a water bill is sent to each consumer by the water board, municipality, improvement board or village water committee, which is responsible for the collection of money.

Water is mainly used for agricultural and domestic purposes. Indrustrial and other use of water is narrow. Urban areas were mainly supplied with groundwater by 1974. This fact led to the depletion of the grounwater and drastical actions had to be taken. From 1960 the use of stored water in the dams have been increased for urban water supply. Sea-water desalination and wastewater plant were appeared to cover the increasignly population demands. Nowadays, almost the whole population of the island is supplied by piped house-to-house water supply systems.
(A,A. K,L. K,D. M,N. 2012)

Kouris Dam in Limassol town, (115mcm storage capacity) (My Guide Cyprus, 2021)

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