



FLOOD THE DROUGHT SEASON

—Treatment of the desertification caused by the imbalance of water supply and demand



Country / City	China/Harbin
University / School	Harbin Institute of Technology
Academic year	2019-2020
Title of the project	Flood the drought season--Treatment of the desertification caused by the imbalance of water supply and demand
Authors	Cai Meng,Zhong Yunhao

TECHNICAL DOSSIER

Title of the project	Flood the drought season--Treatment of the desertification caused by the imbalance of water supply and demand	
Authors	Cai Meng,Zhong Yunhao	
Title of the course	Research Design Studio	
Academic year	2019-2020	
Teaching Staff	Zhuxun,Zhao wei	
Department/Section/Program of belonging	Landscape Architecture	
University/School	Harbin Institute of Technology	



Written statement, short description of the project in English, no more than 250 words

The study area is located in the Yulongkashi River Basin in Hotan region of China. The lower reaches of Yulongkashi River crosses the Taklimakan Desert, which is the guarantee of desert ecosystem. However, a large amount of water consumption in oasis city leads to the decrease of river water quantity. In dry season, the water supply of downstream river is less than the demand, which eventually leads to desertification. We hope to form a water storage structure symbiotic with nature on the flood plain. We use the existing urban dams to store the river water in the wet season and the stored water for the oasis city in the dry season to change the current unsustainable strategy. The system consists of three parts: the water storage module on the floodplain, the water distribution network in the city and the sustainable ecological service. Through the study of river water dynamics, we build a water storage system between the flood plain and the city, transforming the isolated flood plain into a compound system of storing water, alleviating the contradiction of water use, supplementing water resources, and serving various industries in the dry season. A comprehensive water regulation system is established and the oasis city can maintain the balance of its own supply and downstream water delivery. Through these strategies, the future city will form a sustainable water use and circulation, and the ecological value of this oasis area will gradually increase, injecting new vitality into the city, oasis and desert.

For further information

Máster d'Arquitectura del Paisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842

Contact via email at: biennial.paisatge@upc.edu

Máster d'Arquitectura del Paisatge -DUOT - UPC

ETSAB- Escola Tècnica Superior

d'Arquitectura de Barcelona

Avenida Diagonal, 649 piso 5

08028 Barcelona-Spain



CLIMATE CHANGE AGAIN

11th International Biennial Landscape Barcelona

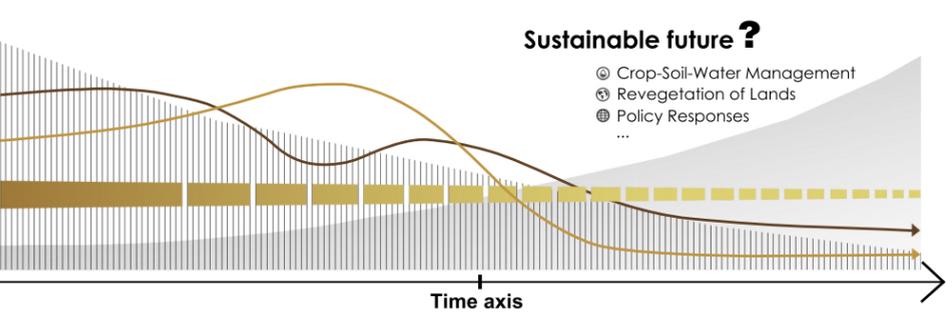
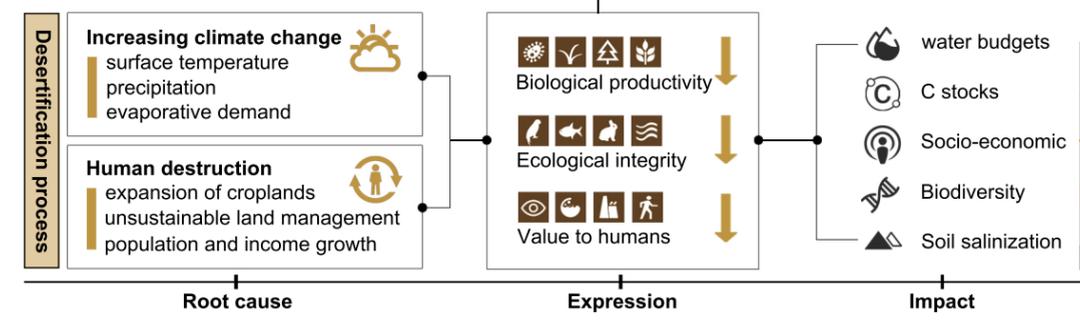
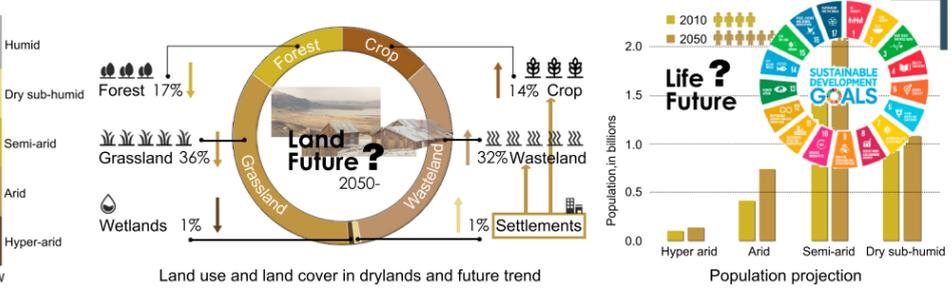
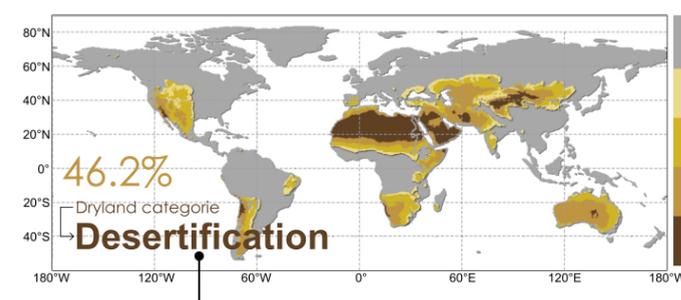
Barcelona September 2020

SCHOOL PRIZE



PROBLEM POSING

Desertification is land degradation in arid, semi-arid, and dry sub-humid areas, collectively known as drylands, resulting from many factors, including human activities and climatic variations. The range and intensity of desertification have increased in some dryland areas over the past several decades.

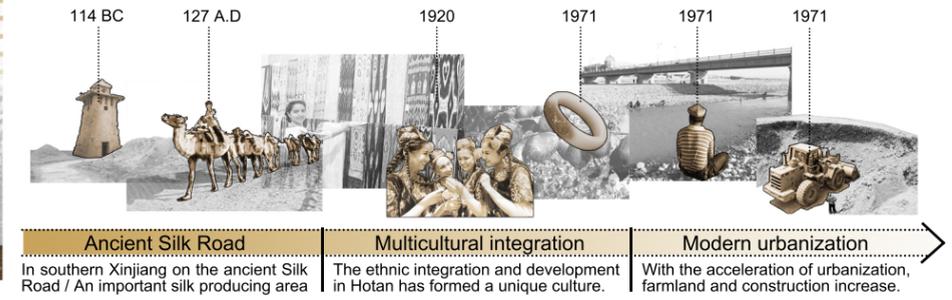


LOCATION

The site is located in Hotan, at the edge of Taklimakan Desert, it is the upstream section of Hotan River, the life line of desert. The water resources are abundant in rainy season and deficient in dry season.



HISTORY



PROBLEM AND STRATEGY

Unsustainable water use

The runoff increases year by year, but the time distribution of water volume is seriously uneven.

The water volume is insufficient in the dry season, exceeds the demand in the wet season, and the supply and demand are unbalanced.

PHASE 1 FLOODPLAIN WATER STORAGE

Add water storage module on the flood plain by using the current urban embankment, and carry out primary water storage and inward transmission in the wet season.

Unbalanced human and nature

Population growth leads to the continuous expansion of water demand of oasis city and surrounding farmland.

With the expansion of cities and the increase of industries, the traditional way of water use leads to the increasingly poor adaptability of human and nature.

PHASE 2 HYDROPHILIC INTERACTIVE ENVIRONMENT

The footpath can adapt to the change of water volume, provide dynamic hydrophilic experience, integrate local cultural characteristics and adapt to the surrounding areas.

Invaded natural environment

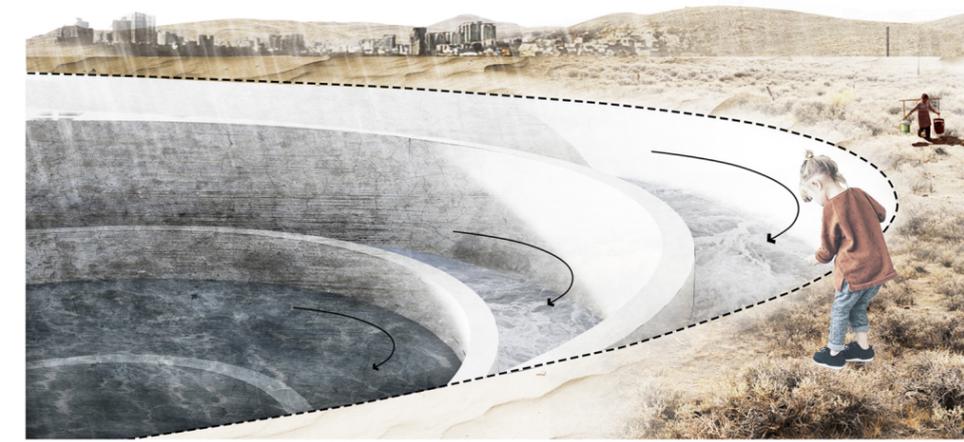
A large amount of water from rivers in cities destroys the ecology of oases and deserts in the dry season.

The lack of water resources and the destruction of habitat lead to the decrease of native species habitat. Oasis is destroyed and desertification is intensified.

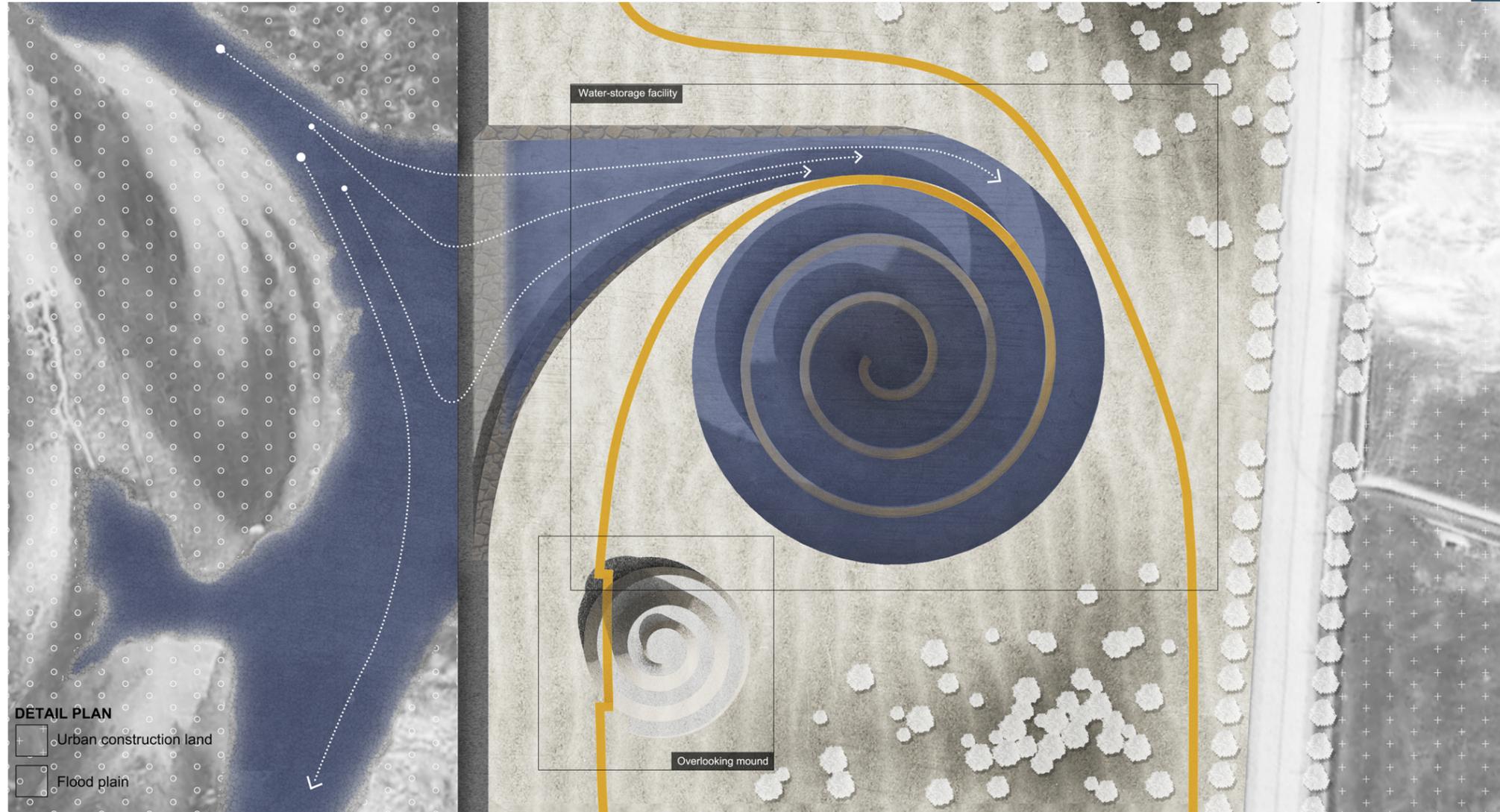
PHASE 3 HABITAT FOR NATIVE SPECIES

The structure provides a variety of living environment for the typical local species such as insects, reptiles and amphibians to provide a suitable foothold and food source.

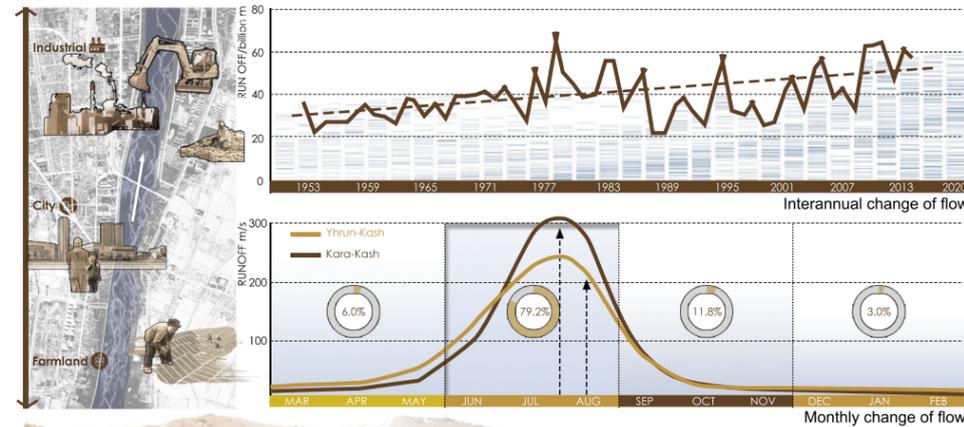
WATER CHANNEL



INTERIOR SIDEWALK



WATER FLUCTUATION



STRATEGY AND EFFECTIVENESS

Waiting period

The total volume of water collected during the flood season. (Full capacity)

4078094m³

Waiting period

The water collected will be maintained until the drought season.

Supply through certain method

Nov-Feb

Mar-May

- Living water use: 577902m³
- Industrial water use: 1256179m³
- Agricultural water use: 2244013m³

Proportion of each part

- Living water use: 14.2%
- Industrial water use: 30.8%
- Agricultural water use: 55.0%

Waiting period

Diving experience

Migratory bird

Desert plant scenery

Tourism planning

After the tourism planning, all local tourist resources will be explored including desert plant, animals and terrain.

- +1 Possible 4A / 5A scenic spot
- Currently, there is only one 4A and two 3A scenic spot in Hetian.
- +500000 tourist person-time
- Currently, the total tourist person-time has reached 1400000.

Living water use

Water supply and drainage network

Usage

577902m³

100% Living water use

This part of water can provide for all living water use during drought season.

5720000 m³ Reduction of water pumped

In this way, there will not be any water pumped for living during drought season.

Industrial water use

Water-consuming industry

Local industry including clothing and textile factory, mining and etc.

1256179m³

26.1% Industrial water use

This part of water can provide for 26.1% amount of industrial water use.

2219800 m³ Reduction of water pumped

With circulation treatment, water pumped from river can reduce 2219800m³.

Agricultural water use

Monitoring Stations

Sprayer

Can save 40% of water than irrigation

Drop irrigation

Can save almost 70% of water than irrigation.

2244013m³

167 hm² Irrigation area

This part of water can irrigate 167hm² field during drought season.

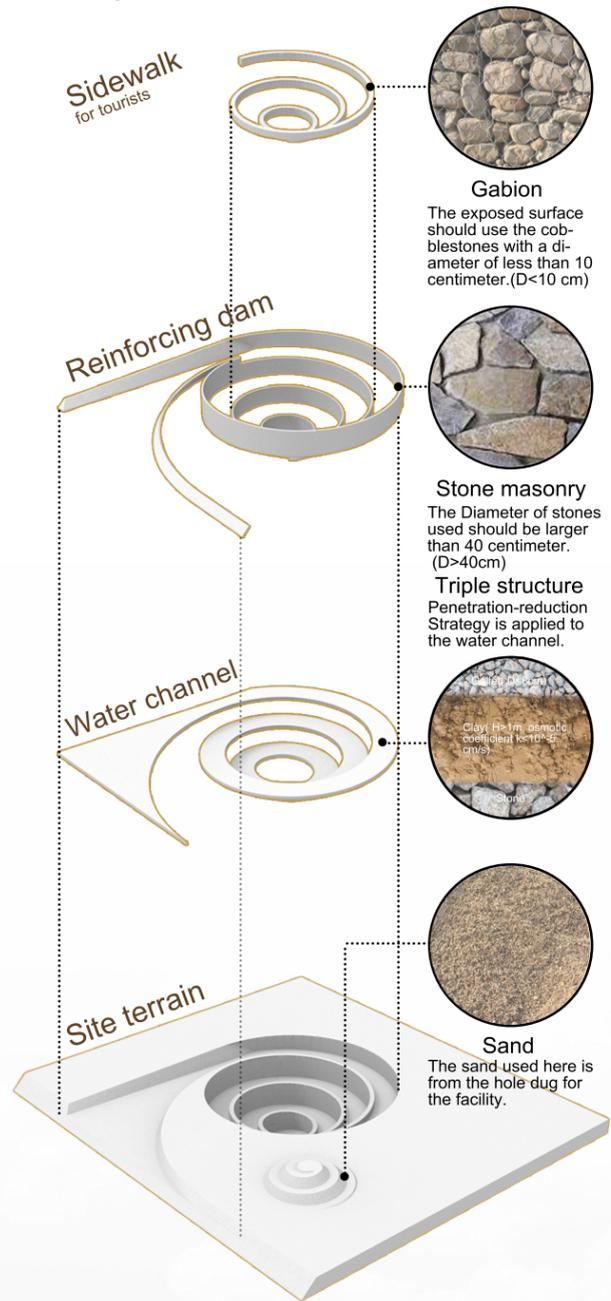
7500000 m³ (7.2%) Reduction of water pumped

In this way, water pumped from the river for irrigation can reduce 7500000m³.

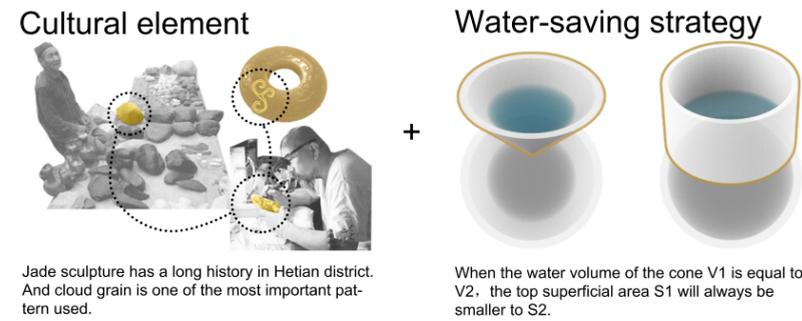


DISMANTLING

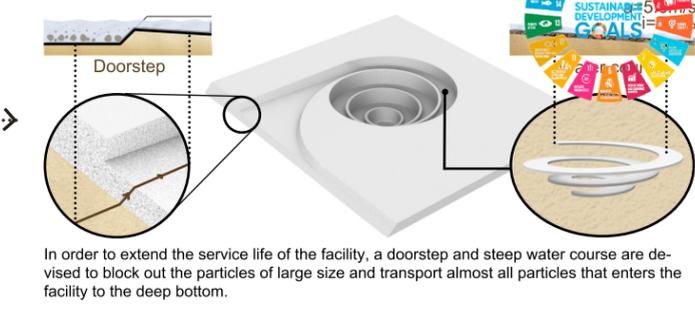
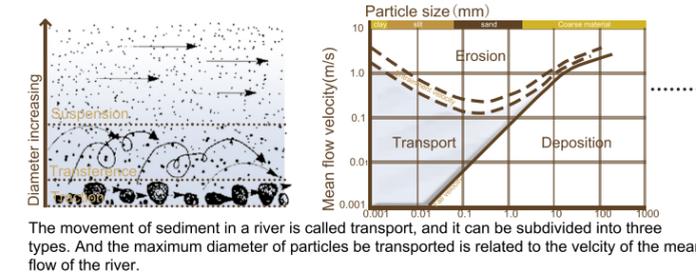
Four-layer structure



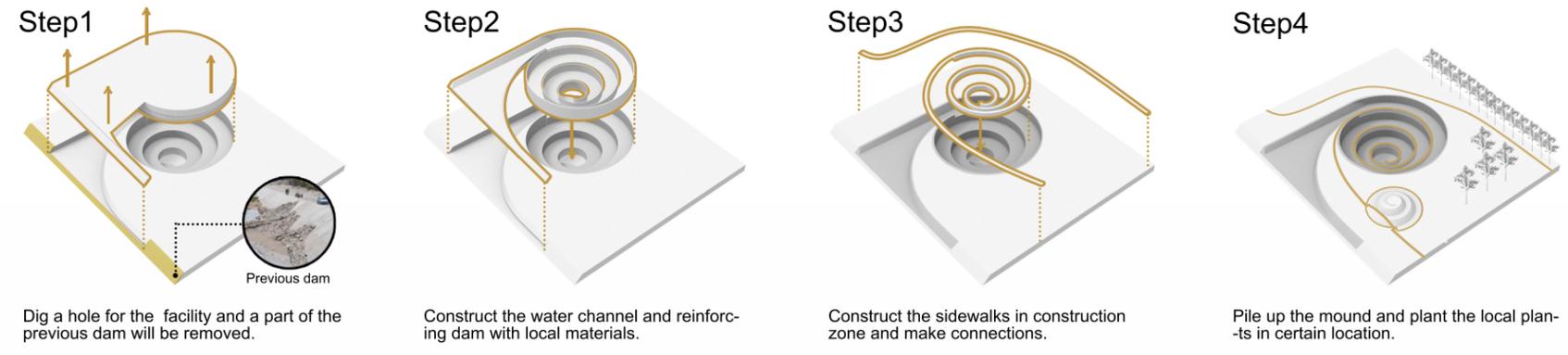
STRUCTURE GENERATION



Filtration theory and utilization



CONSTRUCTION PROCESS



DEVELOPMENT

