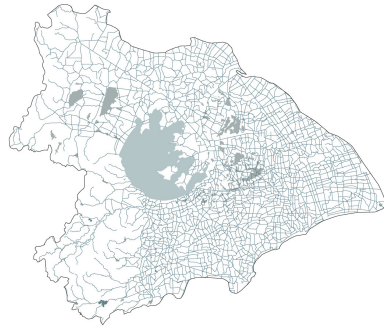




SPONGE POLDER

The revival of traditional polder wisdom in the Taihu Lake Basin

Mentors:
Steffen Nijhuis
Gregory Bracken

Qian Yao 5263875

CONTENT

01	Introduction	05	Regional Strategy&Principle
02	Methodology	06	Design exploration
03	Polder landscape of Taihu lake basin	07	Conclusion&Reflection
04	Analysis of Lougang polder		

01 Introduction

- Fascination
- Location
- Problem statement
- Research objective
- Research question



范晓伟摄影作品

Fascination--Water town

"land of fish and rice" "home of the silk"



Source: <https://zgjrwdl.xml-journal.net/bookPart/id/9743>



Source: <https://www.intrepidtravel.com/adventures/wp-content/uploads/2015/03/resized-xingtan-credit-Xianyi-Shen.jpg>

Fascination--Polder landscape

"Harvest in Su (zhou) and Hu (zhou) provides a year of prosperity"

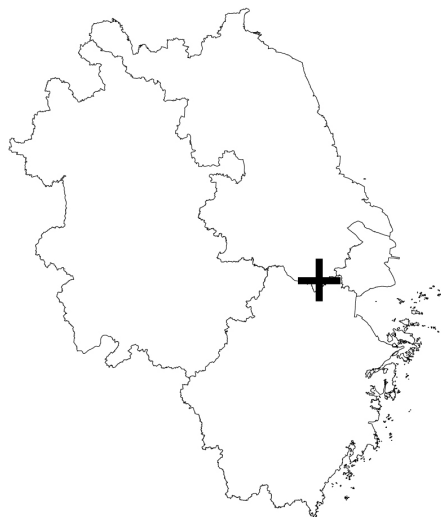


Source: <https://ishare.ifeng.com/c/s/7qTilRdCKnH>

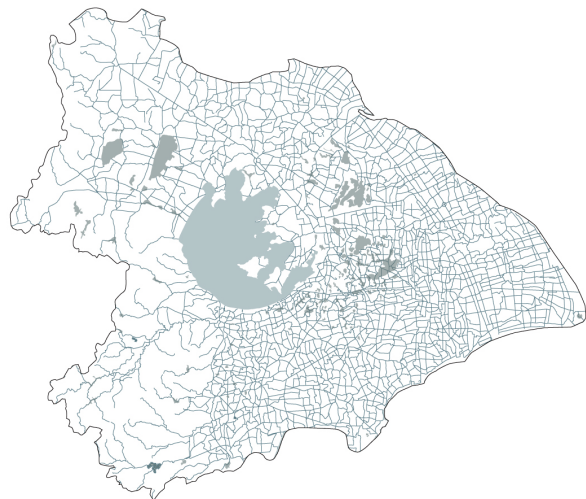
Background--Location



China



Yangtze River delta



Taihu lake basin

Water as resource



Architecture heritage

Source: <http://www.lv mama.com/trip/show/338350>



Water heritage

Source: <https://fashion.sina.cn/l/ds/2022-04-28/detail-imcwipii6764679.d.html>



Agriculture heritage

Source: http://iyantian.sznews.com/yantian-zt/contents/2017-06/15/content_16474284.htm



Water town



Source: <http://livechina.ipanda.com/2016/09/13/ART1FchgSd09iVQ8rya5W4TT160913.shtml>

Mulberry dike fish pond



Water as threat



Source: <http://discovery.cctv.com/20080125/102623.shtml>



Source: <https://news.ln.com.tw/news/world/breakingnews/3231247>



Source: <https://img.sinchew.com.my/2019-11/07/31e76c36-7a1f-4dd3-a2ae-8cef0cf75d4.jpg>

Urban expansion



Source: https://www.sohu.com/a/416880371_100188365

Flooding



Source: https://k.sina.com.cn/article_2810373291_a782e4ab02001r811.html?from=news&subch=onews#/



Water as threat

Water as resource

Water-resilient
polder landscape

Research objective and questions

To identify design strategies and principles for water-resilient polder landscapes in the Taihu Lake basin while protecting cultural heritage through learning from history.

Understanding

What is the traditional polder system and how is the polder system connected to Taihu lake?

Principles

What are the design principles of polder landscape systems from the perspective of water, settlement, ecology, and agriculture systems?

Application

How to apply the design strategies and principles in Lougang polder in the Taihu lake basin?

Reflection

To what degree do the strategies and principles increase resilience in polder landscapes?

02 Methodology

- Theoretical background
- Methodology framework

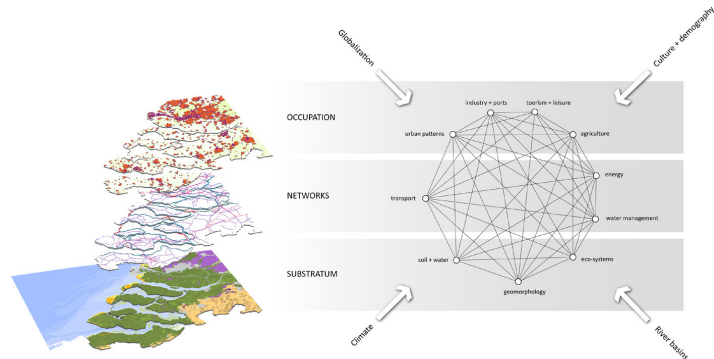


Theoretical background

Cultural landscape

Theory to understand polder landscape and cultural heritage

Combined works of nature and by humans, and they express a long and intimate relationship between people and their natural environment. (UNESCO)



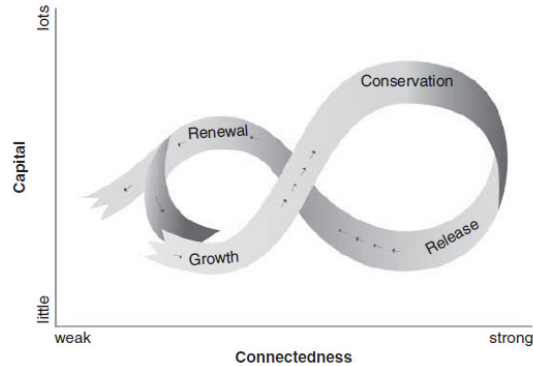
Layered entity
1) underlying natural landscape,
2) hydraulic interventions,
3) the organization imposed by the agricultural development of the land

Source: Understanding the urban landscape as a layered and complex system (image: Steffen Nijhuis).

Resilience capacity

Theory to design resilience

Resilience is defined as the capacity of system to respond to change or disturbance without changing its basic state (Walker and Salt, 2006).



- Multifunctionality
- Redundancy and modularization
- (Bio and social) diversity
- Multi-scale networks and connectivity
- Adaptive planning and design

Source: A stylized representation of the four ecosystem functions (r, K, Qf, a) and the flow of events among them. From Gunderson and Holling 2001 with permission of Island Pres

Understanding

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To what degree do the strategies and principles increase resilience in polder landscapes?

03 Polder landscape of Taihu lake basin

- Structure map
- Historical development
- Challenges in Taihu lake basin
- Polder development
- Polder typology



Structure map of Taihu lake basin



-Traditional water town



-Polder

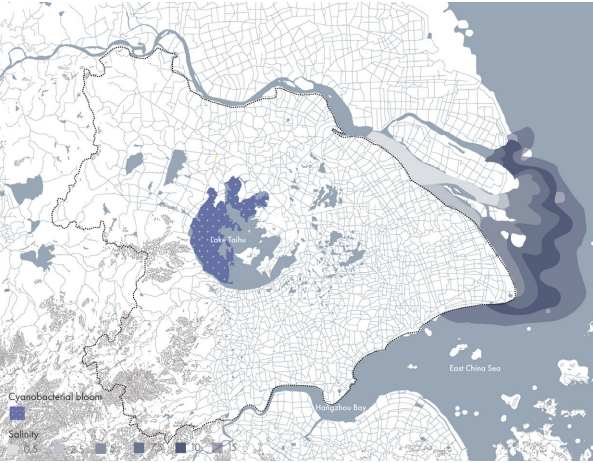


-Tea mountain



Challenges in Taihu lake basin

Salination&Cyanobacterial bloom



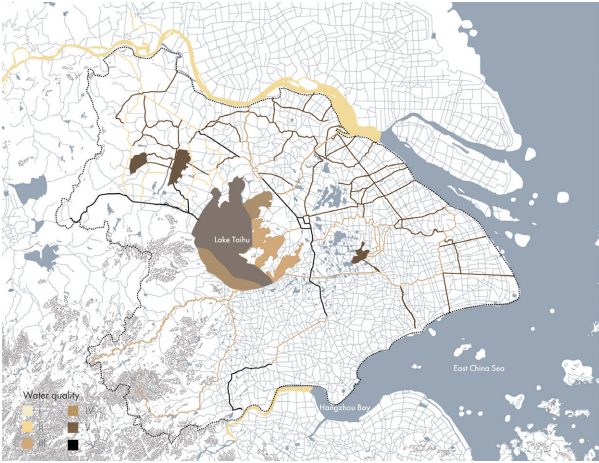
Source: <https://scenariojournal.com/article/yangtze-river-delta-project/>

City expansion&Water town



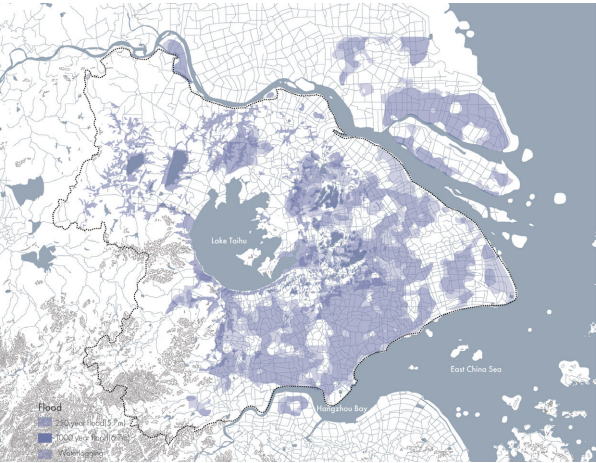
Source: Draw based on the data from Lake-Watershed Science SubCenter, National Earth System Science Data Sharing Infrastructure, National Science & Technology Infrastructure of China (<http://lake.geodata.cn>)

Water quality



Source: Water resources report of Taihu Lake

Waterlogging &Flood

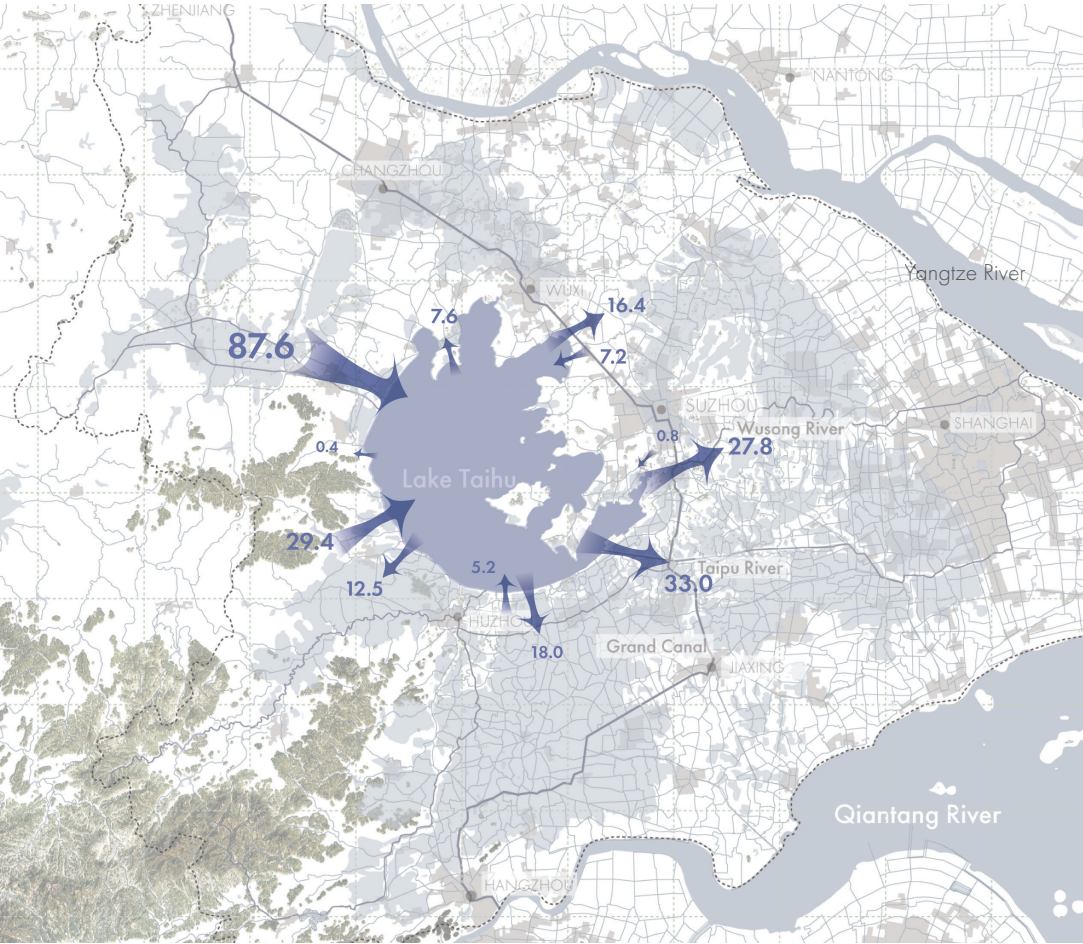


Source: Draw based on the Wang, Pendlebury, & Nolf, 2022

Challenges in Taihu lake basin

Water exchange in key areas of Taihu Basin in 2021

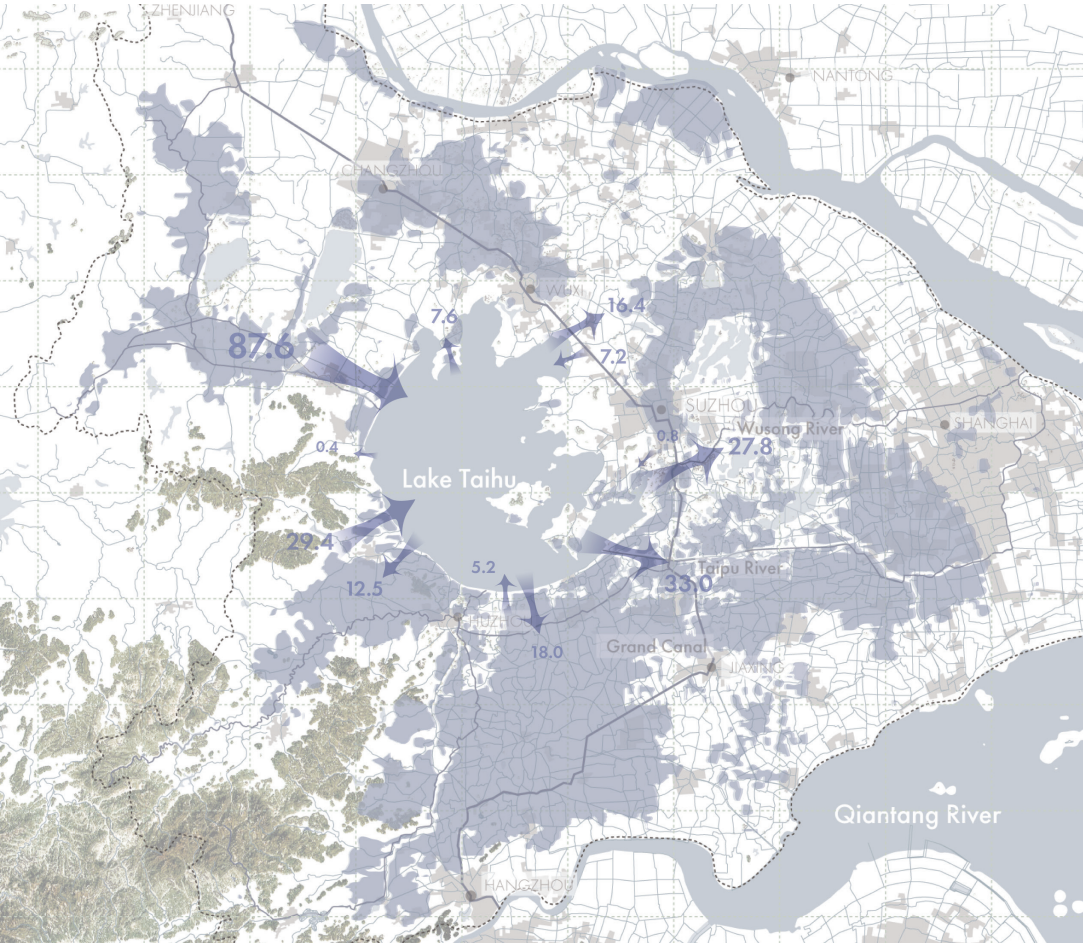
Easy to rise, difficult to fall



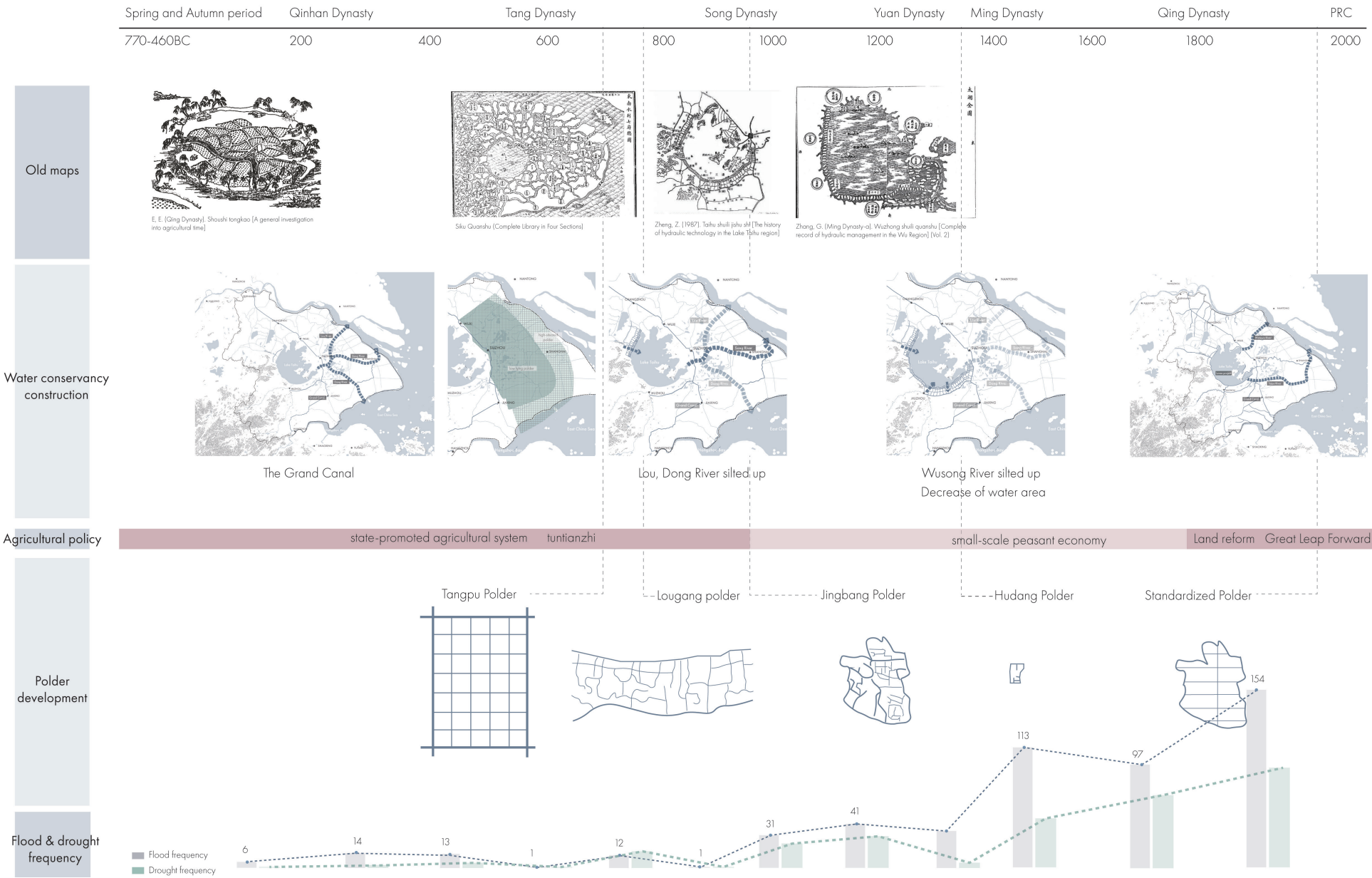
Source: 2021 Water resources report of Taihu Lake

Challenges in Taihu lake basin

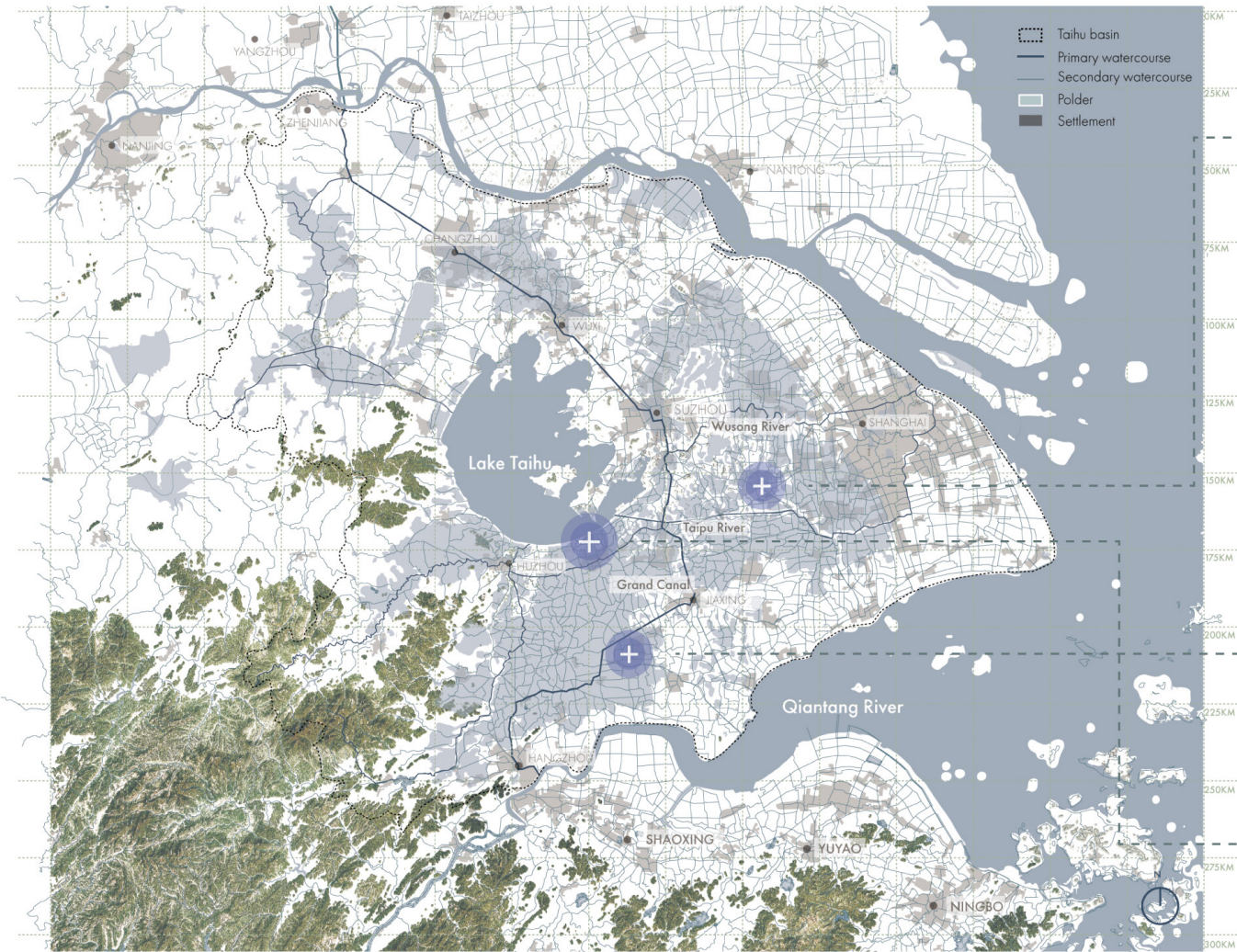
Water exchange in key areas of Taihu Basin in 2021



Polder development



Polder typology



Hudang polder

Like islands;
Separated land units surrounded by a
large water surface;
Vulnerable to floods.



Jingbang polder

Small-sized polders and a fragmented
water system in a branched canal
structure.



Lougang polder

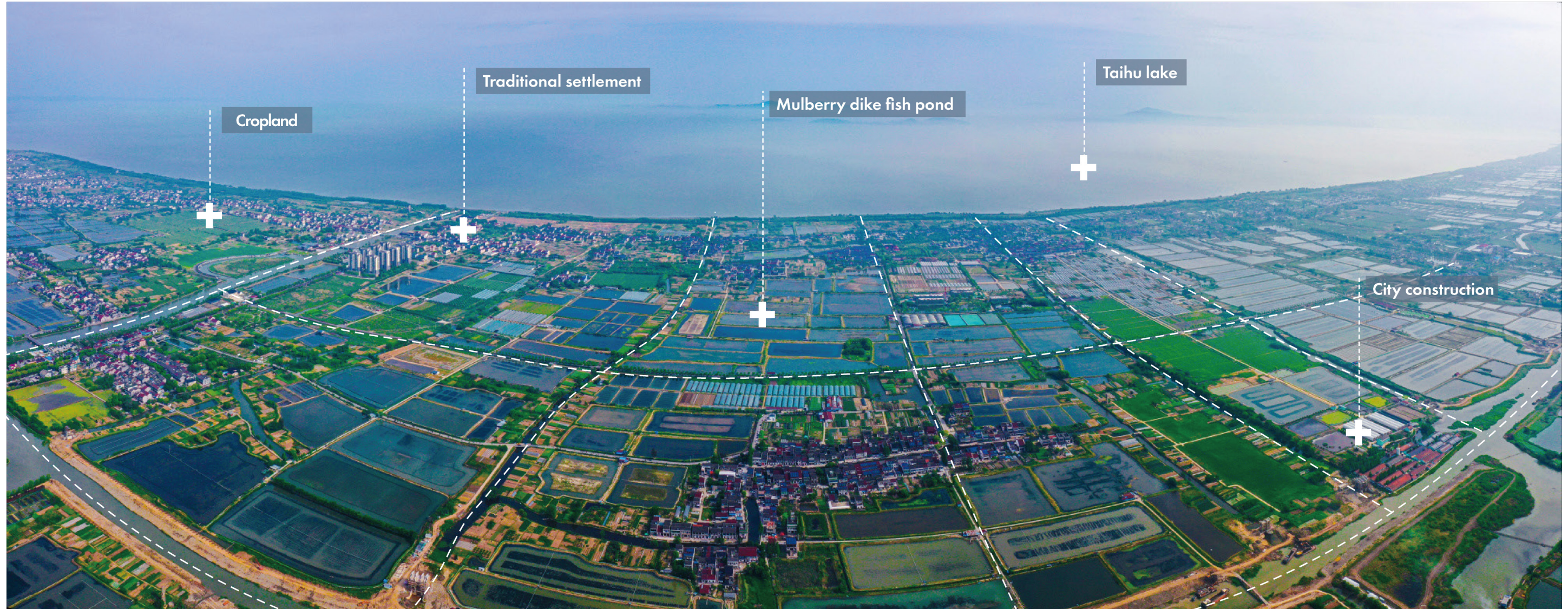
Small densely distributed watercourses
that discharge water into or out of Lake
Taihu.

04 Lougang Polder

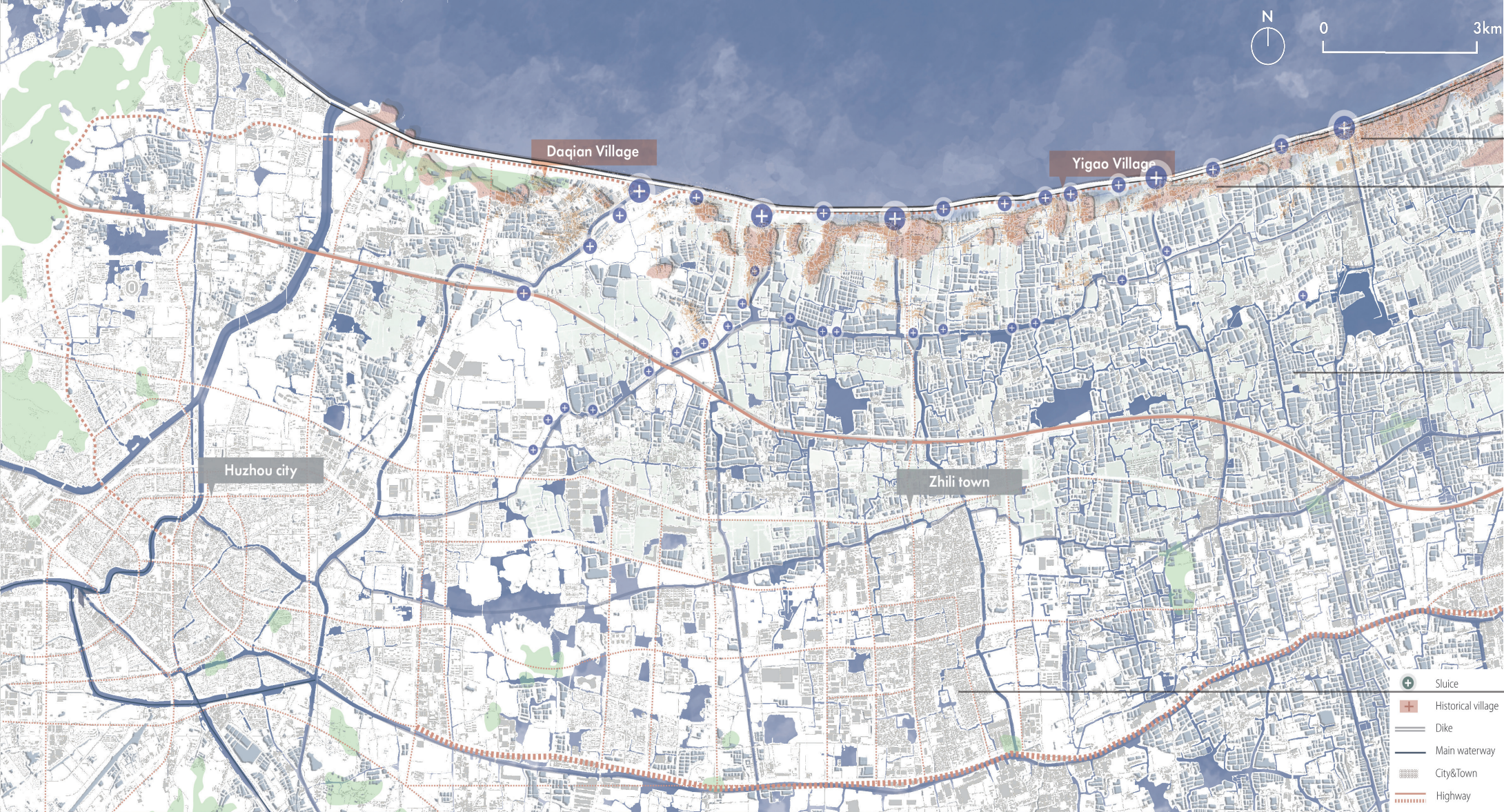
- Historical development of Lougang polder
- Understanding Lougang polder(Water infrastructure/water culture)
- Learning historical experience
- Current challenges
- Principles



Glimpse of Lougang polder



Fragmented polder landscape



Ring dike



Traditional settlement



Mulberty dike pond

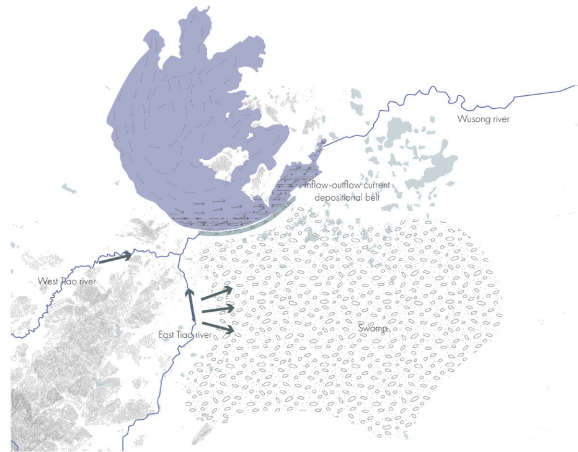


Zhili Town

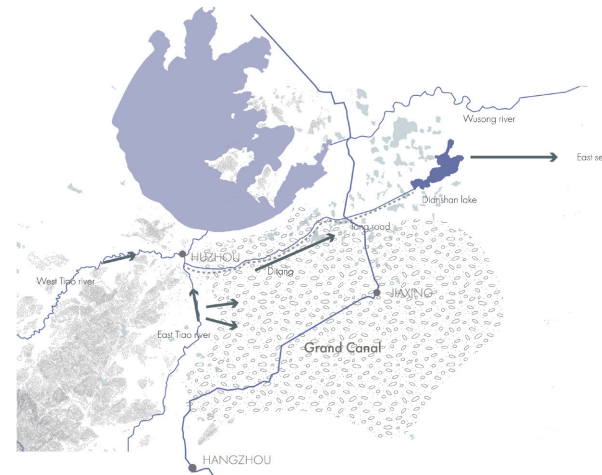


Historical development of Lougang polder

Prehistory



Tang dynasty



Song dynasty



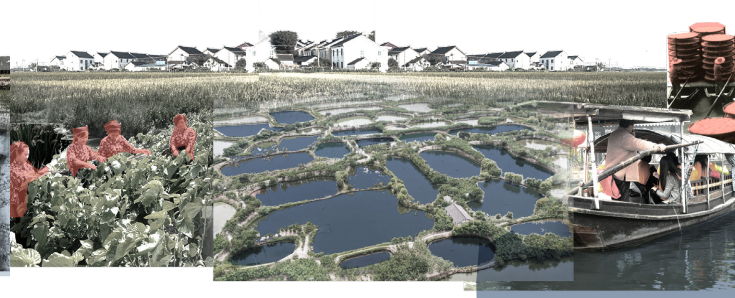
Current



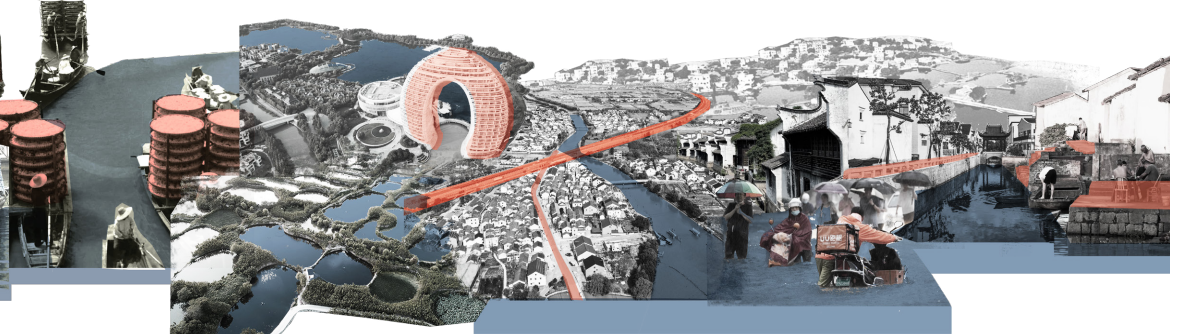
Reclamation



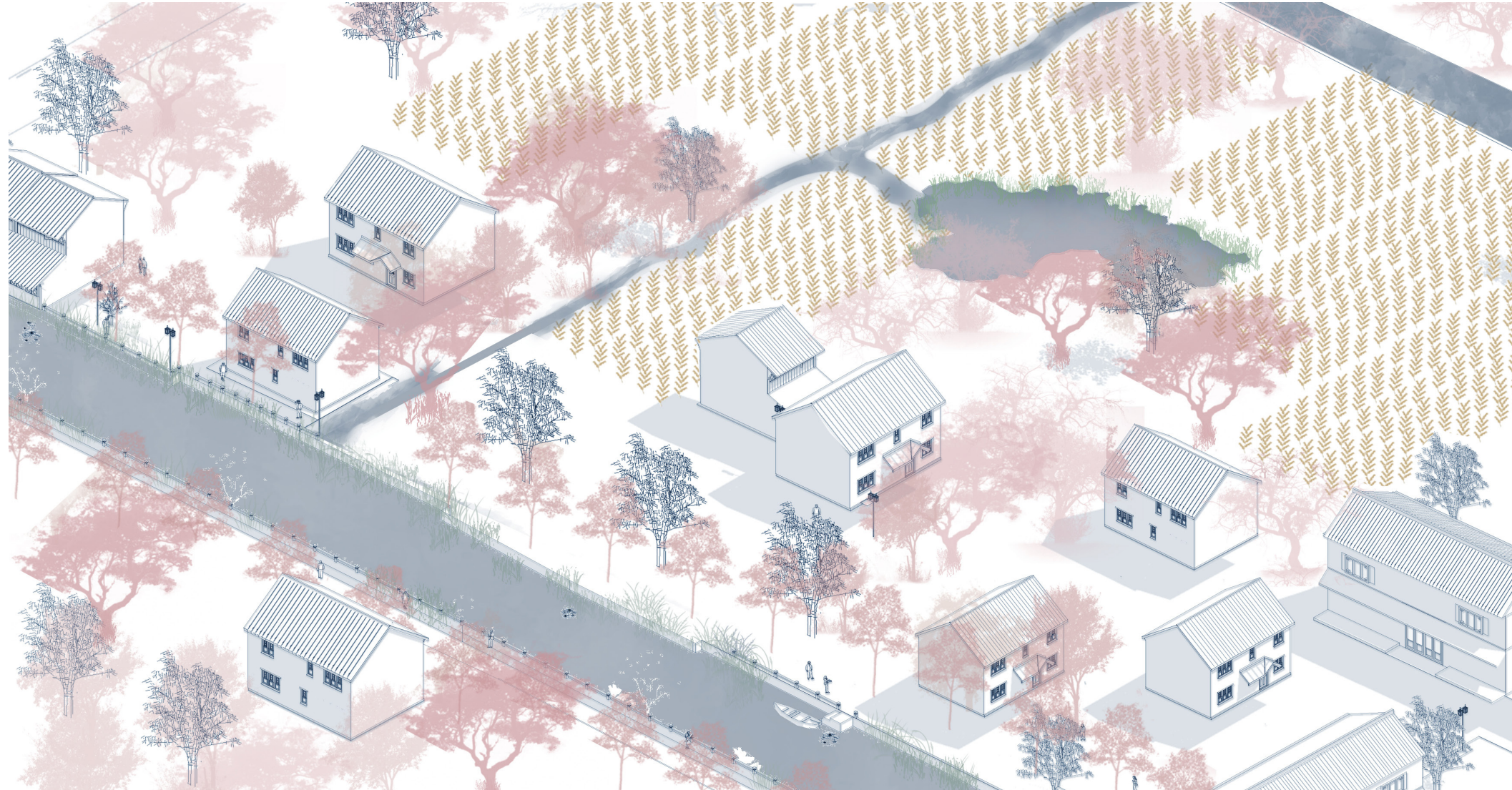
Densification



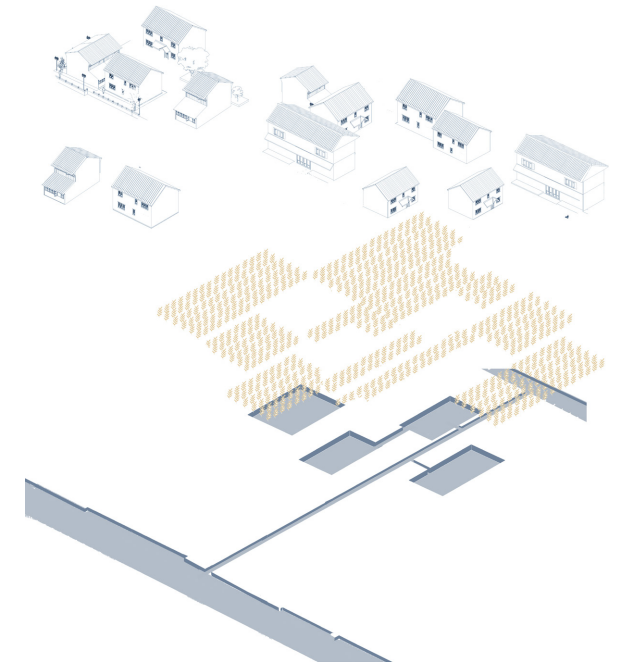
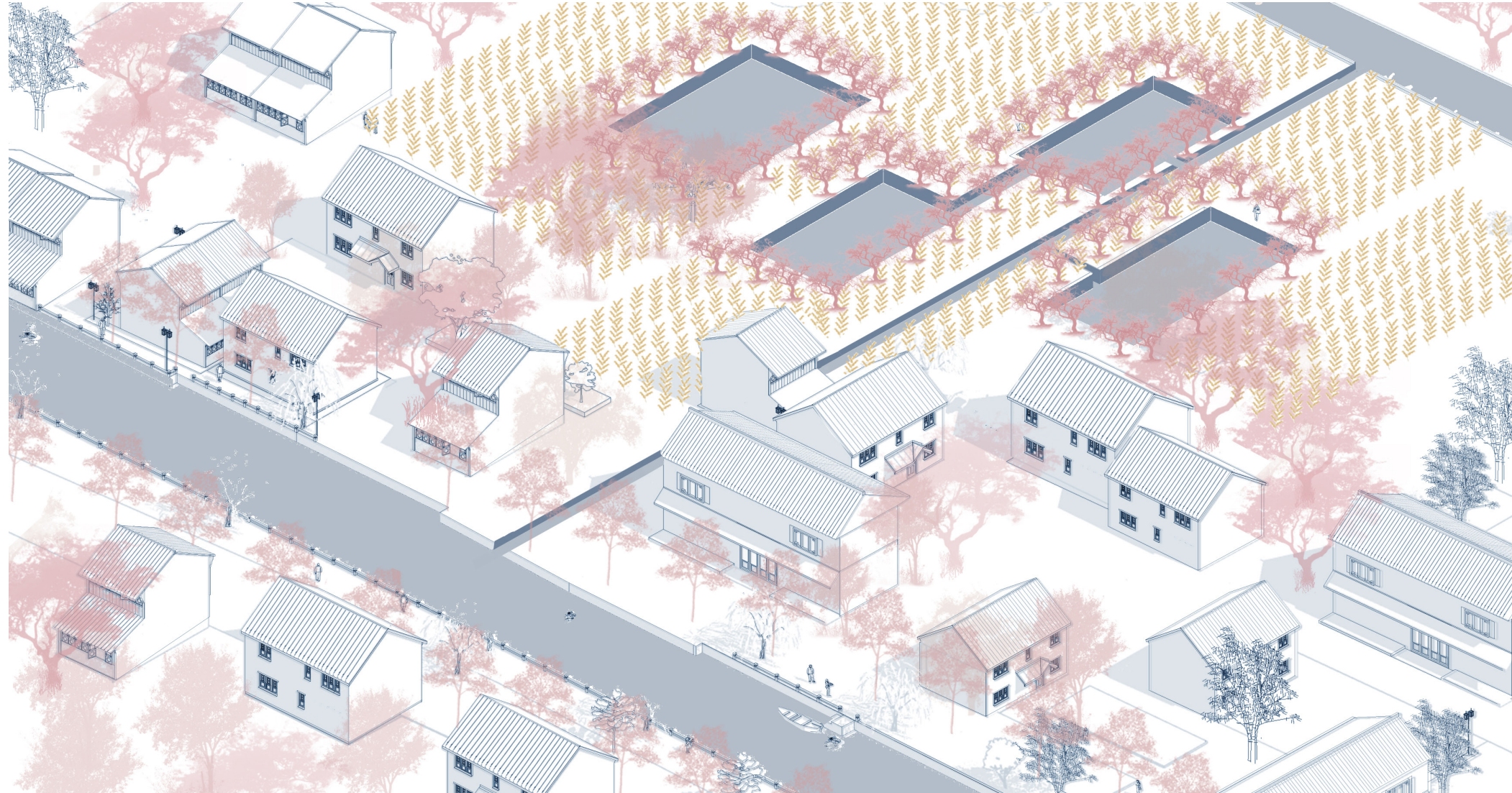
Modernization



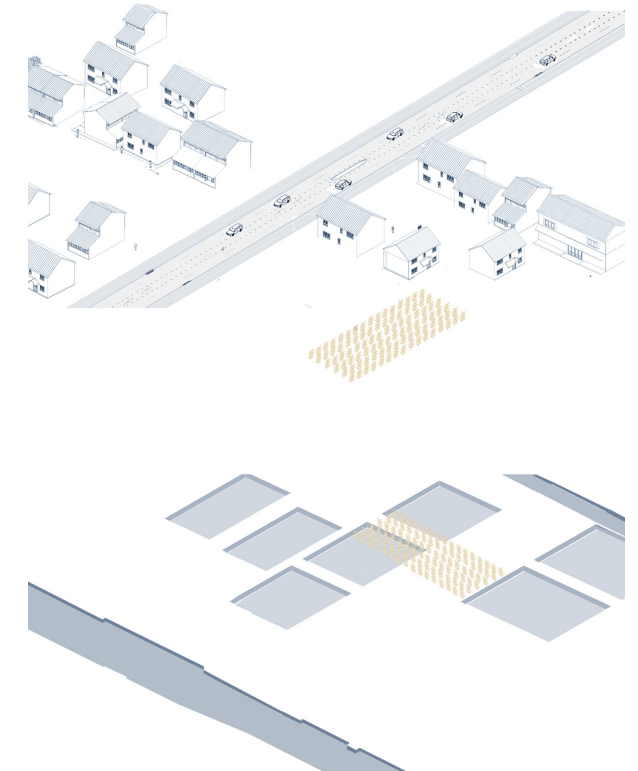
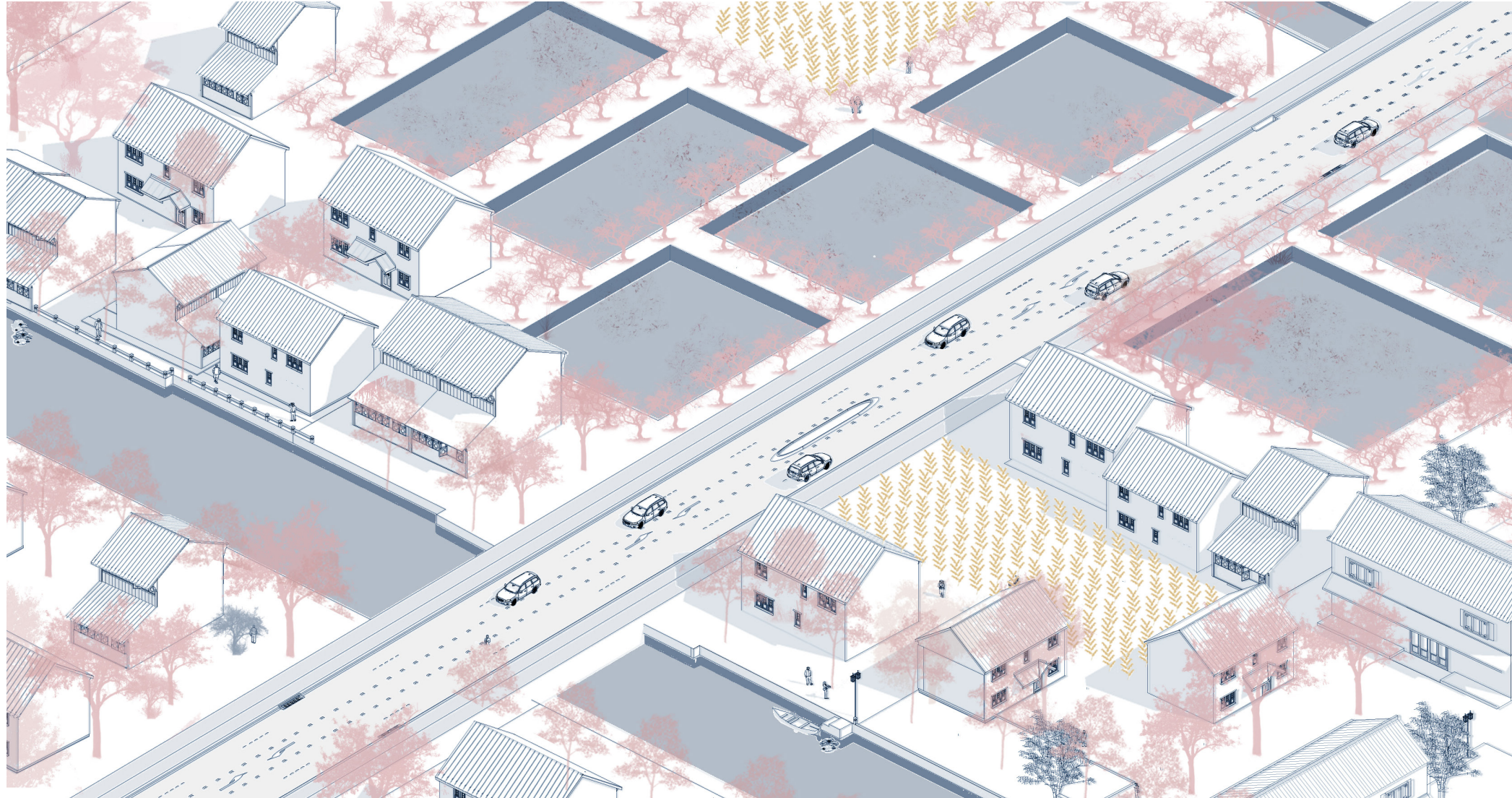
Reclamation: Agricultural landscape--Rice



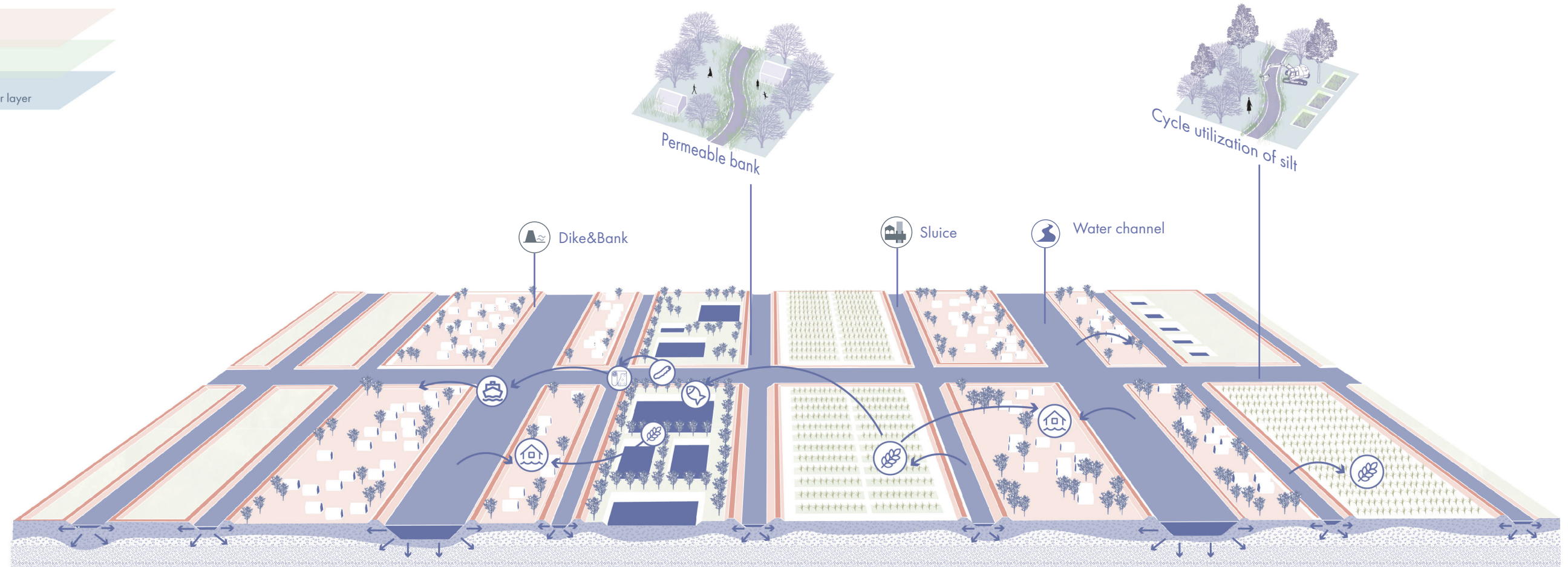
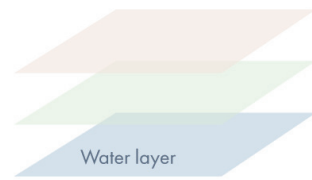
Densification: Agricultural landscape--Dike pond



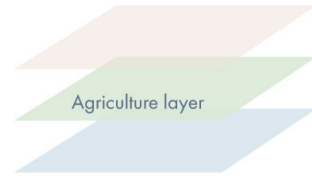
Modernization: Fragmented landscape



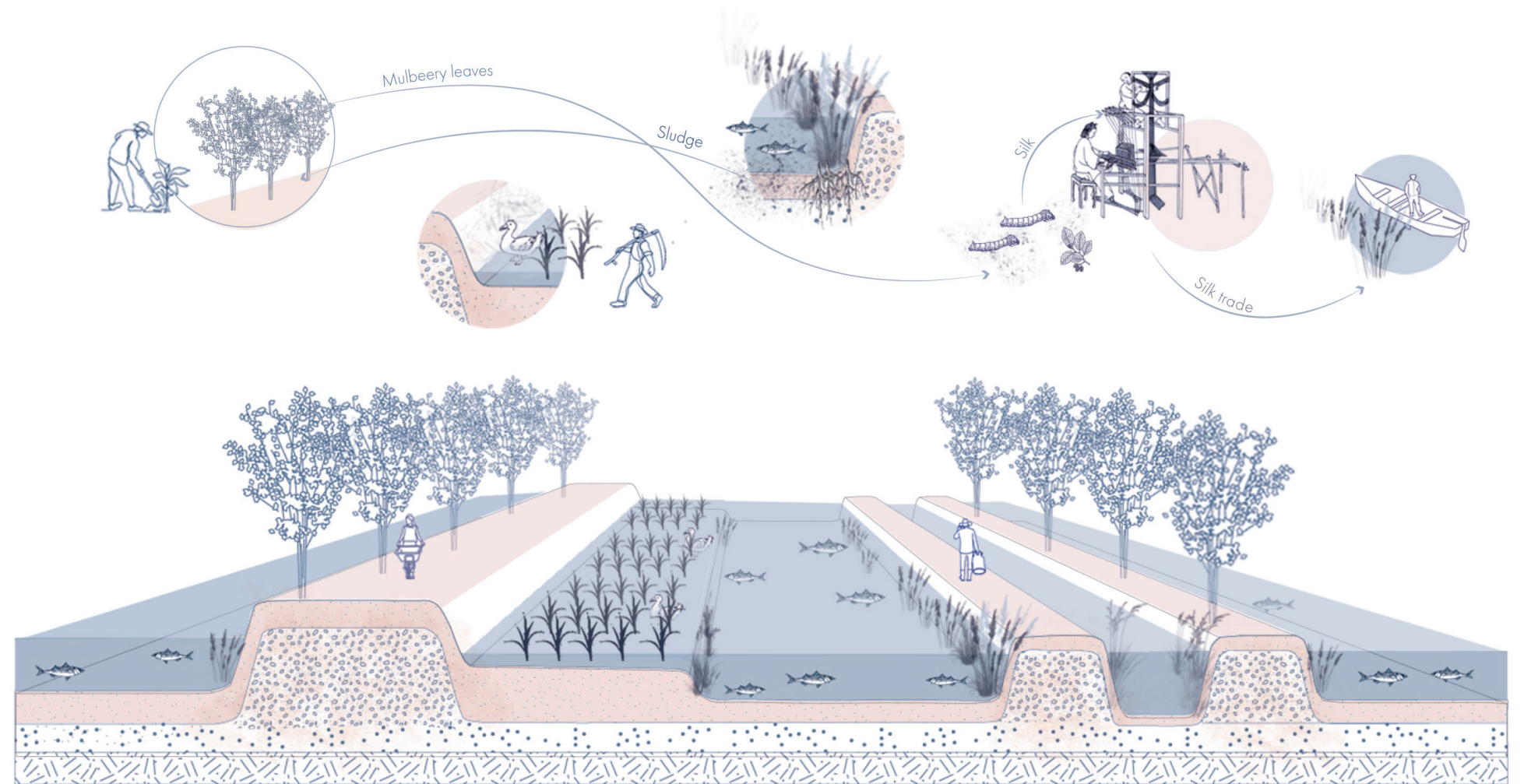
Flexible allocation of water resources



Efficient land use--Sustainable Agriculture



Mulberry dike fish pond

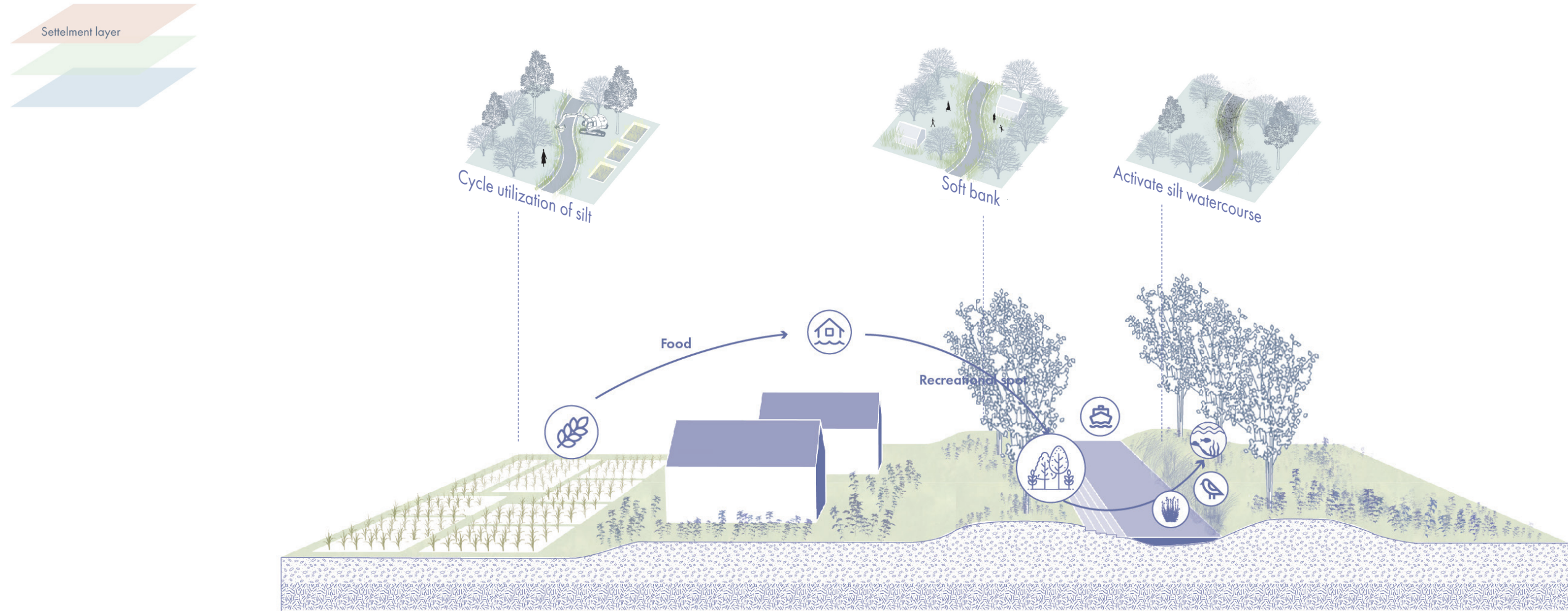


Traditional settlement

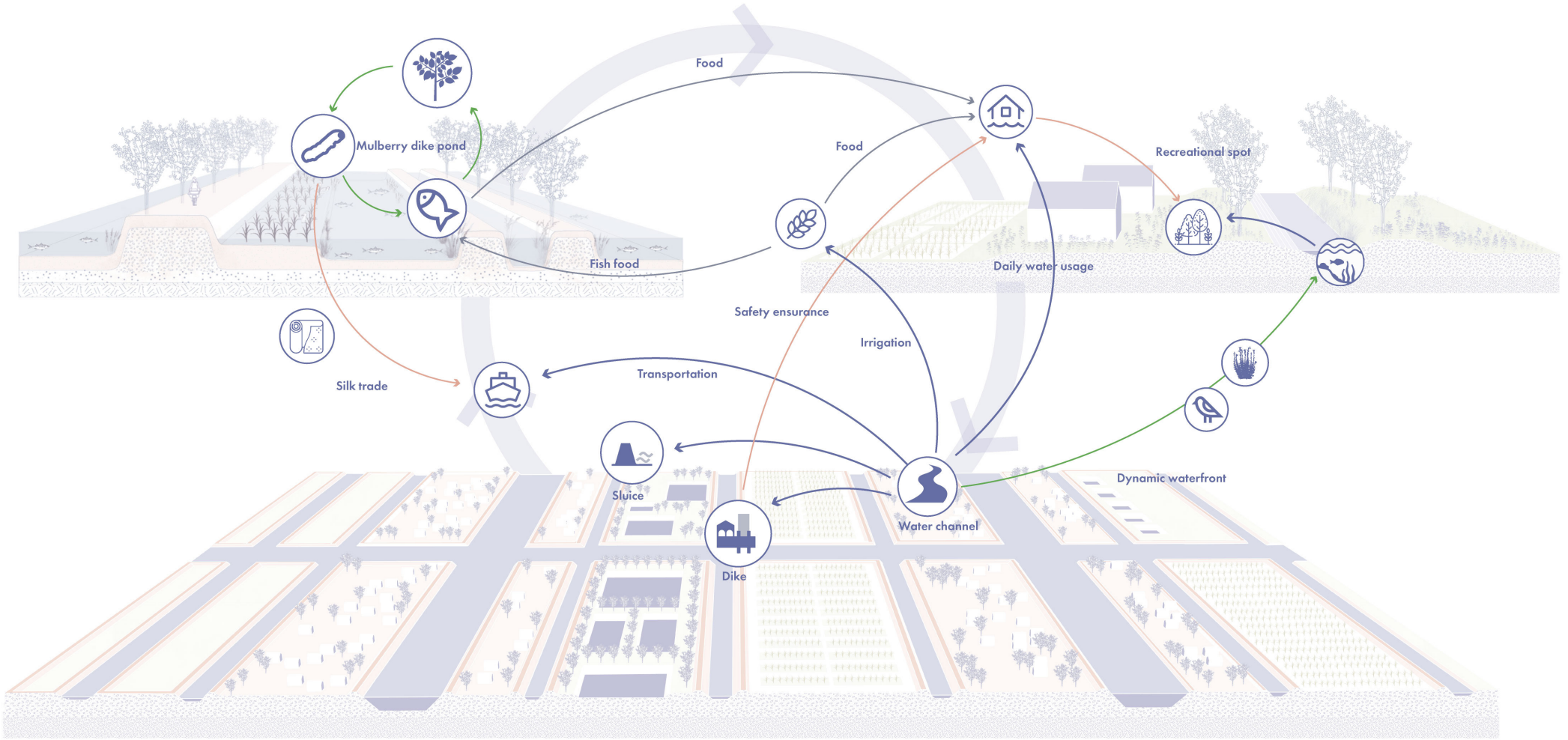


Source: <https://fashion.sina.cn/1/ds/2022-04-28/detail-imcwipii6764679.d.html>

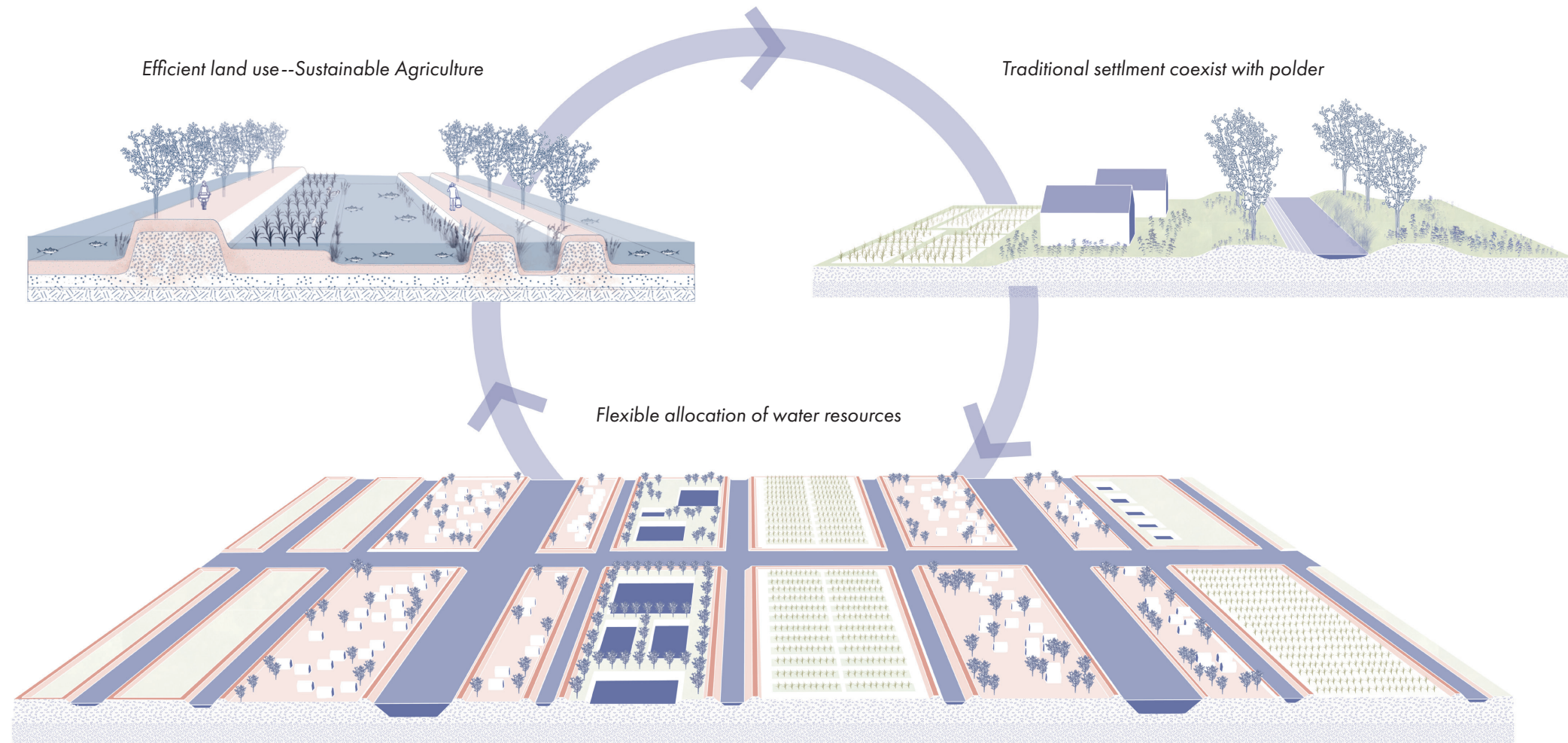
Traditional community co-existing with polders



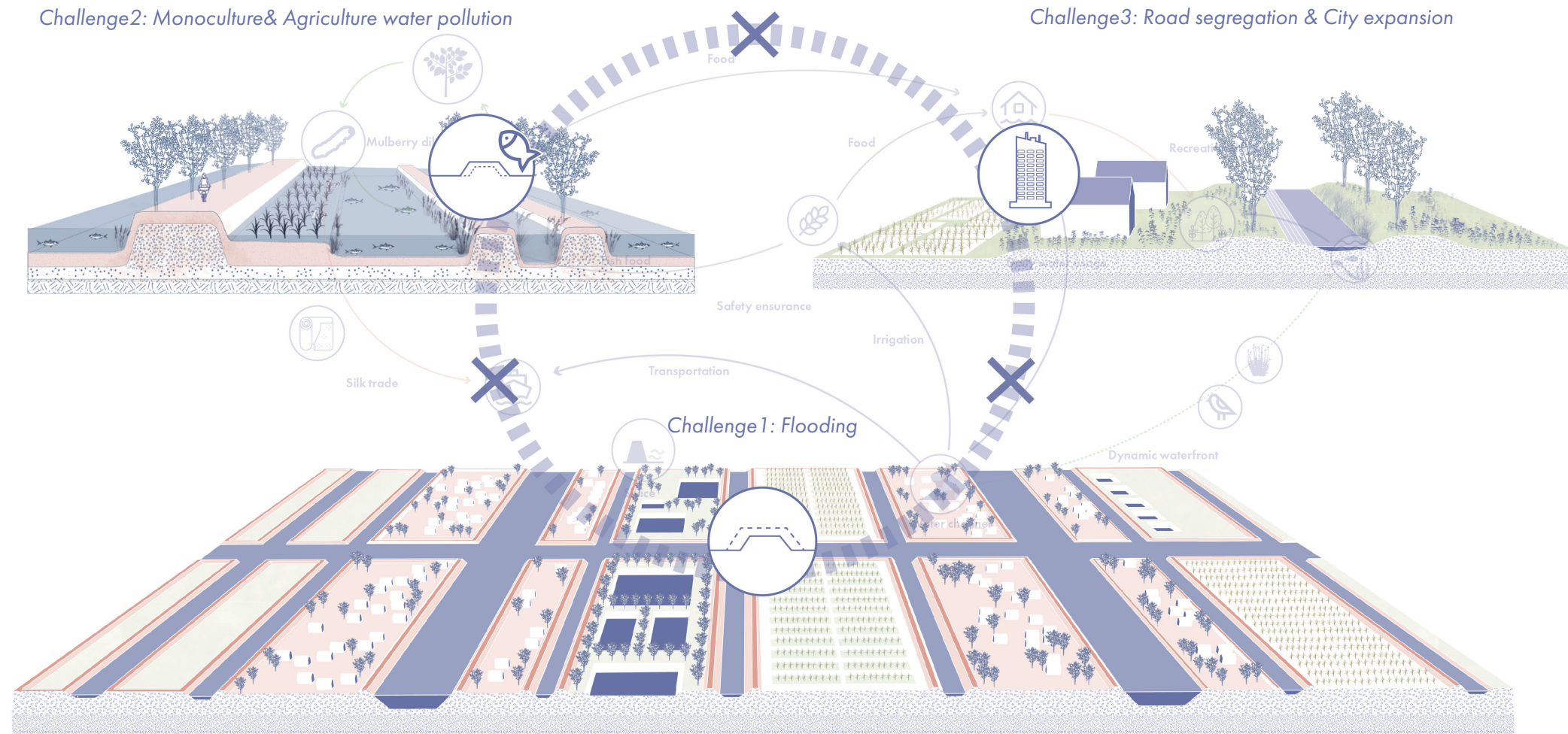
Interdependent relationship among three systems



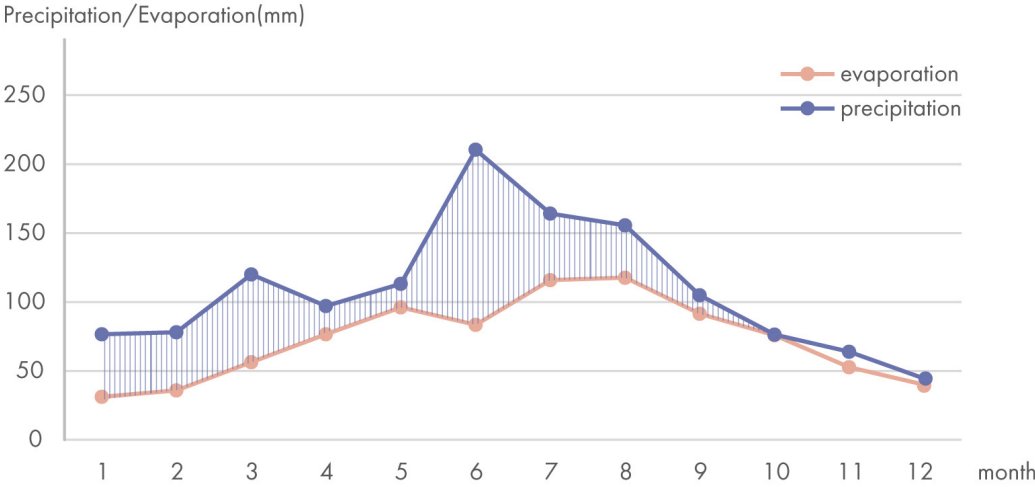
Interdependent relationship among three systems



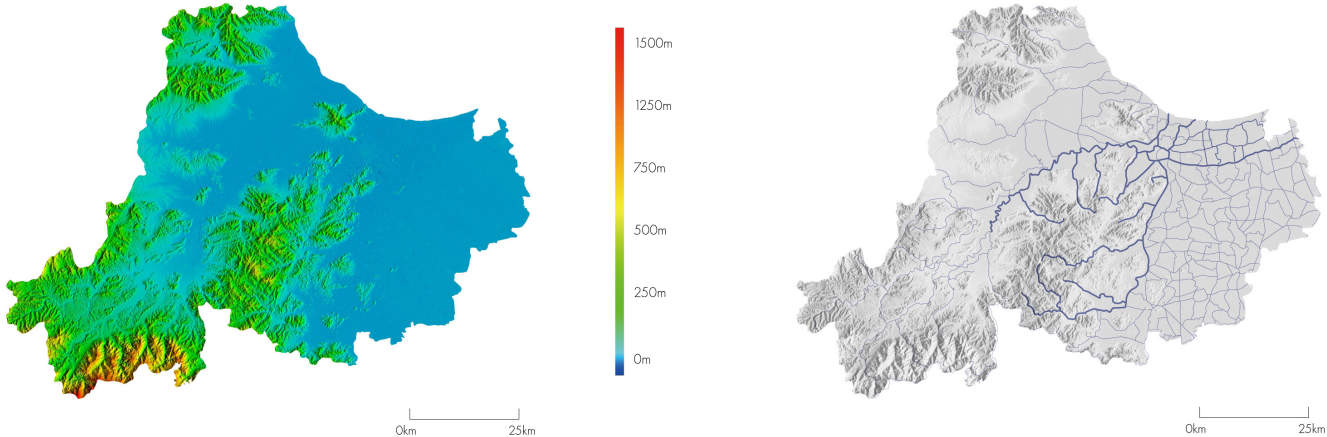
Challenges in Lougong polder



Challenge 1: Flooding

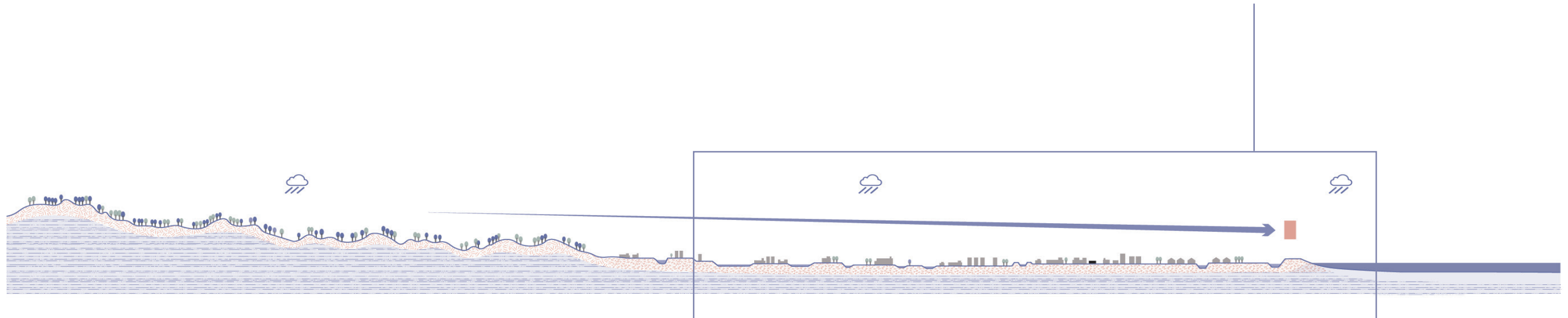
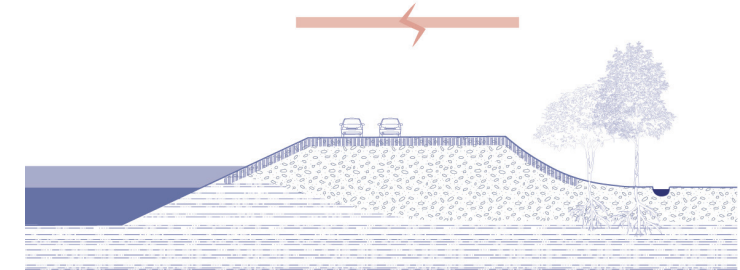


Source: Draw based on data from <https://max.book118.com/html/2021/0704/7060014050003141.shtml>



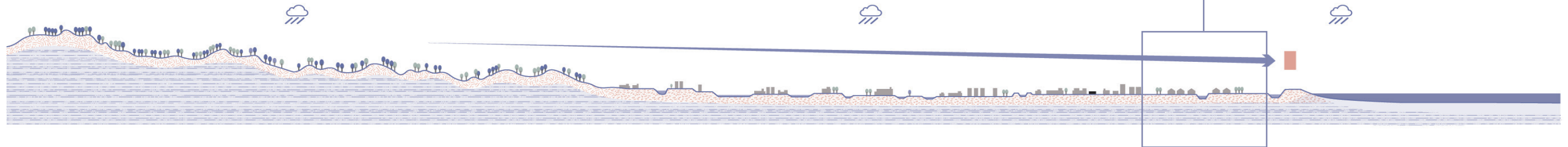
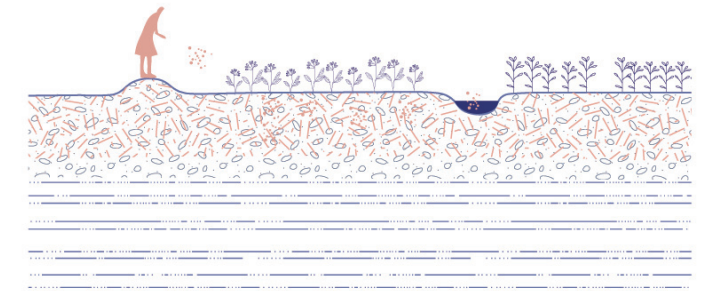
Challenge 1: Flooding

Ring dike along the Taihu lake



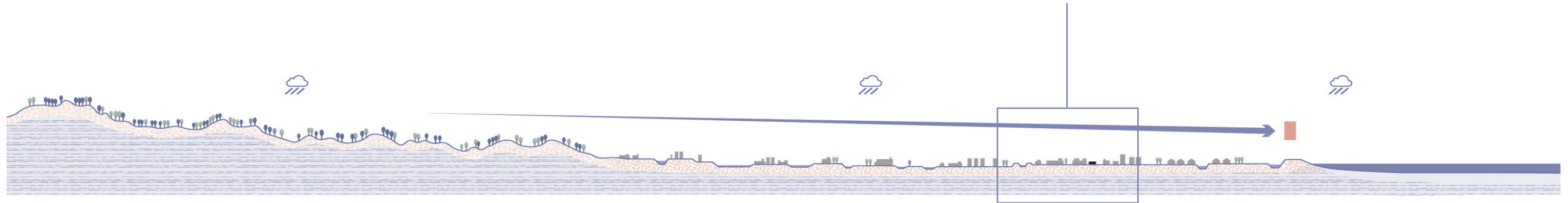
Challenge2: Monoculture& Agriculture water pollution

Deterioration of water quality caused by aquaculture tail water and chemical fertilizer in cropland

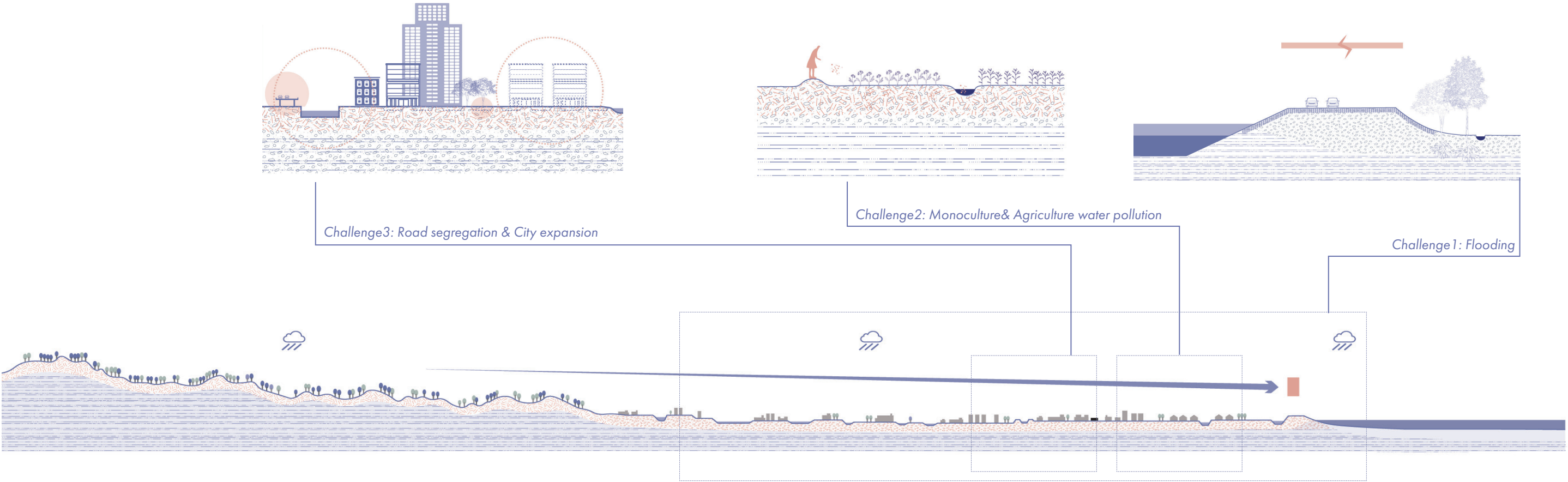


Challenge3: Road segregation & City expansion

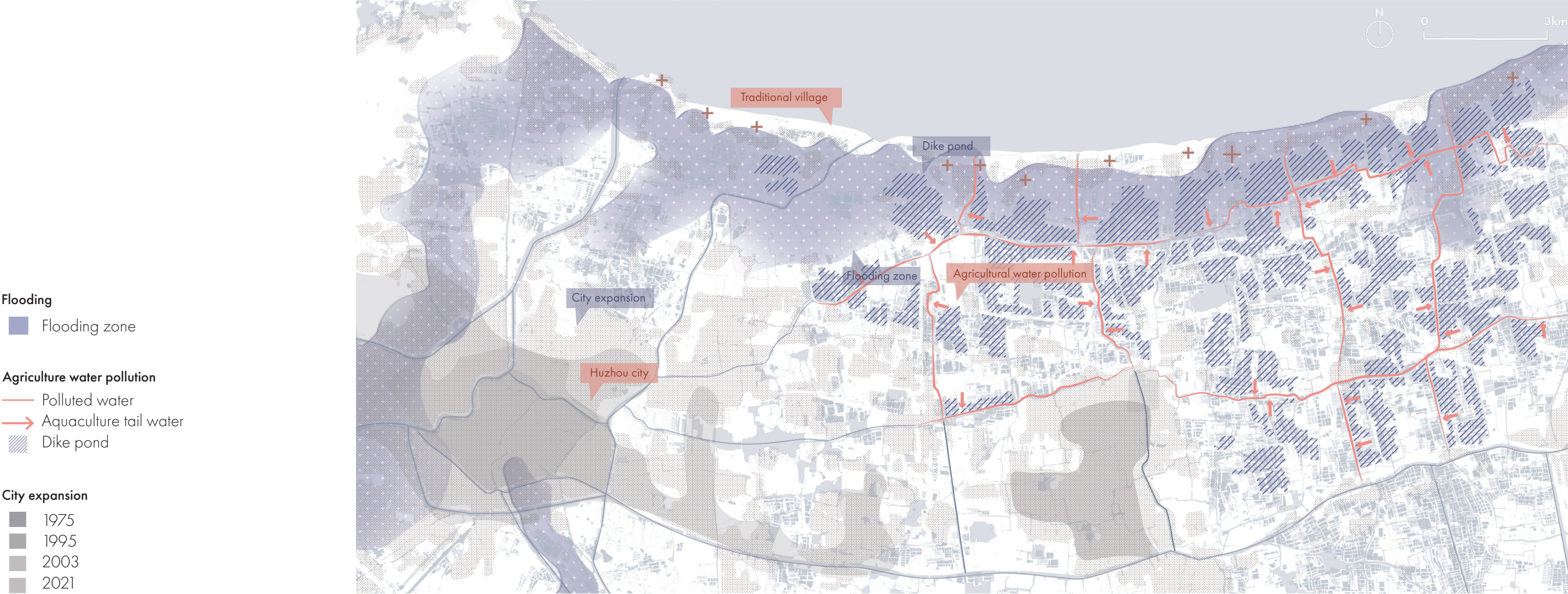
Expanding city in the rural area



Challenges



Challenges in Lougang polder



Understanding

What is the traditional polder system and how is the polder system connect to Taihu lake?

Principles

What are the design principles of resilient polder landscape systems from the perspective of water, ecology, agriculture, and settlement systems?

Application

How to apply the design strategies and principles in Lougang polder in the Taihu lake basin?

Reflection

To what degree do the strategies and principles increase resilience in polder landscapes?

05 Design principle

- Design Principle
- Water&ecology principles
- Agriculture&settlement principles
- Design strategy
- Stakeholder
- Vision map



Case study

Bishan-Ang Mo Kio Park

Bishan, Singapore | Ramboll Studio Dreiseitl



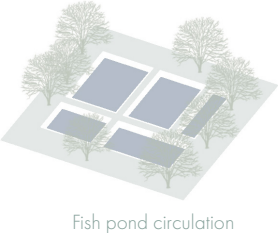
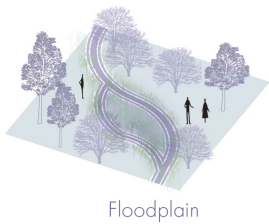
The Oostvaardersplassen

Flevoland, Netherlands | Feddes/Olthof Landscape Architects

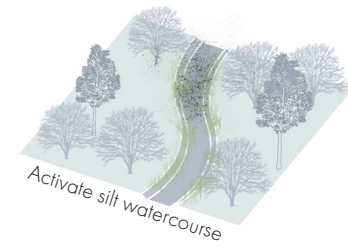
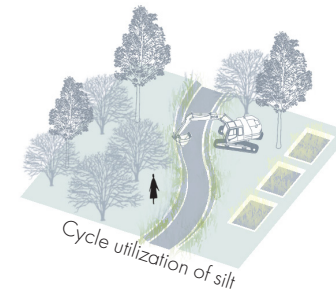
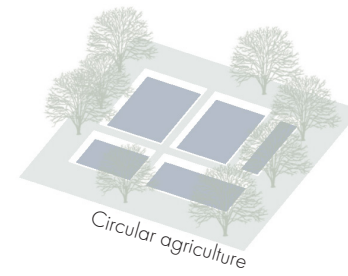
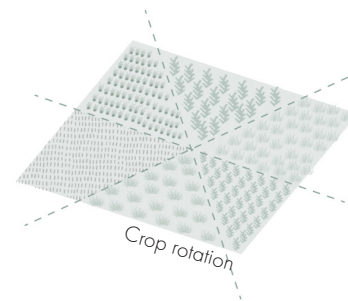
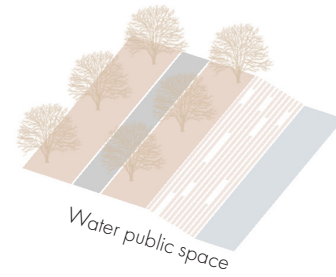
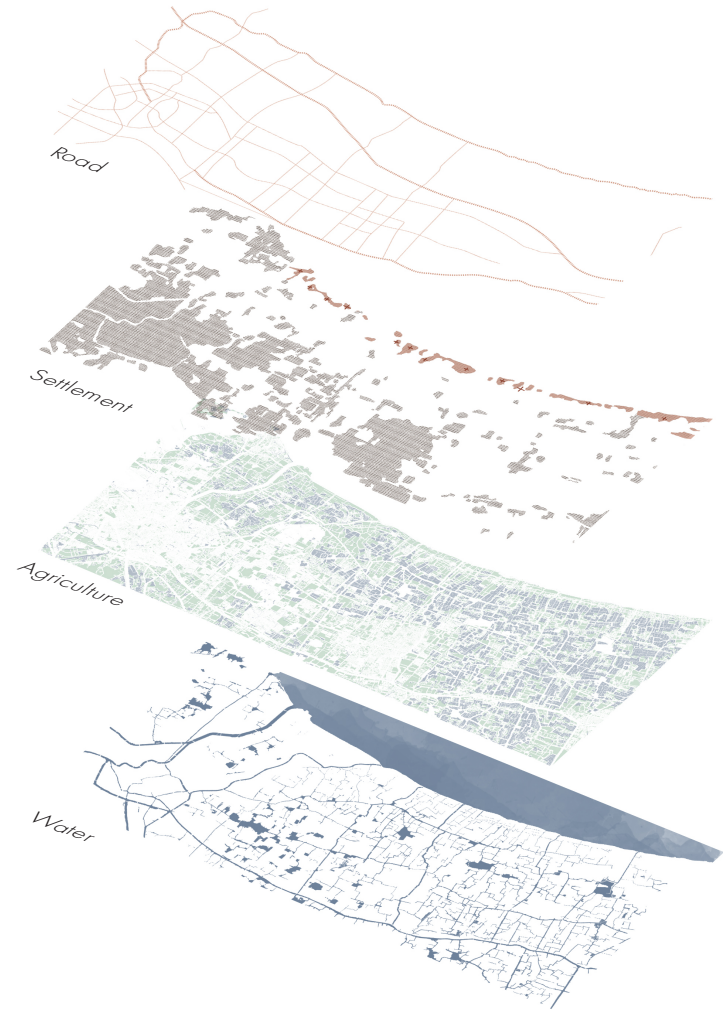


Jianyang lake wetland park

Zhejiang, China | AECOM

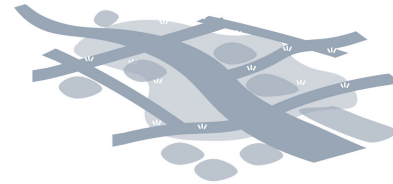


Historical experience--traditional polder wisdom



Design principle

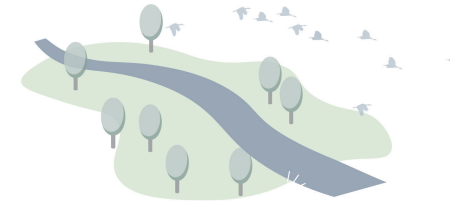
Water&Ecology



01 Sponge water network

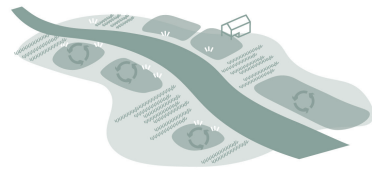


02 Water purification

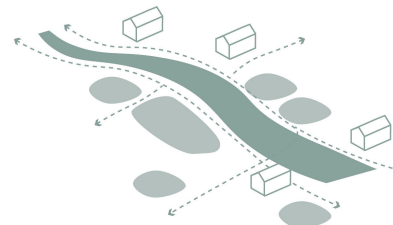


03 Enhance ecosystem

Agriculture

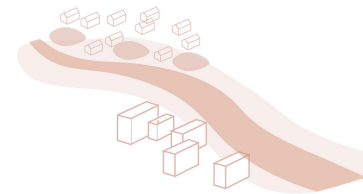


01 Circular agriculture

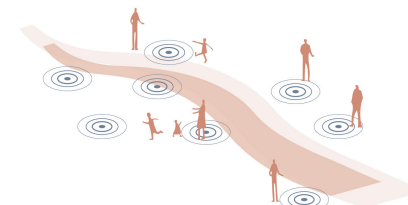


02 Cultural tourism

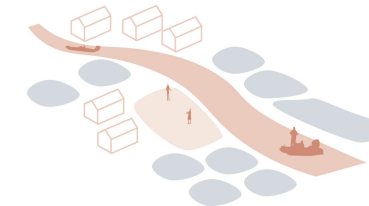
Settlement&Public space



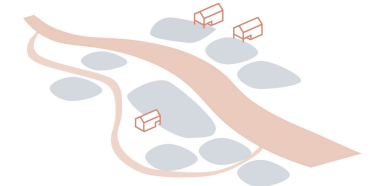
01 City&rural connection



02 Resilient waterfront public space



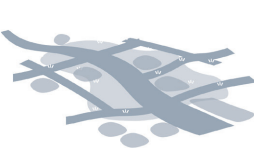
03 Historical water routes



04 New typology of settlement

Tool kits of principle

Water&Ecology



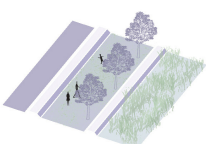
01 Sponge water network



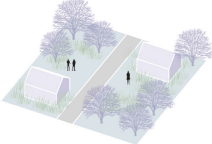
02 Water purification



03 Enhance ecosystem



Double dike



Rain garden



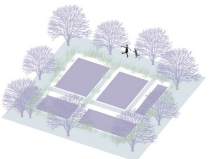
Aquatic plant



Green corridor



Floodplain



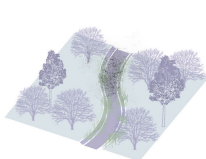
Dyke pond



Wetland purification



Wetland ecosystem



Activate silted waterways

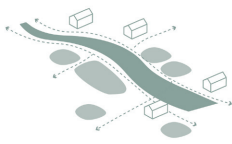


Dredge sludge

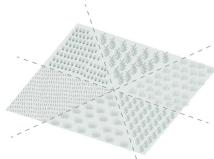
Agriculture



01 Circular agricultural optimization



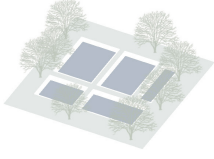
02 Cultural tourism



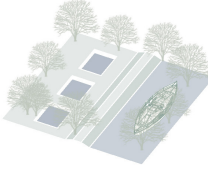
Crop rotation



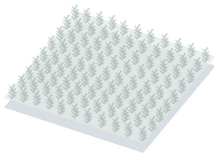
Silk weaving experience



Fish pond circulation

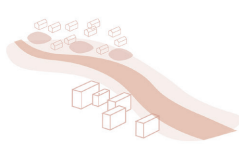


Sightseeing boat

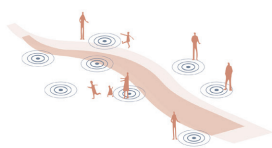


Rice planting

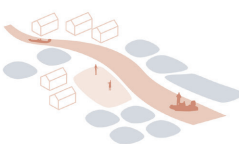
Settlement&Public space



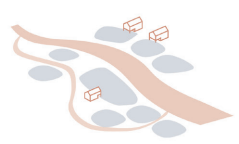
01 City&rural connection



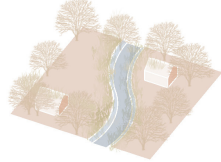
02 Resilient waterfront public space



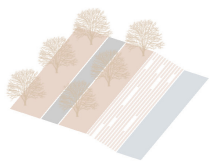
03 Historical water routes



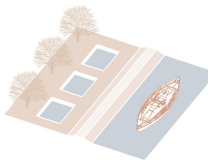
04 New typology of architecture



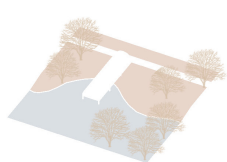
Green corridor



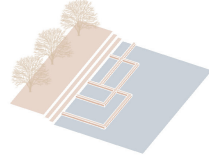
Water step



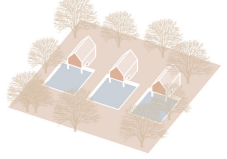
Sightseeing boat



Bird Watching



Wetland wooden walkway



New house

Understanding

What is the traditional polder system and how is the polder system connect to Taihu lake?

Principles

What are the design principles of polder landscape systems from the perspective of water, ecology, settlement, and agriculture systems?

Application

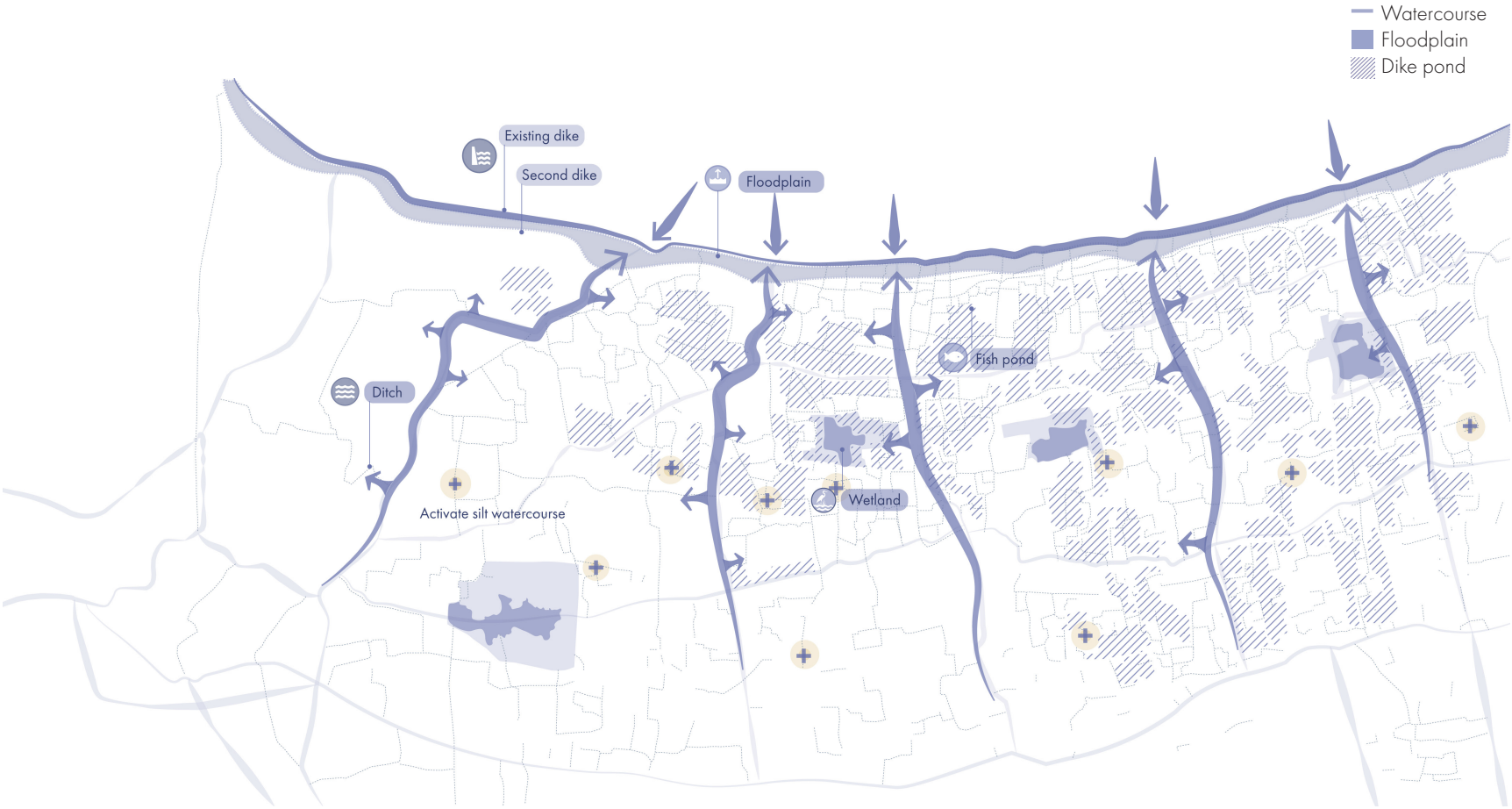
How to apply the design principles in Lougang polder in the Taihu lake basin?

Reflection

To what degree do the strategies and principles increase resilience in polder landscapes?

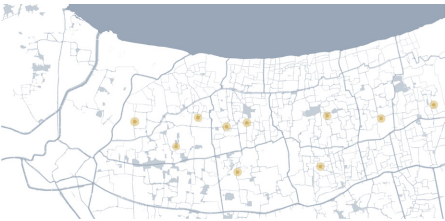
Sponge water network

Enlarge water storage capacity



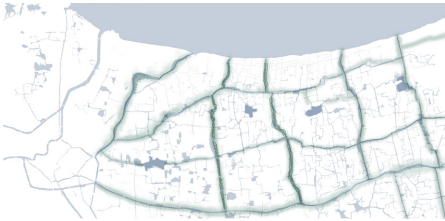
Strategy 01

Activate silt watercourse and complete water network



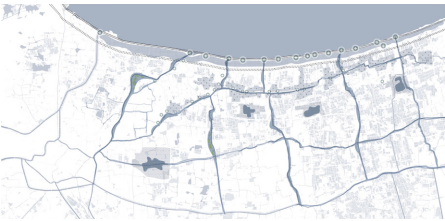
Strategy 02

More space for water



Strategy 03

Slow down the runoff (ecological floating islands, aquatic plant)



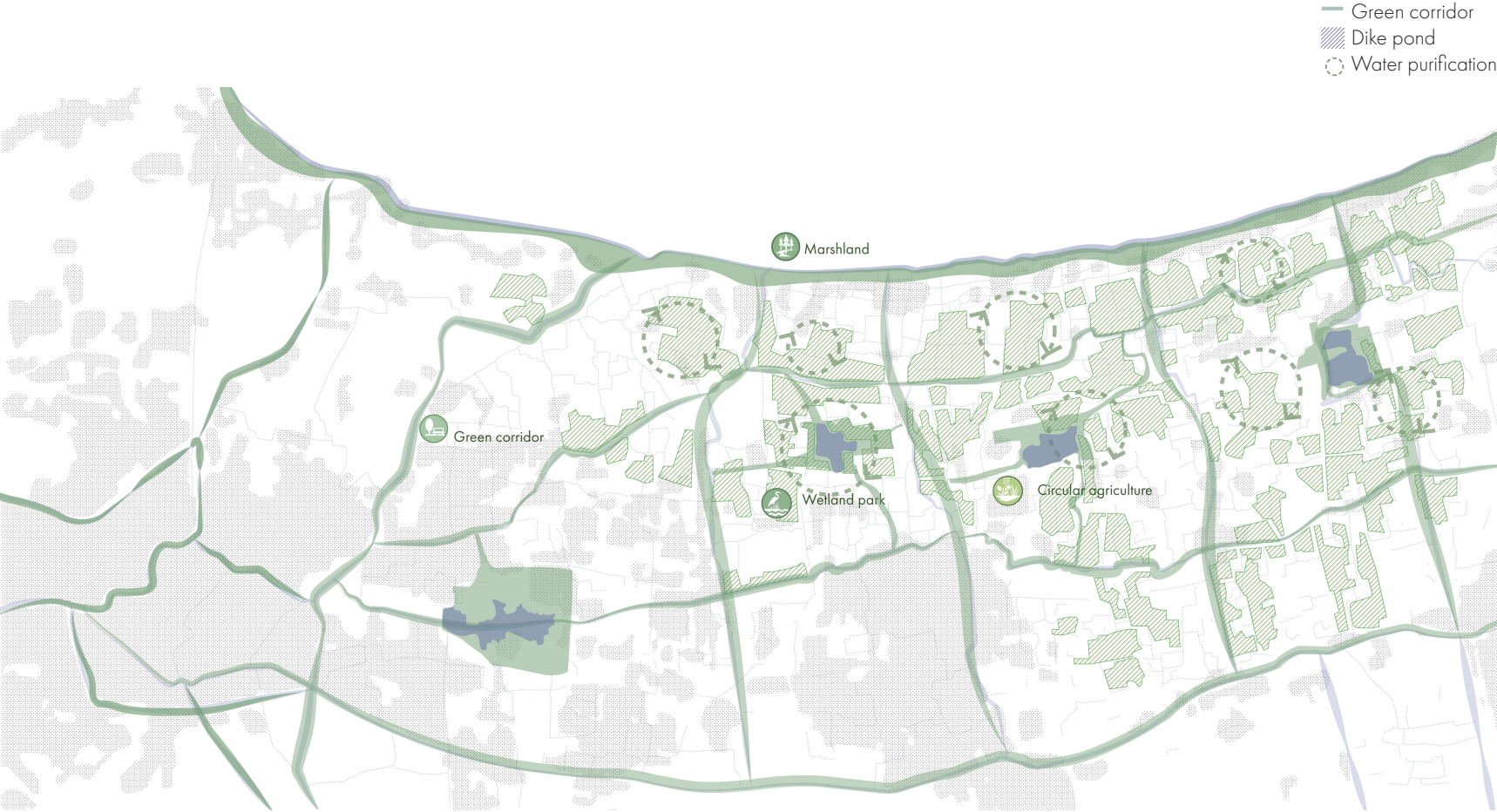
Strategy 04

Ecological water purification (dike pond, wetland)



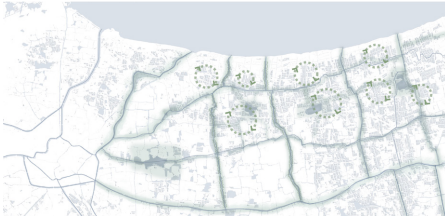
Sustainable agri/aquaculture

Improve water quality



Strategy 05

Make use of vegetation, and sludge to build circular agriculture



Slow waterfront space

- Improve spatial quality
- Protect cultural heritage



Strategy 06

More waterfront public space

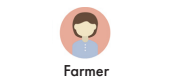
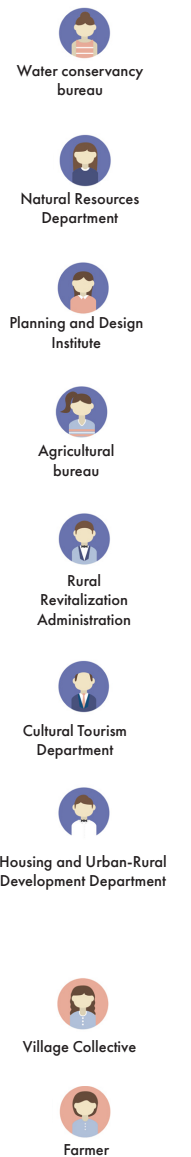
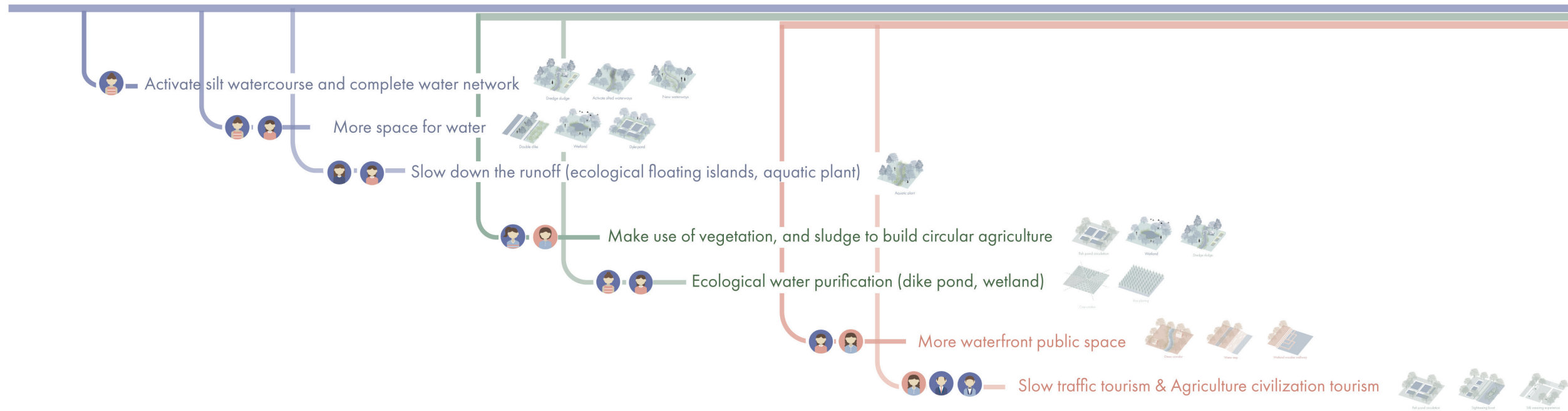
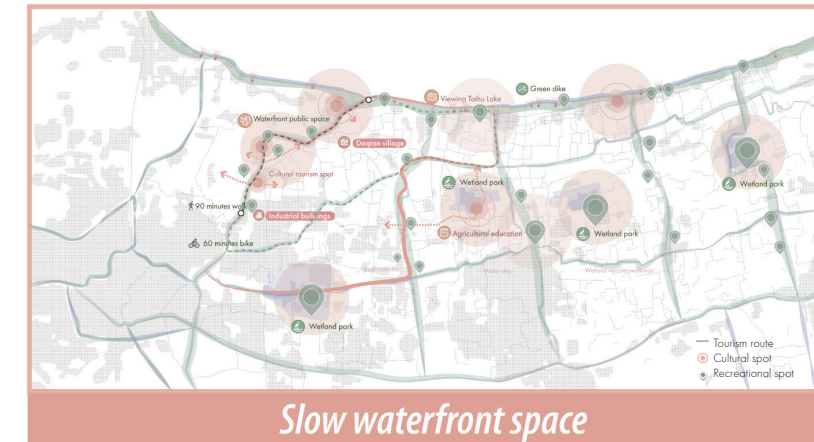
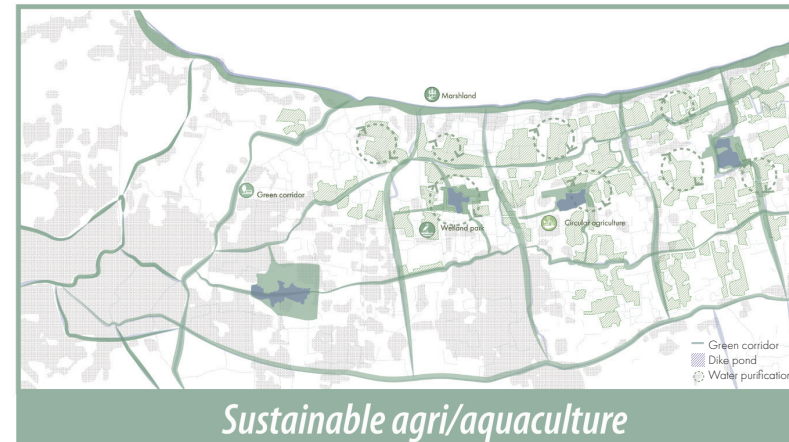
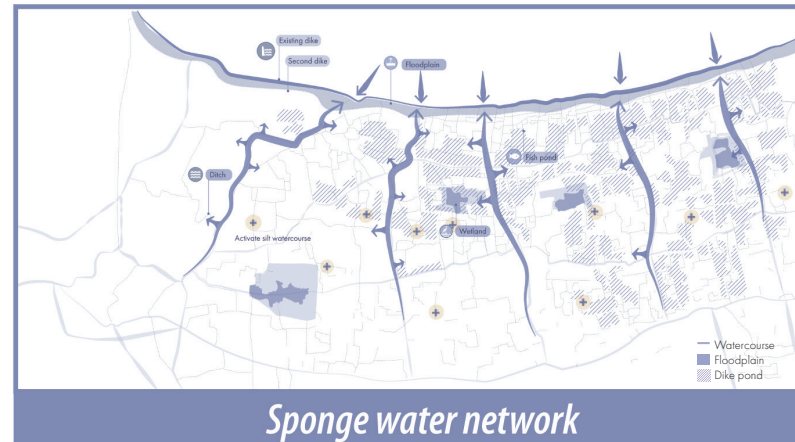


Strategy 07

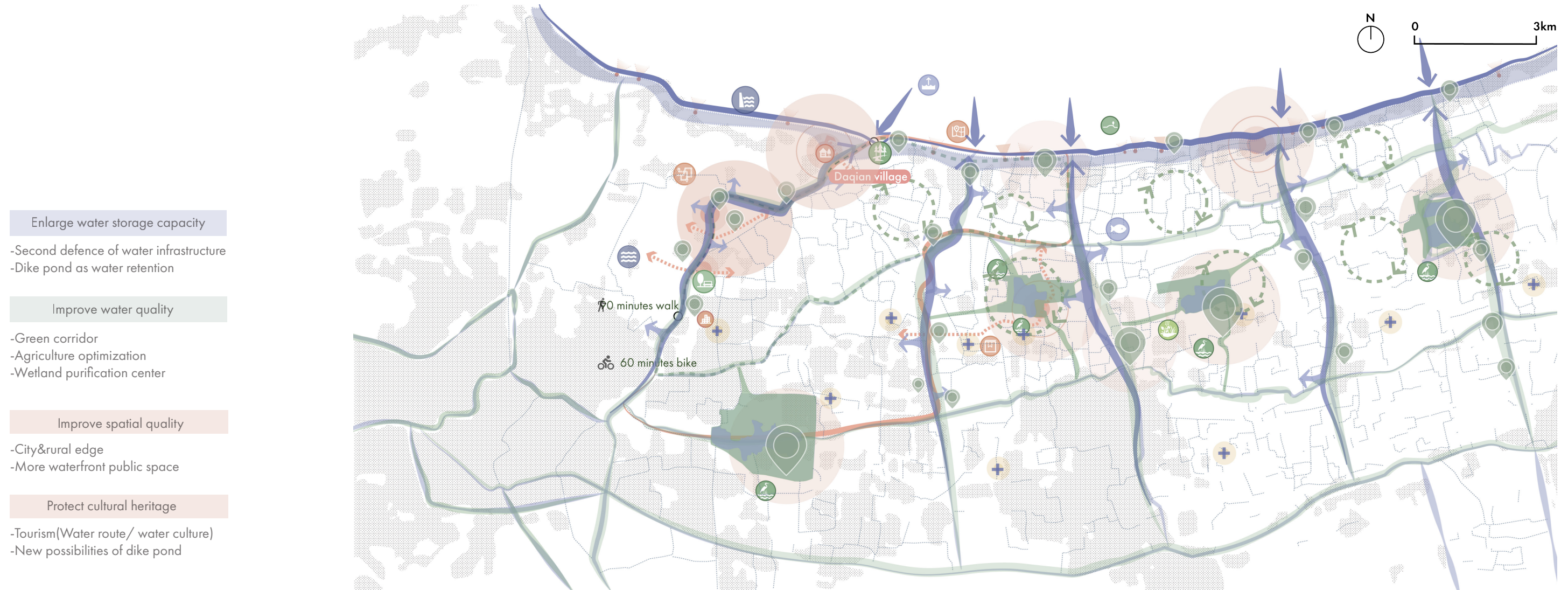
Slow traffic tourism, agriculture civilization tourism



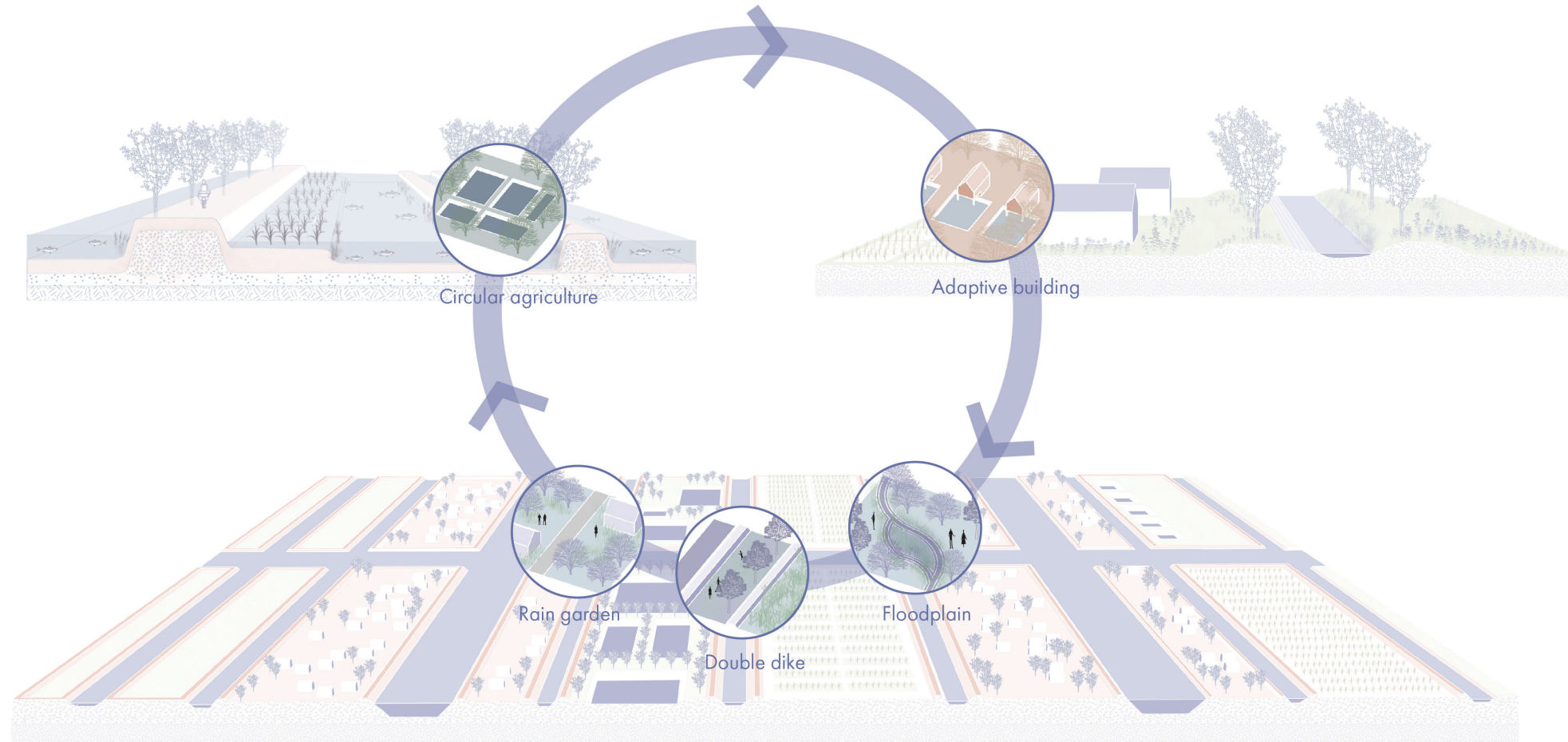
Strategy&Stakeholder



Design assignment



Rebuild the interdependent relationship



06 Design exploration

- Vision map--Resilient polder landscape
- Local scale design exploration
- Sponge lakeshore line
- Sponge agri/aquaculture
- Sponge peri-urban
- Conclusion



6.1 Vision map--Resilient polder landscape



0

3km

+RESTORE resilient water system

Enlarge water storage capacity

- Second defence of water infrastructure
- Dike pond as water retention

Improve water quality

- Green corridor
- Agriculture optimization
- Wetland purification center

+RENEW the public space

Improve spatial quality

- City&rural edge
- More waterfront public space

+REMIND people of cultural value

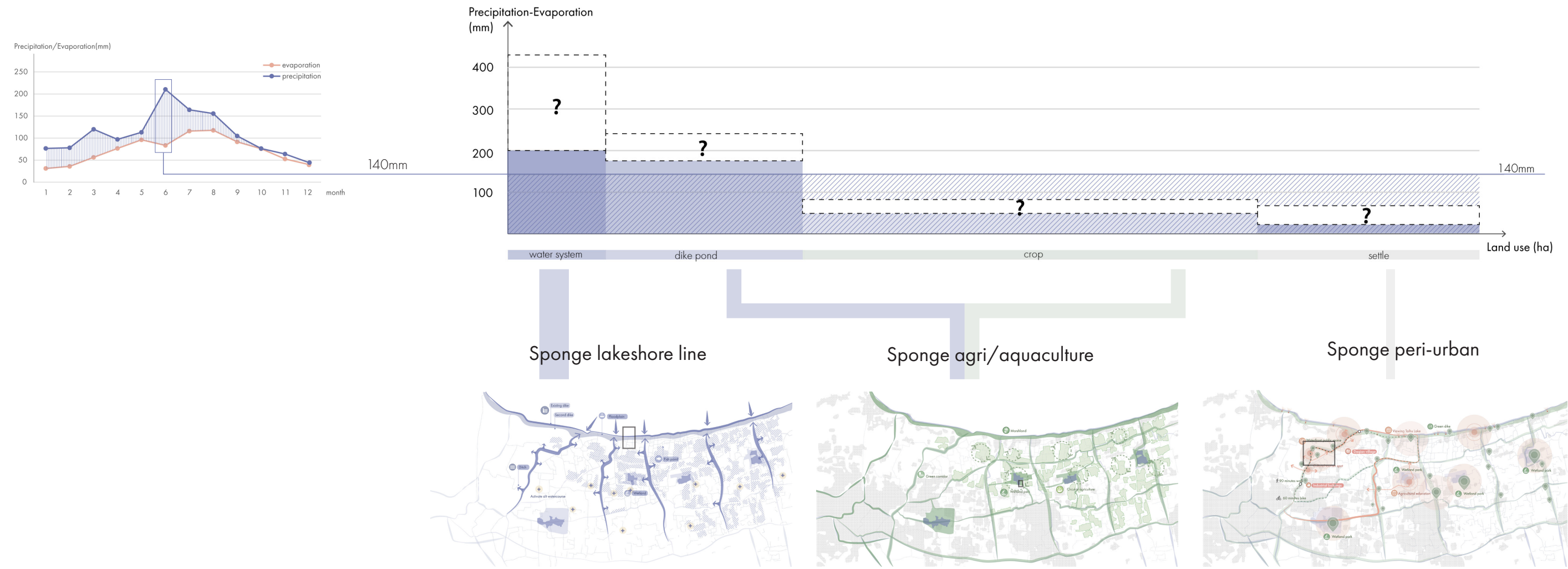
Protect cultural heritage

- Tourism(Water route/ water culture)
- New possibilities of dike pond

Figure 6.2 Vision map

- Traditional settlement
- City building
- Floodplain
- Green corridor
- Cropland
- Dike pond
- First dike
- Second dike
- Waterway

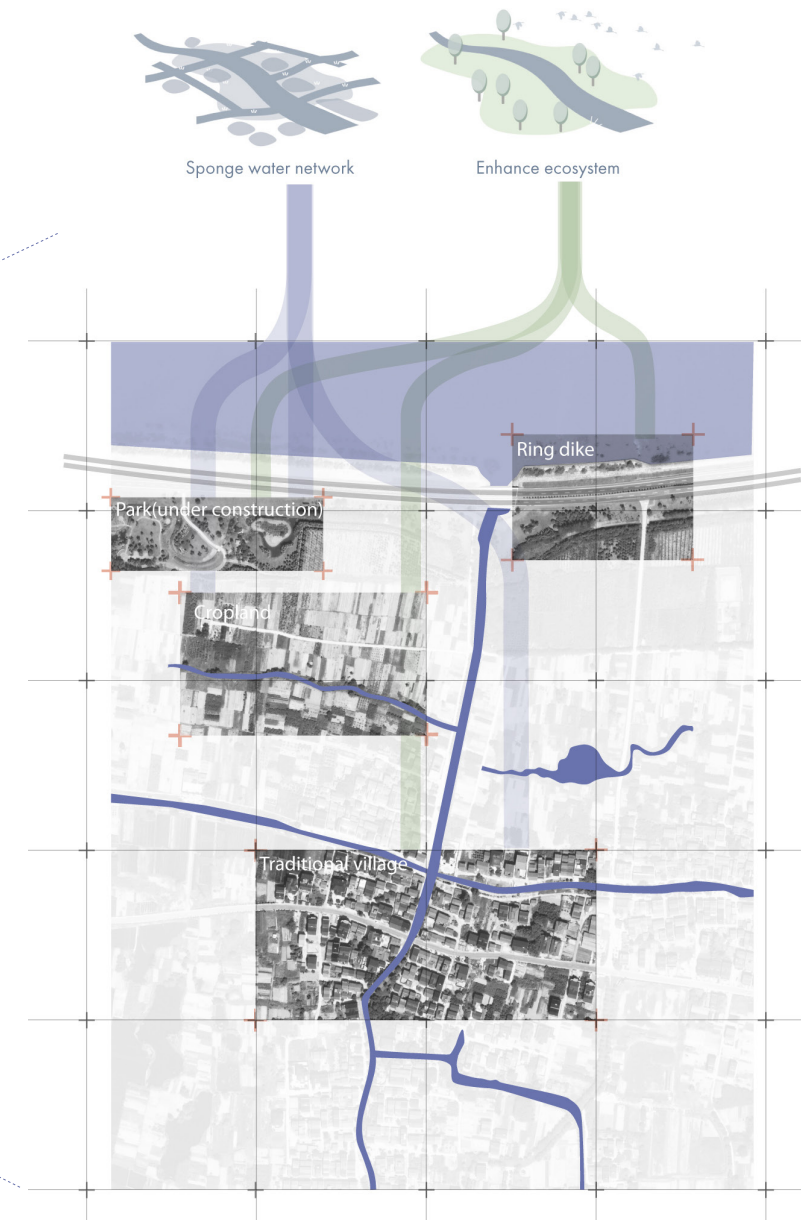
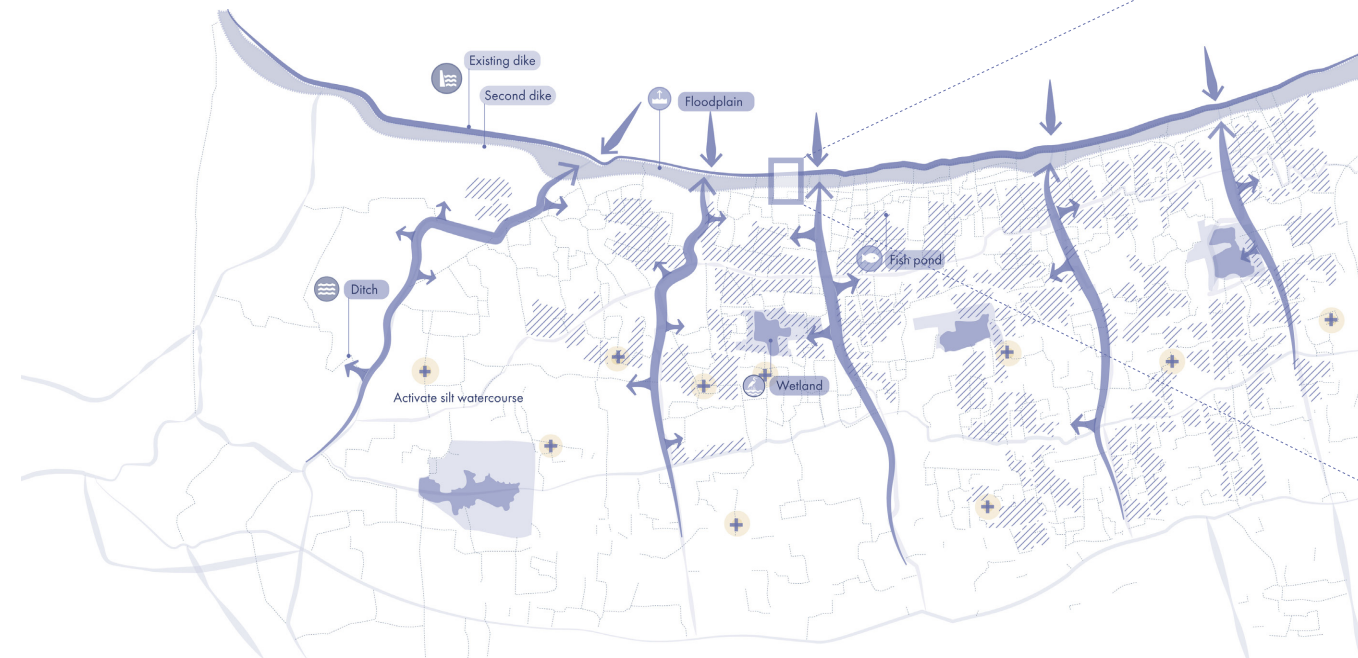
Rebuild the interdependent relationship



1/3 Sponge lakeshore line

+RESTORE resilient water system

Enlarge water storage capacity



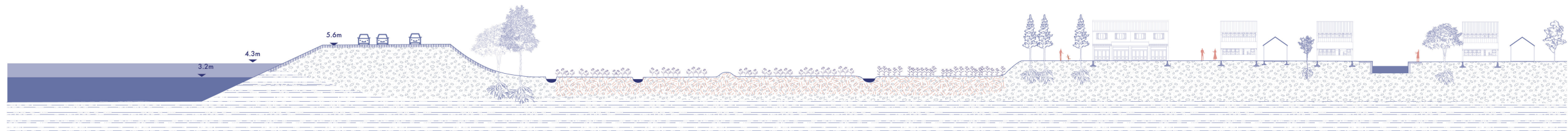
1/3 Sponge lakeshore line

Challenges

01 Dike segregation



02 Lack of public space



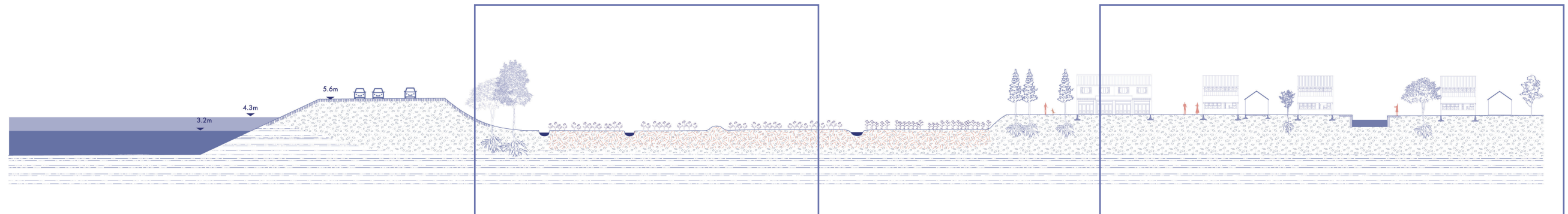
1/3 Sponge lakeshore line

Potential

- Enlarge water storage capacity
- Build the link between animals and Taihu lake
- Reconstruct the close relationship between people and the water.

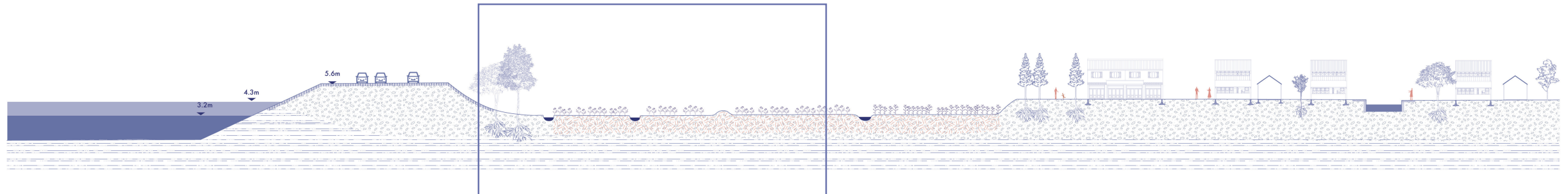
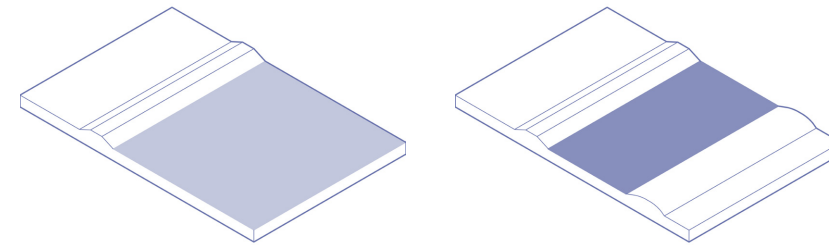
Pilot1 Double dike and floodplain

Pilot2 Neighborhood design





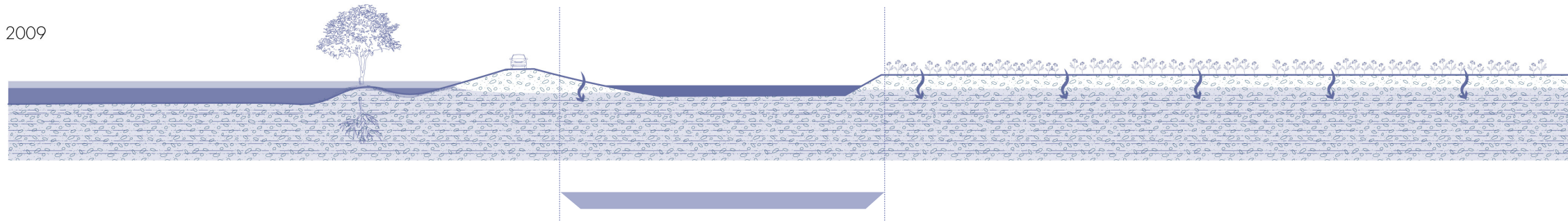
Pilot1 Double dike and floodplain



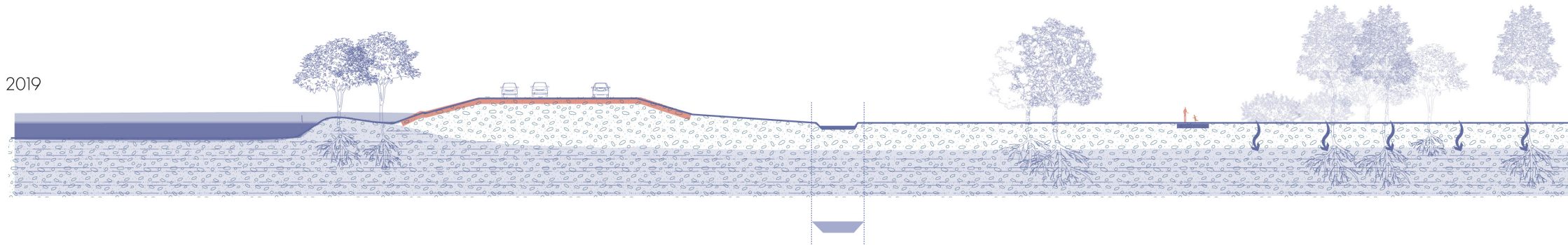
1/3 Sponge lakeshore line

Pilot1 Double dike and floodplain

2009

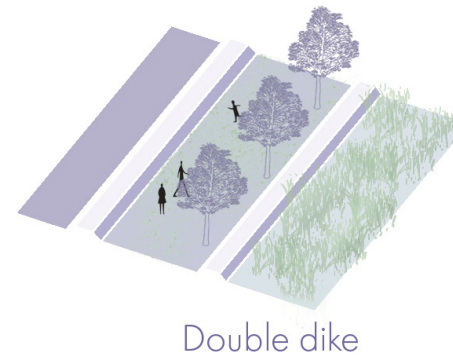


2019

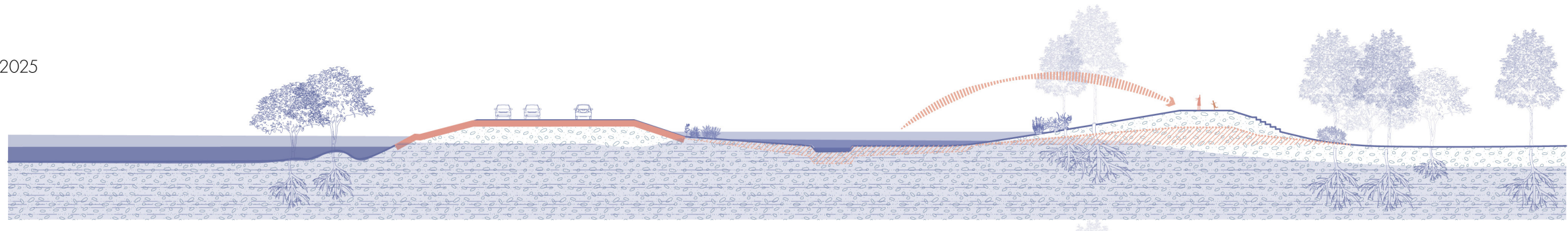


1/3 Sponge lakeshore line

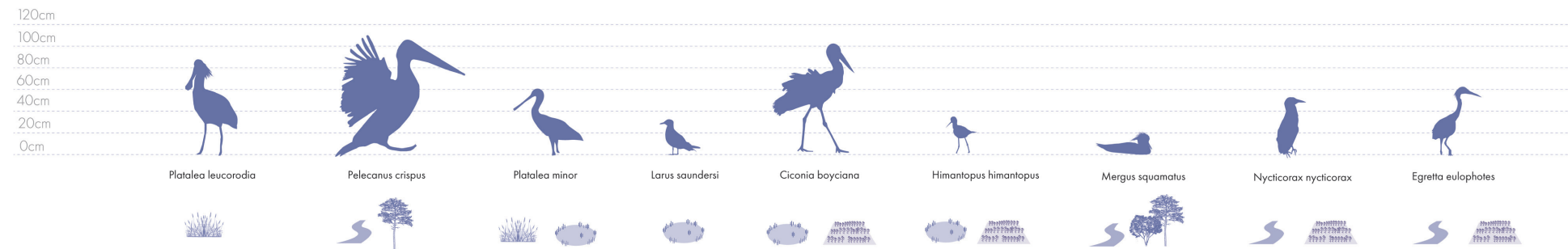
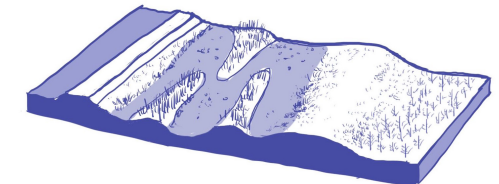
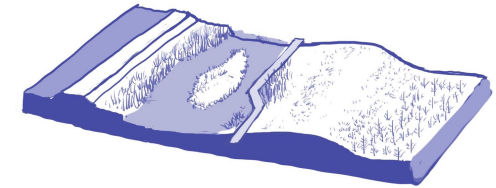
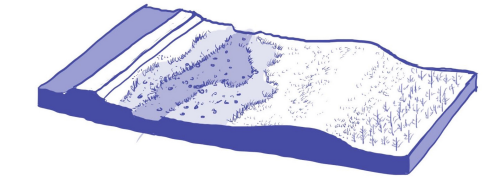
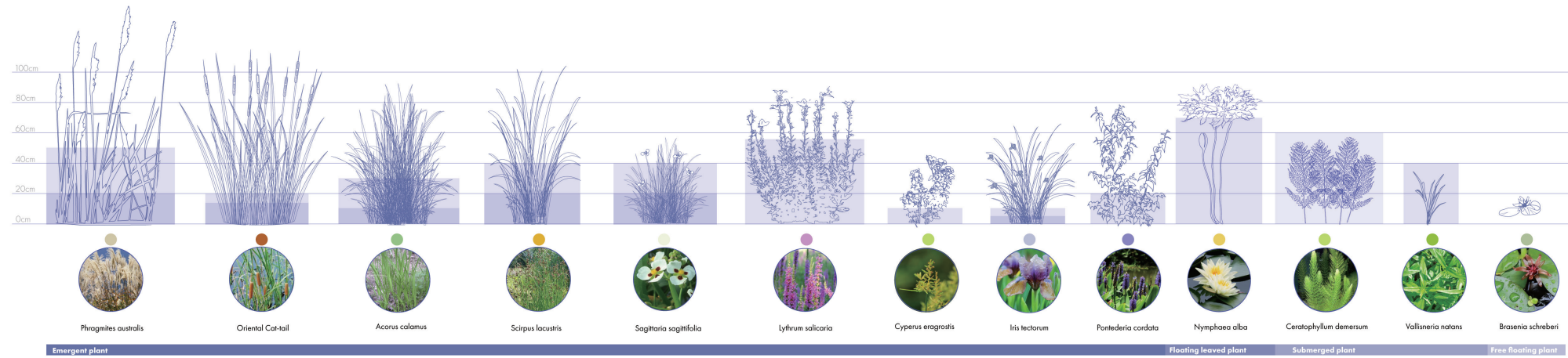
Pilot1 Double dike and floodplain



2025



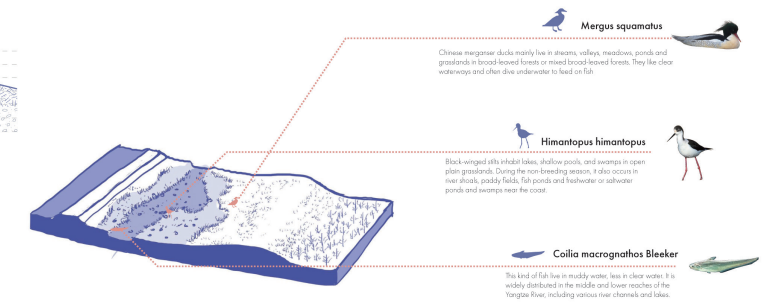
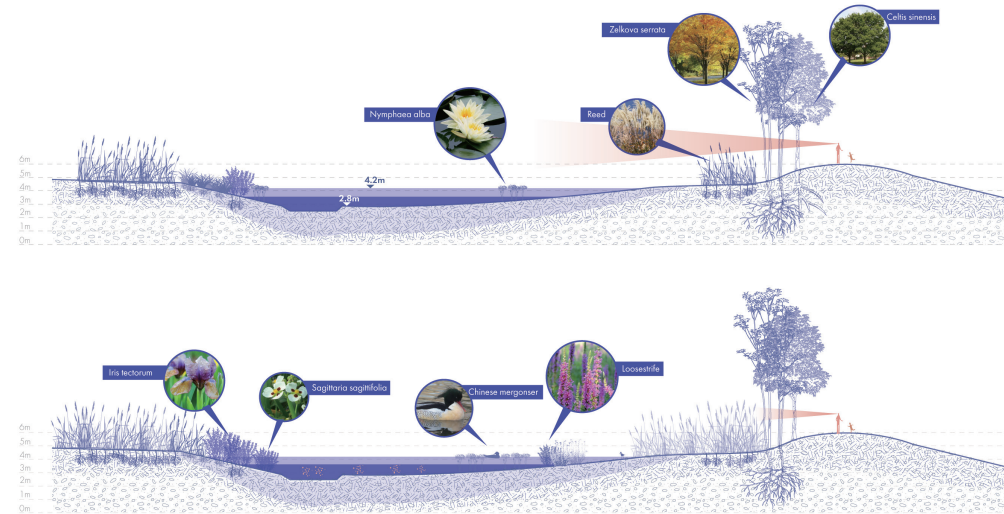
Pilot1 Double dike and floodplain



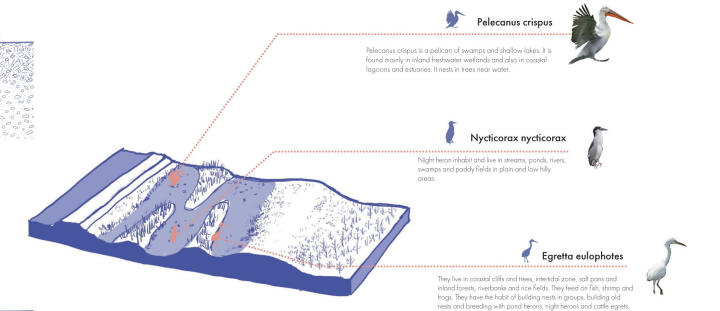
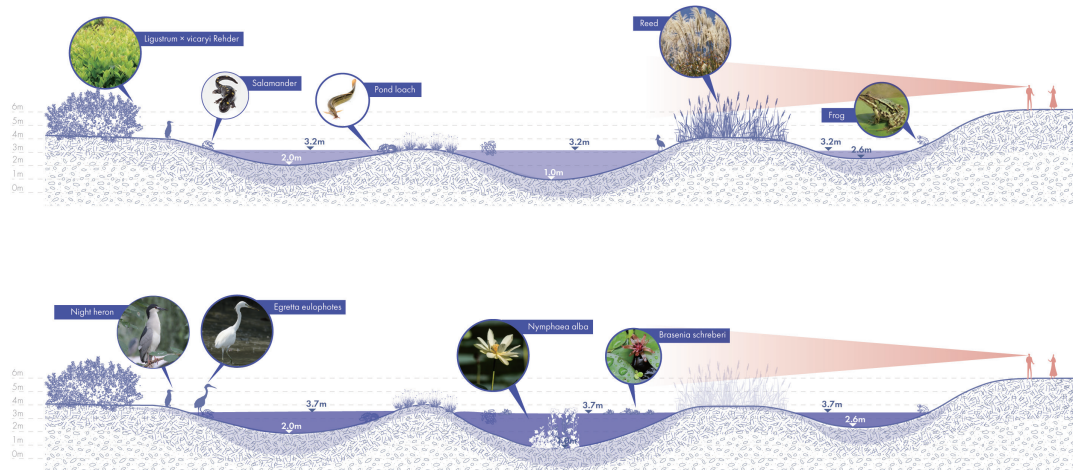
Pilot1 Double dike and floodplain

Natural succession in floodplain

01

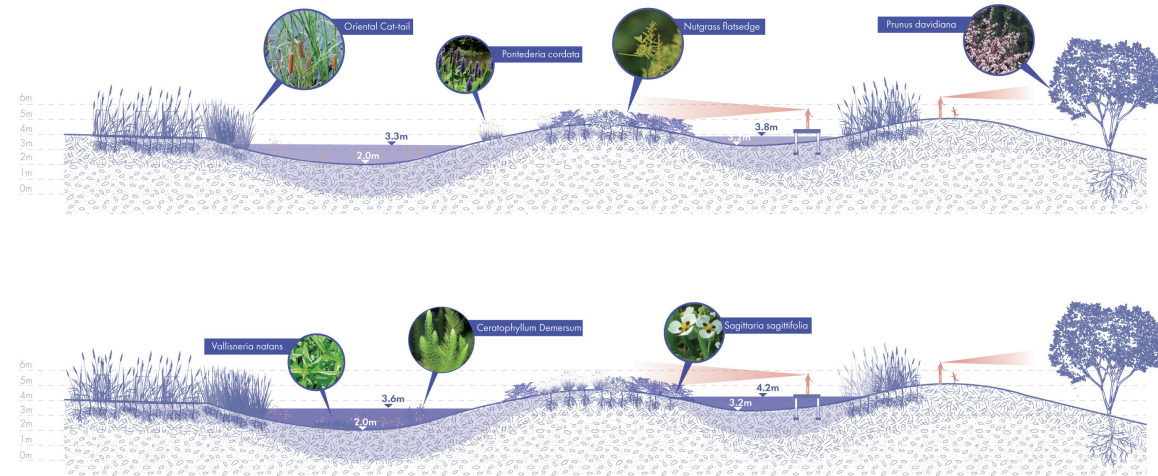
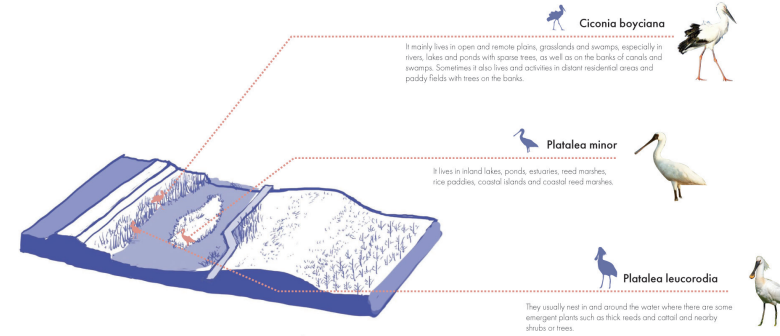


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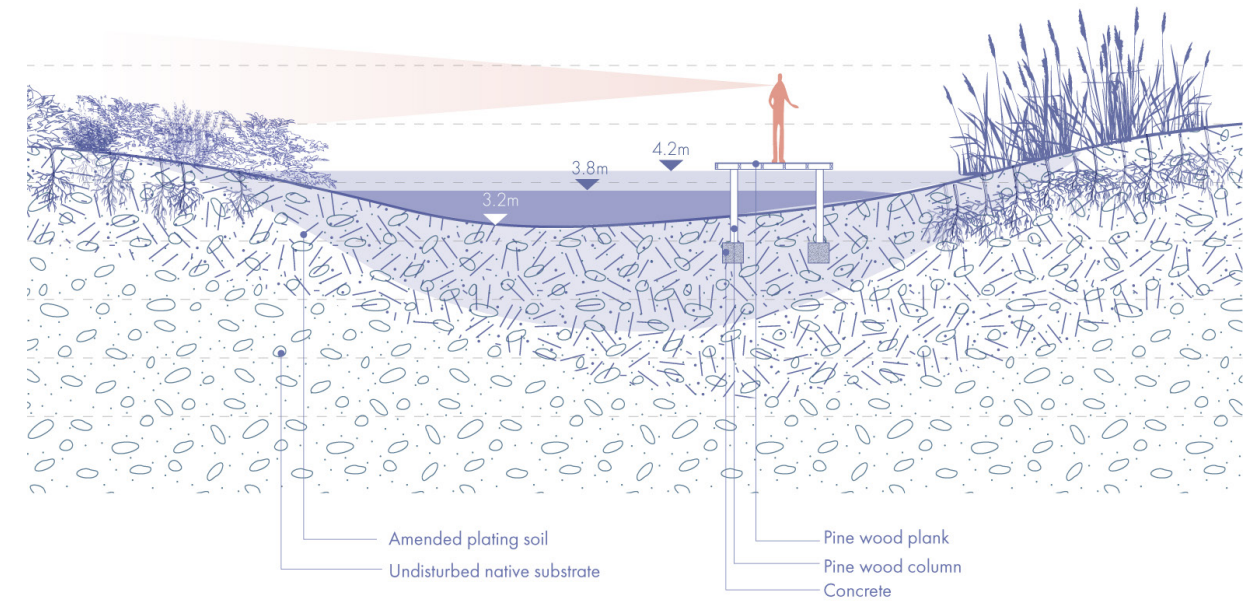


Pilot1 Double dike and floodplain

03



Accessible floodplain



Pilot1 Double dike and floodplain

Floodplain in dry season



+ Oriental Cat-tail

+ Loosestrife

+ Yellow-billed egret

+ Iris

+ Reed

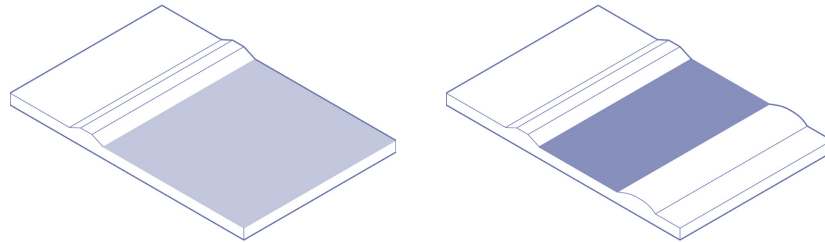
Pilot1 Double dike and floodplain

Floodplain in rainy season



Conclusion

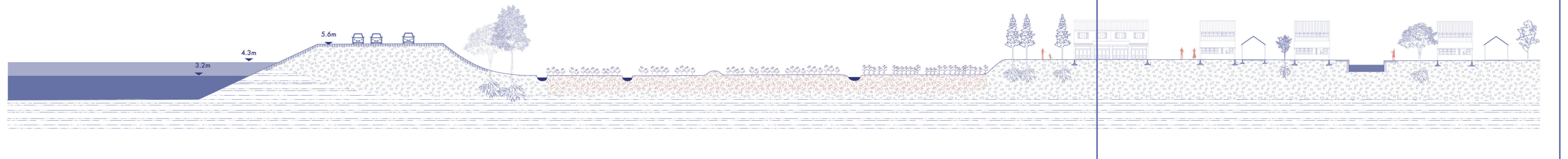
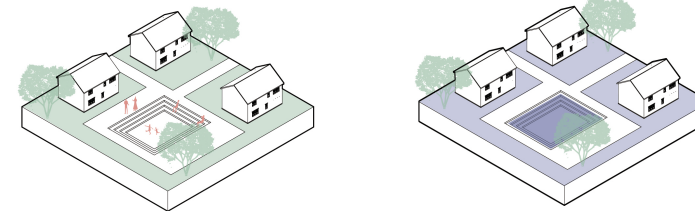
Restore resilient water network



- Double dike** protect lake shoreline, ensuring the water safety;
- Space between two dikes become **floodplain**, which not only enlarge water storage capacity, but also provide habitats for flora and fauna, enhancing the ecosystem;
- Water fluctuation triggers the **natural succession** in the floodplain.



Pilot2 Neighborhood design



Pilot2 Neighborhood design

Existing condition--Impermeable surface and hard bank



Source: https://m.thepaper.cn/baijiahao_15285109



Source: <https://baijiahao.baidu.com/s?id=1655243482328567847&wfr=spider&for=pc>

Pilot2 Neighborhood design

Traditional wisdom-- courtyard water collection



Source: Draw based on http://agzy.youth.cn/qsnag/zxbd/202106/t20210623_13043999.htm

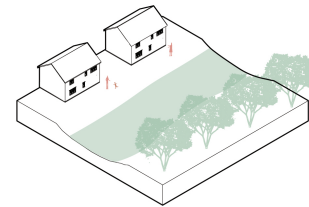
Pilot2 Neighborhood design

Water management

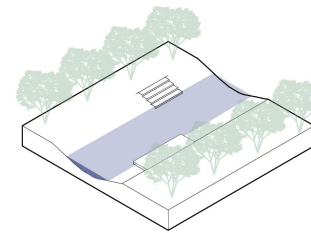


Pilot2 Neighborhood design

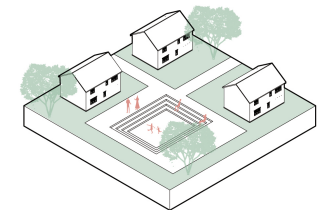
Dry season



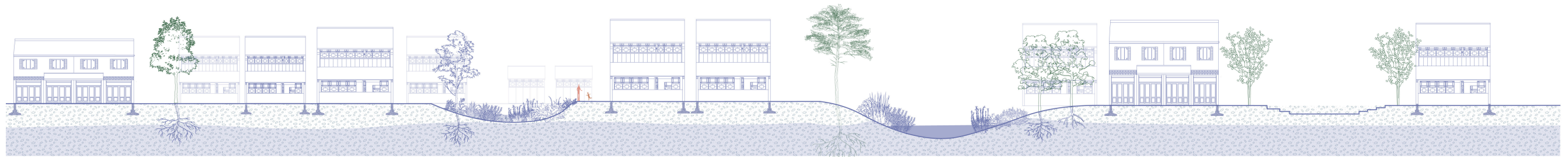
Bioswale



Soft bank

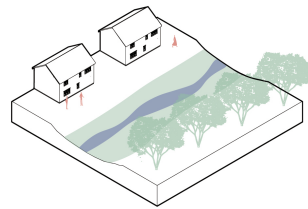


Water square

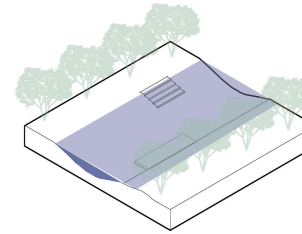


Pilot2 Neighborhood design

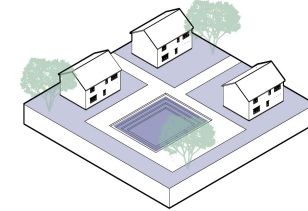
Rainy season



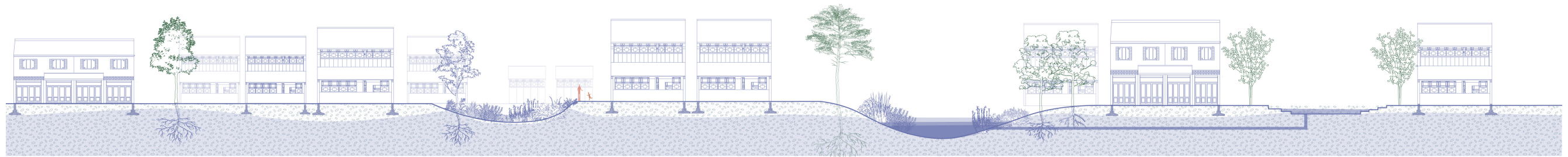
Bioswale



Soft bank



Water square



1/3 Sponge lakeshore line

Bioswale in neighborhood



Traditional settlement

+ Bioswale

+Porous paving

+Gravel

1/3 Sponge lakeshore line

Sponge lakeshore line plan

Dry season



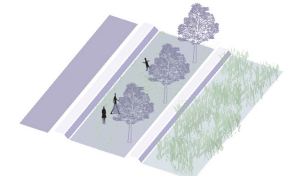
Rainy season



- ① Protective bank
- ② Flood plain
- ③ Double dike
- ④ Paddy field
- ⑤ Rain garden
- ⑥ Bioswale
- ⑦ Wetland



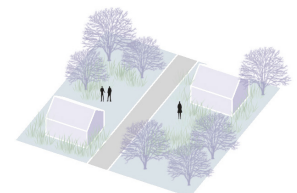
Floodplain



Double dike



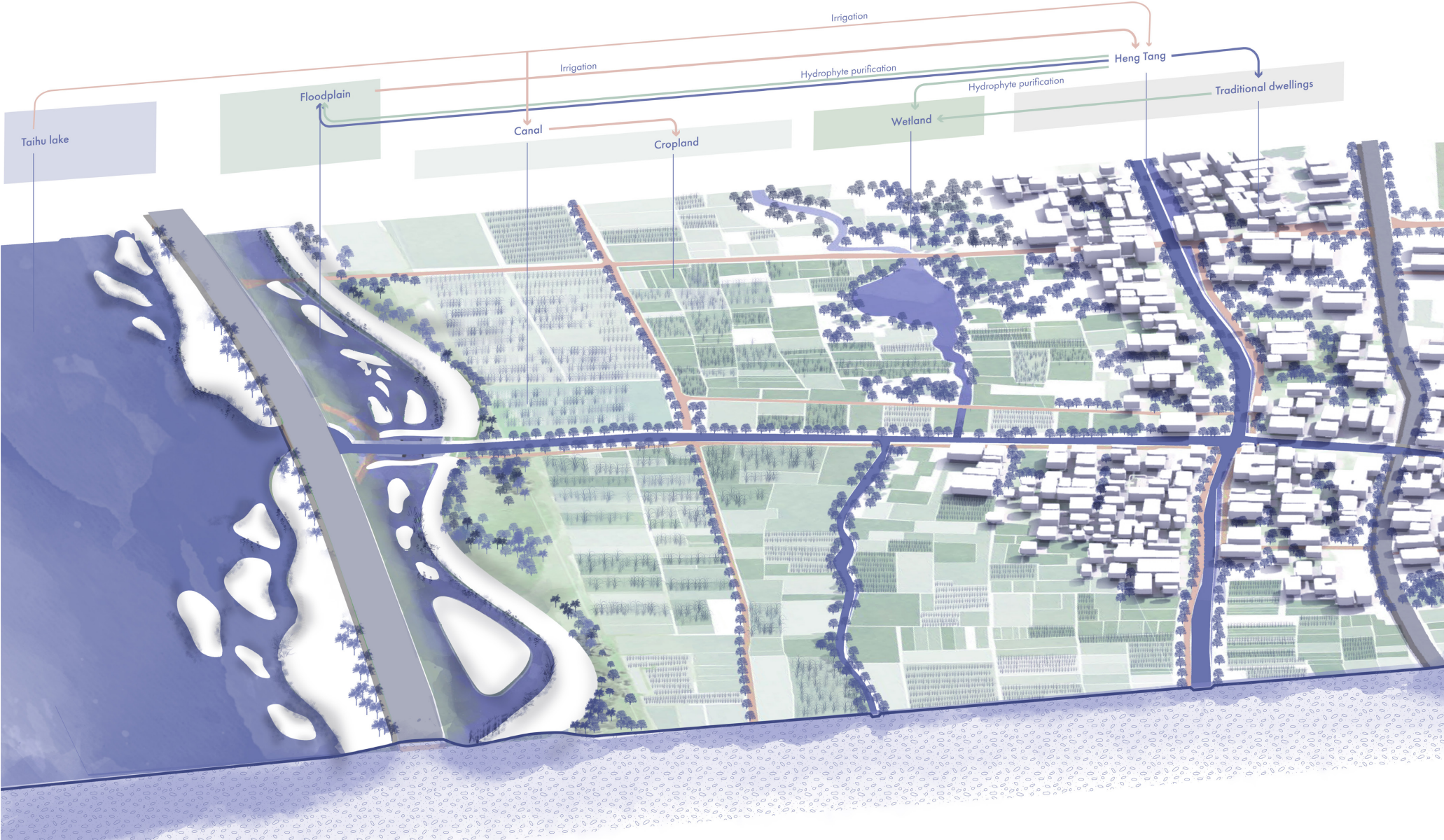
Wetland ecosystem



Rain garden

Sponge lakeshore line birdview

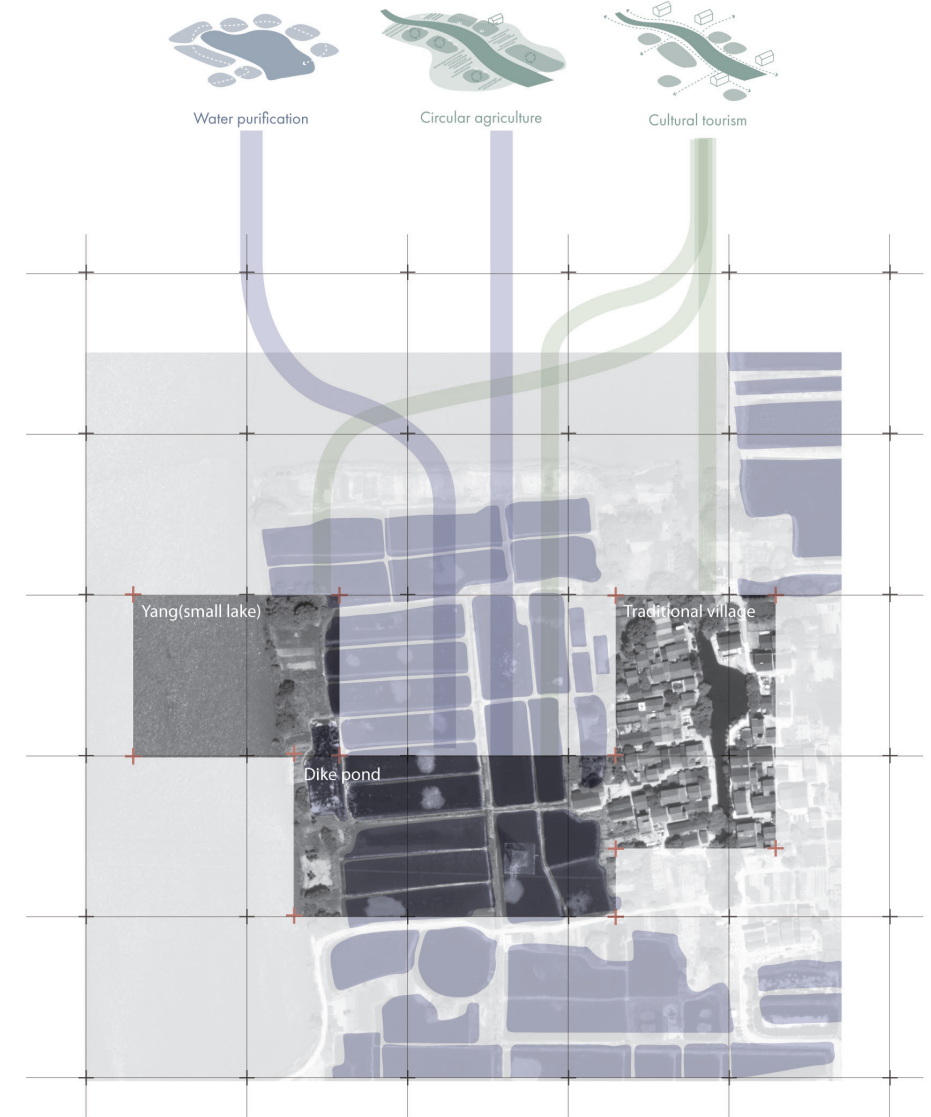
Sponge water network system **increases the water resilience** in the region as well as **generates natural succession** and **benefits for the spatial quality**.



2/3 Sponge agri/aquaculture

+RESTORE resilient water system

Improve water quality



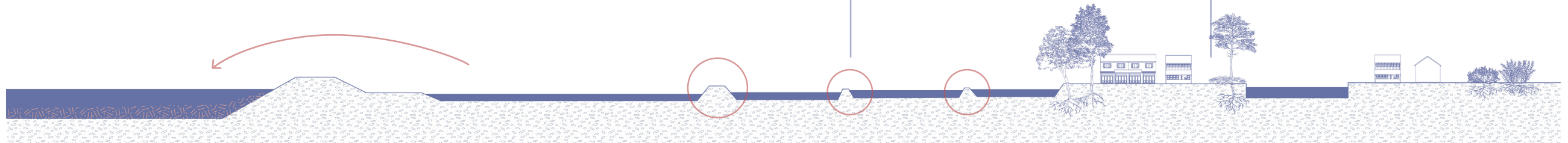
2/3 Sponge lakeshore line

Challenges

Pond water pollution

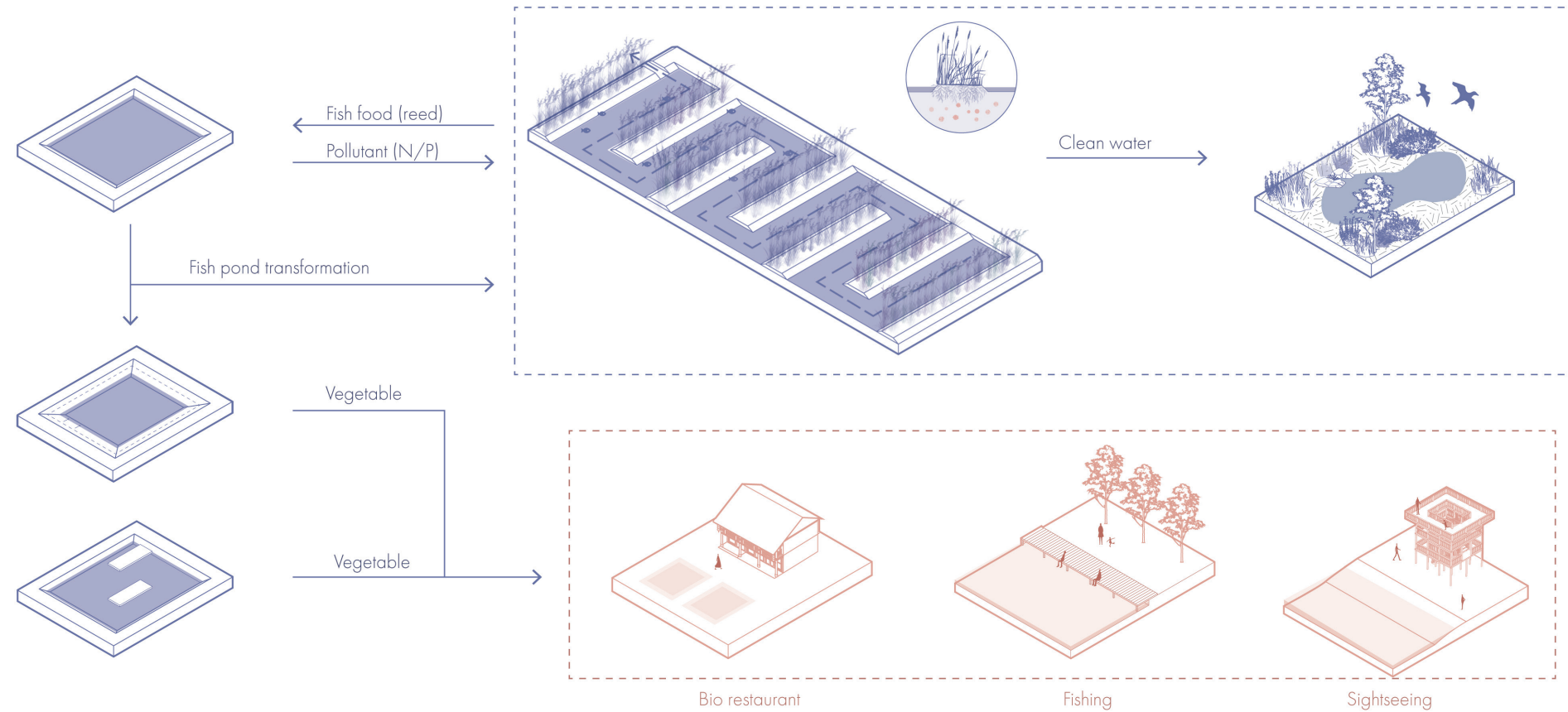


Fragile dike



2/3 Sponge lakeshore line

New possibilities for dike pond



2/3 Sponge agri/aquaculture

Circular agriculture vision



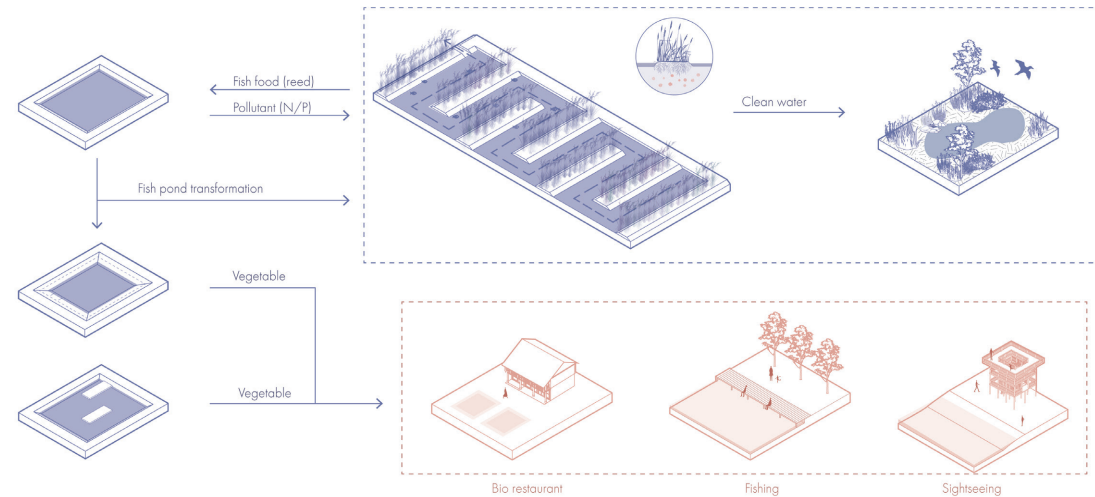
2/3 Sponge agri/aquaculture

Purification pond recreation



Conclusion

Restore resilient water network



- A new **sustainable and circular** way to reduce the pollutant from aquaculture, as well as to integrate with **educational and recreational functions**.
- Transforming dike ponds to **adapt to modern ecological and economic development**, ensuring their viability in the current context.

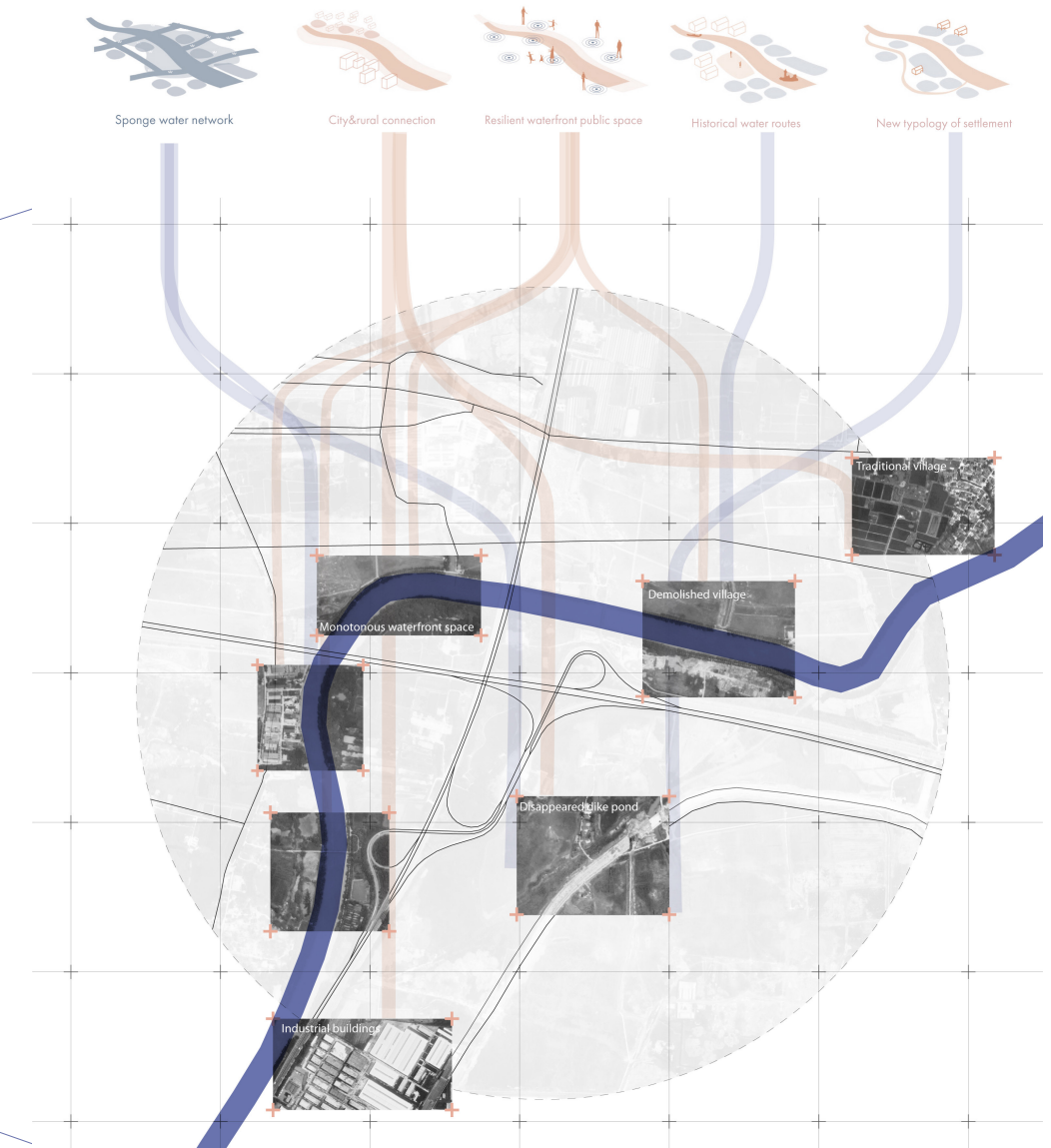
3/3 Sponge peri-urban

+RENEW the public space

Improve spatial quality

+REMIND people of cultural value

Protect cultural heritage



3/3 Sponge peri-urban

Challenges

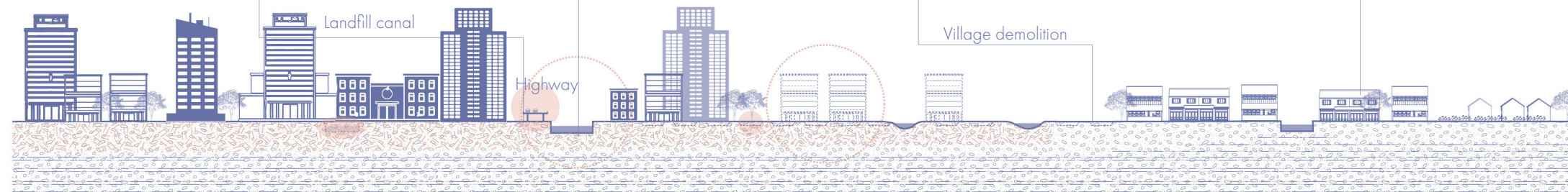
Monotonous waterfront space



Disappeared dike pond



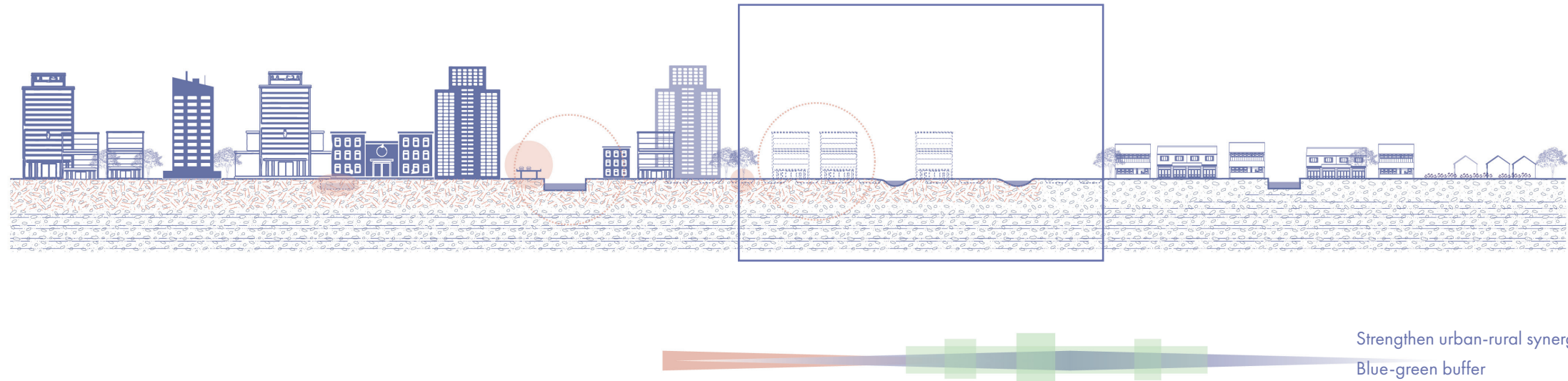
City expansion



Flooding
Urbanization
Fragmented green space

3/3 Sponge peri-urban

Potential



3/3 Sponge peri-urban

Water management

Water system in 2016

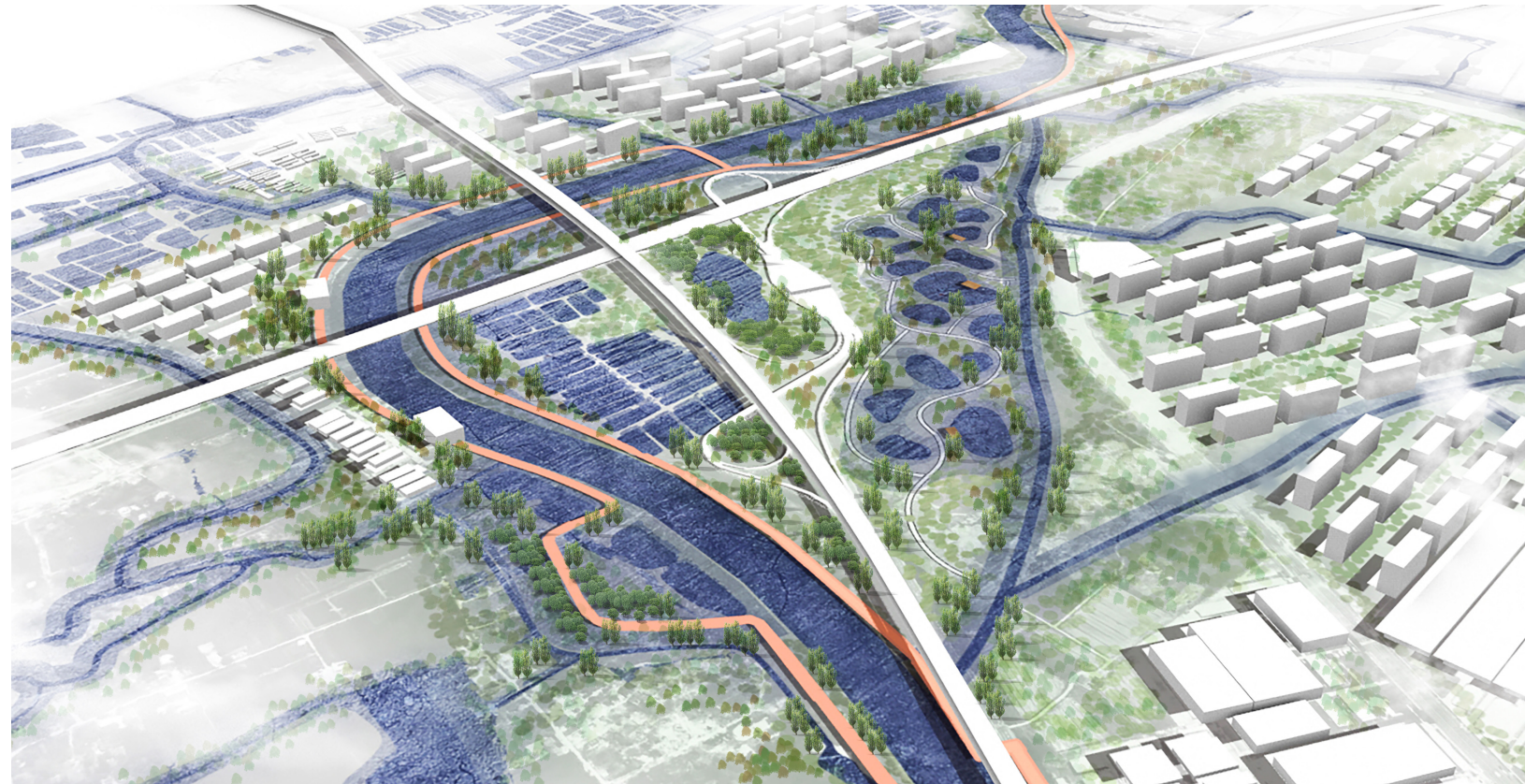


Water system in 2021



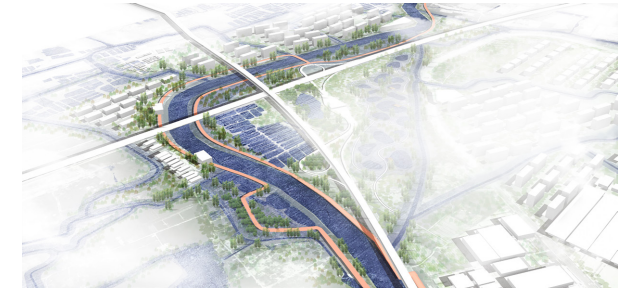
3/3 Sponge peri-urban

Sponge peri-urban birdview



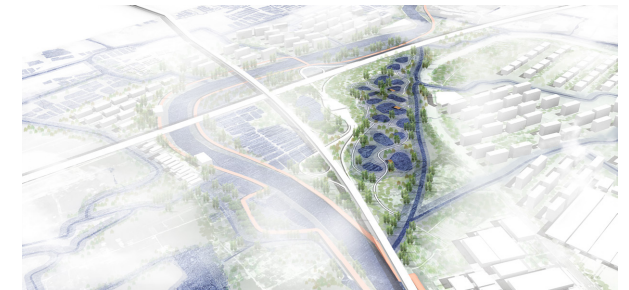
Riverfront design

Natural
-Resilient riverfront
-Slow traffic combined with social activities



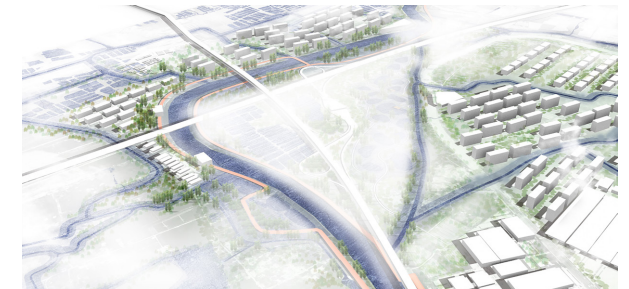
Pond space design

Cultural
-Dike pond space translation



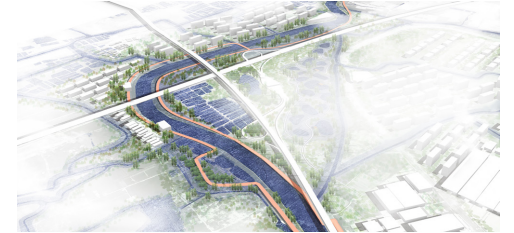
Water adaptive building

Social
-Water adaptive building

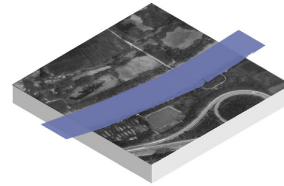


3/3 Sponge peri-urban

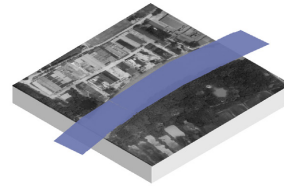
01 Riverfront design



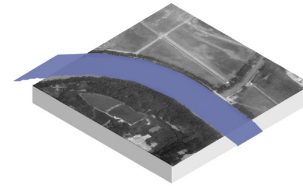
Existing conditions



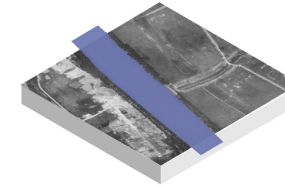
Abandoned pond



Building + Forest

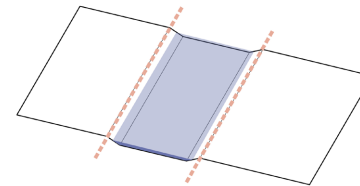


Filled land + Forest



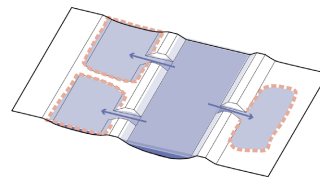
Removed house + Filled land

Before

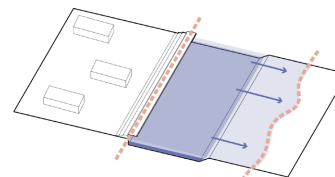


Hard bank

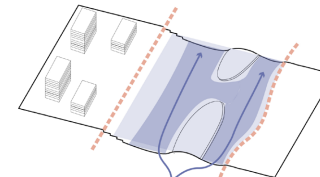
After



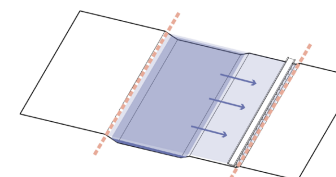
Abandoned dike pond
as retention pond



Higher bank with steps



Steps + Island



Flood plain

3/3 Sponge peri-urban

01 Existing Riverfront



3/3 Sponge peri-urban

01 Resilient riverfront design

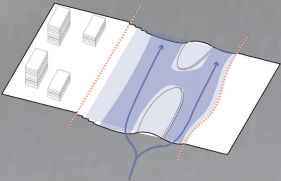


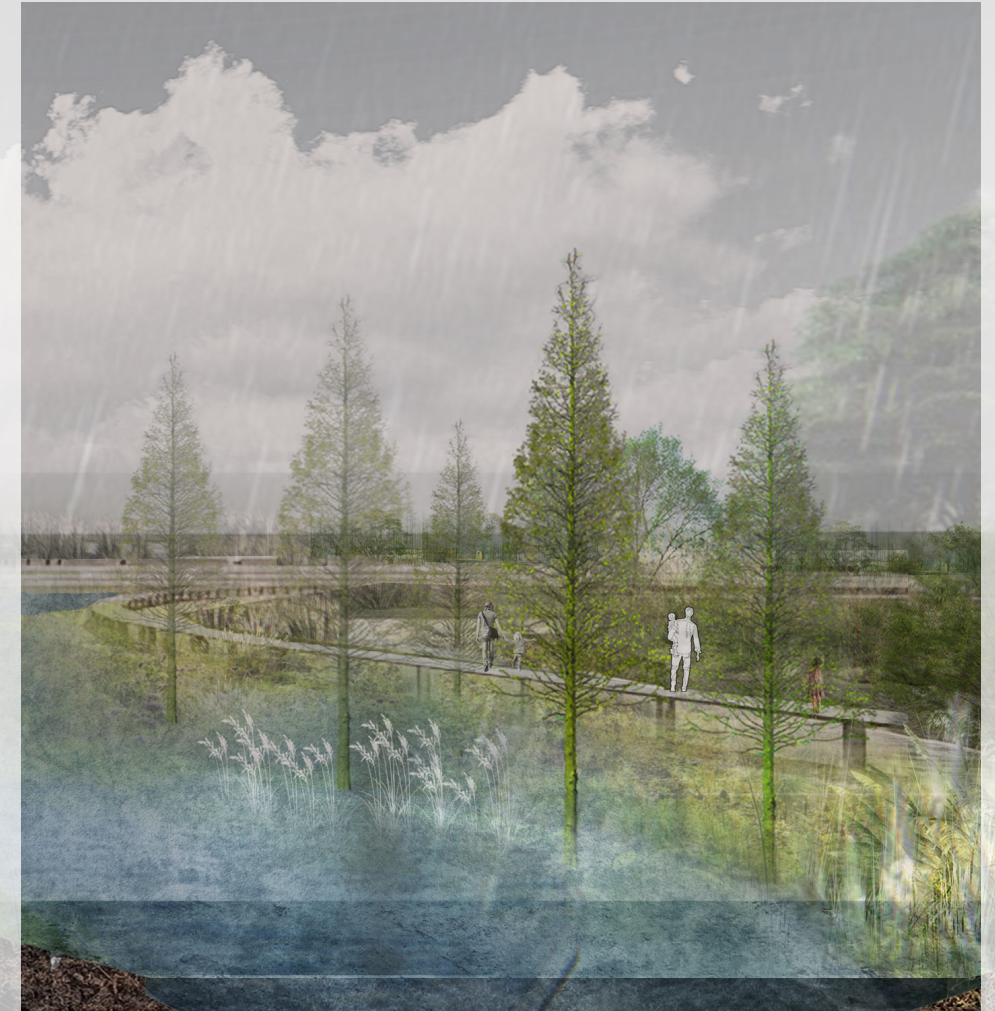




3/3 Sponge peri-urban

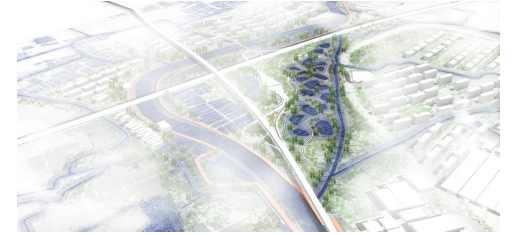
01 Resilient riverfront design





3/3 Sponge peri-urban

02 Pond space design



2016



Source: Google map

2021



2025



3/3 Sponge peri-urban

02 Pond space design

Enclosed feeling of dike pond-- Introverted space



Source: <http://www.ciae.com.cn/detail/zh/16186.html>

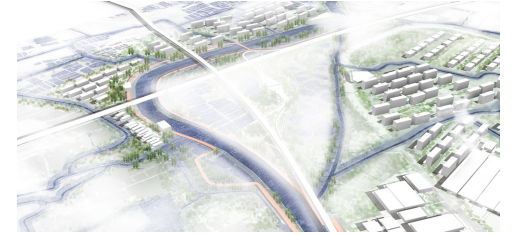
3/3 Sponge peri-urban

02 Pond space design



3/3 Sponge peri-urban

03 Water adaptive building



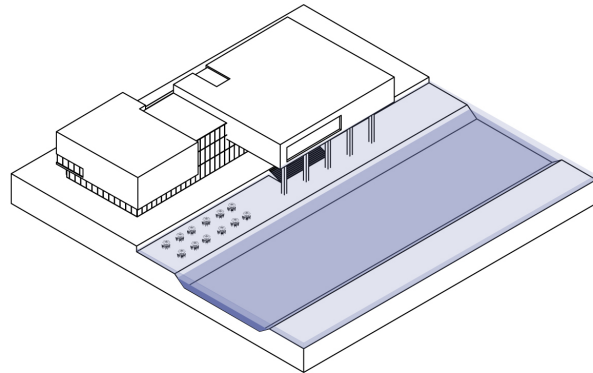
Gengzhi tu
Source: Retrieved from website:<https://www.shuge.org/ebook/geng-zhi-tu/>

3/3 Sponge peri-urban

03 Water adaptive building

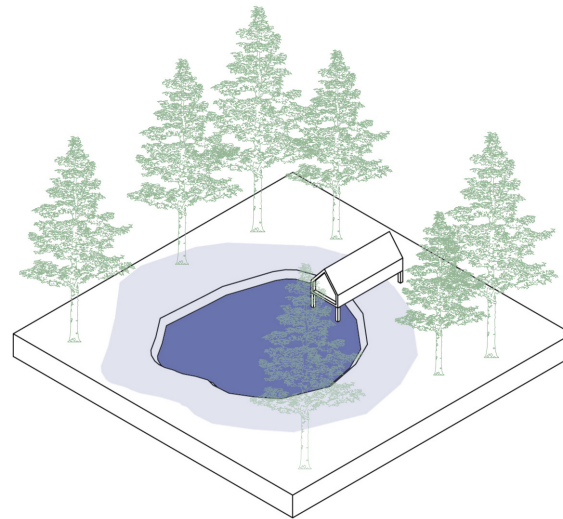
01 Commercial building

Waterfront open public space



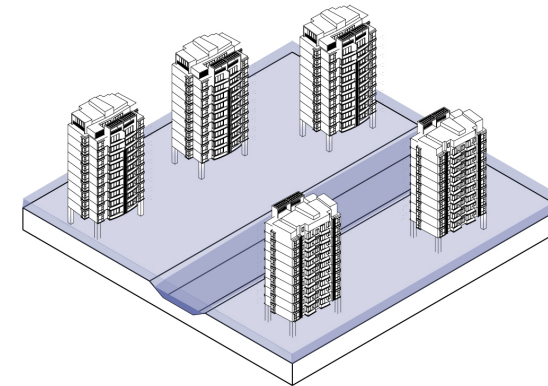
02 Viewing building

Semi-open pond space



03 Residential building

Community space



3/3 Sponge peri-urban birdview

- Establishing a well-connected **sponge water system**;
- Transforming dike ponds into **visible** recreational spaces;
- Aiming to **strengthen urban-rural synergy**, and integrate water storage function with entertainment function, while also preserving and promoting the **cultural value** of the area.



3/3 Sponge peri-urban plan

Dry season



Normal season



Rainy season



Figure6.36 Phasing plan of Peri-urban

Strategic phasing

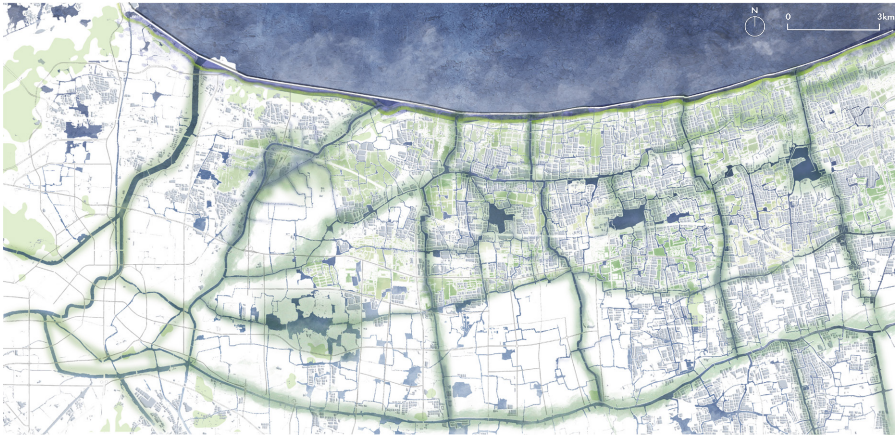
2023-2025



Sponge water network

- 1. Activate the silt watercourse and create a well-connected water network;
- 2. Secondary dike and floodplain, expanding more space for water;
- 3. Slow down the runoff from the south side;
- 4. Rebuild the close relationship between local people and water.

2025-2030



Green network

- 1. Utilize the sediment as nutrient-rich fertilizer for cultivating vegetables on the dike;
- 2. Transform some of the fish ponds into purification ponds for water treatment purposes;
- 3. Introduce the new dike pond to the public, converting it into a recreational area and combining it with the educational function.

2030-2035



Social conectivity

- 1. A variety of appealing recreational areas will be constructed;
- 2. Visitors will have access to leisurely tourism routes that combine slow traffic exploration and agricultural civilization experiences.

07 Conclusion&Reflection

-Conclusion
-Reflection



Understanding

What is the traditional polder system and how is the polder system connect to Taihu lake?

Principles

What are the design principles of polder landscape systems from the perspective of water, ecology, settlement, and agriculture systems?

Application

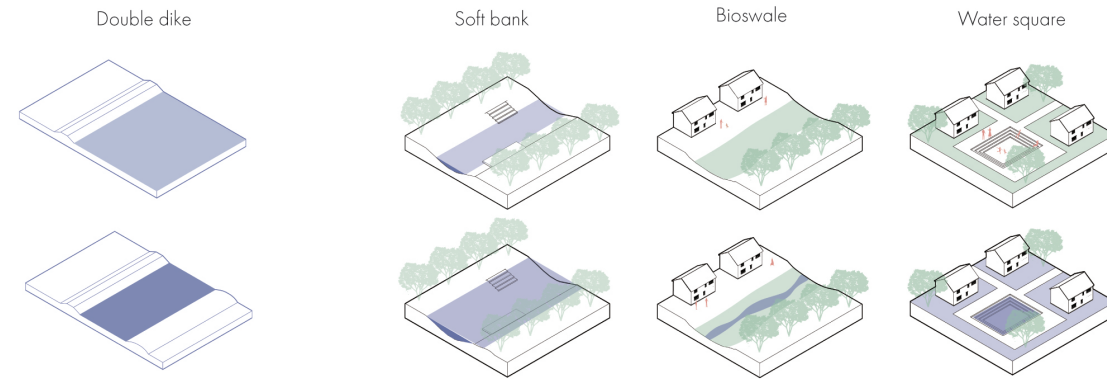
How to apply the design principles in Lougang polder in the Taihu lake basin?

Reflection

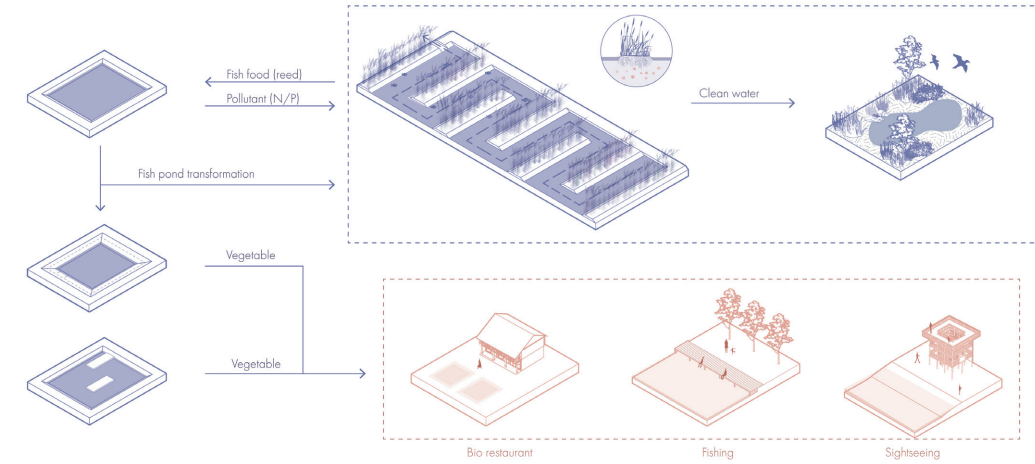
To what degree do the strategies and principles increase resilience in polder landscapes?

Resilience reflection

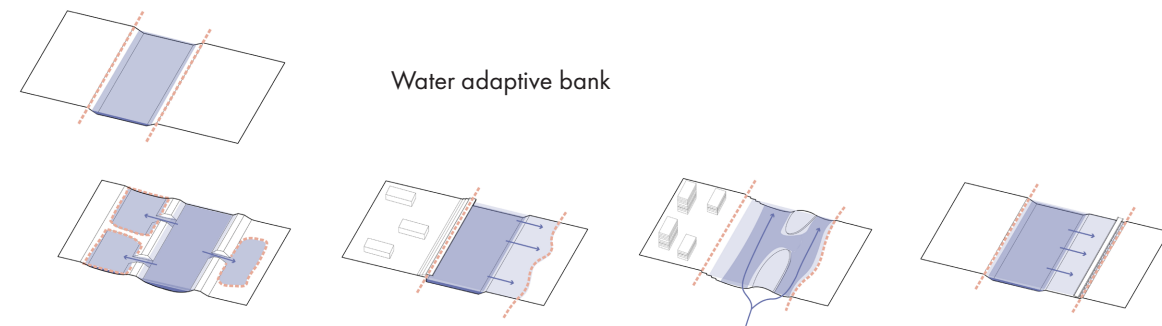
Sponge lakeshore line



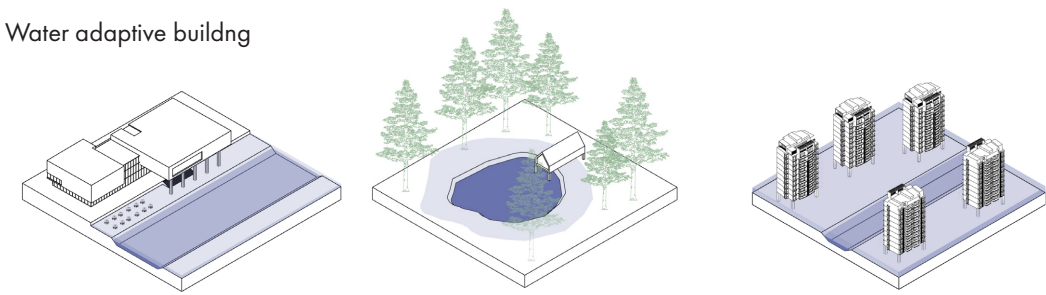
Sponge agriculture



Sponge peri-urban



Water adaptive building



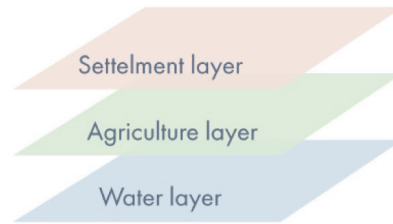
Research Objective

To identify design strategies and principles for **water-resilient polder landscapes** in the Taihu Lake basin while protecting **cultural heritage** through learning from history.

Understanding

What is the traditional polder system and how is the polder system connected to Taihu lake?

Cultural landscape



Challenges

Challenge3: Road segregation & City expansion
 Challenge2: Monoculture & Agriculture water pollution
 Challenge1: Flooding

Traditional wisdom

Dynamic waterfront public space
 Mulberry dike fish pond
 Well coordinated water infrastructure

Case study

Bishan-Ang Mo Kio Park
 The Oostvaardersplassen
 Jianyang lake wetland park

Principles

Principle

- 01 Sponge water network
- 02 Water purification
- 03 Enhance ecosystem
- 01 Circular agriculture
- 02 Cultural tourism
- 01 City&rural connection
- 02 Resilient waterfront public space
- 03 Historical water routes
- 04 New typology of settlement

Application

Strategy

- 01 Activate silt watercourse and complete water network
- 02 More space for water
- 03 Slow down the runoff (ecological floating islands, aquatic plant)
- 04 Ecological water purification (dike pond, wetland)
- 05 Make use of vegetation, and sludge to build circular agriculture
- 06 More waterfront public space
- 07 Slow traffic tourism and agriculture civilization tourism

Reflection

Resilience evaluation

Multifunctionality
 Redundancy and modulization
 (Bio and social) diversity
 Multi-scale networks and connectivity
 Adaptive planning and design

Resilience meaning

-More water storage space to contain the excessive water in rainy season.
 -Preparing for the possible rising water level in Taihu lake
 -Circular agriculture to reduce the pollutant from crop and pond
 -Resilient to city expansion, allow for sustainable urbanization

Site-specific design

Sponge lakeshore line
 Spone agri/aquaculture
 Sponge peri-urban

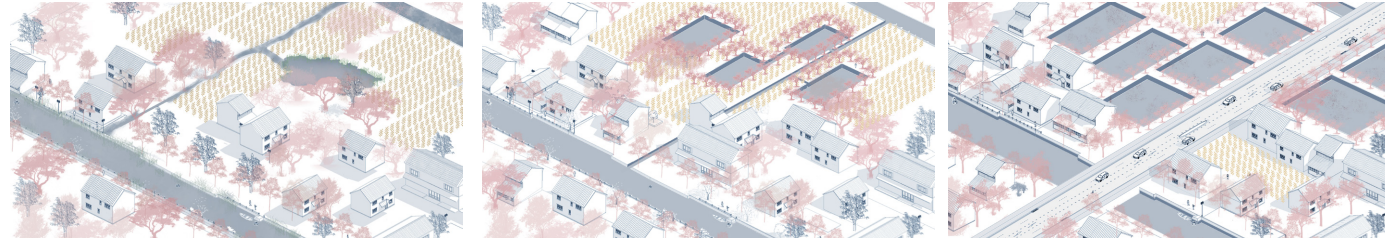
Regional design

Restore resilient water network
 Renew the public space
 Remind people of cultural value

Understanding

What is the traditional polder system and how is the polder system connected to Taihu lake?

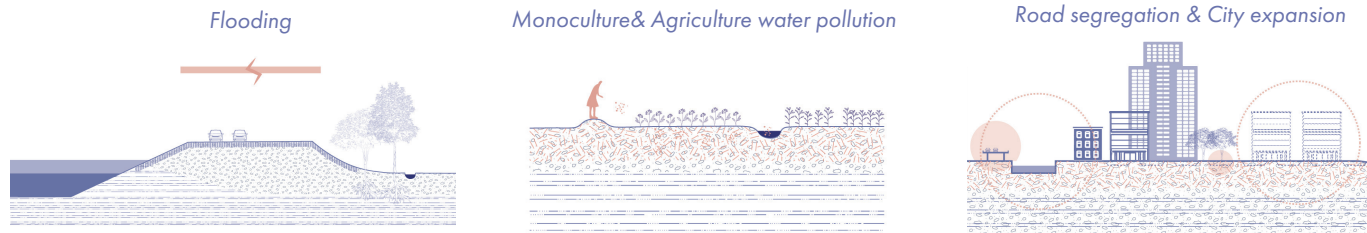
Three phases



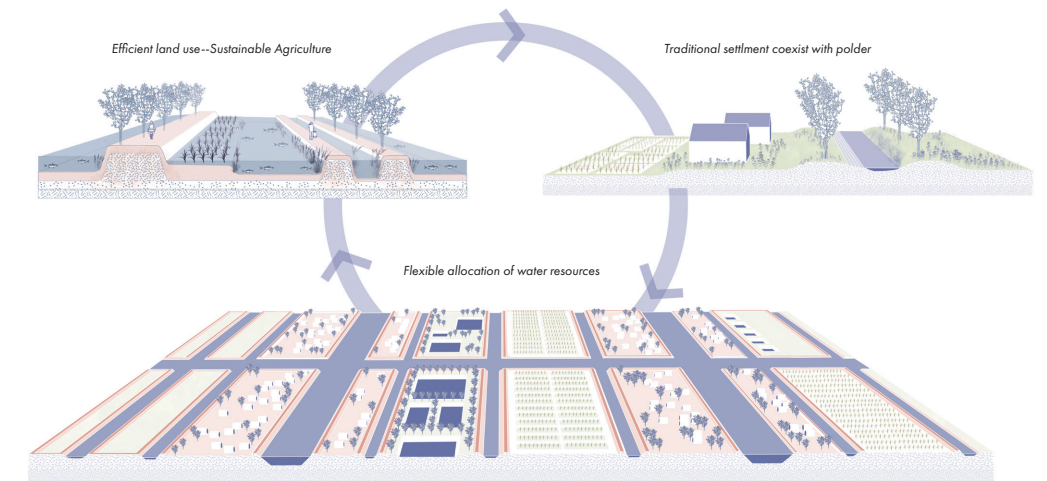
Three layers

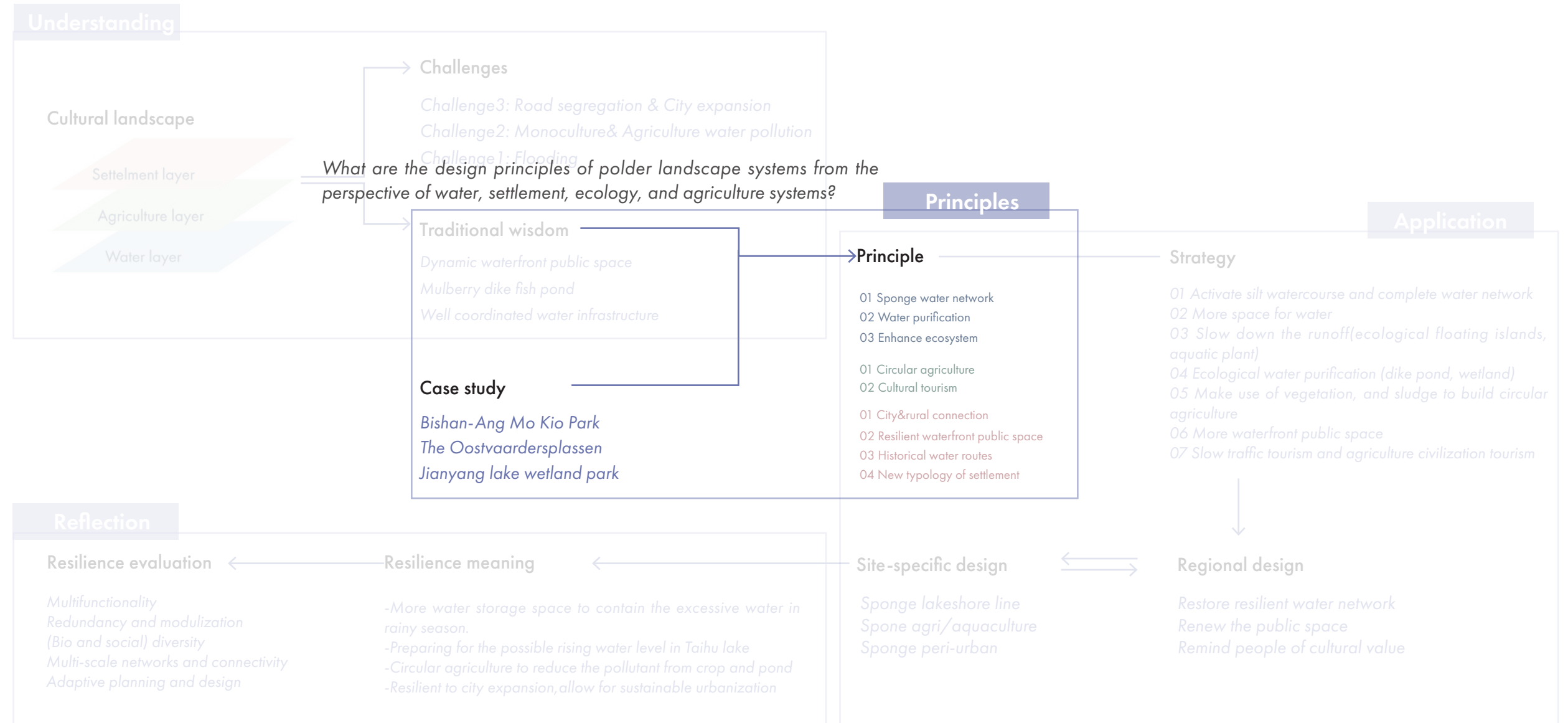


Three challenges



Traditional wisdom





Principles

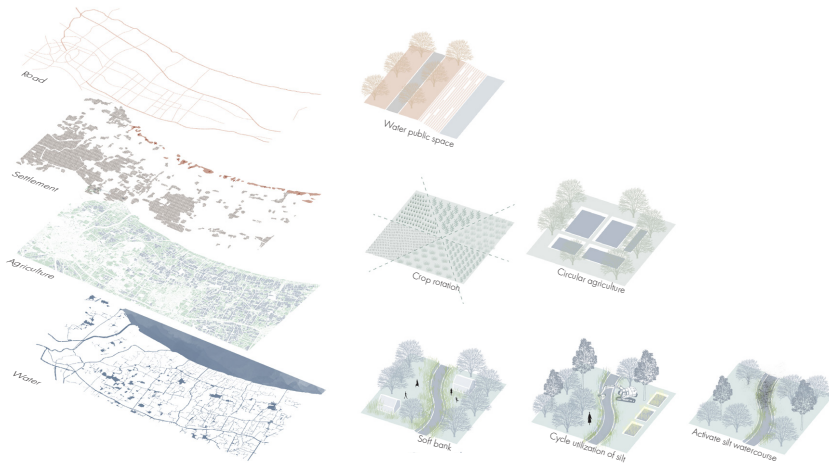
What are the design principles of polder landscape systems from the perspective of water, settlement, ecology, and agriculture systems?

Case study

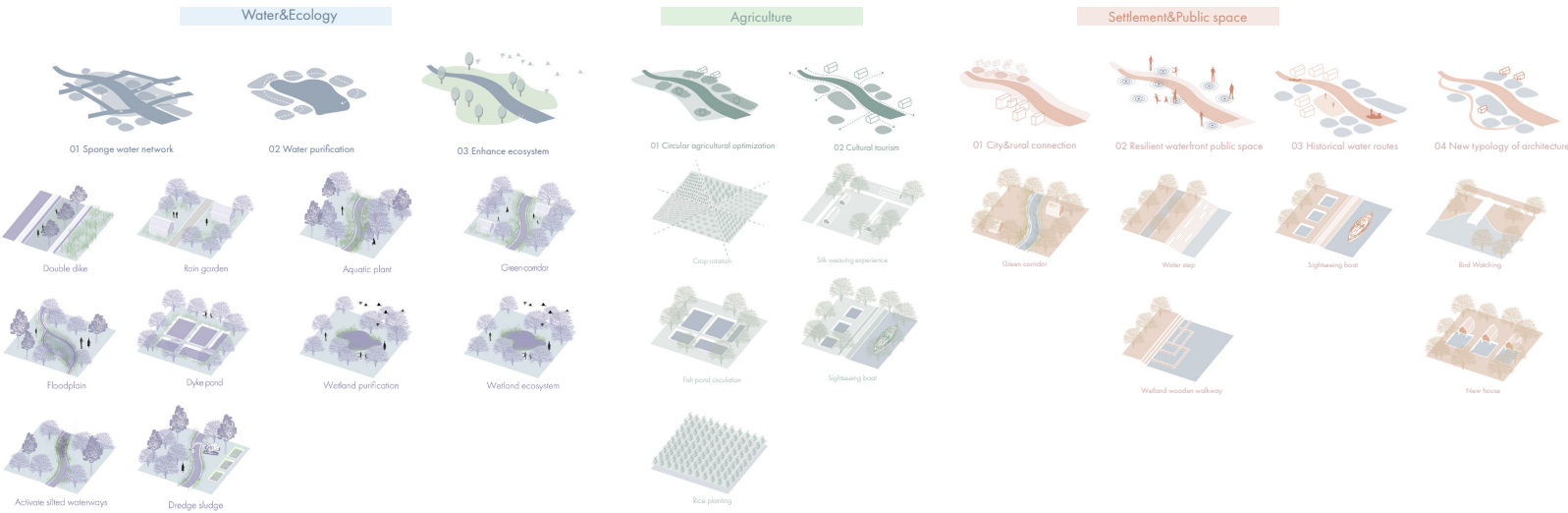


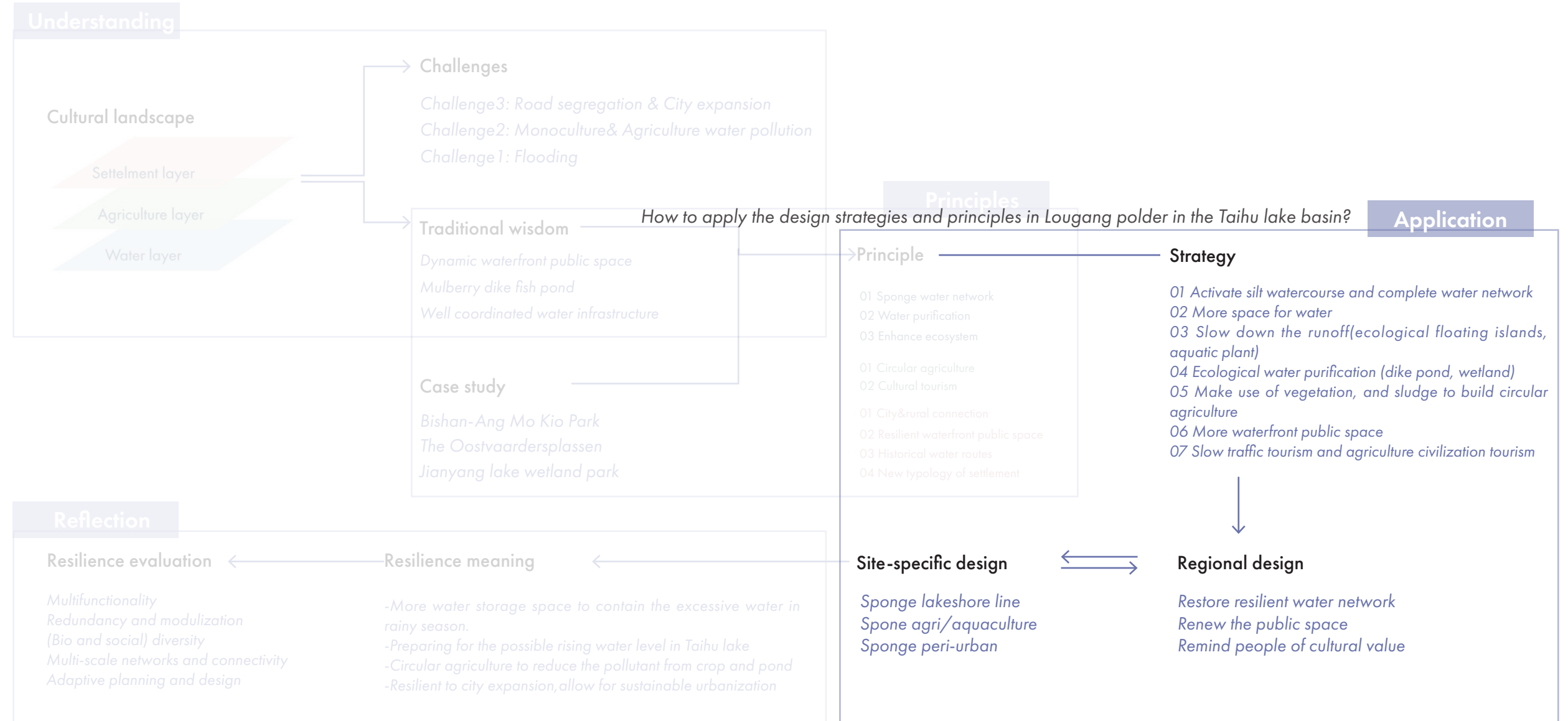
+

Traditional wisdom



Principle

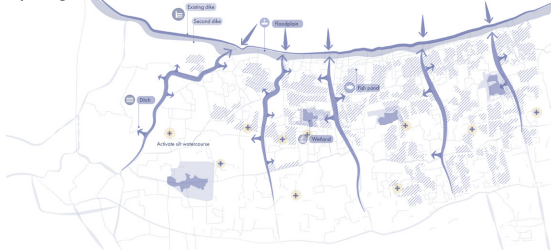




Application

How to apply the design strategies and principles in Lougang polder in the Taihu lake basin?

Sponge water network



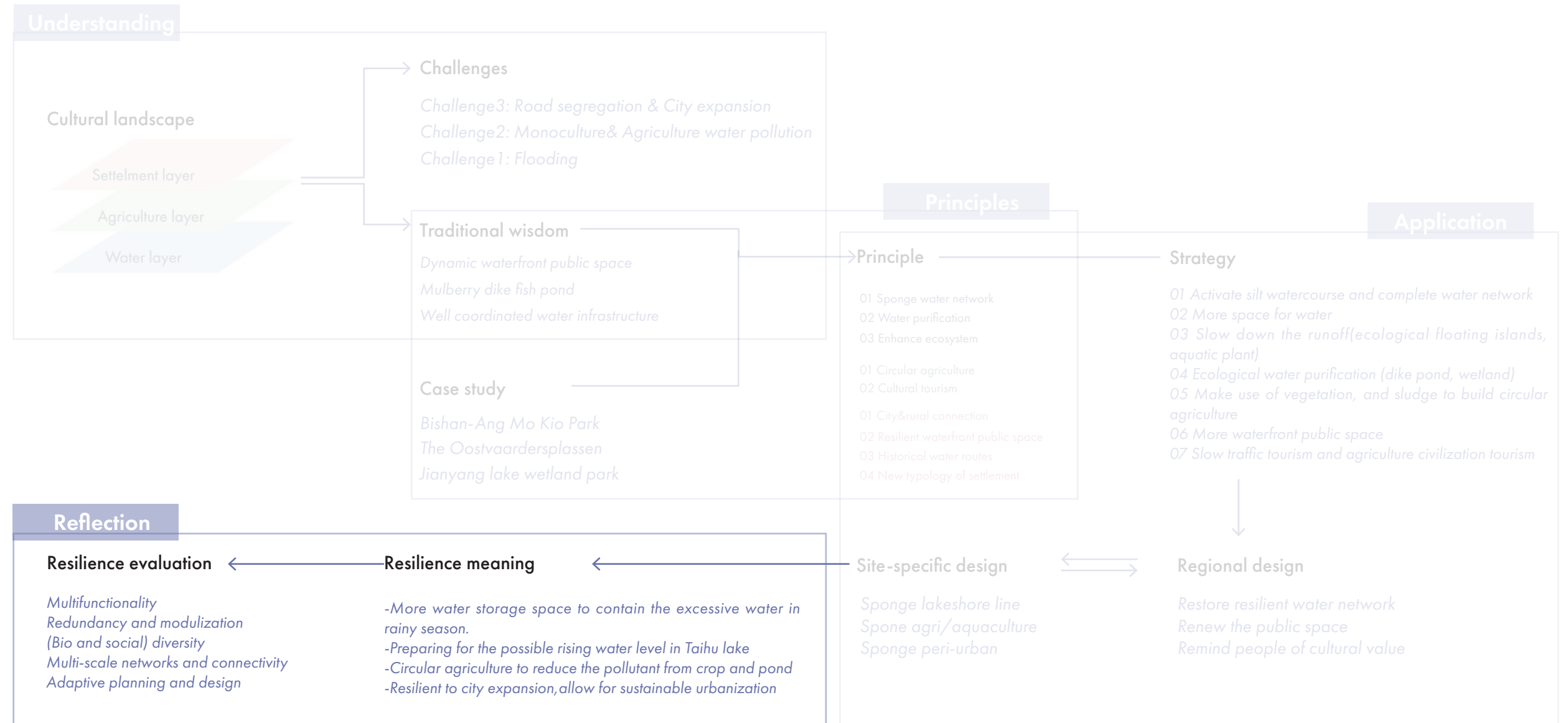
Sustainable agri/aquaculture



Slow waterfront space



	Historical experience	Assignment	Regional Principle	Strategic significance in the region
Sponge lakeshoreline Flooding	Flexible allocation of water resource 	+RESTORE resilient water system Enlarge water storage capacity -Second defence of water infrastructure	Water&ecology 	Sponge lakeshore line increases water resilience in the region as well as generates natural succession and benefits for the spatial quality among traditional settlements.
Sponge agri/aquaculture Agriculture water pollution	Circular agriculture 	+RESTORE resilient water system Improve water quality -Agriculture optimization -Wetland purification center -New possibilities of dike pond	Agriculture 	Sponge agriculture transforms agriculture into a more sustainable and ecological form, integrating social and cultural function into it.
Sponge peri-urban City expansion	Water adaptive bank and building 	+RENEW the public space in rural area Improve spatial quality -City&rural edge -More waterfront public space +REMIND people of cultural value Cultural heritage protection -Tourism(Water route/ water culture)	Settlement&Public space 	Sponge peri-urban water management combines with the waterfront public space and allows for sustainable urbanization .



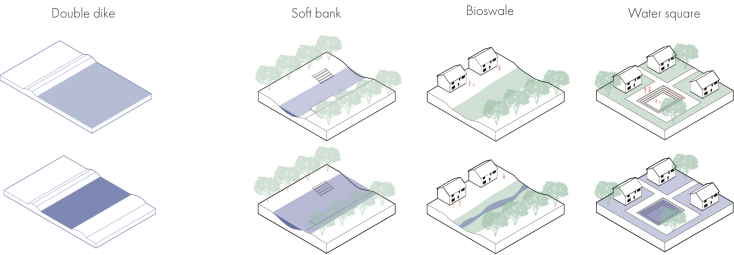
Reflection

To what degree do the strategies and principles increase resilience in polder landscapes?

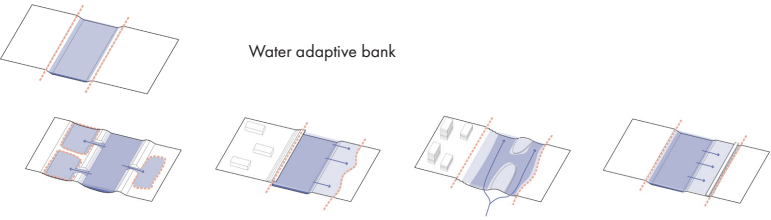
- Multifunctionality
- Redundancy and modularization
- (Bio and social) diversity
- Multi-scale networks and connectivity
- Adaptive planning and design

Resilience	
Sponge lakeshoreline Flooding	-More water storage space to contain the excessive water in rainy season. -Preparing for the possible rising water level in Taihu lake MultifunctionalityBiodiversityRedundancy
Sponge agri/aquaculture Agriculture water pollution	-Circular agriculture to reduce the pollutant from crop and pond MultifunctionalityBiodiversityModulization
Sponge peri-urban City expansion	-Resilient to city expansion, allow for sustainable urbanization Adaptive planning and designSocial diversity

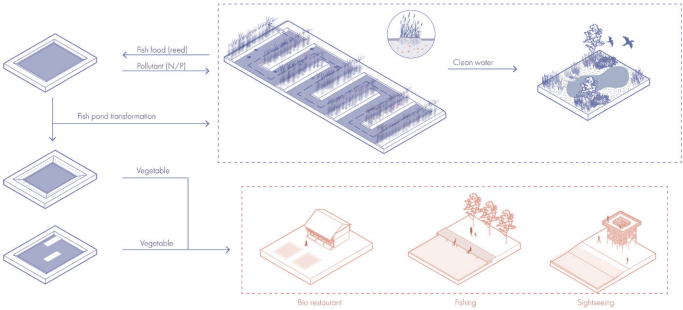
Sponge lakeshore line



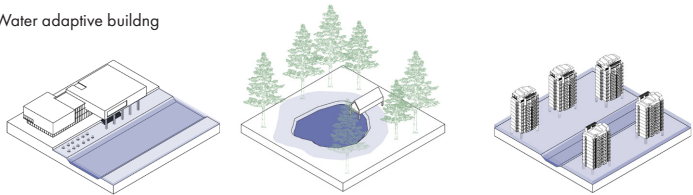
Sponge peri-urban

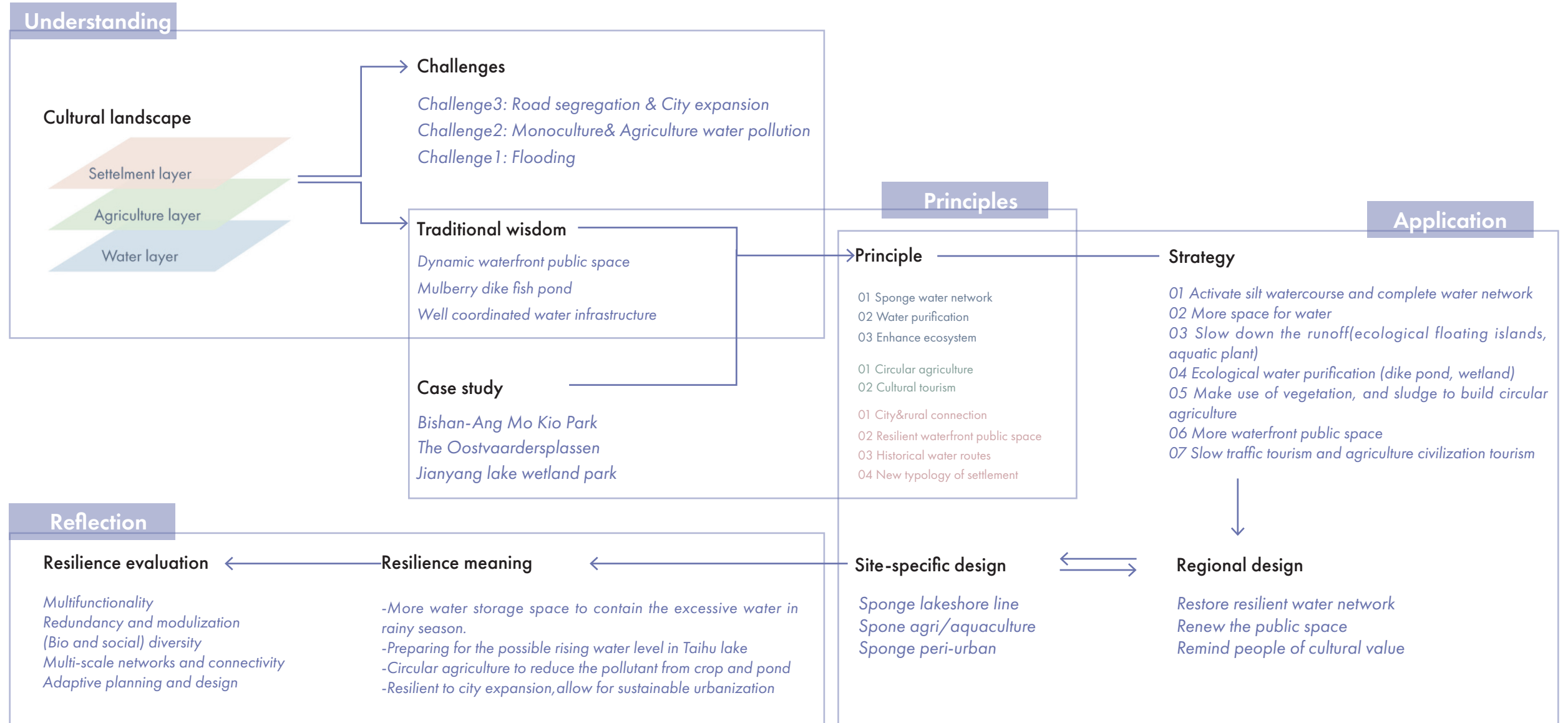


Sponge agriculture



Water adaptive building





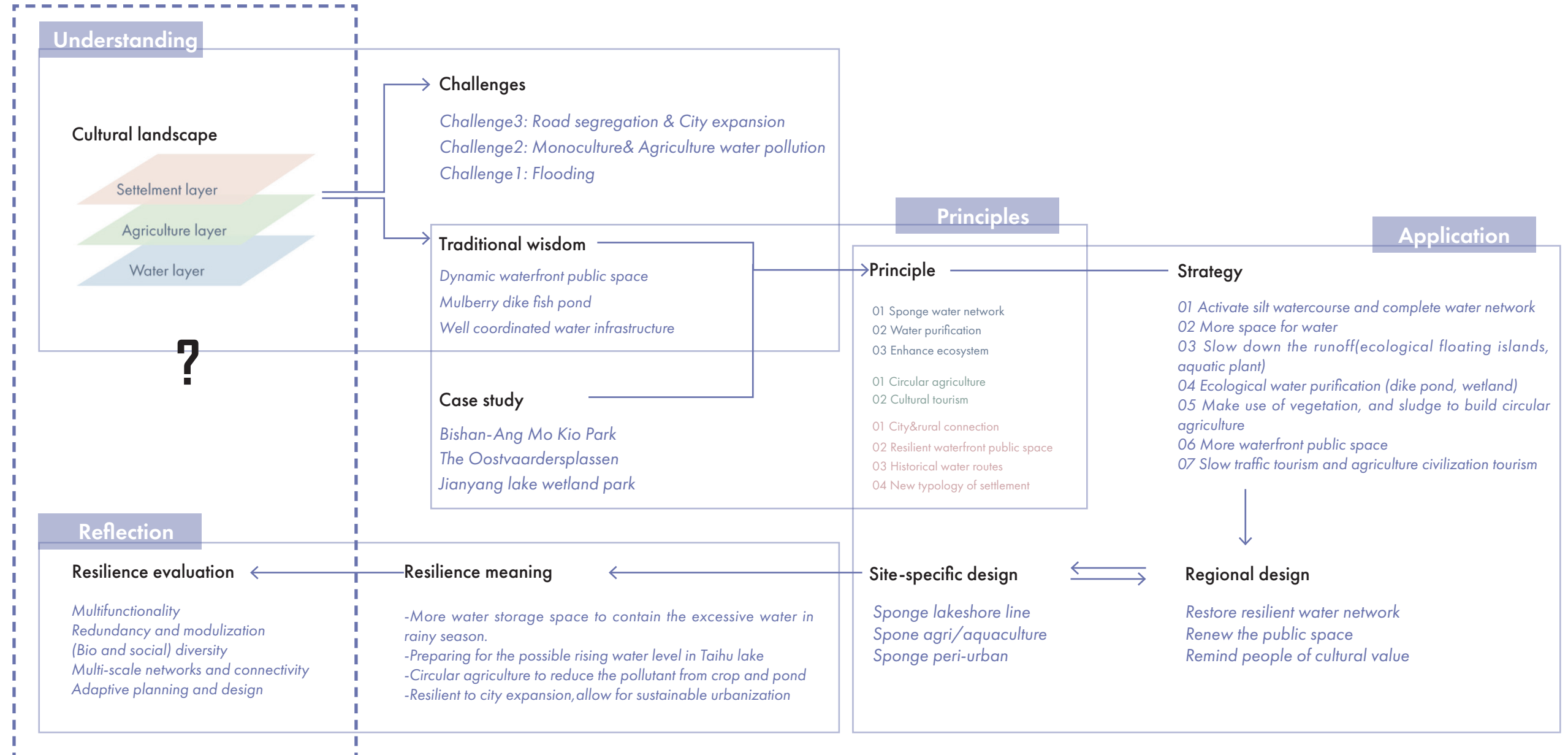
Lessons learned--Learn from local traditional wisdom

-**Respect the local culture** and integrate it into the contemporary context with the demands of the present and the uncertainties of the future.

-By employing these **time-tested techniques**, we could create a design that **honors the past, accepts the present, and gets ready for difficulties in the future**.



Gengzhi tu (Farming and Weaving pictures)
Source: Retrieved from website:<https://www.shuge.org/ebook/geng-zhi-tu/>



Resilience thinking + Cultural landscape

How to integrate the resilience thinking into cultural landscape?

Resilience thinking + Cultural landscape

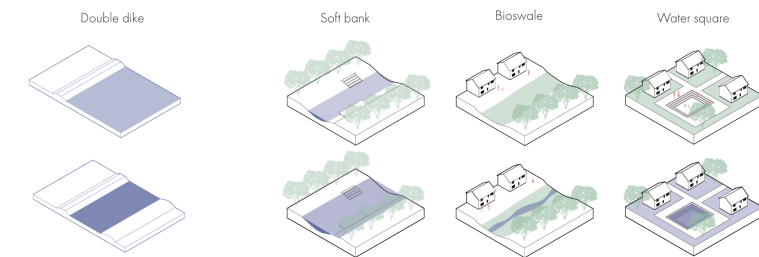
Water heritage



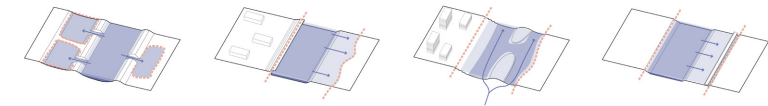
Architectural heritage



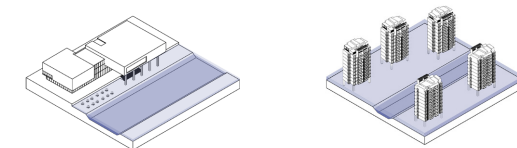
- Flexible allocation of water resources



-Water adaptivity



-Suitable for contemporary and future contexts

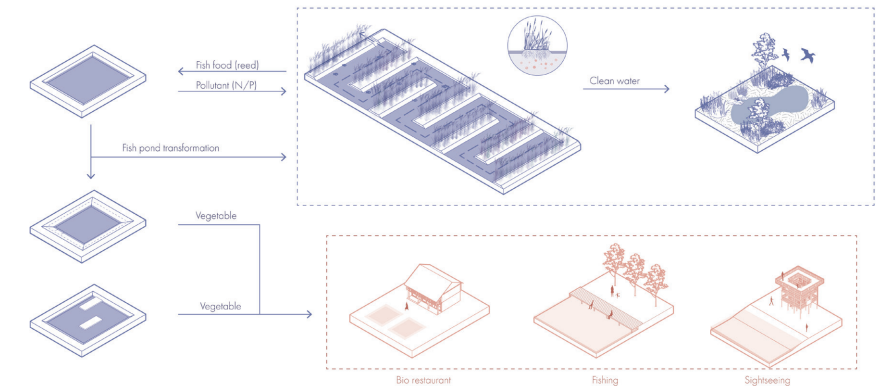


Resilience thinking + Cultural landscape

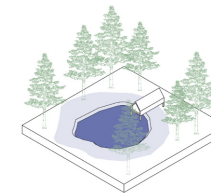
Agricultural heritage



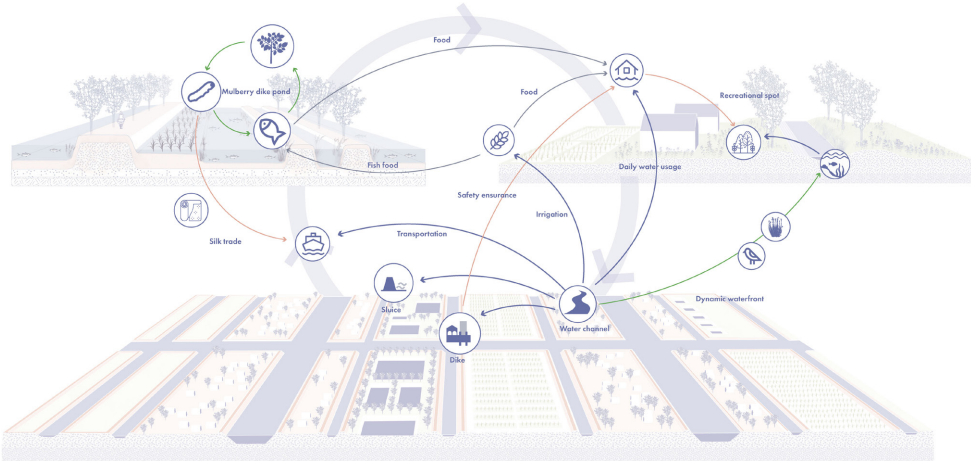
-Revitalizing the circularity wisdom



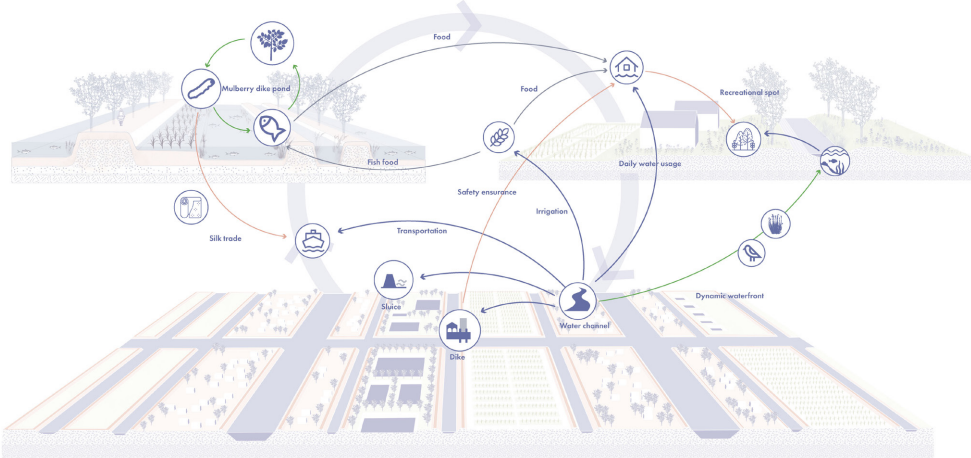
-Translating the dike pond space



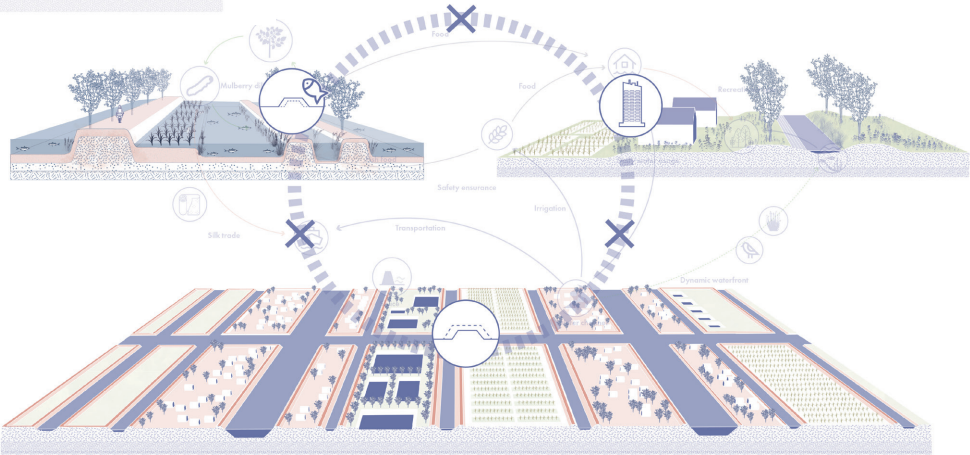
Past



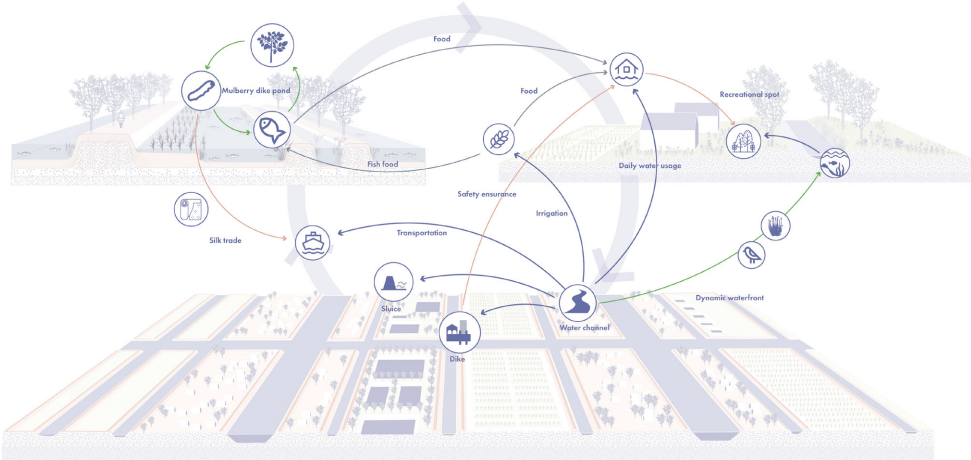
Past



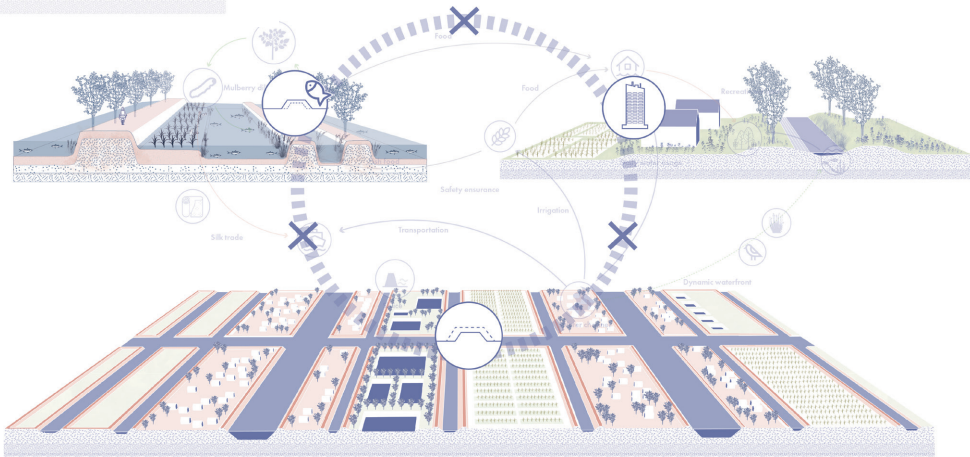
Now



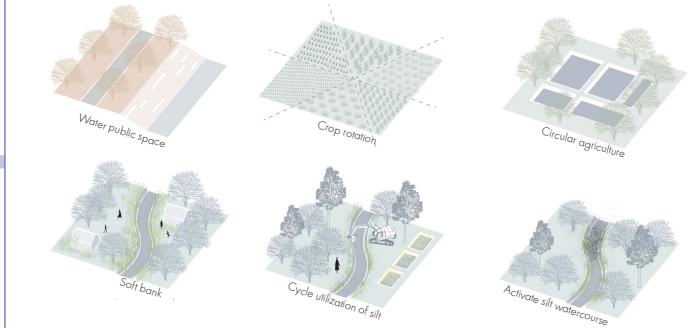
Past



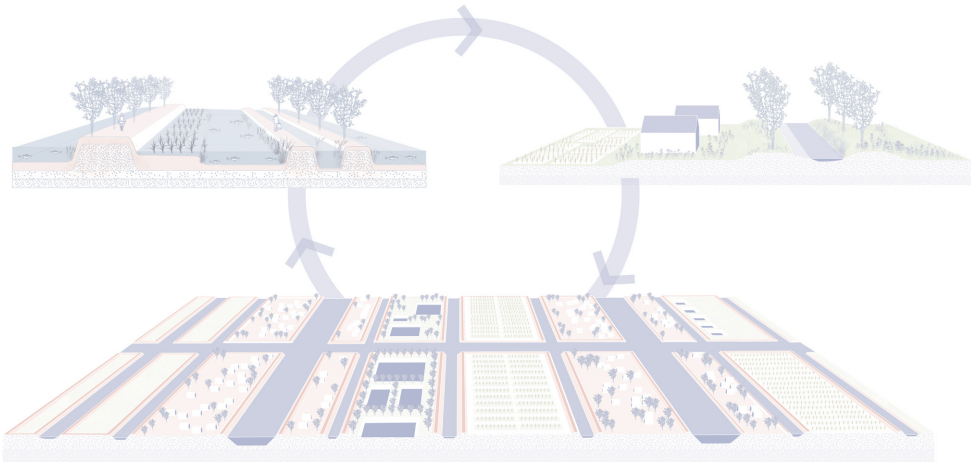
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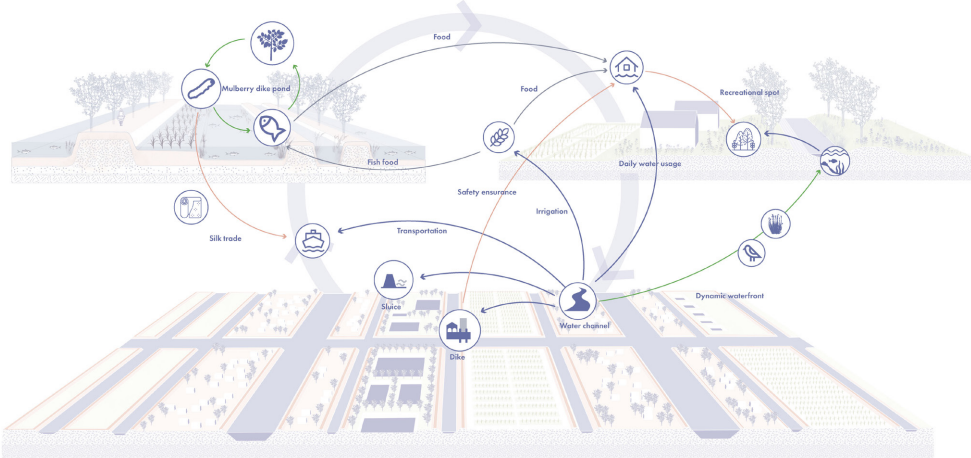
Traditional wisdom



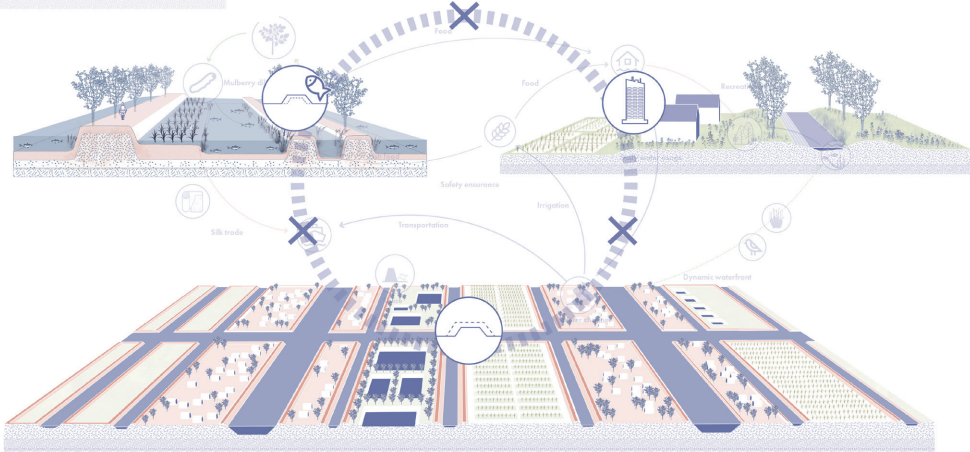
Future



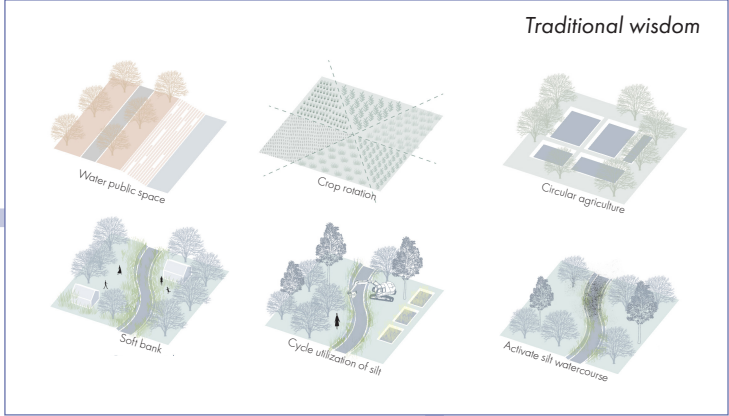
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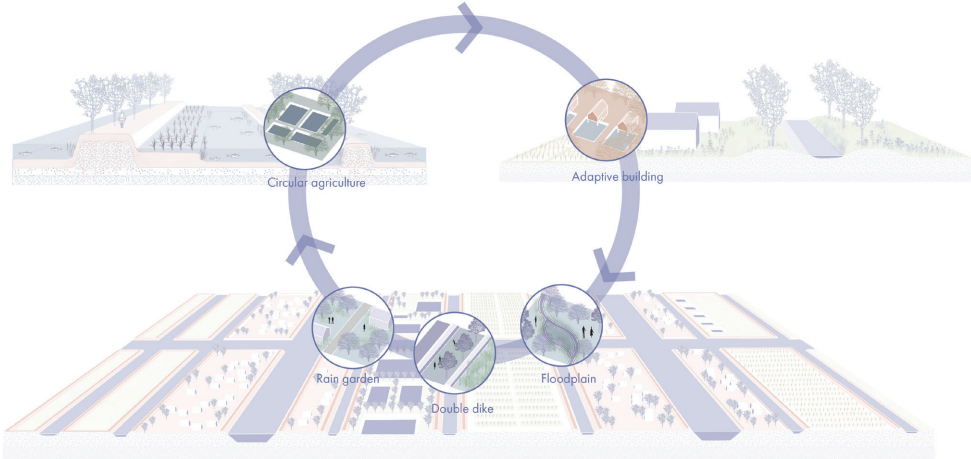
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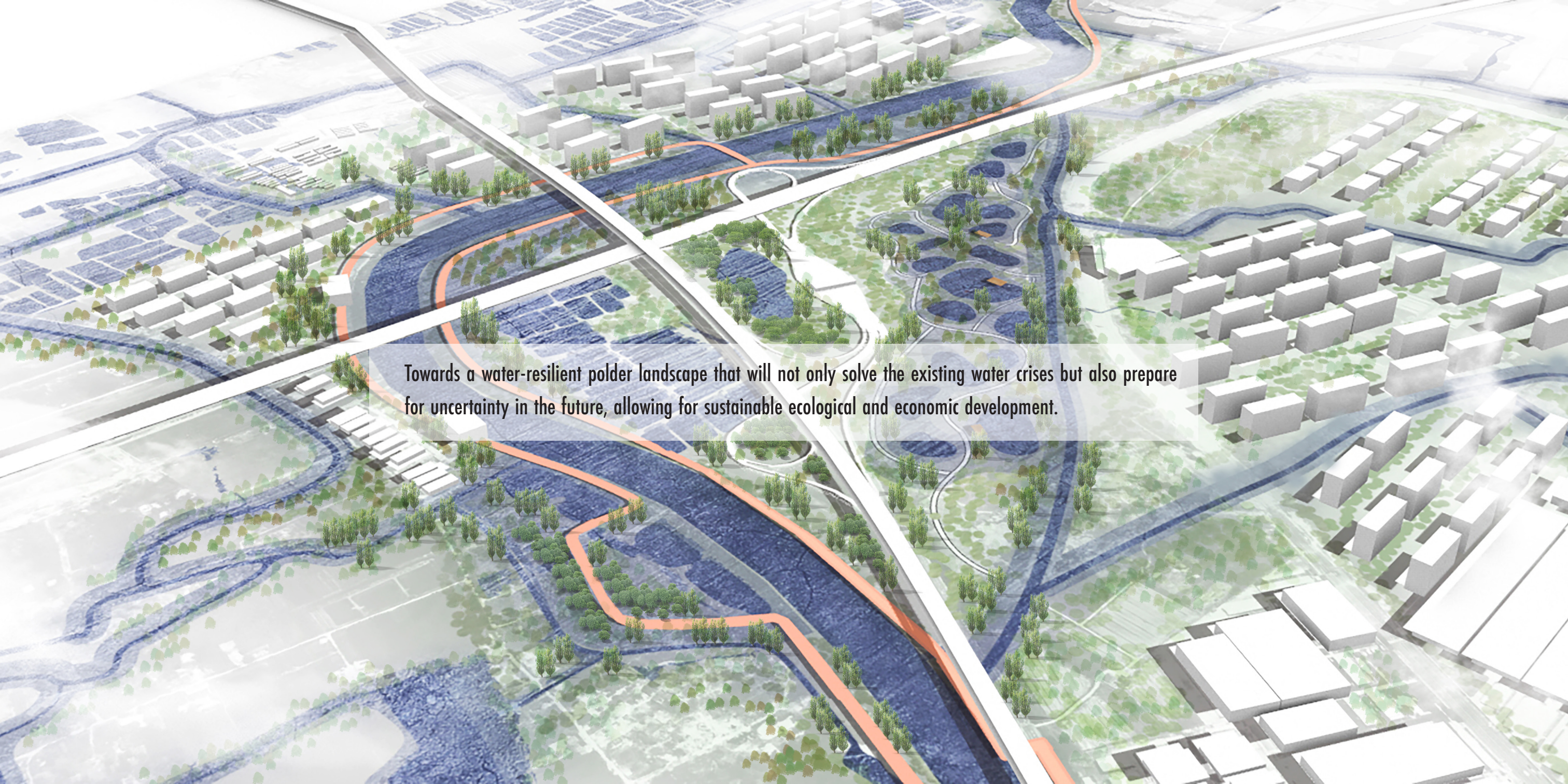


Traditional wisdom



Future



An aerial architectural rendering of a water-resilient polder landscape. The scene features a complex network of blue water channels and orange-lined dikes. White building blocks are arranged in clusters, interspersed with green trees and landscaped areas. A central area contains several circular water features. The overall design suggests a sustainable, water-resistant urban environment.

Towards a water-resilient polder landscape that will not only solve the existing water crises but also prepare for uncertainty in the future, allowing for sustainable ecological and economic development.