Synergy through water, land and forestry systems

Towards evolutionary socio-ecological resilience in Red River Delta, Vietnam

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Transitional Territories Studio, 2020-2021
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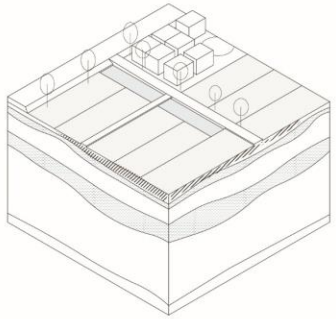
Second Mentor: Daniele Cannatella

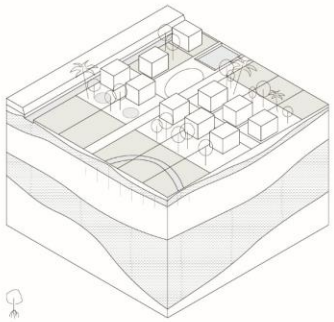
Jun, 2021

Linking production with vulnerabilities



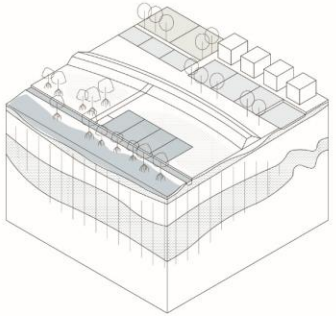
Interfluvial type

Cooperative-based mainly
groundwater: 0-10, 30-40
soil type: eutric gleysols and fluvisols, sealing condition
main production type: rice, vege
* trees been reduced due to land expansion and production need



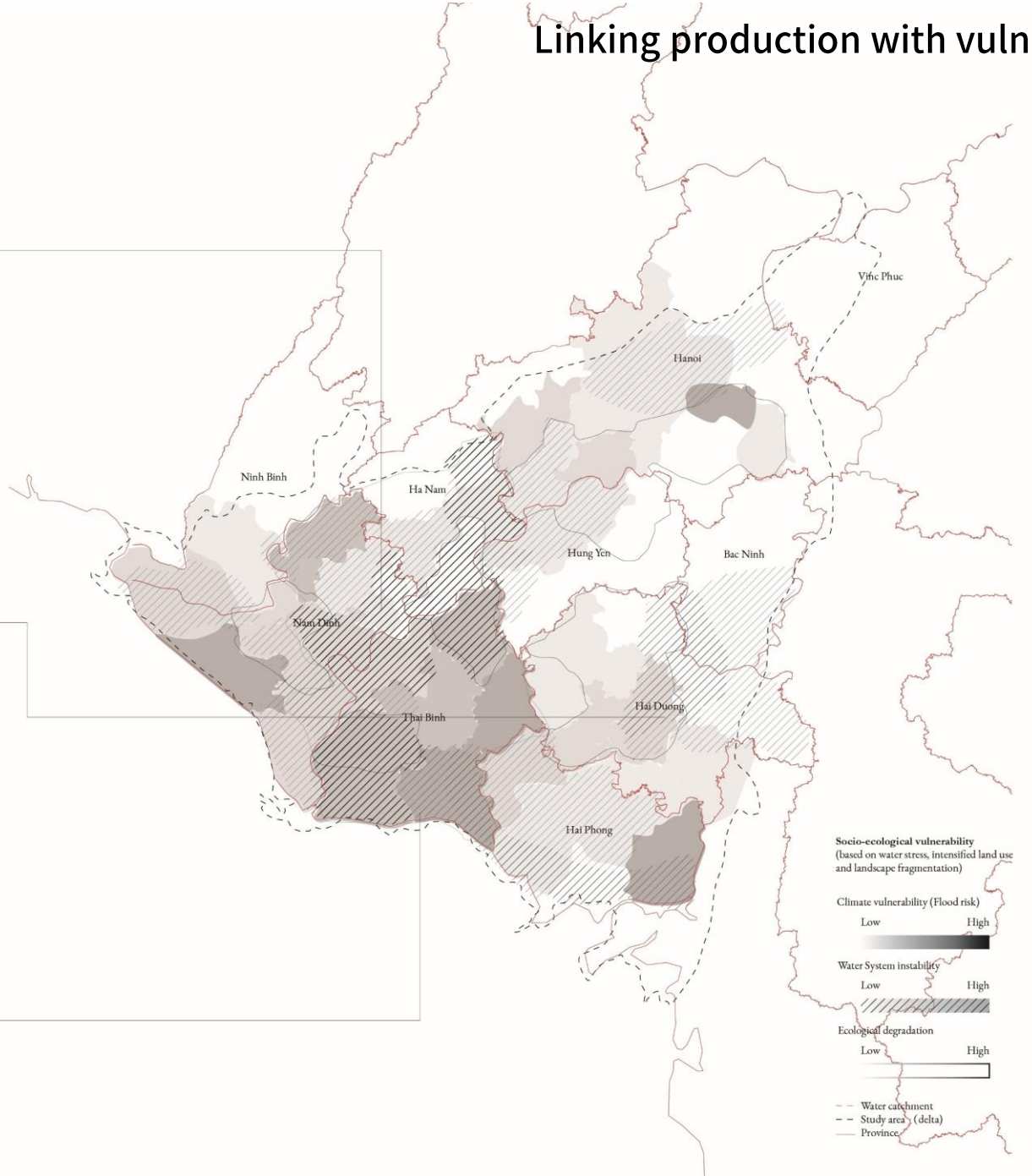
Higher tide type

Family-based mainly
groundwater: 0-10, 30-80
soil type: eutric gleysols and fluvisols, marine clay
main production type: horticulture, medicine, productive forestry, rice
* inland river can be influenced by wave, trees for infiltrate fresh and salt, especially in low velocity waterflow area.

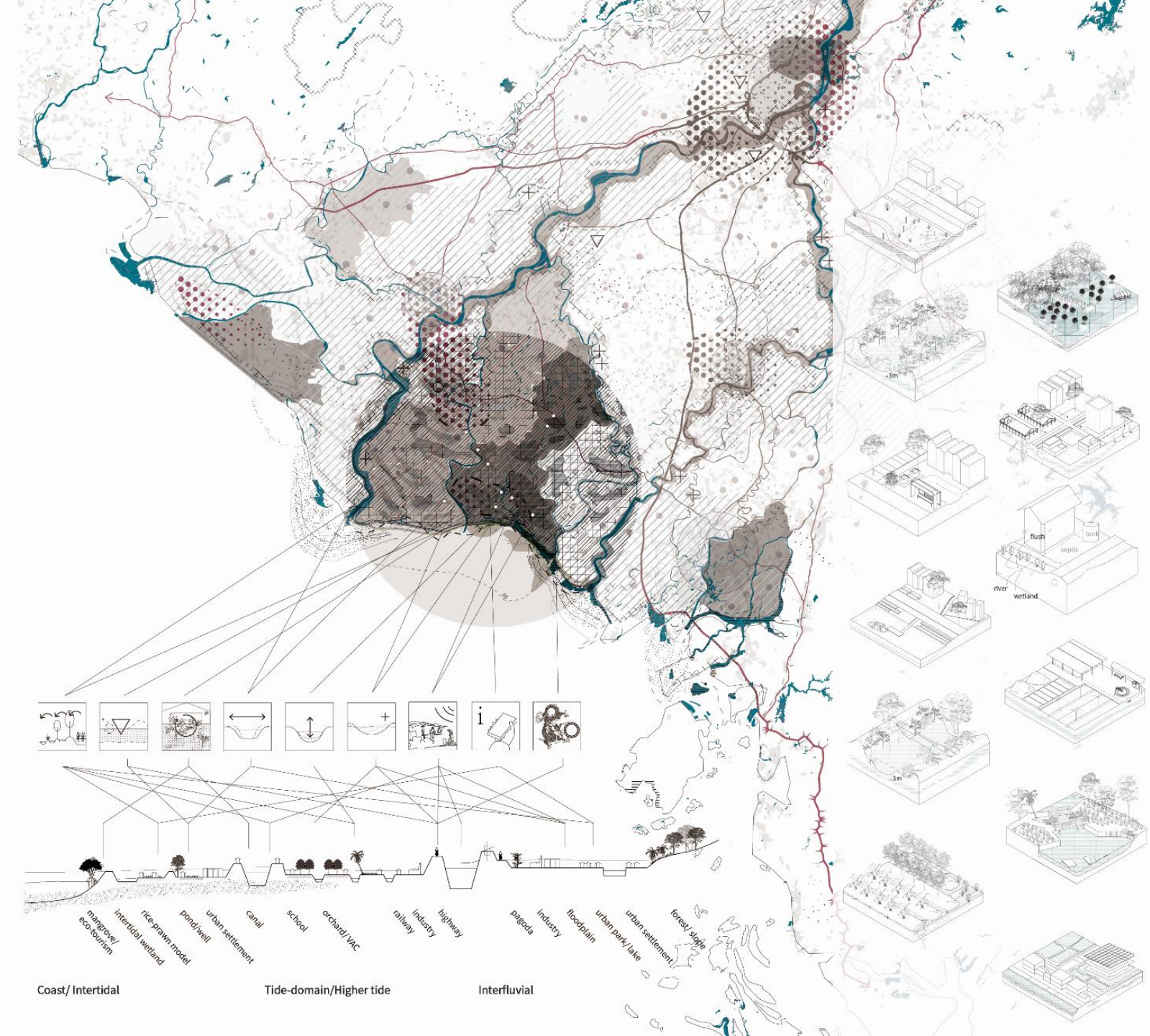


Intertidal type

Cooperative-based mainly
groundwater: 0-10, 30-50
soil type: marine clay, peat
main production type: shrimp, rice, fish
* mangrove as common property



Systemic synergy



Source: Screenshot from Google street view (left) and Forgetting Vietnam. Trinh Minh-ha, 2015 (right)

Focus and aim

Source: Forgetting Vietnam. Trinh Minh-ha, 2015

Resilience

Biophysical
System

time + scale

Socio-ecological
(cultural)
System

Ecosystem
services

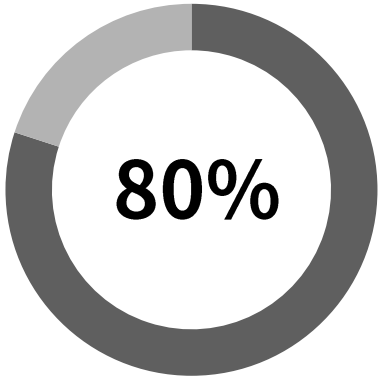
Location

Source: Forgetting Vietnam. Trinh Minh-ha, 2015; Google street view ; https://e.vnexpress.net/

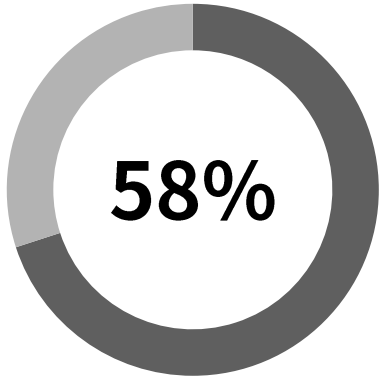
‘The landscape in the Red River Delta is not only manipulated by humans but entirely transformed by humans.’

Le Ba Thao, 1997: 323-31

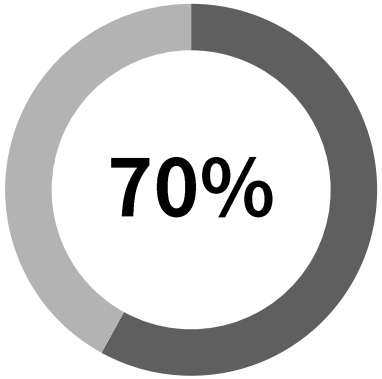
Main drivers of change - resource consumption



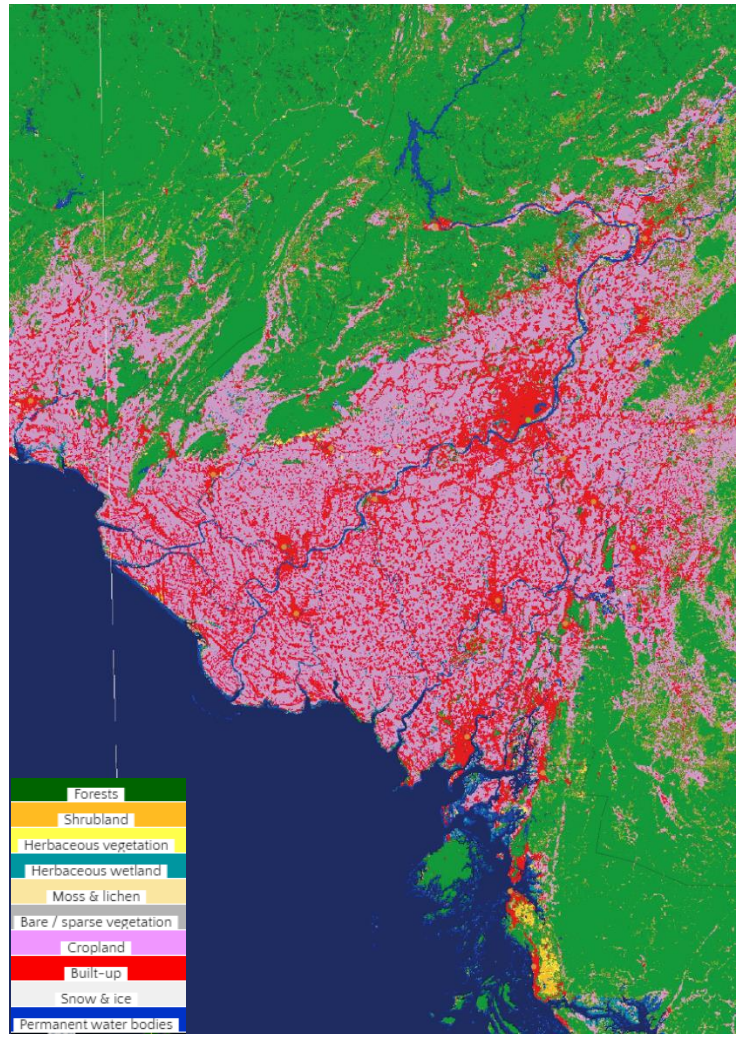
Annual water consumption for irrigation



Land use for agriculture



Workers in agriculture sector



Data and Source: Land Corponicus and Wikipedia.

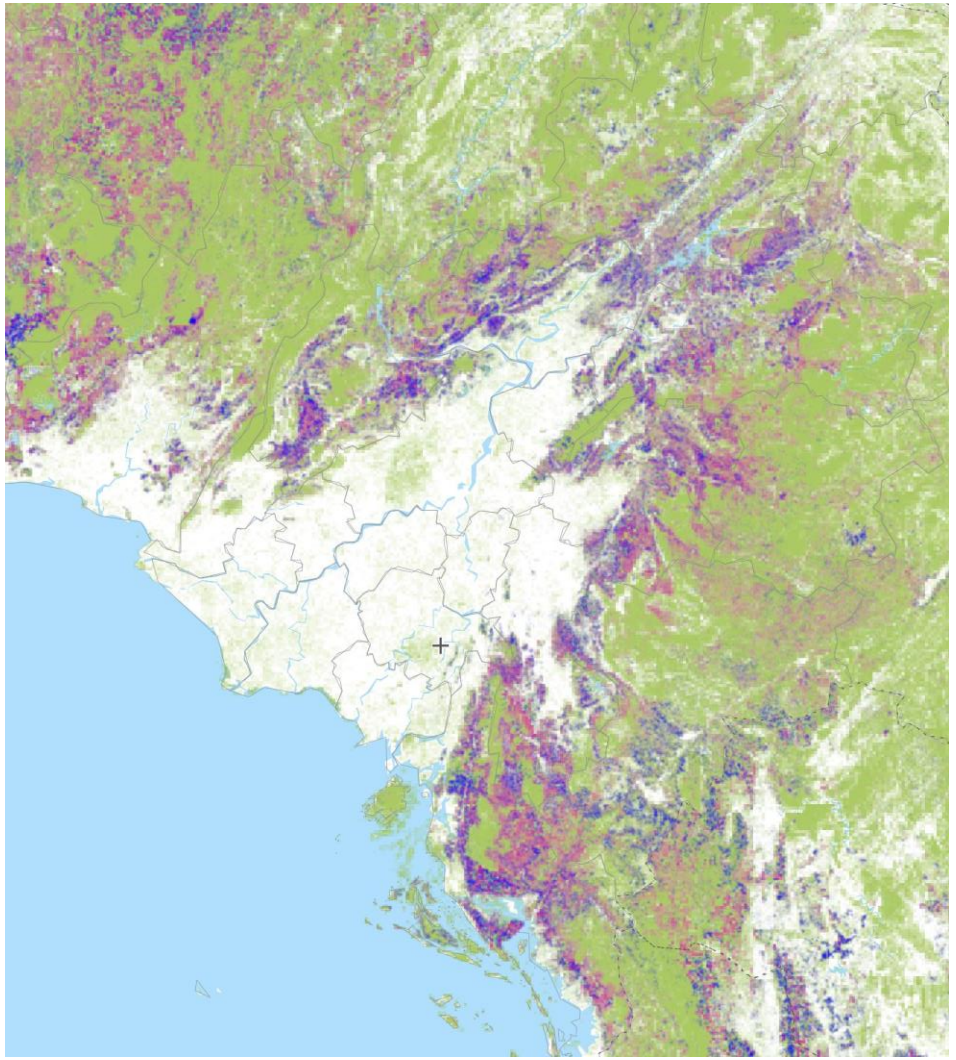
Main drivers of change - water fluctuation

Flooding 1971

Waterflow abandoned in division area as pollution container

Source: globalenergy-news

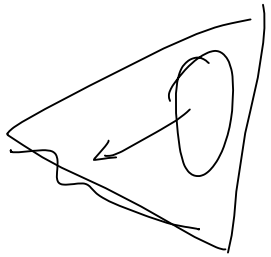
Main drivers of change - forestation condition



Source: Global forest watch

Main drivers of change -

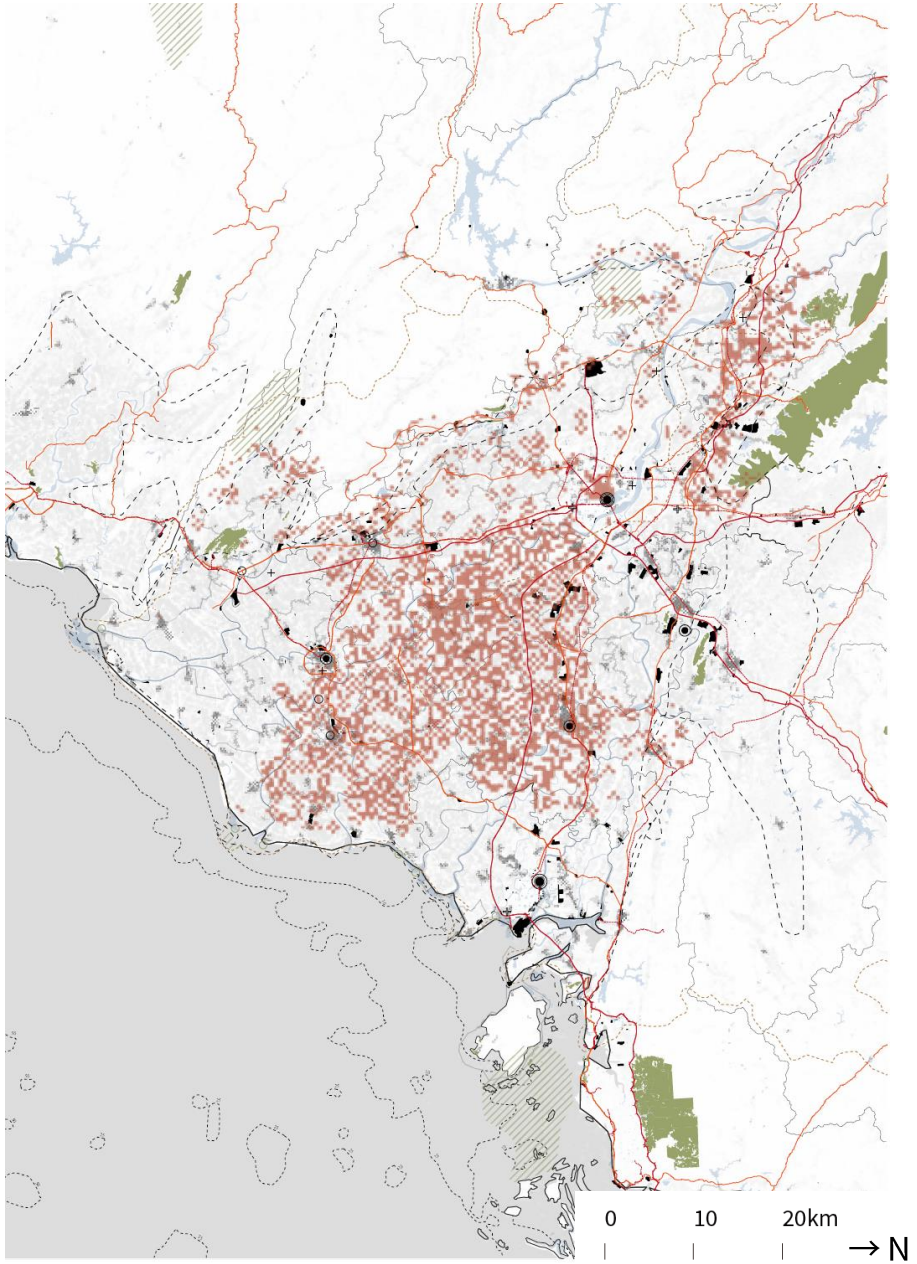
Future expansion 2030 (High Climate Impact Scenario)



Land use change by land class and scenario, 2007-2030					
	2007	2030-HCI		2030-HEG	
	km²	km²	change(%)	km²	change(%)
Paddy rice	53,462	41,434	-22	41,362	-23
Other agriculture	52,802	51,775	-2	46,941	-11
Production forest	74,858	100,498	34	105,429	41
Non-production forest	61,640	54,543	-12	45,246	-27
Shrub and grassland	62,986	50,401	-20	50,375	-20
Built-up areas	8645	15,742	82	25,039	190
Other land	18,517	18,517	0	18,517	0
Total	332.910	332,910	0	332,909	0

*HCI- High Climate Impact, HEG- High Economic Growth;
*BAU- Business as Usual, the result of which similar to HCI scenario;
*The other land also covers protected area, such as small tracts of paddy rice and other agriculture and shrub land.

Figure 2.4 (Right)
Urban expansion, Scenario 2030- HCI
Source: Van Dijk et al, 2013

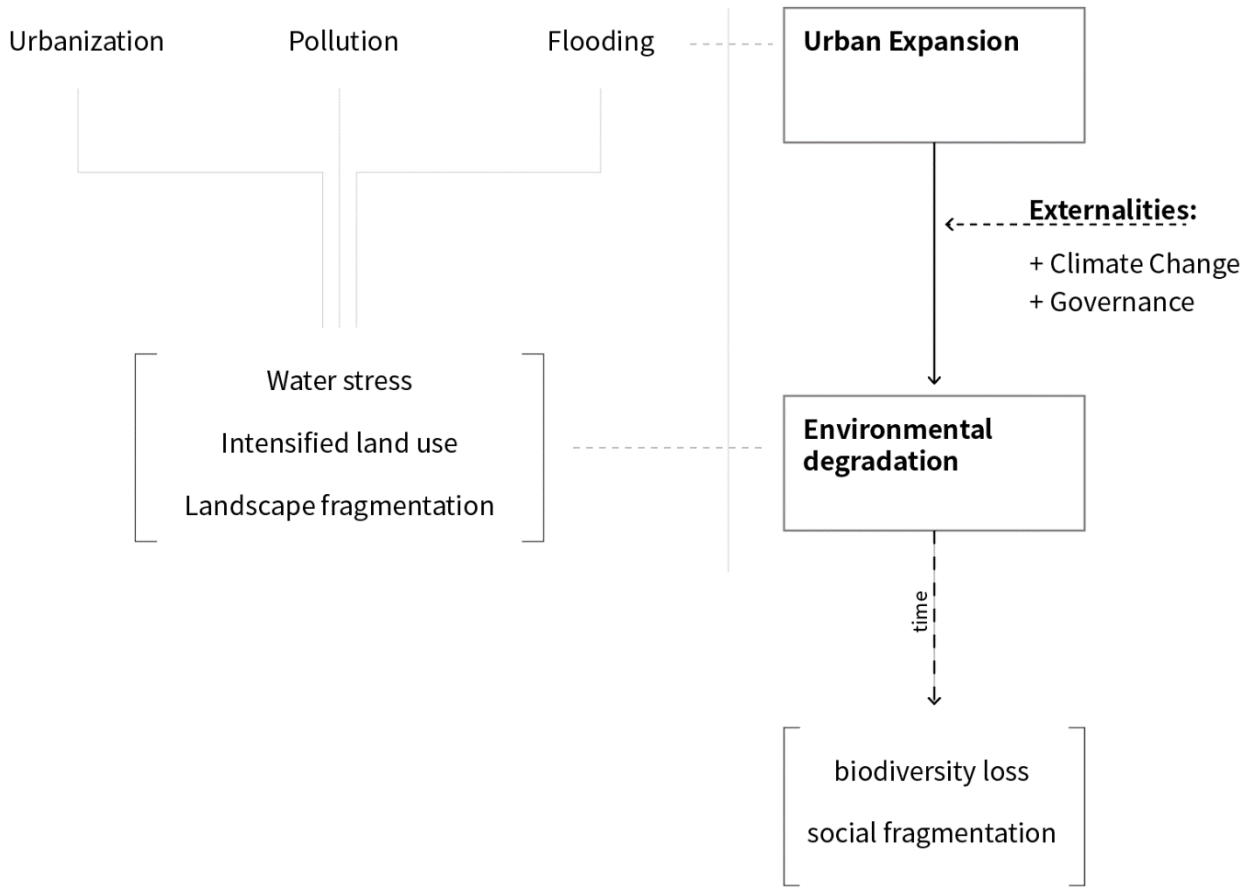


Source: Van Dijk et al, 2013

'I got a bank loan to set up an aquaculture farm, but I didn't know anything about aquaculture. When all the animals died, I couldn't make money. I got more bank loans to pay my debts hoping that the animals would return…but they never did. I had to sell everything at a cheap price and now life is a struggle.'

- from a local interview, Steven et al., 2015.

Problem Statement



Focus and aim

Sources: Stories from Southeast Asia. 2016. "Pesticide and Food | Huế, Vietnam."

[Research question]

How and to what extent can performative landscape help to cope with socio-cultural and ecological vulnerabilities through adaptive resource co-management in the context of Red River Delta?

[Research aim]

The goal is to develop an ecosystem-based adaptation to wise use eco-services and develop **performative landscape with integrated systems**, enhancing **socio-ecological resilience** with **adaptive resource co-management** besides climate change.

Research questions

- How and to what extent can performative landscape help to cope with socio-cultural and ecological vulnerabilities through adaptive resource co-management in the context of Red River Delta?

1

What are the current relations of local practices and external forces between land uses, water management and productive forestry in the existing cultural landscape within the lower Red River delta?

2

What indicators should be considered to assess socio-cultural and ecological vulnerabilities to build future capacity towards a sustainable and safe lowland delta?

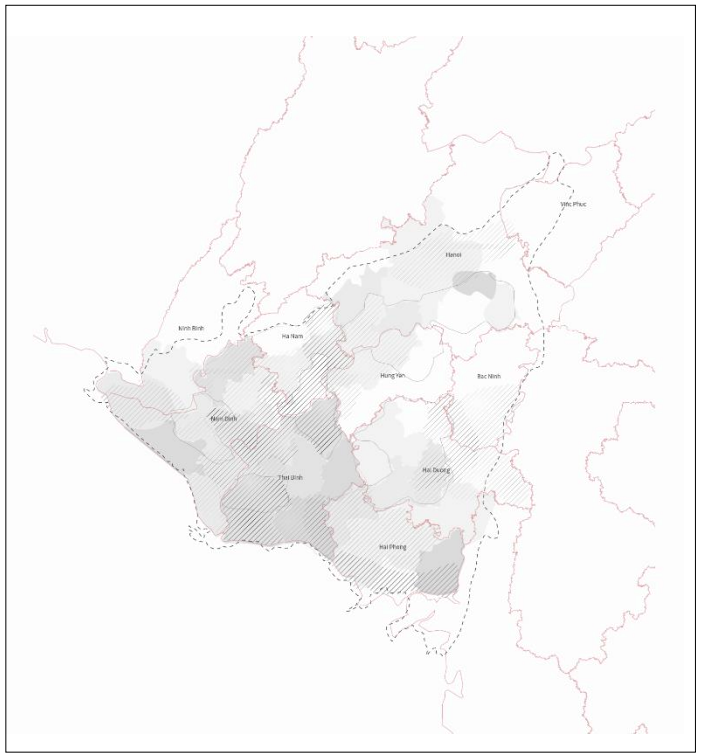
3

How and to what extent can ecosystem-based adaptation through performative landscape contribute to implement adaptive resource co-management in lowland delta

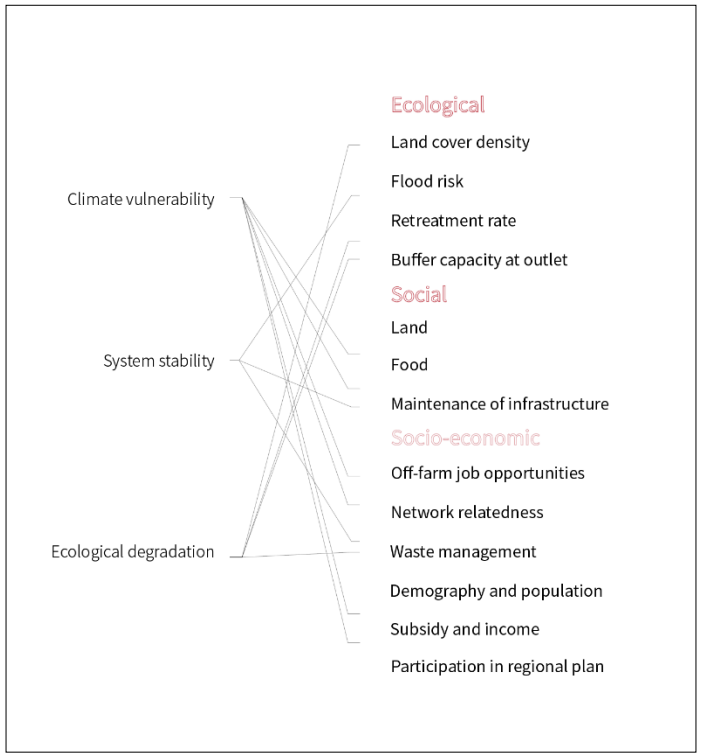
4

How can adaptive resource co-management at local scale reach socio-ecological resilience through evolutionary processes with adaptive governance?

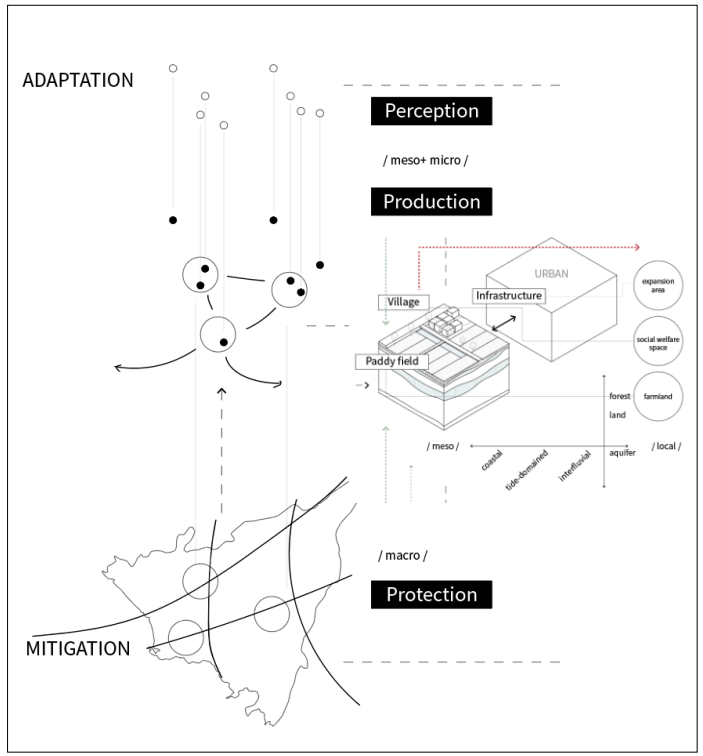
Potential Outcomes



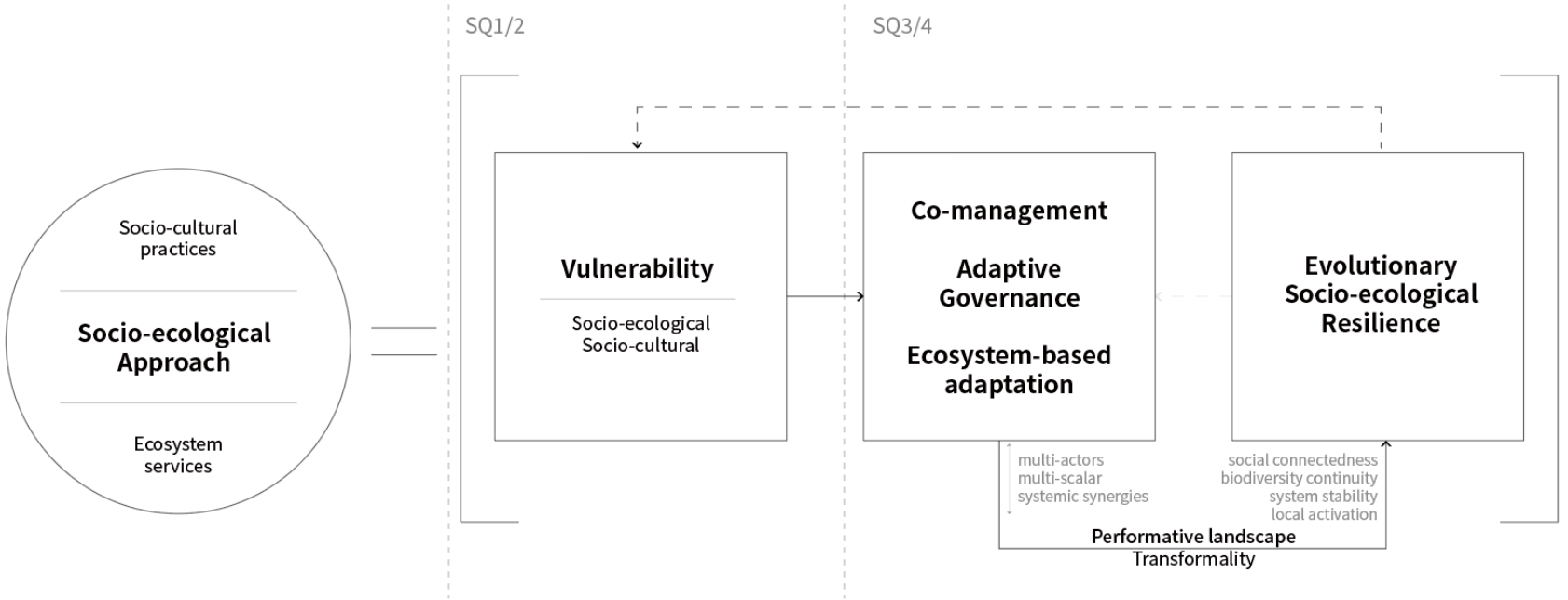
A review of systemic rice-based delta performance



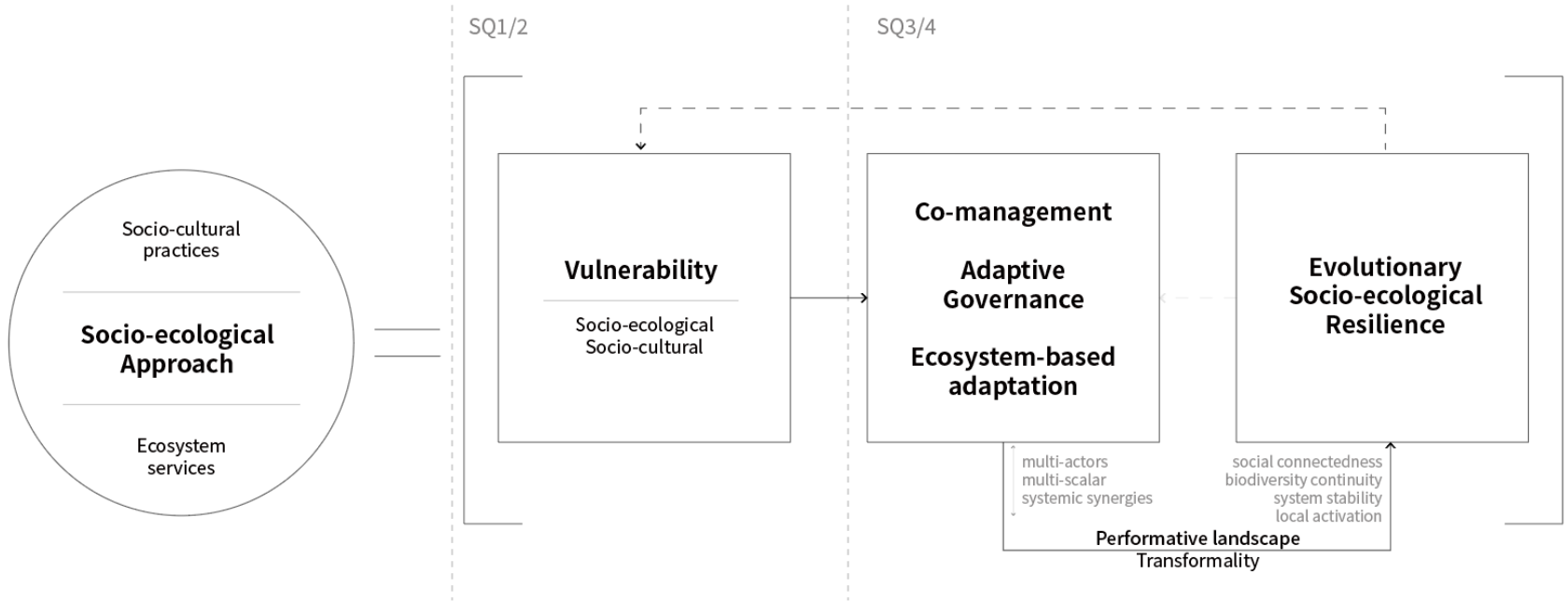
An ecosystem-based adaptation framework with sustainability assessment



Multi-scalar design processes



How to act? – Conceptual framework



Ecosystem-based Adaptation

IUCN, 2008

··· adapts to uncertainty and reduce the vulnerabilities brought from climate change and biodiversity loss based on the ecosystem.

··· requires multi-disciplinary consciousness to encourage local participation and community-based adaption as well, in order to try to maintain local livelihood and food and water security.

Co-management

Armitage et al., 2009. Olsson et al. 2004

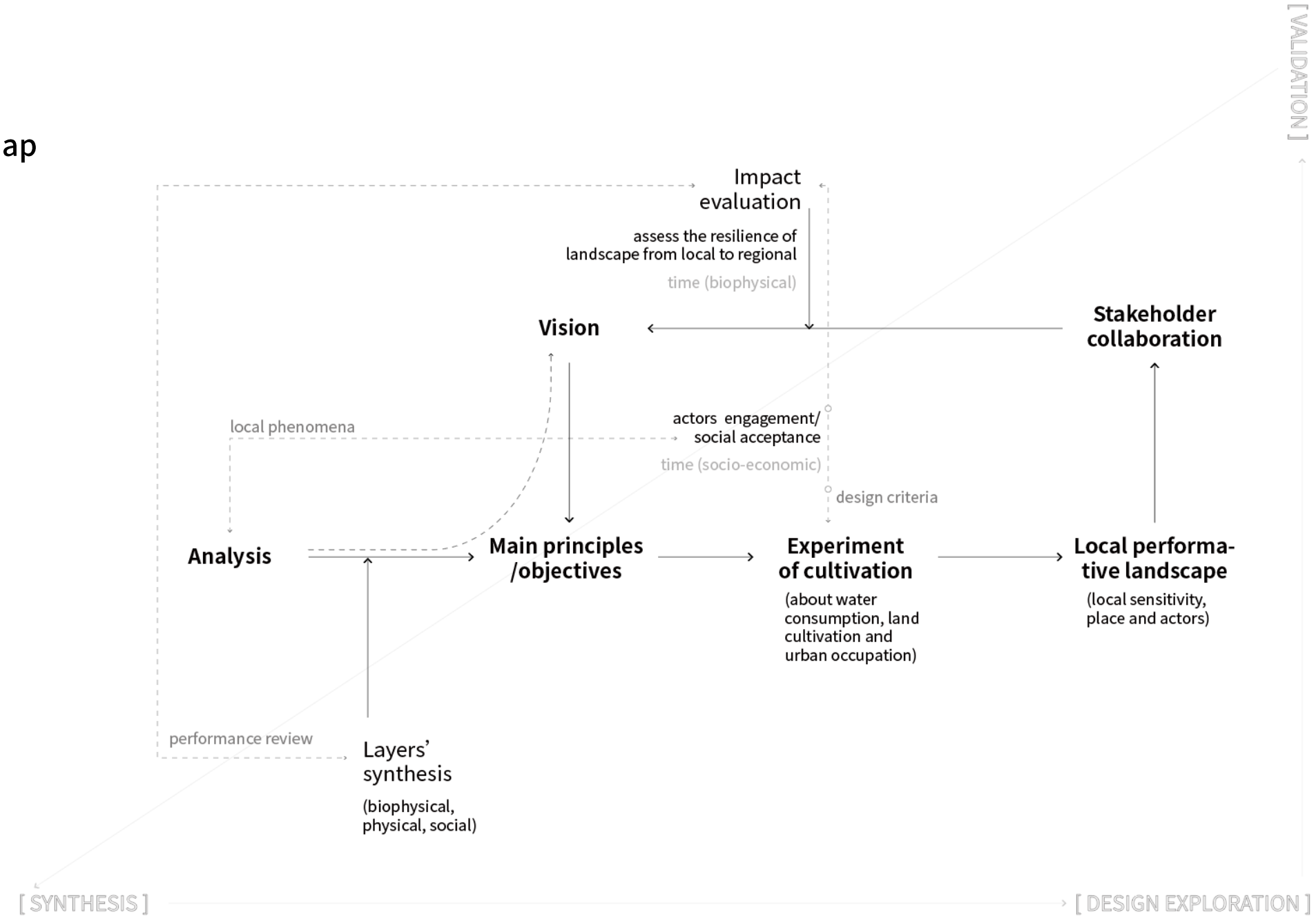
··· self-organizing process of adaptive co-management development, under regulations, has the potential to make socio-ecological system more robust to change.

Adaptive Governance

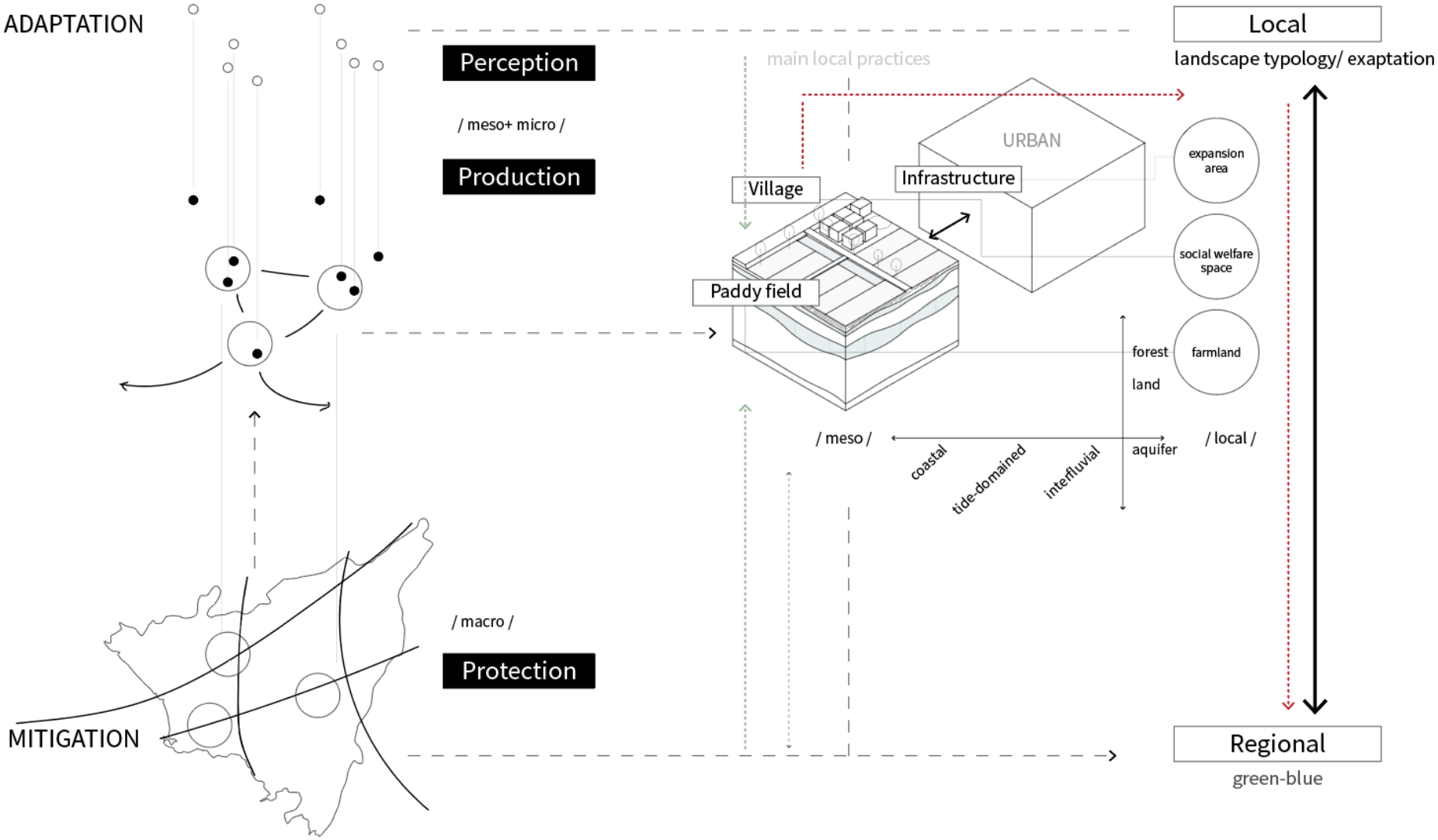
Adger et al., 2003

··· necessary for long-term development and adaptation to climate change. It helps to build social and ecological capitals through phasing and processes by integrating local and social institutions to communicate and express themselves and bind with formal decisions··· Economic efficiency, environmental effectiveness, equity, and political legitimacy have been highlighted as four main criteria for sustainable governance.

Roadmap


[VALIDATION]
Impact evaluation
assess the resilience of landscape from local to regional
time (biophysical)
Vision
Stakeholder collaboration
local phenomena
actors engagement/ social acceptance
time (socio-economic)
design criteria
Analysis
Main principles /objectives
Experiment of cultivation
(about water consumption, land cultivation and urban occupation)
Local performa-tive landscape
(local sensitivity, place and actors)
performance review
Layers' synthesis
(biophysical, physical, social)
[SYNTHESIS]
[DESIGN EXPLORATION]

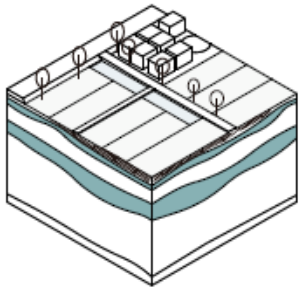
Design Framework

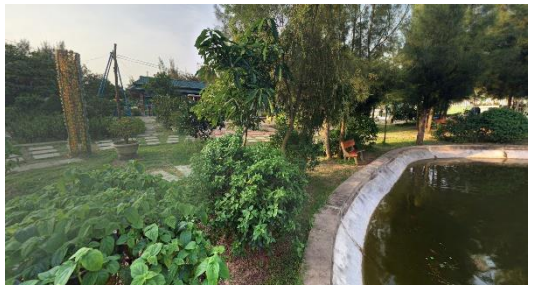


Starting from local

Habitat

Midland, interfluvial
Cooperative-based mainly
groundwater: 0-10, 30-40
soil type: eutric gleysols and fluvisols, sealing condition
main production type: rice, vege
* trees been reduced due to land expansion and production need





Midland, tide-domained
Family-based mainly
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soil type: eutric gleysols and fluvisols, marine clay
main production type: horticulture, medicine, productive forestry, rice
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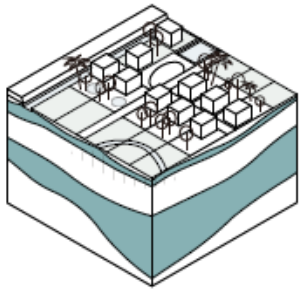
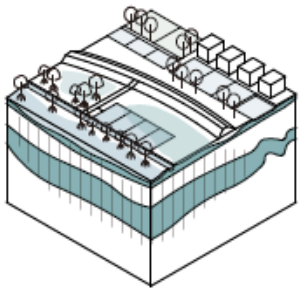
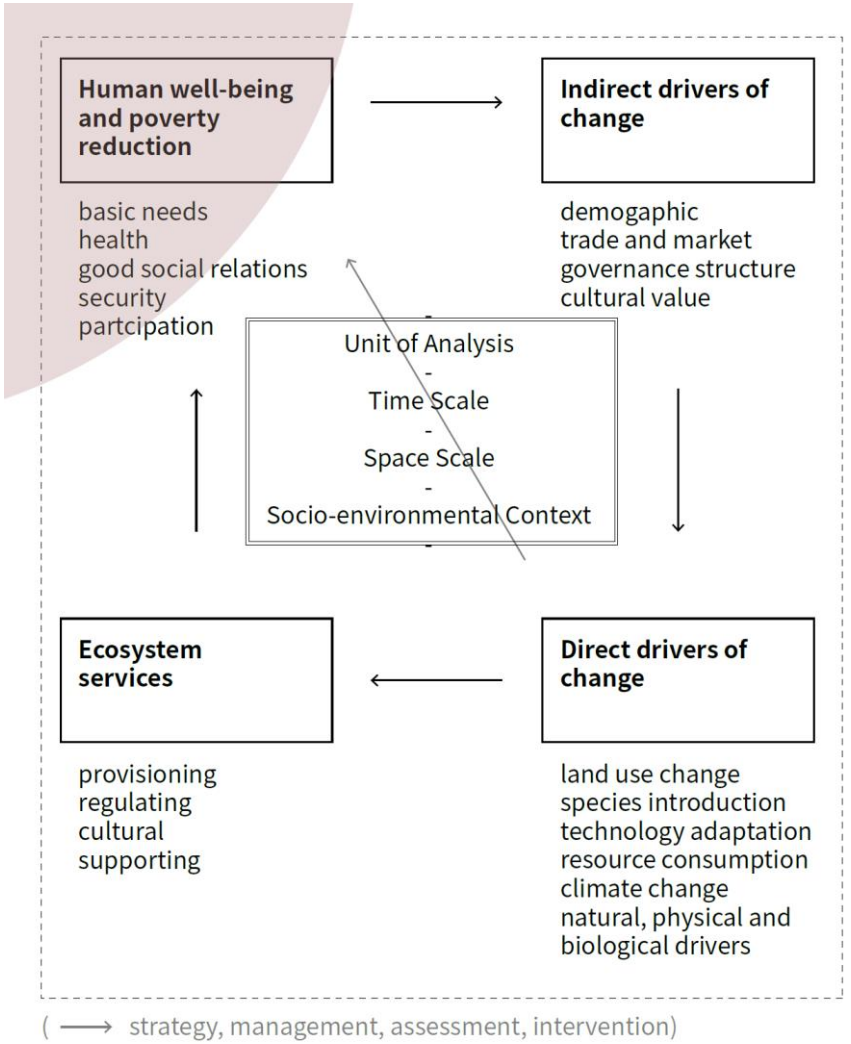


Lowland, coastal
Cooperative-based mainly
groundwater: 0-10, 30-50
soil type: marine clay, peat
main production type: shrimp, rice, fish
* mangrove as common property

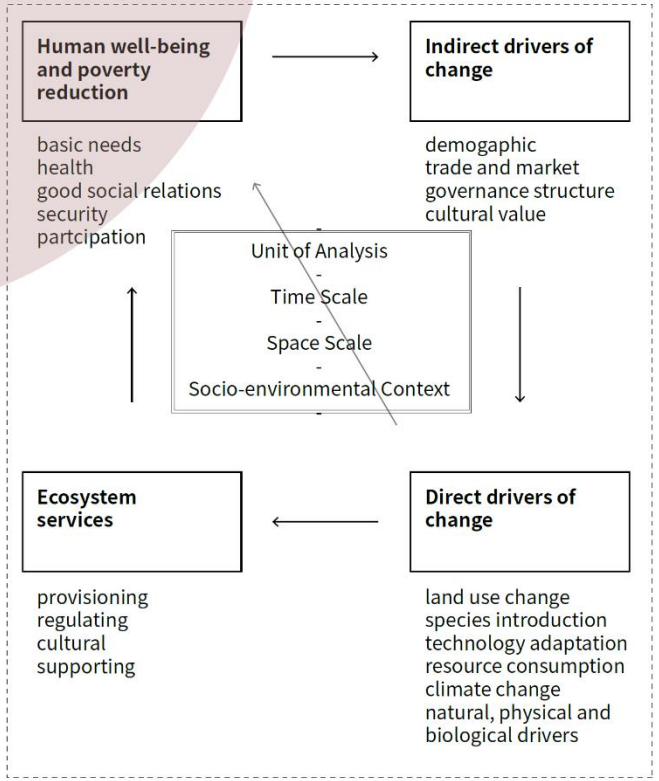


Source: Google street view

Adapted from Ecosystem services, MEA, 2005



Adapted from Ecosystem services, MEA, 2005 → Elaborated for understanding the delta subsystems



(⟶ strategy, management, assessment, intervention)

Local practices/ local

morphology of production
landscape

(geology, ecological condition)
(management, political condition)

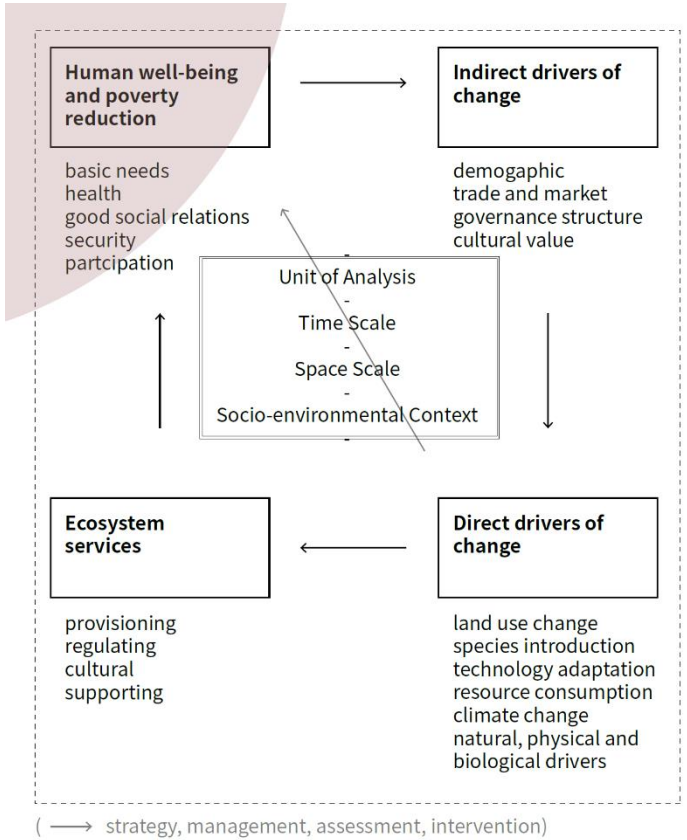
External forces/ regional to local

Biophysical
water quality
water quantity
flooding

Physical
land cultivation
transportation infrastructure
protection infrastructure

Social
population
physical movement
intensified cultivation
accessibility to services

Adapted from Ecosystem services, MEA, 2005 → Elaborated for understanding the delta subsystems → Lines' Synthesis (following studio methodology)



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Biophysical
water quality
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flooding

Physical
land cultivation
transportation infrastructure
protection infrastructure

Social
population
physical movement
intensified cultivation
accessibility to services

MATTER [WATER]
Water Fluctuation in Land

Pollution by linear use
Evolving engineering construction by urbanization
Water level change by urbanization and climate change

TOPOS [TRANSLATION]
Occupation, Expansion and Transformation of Land

Future urbanization trend
Land conversion and impact at coast
Pressure inside delta

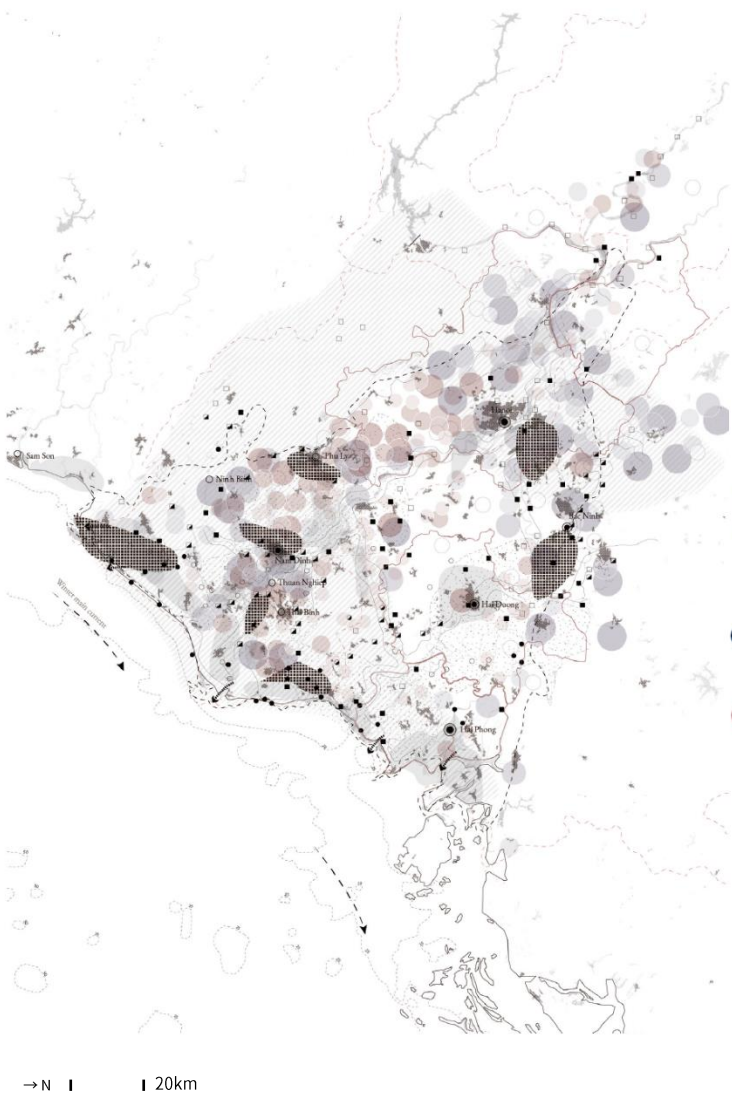
HABITAT [DIVERSITY]
Cultivation of Land

Land productivity
Local diverse production model
Shifting patterns of diverse vegetation

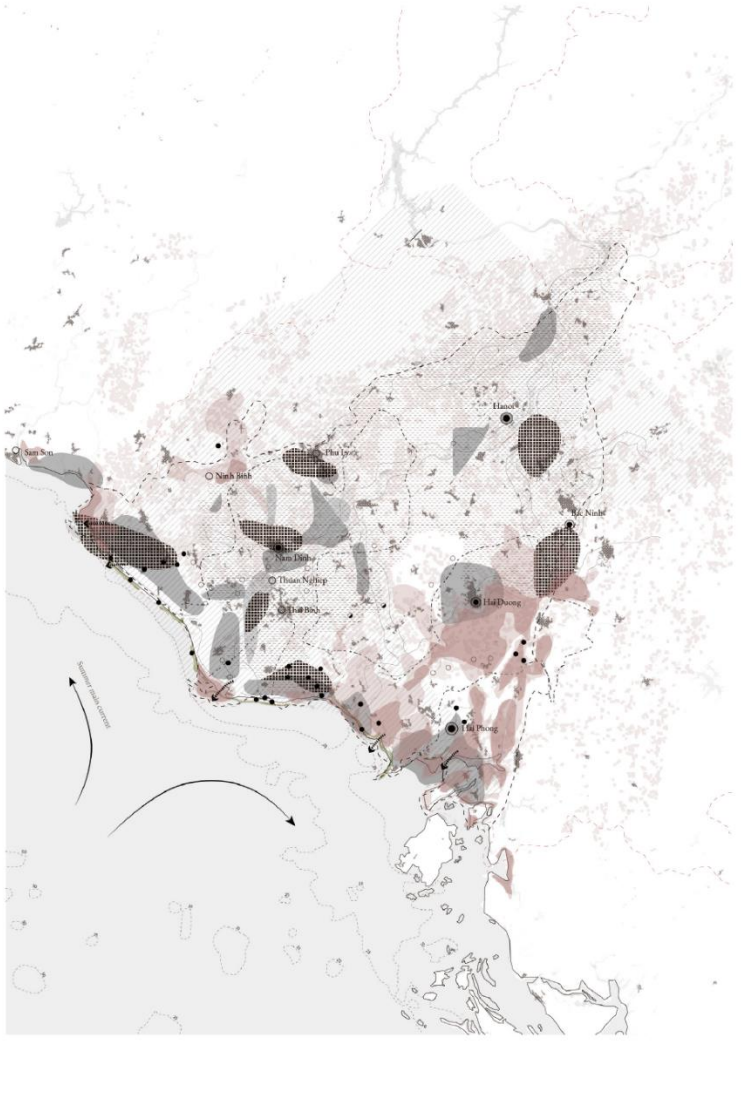
GEOPOLITICS [OWNERSHIP]
Control of Land and Resources

Claiming the territory
Institution ecology
Transboundary water body

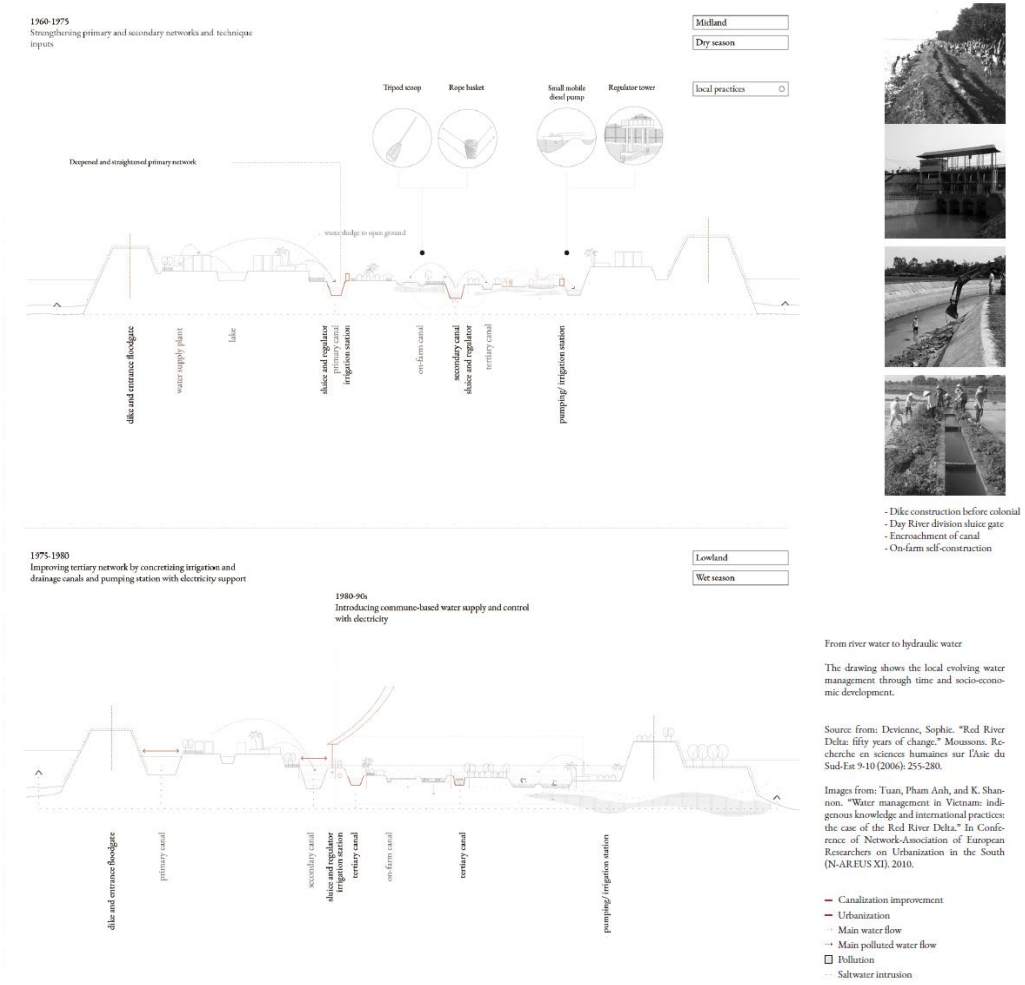
OPPORTUNITY AND CONCLUSION



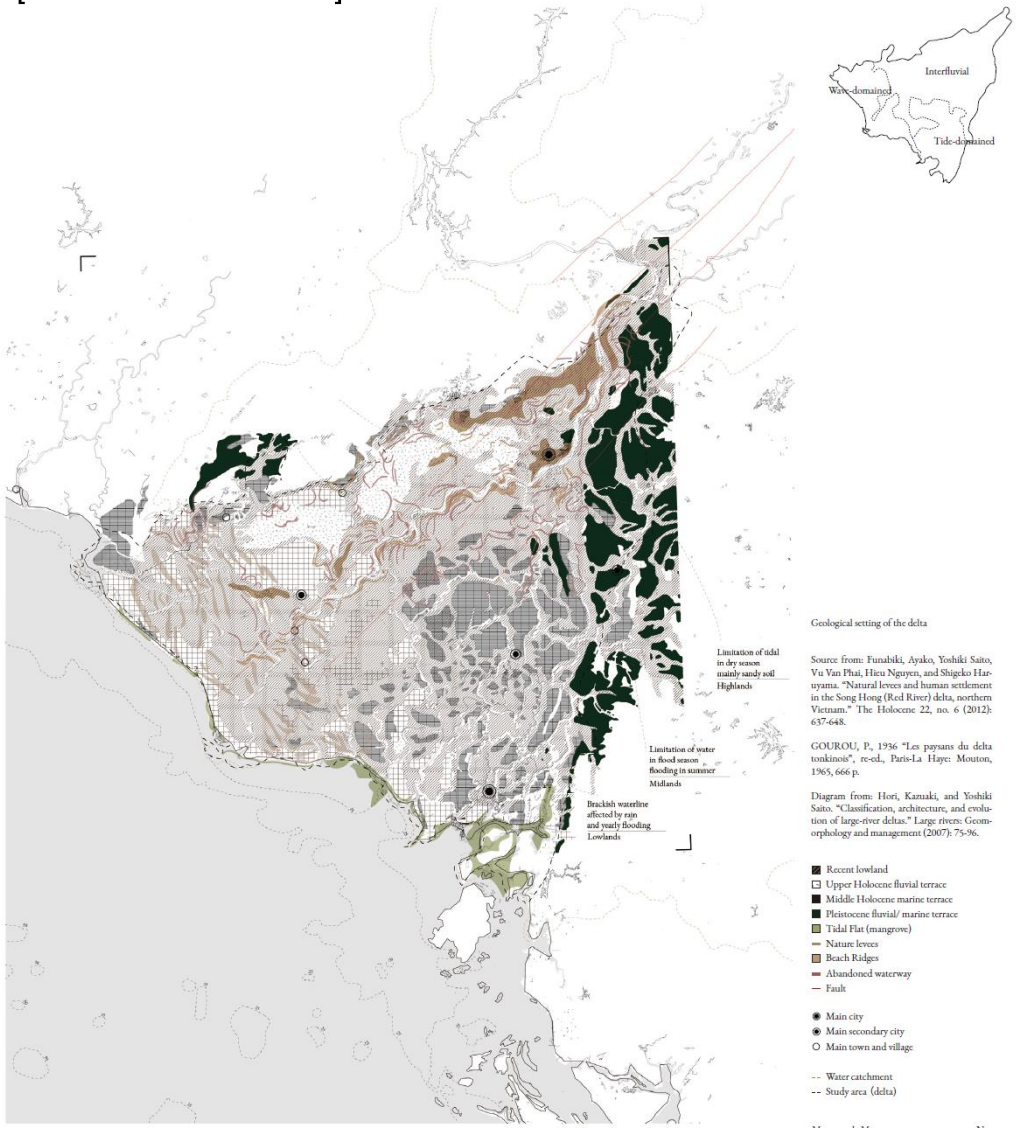
Water stress in drought season



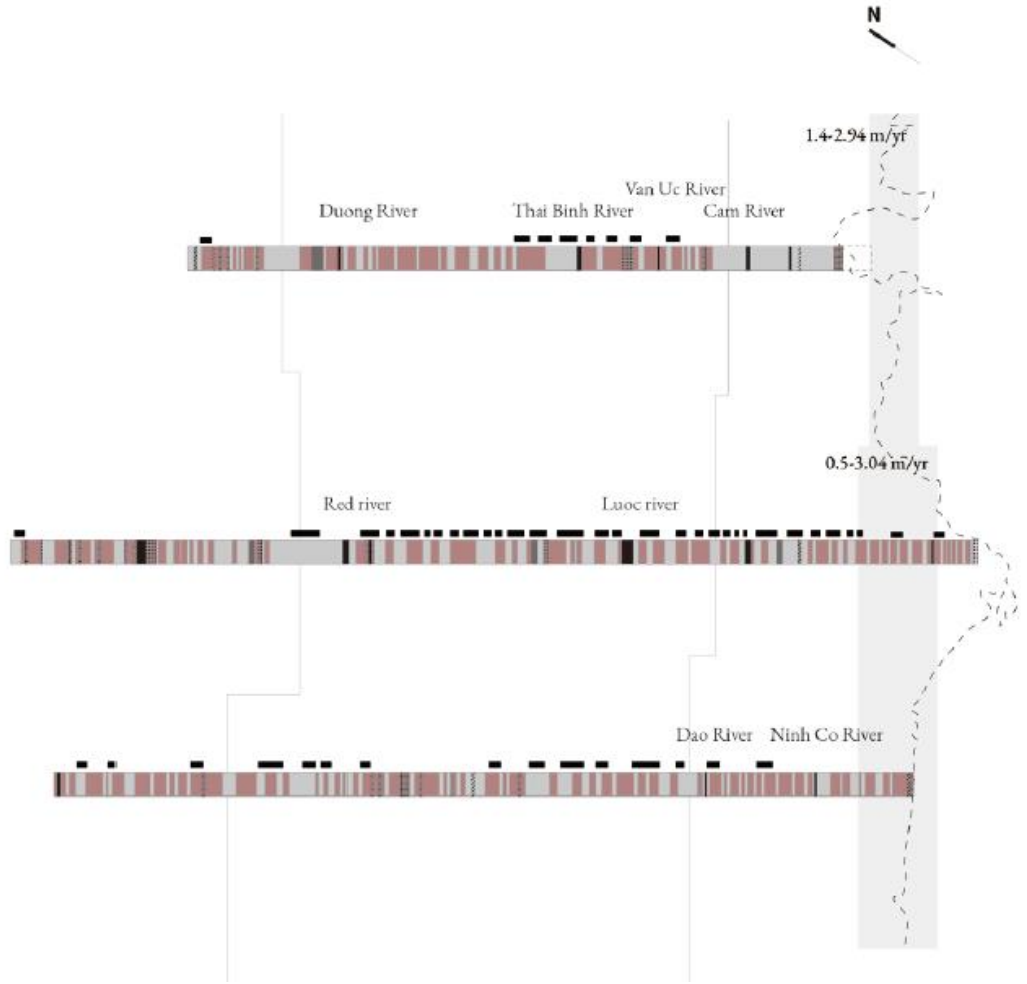
Water stress in wet season



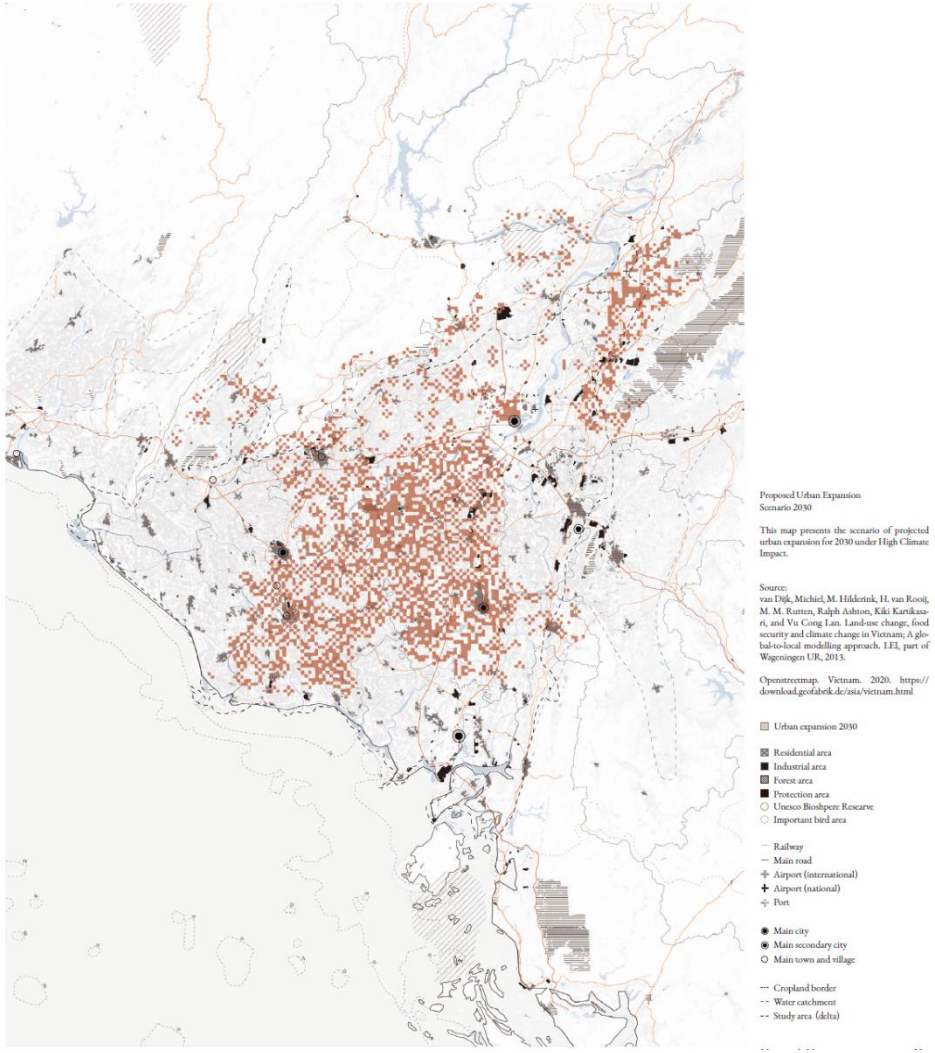
From river water to hydraulic water



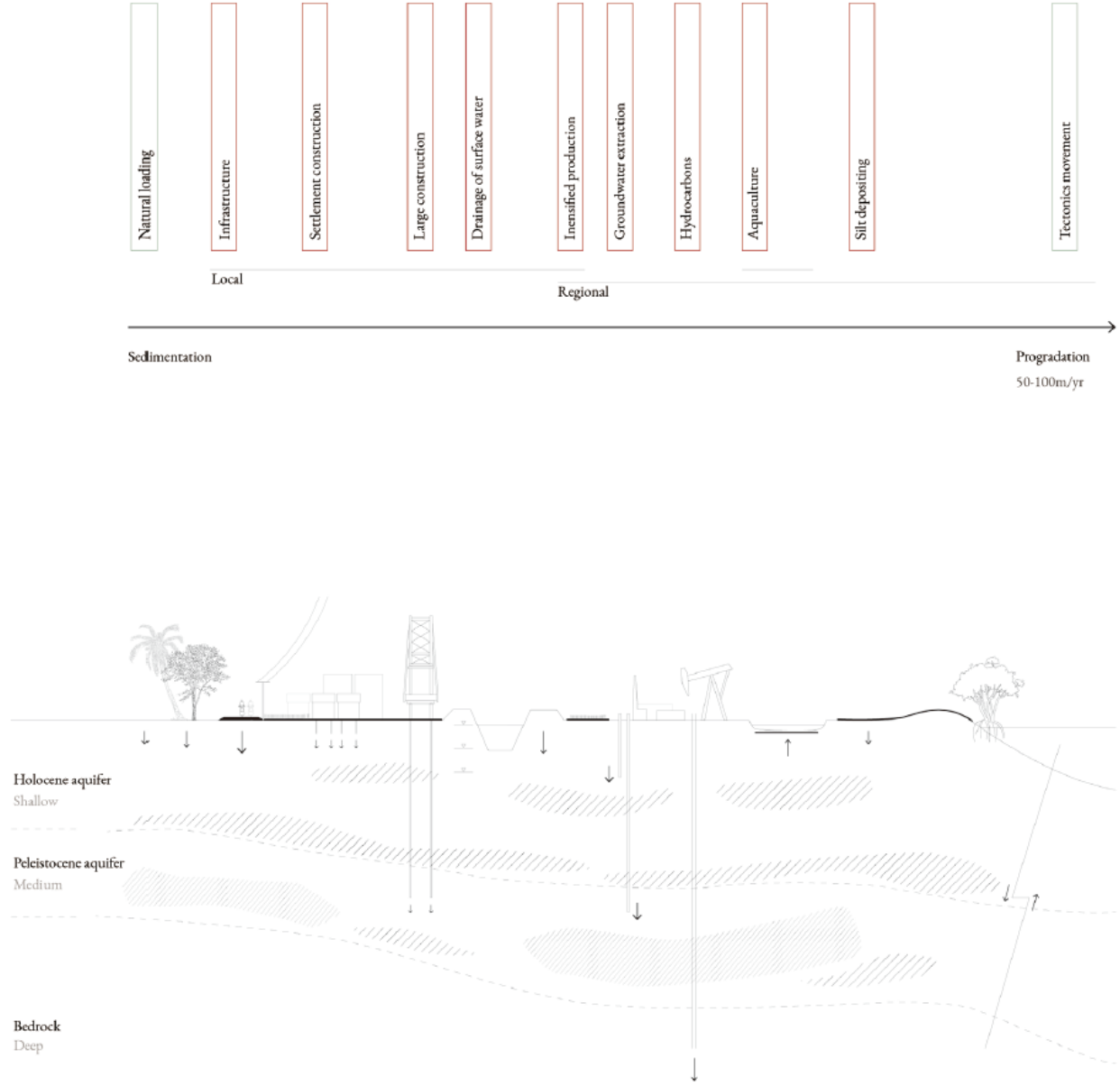
Geological setting of the delta



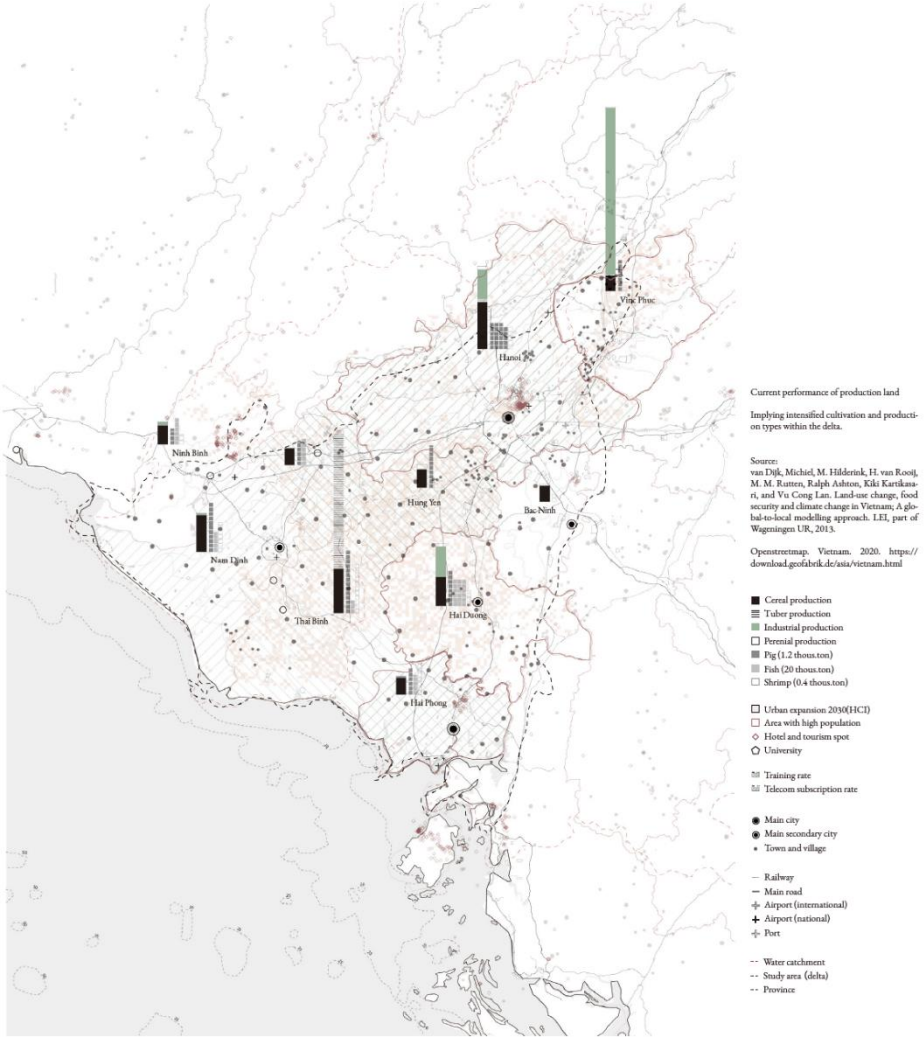
Formation, location and conversion



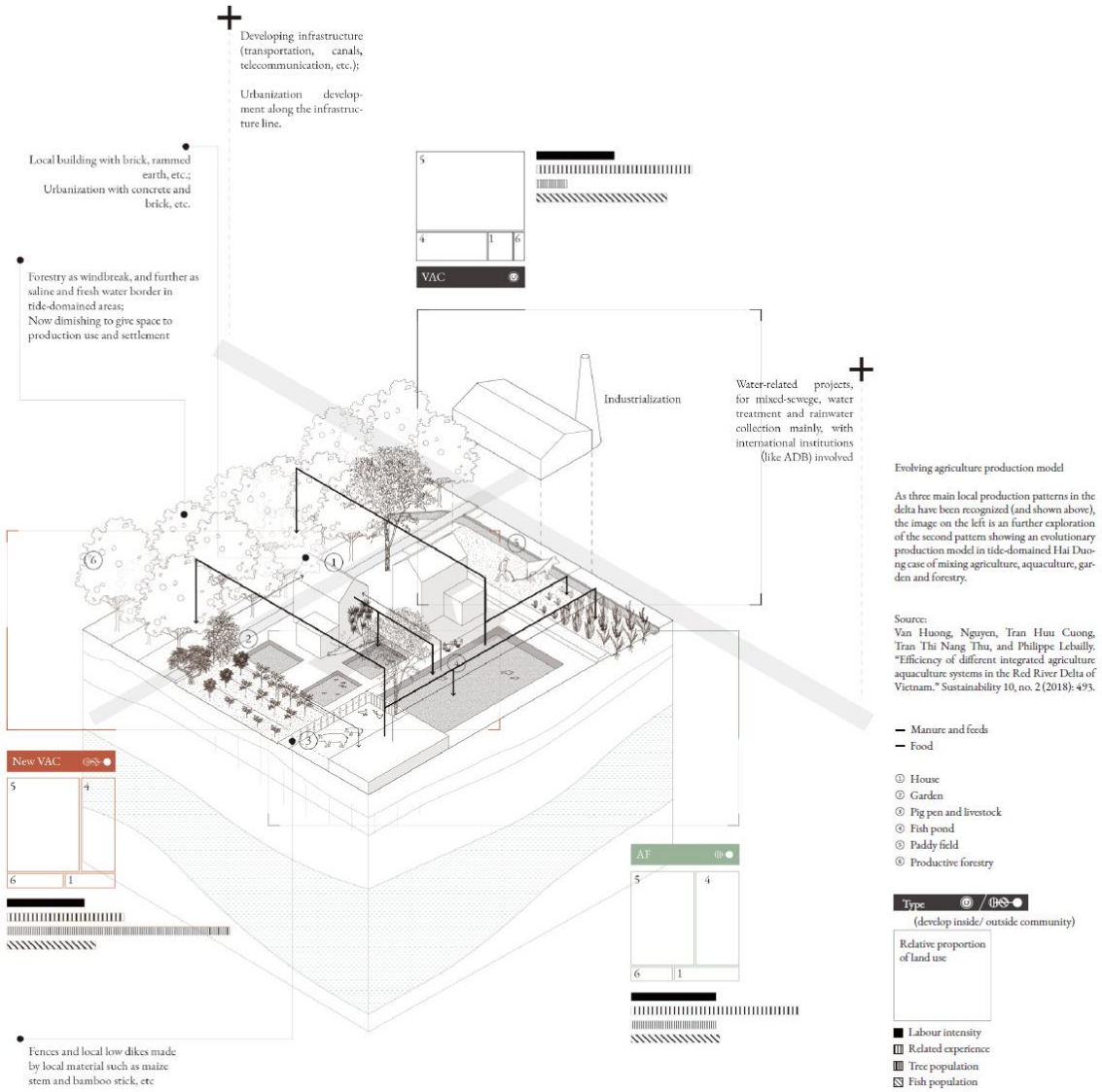
Proposed Urban Expansion Scenario 2030



Compaction, subsidence, and land condition

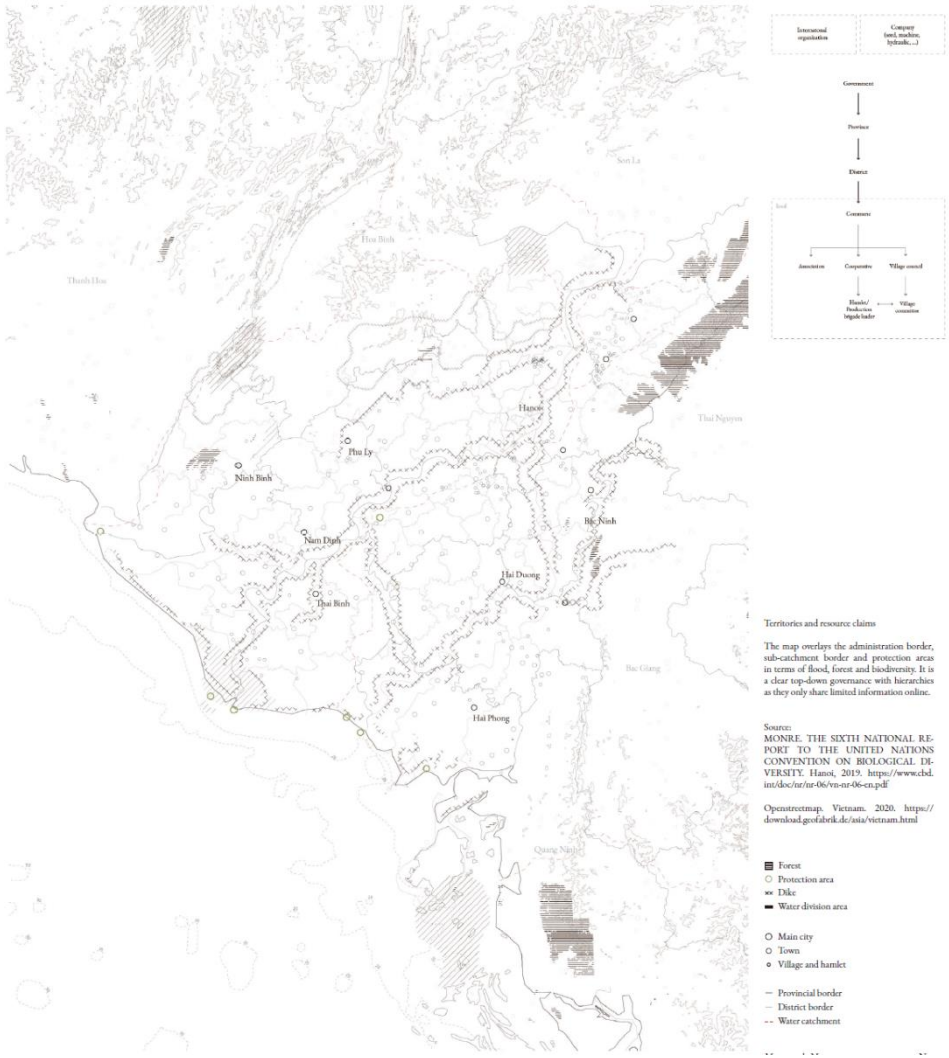


Current performance of production land

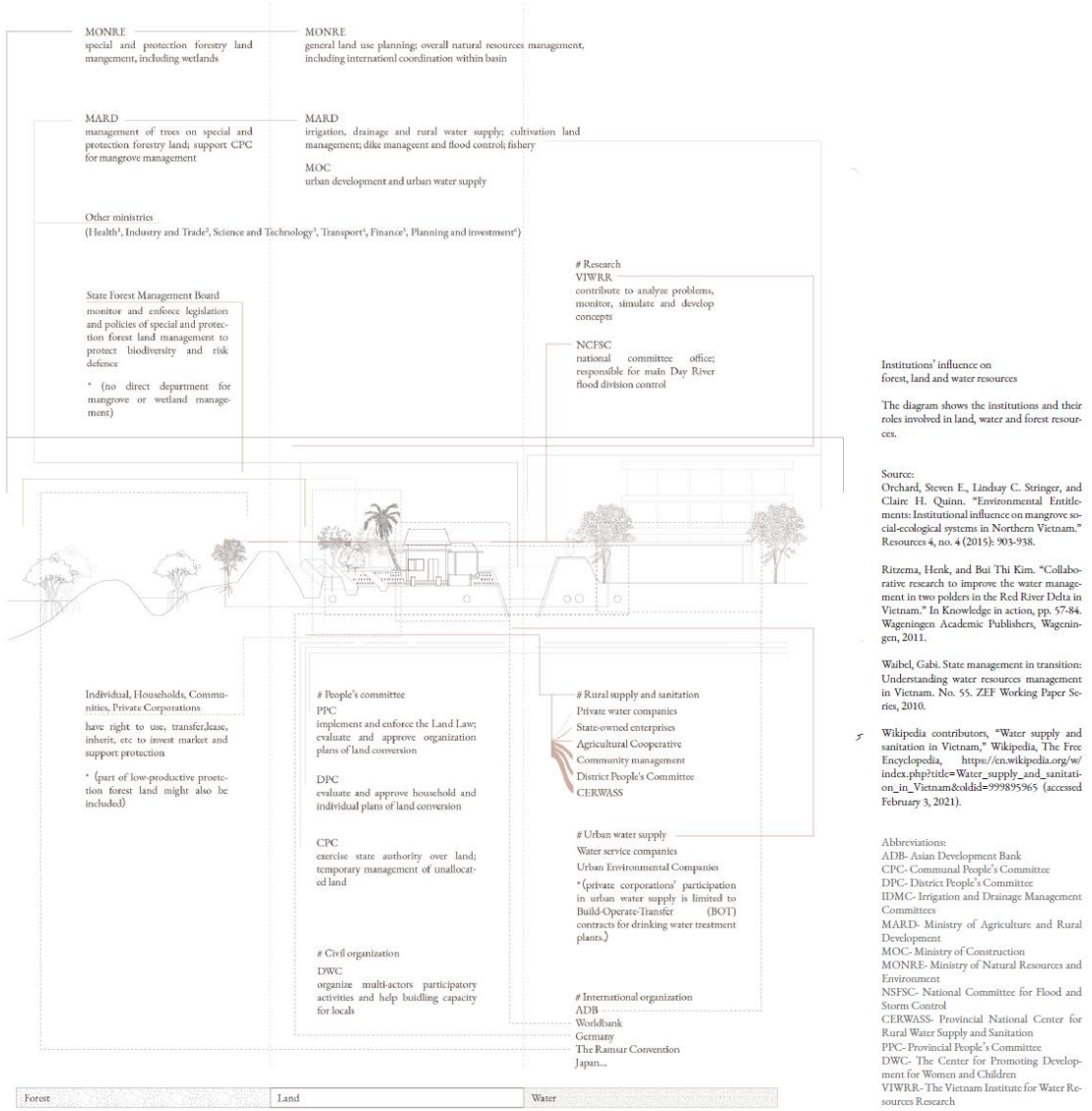


Evolving agriculture production model

[**GEOPOLITICS- OWNERESHIP**]



Territories and resource claims



Institutions' influence on forest, land and water resources

Lines’ synthesis

Socio-ecological vulnerability

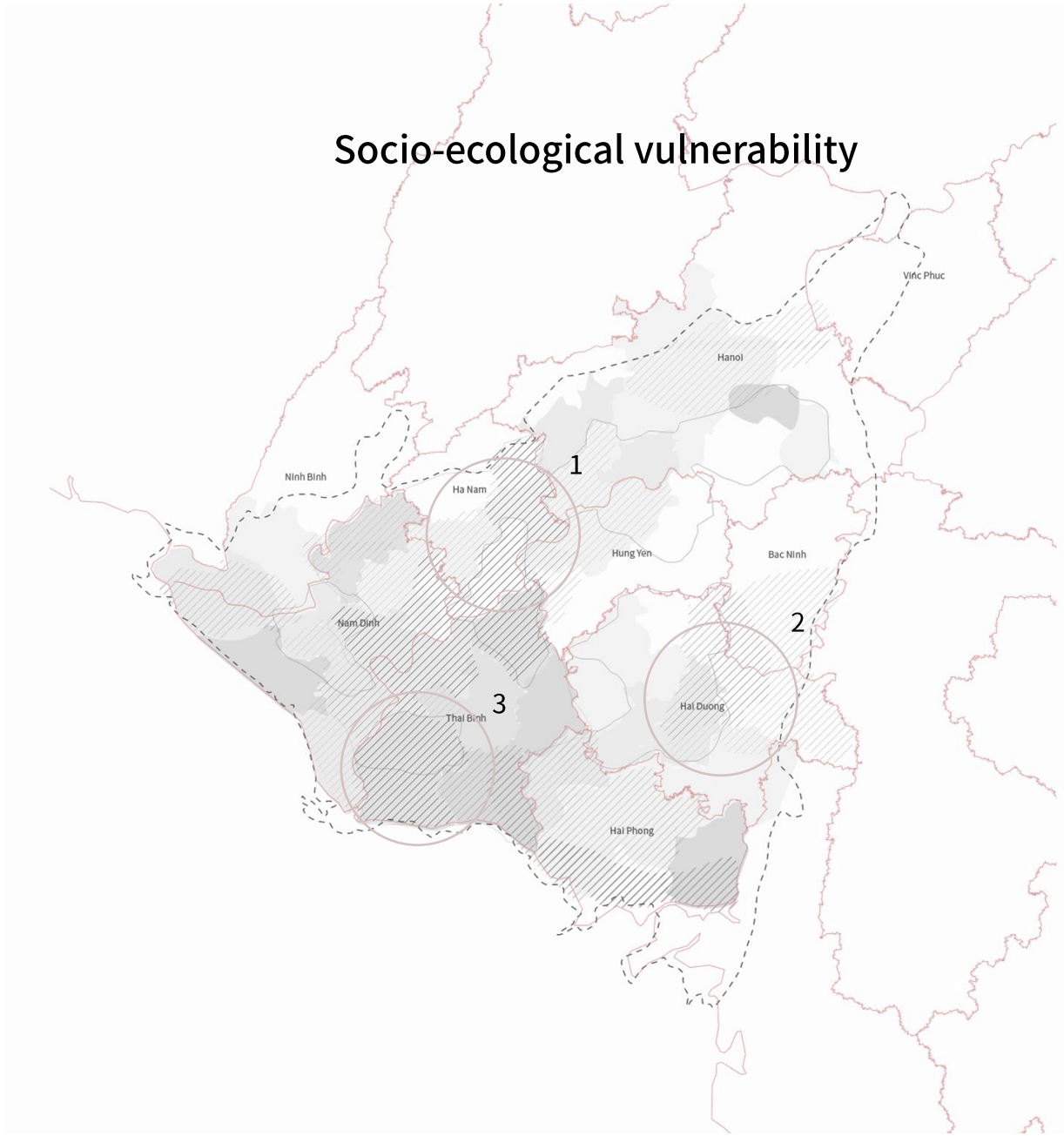
Socio-ecological vulnerability
(based on water stress, intensified land use and landscape fragmentation)

Climate vulnerability (Flood risk)
Low High

Water System instability
Low High

Ecological degradation
Low High

Water catchment
Study area (delta)
Province




1


2


3

Source: Google Earth

→ N | | 20km

Socio-ecological vulnerability

Water stress/ Water sensitivity and permeability

Socio-ecological vulnerability
(based on water stress, intensified land use and landscape fragmentation)

Water System instability
Low High

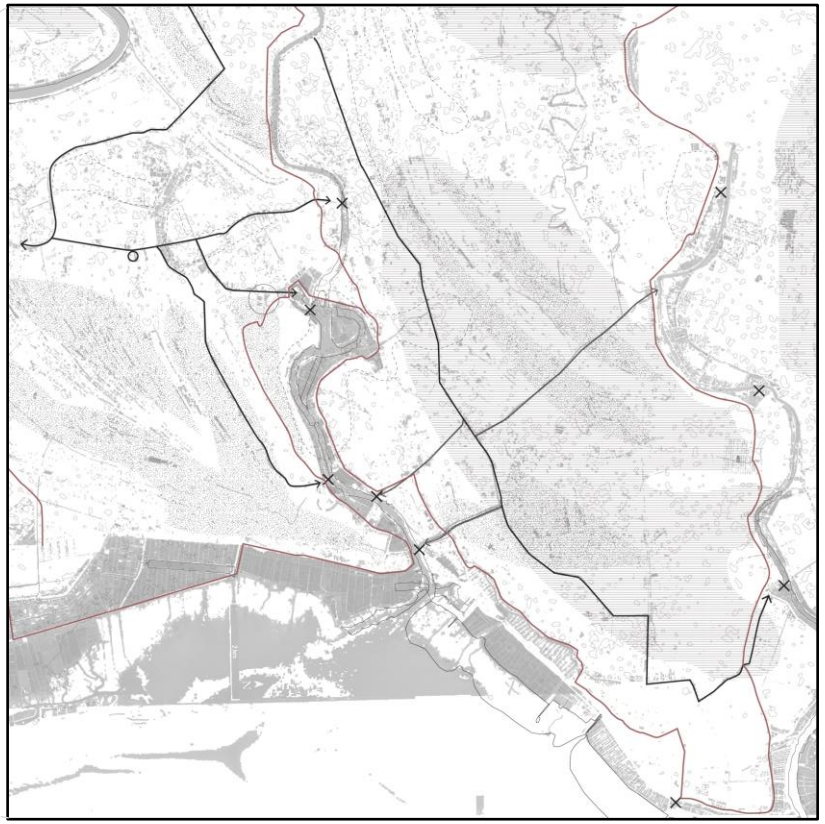
Water catchment
Study area (delta)
Province

Vinc Phuc
Hanoi
Ninh Binh
Ha Nam
Hung Yen
Bac Ninh
Nam Dinh
Thai Binh
Hai Duong
Hai Phong

main drainage canal
main sluice gate
dike
vulnerable lovwland
waste retreament plant

Flood and saline sensitivity
Low High

Surface permeability
Low High



→ N | 20km | 4km

Socio-ecological vulnerability

Climate vulnerability/ Urban accessibility

Socio-ecological vulnerability
(based on water stress, intensified land use and landscape fragmentation)

Climate vulnerability (Flood risk)

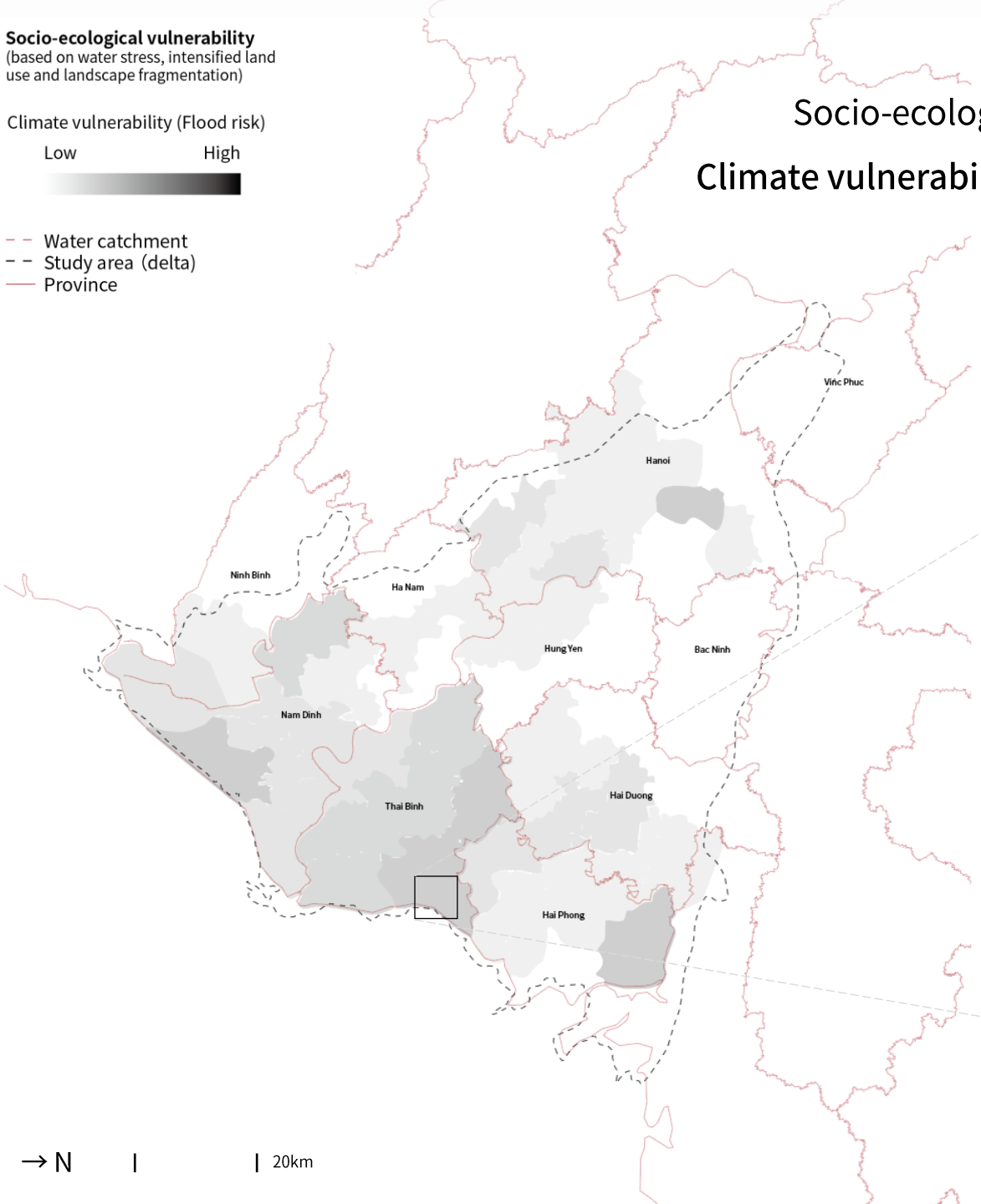
Low — High

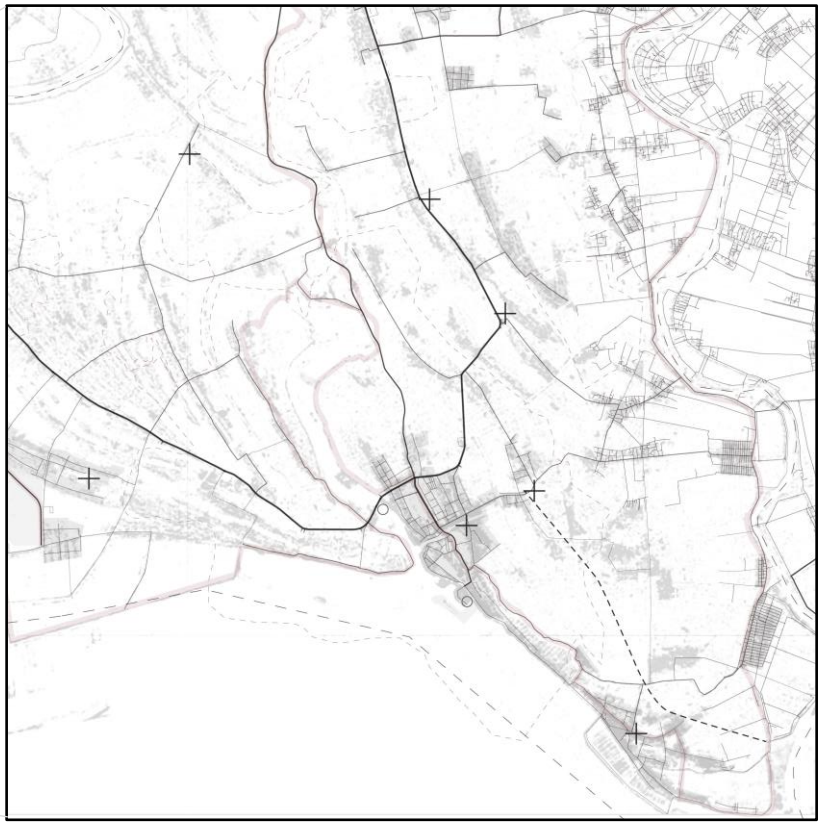
- Water catchment
- Study area (delta)
- Province

- main primary road
- main secondary road
- main tertiary road
- dike
- market
- port (regional)

Connectivity and assess

Low — High





→ N

20km

4km

Socio-ecological vulnerability

Ecological degradation/ Production and winter input

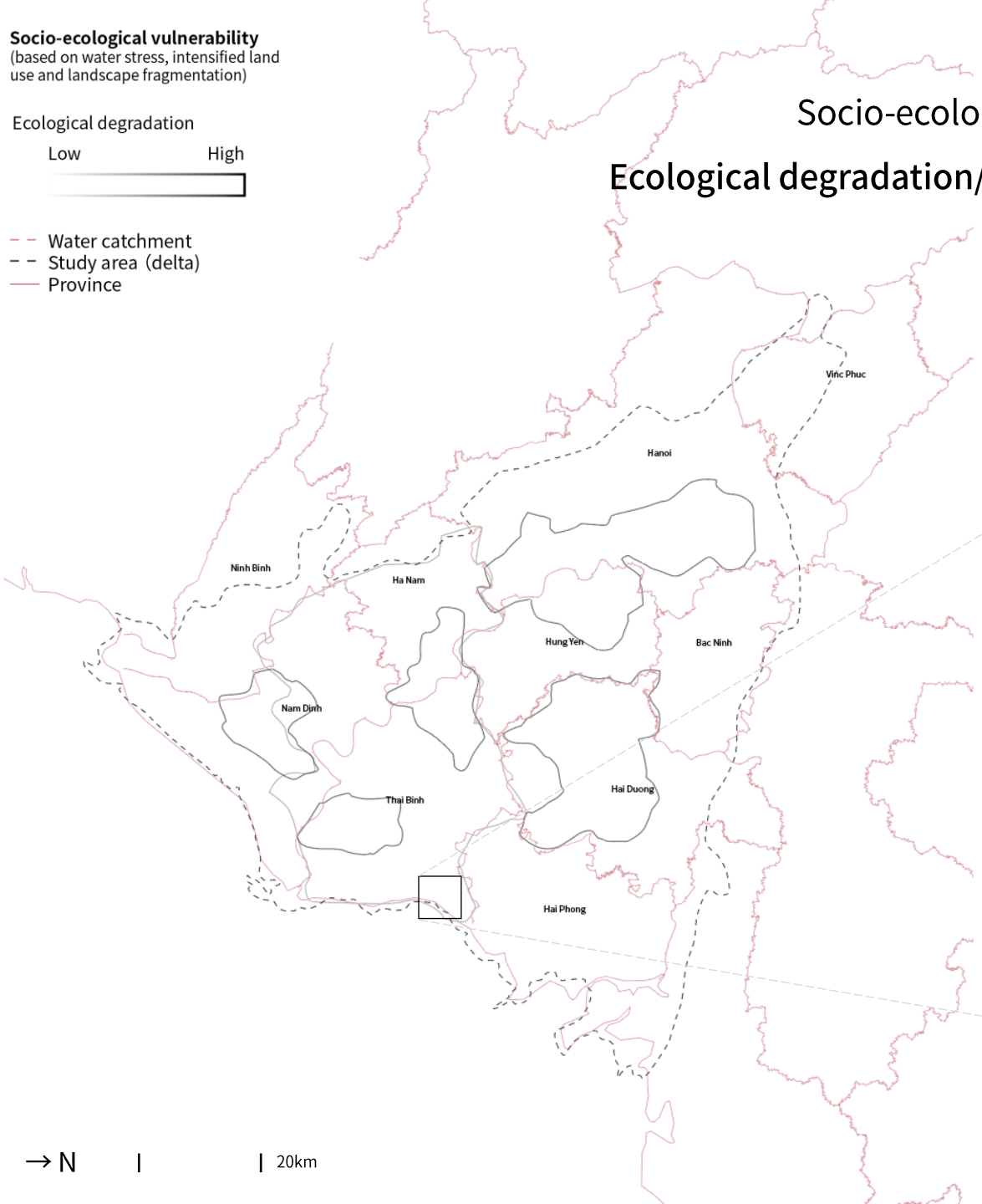
Socio-ecological vulnerability
(based on water stress, intensified land use and landscape fragmentation)

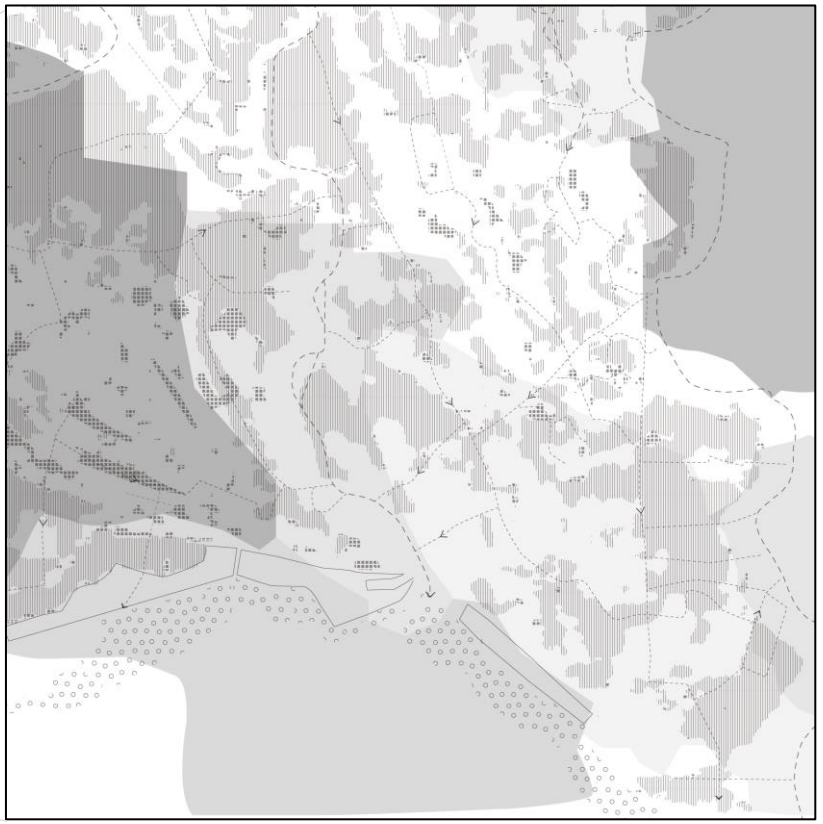
Ecological degradation
Low — High

- Water catchment
- Study area (delta)
- Province

lowland agriculture
upland agriculture
integrated agri-aqua
main water flow

Fertilizer input in winter
Low — High





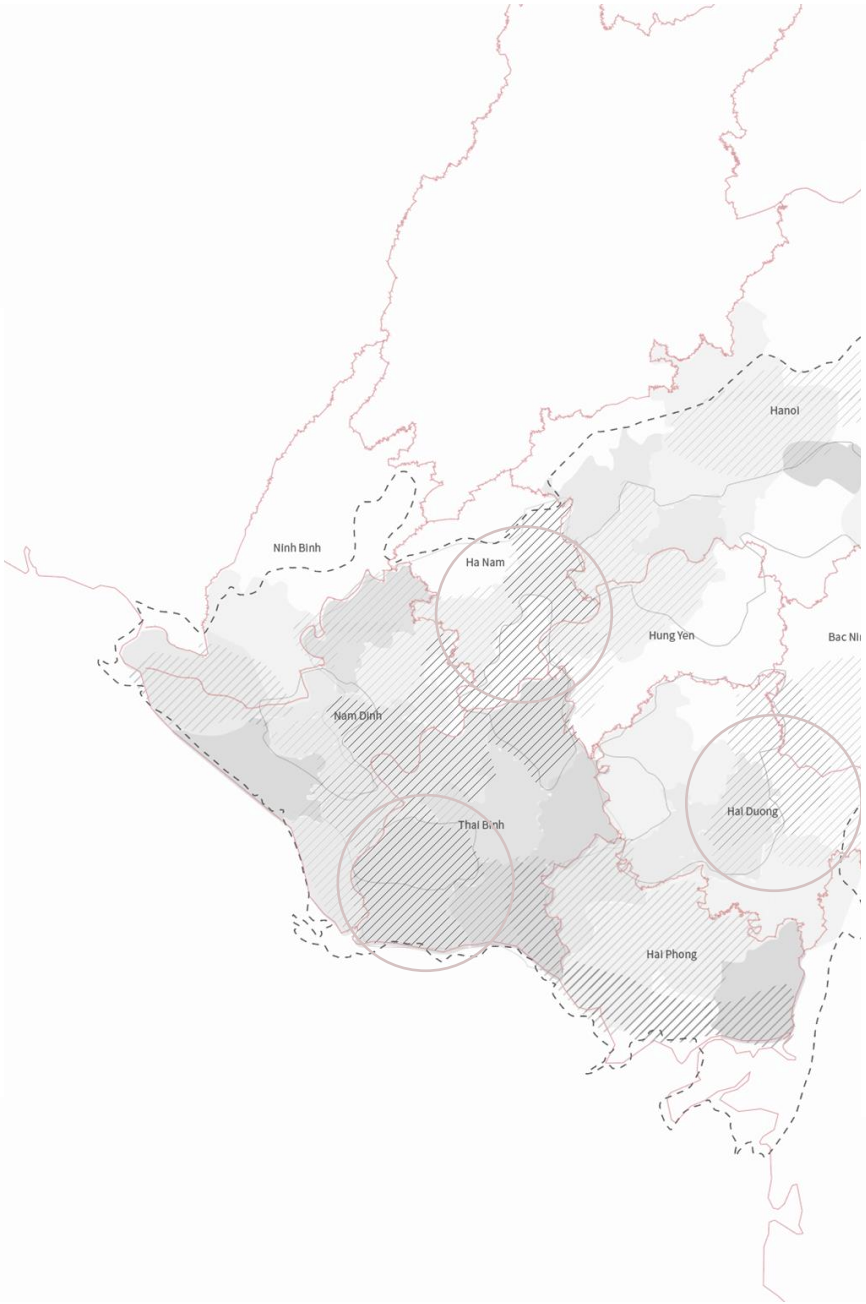
→ N | 20km | 4km

Seeking opportunity -

Water
-
Groundwater recharge
Surface water retention
Wastewater from industry

Land
-
Strategic expansion
Knowledge sharing and accessibility
Land productivity

Forestry
-
Landscape continuity
Soil retreatment
Water defense



Day River as a reservoir

high ecological footprint
efficiency-centric protection
high-tolerance production

High-tech surveillance

low ecological footprint
bio-engineering-centric protection
mild-tolerance production

Radical renaturalization

high ecological footprint
displacement-centric protection
low-tolerance production

Engineering
Ecology
Reactive
Proactive

Intergrated Water and Land Co-management

Forest as the opporunity

Protection + Production

System x Processes

Ecosystem restoration
Social well-being
Sustainable agro-forestry production

→ N

Scales

network upgrade

detail implementation

Macro

Delta.
Hybridity of infrastructure network

Intermediate

Urban-rural growing cluster regarding to three types of cultural landscape- tidal, high-tide and alluvial.
Potential of function integration across systems

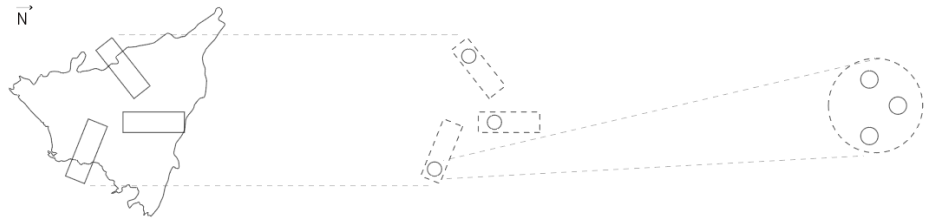
Local

Rural commune within Intertidal case.

Communication

Limited understanding from research-er' s perspective imagining future performance of Vietnam

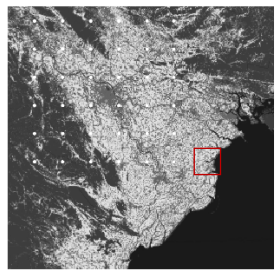
* Local sociology implies people trust social media more than communal organizations in some cases as the latter are usually composed of villagers' family members, mixing interest and trust. Therefore, the media may be more useful than communal organizations, but also under supervision.



Biophysical

Network of green, blue and social infrastructure

Water structure
Green-blue buffer
Coastal mangrove
(Proposed urban structure)



(20km grid)

Socio-ecological
Socio-economic

Ecological restoration and socio-eco-nomic transformation of landscape
_along infrastructure, in paddy field or within human settlement

Changing water surface and wetland
Flooding or saline intrusion area
Forestation along water-infrastructure
Road depth
Dike modifcation
Special production program

(2km grid)

Socio-cultural

Resistance and transformation of local landscape

Landscape transformation with agroforestry and public activation

(1km grid)

Virtual

Reference

Weiliu Wetland Park, China, 2019

PANORAMA LOKAAL – Julianadorp, the Netherlands, 2020

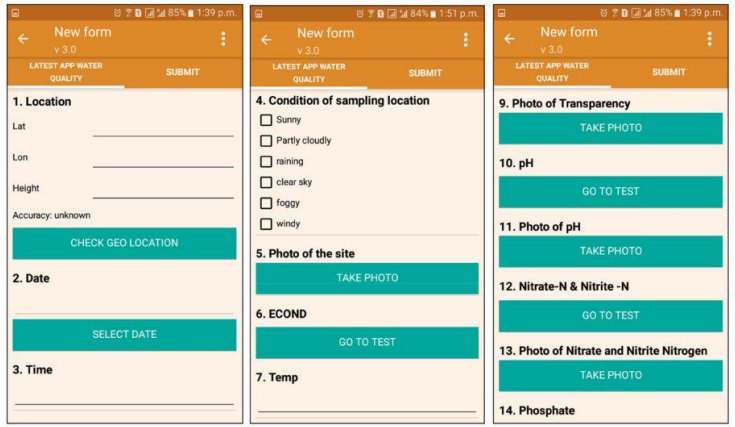
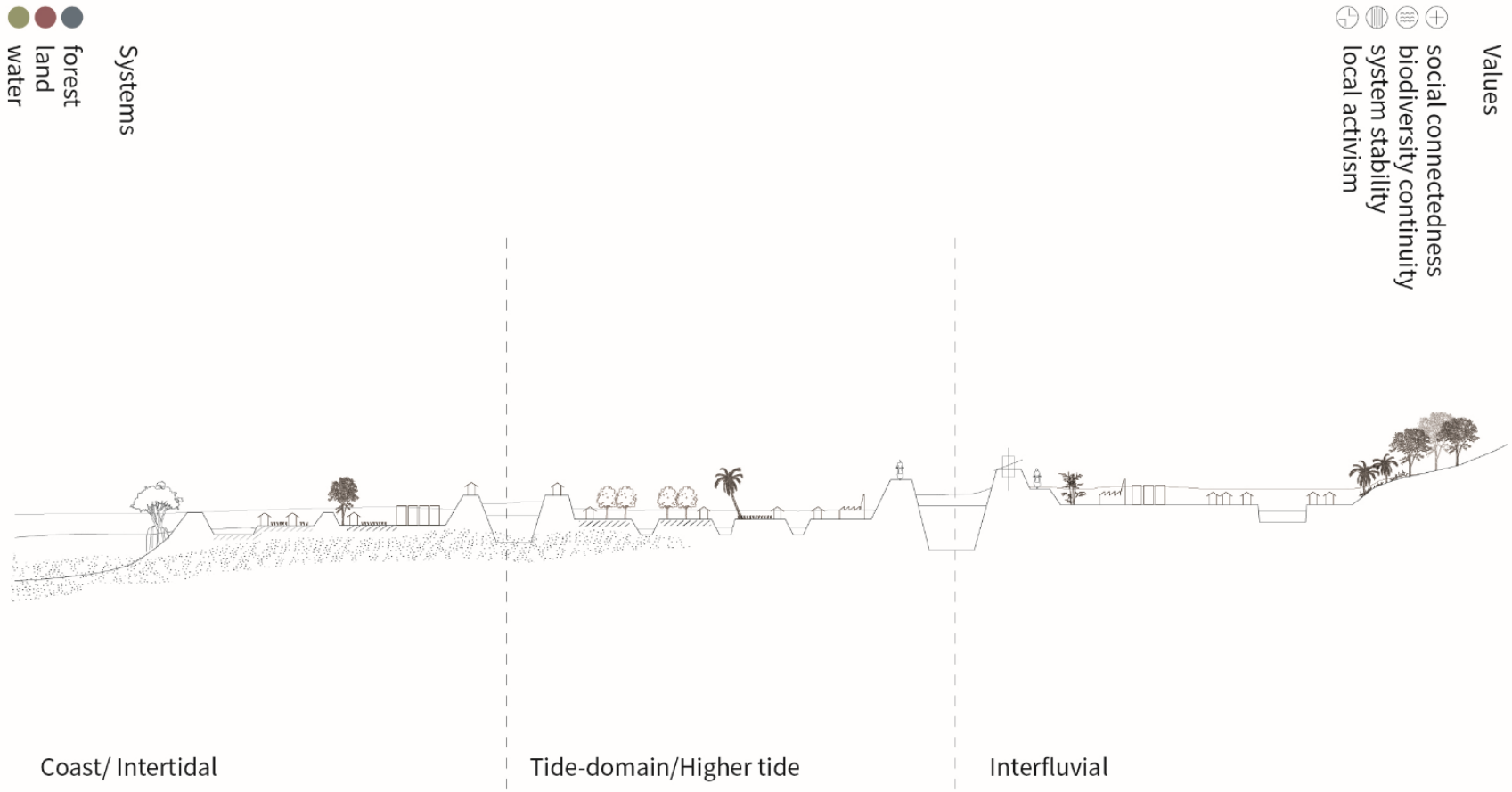


Figure 2. Flow application and survey form.

A low-cost water quality monitoring system using a participatory approach, Mymmar, 2019

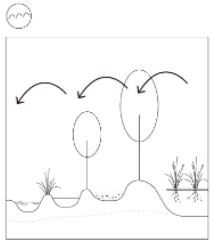
Start from identifying social and spatial processes



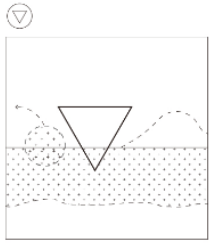
Performative landscape

Main Principles

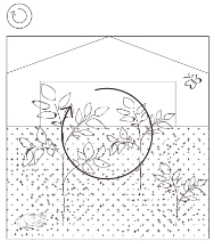
Clean water



Phytoremedia-tion

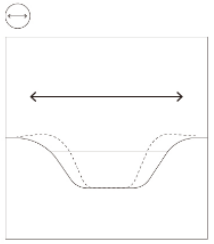


Soil cleaning

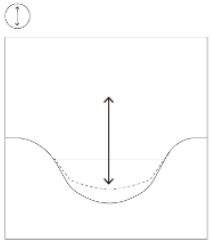


Sustainable production

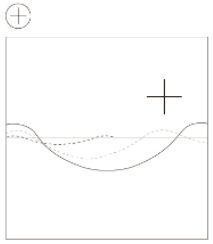
Restore water



Waterway width modification



Waterway depth modification



New water surface

Access to knowledge

Social infrastruc-ture activation

Public participa-tion

Integration with tradition

Source: baoquangtri.vn

baobinhdinh.com.vn

Google street view

Satsuki Shibuya, 2015

thaithuy.thaibinh.gov.vn

Google street view

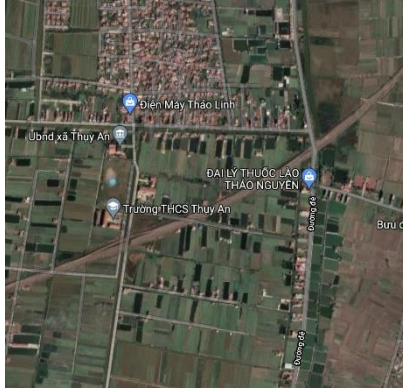
Google street view

Google street view

camgiang.haiduong.gov.vn

Proposition catalogue

VISION	PRINCIPLE	MAIN STRATEGY	SPATIAL PROCESS
Performative Landscape (allow redundancy and contribute to enhanced hybridity of delta in protection and production)	clean water	waste management	along infrastructure
	restore water	wetland restoration	paddy field
	access to knowledge	sustainable production	communal space



Source: Google Earth

Proposition catalogue

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	access to knowledge	sustainable production	communal space

↓

Land

Agroforestry

Hydrology

Source: Google street view

Proposition catalogue

TEMPORAL PROCESS

short-term
dry season
ainy season
monsoon season

long-term

SOURCE

Open source data

Open report

Documentary from
artist and locals

CRITERIA

water quality and quantity

land use diversity

sustainable livelihood

VALUE

social connectedness

biodiversity continuity

system stability

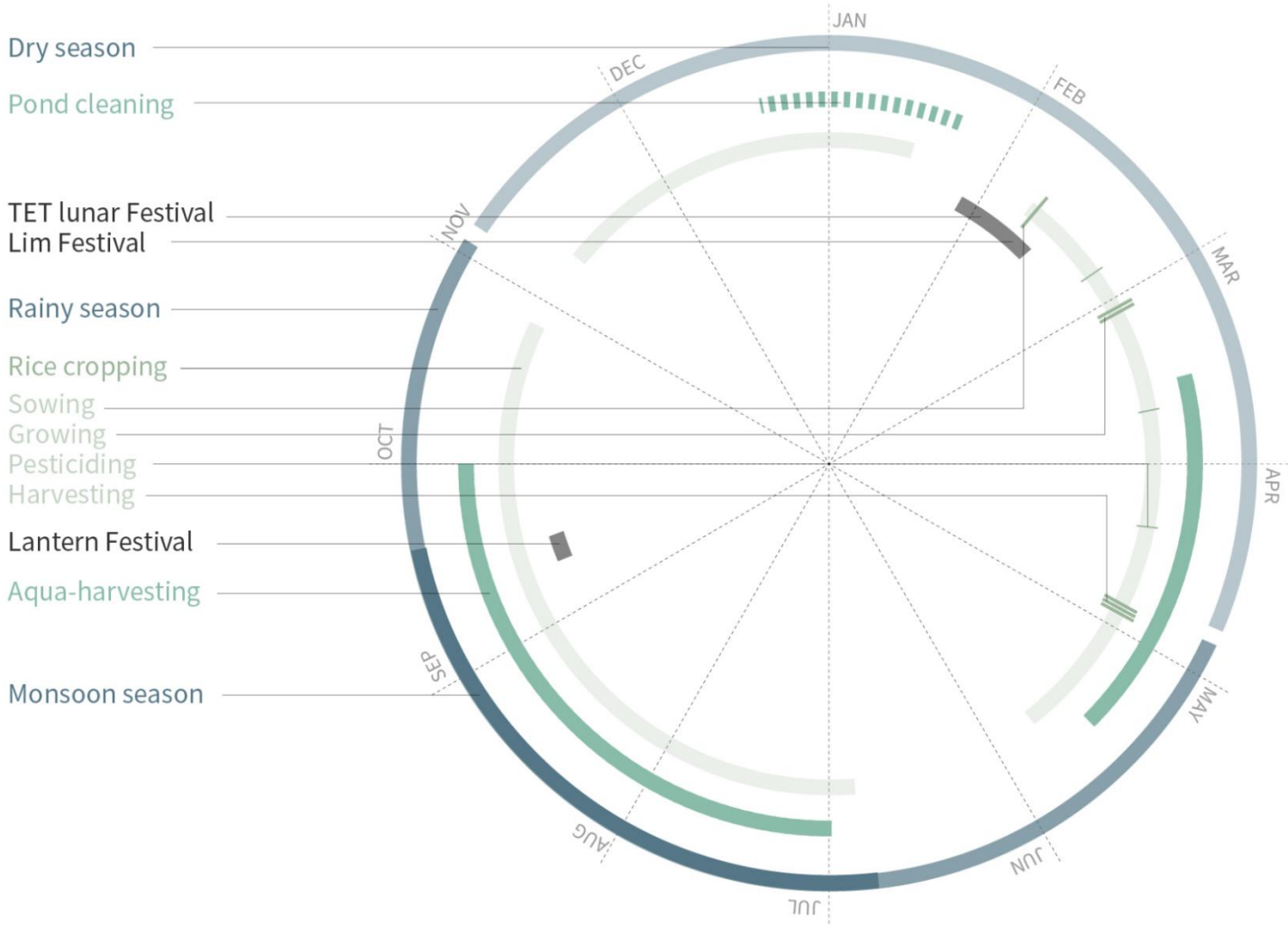
local activism

Temporal- socio-economic

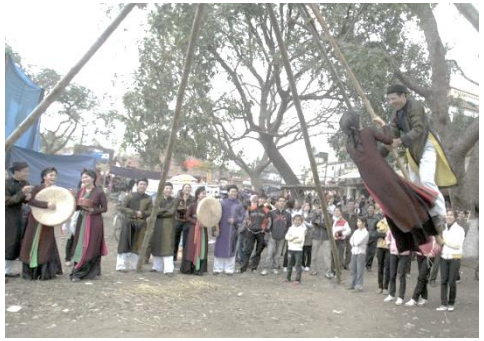
TEMPORAL PROCESS

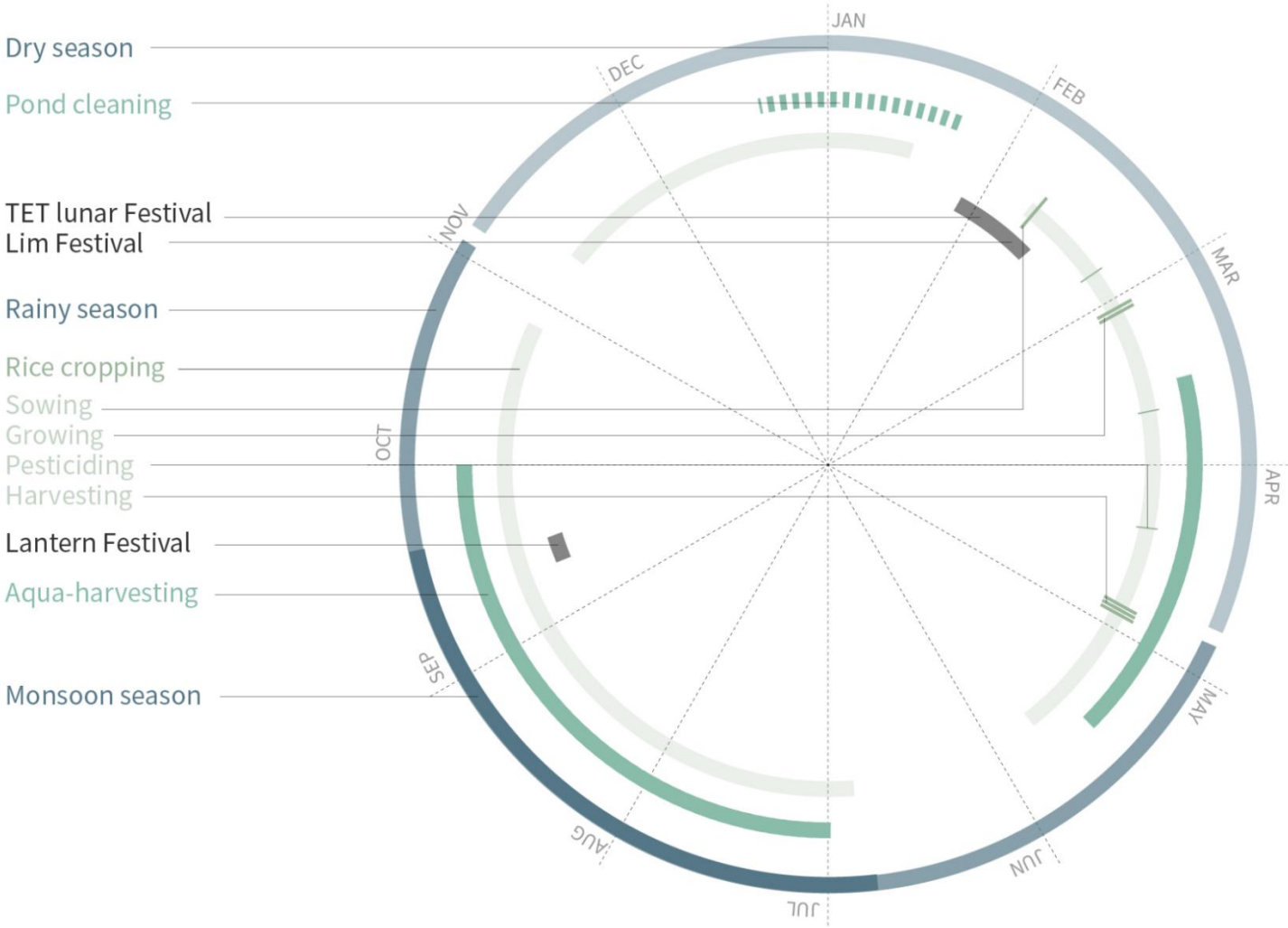
short-term
dry season
ainy season
monsoon season

long-term



Temporal- socio-economic





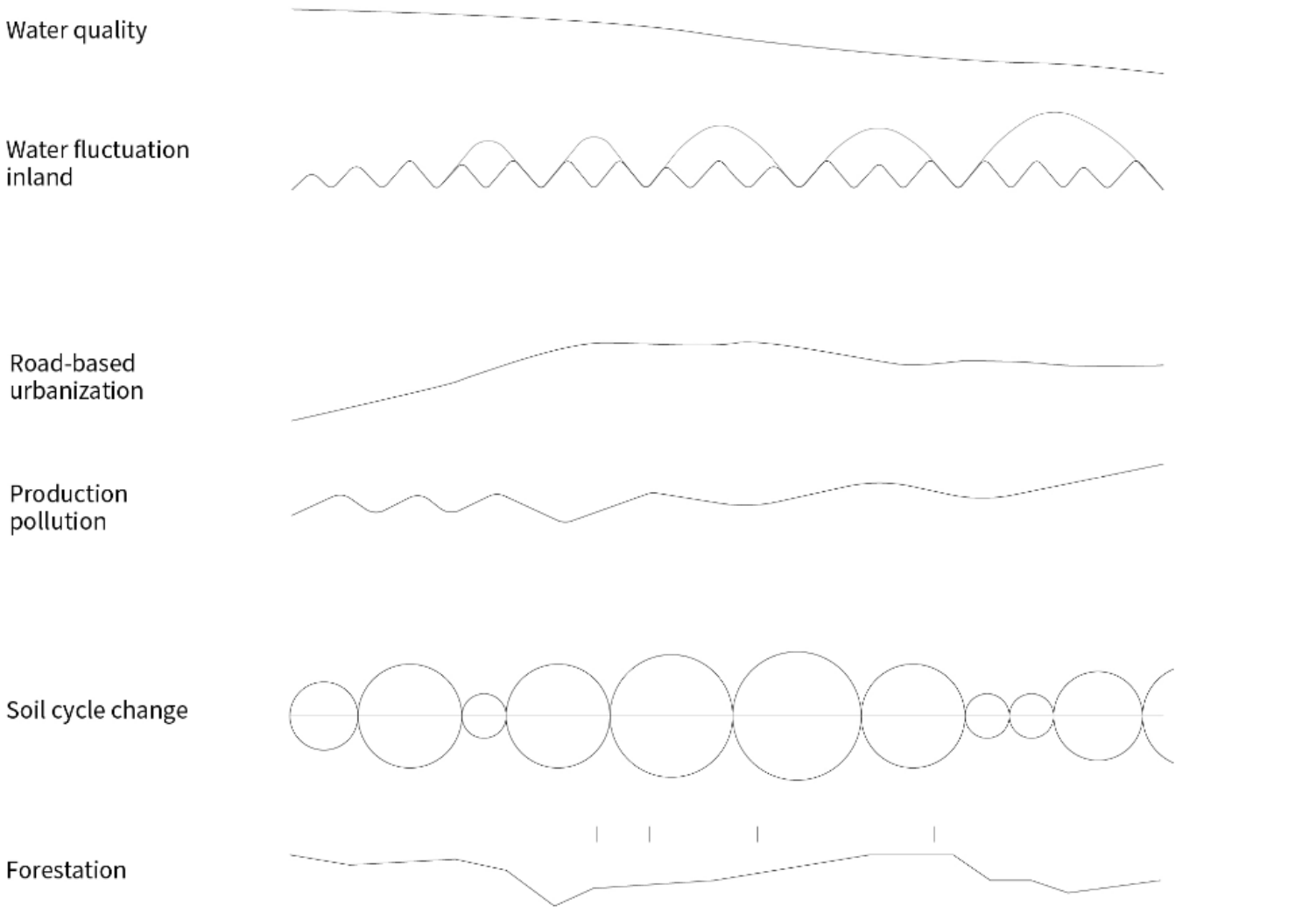
Source: visa2vietnam.blogspot.com

Temporal- biophysical

TEMPORAL PROCESS

short-term
dry season
ainy season
monsoon season

long-term

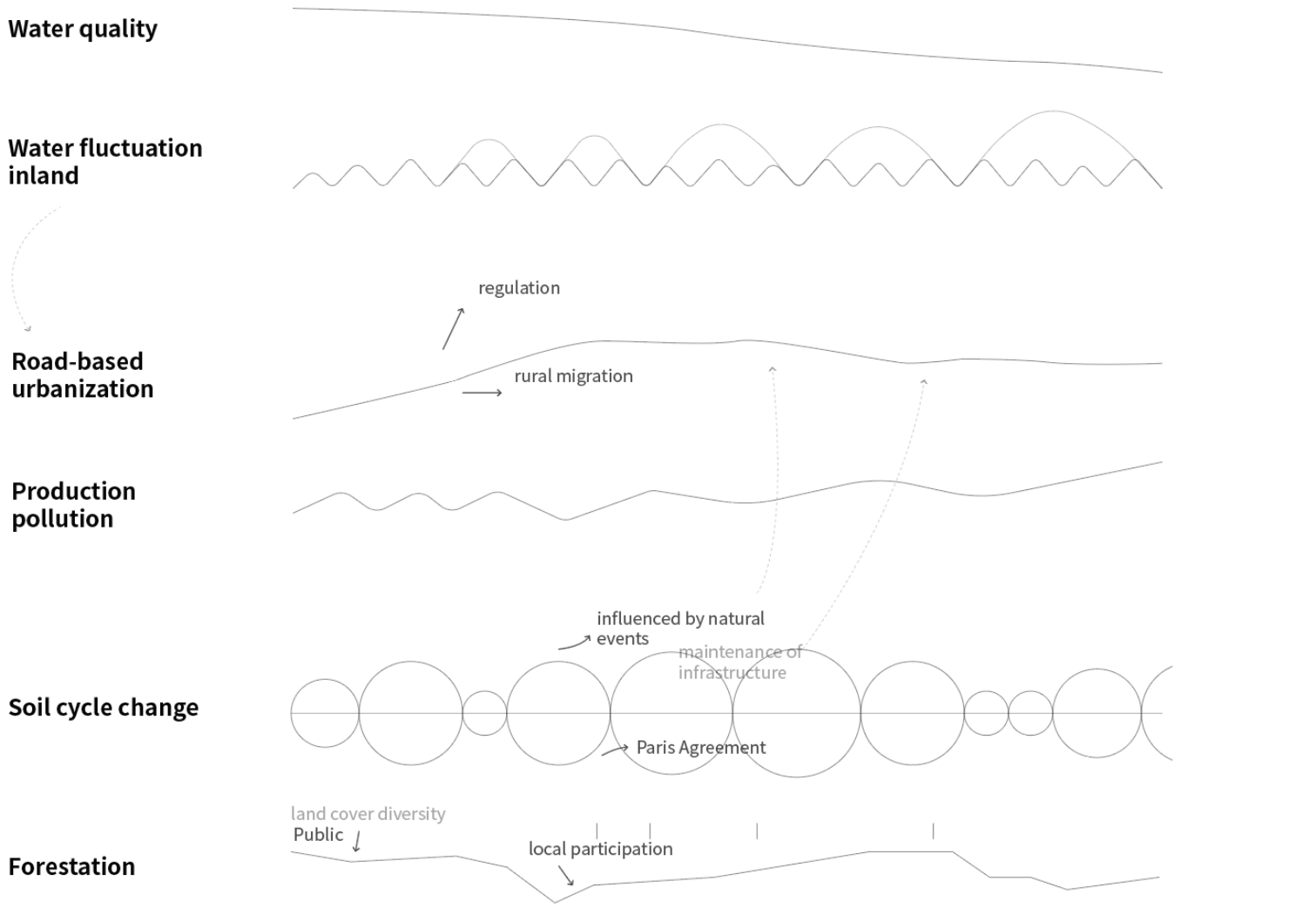


Temporal- biophysical

TEMPORAL PROCESS

short-term
dry season
ainy season
monsoon season

long-term



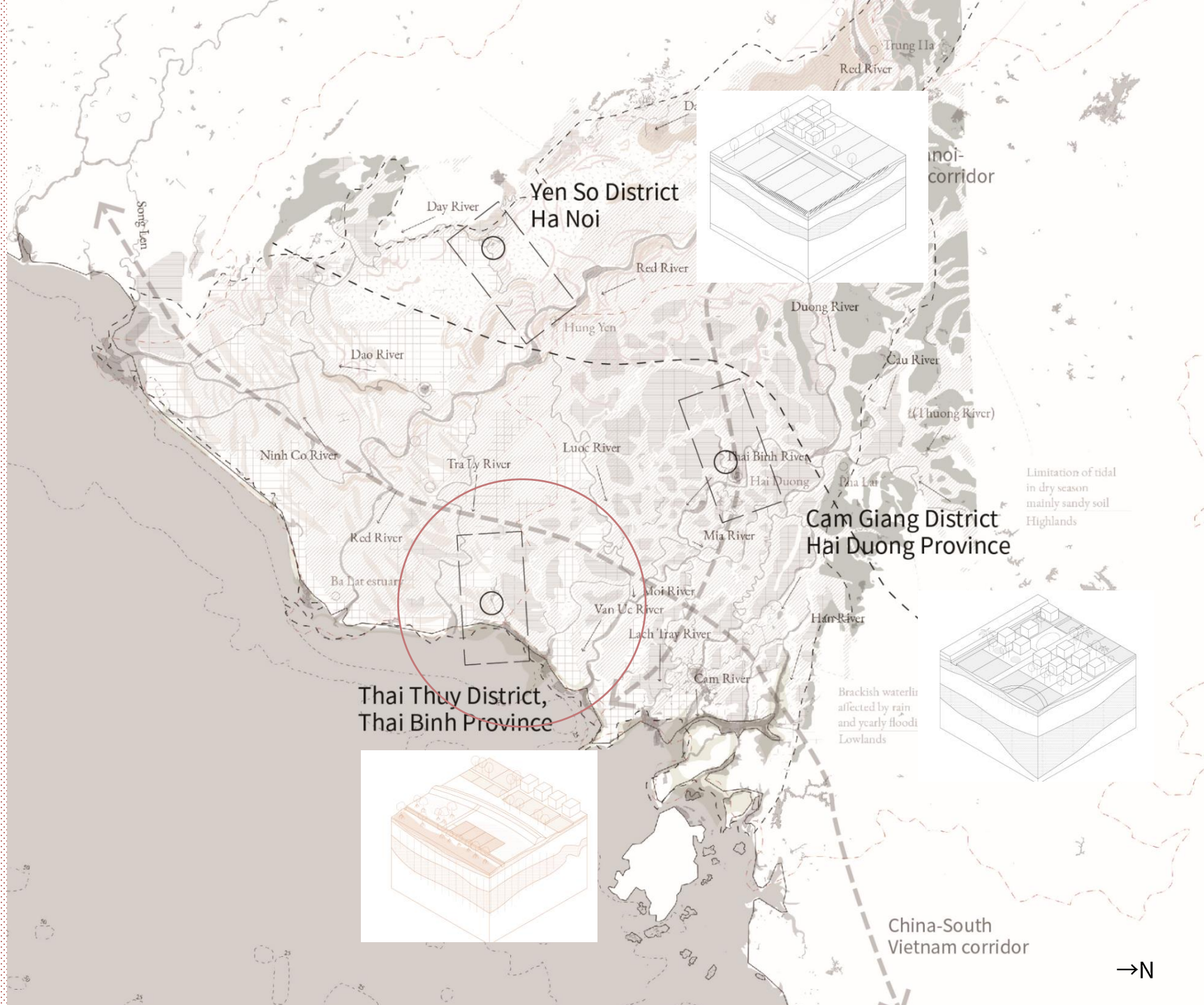
Exploration

Selected case study- intertidal (coastal)

SPATIAL MODIFICATION
•proposing new flows with processes composed of elements from different systems;. changing land use, potential local interventions

GOVERNANCE SHIFT
•changing relations between actors involved

COST AND BENEFIT
•Footprint, protection, production, livelihood capitals



Source: Open street map

I I 4km

↑N

Exploratory Catalogue

VULNERABILITY

Water system stability
Climate vulnerability
Ecological degradation

OPPORTUNITY

National economic corridor
Social diversity
Bioshpere conservation

CASE FOCUS

Freshwater supply and pollution at coast;
Sustainable saline-tolerance producti-on;
Community participation in facility maintenance.

(These are related with problems at a COST of loss of yield, access to fresh water, rural sanitation and health...)

SPATIAL

LAND.
paddy field, aqua pond, mangrove field
URBAN.
market, settlement, industry, pagoda
WATER.
communal pond, canal, sluice gate

TEMPORAL

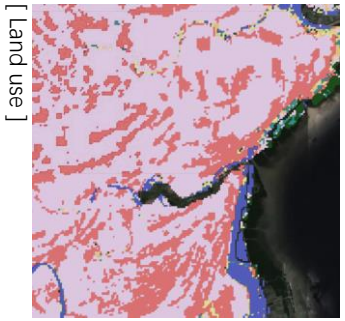
Salinity, monsoon, flooding, drought

MAIN INTERVENTION

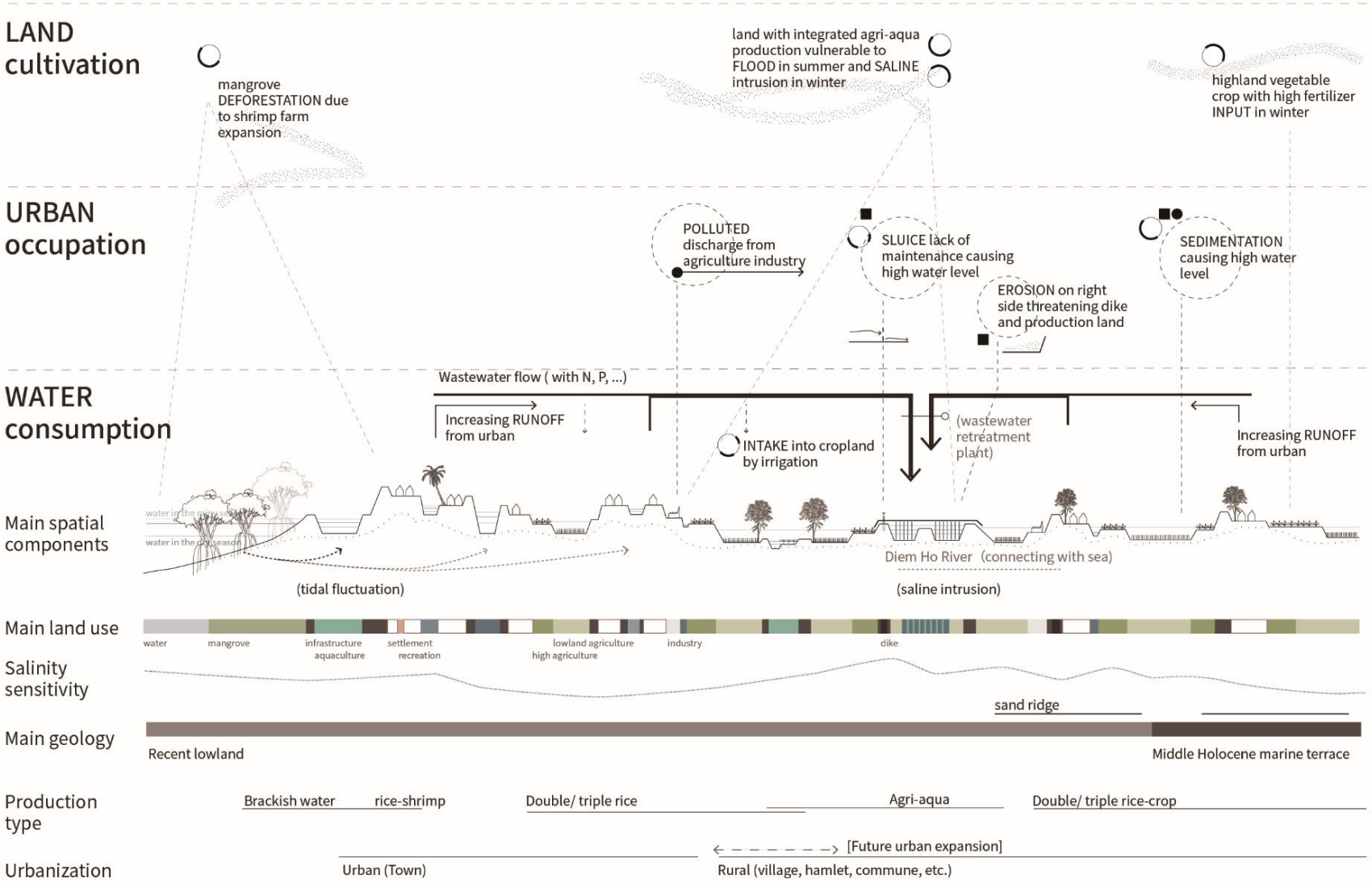
Sustainable production
Social infrastructure
Wetland restoration

Relation Project-territory

[Land use]



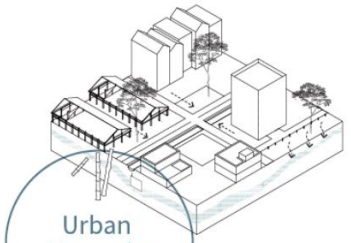
[Geology]



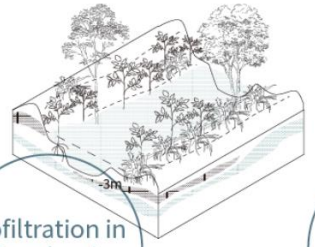
Reorganizing and potential local intervention

Source: Minghu Wetland Park, 2012

Main strategies - Water restoration

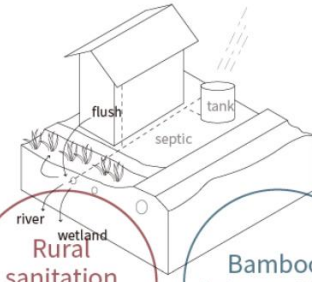


Urban bioswale



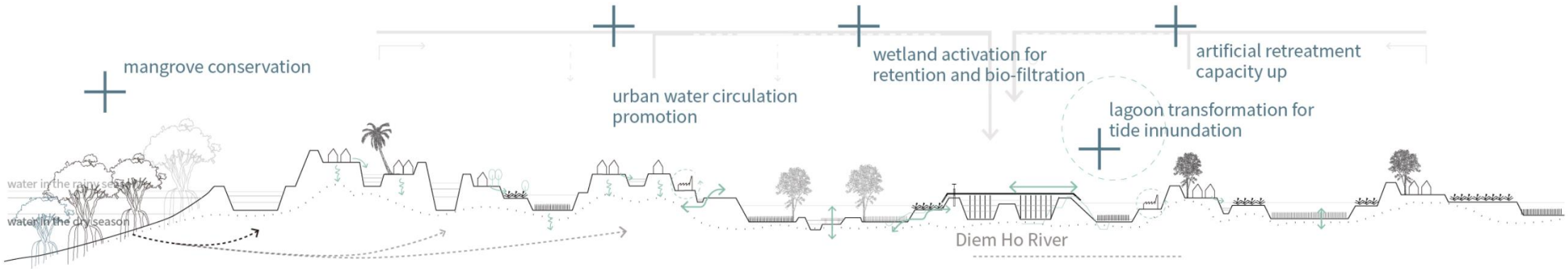
Biofiltration in farmland

Innundation by widening



Rural sanitation project

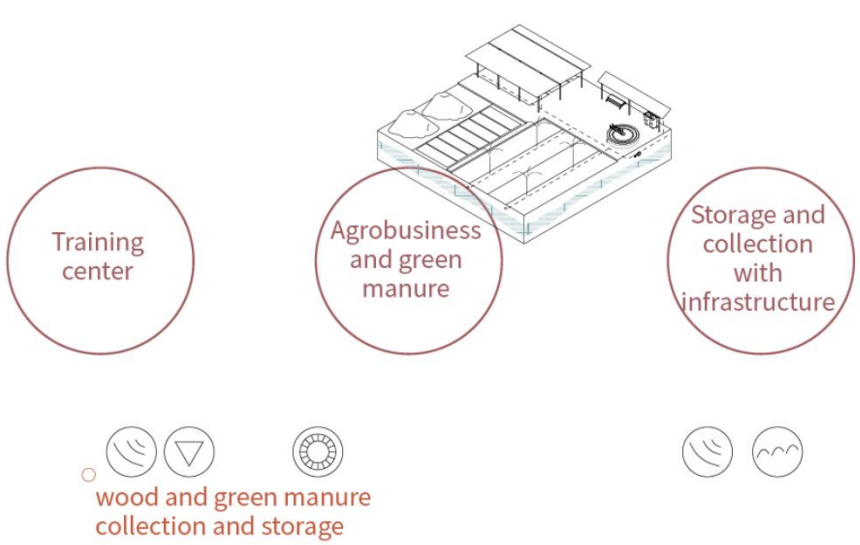
Bamboo interposition

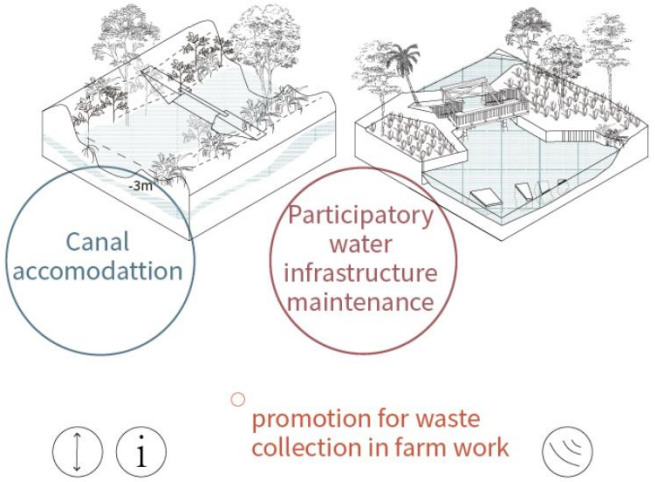


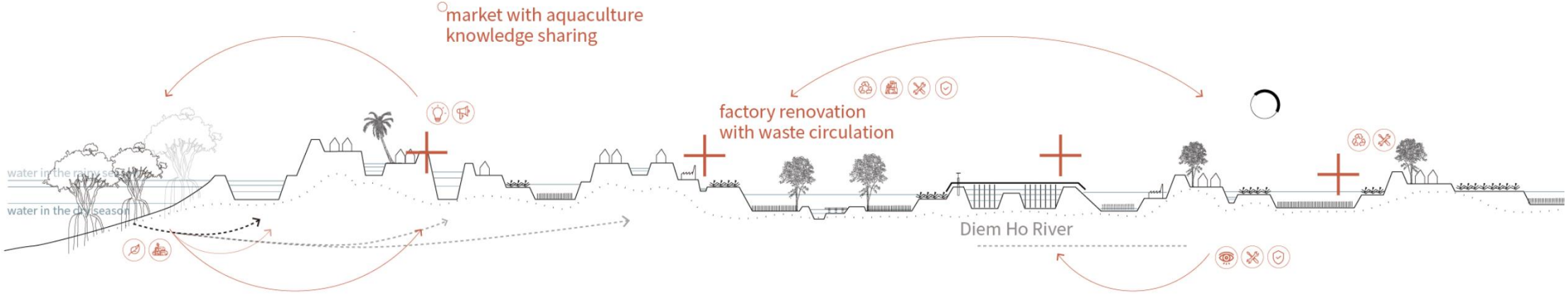
Main strategies - Social infrastructure activation

Reorganizing and potential local intervention

Source: eboi.vn



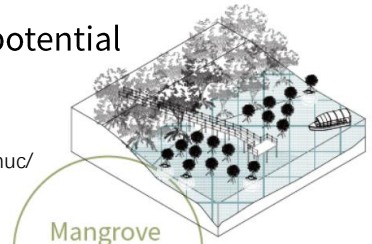




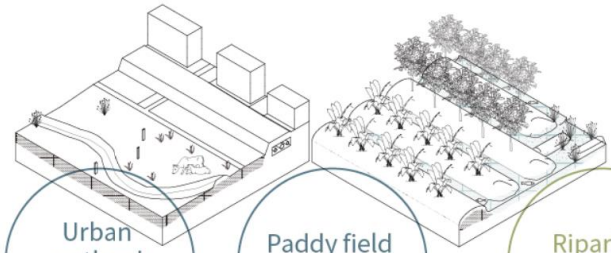
Main strategies - Sustainable production

Reorganizing and potential local intervention

Source: moha.gov.vn/danh-muc/



Mangrove restoration

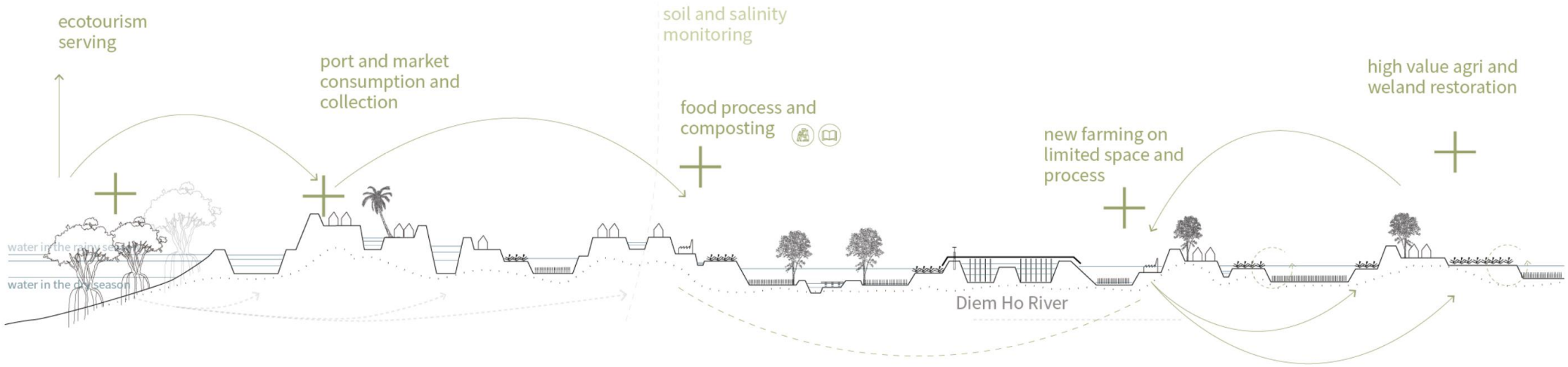


Urban wetland restoration

Paddy field transformation

Riparian afforestation

Training center



Changes in seasonal water surface

- widen and soften with forest edge
- water surface- new/ rainy/ monsoon
- saline-tolerant wetland
- factory adding up retreat-ment capacity/ nutrient
- mangrove conservation
- main sluice

4km

N

Upgrade in urban connection

factory for storage-machine, materials, etc. and serving radius

publc market as vocational space

safety and hybridity of roads

widen and enhance hybrid-ity of dikes

second dike construction

potential urban growth

4km

N

Characteristic sustainable production

highland vegetable production (with high value including medicine)

recreational mangrove-shrimp farm

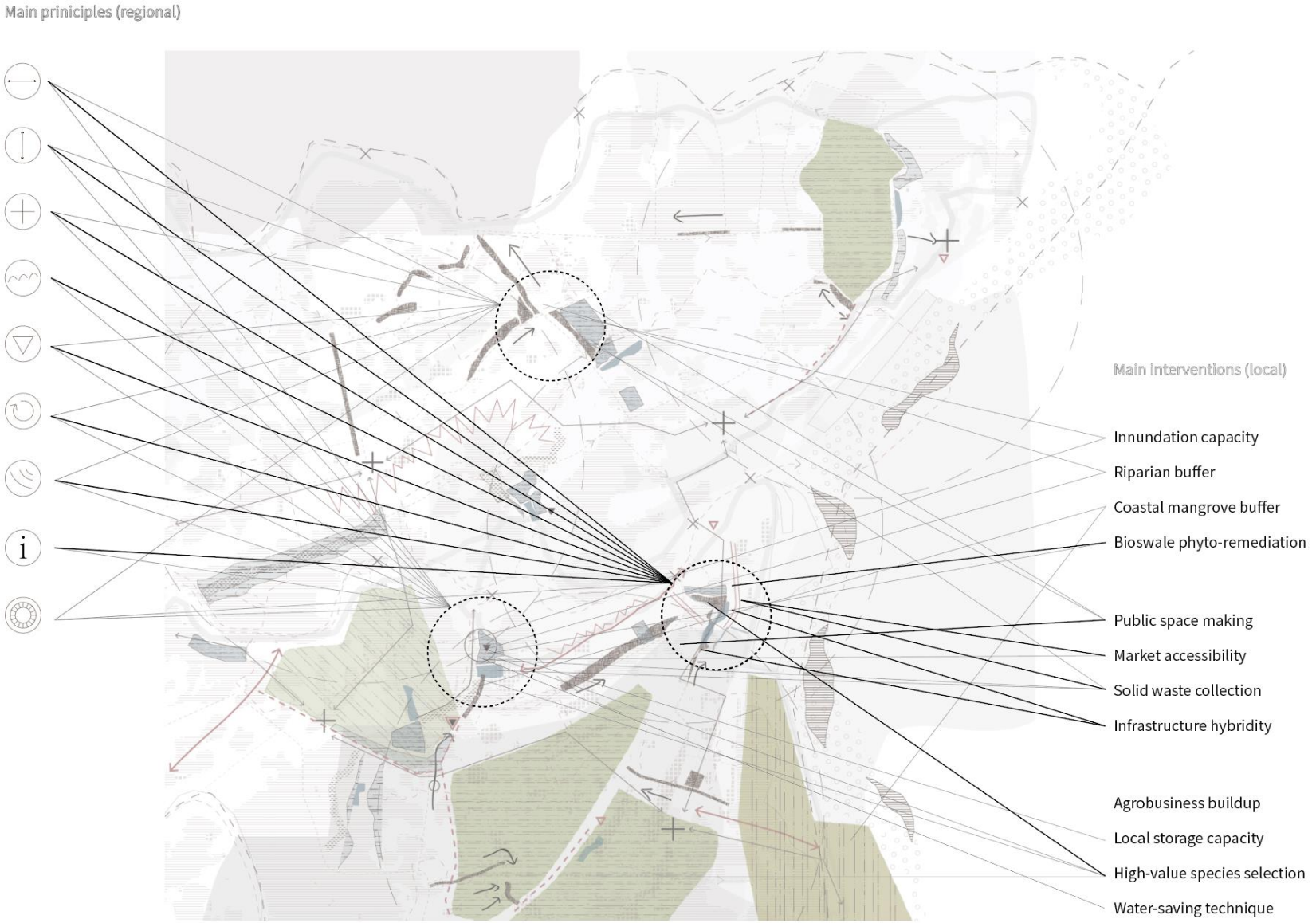
aquaculture and mangrove seeding farm

4km

N

Relation Project-territory

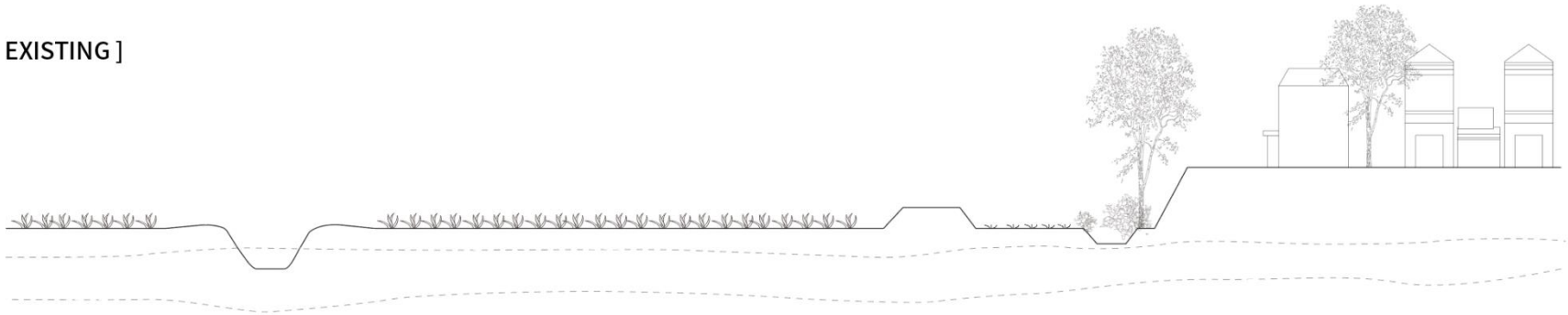
Connecting local and regional through intermediate scale



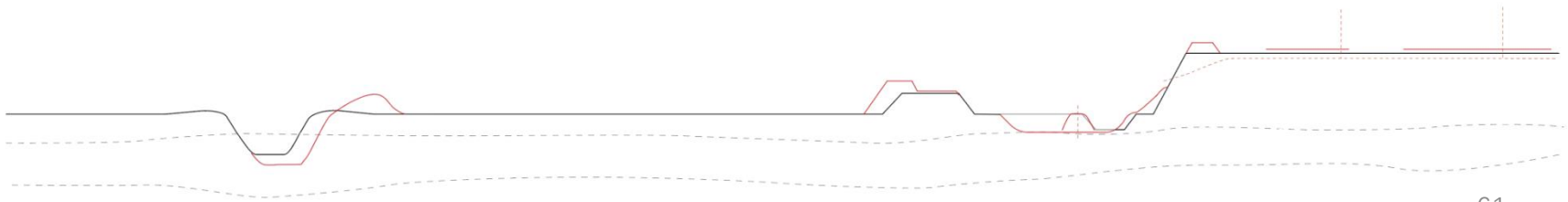
Local intervention

– along the infrastructure

[EXISTING]

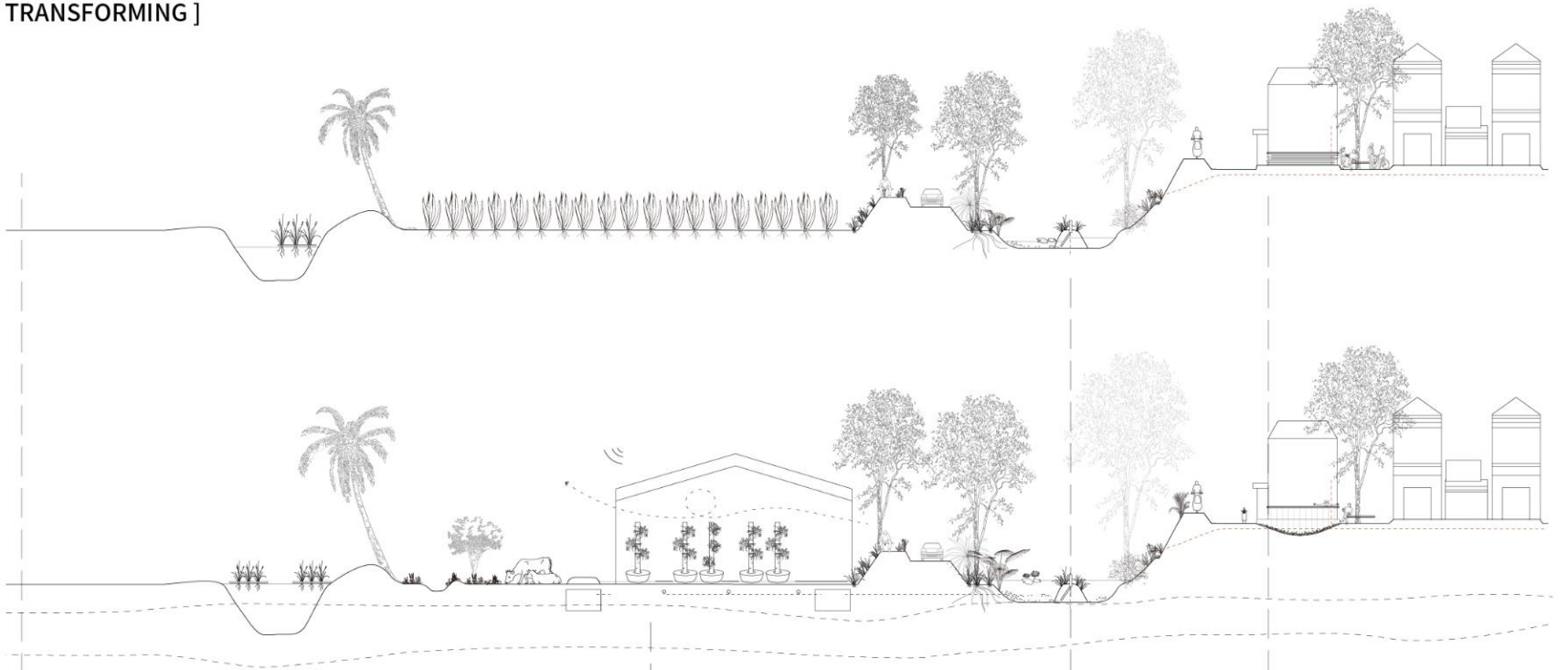


[CUT AND FILL]



Source: ‘King Farm Updates (Feb 2021)’, from youtube, uploaded by Angie Mead King

[TRANSFORMING]



improved surface water quality for irrigation

seasonal use change - vertical farming, water circulation and monsoon sedimentation

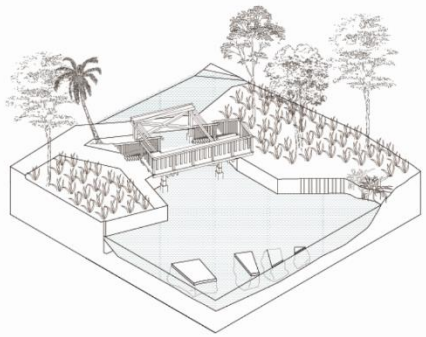
flexible sluice accommodating canal overflow and surface runoff

social center spreading knowledge and storage for temperory materials

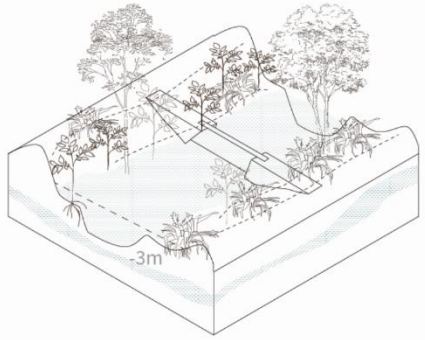
rural sanitation including rainwater purification

Local intervention

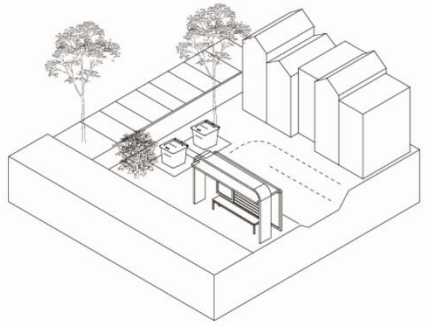
Exemplar tools



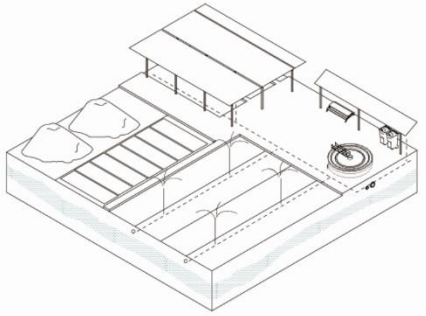
Levee and earth dike maintenance



Sluice maintenance



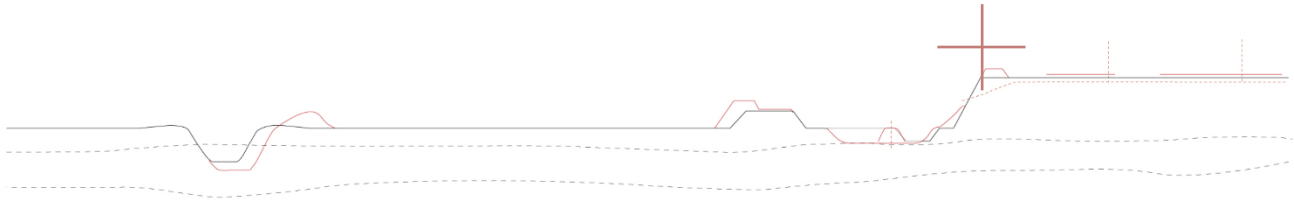
Circular carbon lab with water-saving techniques



Solid waste collection

Local intervention

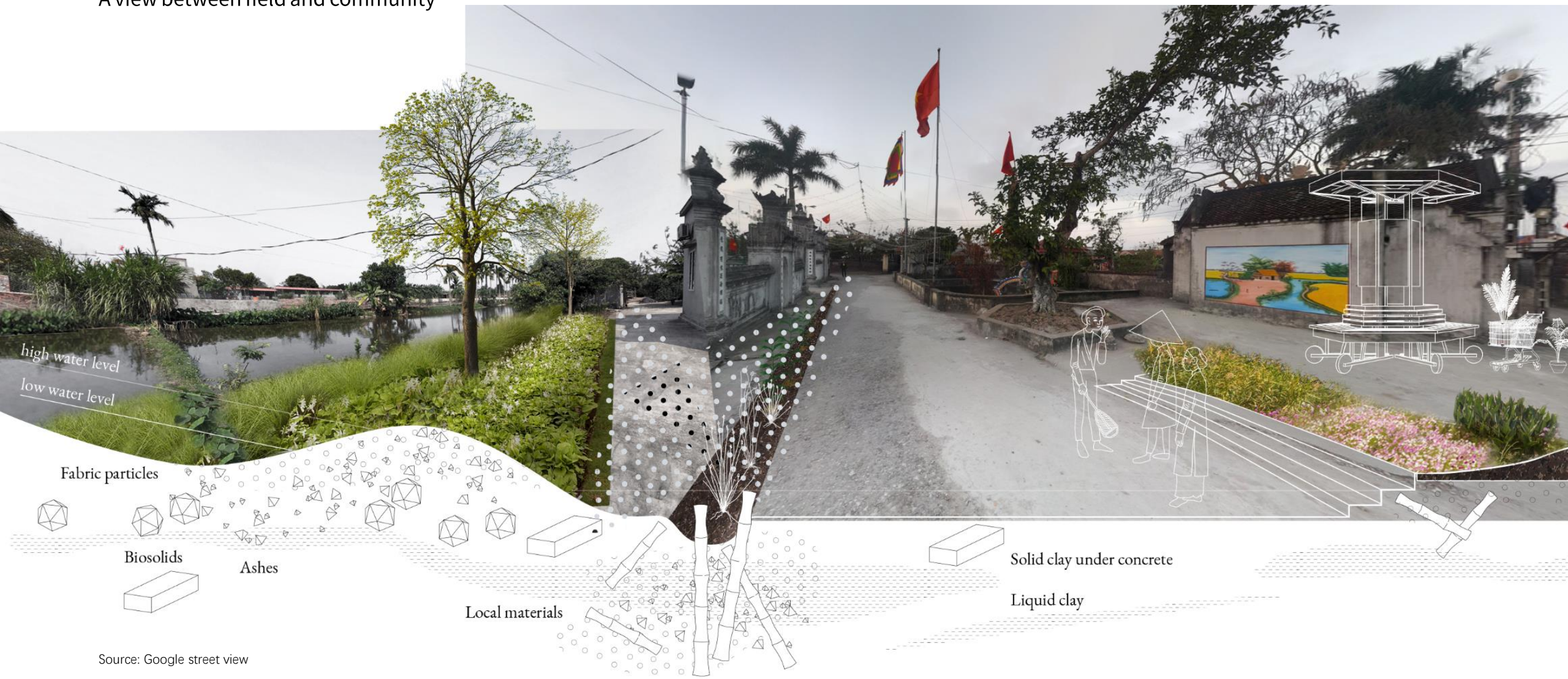
A view between field and community



Source: Google street view

Local intervention

A view between field and community



Source: Google street view

Local phasing

Better understand actors who play and how to co-manage.

Source: Open street map

Source: Google Earth

Phase 1

Bioswale with local vegetation, from flood-tolerant to saline-tolerant.

Co-management

Public/ Department of transportation
Private/ Hydraulic company
Civic/ Cooperative

Phase 2

Public infrastructure activation and intalling floating sluice for seasonal water buffer.

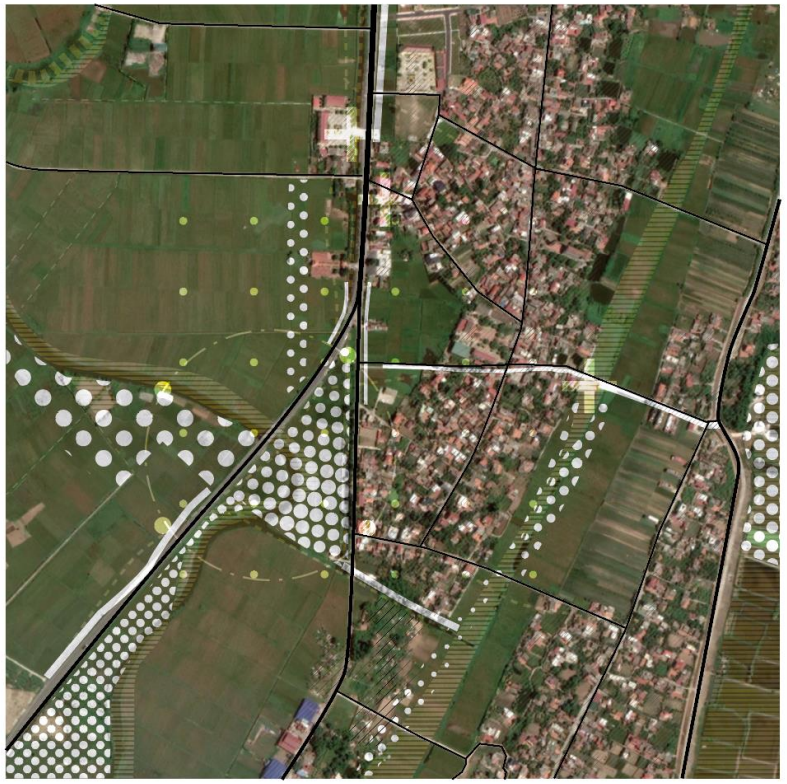
Co-management

Civic/ People' s Committee
Research/

Local phasing

Better understand actors who play and how to co-manage.

Source: Open street map



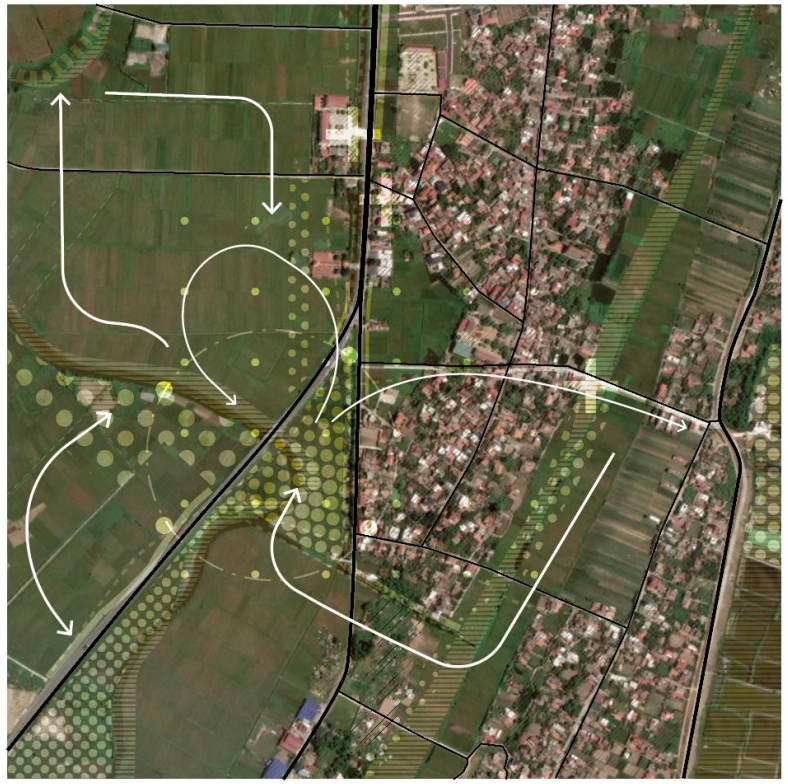
Phase 3

Forestation and green space connection.

Co-management

Public/ Department of Agriculture and Rural Development, Department of Transportation
Private/ Agricultural Extension Club
Civic/ Cooperative

Source: Google Earth



Phase 4

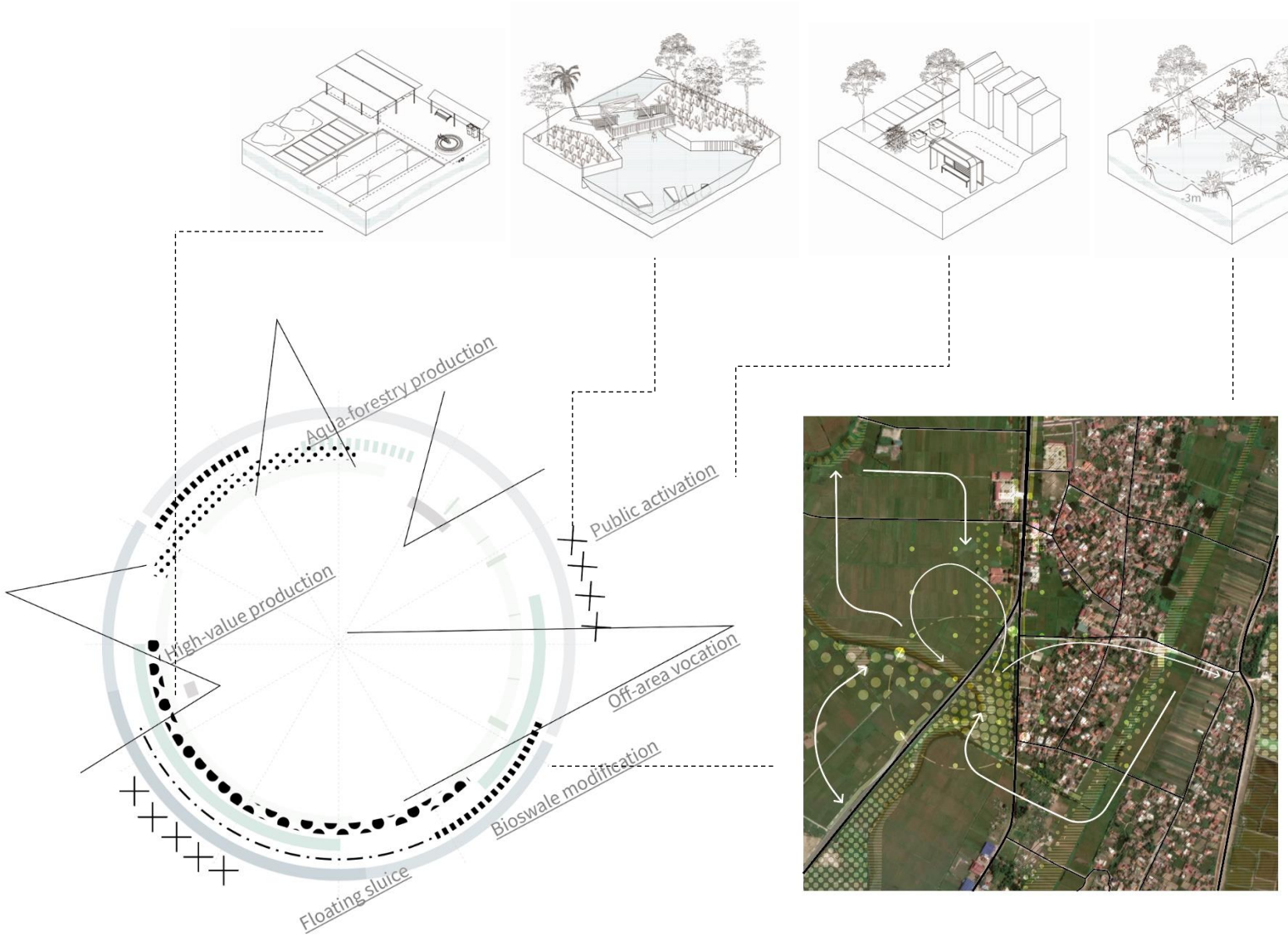
Soil cycle change through cleaning, cutting and fillling.

Co-management

Civic/ People' s Committee
Research/

Local phasing

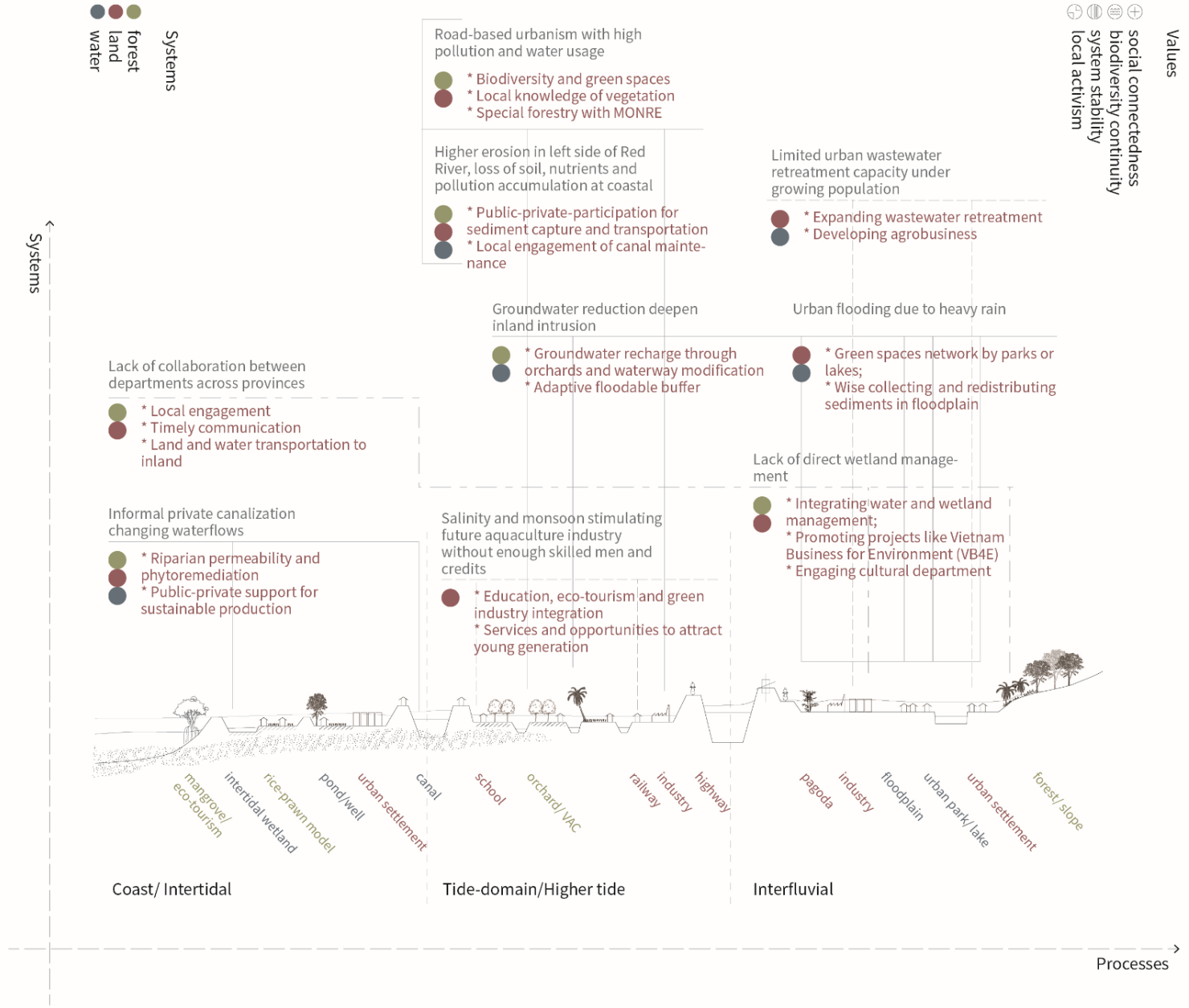
Better understand actors who play and how to co-manage.



Source: Google Earth

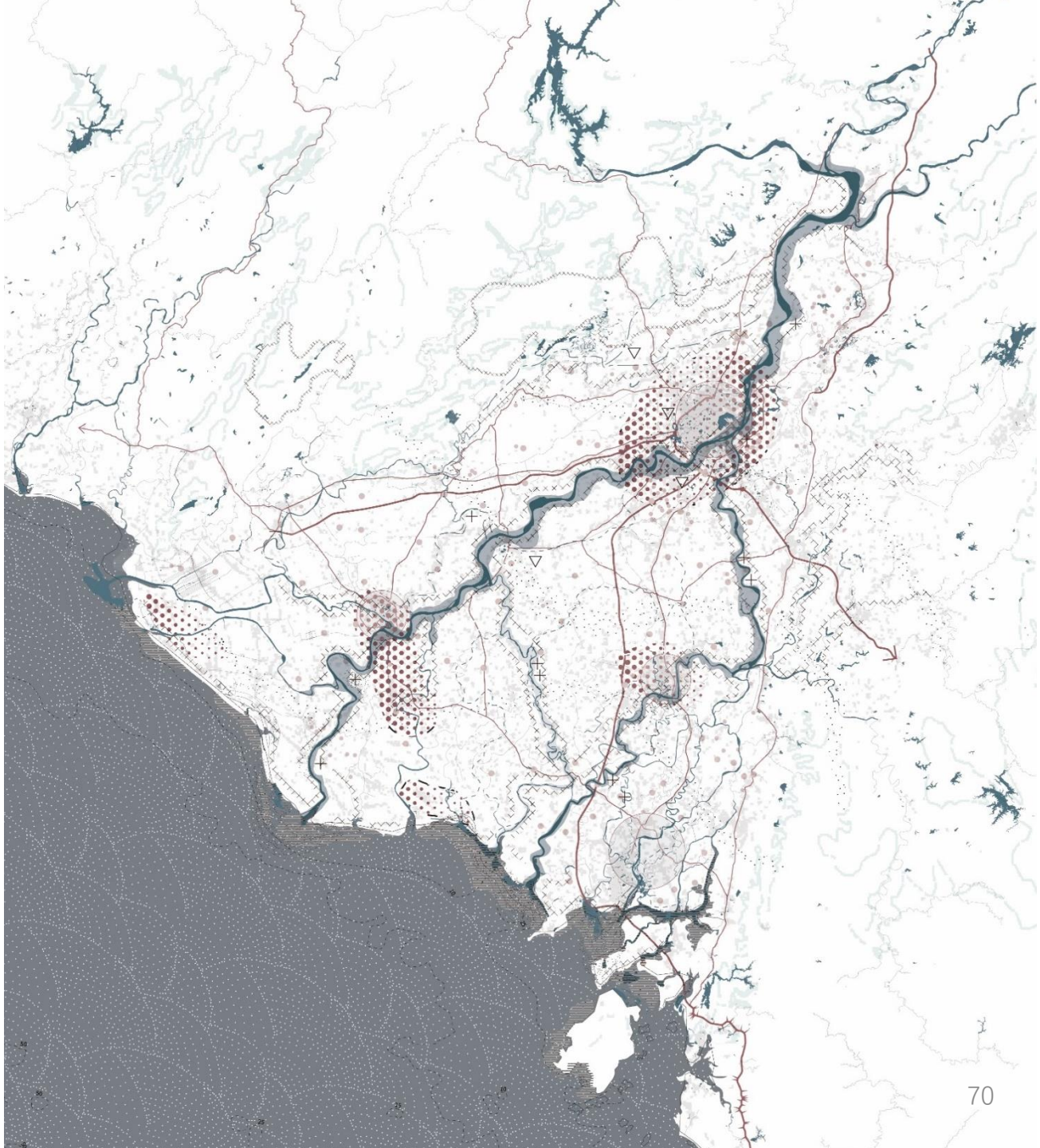
Vision

Seeing the future structure of the delta

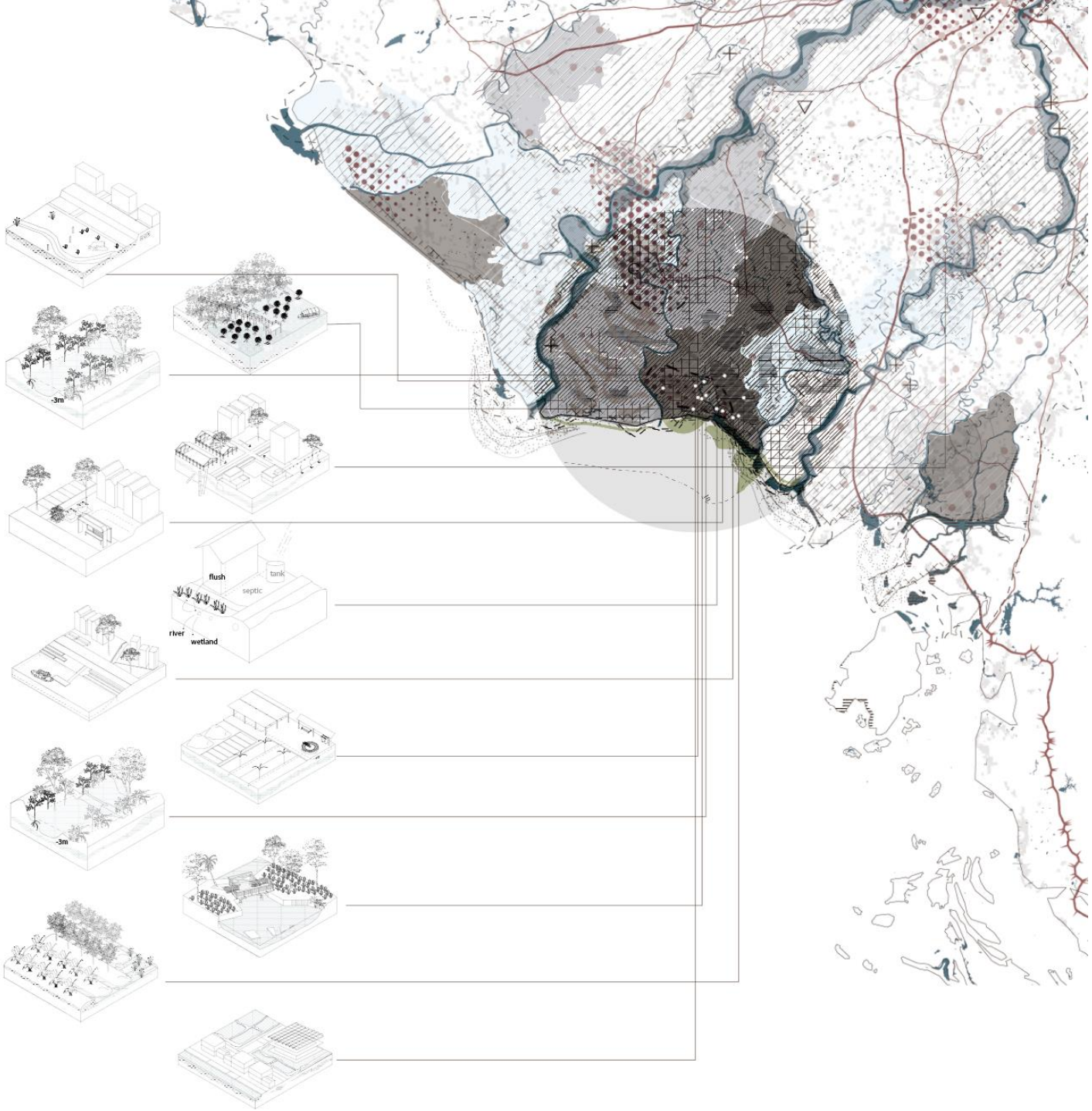


Vision

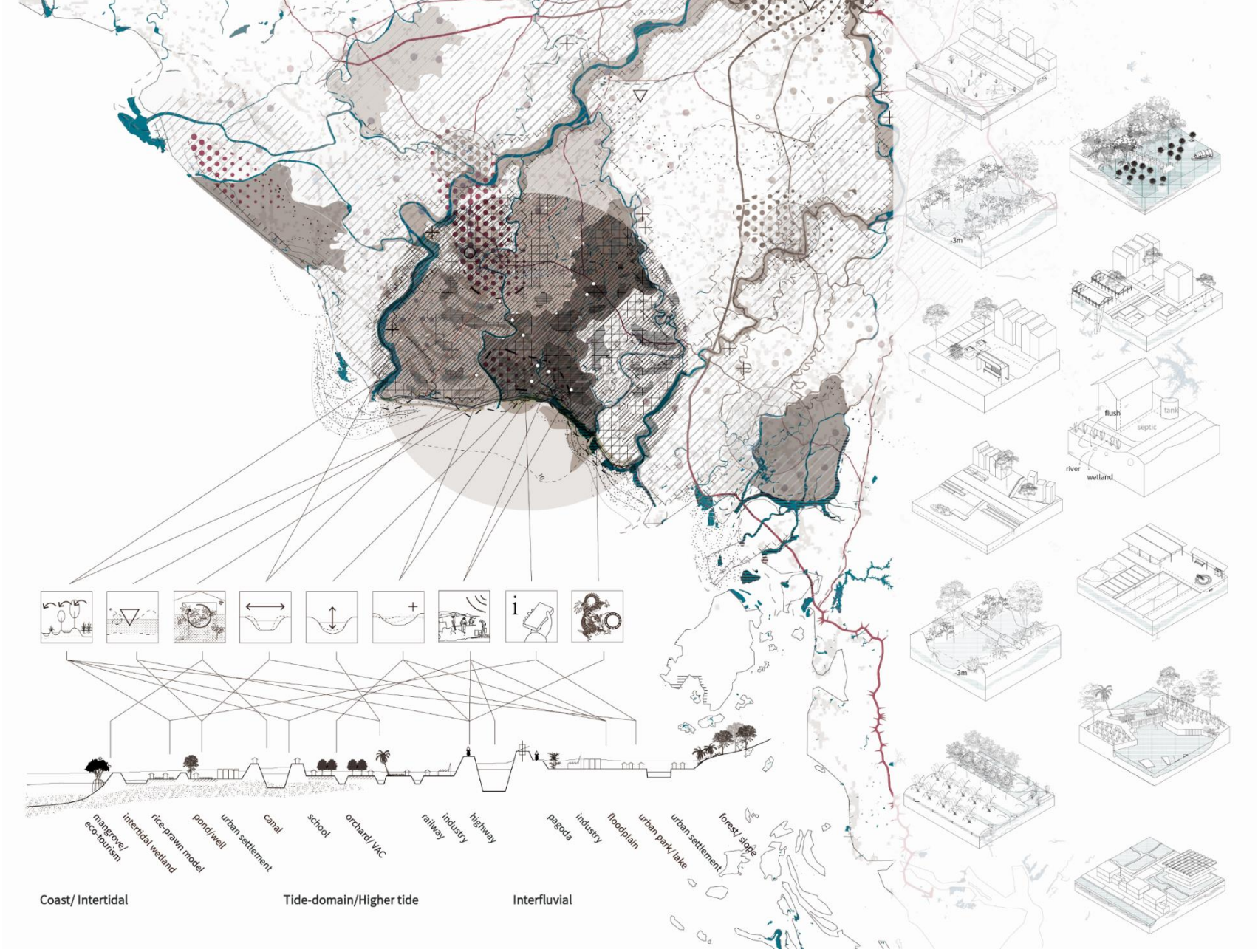
Seeing the future
structure of the delta



Vision



Vision


mangrove/ eco-tourism
intertidal wetland
rice-prawn model
pond/well
urban settlement
canal
school
orchard/ VAC
railway
industry
highway
pagoda
industry
floodplain
urban park/ lake
urban settlement
forest/ slope
Coast/ Intertidal
Tide-domain/Higher tide
Interfluvial
flush
tank
septic
river
wetland
3m
3m

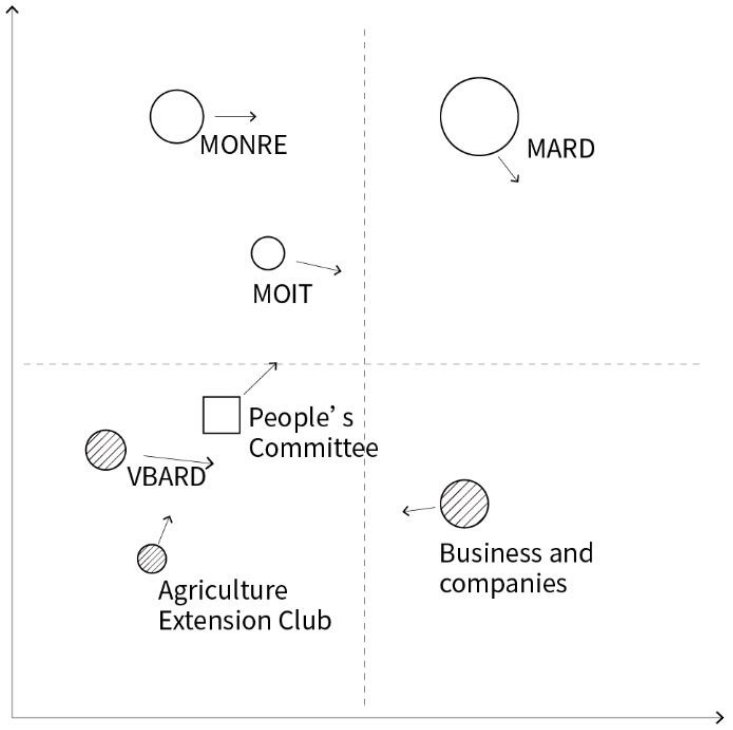
Stakeholder analysis, for participation at intermediate

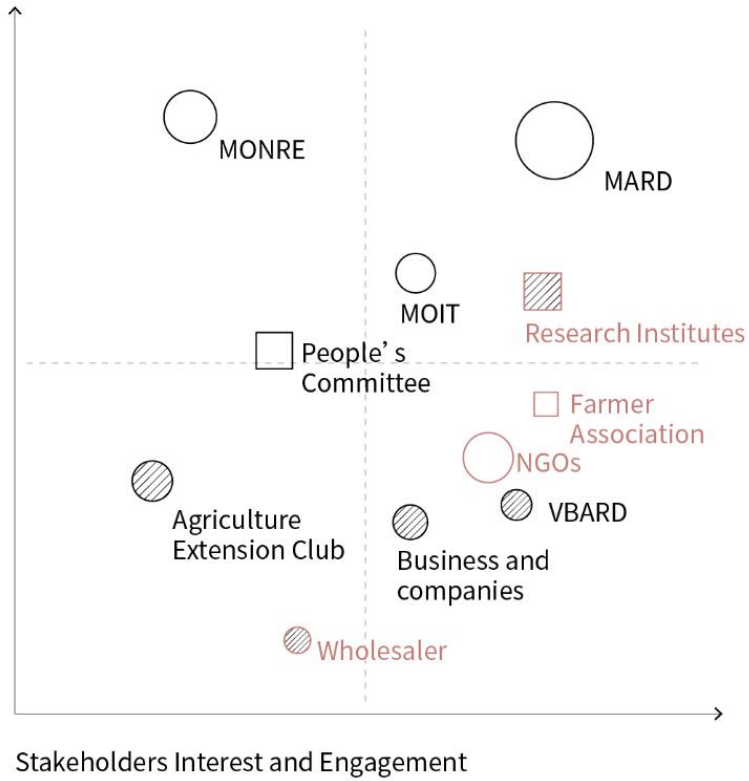
Power and interest analysis for implementing sustainable production strategy

Public Private Civic Research

Ministry of Natural Resources and Environment （MONRE)
Ministry of Agriculture and Rural Development (MARD; DARD)
Ministry of Industry and Trade （MOIT)
Vietnam Bank for Agriculture and Rural Development (VBARD)

NGOs: Vietnam Business for Environment, Cities Alliance, etc.
Research Institutes: IMWI, CGIAR, etc.





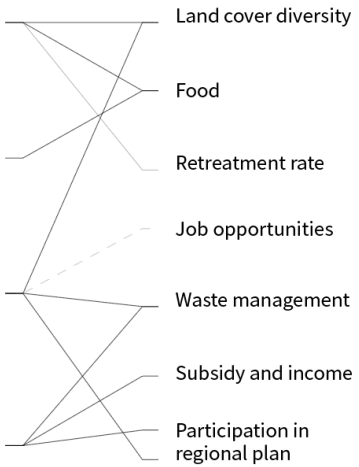
Stakeholders Interest and Engagement

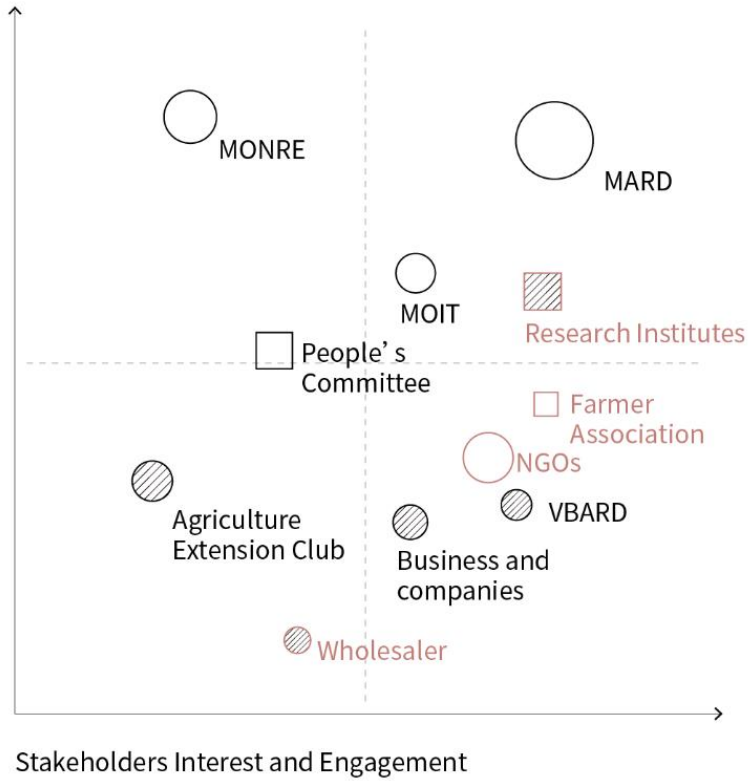
Stakeholder analysis, for participation at intermediate

Power and interest analysis for implementing sustainable production strategy

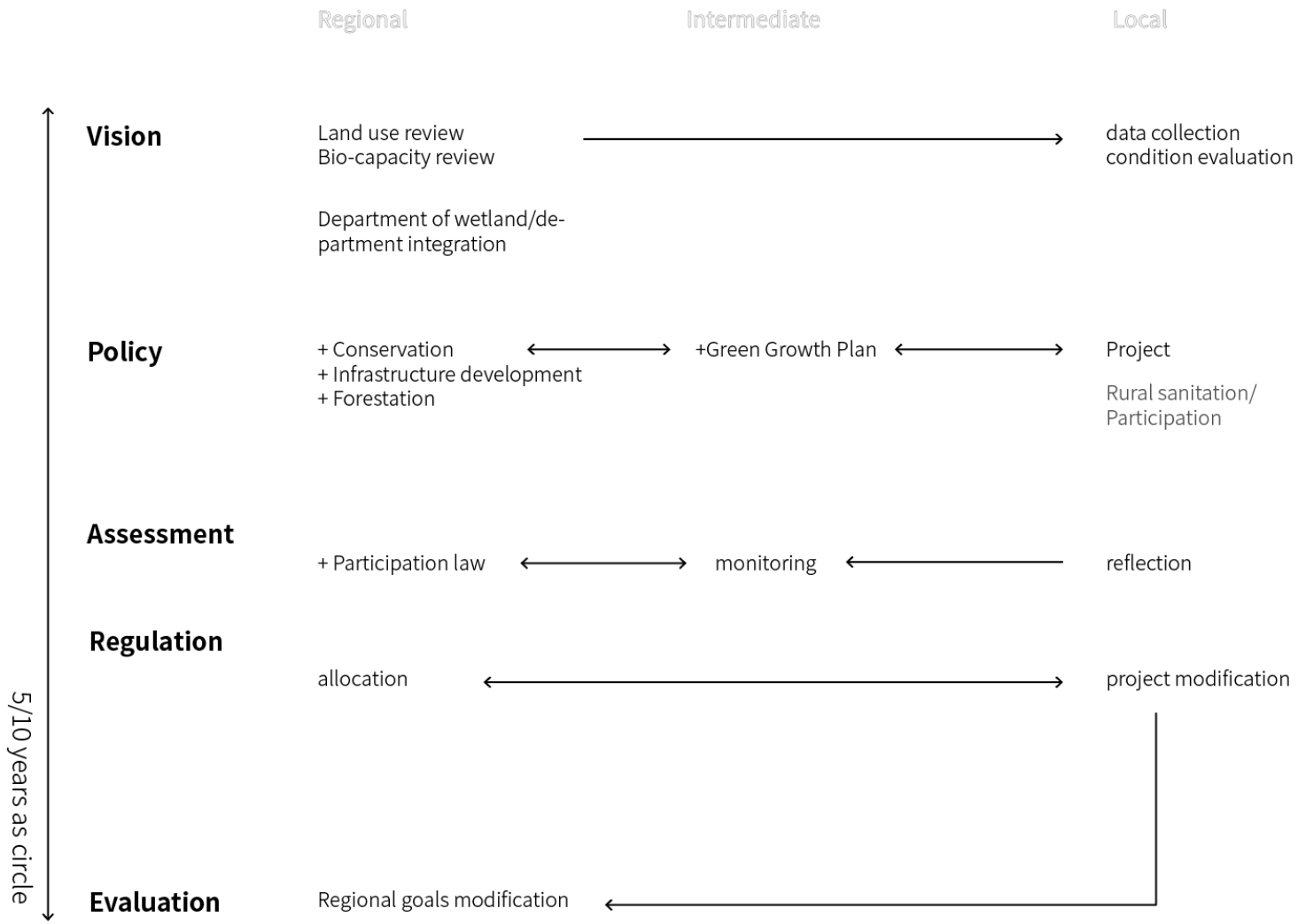
SECTOR	ACTOR	FUNCTION	ACTION/ INTEREST
Public ○	Ministry of Agriculture and Rural Development (MARD; DARD)	Regulatory, Monitoring	Regulating crop diversification and footprint; Planning and guiding industrial production and sales; Green growth planning and forestry conservation.
Private ◍	Wholesaler	Investment Participatory	Connecting supply chains and material exchange with efficiency, such as between local small-scale production and touristism, cooperative and mobile markets, port offices, etc.
Civic □	Farmer Association	Operation, Monitoring, Maintenance	New production models design and execution; Organizing waste collection and vocational training.
Research ▨	NGOs (Vietnam Business for Environment, Cities Alliance, etc.)	Funding, Collaboration	Supporting local capacity building including sustainable business and biodiversity, data bank and information collection, etc; Ecosystem conservation.

VALUES FOR THE PROJECT

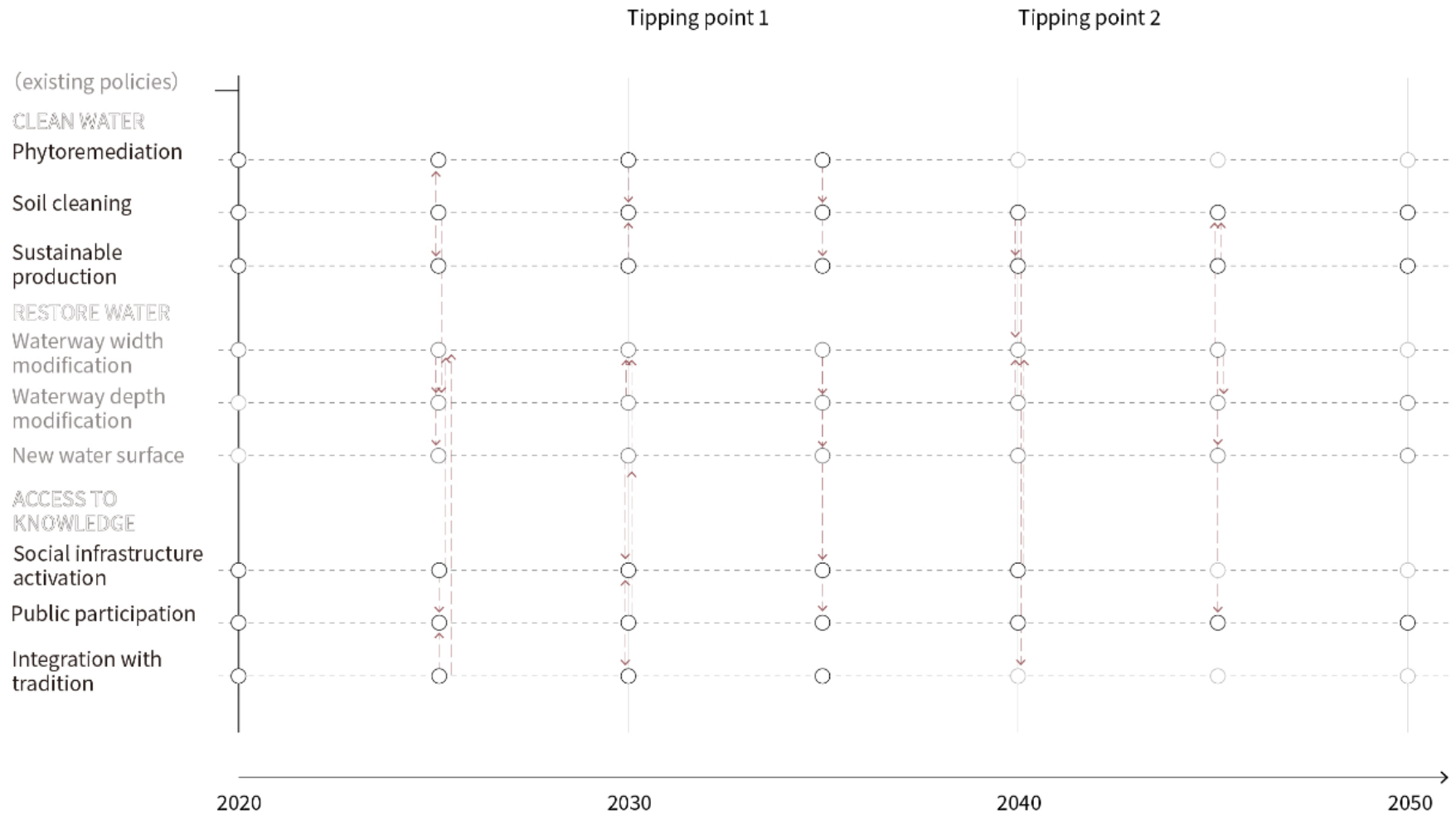




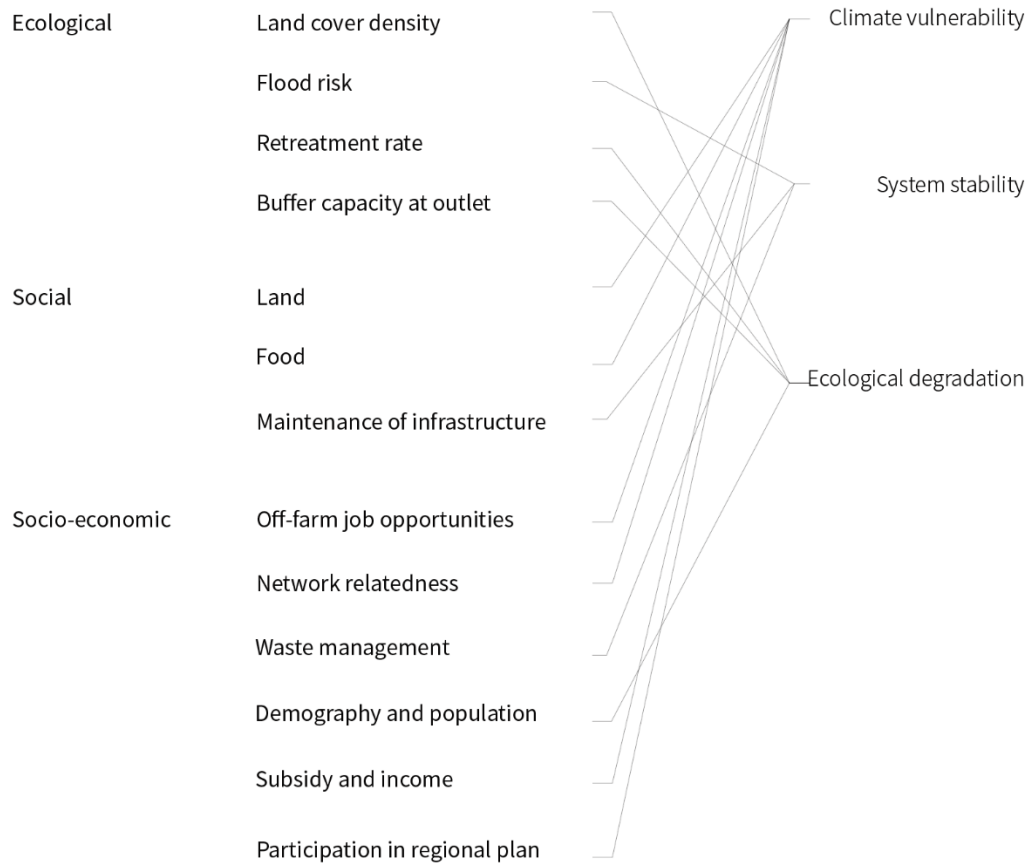
Regional phasing and regulating



Adaptive pathways as part of evaluation

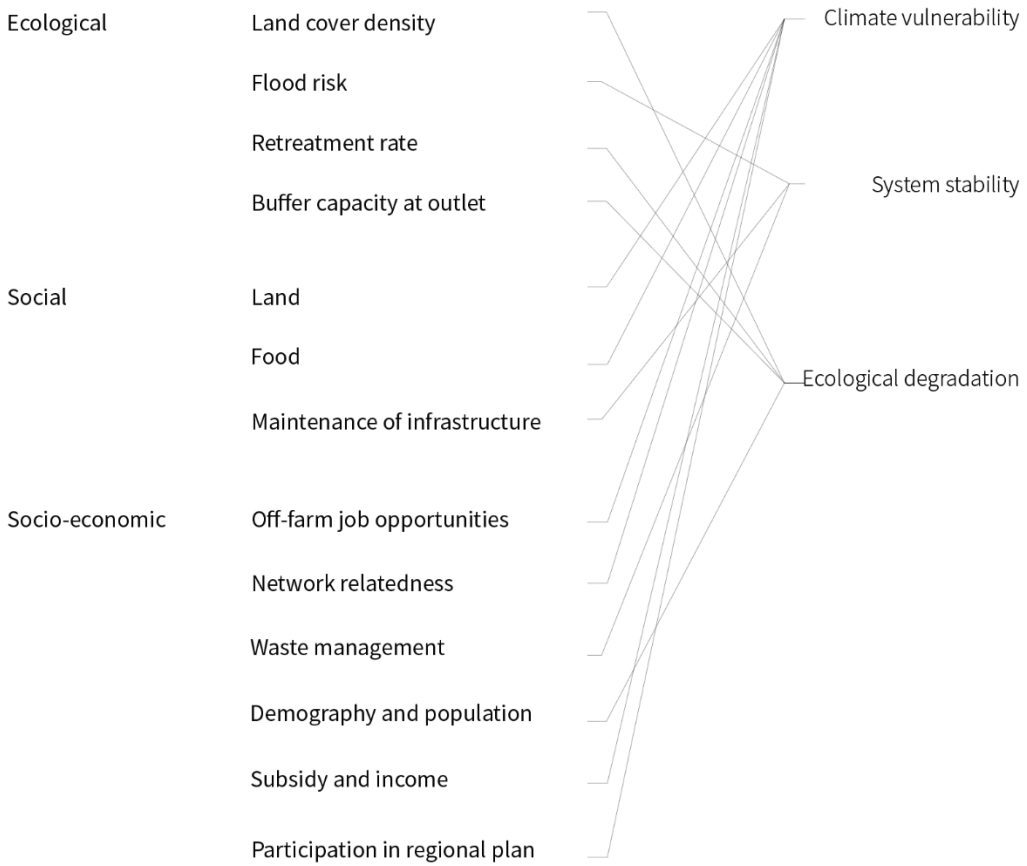


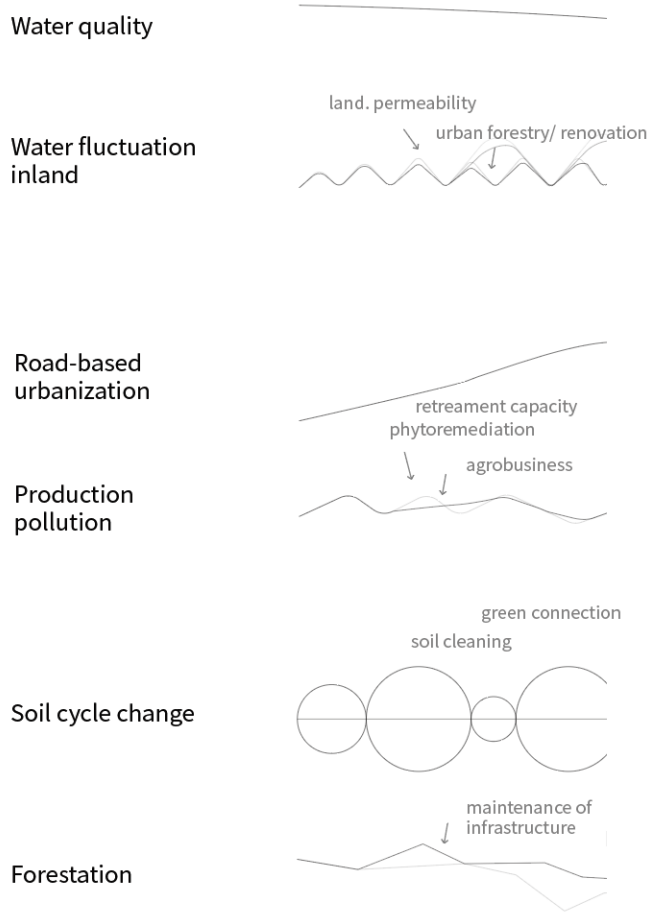
Evaluation



Evaluation indicators consider productivity, resilience, stability, reliability, adaptability, equity and self-reliance from MESMIS (Lopez-Ridaura et al., 2002)

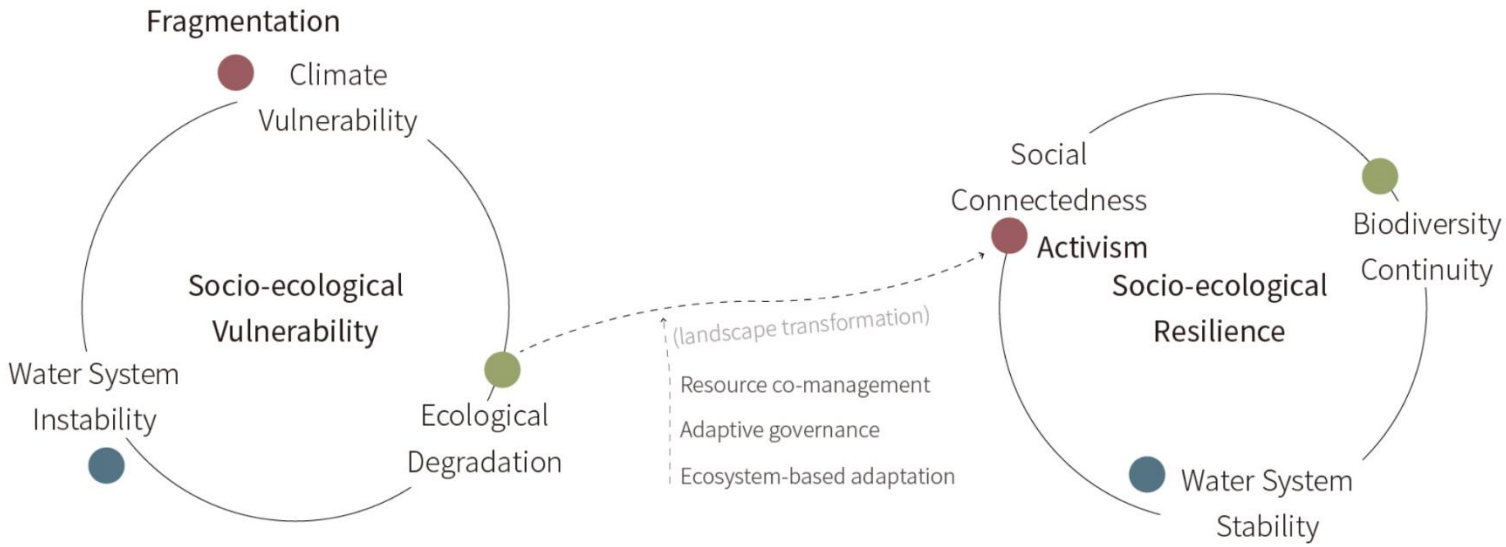
Evaluation – from local to regional





Evaluation indicators consider productivity, resilience, stability, reliability, adaptability, equity and self-reliance from MESMIS (Lopez-Ridaura et al., 2002)

Conclusion - Value

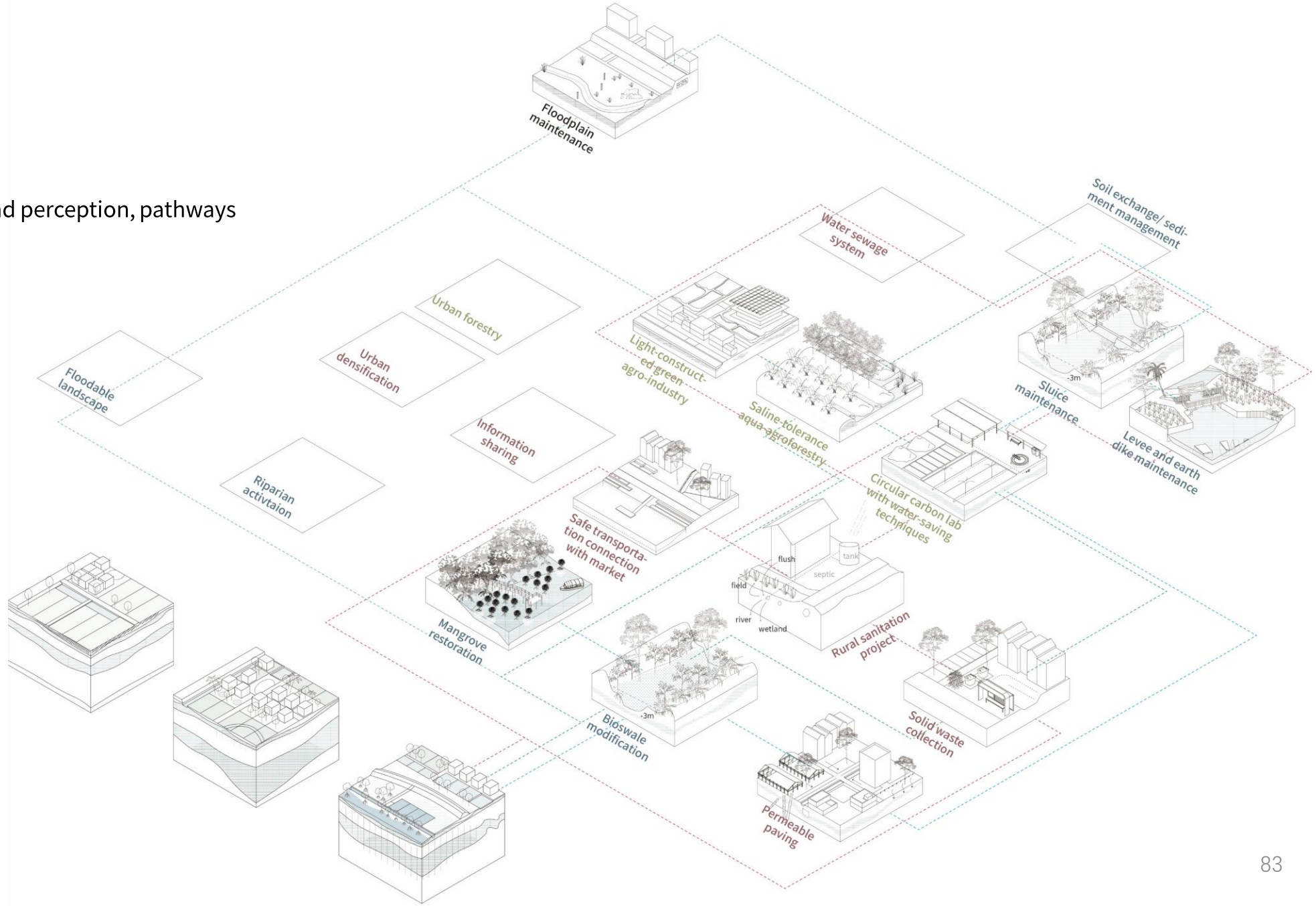


Conclusion

Multi-scalar and systemic thinking

Conclusion

Local cultivation and perception, pathways



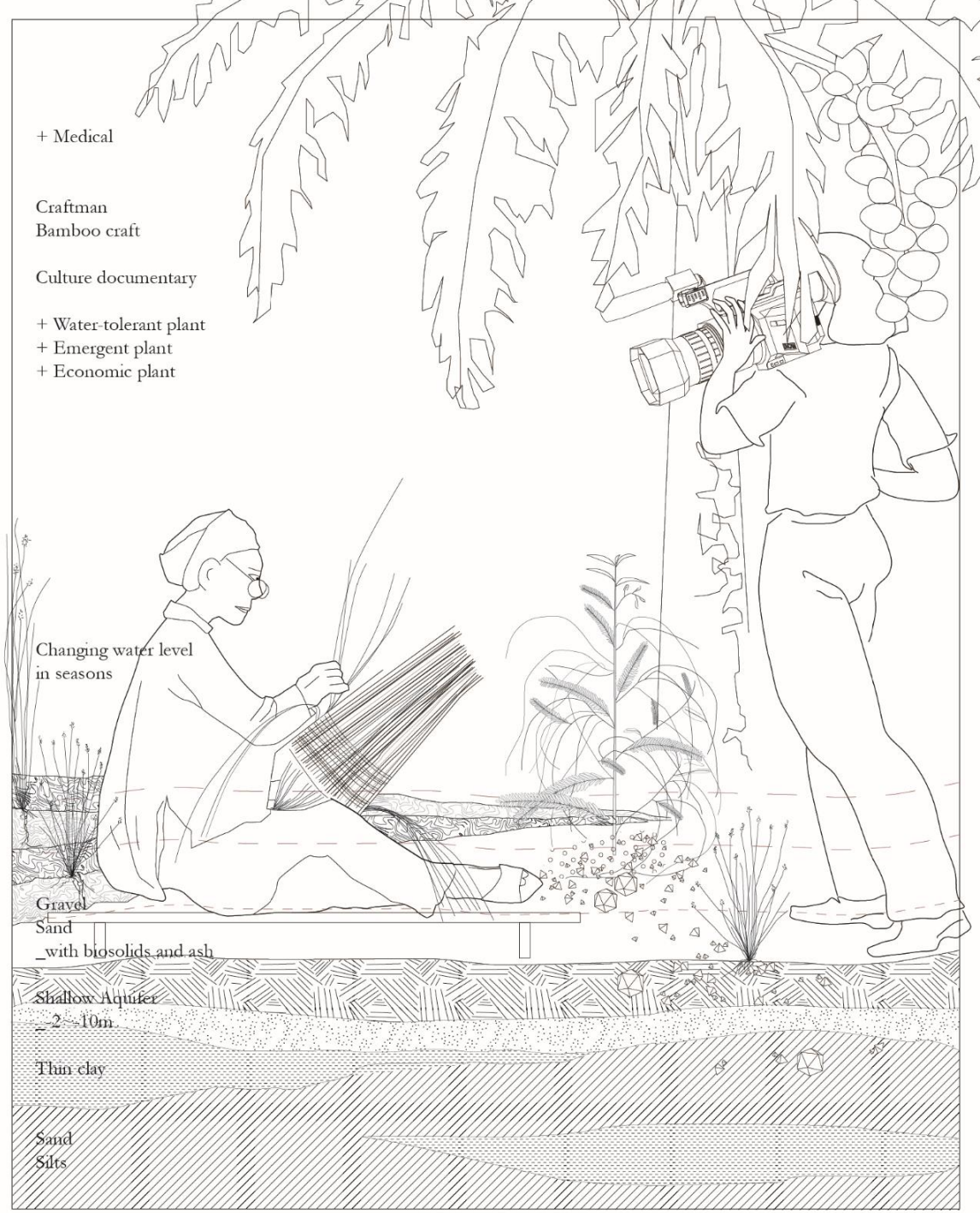
Thanks for listening!

Synergy through water, land and forestry systems
Towards evolutionary socio-ecological resilience in Red River Delta, Vietnam

Zhongjing Zhang (5082358)

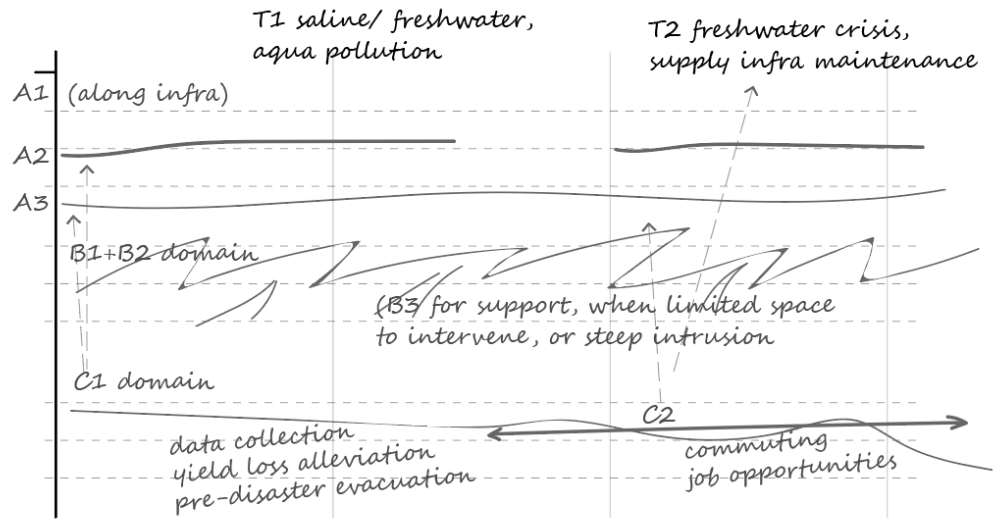
Transitional Territories Studio, 2020-2021
First Mentor: Diego Andrés Sepulveda Carmona
Second Mentor: Daniele Cannatella

Jun, 2021

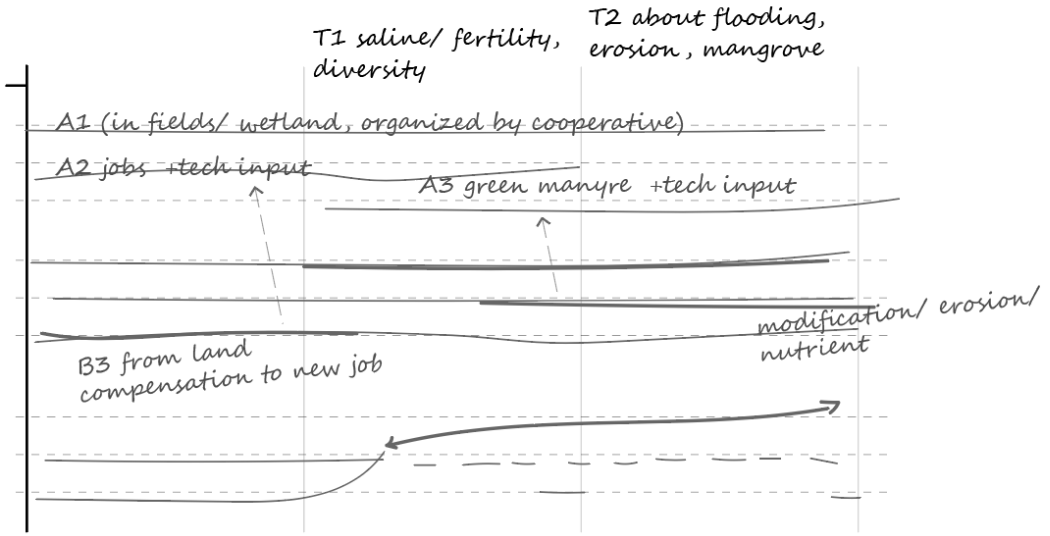


Adaptive pathways as part of evaluation

Intertidal, household-based



Intertidal, collective



Adaptive pathways as part of evaluation

from biodiversity and freshwater
to local livelihood and safety including food and sanitation security.

Conclusion

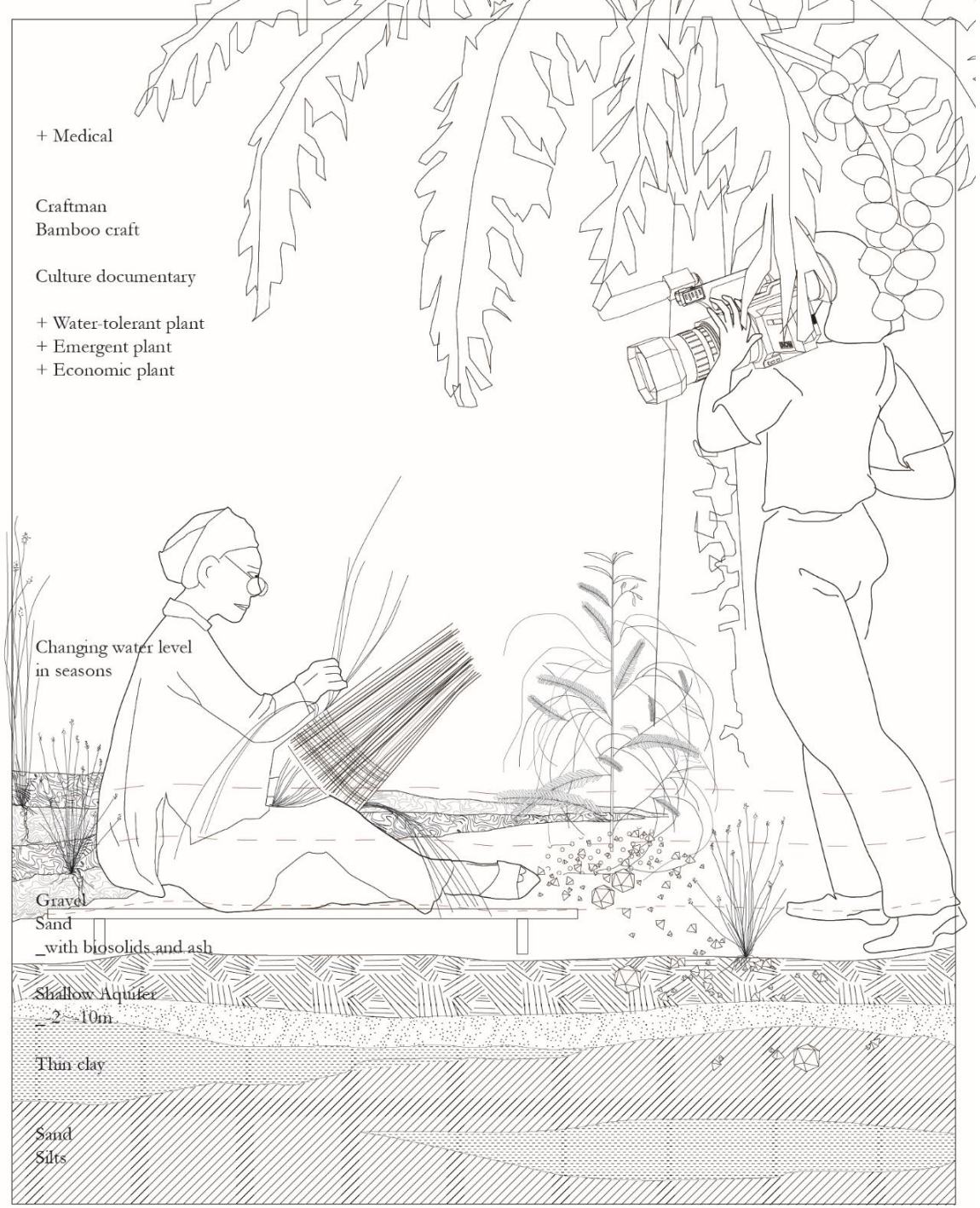
Urban planning with biophysical awareness/ ecoservices and well-being

Systemic understanding interdependencies and integration, wise pair, use efficiency and equity,
Interdisciplinary- integrated geological and hydrological, sociology awareness

Planning at a higher level and ‘arm’ local to stabilize the transformation.
Time-wise
Private sectors as important actors and local resistance and acceptance

Cultural appropriation- potential change in diet, festival celebration, construction materials.

Local adaptation



Reference, similar context, restore natural and land captials

https://www.unep.org/explore-topics/climate-change/what-we-do/climate-adaptation/ecosystem-based-adaptation

SDG

Reflection

Values and approach:

- systemic sections as method
- Evaluation framework in the context
- Multi-scalar approach
- Knowledge gaining from local to regional

‘ecosystem-based adaptation

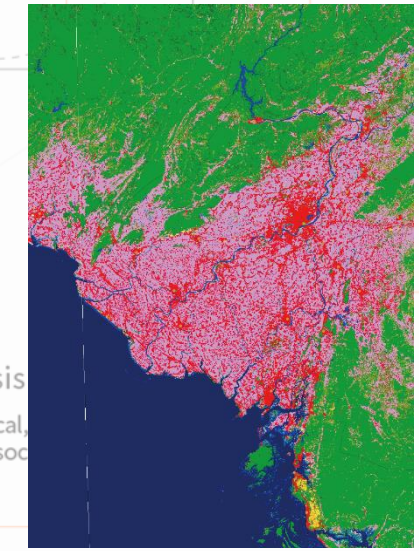
‘evolutionary socio-ecological resilience

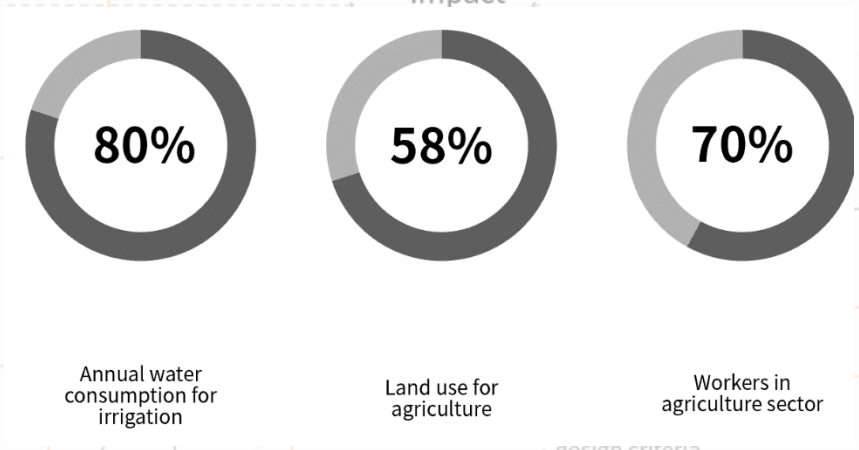
‘performative landscape

[Analysis]

1 **exploitation and inefficient resource consumption** of human activities upon nature in the delta is under low well-being and a future growing demand of resources.

Local vernacular production shows certain adaptation to external dynamics but **not well connected or represented**. Their livelihood is under risk somehow.





Impact

Stakeholder collaboration

design criteria

Experiment of cultivation

(about water consumption, land cultivation and urban occupation)

Local performa-tive landscape

(local sensitivity, place and actors)

performance review

Layers' synthesis

(biophysical, physical, soc

[VALIDATION]

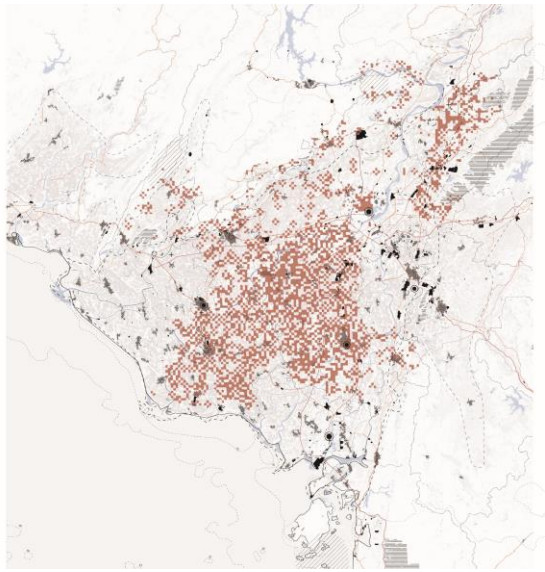
[DESIGN EXPLORATION]

[Review- synthesis, projection]

2 Layers include both nature and human ecosystems, related to water, land and forestry systems. While assuming an extension of current delta performance under a high climate impact scenario, potential risks and vulnerabilities entail **the biophysical system as part of remediation and development of whole area.**

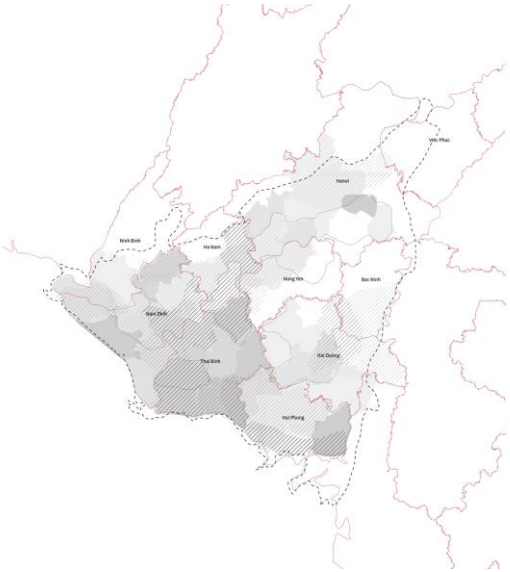
Also through local, the potentials of **local economy as an intermedia process between risk and development** might can seen. The idea of performative landscape links to its authentic culture of transforming the land.

Source: www.baoquangtri.vn



[Urban expansion proposal of delta 2030 (HCI)]

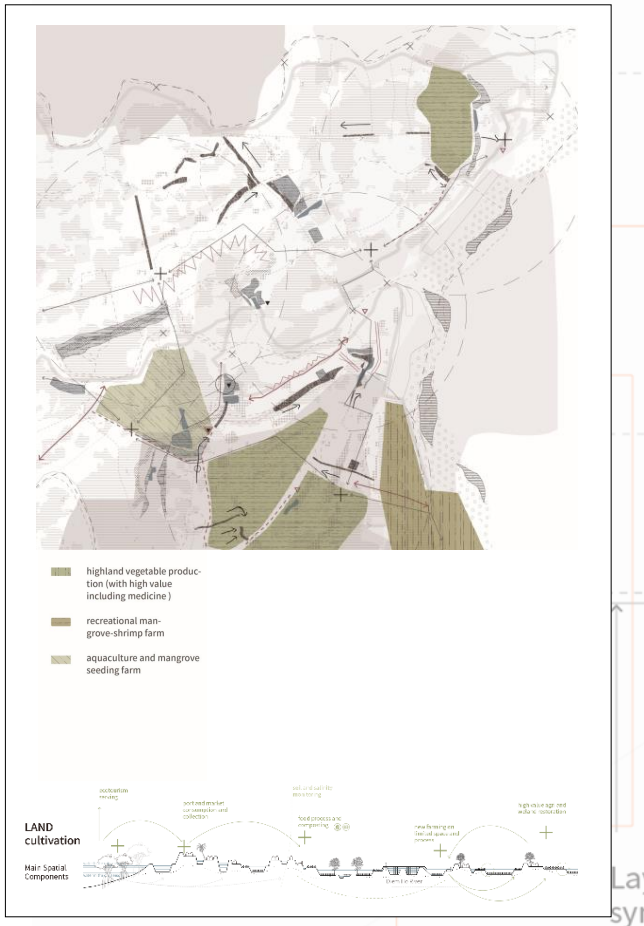
Adapted from van Dijk et al., 2013



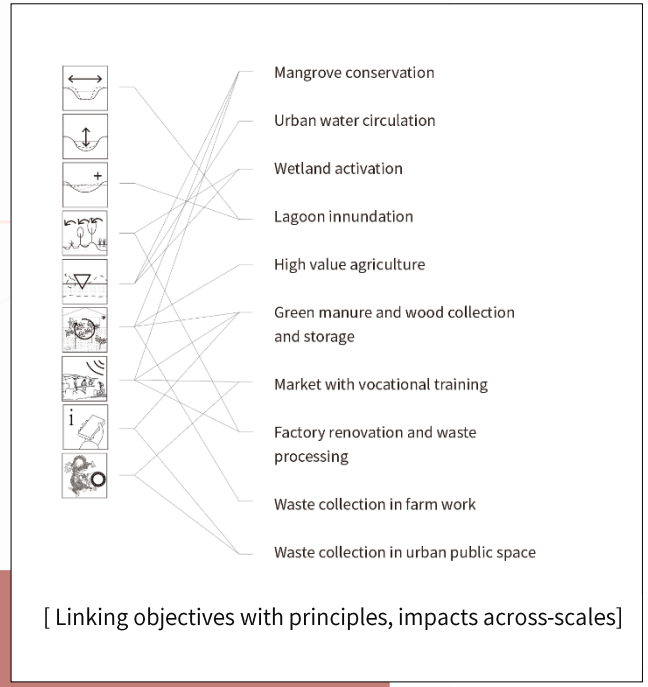
[Socio-ecological vulnerability]

(Gradients of climate vulnerability, water instability and ecological degradation)

Made by author



[A method of exploration through transect and plan]

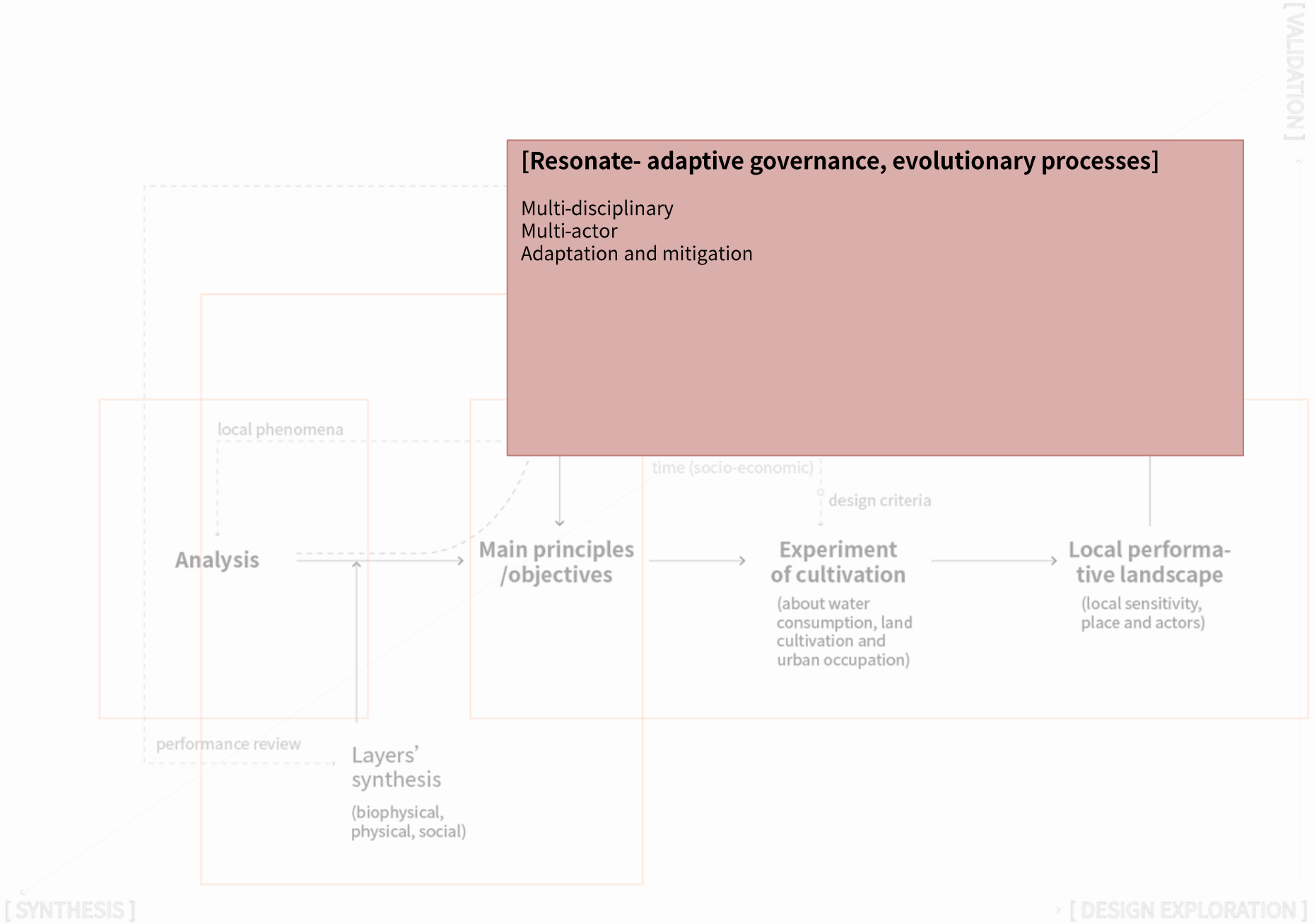


[Linking objectives with principles, impacts across-scales]

[Reorganize- objective, exploration, acceptance]

3 Design part is to explore how can the manipulated biophysical system can regenerate the delta, and allow the development at same time, but integrate local transformation in delta region. Under main principles of restore and clean water, access to knowledge, design as a method combines forms of transect as windows, plan for relocation, and sections for detail implementation, to provide decomposition possibilities to transform by **elevating the systemic interrelations.**

Local acceptance of such transformation needs to consider its traditional practices, cost and benefit, ad interest groups involved, etc.


[Resonate- adaptive governance, evolutionary processes]
Multi-disciplinary
Multi-actor
Adaptation and mitigation
[VALIDATION]
local phenomena
time (socio-economic)
design criteria
Analysis
Main principles /objectives
Experiment of cultivation
(about water consumption, land cultivation and urban occupation)
Local performa-tive landscape
(local sensitivity, place and actors)
performance review
Layers' synthesis
(biophysical, physical, social)
[SYNTHESIS]
[DESIGN EXPLORATION]