Towards a Sustainable and Liveable Desakota

Designing for sustainable industry transition in the peri-urban territory of the Greater Bay Area

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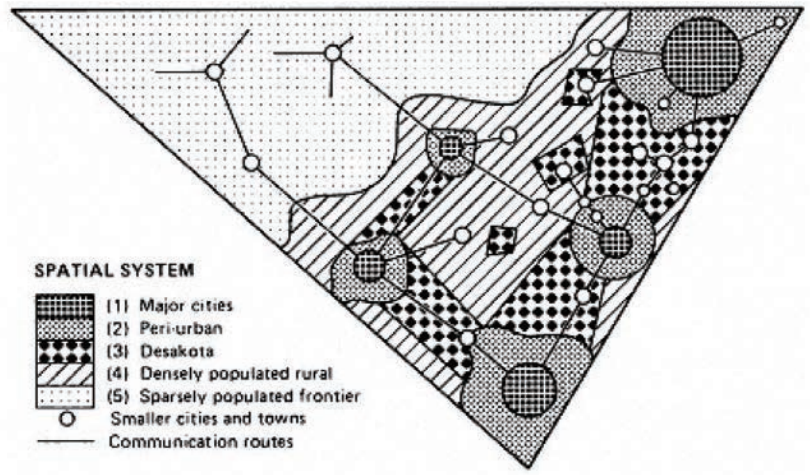
P5 presentation: 29/06/2023

INTRODUCTION
- Desakota in the Greater Bay Area

DESAKOTA is a term used to describe areas in the extended surroundings of large cities, in which urban and agricultural forms of land use and settlement coexist and are intensively intermingled



source: Mcgee, T. (1991). The emergence of desakota regions in Asia: expanding a hypothesis

source: image by @ZhouMini in Xiaohongshu

INTRODUCTION
- Desakota in the Greater Bay Area

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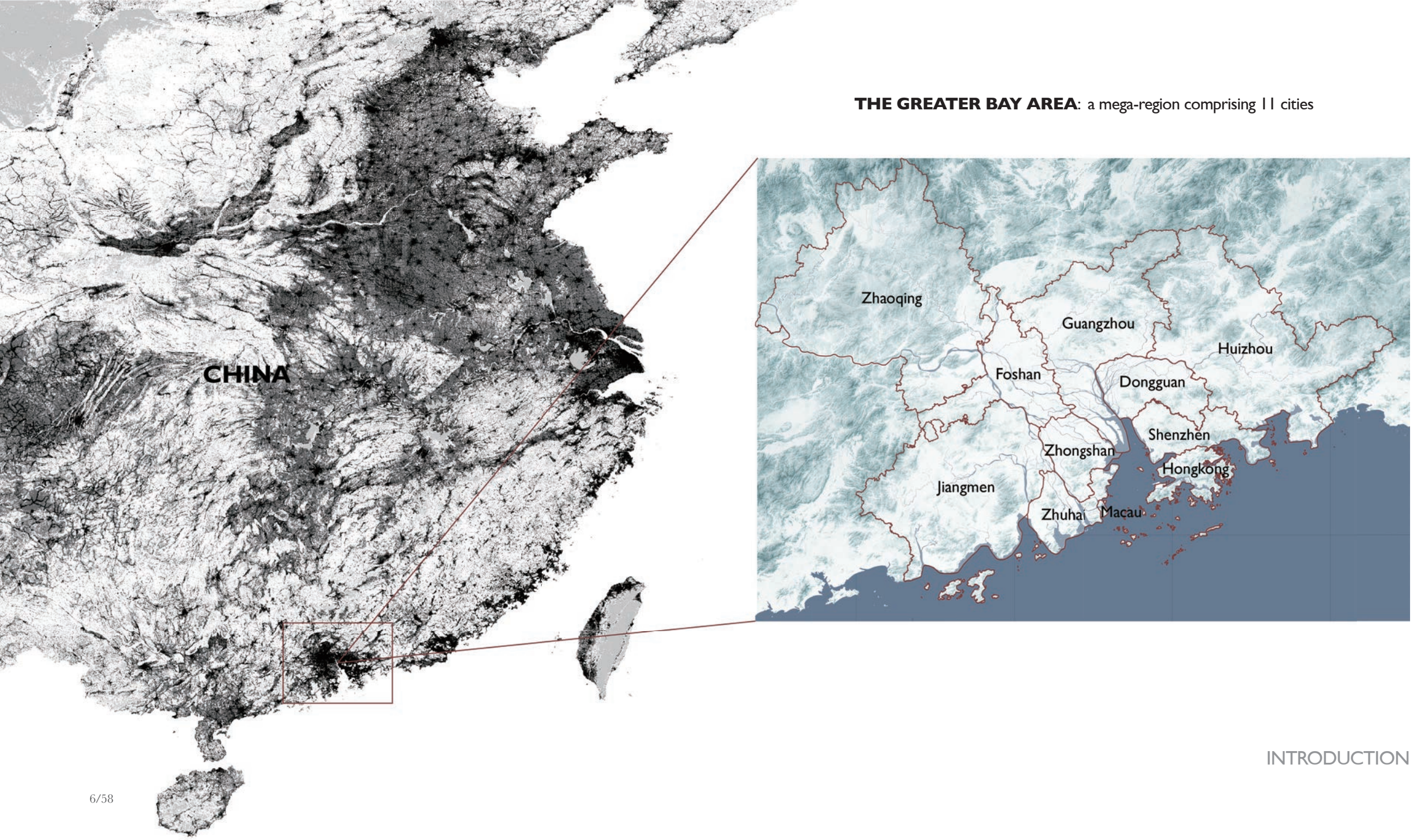
- Desakota in the Greater Bay Area

source: image by @ZhouMini in Xiaohongshu

INTRODUCTION
- **Desakota in the Greater Bay Area**

source: images by @1016113138 & in Xiaohongshu

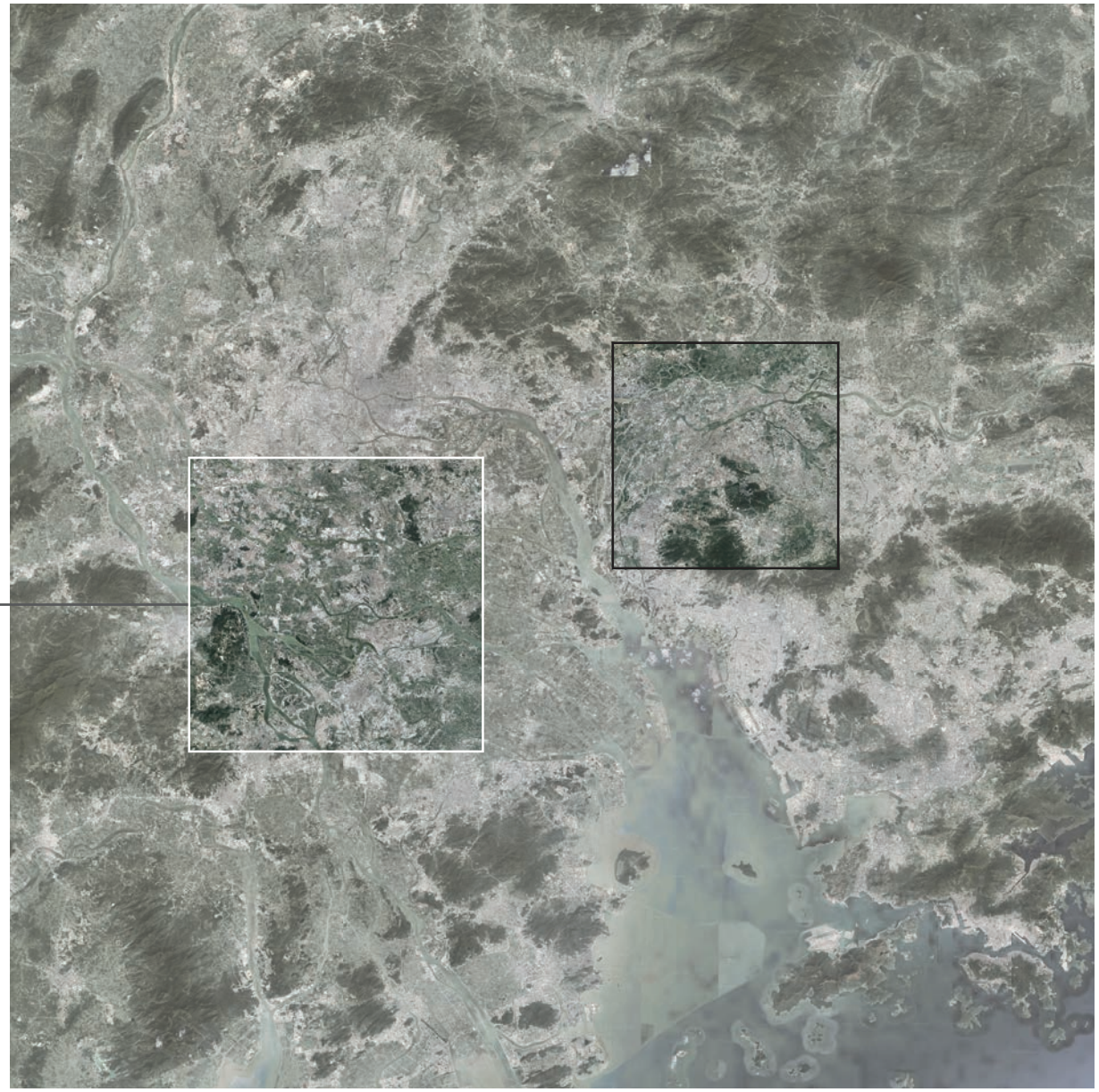
THE GREATER BAY AREA: a mega-region comprising 11 cities



MOTIVATION

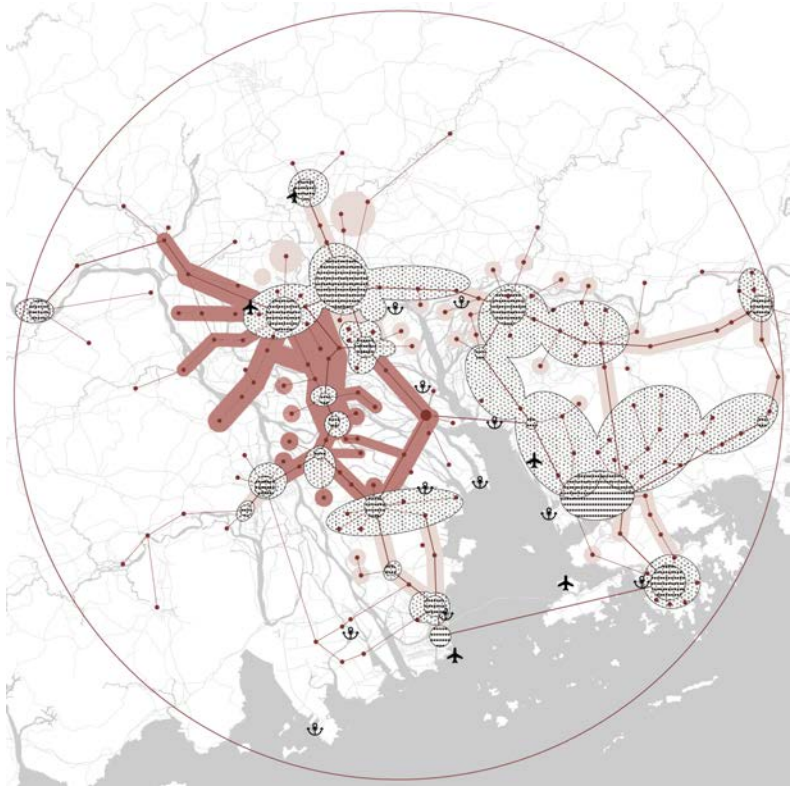
- **An Alternative Future of Desakota in the GBA**

source: image from Tian, M. (2019). Seeing from Above: Observation of Contemporary Dike-Pond Landscape. 7(4), 130-138. https://doi.org/https://doi.org/10.15302/J-LAF-1-050004



CONTEXT

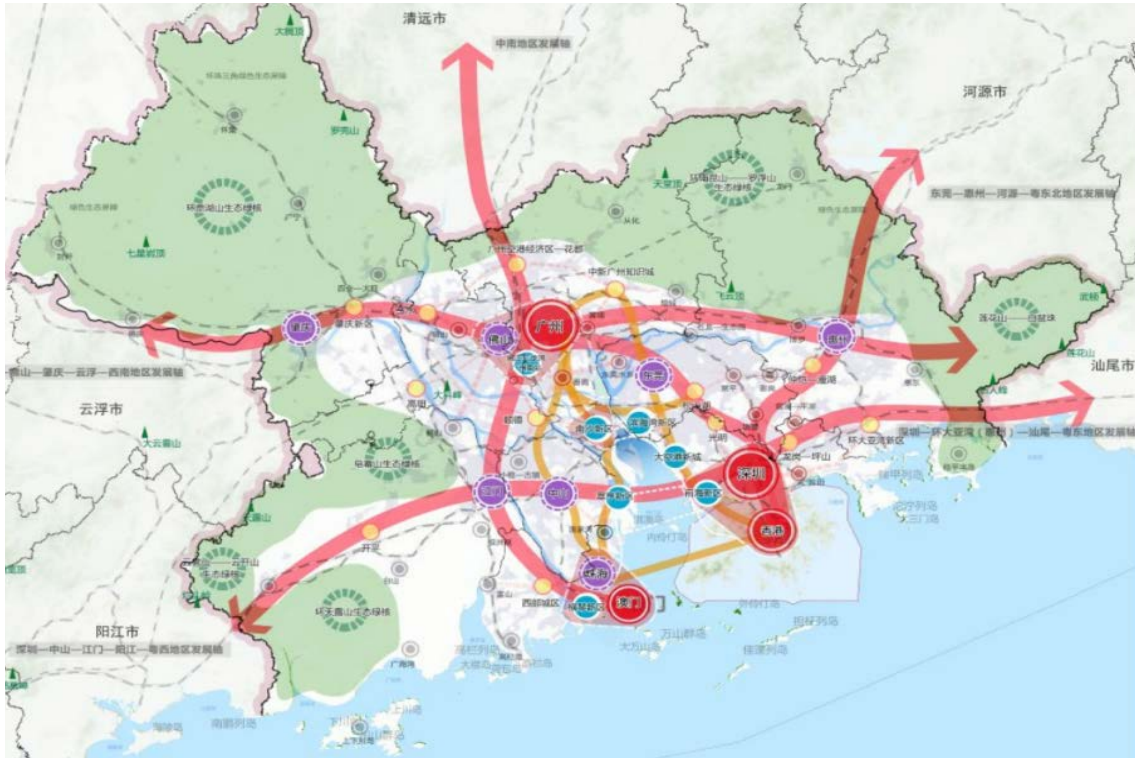
- Regional Networking & The Intensive Emergence of Dedakota in the GBA



LEGEND

- active towns
- towns
- major city
- peri-urban area
- polycentric metropolitan region
- main communication route
- Desakota intensive region
- Desakota region

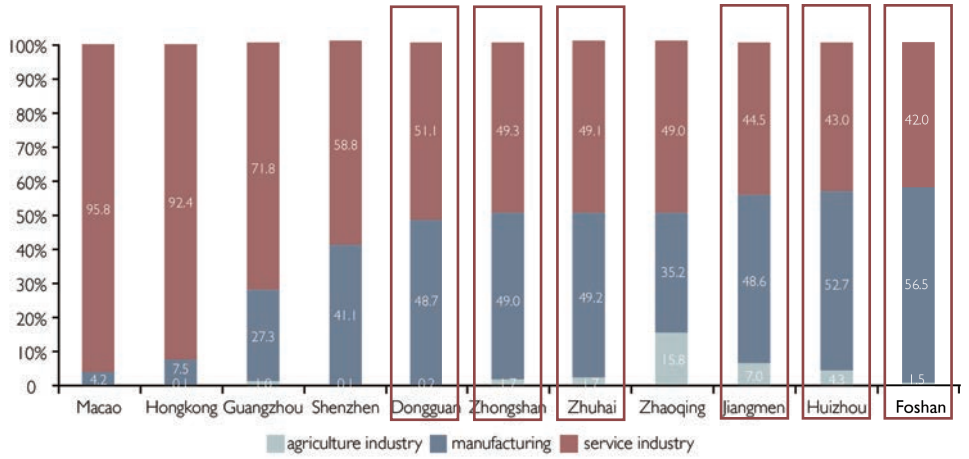
Tendency of regional integrated development (a national strategy)



source: Territorial spatial planning of Guangdong province. (2019). Department of natural resources of Guangdong province. http://nr.gd.gov.cn/attachment/0/413/413359/3225138.pdf

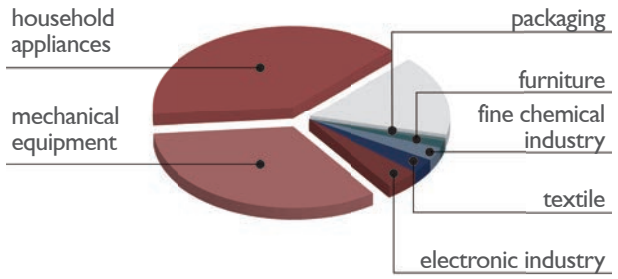
INTRODUCTION

Manufacturing shift to second-tier cities



source: author's own based on the data from The GBA Fintech Report 2019: Hong Kong-Macau-Guangdong Greater Bay Area Fintech Analysis & Recommendations

Industrial structure of Desakota



GBA's Desakota area assumes more significant role in manufacturing

source: image by @ZhouMini in Xiaohongshu

CONTEXT

- Certain Future of Industry Transition in the Desakota

Higher-end Manufacturing

Low-carbon Transition

Conversion Plan of Village-level Industrial Parks (Urban Regeneration)

GBA's Desakota area assumes more significant role of manufacturing

A Solid & Long-term Spatial Strategy?

source: image by @ZhouMini in Xiaohongshu

PROBLEM

- **Fragmented Open Space with Incompatible Industrial Activities**
- **Uneven Public Facilities and Uninhabitability**
- **The Loss of Identity**

Reduction of open space due to industrialisation and urbanisation:
50%

source: image from Sohu.com: https://www.sohu.com/a/431070210_612977;

Workers of manufacturing:
50% of the total population;
50% of them are migrants

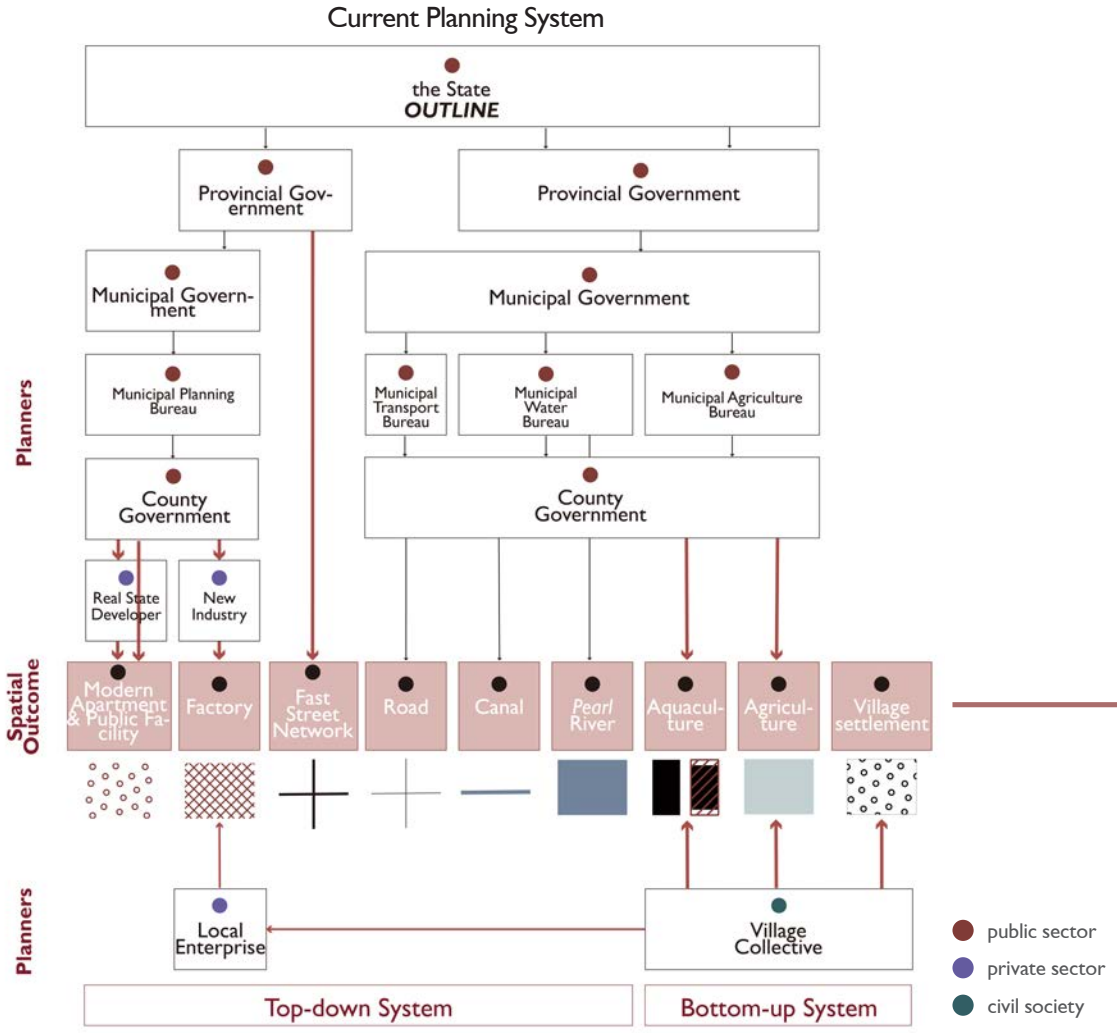
source: image from BBC News Chinese: https://www.bbc.com/zhongwen/simp/china/2014/02/140220_china_migrants_workers

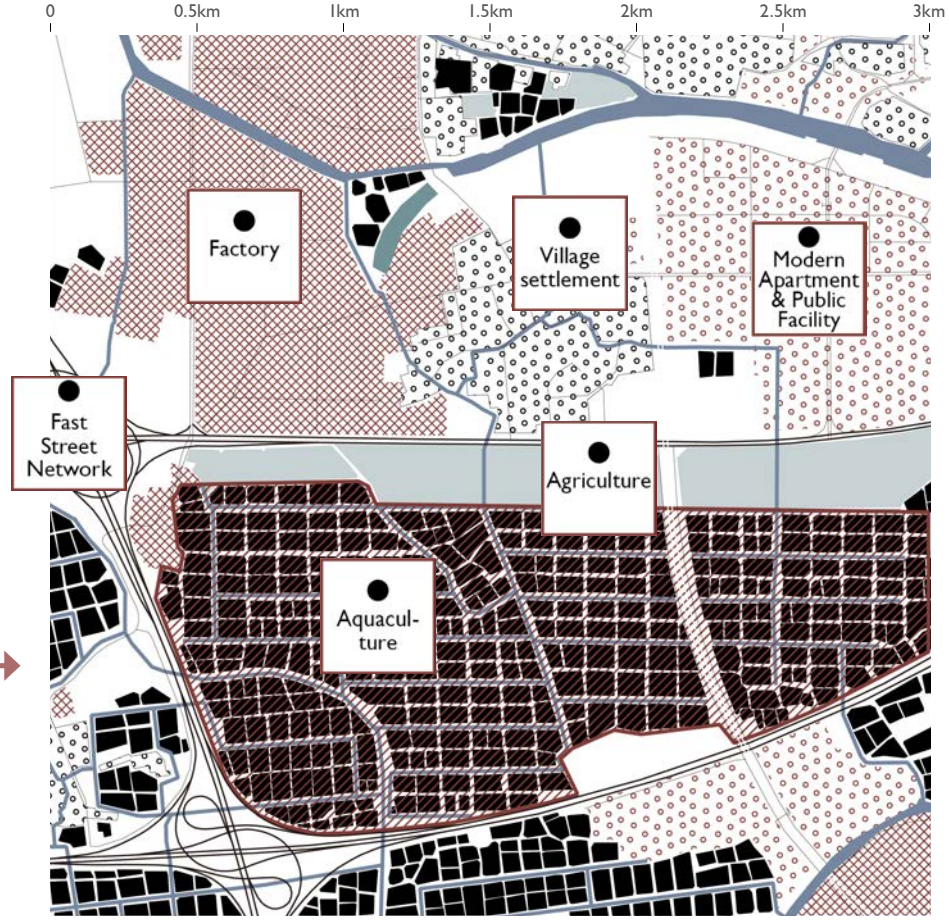
Old industrial parks in transition:
70%

source: image from ZSBTV.com.cn: http://www.zsbtv.com.cn/a/zq/content_191503.shtml

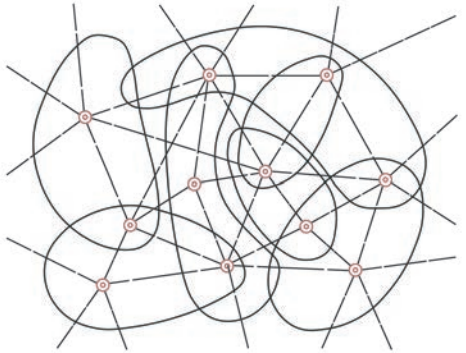
PROBLEM

- **Urban-Rural Dichotomy Planning System**



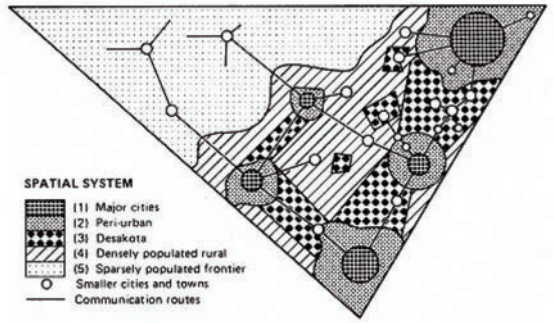


REGIONAL PERSPECTIVE & CROSS-SCALE RESEARCH



NETZSTADT (NET-CITY)

+



DESAKOTA

source: above: Oswald, F., Baccini, P., & Michaeli, M. (2003). Netzstadt. Springer Science & Business Media; below: Mcgee, T. (1991). The emergence of desakota regions in Asia: expanding a hypothesis.

RESEARCH AIM
- **Research Question**

What are the potentials of the desakota pattern to be adapted
in the proposed network of the Greater Bay Area megaregion
for industry transition that supports sustainable and liveable urbanisation?

1. Identify the current Desakota network in the GBA network

2. Analyse the potential and challenges of this network

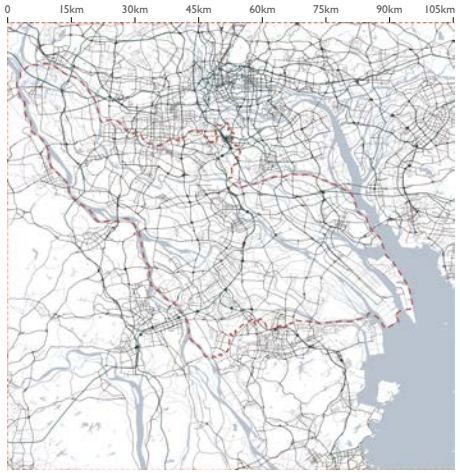
3. Understand what development pattern and spatial qualities can this network achieve through formulating the potantial

4. Establish a spatial planning framework to adapt this network

5. Formulate future recommendations & Reflect on the whole process

1. IDENTIFY the current Desakota network in the GBA network

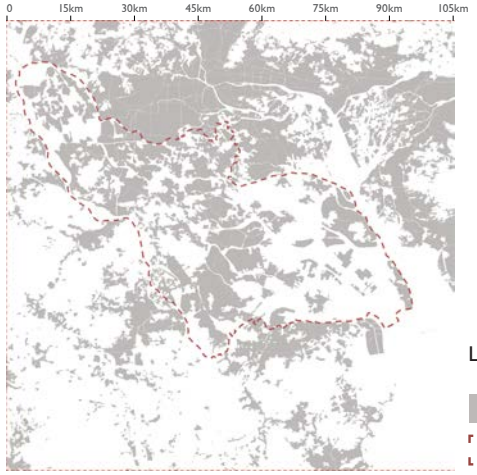
DEFINING THE DESAKOTA NETWORK
- Identification of Nodes and Connections: Morphology



LEGEND

- waters
- project perimeter
- railways with railway stations
- fast Street network

Waters and transport infrastructure



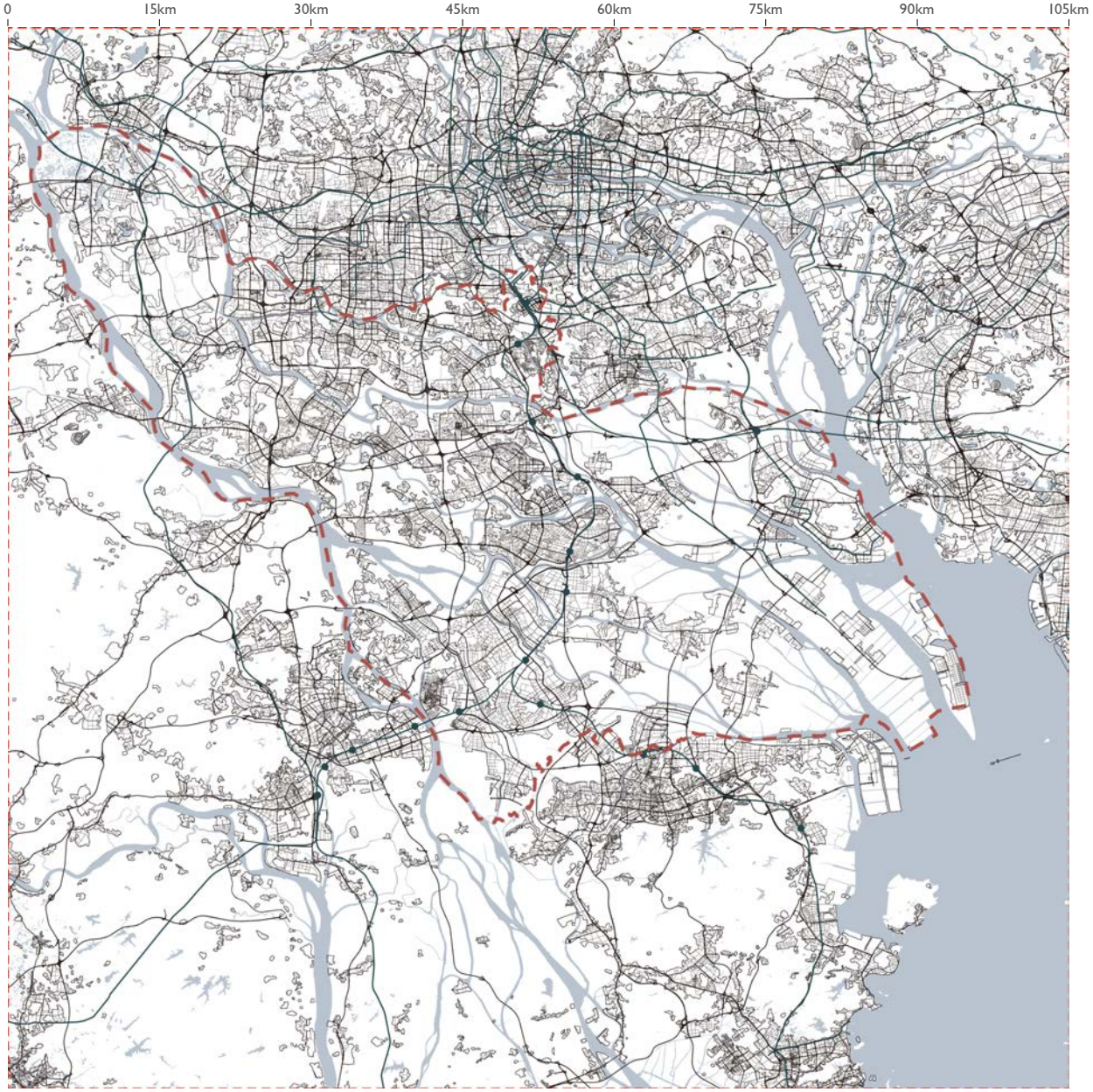
LEGEND

- settlement areas
- project perimeter

Settlement areas

LEGEND

- waters
- project perimeter
- nodal areas with internal structure
- railways with railway stations
- fast Street network



1. IDENTIFY the current Desakota network in the GBA network

DEFINING THE DESAKOTA NETWORK
- Identification of Nodes and Connections: Physiology

HEATMAP OF PUBLIC SERVICES

Project perimeter

towns outside the project perimeter

towns within the project perimeter

heatmap of public facilities including parks, markets, hospitals, schools and housing

DENSITY OF WORKPLACES

Project perimeter

towns outside the project perimeter

towns within the project perimeter

density > 1

density of workplaces = workplaces / workforce inhabitants

DENSITY OF INHABITANTS

Project perimeter

towns outside the project perimeter

towns within the project perimeter

>10000

4000-10000

2000-4000

1000-2000

0-1000

density of inhabitants = number of inhabitants / area of town (km2)

ECONOMIC VALUE OF LAND

Project perimeter

towns outside the project perimeter

towns within the project perimeter

60-80 (€8-10.6)

40-60 (€5.3-8)

20-40 (€2.6-5.3)

<20 (€2.6)

GDP per km2 =GDP (million) / area of town (km2)

COMMUTING FLOW

Project perimeter

towns outside the project perimeter

towns within the project perimeter

35,000

100 (trips)

LEGEND

waters

project perimeter

mountains

physiological nodes outside the project perimeter

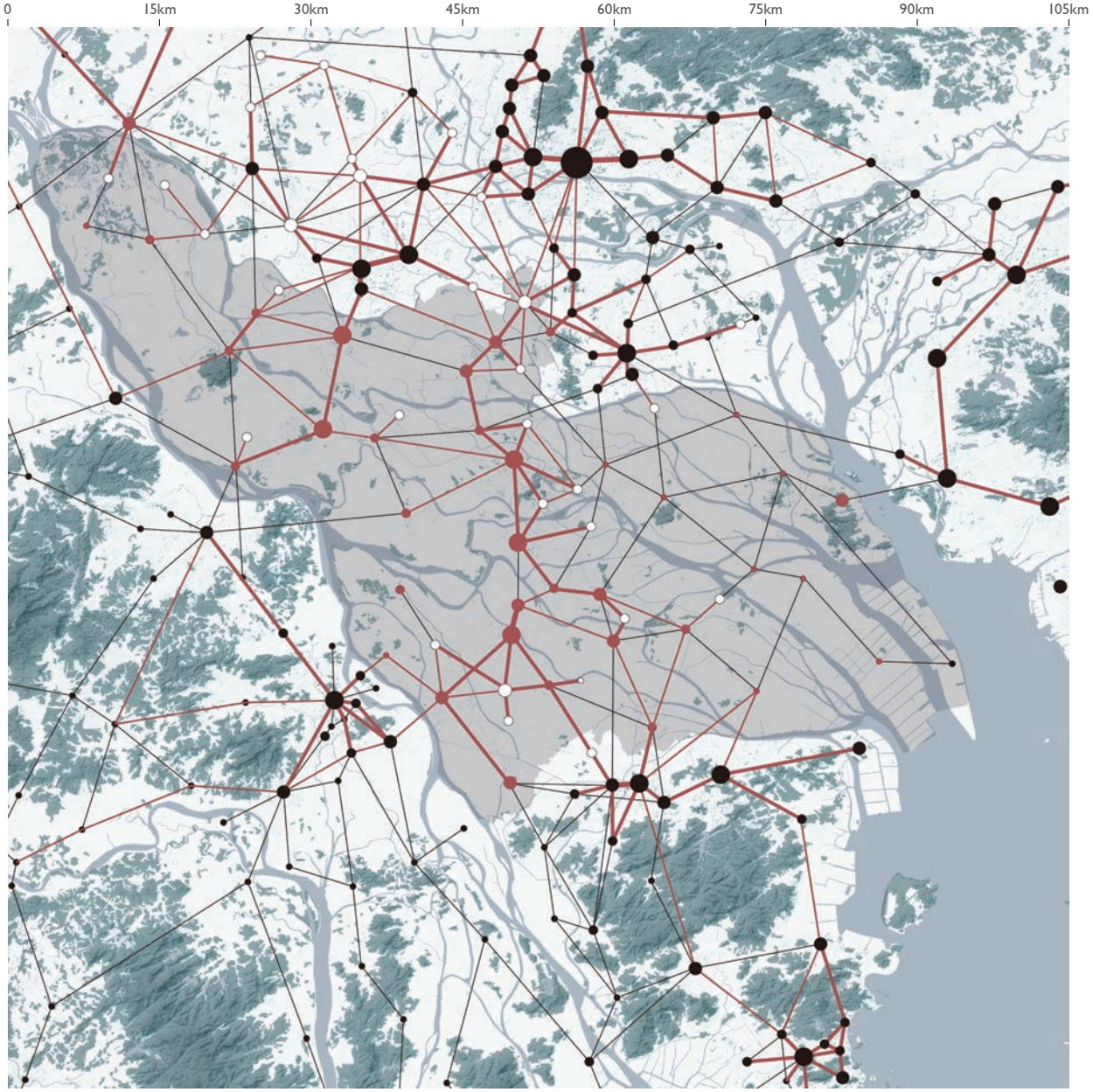
physiological nodes within the project perimeter

nodes different from towns' center

physical connections

strong human flows between the towns

lighter human flows between the towns



1. IDENTIFY the current Desakota network in the GBA network

DEFINING THE DESAKOTA NETWORK
- Morphological and Physiological Network

L - node urban characteristics

-high density of people: >4000/km2

-active economic activities in secondary and tertiary industry

-concentration of public services

-have workforce attraction and sufficient workplaces

M - node peri-urban characteristics

-high density of people: 2000-4000/km2

-economic activities dominated by the secondary industry

-lighter concentration of public services

-residential and working areas

S - node transitional characteristics

-moderate density of people: 1000-2000/km2

-economic activities dominated by both first and secondary industry

-insufficiency of public services

-mixed areas for both urban and rural life

XS -node rural characteristics

-less density of people: <1000/km2

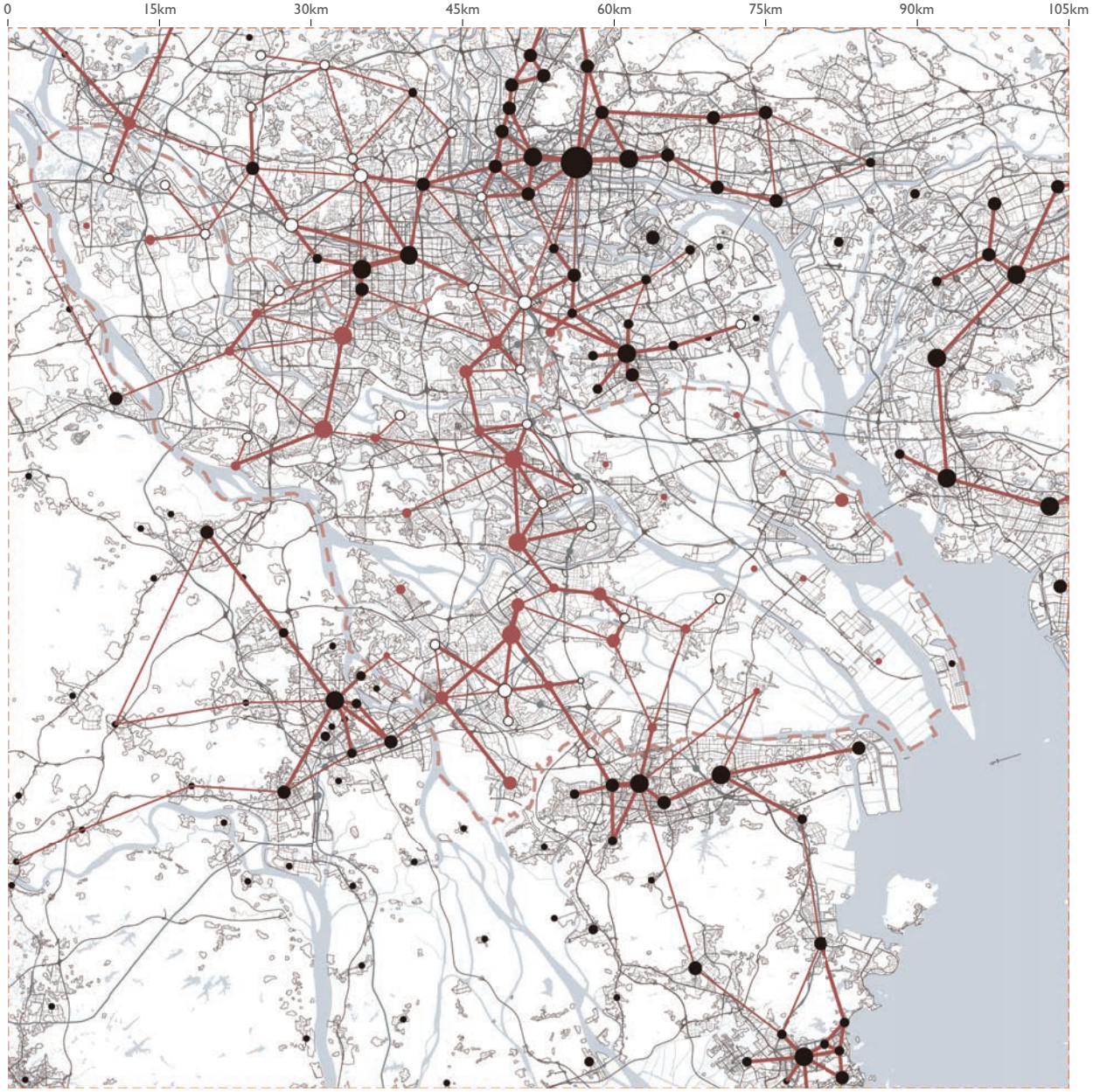
-economic activities dominated by the first industry

-lack of public services

-concentration of village settlement

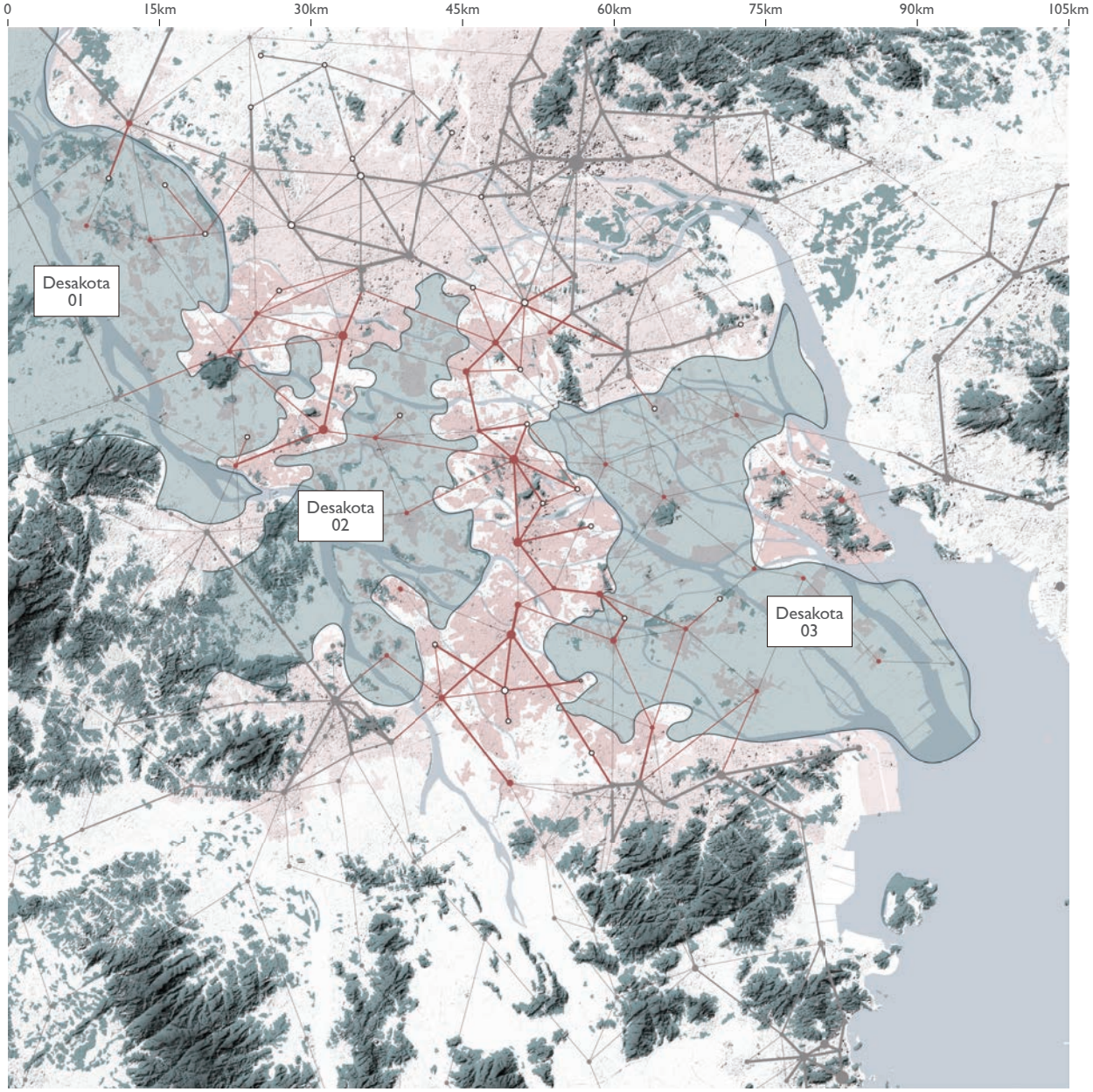
LEGEND

- waters
- project perimeter
- nodal areas with internal structure
- physiological nodes outside the project perimeter
- physiological nodes within the project perimeter
- nodes different from towns' center
- physical connections
- strong human flows between the towns
- lighter human flows between the towns
- railways with railway stations
- fast Street network



1. IDENTIFY the current Desakota network in the GBA network

THE STRUCTURE OF DESAKOTA NETWORK
- Conclusion



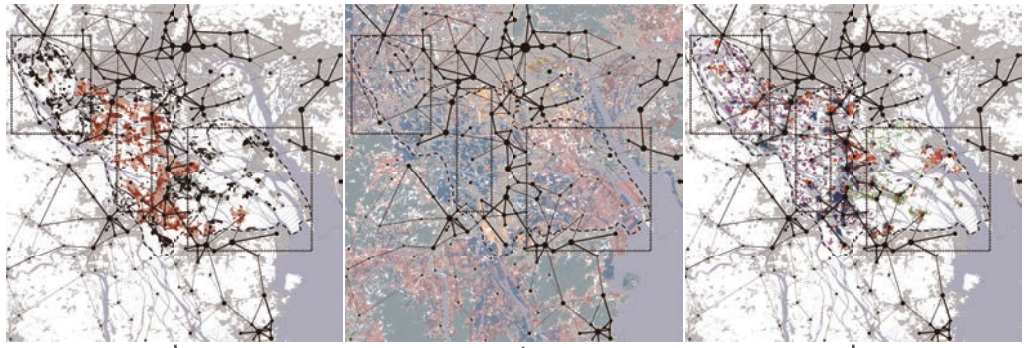
LEGEND

waters
settlement patches
L&M&S&XS node
Desakota area
hills
urban areas
connections

1. IDENTIFY the current Desakota network in the GBA network

2. ANALYSE the potential and challenges of this network

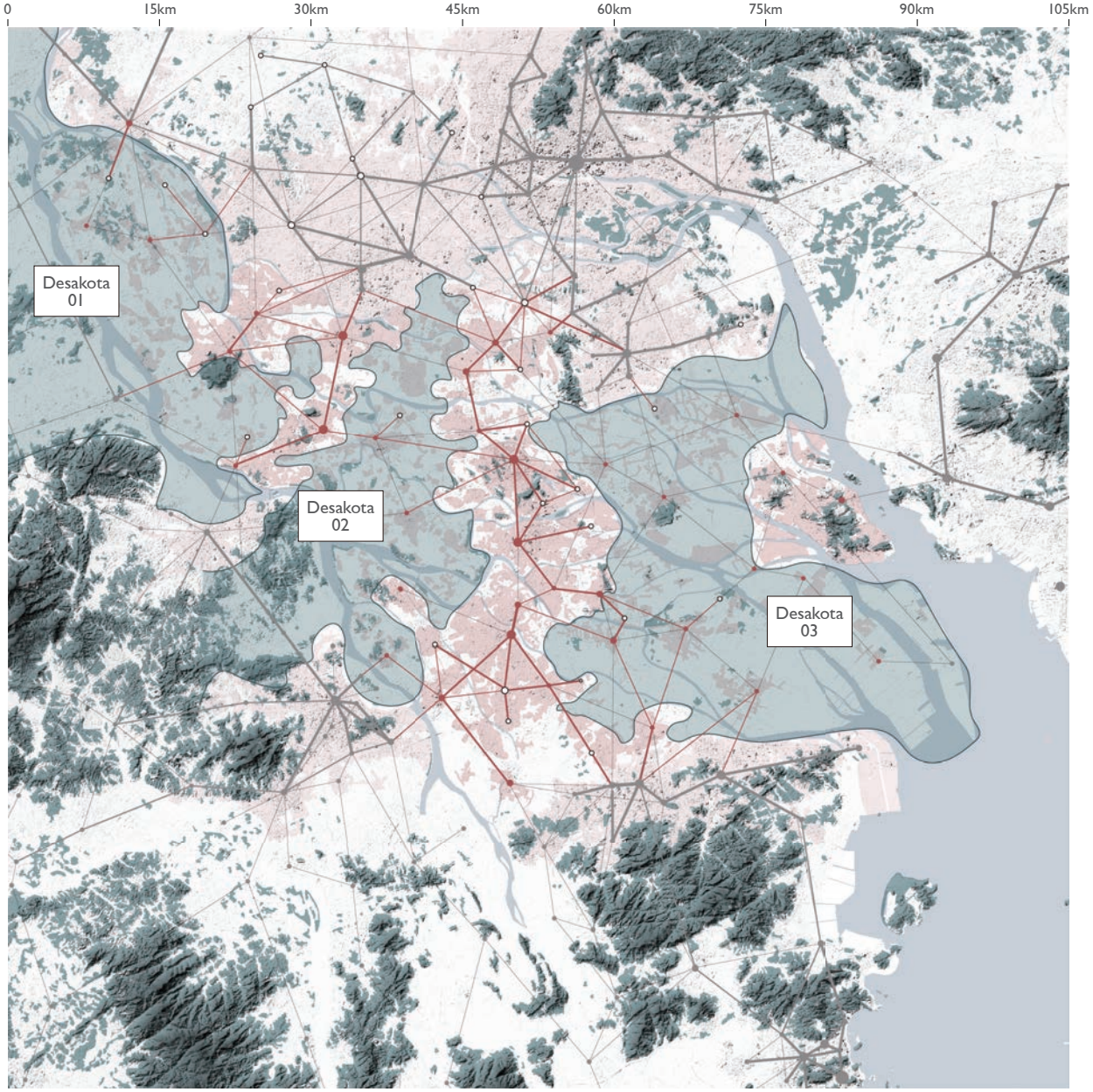
Industrial system + Landscape system + Residential system +



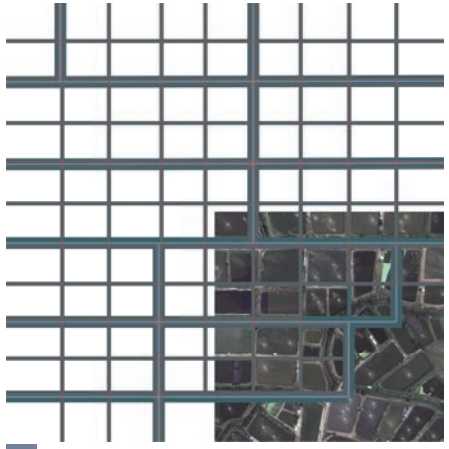
Elements Layers

Elements Layers

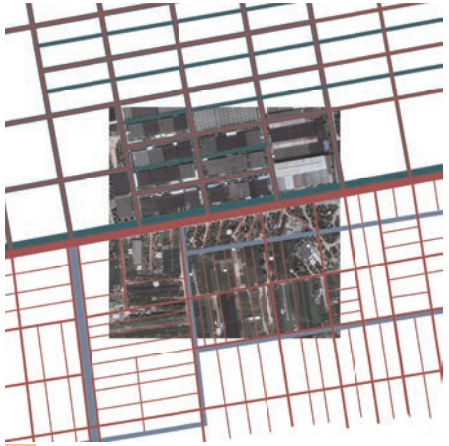
Elements Layers



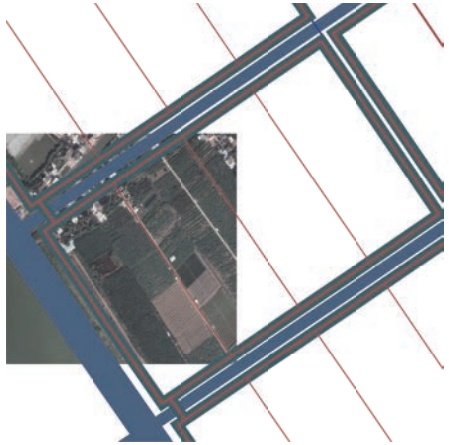
ELEMENTS AND LAYERS STUDY
- **Example: Landscape Elements & Layers**



dike-fish pond

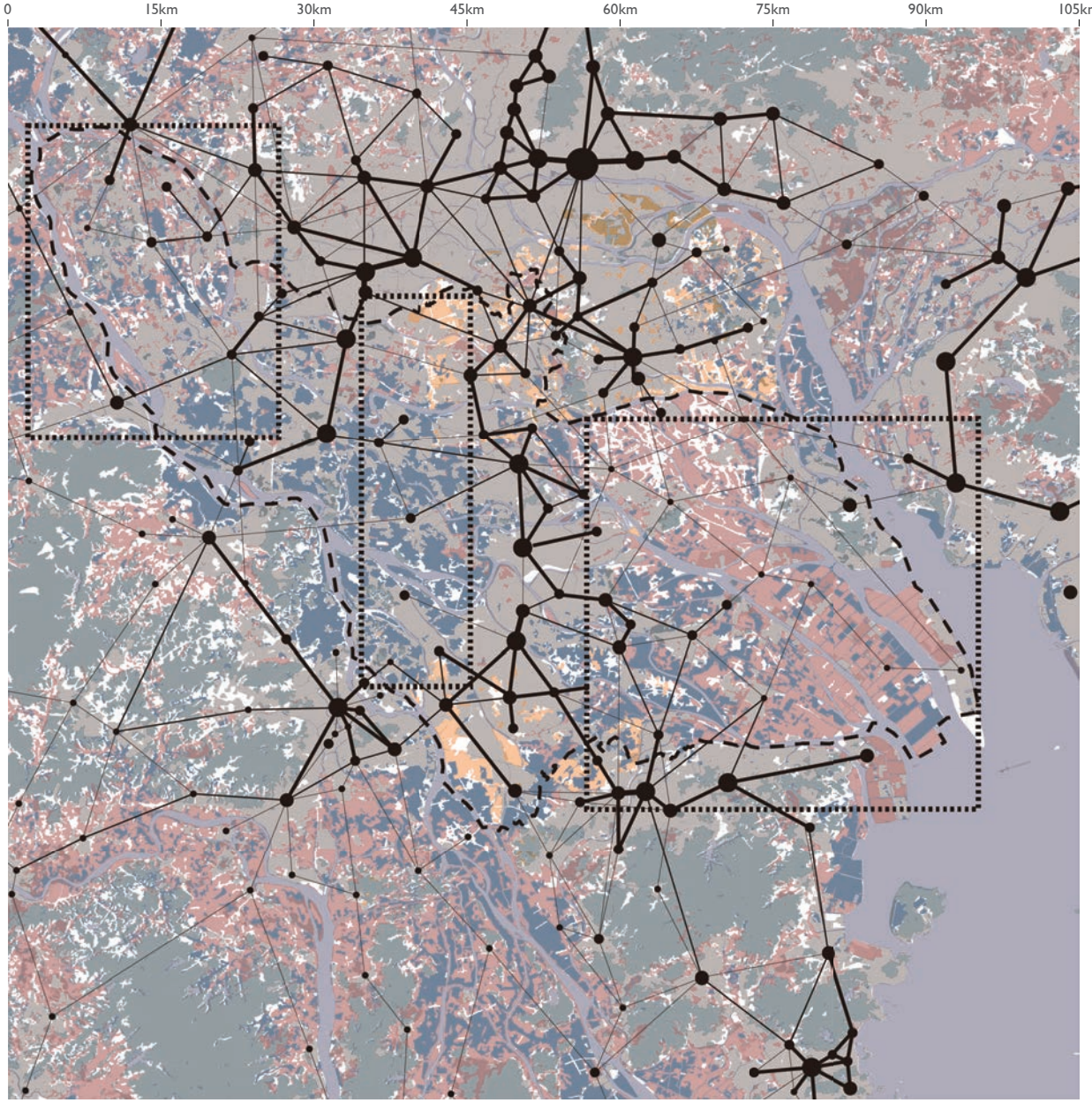


horticulture (nursery garden)



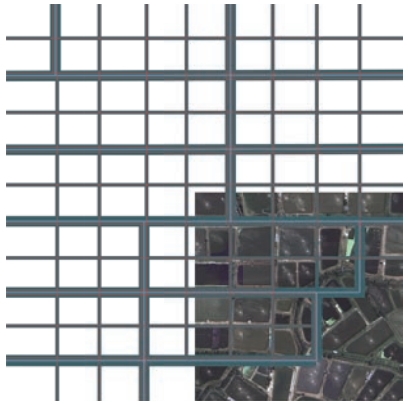
dike and arable land

forest



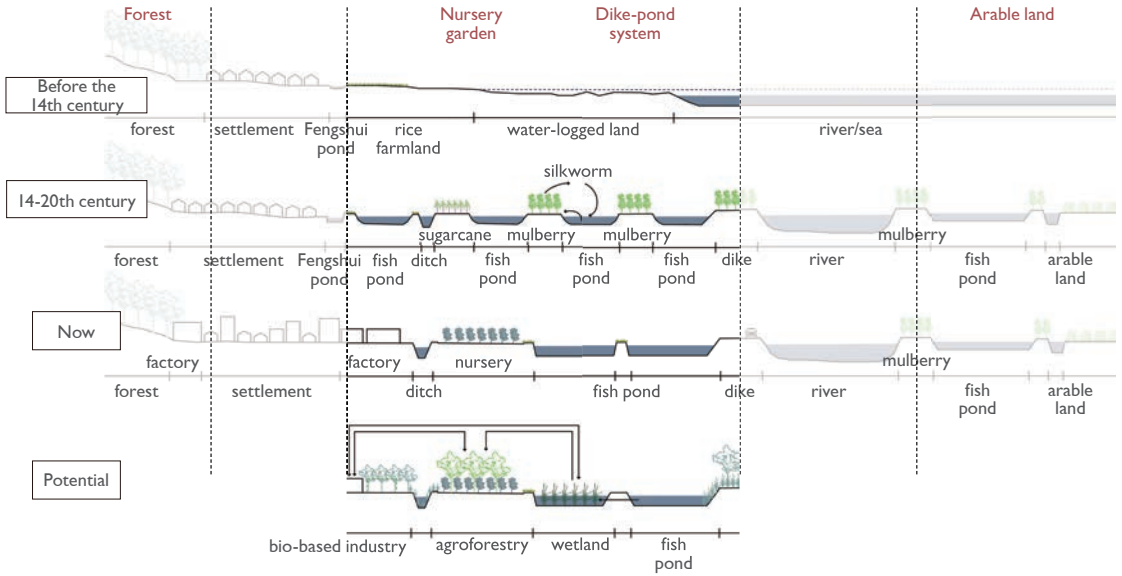
2.ANALYSE the potential and challenges of this network

ELEMENTS AND LAYERS STUDY
- Example: Landscape Elements & Layers

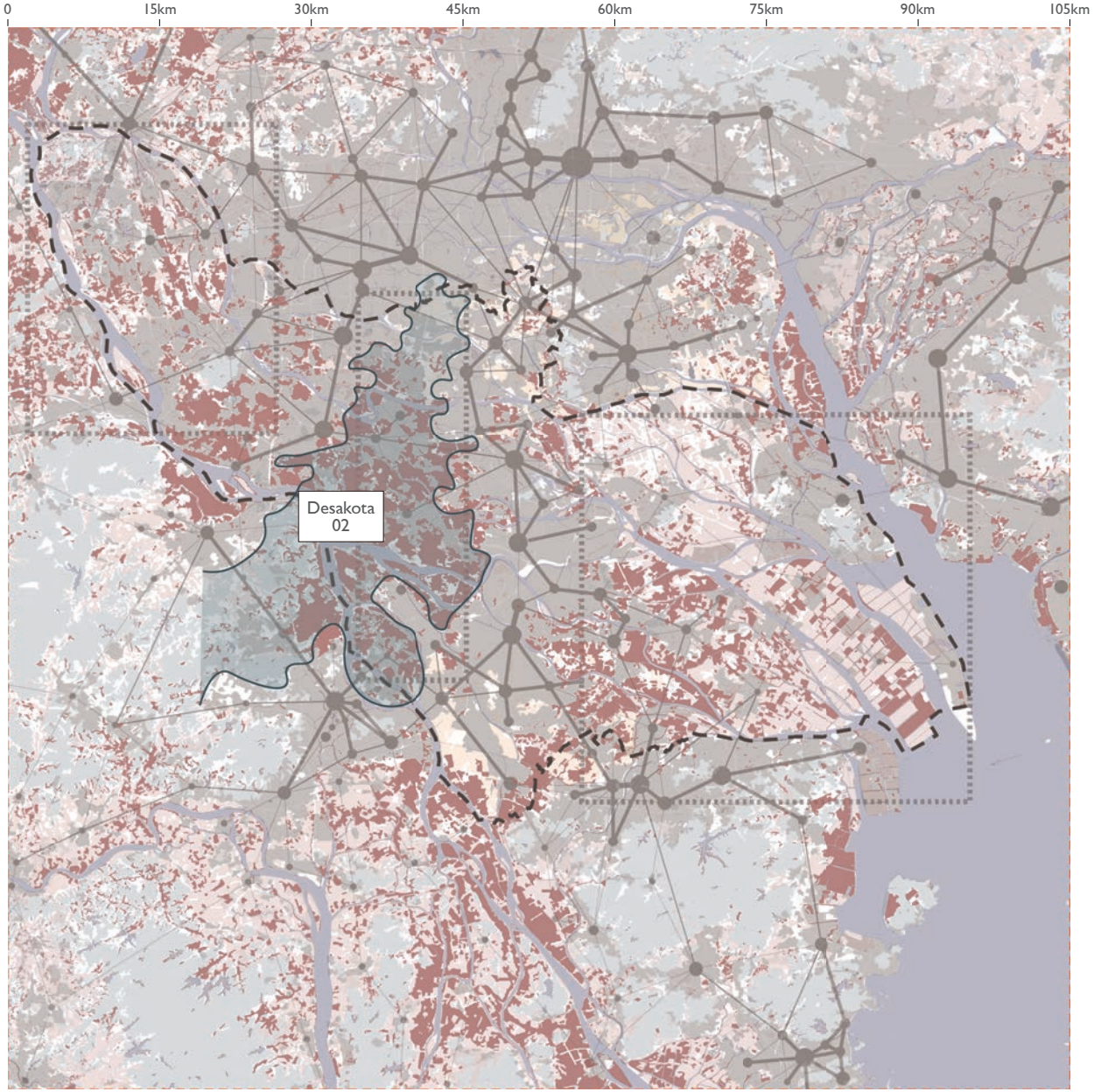


dike-fish pond

source: image by Elma Okic



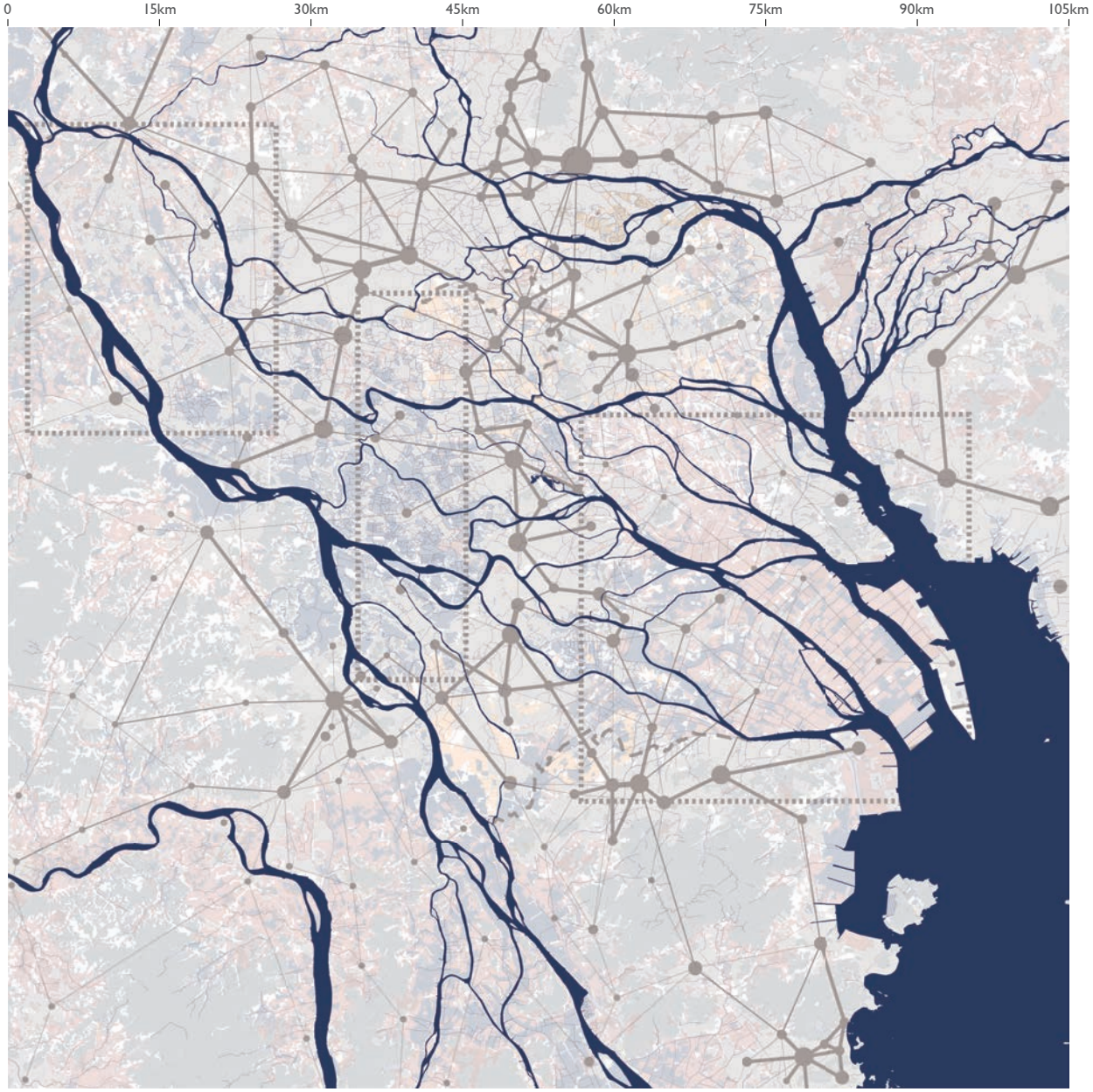
2.ANALYSE the potential and challenges of this network



ELEMENTS AND LAYERS STUDY
- **Example: Landscape System**

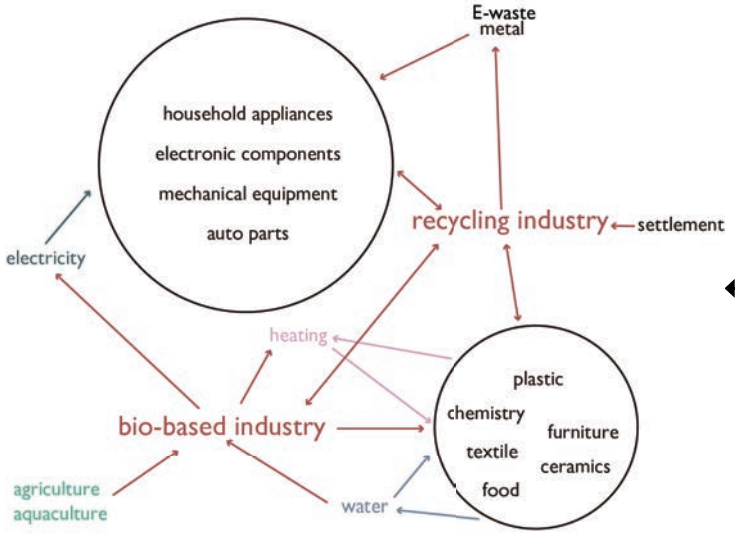
source: image by @1016113138 in Xiaohongshu

source: image by @949459555 in Xiaohongshu



2.ANALYSE the potential and challenges of this network

CONCLUSION
- The Potential of Industrial System

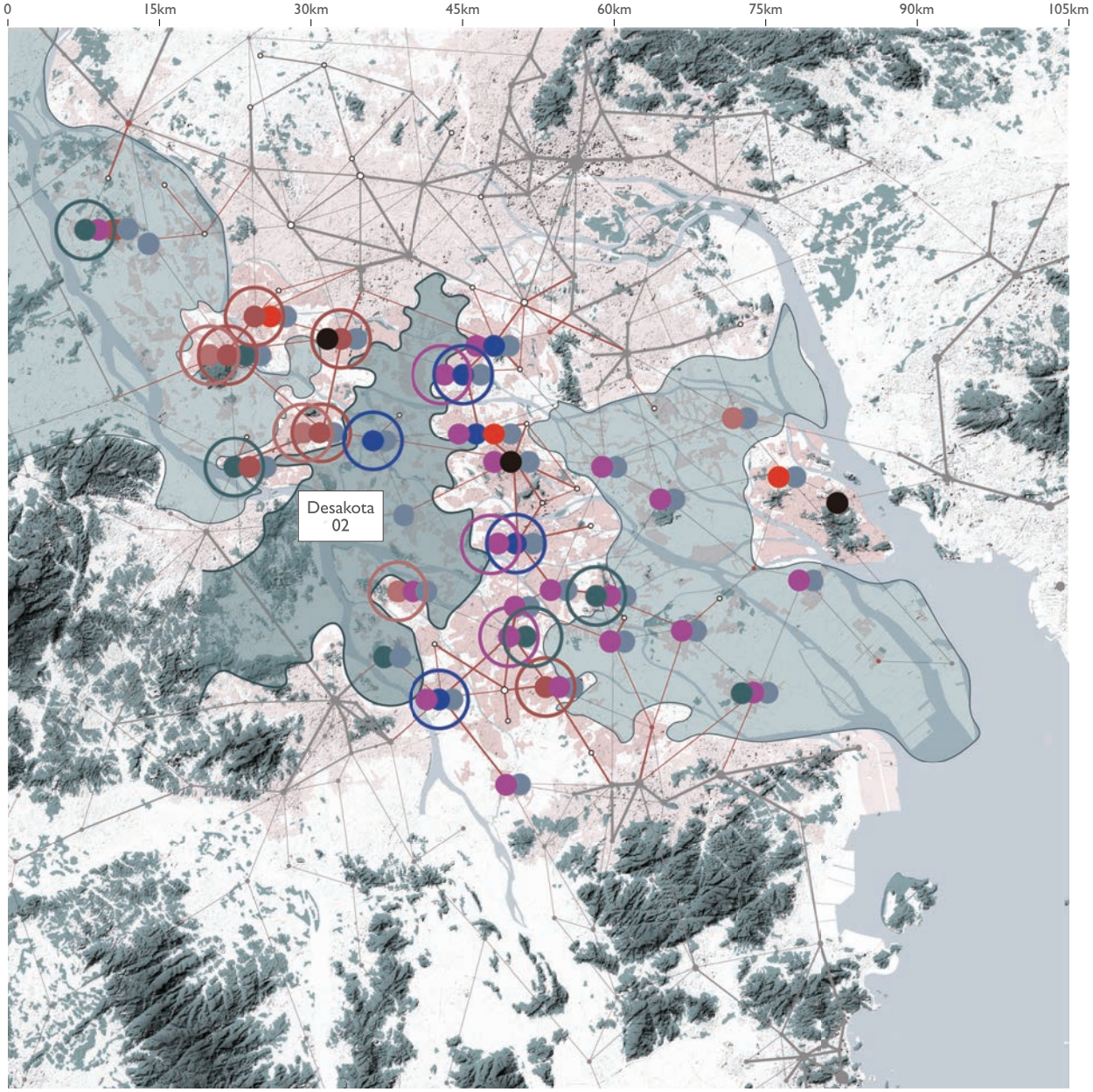


POTENTIAL OF INDUSTRY SYMBIOSIS

source: image from In-Crete website

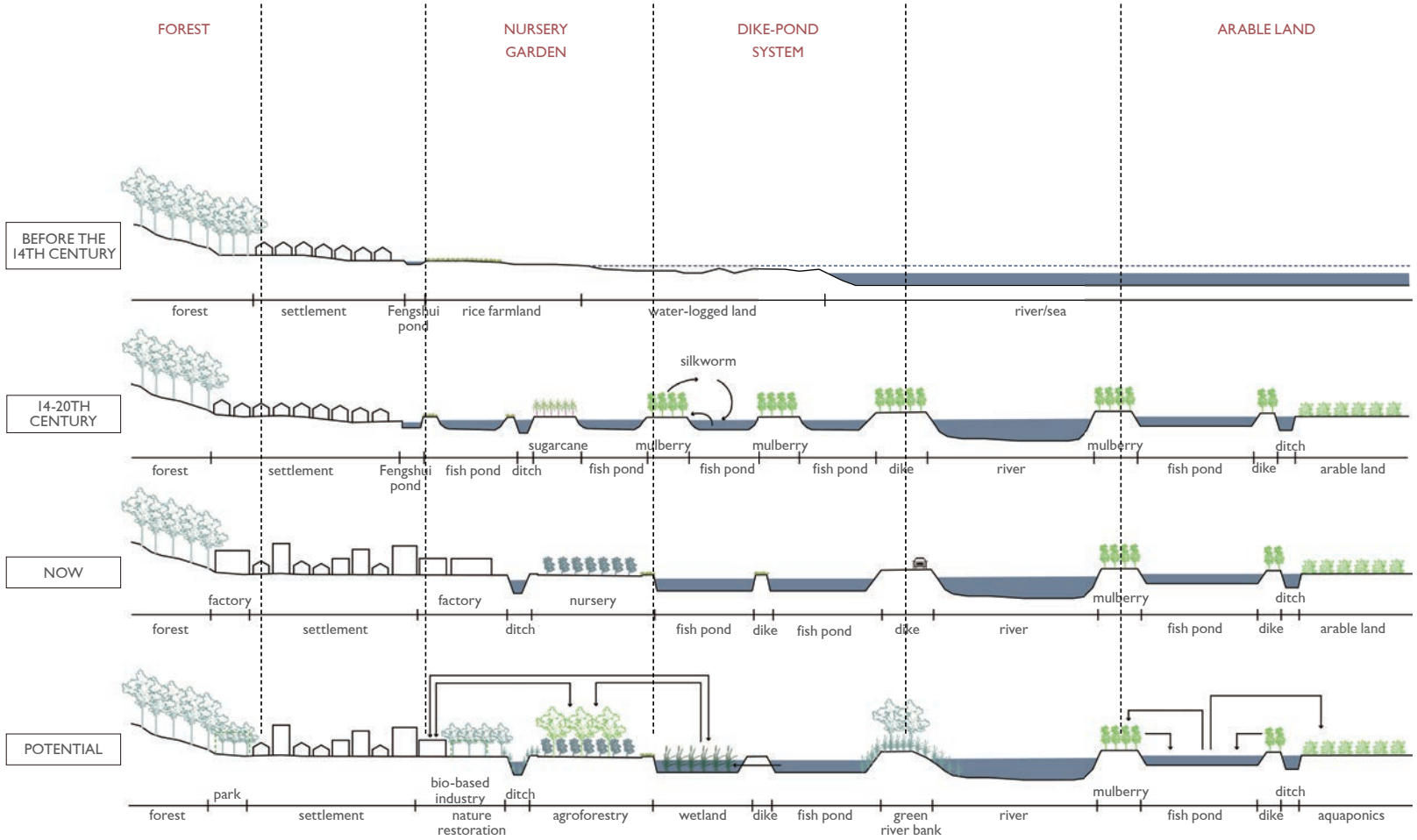
LEGEND

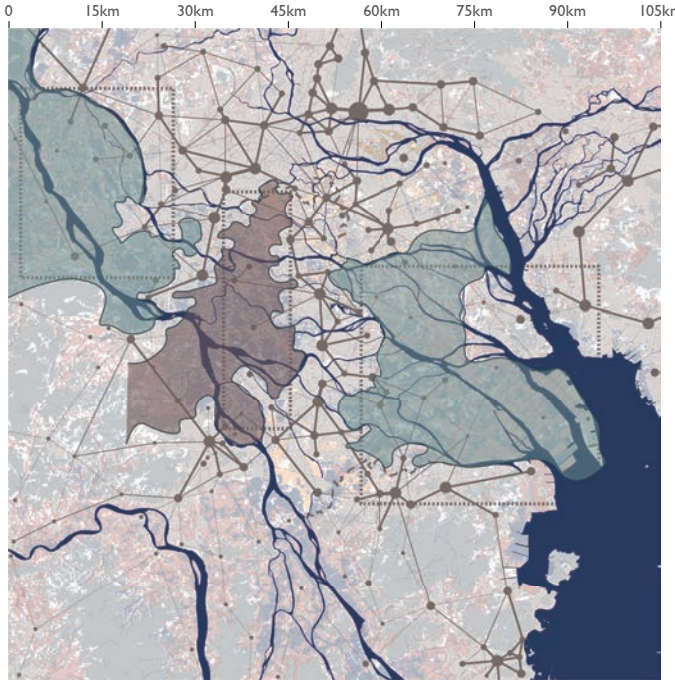
- service industry
- auto part
- plastic and metal processing
- mechanical production
- furniture
- textile
- food processing
- appliance
- regional importance
- main industry of each node



2.ANALYSE the potential and challenges of this network

CONCLUSION
- The Potential of Landscape System



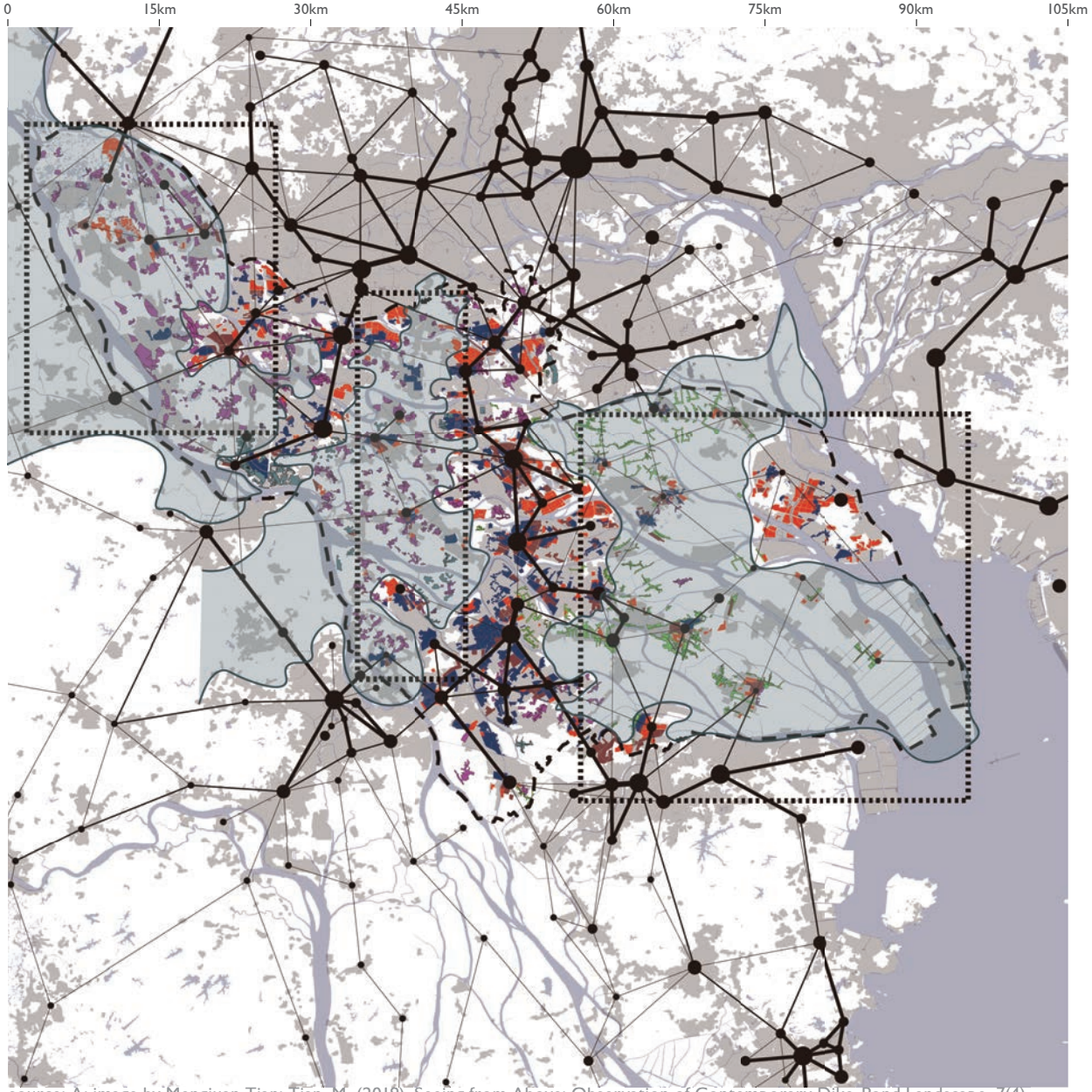


POTENTIAL OF GREEN & BLUE NETWORK
& INDUSTRY AND AGRICULTURE COOPERATION

2. ANALYSE the potential and challenges of this network

CONCLUSION
- The Potential of Living Environment

POTENTIAL OF DIVERSE SETTLEMENT CULTURE

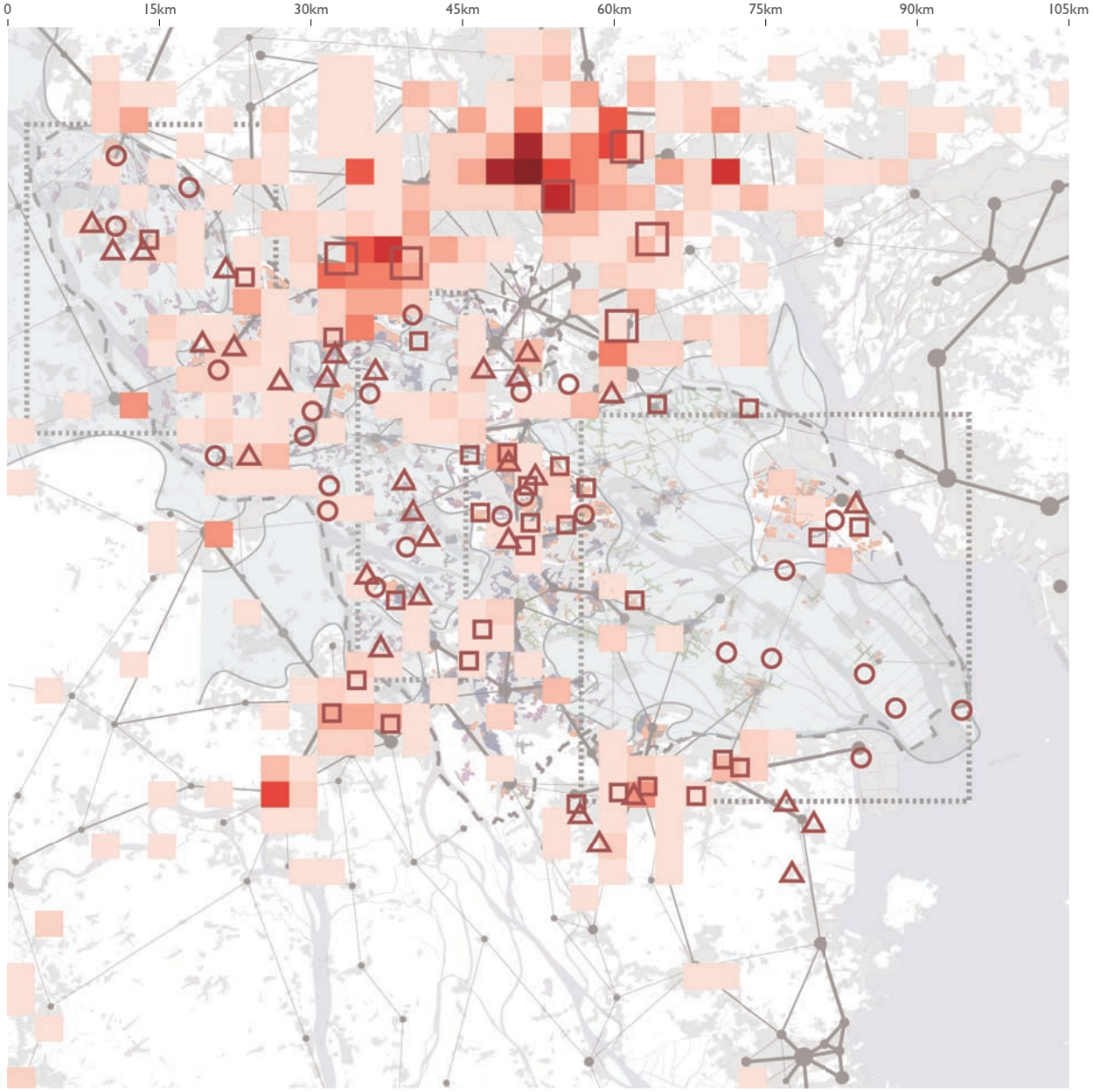


source: A: image by Mengjuan Tian: Tian, M. (2019). Seeing from Above: Observation of Contemporary Dike-Pond Landscape. 7(4), 130-138. https://doi.org/https://doi.org/10.15302/J-LAF-1-050004; B: image by @635133568 in Xiaohongshu; C: image by @270207453 in Xiaohongshu; D: image from Baidu Street Map; E: image by @791326870 in Xiaohongshu; F: image by @183650159 in Xiaohongshu

2. ANALYSE the potential and challenges of this network

CONCLUSION
- The Potential of Living Environment

POTENTIAL OF A MUTUAL COMPLEMENTARY REGIONAL COMMUNITY



2.ANALYSE the potential and challenges of this network

3. UNDERSTAND what development pattern and spatial qualities can this network achieve through formulating the potantial

DESIGN PRINCIPLES
- A diverse, decentralised structure with shared green & blue network

RUHR METROPOLIS:
A DECENTRALISED STRUCTURE

SHANGHAI 2035:
A HIERARCHICAL STRUCTURE

A SELF-ORGANISED STRUCTURAL POLICY

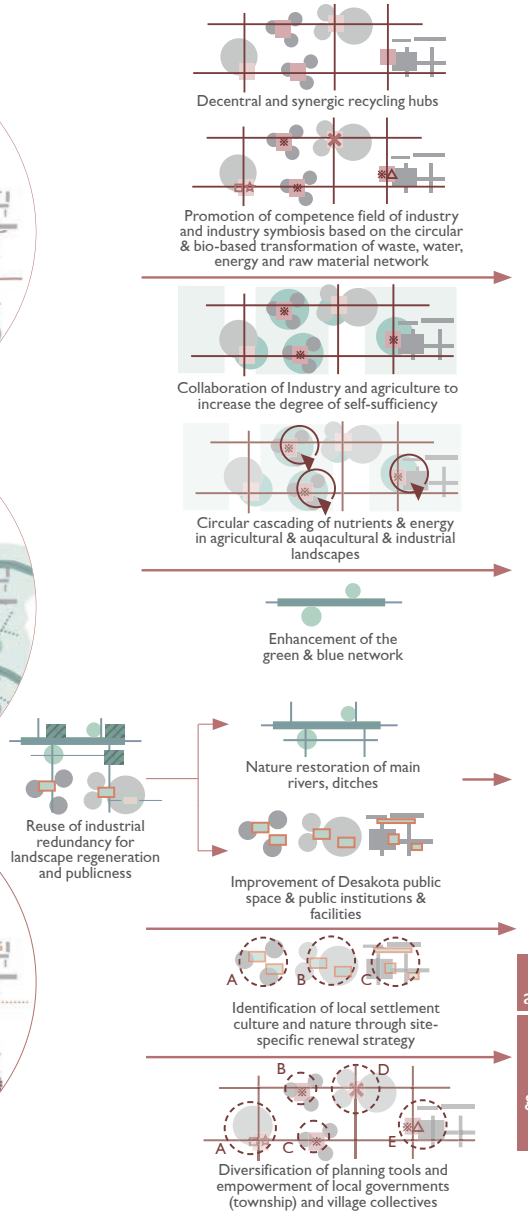
A REGIONALISED AND CENTRALISED STRUCTURAL POLICY

Symbiotic industrial network of eco-industrial parks

Continuity and share of green & blue network

Identification and just metropolitan publicness of living environment

Regionalised & Decentralised governance structure & Flexible planning



DESAKOTA IN THE GBA

unsustainable INDUSTRIAL DEVELOPMENT

poor quality of OPEN SPACE with incompatible industrial activities

uneven PUBLIC FACILITIES (recreation, education) and UNINHABITABILITY

the loss of IDENTITY

PLANNING SYSTEM:
a centralised structural policy

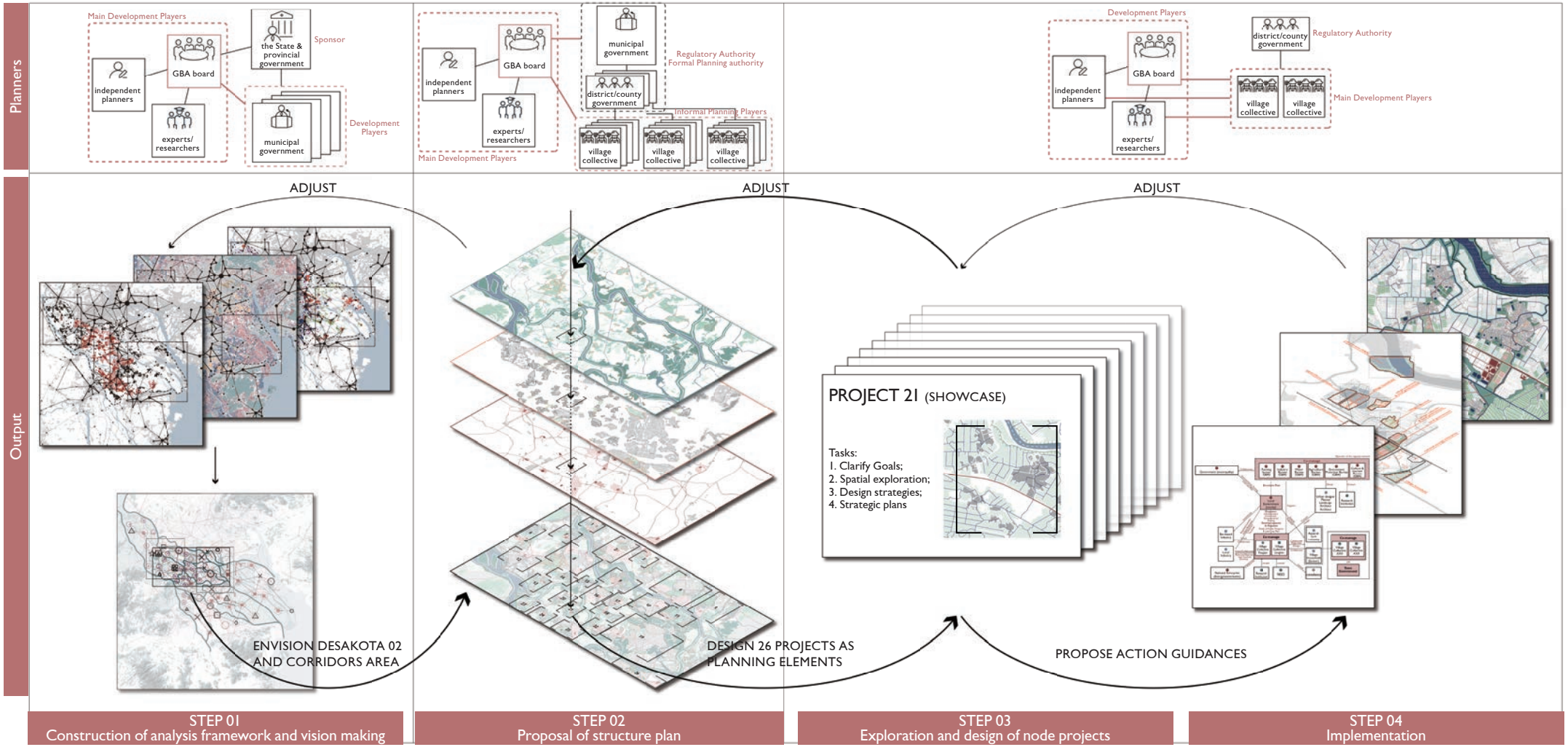
MAIN ACTORS:
GBA(the state) & Provincial government & Four seperate municipal governments

3. UNDERSTAND what development pattern and spatial qualities can this network achieve through formulating the potantial

4. ESTABLISH a spatial planning framework to adapt this network

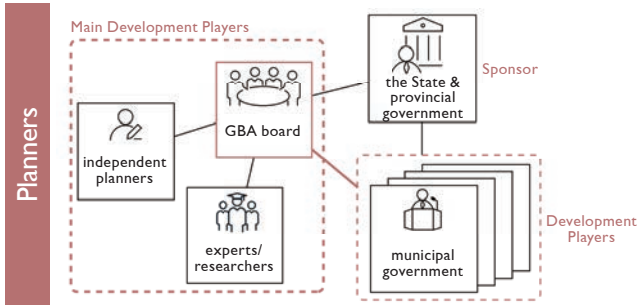
ESTABLISHING A FRAMEWORK

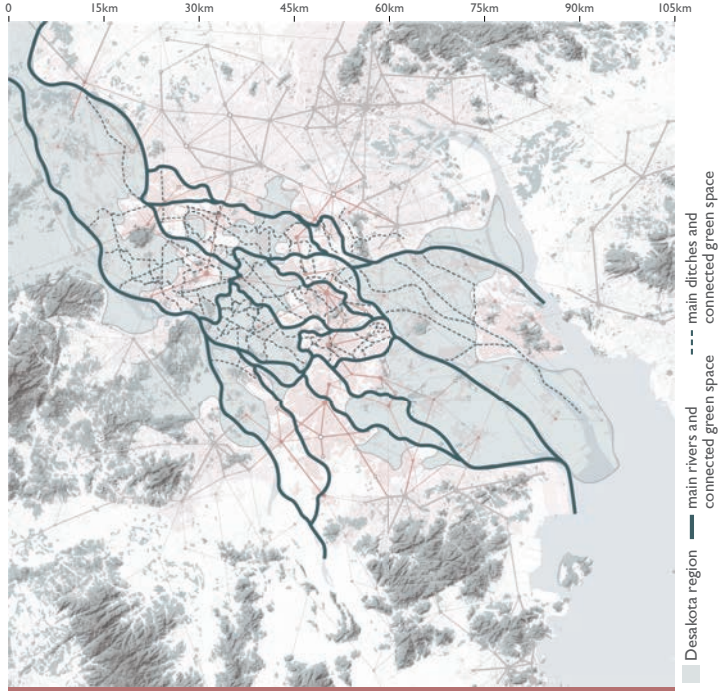
- Spatial Planning Framework of Sustainable Industry Transition in the Desakota



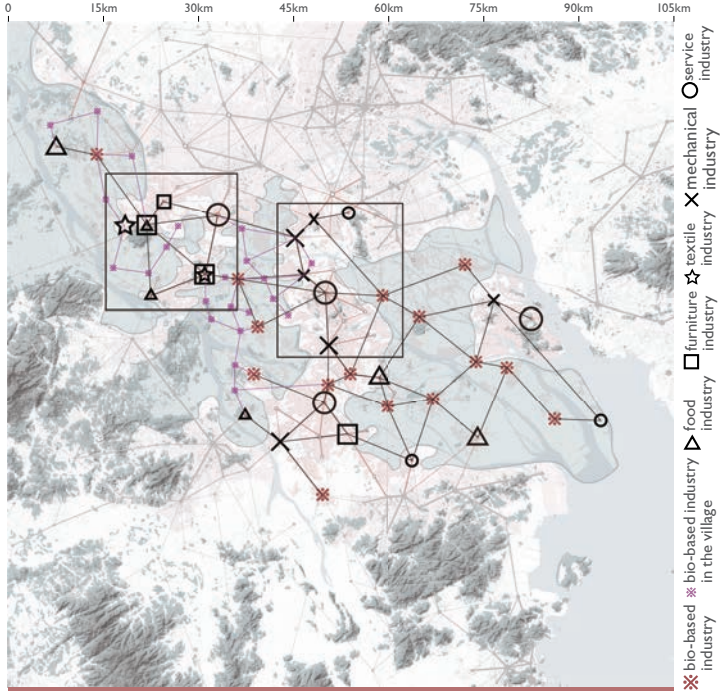
4. ESTABLISH a spatial planning framework to adapt this network

SYNTHESISING PRINCIPLES TO THE NETWORK STRUCTURE
- Step 01: Vision Making

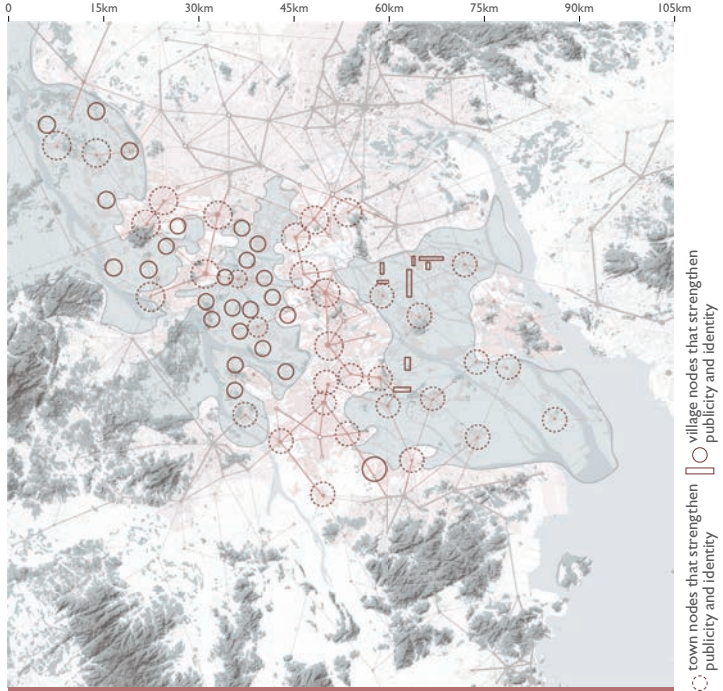




Vision 01: Ensure the continuity and share of green & blue network



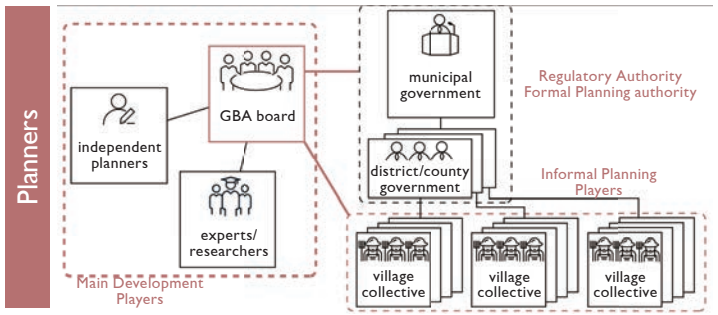
Vision 02: Develop symbiotic industrial network of eco-industrial parks

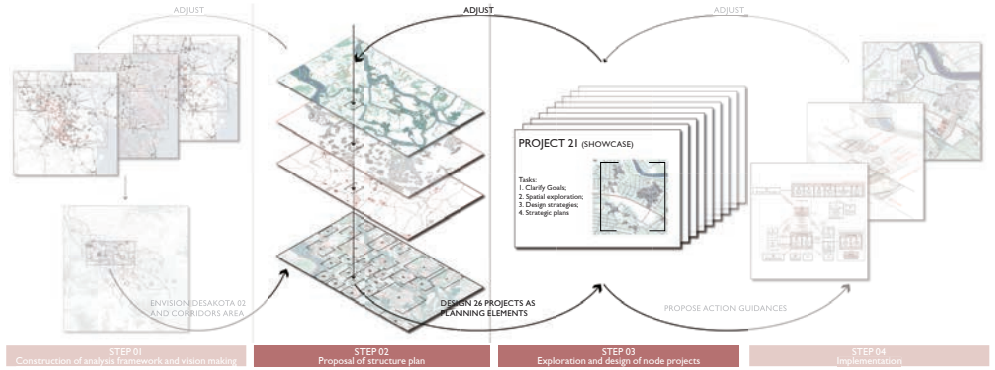


Vision 03: Facilitate identification and just metropolitan publicness of living environment

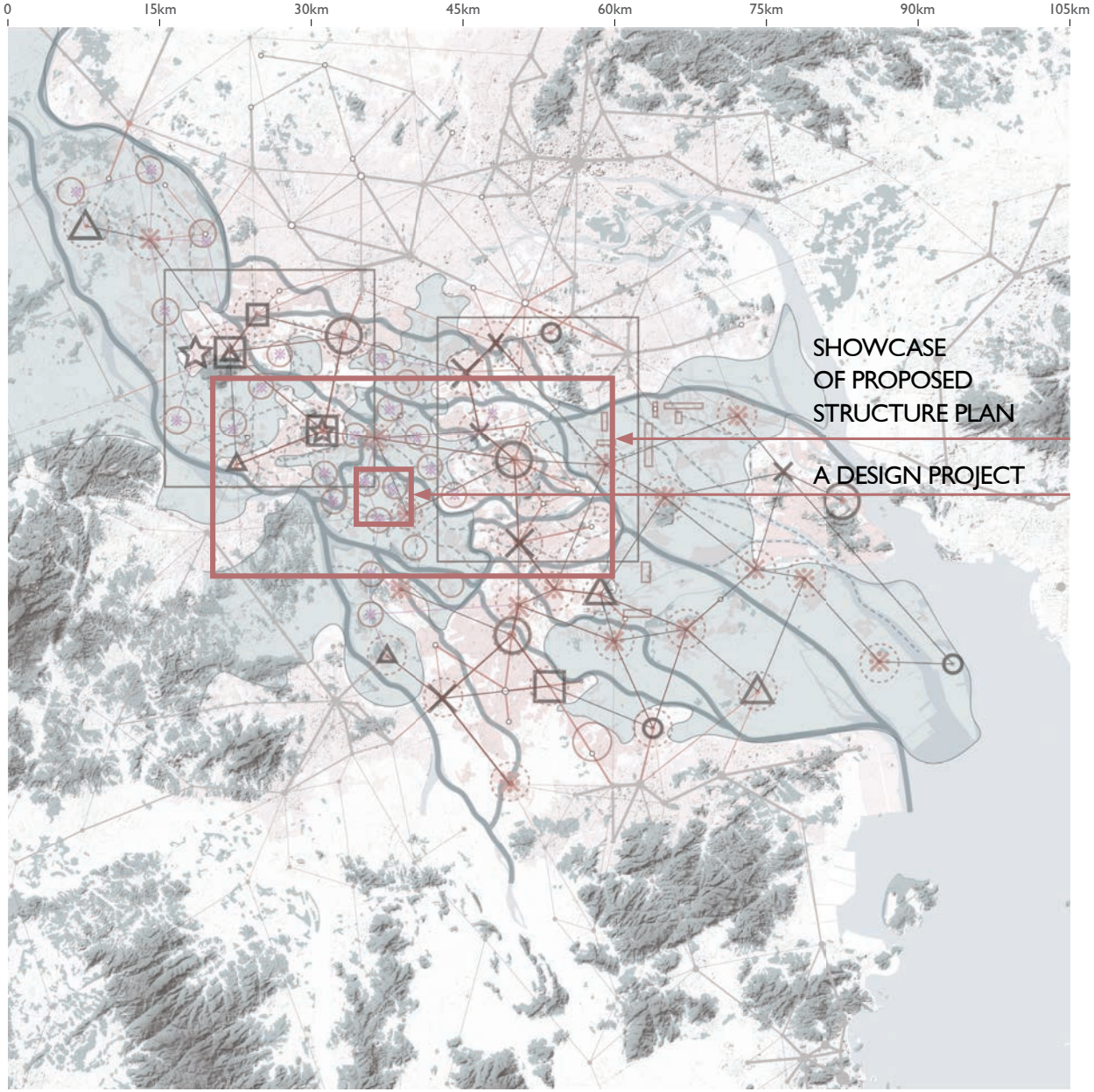
4. ESTABLISH a spatial planning framework to adapt this network

ENVISIONING DESAKOTA 02 AND CORRIDORS AREA
- Step 02: Proposal of Structure Plan



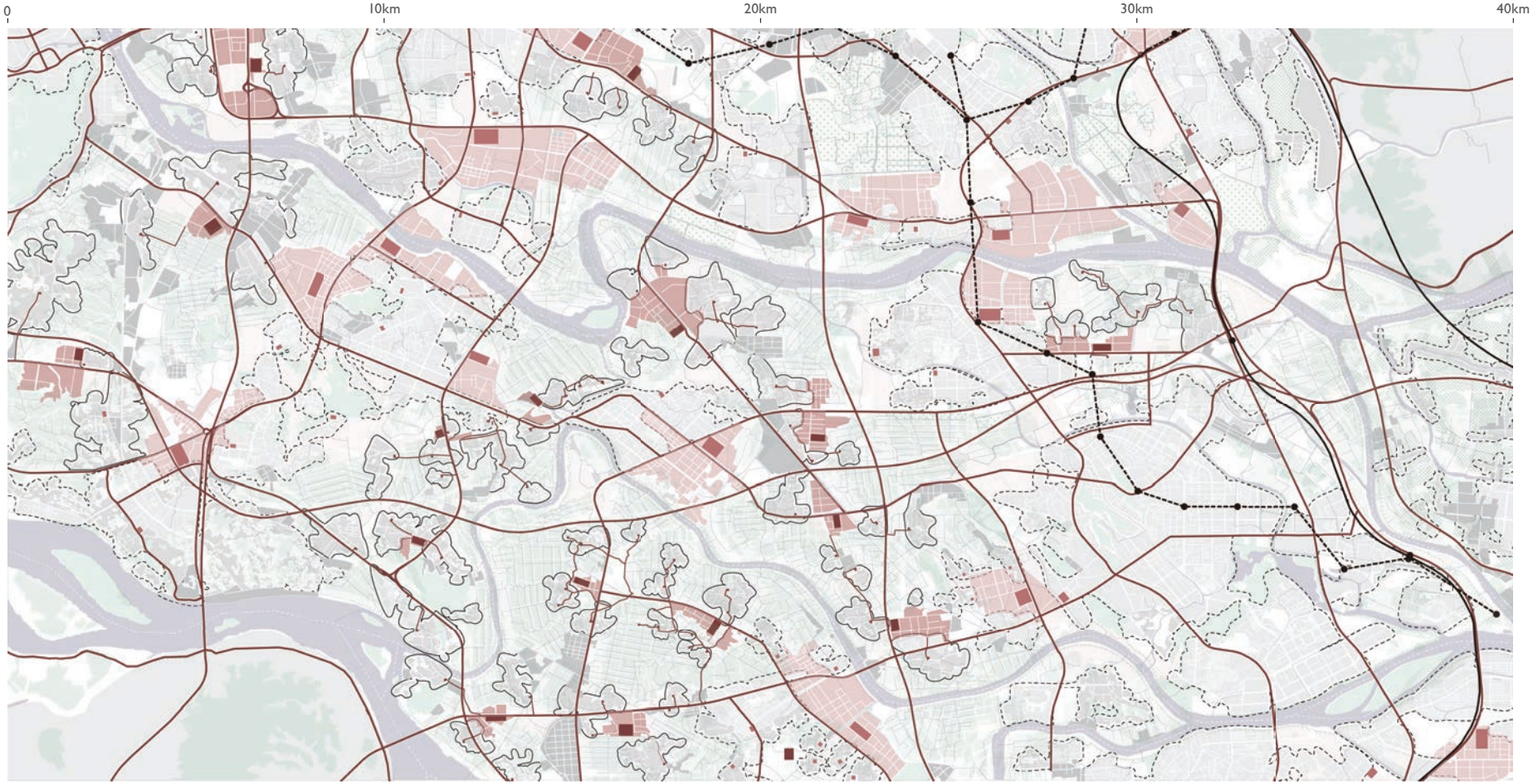


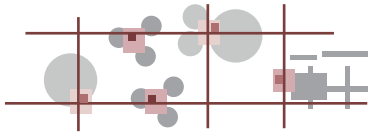
4. ESTABLISH a spatial planning framework to adapt this network



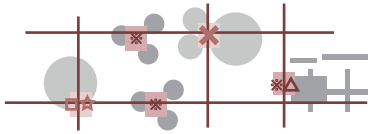
ENVISIONING DESAKOTA 02 AND CORRIDORS AREA

- Step 02: Industrial System of the Proposed Structure Plan





Decentral and synergic recycling hubs

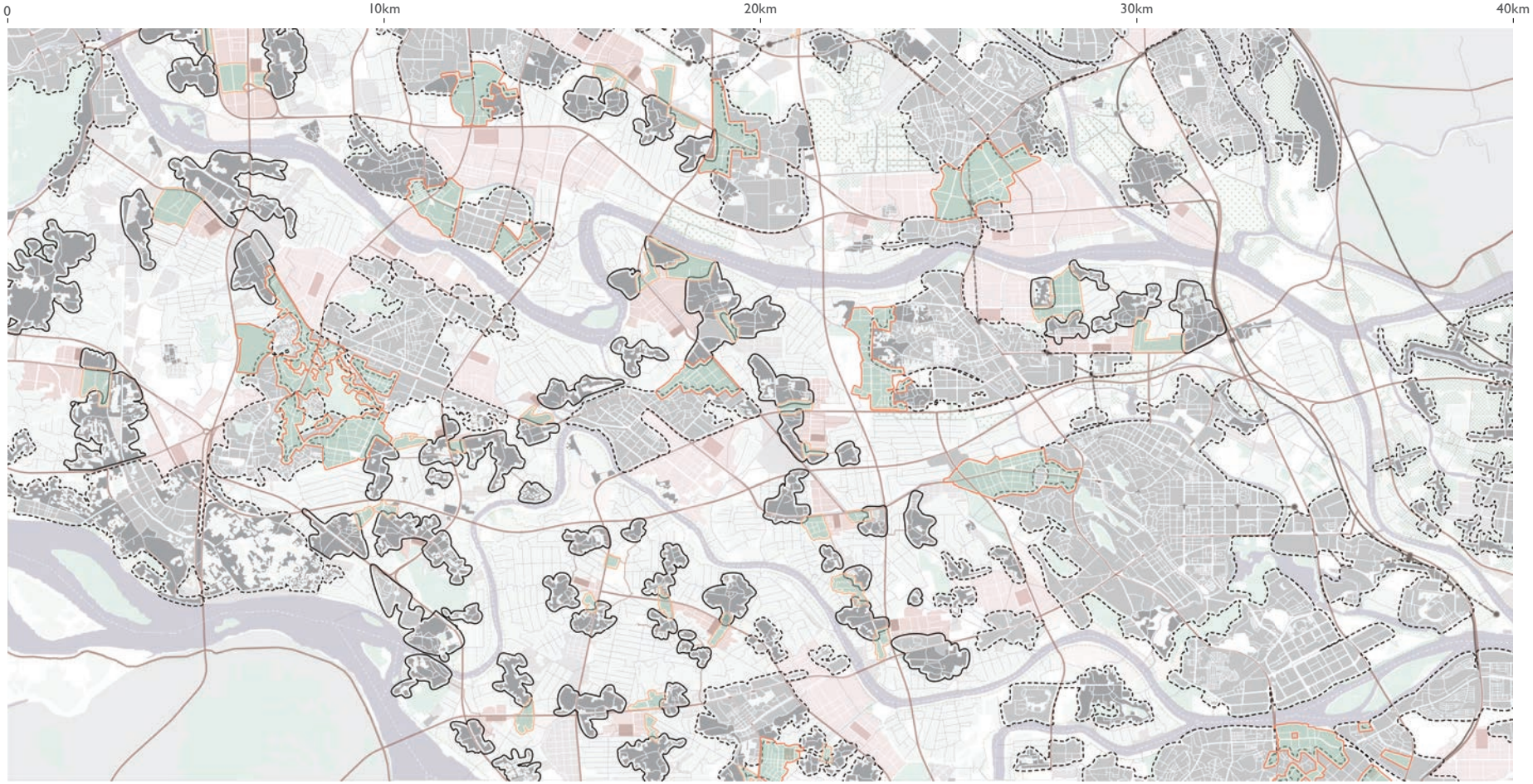


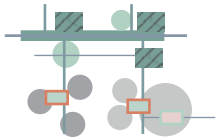
Promotion of competence field of industry and industry symbiosis based on the circular & bio-based transformation of waste, water, energy and raw material network

4. ESTABLISH a spatial planning framework to adapt this network

ENVISIONING DESAKOTA 02 AND CORRIDORS AREA

- Step 02: Living Environment of the Proposed Structure Plan

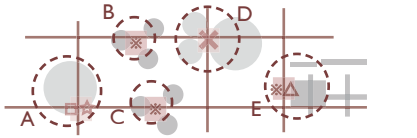




Reuse of industrial redundancy for landscape regeneration and publicness

Improvement of Desakota public space & public institutions & facilities

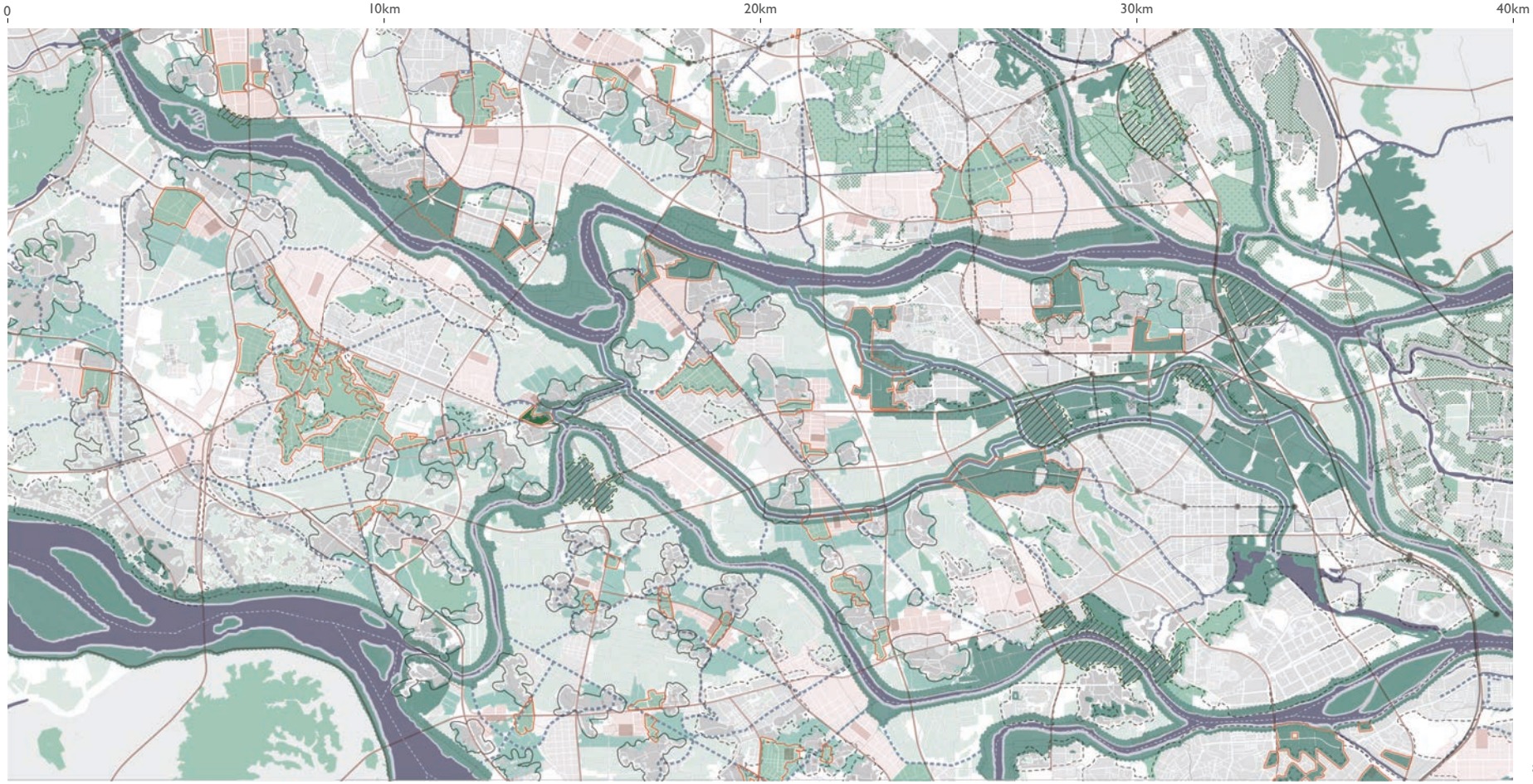
Identification of local settlement culture and nature through site-specific renewal strategy



Diversification of planning tools and empowerment of local governments (township) and village collectives

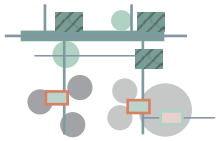
4. ESTABLISH a spatial planning framework to adapt this network

ENVISIONING DESAKOTA 02 AND CORRIDORS AREA
- Step 02: Landscape System of the Proposed Structure Plan

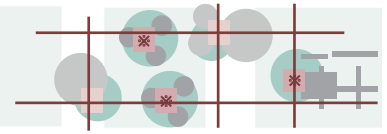


Enhancement of the green & blue network

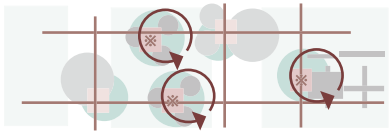
Nature restoration of main rivers, ditches



Reuse of industrial redundancy for landscape regeneration and publicness



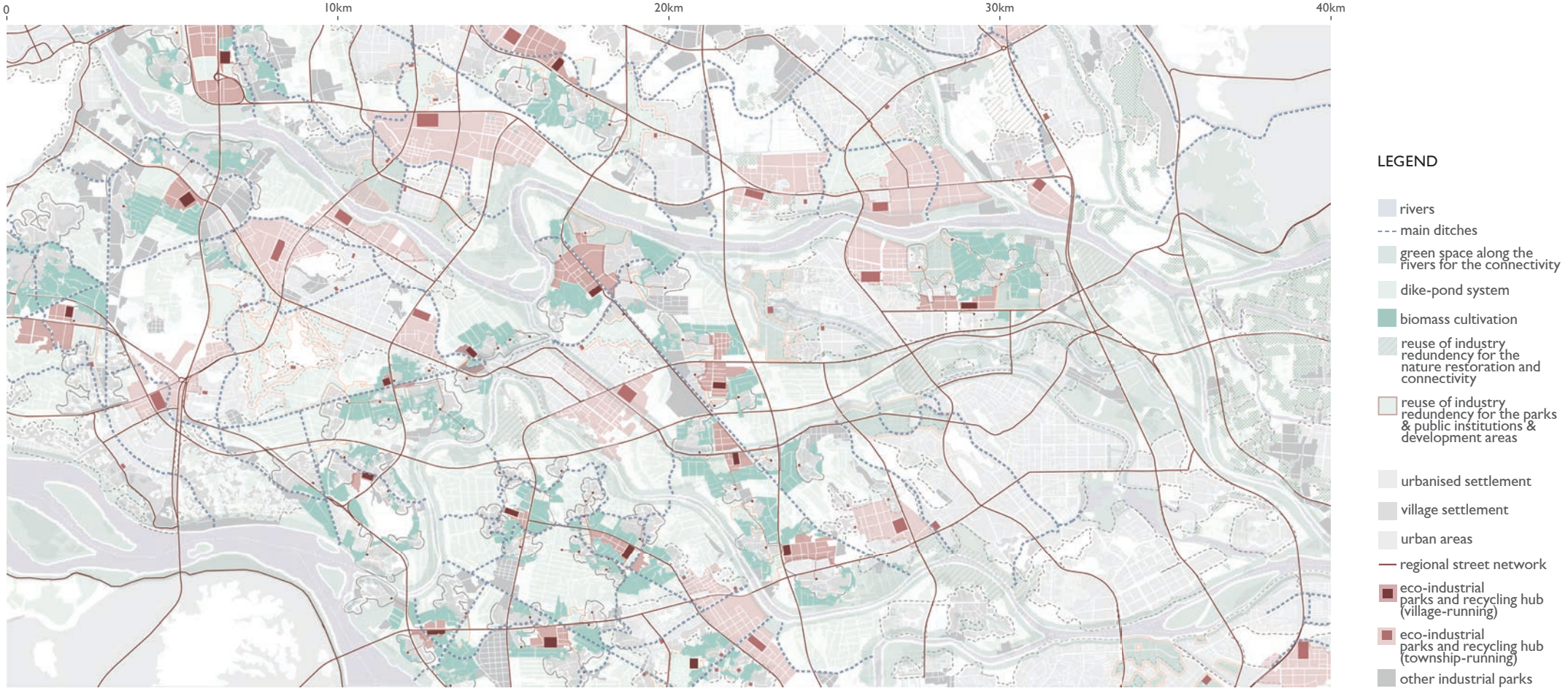
Collaboration of Industry and agriculture to increase the degree of self-sufficiency



Circular cascading of nutrients & energy in agricultural & auqacultural & industrial landscapes

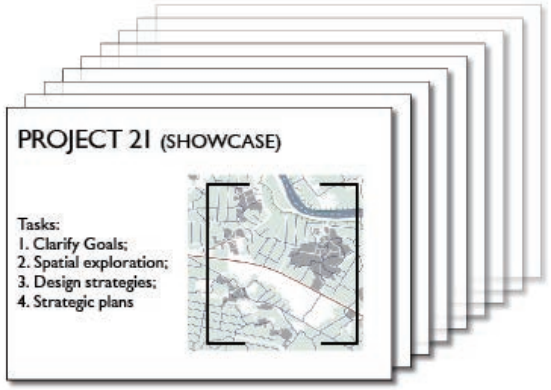
4. ESTABLISH a spatial planning framework to adapt this network

ENVISIONING DESAKOTA 02 AND CORRIDORS AREA
- Step 02: Proposal of Structure Plan



4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: A Showcased Design Project



Goals Defined in the Regional Scale

1. Select industrial parks as Eco-industrial park

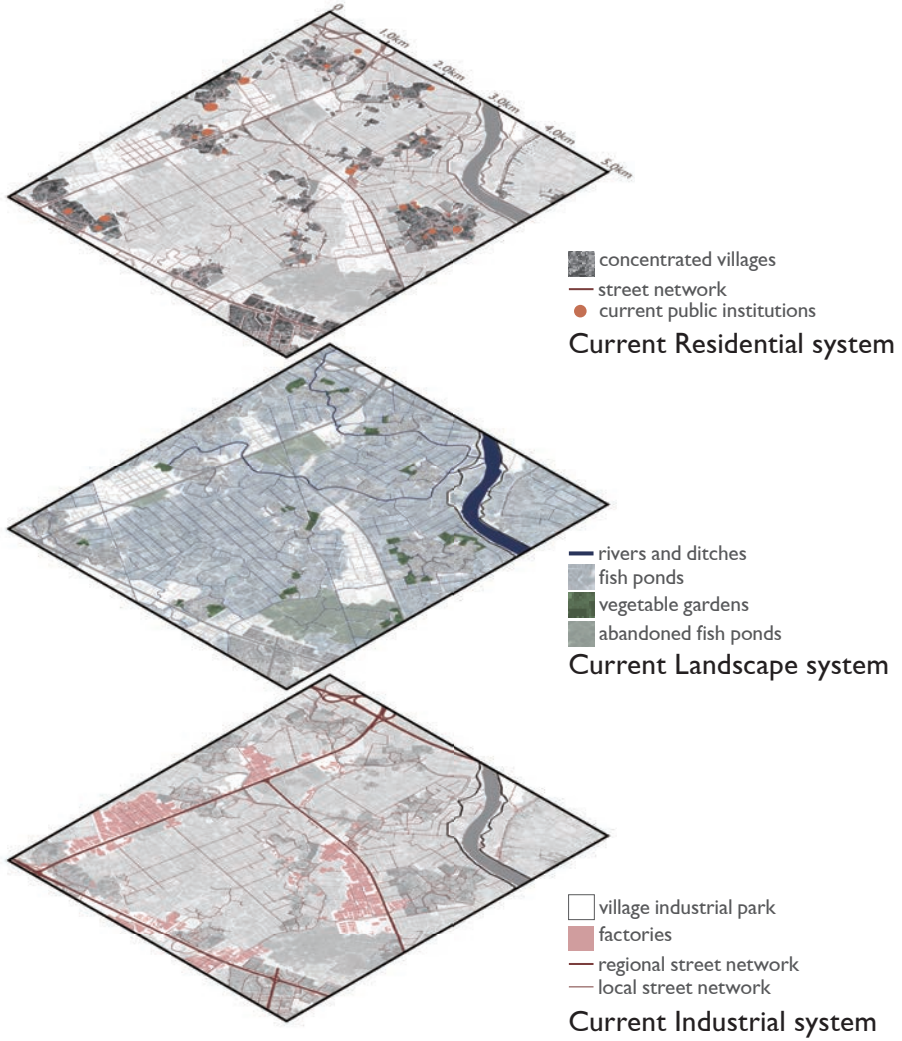
2. Establish resource circular flows between industry and agriculture

3. Choose appropriate industrial spaces to enhance the quality of life

4. Restore the ecology of rivers, main ditches and fish pond landscape

5. Ensure the operation of circularity by a localised governance strategy

LOCATION OF DESIGN PROJECT



4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- **Step 03: Spatial Exploration of the Showcased Design Project**


Hardened dike of the rivers

Ditches between fish ponds

Vegetable garden in the village

Dike- fish pond system

Vegetable garden along the fish ponds

Axis view display of landscape system

4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- **Step 03: Spatial Exploration of the Showcased Design Project**

Residential building

Cultural building used as leisure place

Sports ground and square

Corner space for outdoor activities

Vegetable garden around Fengshui pond

Axis view display of residential system

4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT

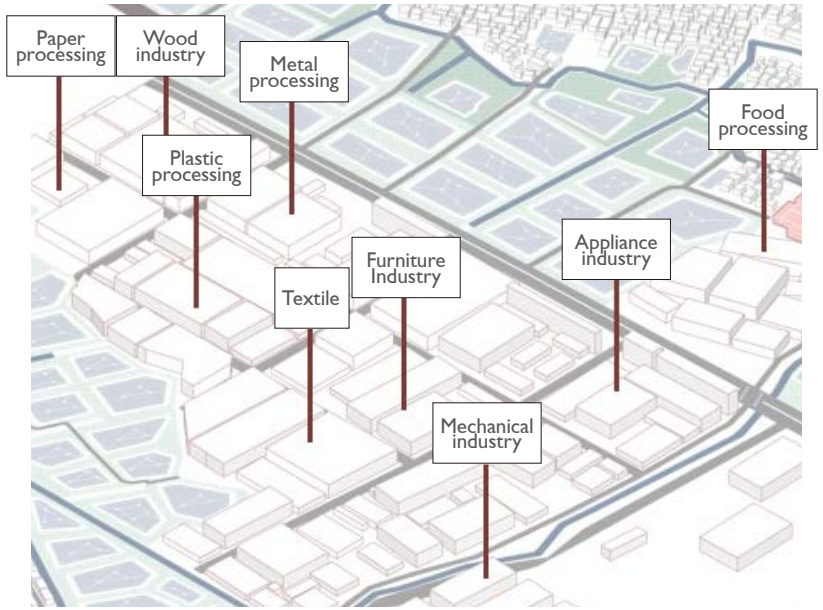
- Step 03: Spatial Exploration of the Showcased Design Project

The industrial park

Polluted ditches around the factories

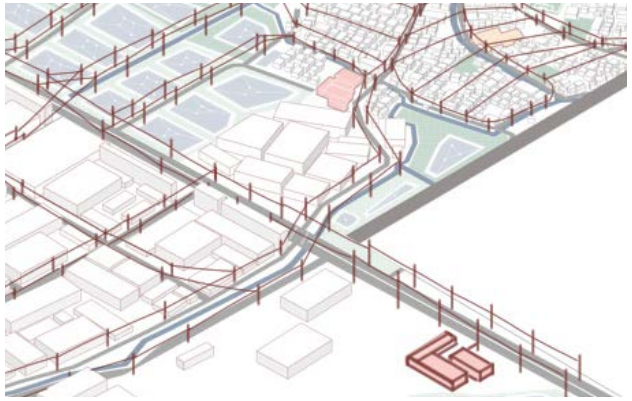
Cable setting in the fish pond

Village factories and motorised street

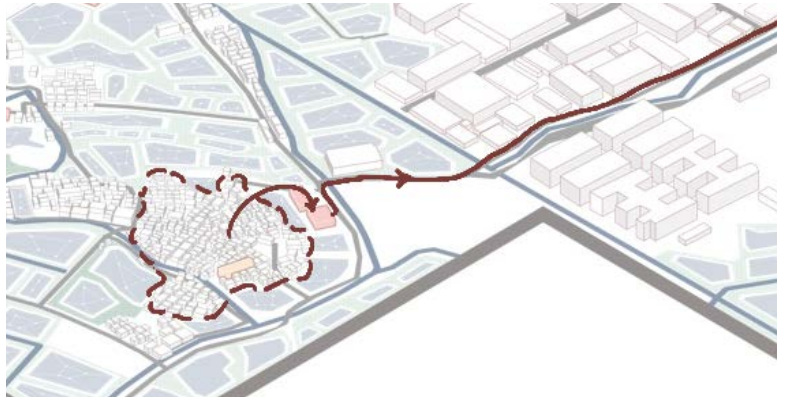


Axis view display of the industrial park

Sewer and water pipes



Power supply network and substation



Household waste collection

4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Spatial & Functional Strategies of the Showcased Design Project

Proposed industrial network

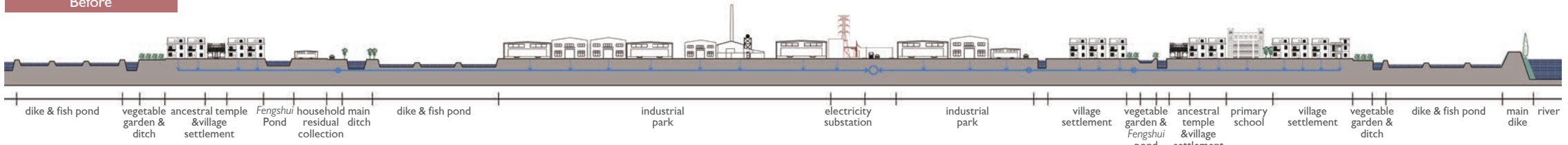
Proposed public network

Proposed landscape network

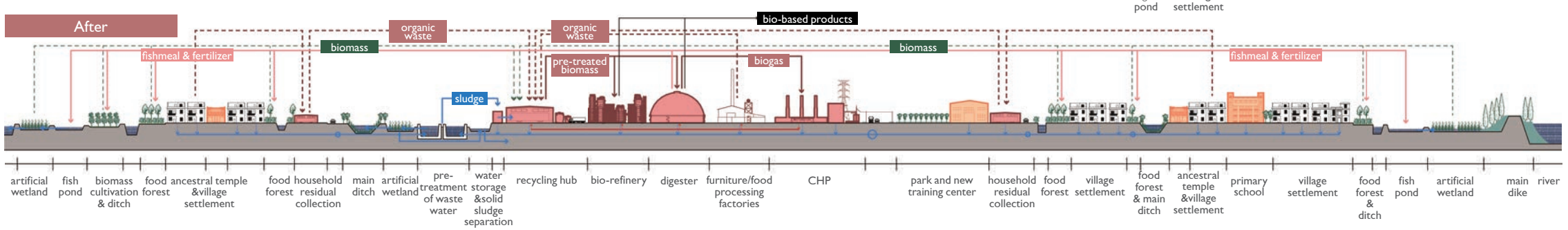
+

material flow of bio-based industries
flow of nutrients in waters
flow of biogas residue
main flow of biomass
flow of organic waste from household and industries
flow of heating
flow of bio-based products to other areas

Before



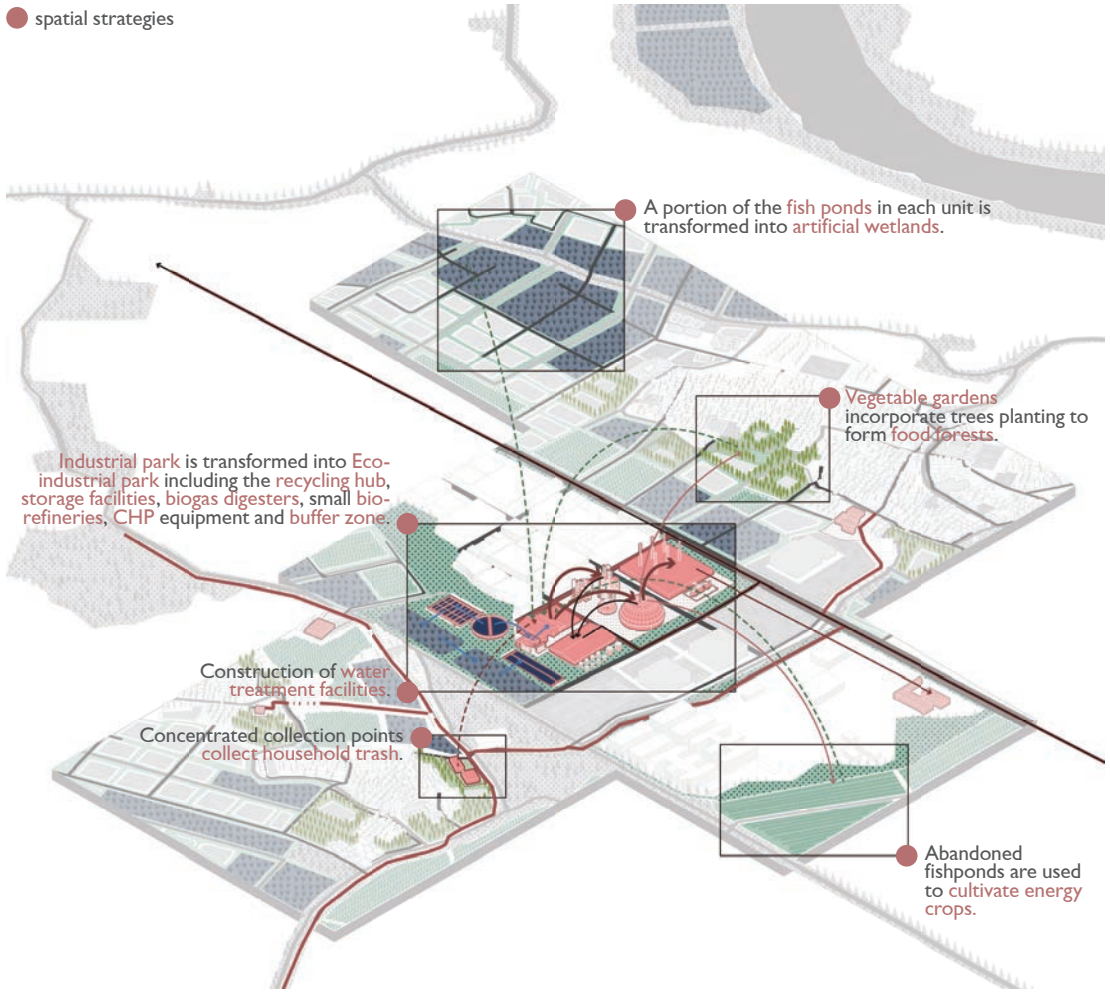
After

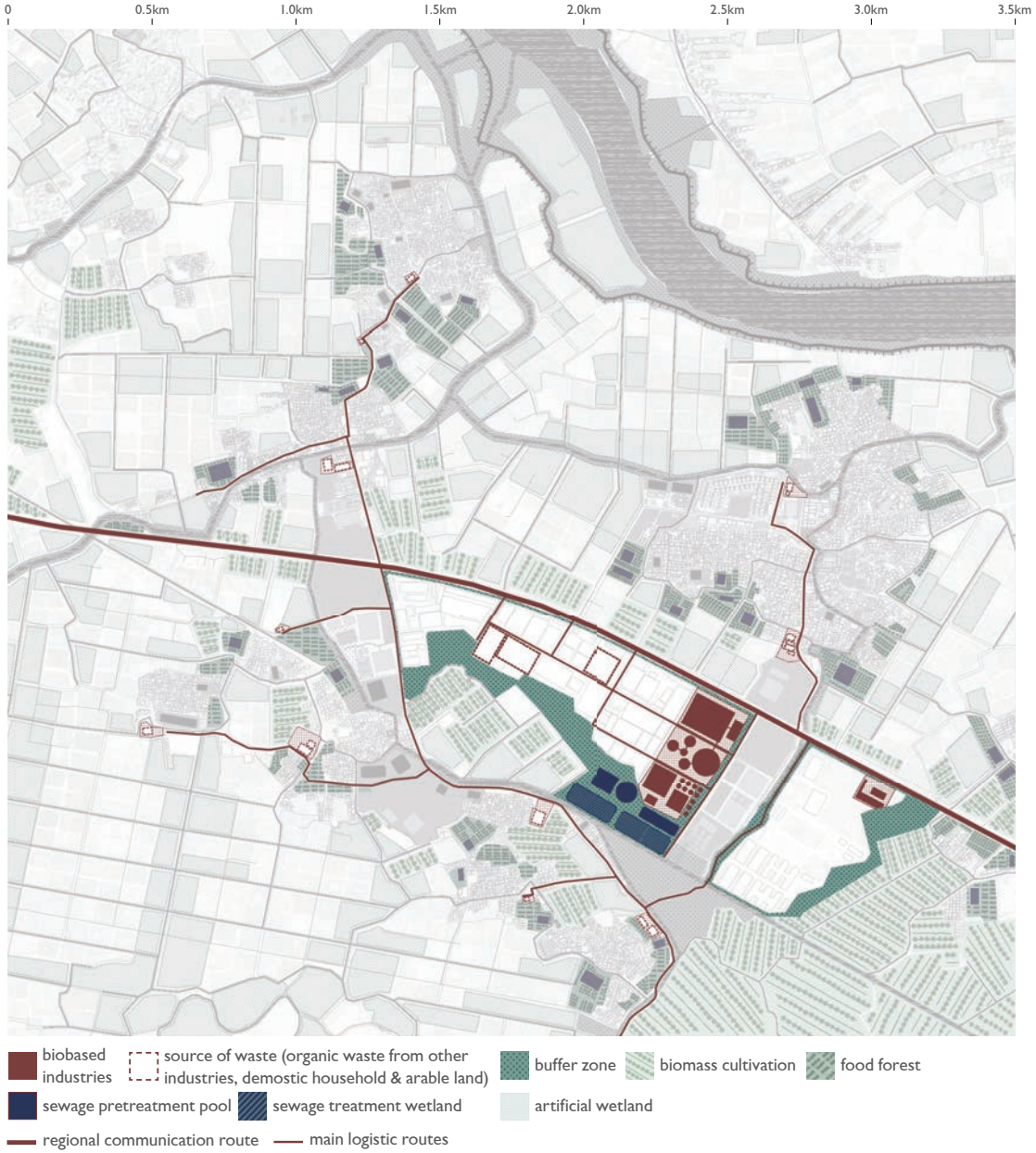


4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 01: SYMBICTIC INDUSTRIAL DEVELOPMENT

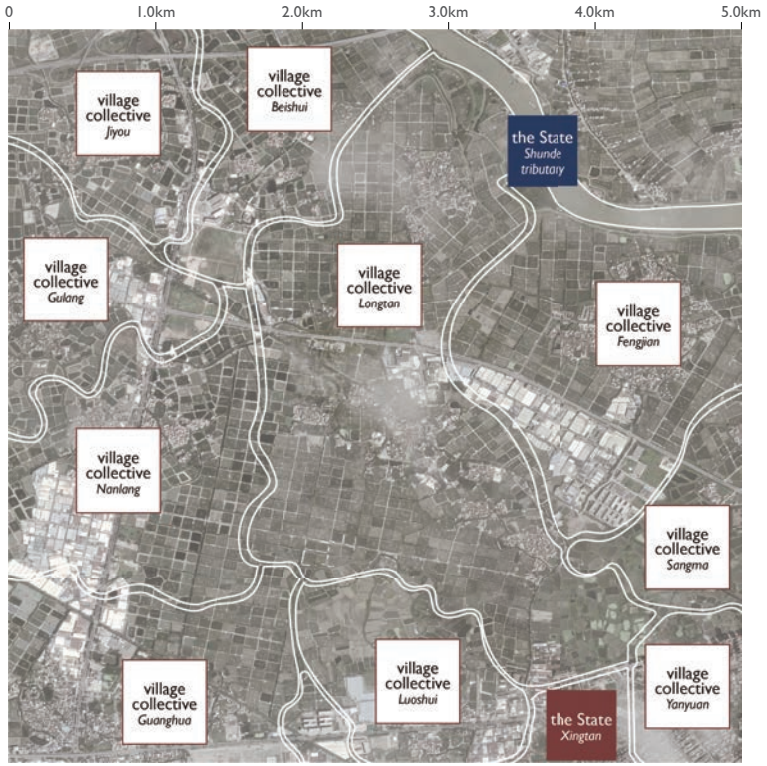




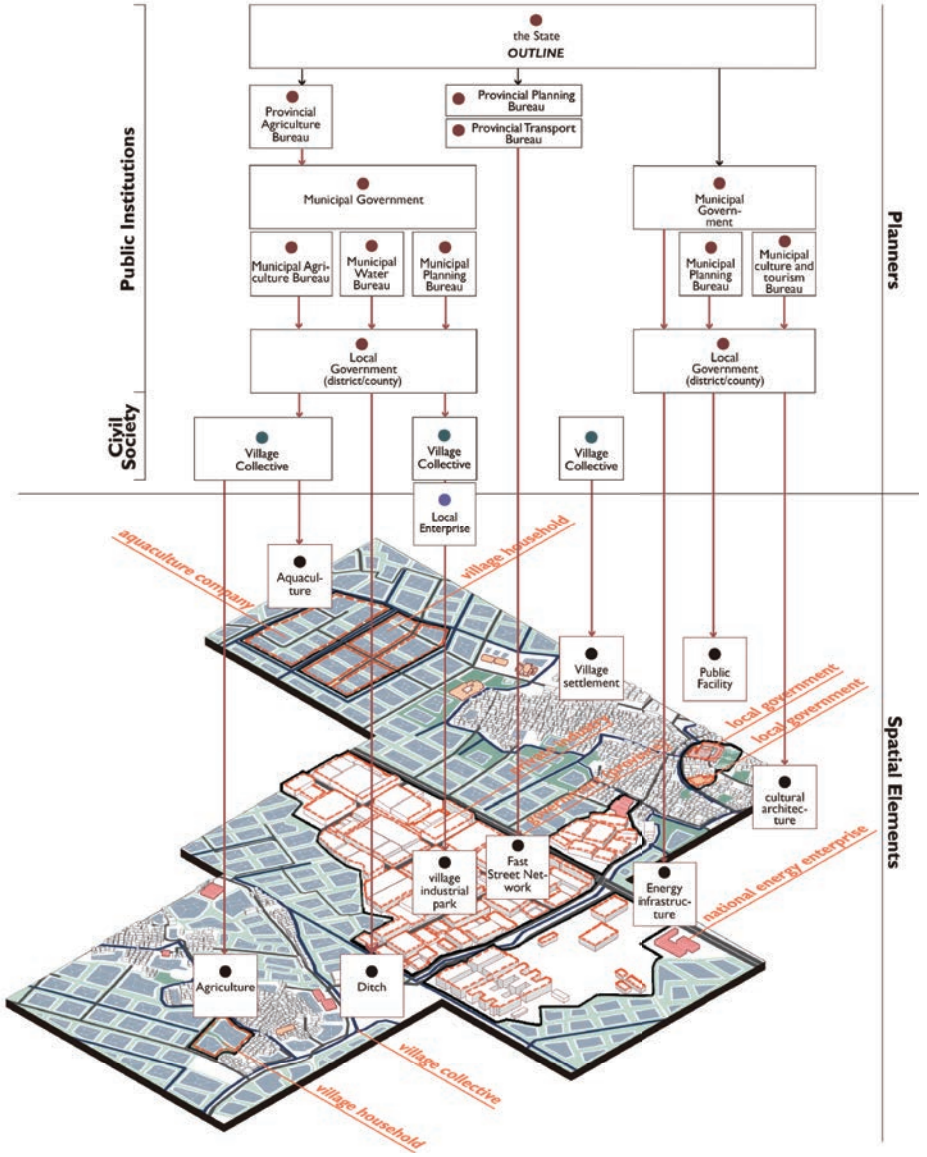
4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT

- **Step 03: Governance Analysis of the Showcased Design Project**



Land Ownership

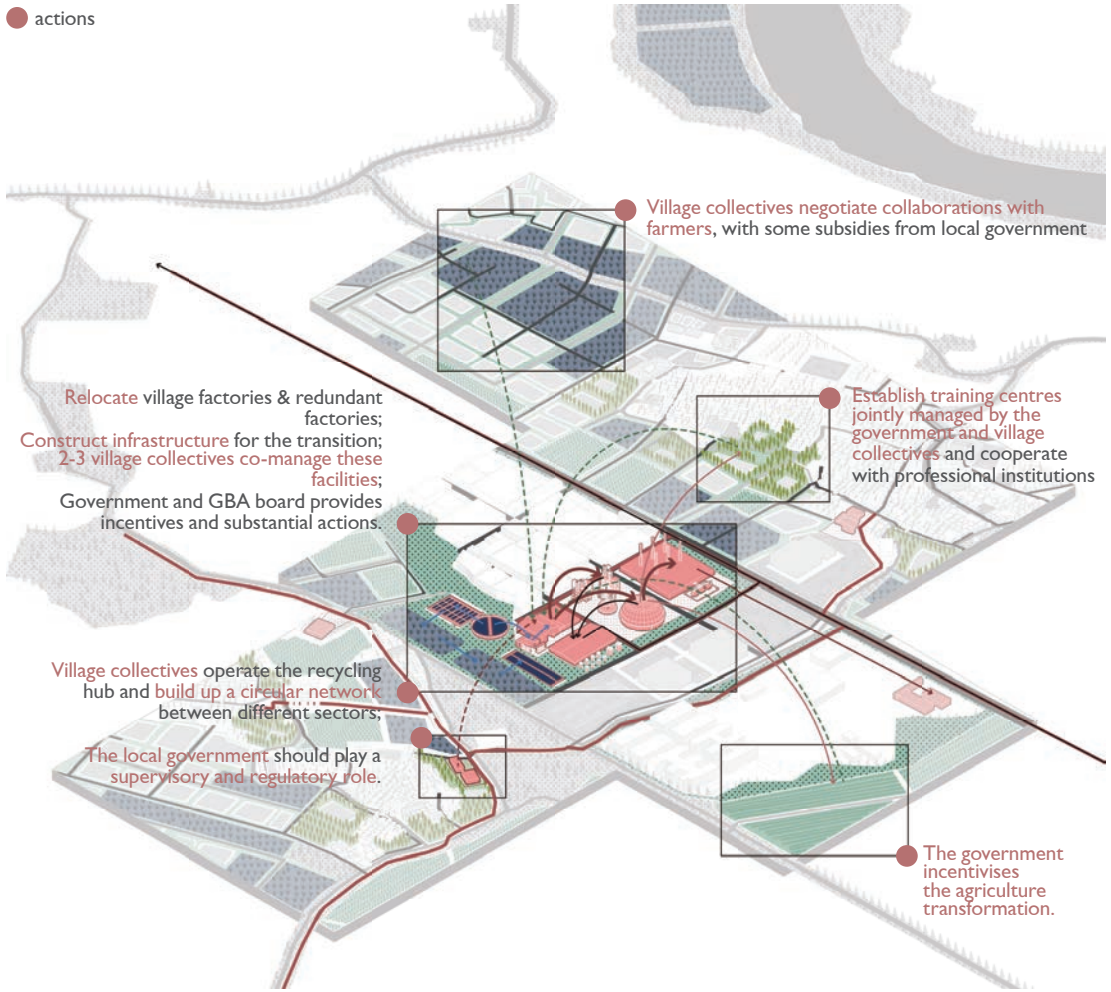


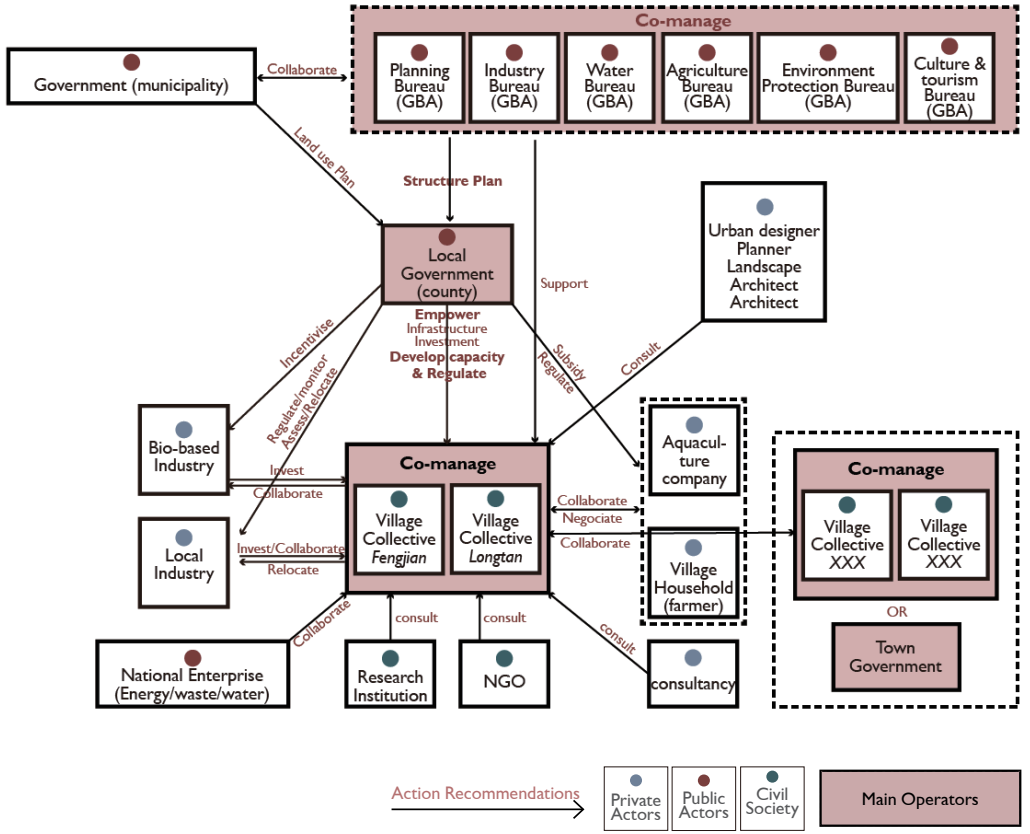
Planners & Operators of Each Element

4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 01: SYMBICTIC INDUSTRIAL DEVELOPMENT

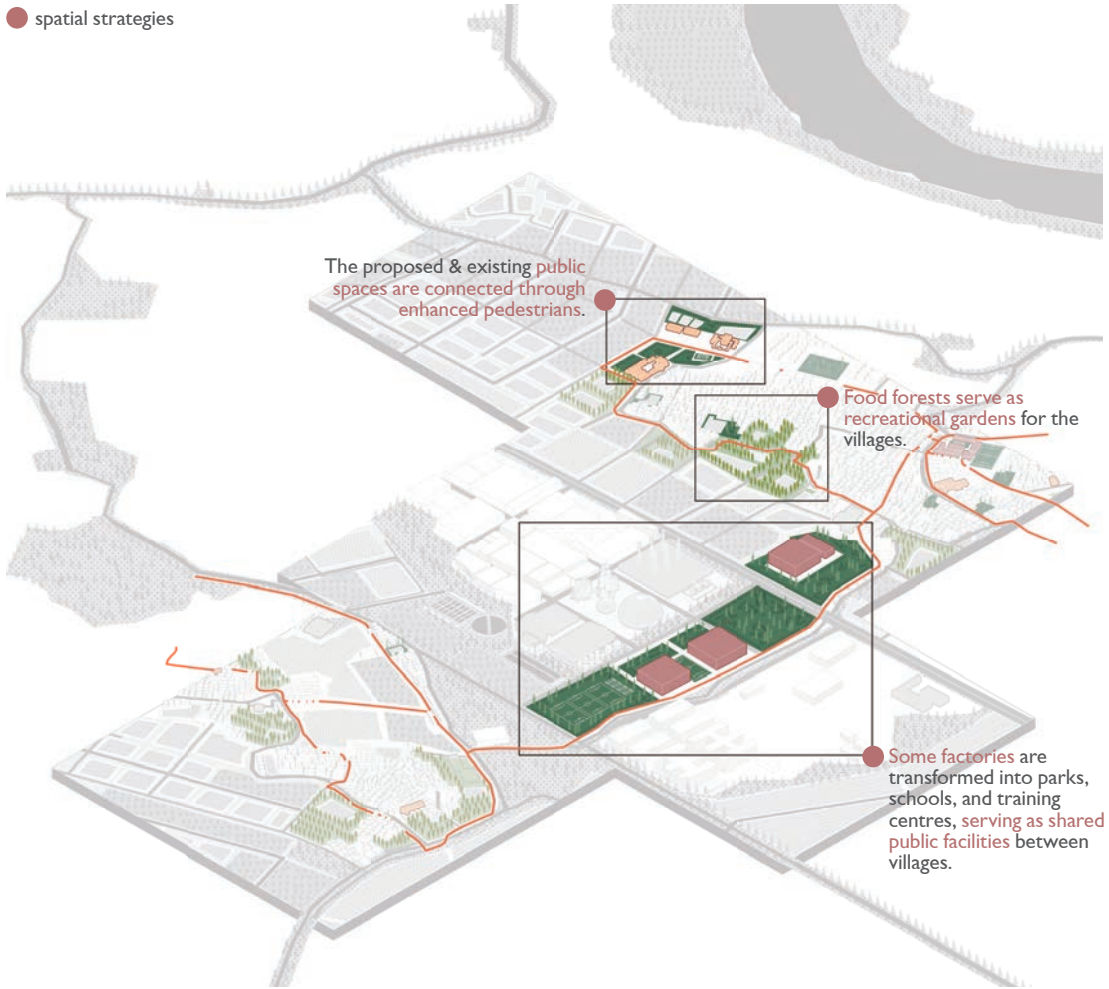


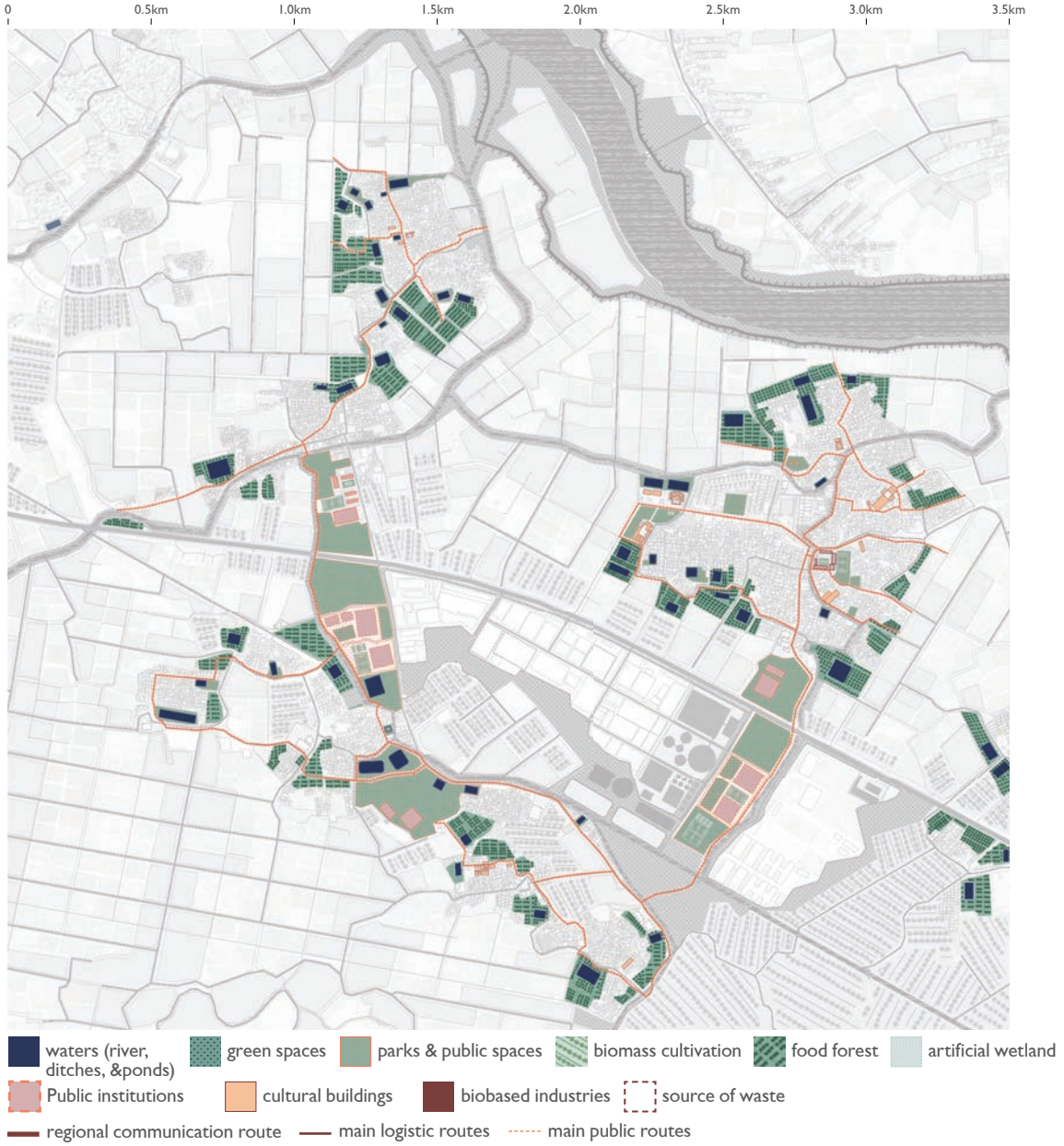


4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 02: IMPROVEMENT OF PUBLIC FACILITIES AND PUBLIC SPACES

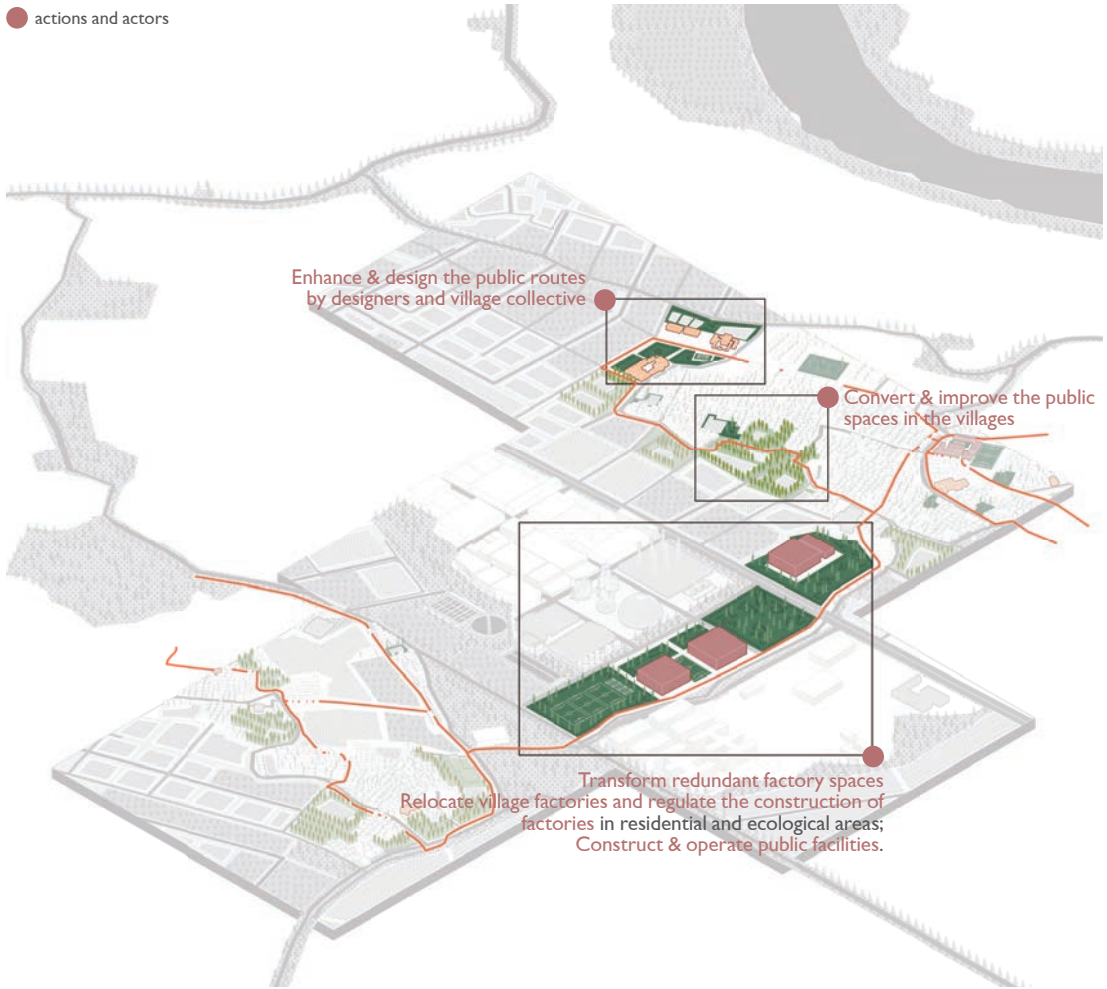


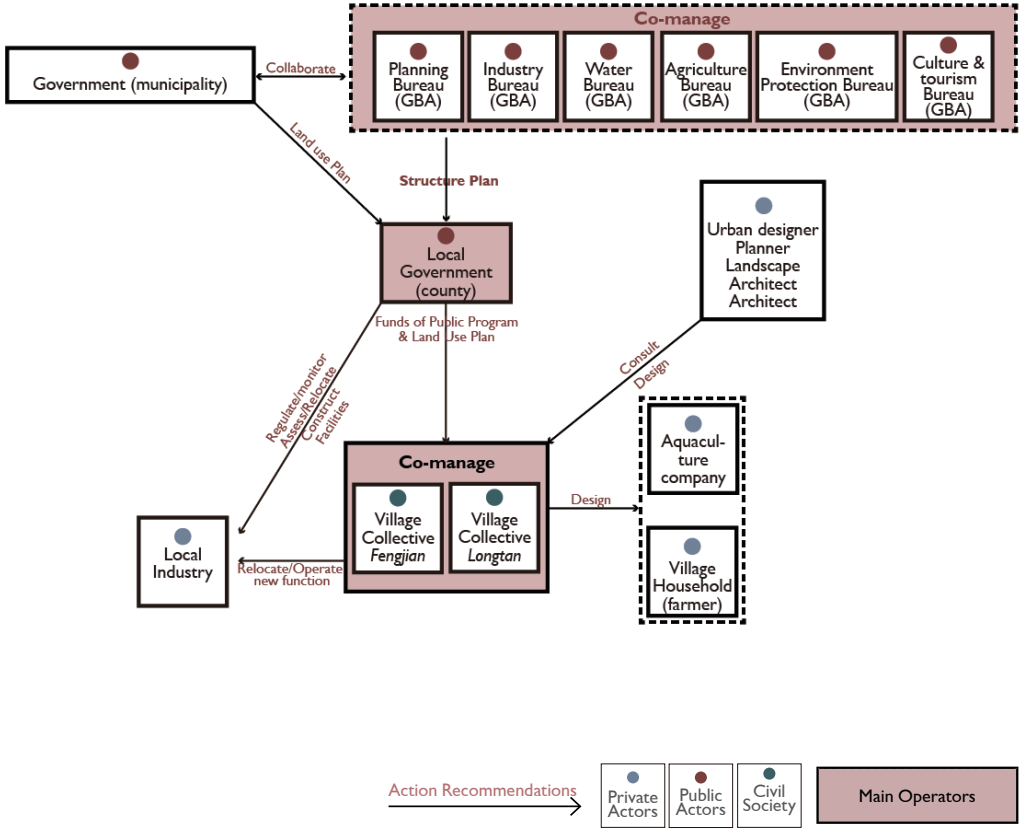


4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 02: IMPROVEMENT OF PUBLIC FACILITIES AND PUBLIC SPACES

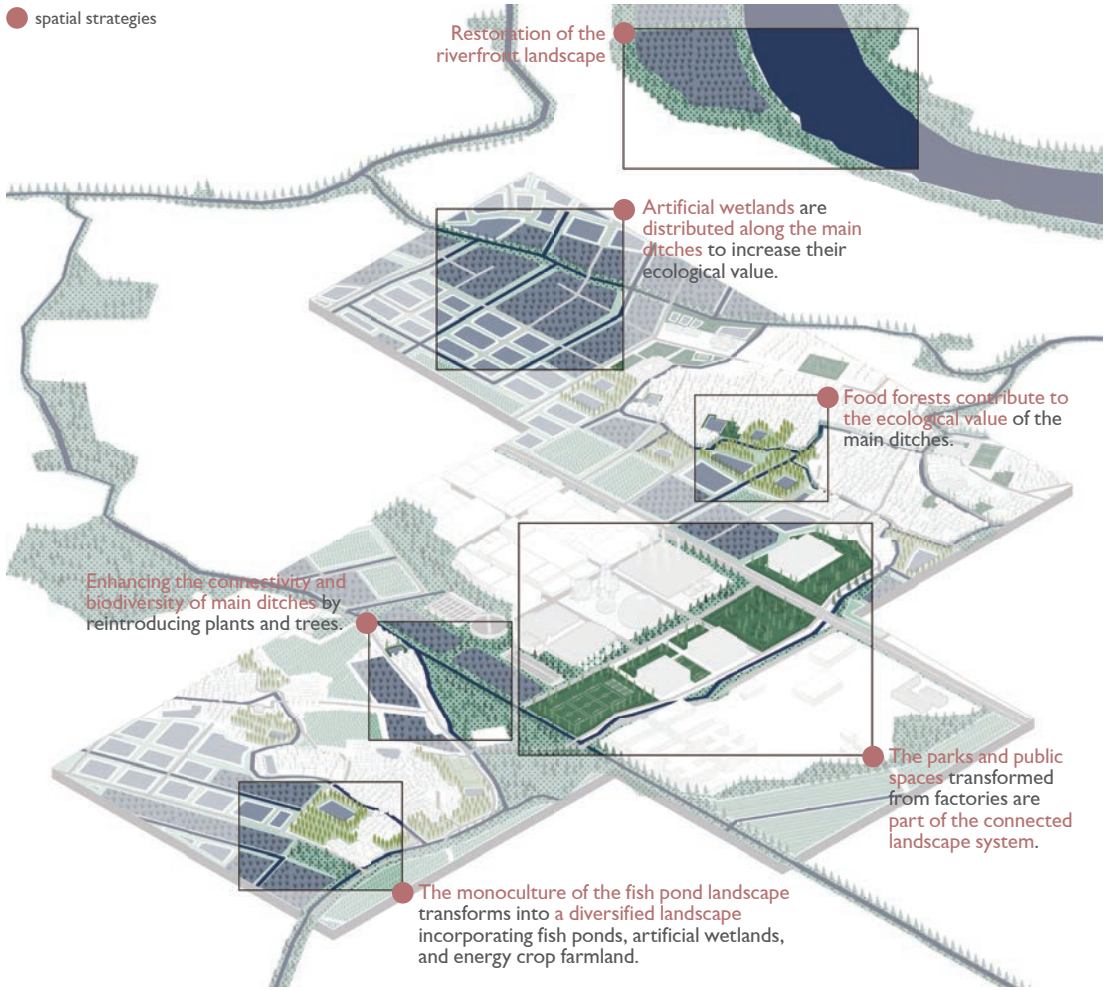


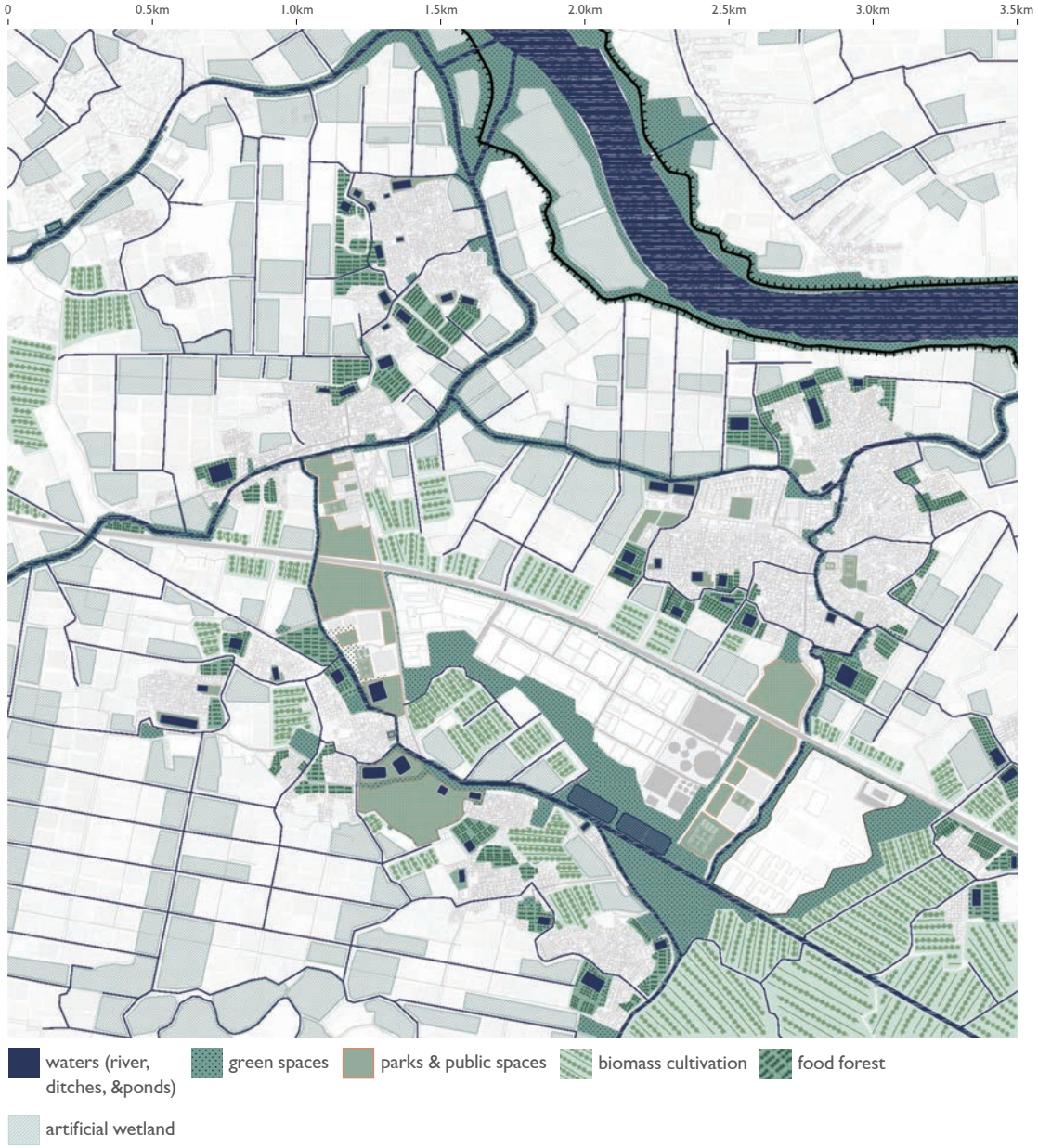


4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 03: ENHANCEMENT OF GREEN & BLUE NETWORK

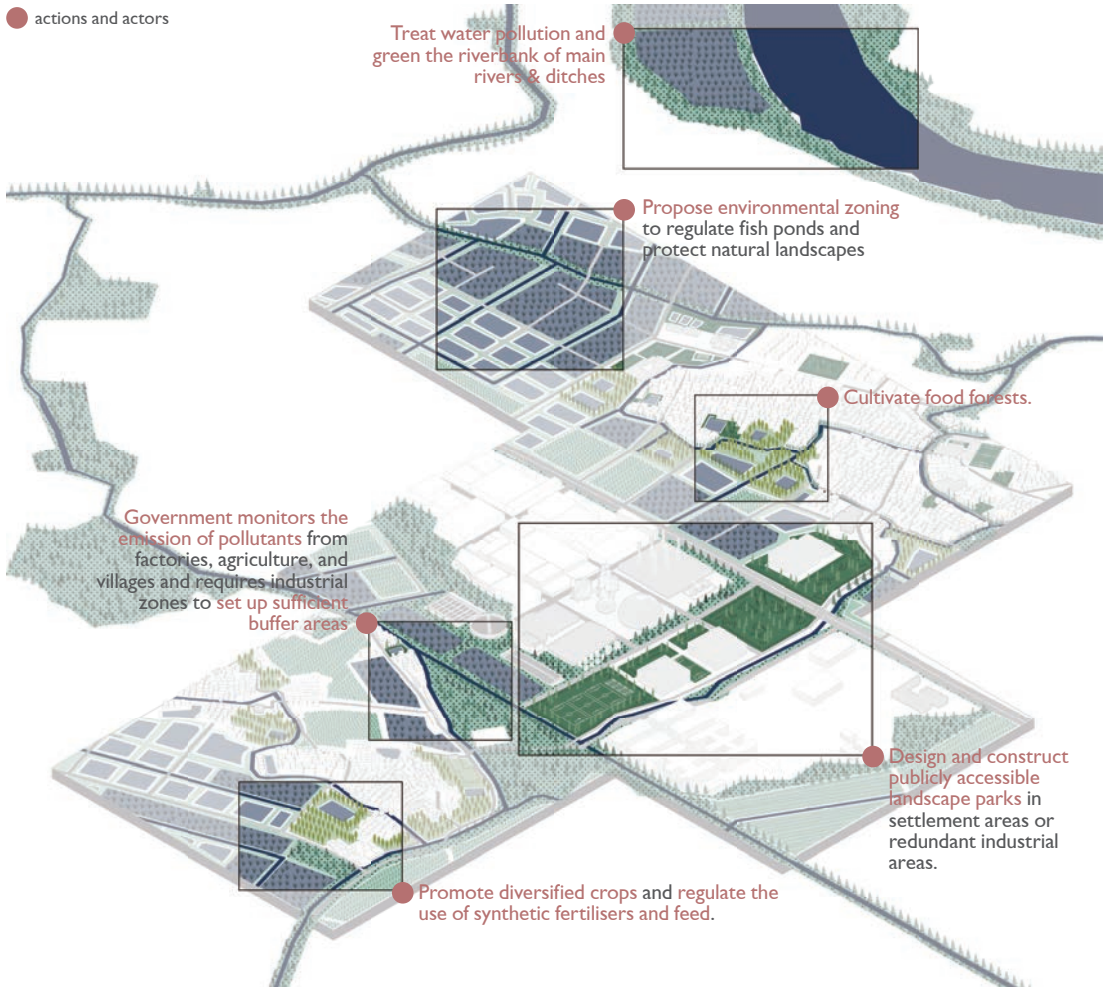


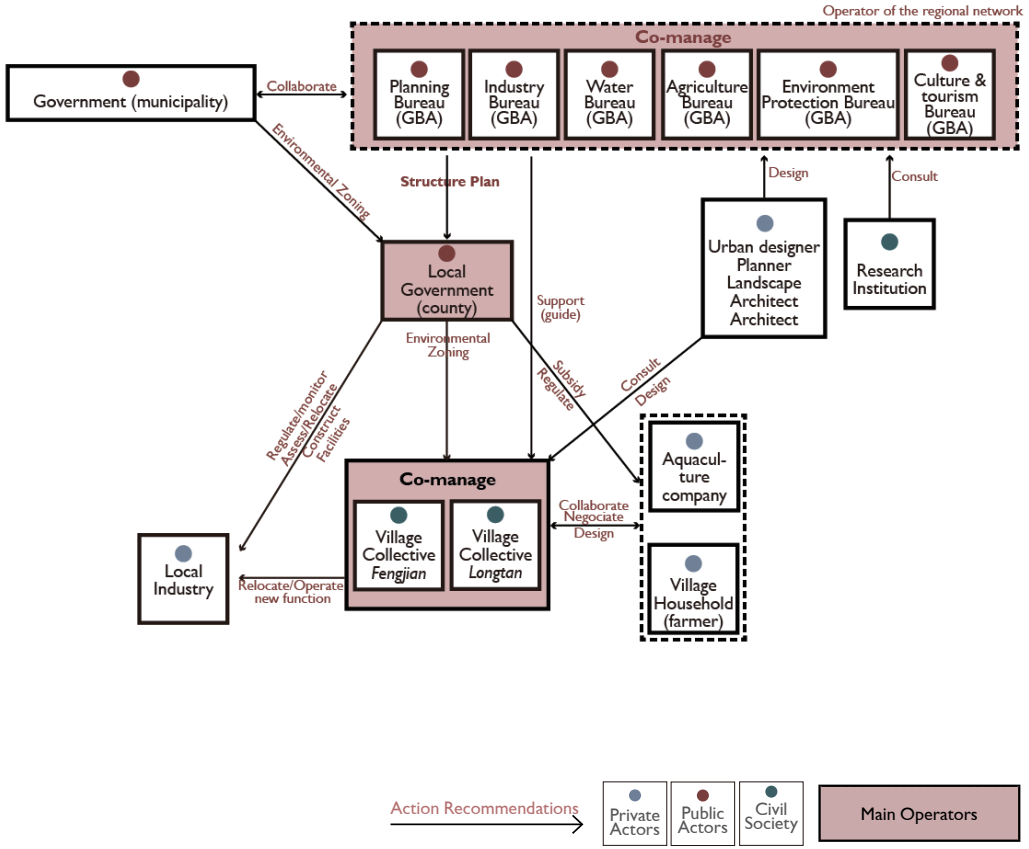


4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- Step 03: Demonstration of Design Strategies

GOAL 03: ENHANCEMENT OF GREEN & BLUE NETWORK

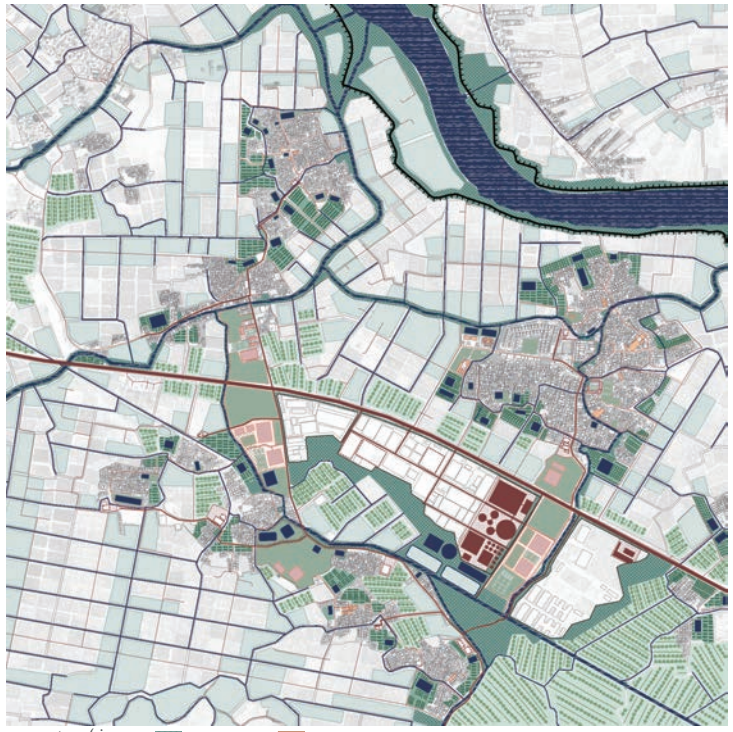




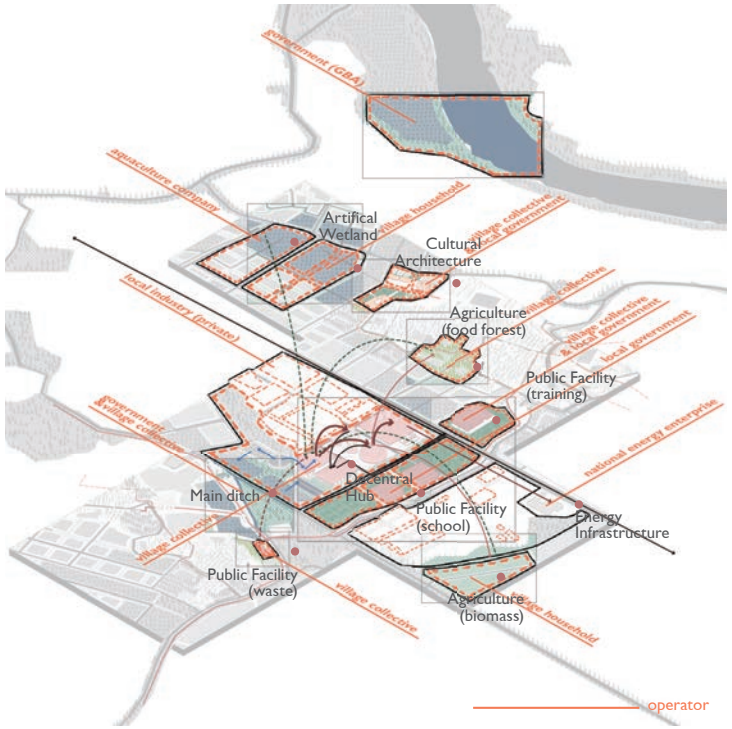
4. ESTABLISH a spatial planning framework to adapt this network

DESIGNING PROJECT AS A PLANNING ELEMENT
- **Step 03: Stractegic Outcomes （Implementation Guidance)**

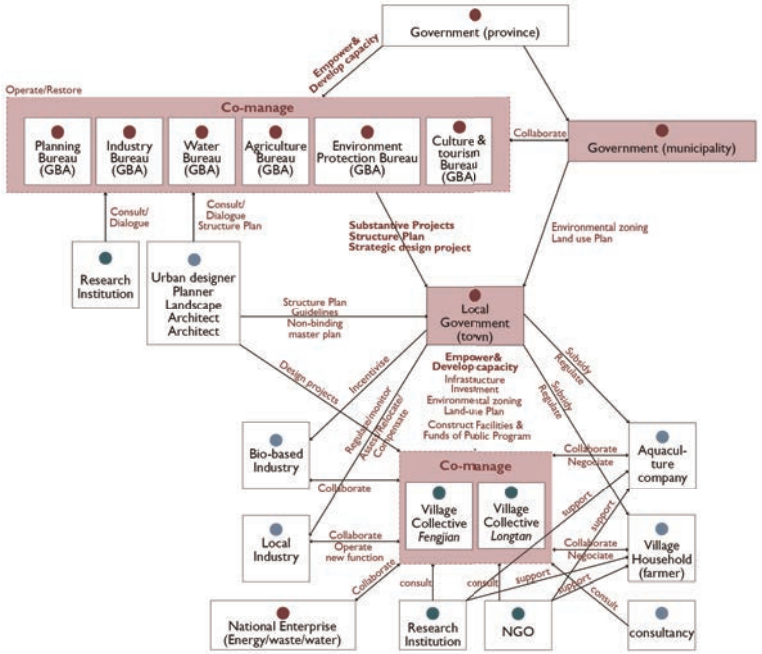
STRATEGIC PLANNING 01 - MASTER PLAN



STRATEGIC PLANNING 02 - SYSTEMATIC DIAGRAM

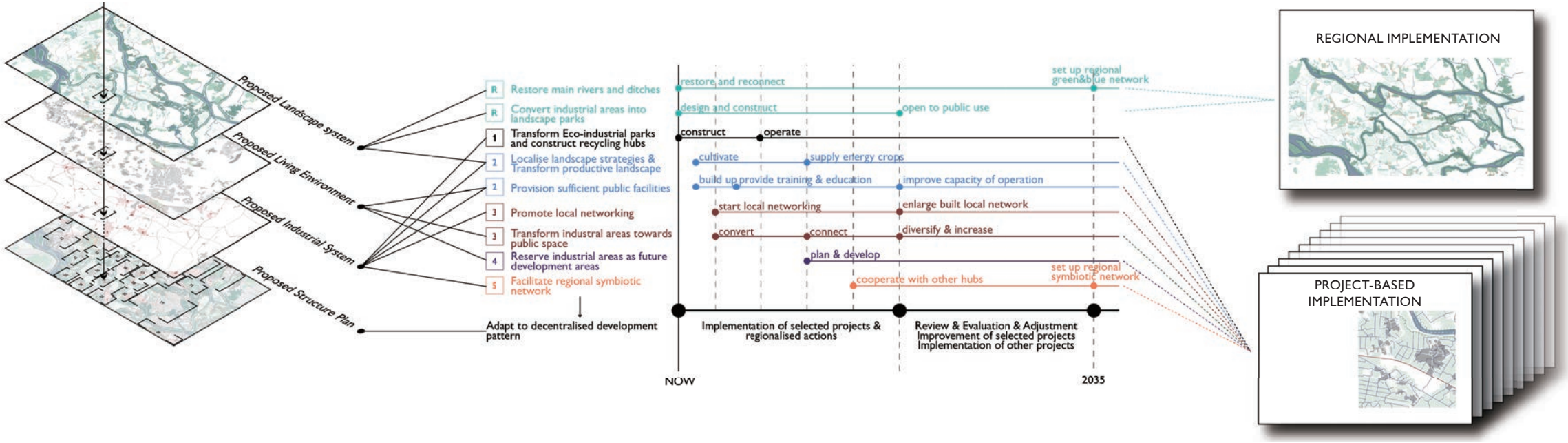


STRATEGIC PLANNING 03 - GOVERNANCE STRUCTURE



4. ESTABLISH a spatial planning framework to adapt this network

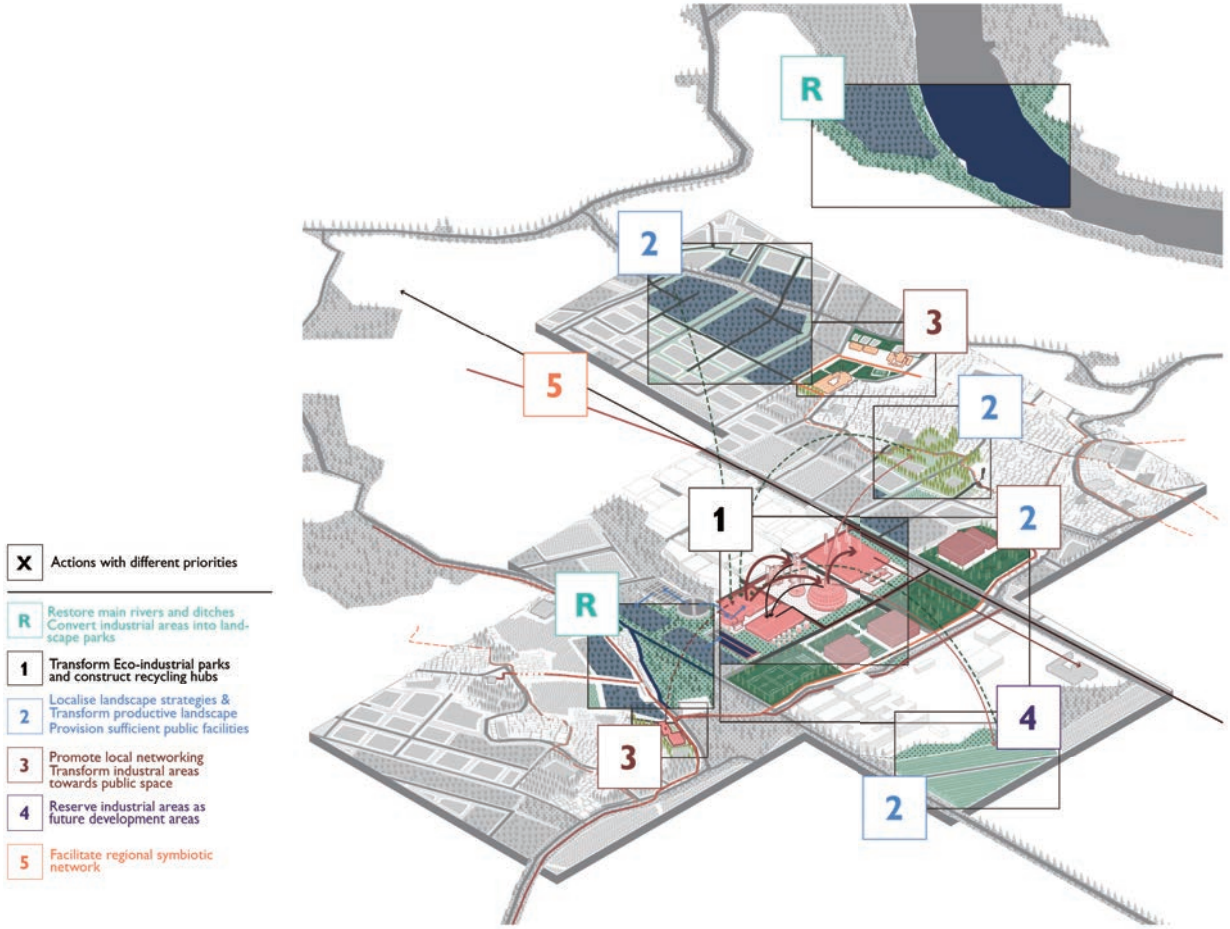
PROPOSING ACTION GUIDANCE
- **Step 04: Action Plans**

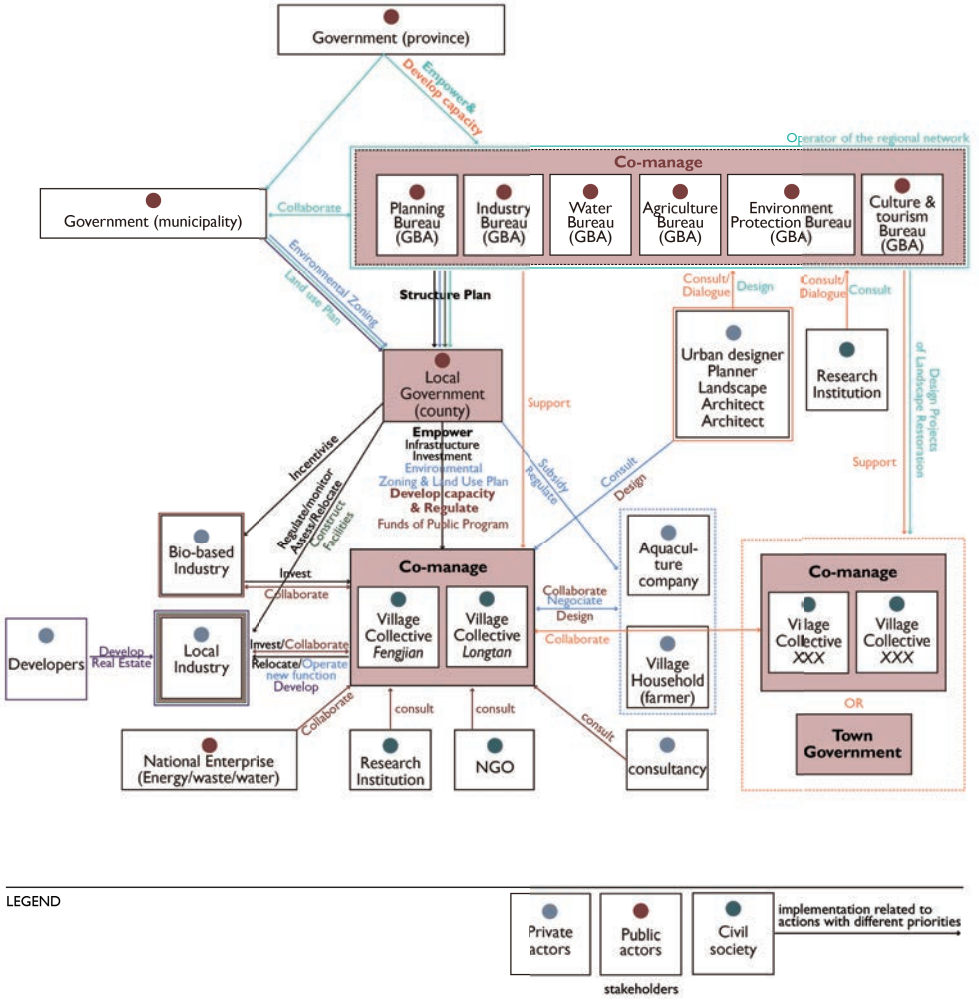


4. ESTABLISH a spatial planning framework to adapt this network

PROPOSING ACTION GUIDANCE

- **Step 04: Localised actions in the showcased project & Guidance for the actions of different actors with priority**



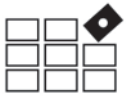


4. ESTABLISH a spatial planning framework to adapt this network

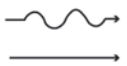
VALUING THE PROPOSED SPATIAL PLANNING FRAMEWORK
- Evaluation And Answers to the Main Research Question

What are the potentials of the desakota pattern to be adapted in the proposed network of the Greater Bay Area megaregion for industry transition that supports sustainable and liveable urbanisation?

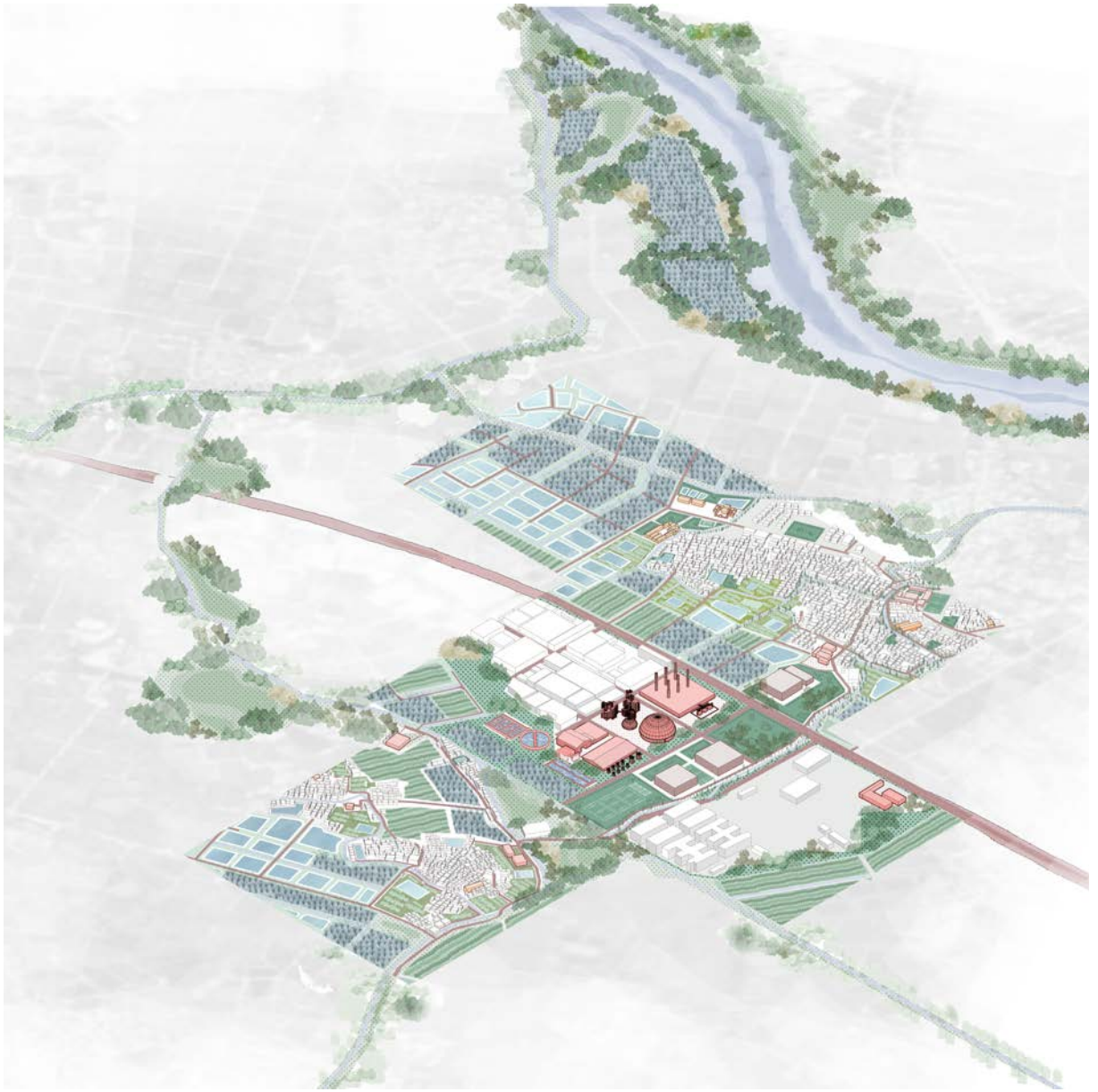
IDENTITY AND DIVERSITY



DEGREE OF SELF-SUFFICIENCY & RESOURCE EFFICIENCY



FLEXIBILITY



source: diagrams are from: Oswald, F., Baccini, P., & Michaeli, M. (2003). Netzstadt. Springer Science & Business Media.

4. ESTABLISH a spatial planning framework to adapt this network

5. FORMULATE future recommendations & REFLECT on the whole process

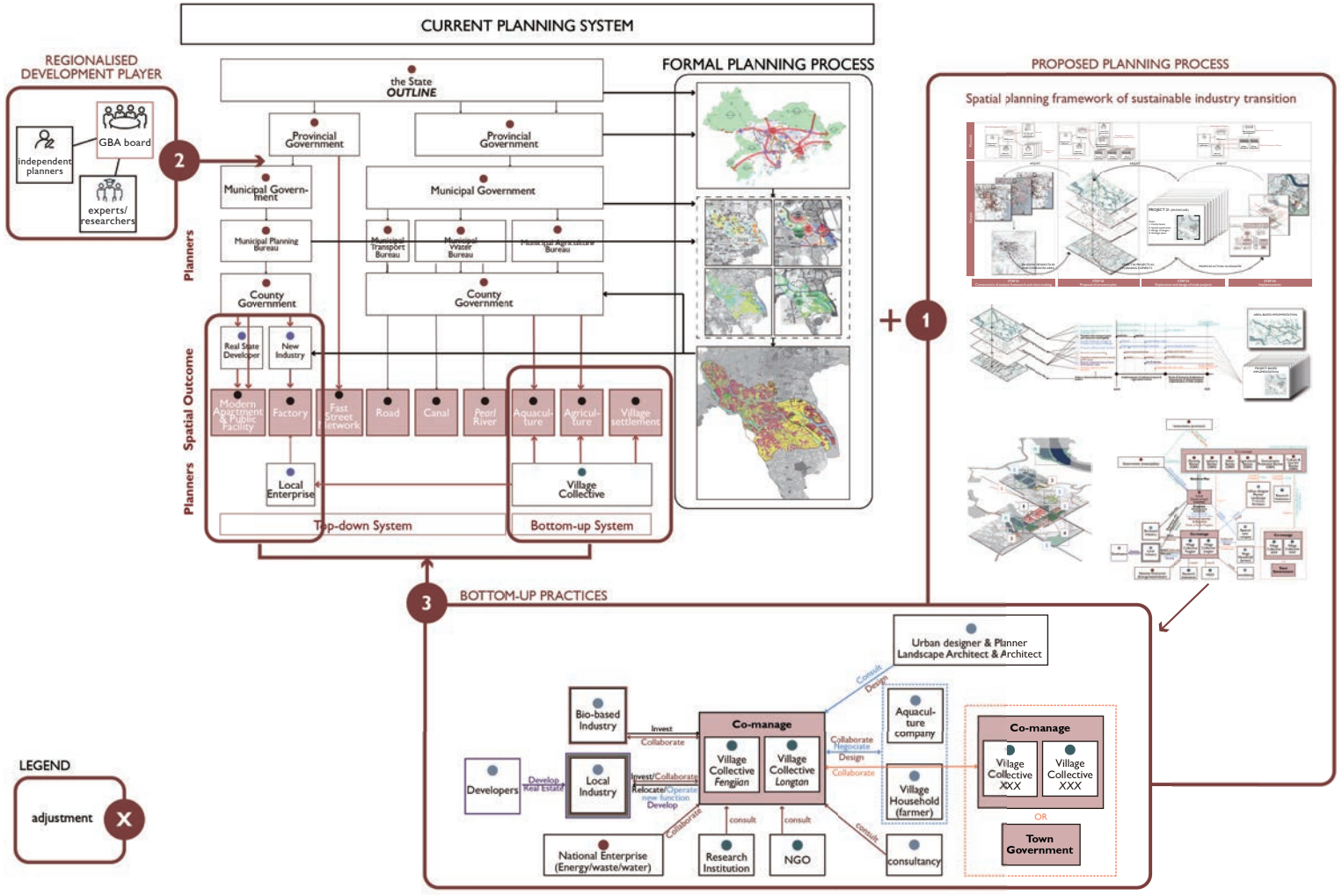
RECOMMENDATIONS

- Three Planning Recommendations to Adjust the Current Planning System

1. The recommended planning framework can be used as a spacial plan to promote the industrial transformation of the Desakota region, which runs parallel to formal planning documents and maintains consistency.

2. Regionalised decision-making bodies and development players, specifically the GBA board, should be empowered and pay more attention to the Desakota region.

3. The governance of the planning system should grant more autonomy to local actors at the premise of effective action guidelines and supporting formal planning processes (to prevent negative impacts from the informal practices of village collectives).



5. REFLECT on the project & FORMULATE future recommendations

REFLECTIONS
- **Regarding Theory Realm**

1. Apply adapted methodology combined with elemental & layer analysis (regarding data lacking);

2. Address the limitation of the Netzstadt method regarding the lack of open spaces analysis and extends its applicability beyond urban areas.

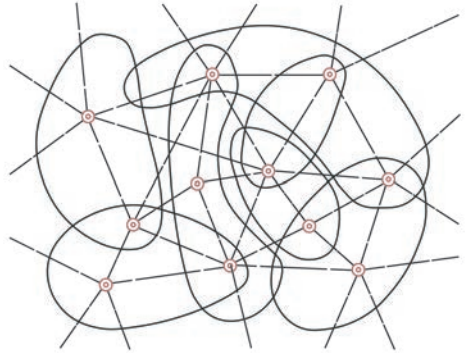
1. Propose an alternative future that considers the potential of Desakota and provide transferable knowledge (methodology, design strategy, & planning practice) to the regions with similar policy, culture and landscape condition.

2. Contribute to a finding that identifies contiguous urbanised areas evolved from Desakota traits.

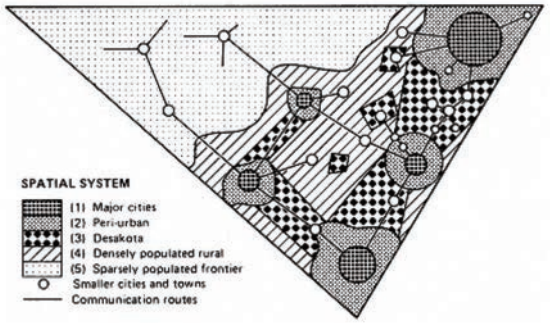
3. Contribute to the spatial planning framework of Desakota that takes into account the positive role of the informal practices and propose effective regulation and guidance for these activities through regionalised governance that transcends the urban-rural dichotomy of Chinese planning system.

4. Provide a more problem-oriented and flexible planning system as a starting point. So the model proposed in this project can adapt to the different challenges through time.

REGIONAL PERSPECTIVE & CROSS-SCALE RESEARCH



\+ NETZSTADT (NET-CITY)



DESAKOTA

5. REFLECT on the project & FORMULATE future recommendations

REFLECTIONS
- **Regarding Personal Development**

The role of urban planner & designer to propose the alternative futures