THE MAKING OF A “WORLD-CLASS CITY CLUSTER”

Local Collaborative Networks for Transboundary Pollution in the Yangtze River Delta

MSc. Thesis Environmental Policy Group

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Abstract

Cross-jurisdictional environmental governance has gained political importance in light of China's ambitious city cluster plan. Yet the processes of how local actors collaborate to resolve transboundary pollution during regional integration is understudied. This thesis investigates the development of a specific arrangement of environmental governance: local collaborative networks for water and air pollution, to understand how they transcend administrative boundaries and realize institutional innovations. Using a demonstration zone that sits at the junction of three provincial-level administrative units in the Yangtze River Delta as a case study, the analysis finds there is considerable room for collaborative and reflexive forms of governance at the local level to generate institutional change despite the tightened central control. Various modes of political steering coexist to optimize the process-design of the network so power can flow to the center. This study also engages in a wider discourse on China's reconciliation of environmental protection and economic growth during regional development. It finds that governmental practices have extended to local culture and aesthetic sensibility under the Ecological Civilization paradigm. They not only instill entrepreneurial spirit among local decision-makers but also shape the subjectivities of local people to regulate their interaction and enable them to self-government.

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List of Abbreviations

CPC	Communist Party of China
CPPCC	Chinese People's Political Consultative Conference
EC	Ecological Civilization
EEB	Ecological and Environment Burea
EPB	Environmental Protection Burea
ENGO	Environmental Non-Governmental Organization
IJA	Interjurisdictional Agreement
JJJ	Jing-Jin-Ji
JRCS	Join River Chiefs System
LCN	Local Collaborative Network
MEE	Ministry of Ecology and Environment
MEP	Ministry of Environment Protection
MWR	Ministry of Water Resources
NPC	National People's Congress
NDRC	National Development and Reform Commission
PRD	Pearl River Delta
RCS	River Chiefs System
SD	Sustainable Development
SME	Small and medium-sized enterprise
YRD	Yangtze River Delt

1. Introduction

China's environmental policies have transformed rapidly under the vision of Ecological Civilization (生态文明, *shengtai wenming*), a new development paradigm promoted by the CPC (Communist Party of China). Recent studies have highlighted the tightened, top-down style of environmental governance under President Xi's administration (Kostka & Zhang, 2018; Qin et al., 2019; Li & Shapiro, 2020; Van der Kamp, 2020); while "regulatory pluralism" and explorative environmental governance are also observed at the local level (Ahlers & Shen, 2018; Shin, 2017; J. Teets, 2018; van Rooij, Stern, & Fürst, 2016). How do we understand the seemingly contradicting interpretations of China's environmental policy-making? In 2018, China elevated the integration of the Yangtze River Delta (YRD) as a national strategy. The objective is to transform it into a "world-class city cluster", a green and innovative engine for global growth. Therefore, environmental stewardship in large urban systems is assigned with more political significance in China's grand narrative of entering a post-industrial era. Previously neglected cross-jurisdictional border areas have become the test beds for integrated environmental policies, and more importantly, to realize Xi's governance principle of "extensive consultation, joint contribution, and shared benefits."[1] It is time to take a fresh look at how these aspirations are being realized through local collaborative actions.

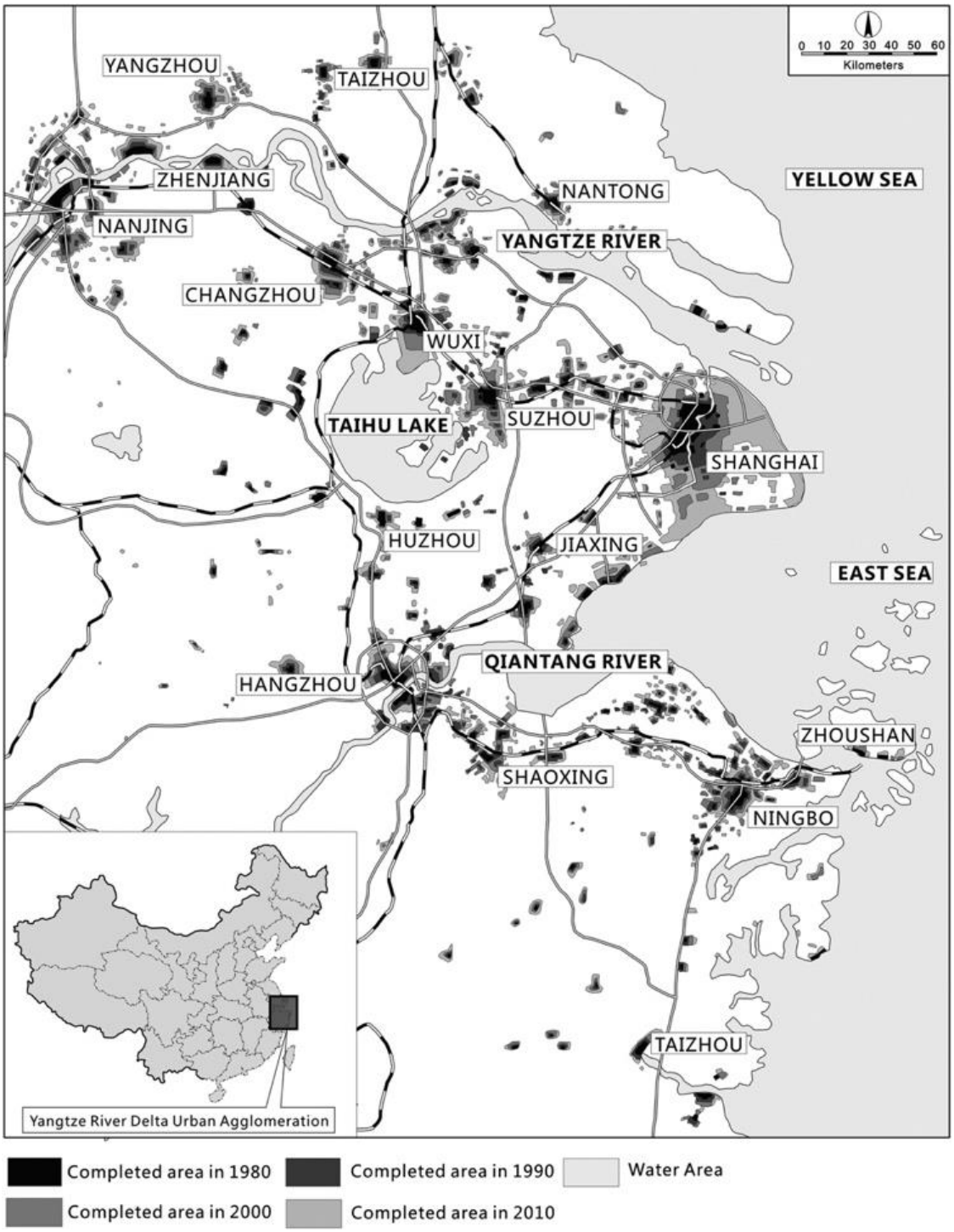
[1] Xi's principle for the Belt and Road Initiative and global governance "extensive consultation, joint contribution, and shared benefits"(共商共建共享) has been frequently adopted for domestic projects that require cooperation in national policies. In the case of the YRD and the Demonstration Zone, see for example: http://www.qstheory.cn/llwx/2019-12/28/c_1125398078.htm and http://www.gov.cn/zhengce/2019-12/01/content_5457442.htm

1.1 China's City Clustering Plan: From Metropolis to Megalopolis

When French geographer Jean Gottmann proposed the concept of Megalopolis in the 1970s, he described it as a "very large polynuclear urbanized systems endowed with enough continuity and internal interconnections for them to be a system in itself" (Gottmann, 1976, p.103). Gottman identified the existing systems. Following the Great Lakes, Tokaid, and Rhine-Ruhr, he wrote: "... and a sixth case of which we yet know relatively little, the urban constellation in mainland China centered on Shanghai" (p.104). Numerous studies on Megalopolis flourished in Chinese academia since. The concept evolved into the term "world-class city cluster" (Fang & Yu, 2017). And the relatively unknown urban system has grown to be the YRD (see Figure 1), a region that comprises 26 prefecture-level cities with an urban area as large as a few European countries. As of 2019, the YRD has over 154 million residents and generates more than a quarter of the national GDP (China Statistical Yearbook, 2019).

Figure 1

Major cities in the YRD city cluster



Note. Historic expansion of completed areas of the Yangtze River delta urban agglomeration in 1980, 1990, 2000, and 2010. Reprinted from "Study on spatial structure of Yangtze River Delta urban

agglomeration and its effects on urban and rural regions," by Z. Zhu and B. Zheng, 2012, *Journal of Urban Planning and Development*, 138(1), 78-89, p.83.

City clustering has become China's new form of urbanization (Babones, 2019; Groff & Rau, 2019; Yeh & Chen, 2020). This shift of focus from developing large monocentric cities to city clusters is driven by the country's ambition to transition from the world's manufacturing hub to an advanced service economy. The rationale behind city clustering is to establish a clearer division of functions among the neighboring cities to overcome industrial isomorphism, resolve the crisises caused by urban entrepreneurialism, and enhance regional developmental capacity in a coordinated manner (Liu, 2015; Wu, 2016; Groff & Rau, 2019). Hall & Pain (2006) suggest functionally networked cities connected by dense information and human flows could be prominent sites for sustainable development. Scholars believe coordination and collaboration across administrative boundaries hold great potential for generating institutional coherence alongside social, economic, and environmental benefits (Groff & Rau, 2019; Li, Wang & Zhang, 2017).

In China's 2014 National New Urbanization Plan, the YRD, the Beijing-Tianjin-Hebei region (JJJ), and the Pearl River Delta Greater Bay Area (PRD) were chosen to spearhead China's economic development. The YRD stood out for its high profile. It covers four provincial-level governments: Shanghai, [2] Zhejiang, Jiangsu, and Anhui. It is the most economically significant, equipped with the most developed intercity infrastructure and international airports and ports (Preen, 2018). Its regional integration was "personally

[2] Shanghai is one of the four direct-administered municipalities of China (the other three are Beijing, Tianjin, and Chongqing). Being under the direct administration of the State Council of China means it enjoys the same ranking as provinces, even though it is referred to as a 'city'. The major and party secretary of Shanghai also ranked higher than other city governors for the its strategic importance.

planned, deployed, and promoted" by President Xi Jinping himself.[3] By 2030, the YRD is expected "to build a networked, open and integrated development pattern, and continue to lead the country in institutional innovation, scientific and technological progress, industrial upgrade, urban-rural integration, and all-round opening up and green development" (National Development and Reform Commission, 2019a, p.9). "Integration" and "high quality" are two keywords of this national plan, and the YRD aims to secure its developmental goal by opening up a new landscape for ecological protection and development.

1.2 New Arena for Environmental Protection?

Accomplishing anything important or innovative in a highly complex, networked system cannot be done by one single player. In what ways is city clustering beneficial for the environment? The YRD is currently facing a wide range of environmental issues; decades of rapid economic growth have threatened its biodiversity, water bodies, with carbon emissions and ecological risks on the rise (Han et al., 2017; Peng et al., 2018; Lu et al., 2020). Major cities like Shanghai are suffering from serious urban diseases such as traffic congestion and air pollution (National Development and Reform Commission, 2019b). Growing pressure on land use and natural resources is also reinforced by the mismatch between management units and the movement of environmental flows, and the lack of cross-border administrative coordination and evaluation mechanisms (Cui, 2020). Many scholars have called for

[3] Xinhuanet 新华网. (2020, October 14). Zhashi tuidong changsanjiao yitihua fazhan buduan qude chengxiao [Solid promotion of the integrated development of the Yangtze River Delta continues to achieve results] http://www.xinhuanet.com/politics/2020-10/14/c_1126603686.htm

comprehensive ecological planning and joint-action mechanisms to resolve transboundary pollution in the YRD (Bu, 2014; Xie et al., 2018; Huang & Xu, 2019; Fang, Wang & Tian, 2020).

Following the footsteps of regional economic integration, a plurality of actors in the YRD has engaged in collective actions to resolve environmental pollution. The three provinces and one municipality in the YRD city cluster and regional-level environmental commissions have been actively pushing for new coordination mechanisms to facilitate cross-jurisdictional and cross-sectoral environmental governance (跨界治理, *kuajie zhili*). In 2019, a Green and Integrated Ecological Development Demonstration Zone (hereinafter "Demonstration Zone") was launched. It situates at the junction of Shanghai, Jiangsu, and Zhejiang (see Figure 2) and it was jointly planned by stakeholders from these administrations. Its overall spatial plan was widely promoted as "China's first cross-provincial territorial spatial plan."

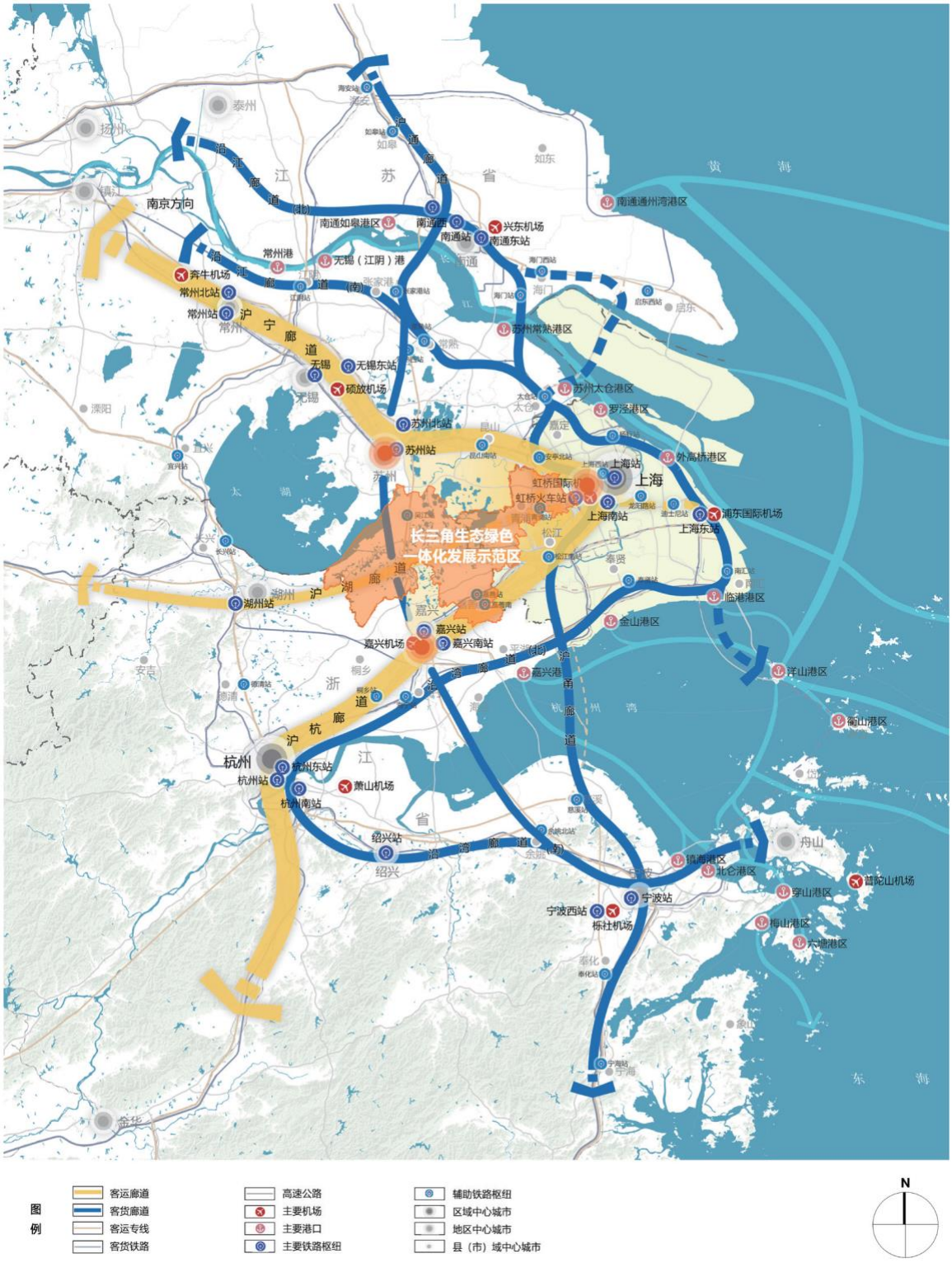
The goal of the Demonstration Zone is to take the lead in transforming ecological advantages into economic and social development advantages, in addition to making a leap from regional project-based coordination to a full-fledged regional integration. One of its key objectives is to "make collaborative efforts to protect and manage the ecological environment" (生态环境共保联治, *shengtai huanjing gongbao lianzhi*) (National Development and Reform Commission, 2019b). Local actors have been taking new policy measures to jointly regulate transboundary pollution under the slogan of "breaking administrative boundaries without breaking administrative affiliation." Informational-based policy instruments such as environmental quality monitoring platform and environmental social credit system[4] are also

[4] Jiangsu was China's first province to launch a pilot programme for environmental social credit system. Companies that have low environmental credit ratings are charged higher wastewater treatment fees and electricity rates.

being built (National Development and Reform Commission, 2019b; Davies & Westgate, 2019). Placing a Demonstration Zone that had been neglected by three provincial-level jurisdictions has significant policy implications. As a national strategy, it is expected to generate scalable and replicable experience for the whole region, including integrative environmental management.

Figure 2

Location and spatial planning of the Green and Integrated Ecological Development Demonstration



Note. The map displays the Green and Integrated Ecological Development Demonstration Zone (in orange), major passenger transportation corridors (yellow), and cargo corridor (navy blue).

Reprinted from: *The Overall Spatial Plan of Green and Integrated Ecological Development Demonstration Zone* (Draft) by Planning and Land Resources Administration of Shanghai Municipality, 2019, retrieved from http://ghzyj.sh.gov.cn/cmsres/bc/bc13fd2cb2bc49fdaca4a9e4eb05a015/e0548fc582ab35fc9d0b325abbca2df6.pdf

Among the literature, empirical analysis of local-local relations established to resolve transboundary pollution is rather inadequate (Eaton & Kostka, 2018). So far, studies on environmental governance at the regional scale mostly center around interjurisdictional relations in the PRD (Hartley, 2018; Hills & Roberts, 2001; Ma & Tao, 2010; Yang, 2005), and air pollution and energy use in the JJJ (Fang et al., 2019; Wong & Karplus, 2017; Xu & Wu, 2020). The YRD has received less attention. Overall, these studies on China's regional environmental governance have offered valuable insights into inter-jurisdictional conflicts and the unintended spillover effects of regional environmental policies, but few of them investigated the dynamic interactions among bordering provinces.

1.3 Collaborative Actions in China's Changing Environmental State

In addition to the limited attention paid to China's inter-regional dynamics, we also need an updated account on local actors address environmental pollution more specifically. China's environmental state changes greatly at each development stage (Xie, 2020). Recent institutional reforms in the environmental sector, including the vertical management reform and the establishment of the Ministry of Ecology and Environment (MEE) have given more power to environmental authorities (Kostka & Zhang, 2018; Y. Ma, 2017). GDP-based assessment of local government officials, which many attributed to China's lax environmental implementation, has also been dropped by Shanghai and a few cities in China since 2015 (Wildau, 2014; He, 2015). Energy and emission reduction and ecological protection are

weighted more in cadre assessment. New policy instruments and institutional arrangements, such as the River Chiefs System (RCS), Central Environmental Inspection, Ecological Redlines, and Ecological Compensation Mechanism are employed nationwide to overcome institutional barriers and facilitate environmental cooperation across departments and jurisdictions (Pan, 2016; Chien & Hong, 2018; Li et al., 2020).

Inter-regional environmental coordination in China has been mainly ad-hoc and happens after environmental pollution disputes had occurred (Pan, 2016). Will city clustering spur new institutional change to improve pollution prevention? The emphasis on high-quality growth requires more collective efforts in regulating, consensus-building, and orchestration among various local actors. And the launch of the Demonstration Zone serves as an ideal case for studying. Therefore, this thesis adopts the conceptual lens of a broadly defined framework: collaborative governance, to investigate how pluralistic modes of governing are manifested during environmental integration processes in the Demonstration Zone. Two types of transboundary pollution are addressed here, namely water and air pollution, with the former being the most prominent pollution issue in the YRD. I apply an integrated conceptual framework to analyze each stage of the development of local networks. I also employ the governmentality theory to supplement the governance theory in order to understand the governmental logics that underpin the reconciliation between environmental protection and economic growth in contemporary China. The justification for using these two strands of theory are elaborated in the next chapter.

The aim of this study is twofold: first, to analyze the dynamic interactions of cross-jurisdictional coordination and collaboration for transboundary pollution at the local level;

second, to explore the embeddedness of these collective actions within regional development. In the scope of water and air pollution, this study asks:

1. How do local actors coordinate and collaborate so as to realize institutional innovations?
2. How is environmental protection and economic growth being reconciled during these processes?

The study contributes to the understanding of regional environmental governance integration in contemporary China. It shows the political significance of regional integration and the devolution of power have increased local actors' shared commitment and creativity on curbing cross-jurisdictional pollution. A few of these efforts are unprecedented in China. Despite the tightened central control, there is still space at the local level for policy experiments to flourish. During the development of local networks, the central government mainly steers policy diffusion through mediation and recognition, instead of coercion and mandates. The study also finds that, under China's Ecological Civilization paradigm, governmental practices have extended to local cultural conditions and actors' aesthetic sensibility. By framing nature as a productive force for economic development, authorities at different scales have made Demonstration Zone a domain to shape the subjectivities of those who are being governed and enable them to self-regulate. The space for bottom-up initiatives have grown, but so as the sophistication of state interventions.

This essay is organized in the following way: chapter two lays out the conceptual frameworks regarding the institutional settings of local collaborative networks for environmental governance, followed by the conceptualization of this governing arrangement.

To operationalize the conceptual framework, chapter three explains the methodology and the analytical framework. Chapter four and five present the analysis and address the research questions in turn. Chapter six makes concluding remarks and reflects on the limitation of the study. The study ends with policy recommendations and directions for future research.

2. Conceptual Frameworks

The arguments proposed in this study draw on a number of concepts and theoretical approaches. The first section of this chapter concerns the contextualization of local collaborative networks for transboundary pollution. It explains the definition of a "world-class city cluster" and the justification for studying it under two imperatives of China's environmental politics, namely Ecological Civilization and "top-level design". Both concepts are heavily promoted under Xi's administration. The purpose of contextualization is to provide the necessary background in regards to 1) why local collaborative networks have emerged and 2) under what institutional setting they are operating. The second section synthesizes concepts related to collaborative networks for cross-jurisdictional environmental protection to enhance their applicability to China's context. An integrative framework is outlined to focus on the dynamic interactions within the networks: how they configure, transform, and innovate China's environmental state.

2.1 The Making of "World-Class City Cluster"

World-class city cluster (世界级城市群*, shijieji chengshiqun*) is a relatively new term in China's official documents. In the late 2000s, China's State Council first proposed the development goal of constructing the YRD into a world-class city cluster. According to its regional plan, the YRD would be transformed into "a key international gateway for the Asia-

Pacific region, an important global center for the modern service industry and advanced manufacturing industry" (Ministry of Commerce, 2010). "World-class" not only refers to certain criteria (population, number of cities, and level of development, etc.) of an urban agglomeration in its physical form but also high international competitiveness (Harrison & Gu, 2019), as in the YRD is expected to compete with other world-class city clusters in its future development.[5] The term has also been frequently associated with innovative and green development (Hu, 2014).

City cluster is often used interchangeably with "urban agglomeration," "metropolitan interlocking region (MIR)" and "mega-city region". Studies on urban agglomeration in China stemmed from the theoretical foundation of "Megalopolis" and have surged since the 1980s (Gottmann, 1957; Zhang & Nin, 2011; Fang & Yu, 2017; Yeh & Chen, 2020). In recent years, China's city master plans adopt polycentricity as a normative approach for economic development, and scholars also use "polycentric mega-city regions" or "mega-regions" to describe the rapid, large-scale urbanization processes in areas like the YRD. Chinese geographers and urban scholars have reached a consensus that a world-class urban agglomeration is the ultimate form of urban agglomeration.[6] The YRD should serve not only as a national but also a global growth center (Fang & Yu, 2017; Fang, Wang & Ma, 2018). To

[5] Hu Qinggang, the deputy chief planner of the Zhejiang Institute of Territorial Spatial Planning, said in an interview that "world-class" is the requirement for ecological cities. And the competition of the future will be the competition of city clusters. The YRD with its developed economy and relatively concentrated industries, will participate directly in the competition and cooperation of world city clusters in the process of future development. It is because of its location and stage of development that the Demonstration Zone has to aim for "world-class". Source: http://www.chinacace.org/tech/view?id=11668

[6] According to Fan Hengshan, former deputy secretary general of the NDRC, "urban agglomerations are the highest level of spatial organisation of cities, and world-class urban agglomerations are the most superior form of urban agglomerations." Source: http://theory.people.com.cn/n1/2020/0213/c40531-31584502.html

avoid confusion, this thesis adopts the term “city cluster” as it is extensively used in official documents and media in more recent years. In other occasions, the concept remains consistent with the way originally addressed by the authors whose works are referenced.

Hall & Pain (2006) described a (polycentric) mega-city region as “a series of anything between 10 and 50 cities and towns, physically separate but functionally networked, clustered around one or more larger central cities, and drawing enormous economic strength from a new functional division of labor” (p.4). Inspired by their works, many Chinese scholars consider the three main coastal megaregions, the PRD, YRD, and JJJ, as emerging Chinese counterparts of mega-city regions in Europe like the Randstad and the Rhine-Ruhr (Zhao & Chen, 2011; Cheng & Shaw, 2017; Chen et al., 2019; Lu et al., 2020). While Harrison & Gu (2019) argue megaregions in China are not only just urban-economic reality but also:

> an always evolving political–economic project orchestrated by the CPC [The Communist Party of China] through a combination of spatial development strategies and urbanization policies to manage the complex relationship between increased exposure to external global capitalist market forces while maintaining tight authoritarian control over internal domestic matters (p.2).

Based on these discussions, “world-class city cluster” in this study refers to an evolving, large urbanized system that contains a number of cities, with one or more mega-cities at its core. These cities are economically, socially, culturally, and ecologically integrated. They are jointly planned by multiple jurisdictions to secure high strategic importance and competitiveness in the global market. In the following sections, I discuss the conceptualization of a city cluster in China’s context and its application for the YRD.

2.1.1 The Criteria of a World-Class City Cluster

The dynamic nature of urbanization processes means it is almost impossible to reach unified criteria among scholars for what constitutes a "(mega) urban agglomeration" or "mega-city region". In a comprehensive overview on urban agglomeration over the last century, renowned Chinese urban geographer Fang Chuanglin and his colleagues observed a few common themes: first, it is a "continuously urbanized region that is centered on one or more highly urbanized and commercialized large cities that attract population and industries and are densely populated" (Fang & Yu, 2017, p.132). Moreover, it must have "more than 3 large cities with populations exceeding 20 million (and one of the three large cities – the core – has over 5 million urbanites). Second, the growth and strengthening of its networks (people, cargo, capital and information) and the integration of socioeconomic ties among the nodes (central and peripheral cities) are essential features. Third, it has "a reasonable self-sustaining hierarchical structure", while each city has its own specialized industries that enhance individual and regional competitiveness. Finally, there must be strong driving forces behind its formation and future development, such as economic globalization, increased population and labor quality, and diversity of consumption.

A "true" urban agglomeration in their view needs to realize co-planning and programming of urban and rural areas, industrial chains, transportation networks, finance, information services, marketization, science and technology development, environmental protection and remediation, and ecological construction. The regional integration plan suggests these highly ambitious and comprehensive functions are indeed what the YRD city cluster trying to realize.

2.1.2 China's New Spatial Unit for Green Urban Development

China's New National Urbanization Plan in 2014 officially embraced the notion that instead of solely focusing on the development of metropolis, it is the more inclusive and coordinated city cluster that should drive China's new urbanization (see Figure 3). Meanwhile, since cultural and ecological factors play an important role in attracting and concentrating international labor and high-value firms (Hall & Pain, 2006), mega-city regions in China have engaged in branding practices (de Jong et al., 2018). Concepts such as "high-quality living environment", "ecological and livable city cluster", "green and ecological corridors" are frequently mentioned in regional plans. With respect to environmental governance, Chung & Xu (2015) argue that the "regional" scale is also deployed as a framing device for how the environment should be regulated. It pivots cities away from their individual interests and situates them on a politically more important scale, which is characterized by a high level of environmental aspiration.

Figure 3

The national new-type urbanization plan which features key megaregions (dashed orange lines) and their core cities (red dots).

Note. Reprinted from *the 13th Five-Year Plan for national economic and social development (p.64),* 2016*,* Edition 8, Chapter 33, Section 1. Beijing: NDRC.

A key objective of city clustering is to institutionalize coordinated development and cooperation mechanisms among local administrations (Groff & Rau, 2019). Recent studies show regional development in China is going through a more relationally-networked and function-dominated transition (Cheng & Shaw, 2017; Li & Wang, 2019). And coordinated development in the YRD has improved during the process of China's economic structural adjustment (Chen & Feng, 2017). City clusters in China are often operating on a scale unprecedented in the globe. Aside from the large population and fast economic growth, the political, economic, and cultural characteristics of regions like the YRD have a long-lasting effect on its present-day development. For instance, the established prefecture and county

hierarchy of the Yangtze Delta could be traced back to the Song Dynasty (960 – 1279). Individual cities in the region, even within one province, often have noticeable unequal economic and development conditions. In relation to its geographic location (the middle and lower reaches of the Yangtze River), the YRD also has a distinctive regional culture. As elaborated in later sections, these characteristics are essential to local actors who are involved in the planning and governing of local ecological conditions.

In terms of global competitiveness, Chinese scholars consider the YRD city cluster is falling behind its Western peers. Its economic density (the ratio of regional GNP to the regional area) is less than one-third of that of the Northeast megalopolis in the US; and its industrial structure is dominated by middle and low-end manufacturing industries (Ye & Huang, 2017). Industrial structure and low resource efficiency are considered by scholars as the root cause of persistent pollution and high energy consumption in the YRD. Highly unbalanced development and intra-regional inequality also further worsen regional environmental problems (Yeh & Chen, 2020).

2.2 The Construction of Ecological Civilization

The construction of Ecological Civilization (EC) is an essential concept to the making of world-class city clusters. Under Xi's administration, Sustainable Development (SD) has given way to EC, which now serves as the ideological framework of China's environmental policy. EC emphasizes the harmonious coexistence of humanity and nature. It "also covers the production patterns, economic foundation, and governance systems based on the shared value" (Pan, 2016, p.37). Social science scholars who endorse EC see it as the successor (while not a complete negation) of industrial civilization (Gare, 2012; Pan, 2016).

Conceptually, EC encompasses not only the three pillars of SD, namely economic, environmental, and social, but also political and cultural dimensions of development. Similar to SD, the discourse of EC is also subject to various and contesting interpretations (Gare, 2012; Hansen & Svarverud, 2018; Goron, 2018; Gare, 2020). Some scholars consider it criticizes the logic of capitalism while maintains a nationalistic and socialism edge (Hansen & Svarverud, 2018; Zhou, 2020; Gare, 2020). For instance, in terms of creating ecological rationality and political modernization, EC highly resembles the Ecological Modernization theory, yet it deliberately distances itself from Western social theories due to the national and political identity associated with the CPC (Wang, He & Fan, 2014; Goron, 2018). Studies on the philosophical foundations of the EC paradigm implied the influence of Confucianism, Daoism, Ecological Marxism, and Alfred North Whitehead's process philosophy on its formation (Wang, He & Fan, 2014; Clayton & Heinzekehr, 2014; Pan, 2016; Gare, 2020). Though this school of thinking originated in the Soviet Union and was proliferated by scholars at the Claremont School of Theology, EC was mainly "taken up, developed, and vigorously and successfully promoted" in China (Gare, 2012, p.10). In the Five-in-One general layout of "Socialism with Chinese Characteristics", EC is put side by side with economic, political, cultural, and social construction. In 2018, the construction of EC was written into the national constitution, further reinforced the party's political commitment to resolving environmental issues (Zhou, 2020; Gare, 2020).

The selection of EC as the Chinese central government's green rhetoric signifies the political, technological, and cultural orientations of the CPC (Hansen & Svarverud, 2018; Goron, 2018; Zhou, 2020). The reform of governmental administrative system is also imperative to its connotation (Zhou, 2020; Gu et al., 2020). Thus, the construction of EC in the

Chinese context is a complex system. And to a large extent it is part and parcel to Xi's thoughts. A prominent case is Xi Jinping's catchphrase: "lucid waters and lush mountains are invaluable assets" (often referred as the "Two Mountains Theory"), which is widely perceived as the essence EC construction in China. The term has become ubiquitous in planning and policy documents, frequently referenced by party members as well as ordinary people.

2.2.1 China's Changing Environmental State

The promotion of EC sees China's environmental state going through rapid reconfigurations in the last decade. Environmental state here refers to the organic makeup of instruments, laws, institutions, and authorities in the state structure intended to achieve ecological metafunction (Mai & Francesch-Huidobro, 2014). One of its important features is "whenever it engaged in economic decision making, considerations of ecological impacts would have equal weight with any considerations of private-sector profits and state sector taxes" (Schnaiberg & Weinberg, 2000, p.9).

Since 2013, the modernization of the national governance system and governance capacity to incorporate EC has been heavily promoted by CPC. Earlier studies on China's "fragmented authoritarianism" demonstrated the neglect of environmental protection among localities in the pursuit of local economic interests (Mol & Carter, 2006; Wang & Lin, 2010). The central regulatory authority was deconcentrated among different administrative entities and environmental ministries suffered from insufficient coordination and budget allocation. Environmental protection bureaus' (EPBs) lack of power over local governments also creates implementation gaps. In recent years, large reforms in ecological and environmental institutions and management systems have taken place to eliminate these

institutional flaws (Wang, 2018; Kostka & Zhang, 2018) (see Table 1). First, GDP-based indicators are weighed less in local cadre performance assessment than environmental indicators. Such a shift has been found to have promising effects on improving the local environment (Wang & Lei, 2021; Xin Wang & Lei, 2020). Regional GDP assessments are canceled for regions under restrictive ecological development or are ecologically fragile (Kitagawa, 2017). "Resource consumption, environmental damage and ecological efficiency" are included in officials' appraisal index system.[7] And the "one-vote vetoes" (一票否决, *yi piao foujue*,) system for environmental protection targets has been applied to political assessment at all levels of the government, which entails failure in accomplishing an environmental one-vote-veto indicator will result in the banning of all promotions and awards, no matter how well a given cadre does on other tasks. [8] More stringent rules have been placed on accountability mechanisms to alter local cadres' growth-oriented mindset and their tendency to shirk their responsibilities (Kostka & Zhang, 2018). In 2015, the State Council approved a lifetime accountability rule (终身责任制, *zhongshen zerenzhi*). [9] This rule particularly affects environmental issues as it addresses their time-lagging impact. Local officials could be held criminally accountable for environmental mismanagement, even after

[7] In December 2016, the Evaluation and Assessment Measures for the Construction of Ecological Civilisation was released, followed by the Green Development Indicator System and the Assessment Target System for the Construction of Ecological Civilisation. The above documents have set up a new development orientation for economic and social development and aim to "correct" the growth-oriented mentality among local cadres.

[8] The National 12th Five-Year Plan for the first time explicitly includes environmental protection in the performance appraisal of local governments at all levels as a one-vote veto audit item.

[9] The Ecological Civilization Construction Target Evaluation and Assessment Methods, the Party and Government Cadres Ecological and Environmental Damage Accountability Methods, and On the Comprehensive Implementation of the River Chief System are among a series of important documents that stipulate and specify the party and government cadres to be held accountable for ecological damage. The renewed environmental protection accountability system traces ecological damage down to a specific person.

they departed or retired from their positions. In 2018, the MEE replaced the Ministry of Environmental Protection (MEP) and unified many functions previously shared by other ministries to reduce institutional fragmentation. EPBs in China have since changed their names to Ecological and Environmental Bureaus (EEBs), as a reflection of this new integration of responsibilities. Another change concerns the vertical management reform in the environmental sector (Ma, 2017). This reform strengthens the authority of provincial EEBs, centralizes environmental monitoring and inspection from municipal and county-level to the provincial level so to address local protectionism and lax law enforcement. The Central Environmental Inspection Teams were also established and have full coverage of mainland China.

Table 1

Major reforms and institutional innovations for environmental protection in the construction of EC (2013-present)

Institutional Innovation	Examples
Accountability mechanisms	'Lifetime accountability' rule; the River Chiefs System
Vertical reforms	Establishment of MEE; Central Environmental Inspection Teams
EC-based cadre assessment	Green development index; "Resource consumption, environmental damage and eco-efficiency" are included in the comprehensive assessment index system
Collaboration mechanisms	The YRD Regional Air and Water Pollution Prevention and Control Cooperative Team; Xin 'an Jiang eco-compensation mechanism
Environmental credit system	Memorandum of Cooperation on the Implementation of Joint Credit Rewards and

Perhaps the most relevant accountability mechanism to address transboundary water pollution is the implementation of RCS. In 2018, the RCS was implemented in all 31 provinces in mainland China. The system designated the main leaders of the party and government at all levels (provincial, city, county, township, and village) the role to personally supervise and manage water bodies within their jurisdictions, and coordinate cross-department, cross-jurisdictional water affairs through the River Chiefs Offices (河长办, *hezhangban*). River chiefs help reduce the transaction costs for EEBs during coordination as the latter have limited administrative power to navigate across different departments. Municipalities are required to implement a "one river, one policy" (一河一策, *yihe yice*) approach, which aims to break the fragmented mode of governance and provides a basin-wide system of river and lake management. Public participation is another important aspect of this system (Chien & Hong, 2018; Y. Wang & Chen, 2020). Actors from civil society and private sector have participated in the monitoring of local river sections as "Civic River Chiefs" (民间河长*, minjian hezhang*) and "Enterprise River Chiefs" (企业河长，*qiye hezhang*).

In the last decade, seven major river basins in China including the Yangtze River have established joint working mechanisms for water pollution prevention and control. In 2016, the YRD Regional Air Pollution Prevention and Control Cooperative Team, which consists of

three provinces and one municipality and a total of 12 ministries,[10] integrated water pollution and control in their operation. However, under China's political system, these basin-level entities and regional commissions do not have authoritative power over provincial governments, hence they are insufficient for mobilizing local governments (Wang & Chen, 2020). In more recent years, diversified horizontal ecological compensation mechanisms for water and air pollution have been explored by local governments. The eco-compensation mechanism establishes relationships between ecological beneficiary areas and ecological protection areas, such as the lower reaches and the upper reaches of river basin through financial compensation, counterpart collaboration, industrial transfer, and talent training (Sheng, Qiu, & Han, 2020).

Albeit these institutional reforms and new instruments have received mixed results and raised concerns for their long-term impact (Chien & Hong, 2018; Shang, Gong, Wang, & Stewardson, 2018; Wang & Chen, 2020), they have considerably affected the dynamics among local actors. In what ways do they manifest in the YRD require closer examinations.

2.2.2 Demonstration Zone as a Policy Experimentation for Green Governmentality

The construction of a Demonstration Zone (示范区, *shifan qu*) could be seen as local policy experimentation. In China's context, policy experimentation is "a policy process in which

[10] The ministries include the former MEP, the National Development and Reform Commission (NDRC), the Ministry of Science and Technology, the Ministry of Industry and Information Technology, the Ministry of Finance, the former Ministry of Land and Resources, the Ministry of Housing and Urban-Rural Development, the Ministry of Transport, the Ministry of Water Resources (MWR), the former Ministry of Agriculture, the National Health and Family Planning Commission and the State Oceanic Administration. The group is connected to the air pollution prevention and control coordination mechanism in terms of operation mechanism, and the agencies and deliberations are integrated and united.

central policy makers encourage local officials to try out new ways of problem-solving and then feed the local experiences back into national policy formulation" (Heilmann, 2018, p.45). The "experimentation under hierarchy" mode of governance is fundamentally different from conventional policy-making process in which policy analysis, formulation, and legislation embodiment *precede* policy implementation. It "means innovating through implementation first, and drafting universal laws and regulations later" (Heilmann, 2008, p.8).

The Overall Plan for Building a Yangtze River Delta Ecological Green Integrated Development Demonstration Zone (hereafter the Overall Plan) stipulates that the Demonstration Zone is built to be "a precursor and trailblazer of the implementation of the YRD integrated development strategy." Policy innovation and new working mechanisms are implemented by local actors under the principle of "policy in accordance with the best" (政策从优, *zhengce congyou)*. [11] These innovations will then be scaled up and generalized at the regional scale. Some scholars have made the distinctions between policy experimentation and policy innovations in China (Göbel & Heberer, 2017).[12] In the case of the Demonstration Zone, it appears to have characteristics of both concepts. As in, the Demonstration Zone itself is a policy experimentation and its desired outcomes include policy innovations.

[11] According to Party Central Committee's Comprehensive Deepening Reform since the 18th Party Congress, initiatives that can be tested first at the local level will be implemented at the demonstration zones to make breakthroughs and realize systemic integration. Any reform or innovation that had been implemented in two provinces and one municipality (individually) can be promoted and shared in the Demonstration Zone.

[12] The authors believe that "In contrast to policy experimentation, where desired policy outcomes are clearly defined, local officials engaging in policy 'innovation' need to decode central government documents and directives to assess whether their planned innovation is likely to meet with the approval of the highest leadership stratum. Instead of being told what to do, they are led to judge by themselves whether their project will earn them praise or criticism" (Göbel & Heberer, 2017, p.474).

"Ecologically-based, green development" was put forward as the first principle in the Overall Plan, what follows is: "Anchor the ecological base, build up ecological advantages and develop ecological economy; highlight the natural ecological beauty of the water towns in *Jiangnan."* [13] This emphasis on governance subjects and their values could be better understood through governmentality in comparison with governance theory (Jessop, 2011). Extended from Michel Foucault's account on governing power (Dean, 1999; Foucault, 1977), the logics of green governmentality have not only emerged in the Western liberal context but also in China. Green governmentality is reflected in new green practices and institutions that affect the production of truth on nature, and increase the market value of environments and natural resources (Goldman, 2001). It also manifested in "novel forms of surveillance, regulation, self-policing, participation, and so on through which nature is governed—the ways, in other words, in which the environment is rendered governable—and the sorts of citizen-subjects that are made in the process" (Watts, 2002, p.1316).

Describing China's recent endeavor to mobilize EC in urban planning, Pow (2018) defined green governmentality as "a specific ensemble of environmental ideas, concepts, and categorization that coalesced around particular sets of 'green' urban practices and governmental assemblages through which diverse (contested) meanings relating to urban sustainability are given social and physical realities" (p.2). Inspired by Pow's work, two coevolving and complementary green governmental logics: eco-technical and eco-aesthetic are highlighted in this study. In the context of the Demonstration Zone, eco-technical strategy refers to technical-calculative practices such as maps, statistics, and various forms of technical

[13] Jiangnan (江南), a distinctive regional culture in the south and lower reaches of the Yangtze River known for its river canals and ancient water villages.

solutions; eco-aesthetic governmentality refers to aesthetic normativity and visual codes for concepts such as "*Jiangnan*" and "world-class", and more importantly the internalization of appropriate conducts and eco-aesthetic sensibility expected from actors who are being governed (Pow, 2018). The explanatory power of green governmentality helps to illustrate how EC is internalized by those who are participating in the governing and self-governing processes of achieving environmental goals, so as to allow the state to "governing at a distance"(Rose & Miller, 1992). Moreover, it helps to illuminate the interplay between ecological and economic rationalities in the making of a "world-class city cluster."

2.2.3 Top-Level Design as the Logic for Metagovernance

This section describes the current institutional setting of environmental governance in China, which is highly complex and often characterized by contradicting features. The aforementioned institutional reforms under unified leadership represent what often dubbed the "top-level design" (顶层设计, *dingceng sheji*), a trend that has been emphasized under Xi's administration (Yang & Yan, 2018). Previous scholarship attribute China's economic miracle in the Reform and Opening Up era to the intense economic and political competition ("political tournament") and experimentation among local governments as they enjoy relatively high autonomy and bargaining power in regards to planning and policy making (Montinola, Qian, & Weingast, 1995). To respond to this "quasi-federalism" account on China's politics, many scholars consider top-level design a (re)centralization of political power and a reconfiguration of central-local relations (Ahlers, 2018; Schubert & Alpermann, 2019; Yang & Yan, 2018). This trend is characterized by increased streamlining of policy formulation and monitoring, and the deepening of comprehensive reforms at all levels of the state hierarchy.

The emphasis on top-level design also deemed the heuristic "fragmented authoritarianism 2.0" less accurate. Fragmented authoritarianism 2.0 suggests that the policy process in China has become more horizontal and pluralized since the reform era (Mertha, 2009). There is space for negotiation and bargaining within the political system and there is also more room for non-state policy entrepreneurs. In the era of top-level design, however, the negotiation mode could be seen as one of several steering modes that coexist (Schubert & Alpermann, 2019). Since China has not followed the Western European democracies' trajectory towards horizontal governance, Schubert & Alpermann (2019) argue "political steering" is a more appropriate account for China's policy-making process. And both "fragmented authoritarianism" and "policy experimentation/competition under hierarchy" are different modes of political steering.

These steering modes are on the spectrum of hard steering, negotiation, competition, and soft steering (Schubert & Alpermann, 2019). [14] In this study, the concept of "metagovernance" (meta-steering) is also applied to represent "central steering subject's efforts to rebalance the use of different steering modes (the steering of steering) (Schubert & Alpermann, 2019, p.207). Metagovernance can be understood as the "governance of governance" (Torfing, 2016, p.525), or "the structuring of the game-like interaction within governance networks, and interaction among actors to influence parameter changes to the overall system" (Jessop, 2011, p106). Metagovernance resembles the institutional logic of

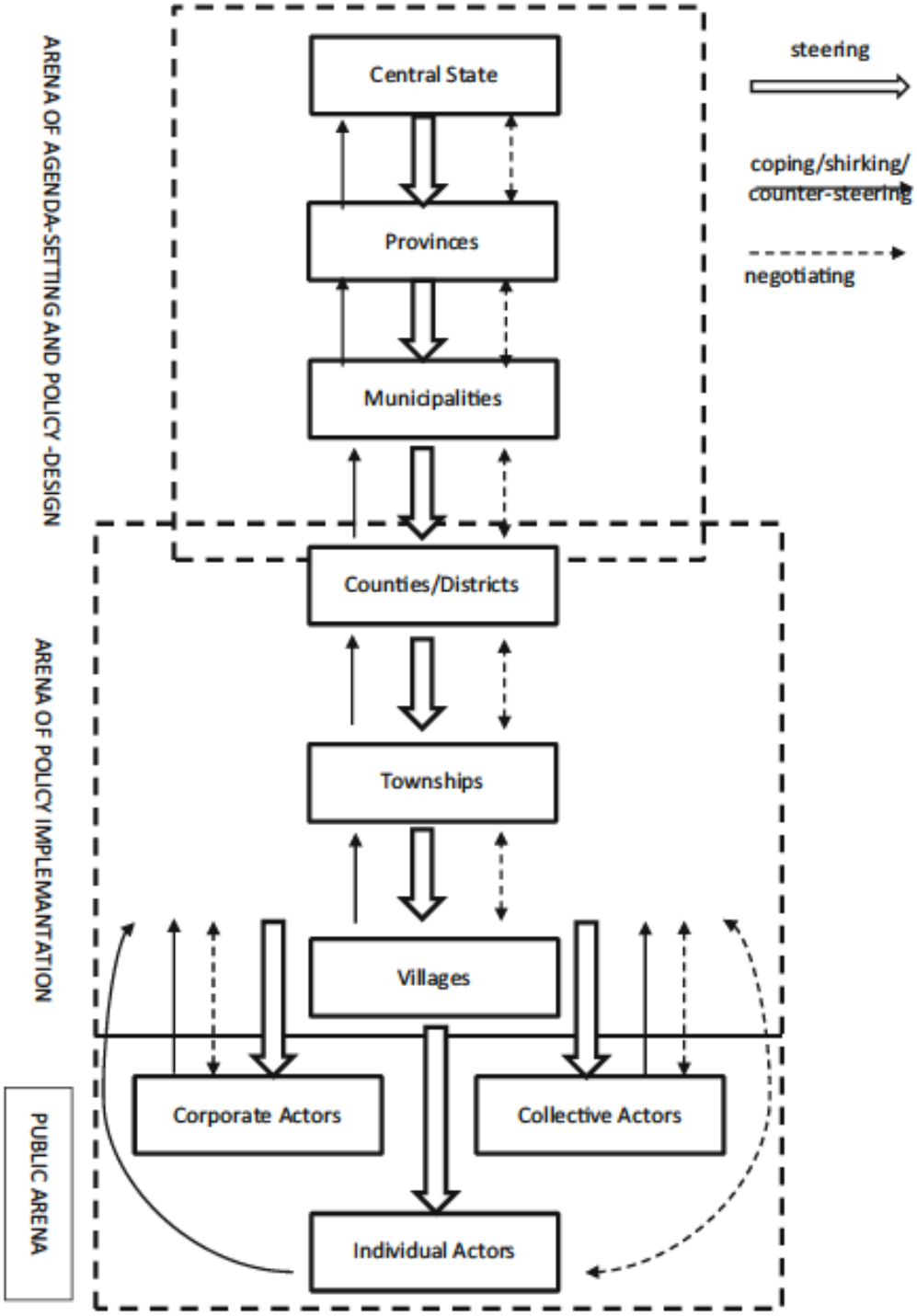
[14] "Soft steering" includes semi-hierarchical guidance, discursive practices of steering, and vertical metagovernance. It can be understood as the steering of self-steering in the shadow of hierarchy.

top-level design—it is often the central government that facilitate the collaborative actions and design their procedures among local actors (Gjaltema, Biesbroek, & Termeer, 2020).

In China's distinctive mode of multi-level steering, "local governments are 'steering objects' from the perspective of the center, but 'steering subjects' in their own right vis-à-vis their subordinate jurisdictions" (Schubert & Alpermann, 2019, p.208) (Figure 4). The changing roles parallels the principal-agent problem in Chinese bureaucracy (Zhou, 2010; Zhou & Lian, 2020). The central government and provincial government are the "principal" who enjoys the highest and formal (symbolic) authority in agenda-setting and institutional design; the county-level governments are agents, responsible for the actual policy implementations. The metropolitan-level government simultaneously plays the role of supervisor and principal. It supervises lower-level governments to ensure implementation, while also enjoys certain discretionary power in localized goal-setting and incentive provision, as a form of real authority delegated/ "subcontracted" by the central government.

Figure 4

China's multi-level steering structure.



Note. Reprinted from "Studying the Chinese Policy Process in the Era of 'Top-Level Design': the Contribution of 'Political Steering' Theory," by Schubert, G., and Alpermann, B., 2019, *Journal of Chinese Political Science*, *24*(2), 199–224, p.214.

The “principal-supervisor-agent” dynamics help explain why under a subcontracting mode of environmental governance, information asymmetry and incongruence of goals between agents and principal are the most likely to induce counter-steering strategies in environmental policy implementation such as collusion (between agents and agents, and agents and supervisors), selective policy implementation, and manipulation of targets and data to compromise state policies and make environmental performances harder to evaluate (Kostka & Nahm, 2017; Zhou, 2010; Zhou & Lian, 2020).

Greater central-level demand means "the system has arguably become even more ‘pressurized’ than it had been before the Xi Jinping era” (Schubert & Alpermann, 2019, p.202). The “pressurized system”, dubbed “downward acceleration of implementation pressures level by level” (层层加码, *cengceng jiama*), describes the long-lasting organizational system (体制, *tizhi*) of Chinese local bureaucracy (Yang & Yan, 2018; Zhou & Lian, 2020). On one hand, there is an asymmetry between the workload and the authority lower-level governments are able to exercise.[15] On the other hand, the supervisor might impose higher goals upon the agent to ensure policy outcomes do not fall short (Ran, 2013; Zhou & Lian, 2020). This often results in local governments overachieving their targets by adopting a blunt, clear-cut approach for environmental policy implementation, data manipulation, and other moral hazards. The pressurized system concept is useful to understand local governments’ behaviors in collective actions. As Schubert & Alpermann (2019) suggested, under higher

[15] The ‘inversion of responsibility and power’ (责权倒置) between higher-level party secretary and local-level EBPs is considered as one of the main reasons behind environmental implementation failure in China (Ran, 2013). Meanwhile, due to the constraints of the ‘*hukou*’ system, residents cannot easily ‘vote with their feet’, which allows local governments to “race to the bottom” when managing environmental pollutions. Though these behaviors have improved in certain areas of environmental protection in recent years (Z. Zhang, Jin, & Meng, 2020).

pressure from above, local governments might be forced to "row" even harder, and "corporate, collective or individual actors may resist central or local level policies by applying different counter-steering strategies" (p.218).

Studies have shown a mixed effect of strengthened central control on local policy experimentations and innovations. Chen (2017) finds local actors are more constrained by the central government; while the central government "primarily focuses on rule by law and on environmental protection in their top-level designs", local actors' prefer to explore effective channels for public participation to resolve local social conflicts (p.667); Teets, Hasmath, & Lewis (2017) find the central government has limited ability to control local officials' decisions to experiment with policy; and "local pressure to respond to governance problems, imitating peers' innovations, and individual preferences for innovation" are more significant factors (p.514). Shen & Ahlers (2018) find local environmental bureaucracy has been more empowered to take innovative steps and effective implementation strategies, even "enter the previously sacrosanct areas of economic interests and government-business ties" (p.364).

2.3 Local Collaborative Networks for Transboundary Pollution

In light of regional integration, transboundary pollution has made institutional flaws much more visible. The Reform and Opening Up era gave rise to local protectionism, industrial isomorphism, and vicious political competition among local governments, which have hindered regional environmental collaboration (Zhou, 2010; Cui, 2020). The mismatch between the biophysical environment and administrative units is also a major barrier. Unlike many federal countries, in China there is no formal governmental body at the regional level to facilitate coordination among provincial-level governments. There is also limited room to

establish such an authority, as it requires the establishment of a comprehensive legal system to supports it (Cui, 2020). Proponents of authoritarian environmentalism might believe that a strong centralized political authority can transcend jurisdictional boundaries and internalize negative externalities, while in reality this mode of governing has been proven to be rather insufficient (Huang & Xu, 2017). Cross-jurisdictional environmental governance thus requires sufficient legislation support, institutional coherence, and the mobilization of relevant state and non-state actors.

2.3.1 The Institutionalization of Regional Collaboration: Forms of Interlocal Agreements

Most studies on China's regional environmental governance have a focus on interjurisdictional relations. Among them, Richard C. Feiock and colleagues' Institutional Collective Action (ICA) framework has been widely applied and modified to China's context (Chen, Ma, Feiock, & Suo, 2019; Yi, Shen, Zhang, & Feiock, 2016; Yi et al., 2018). The ICA framework is built on the research of interjurisdictional collaboration, collaborative governance, and network governance (Yi et al., 2018). It focuses on externalities of choice in fragmented systems (Feiock, 2013). ICA studies employ quantitative methods to investigate how regional collaborations in China are institutionalized through interjurisdictional agreements (IJAs). The forms of IJAs range from informal meetings to formal agreements (Suo, Kan, & Tu, 2018; Yi et al., 2016, 2018) (see Table 2). IJAs are ties and links in local government networks; and policy and administrative choices are accounted for in terms of transaction costs and collaboration risks. Taking into account the features of Chinese administrative system, Yi et al., (2018) categorize three common forms of IJAs for environmental sustainability: *informal agreement*, *formal agreement*, and *imposed authority*. The first two mechanisms are employed by self-organizing governmental entities to overcome horizontal

collective action dilemmas; the last one indicates imposed requirement of city collaborations by higher-level authorities. In the YRD, informal and formal IJAs are both commonly used, while imposed authority is less prominent (Yi et al., 2018).

Table 2

Forms and Main Functions of IJAs

Forms of IJAs	Examples	Functions
Informal agreements	Site-visiting, joint meeting, forum, conference, memorandum; collaboration suggestions	Information sharing, trust and capacity building, problem solving, and service delivery (self-organizing and flexible)
Formal agreements	Framework agreement, joint planning agreement, collaboration statement, binding mutual contracts	Coordinate and delegate responsibilities, work lists, (the most formal, standardized and targeted act of cooperation)
Coordination Office	Regional Pollution Prevention and Control Cooperative Team	Facilitate cross-jurisdictional, cross-departmental coordination and collaboration

From the perspective of regional public administration, Yang (2015) provides two alternative mechanisms: *large administrative unit-led* and *equal and mutually beneficial*. Most of the collaborations in the two provinces and one municipality fall into the category of led by large administrative unit. Higher-level authority like Shanghai advocates and promotes cooperation with nearby local governments and bears the initial costs of the collective action. They also benefit more from the collaboration than other partners. An ideal type of local government network is composed of members that are equal and "mutual benefits" is the key: even if no one benefits, at least all can reduce costs through the collective action. The

most common IJAs employed in this ideal type are *joint meeting*, *intergovernmental agreements*, and *(coordination) office*.

2.3.2 Factors that Influence Collaborative Actions

The above studies showcase the complex balance between interventions from higher-level authority (central and provincial governments) and local self-organizing actions. Other studies on this subject find that strong horizontal metagovernance[16] and leadership are the necessary preconditions for more intensified inter-organizational activities; environmental status disparity and autonomous capacity disparity were sufficient conditions, while strong vertical metagovernance is neither a necessary nor a sufficient condition (Mu, Jia, Leng, Haershan, & Jin, 2018). The YRD exhibited strong horizontal metagovernance, strong leadership, and weak environmental status disparity. In a comparison study on the effectiveness of cooperation environmental governance between the JJJ and the YRD, Mu & Spekkink (2018) find the cooperative structure that was already in place left little room for central government's intervention. The national initiatives hence mainly built on existing cooperation and provided more legitimacy for local policies.

The political tournament explanation offers complementary insights, in which local officials' behaviors are explained through zero-sum political competitions with their neighboring administration with the same ranking (Zhou, 2004). In China's border areas, earlier studies show political incentives for promotion have led to two situations. First, local officials' relative positions in the political rankings made it easier for economic cooperation

[16] Horizontal metagovernance refers to self-organizing mediation and facilitation at the same authority level.

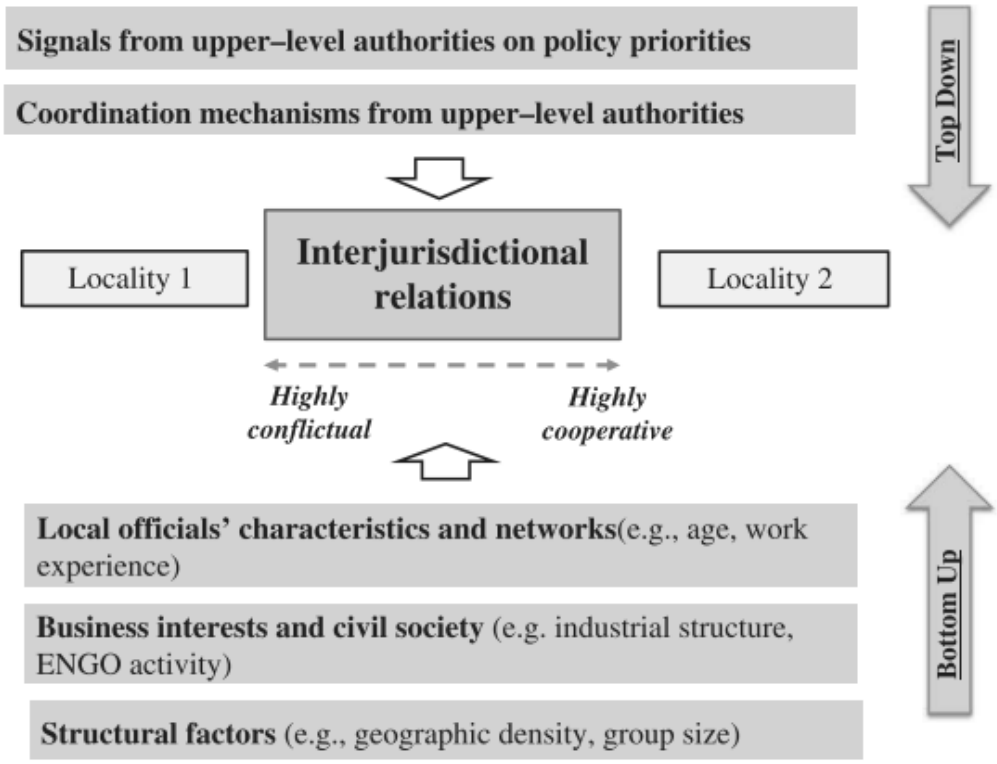
to happen between a fiscally weak government and a fiscally strong government, as they are not in the same political competition group, their relative rankings would not be hindered by cooperation (Zhou & Tao, 2011; Cui, 2020). For this reason, cooperation is less likely to happen in the "weak + weak" or "strong + strong" combination. The YRD case falls into the "strong + weak" category due to Shanghai's "big brother" position; second, local governments are less inclined to cooperate to provide public goods that have positive spillover effects (such as improving environmental quality). Pressure from the central government has led to strategic polluting as provincial governments tend to allocate the most lenient environmental regulation enforcement in its most downstream counties when trying to meet the pollution reduction mandates (Cai, Chen, & Gong, 2016).

Fewer studies have taken a broader scope in which the local government networks are nested within a regional context that involves private interests and the general public. Eaton & Kostka's (2018) preliminary analytical framework for interjurisdictional collaboration on transboundary pollution included factors from the industry and civil society that shape local governments behaviors (see Figure 5). They go beyond the political tournament paradigm and characterize interjurisdictional relations via the interactions between four categories of variables: political institutions (top-down signals and coordinating mechanisms), local officials' characteristics and personal networks, bottom-up factors (business interests and civil society), and structural factors (geographic density, group size). Westman & Broto (2018) provide a more refined outlook on bottom-up factors through the lens of governance networks and sustainability partnerships. Under a top-down model of environmental policy making, local partnerships do emerge and the majority of their sample took the form of "company-led". These partnerships often are built for technology development and profit generation;

sustainability was used to legitimize investment decisions. Furthermore, the inclusion of actors was based on their technical expertise and economic leverage (Westman & Broto, 2019).

Figure 5

Framework for analysis of interjurisdictional environmental interactions



Note. Reprinted from "What makes for good and bad neighbours? An emerging research agenda in the study of Chinese environmental politics," by S.Eaton, & G.Kostka, 2018, *Environmental Politics*, 27(5), 782–803, p.793.

Multijurisdictional collaboration requires a higher level of trust, mutual understanding, and commitment than bilateral local-local relations, which entails increased transaction costs, opportunistic behaviors, and complexity of collaborative structures (Andrew, 2008). Moreover, reducing the iterative processes of a collaborative system to top-down and bottom-up forces would leave out some important elements, such as how the history of

cooperation (Mu & Spekkink, 2018) and counter-steering measures (Schubert & Alpermann, 2019) might influence top-down factors and feed into the system. China's policy-making process, as Heilmann (2018) aptly described, is "an oscillating multi-level interaction rather than as a dichotomized process of centralization versus decentralization" (p.91). Hence, the iterative components of collaborative dynamics could be further analyzed.

2.3.3 Synthesizing Concepts and Frameworks

Mai & Francesch-Huidobro (2014) integrate governance network theories and collaboration theories and make them more applicable to China's semi-authoritarian, hybrid political system.[17] They incorporated mobilization as an important tool for collaborative networks that engage private and voluntary sectors. Mobilization in this context is about assemble financial, material, and personal resources, also securing consent and engaging actors from epistemic community and civil society, which often requires local governments broadening mobilization beyond their own administrative jurisdictions. The framework for collaborative municipal networks proposed by them is based on Ansell & Gash's (2008) and Emerson, Nabatchi, & Balogh's (2012) integrative framework on collaborative governance (see Figure 6) which broadly defined collaborative governance as:

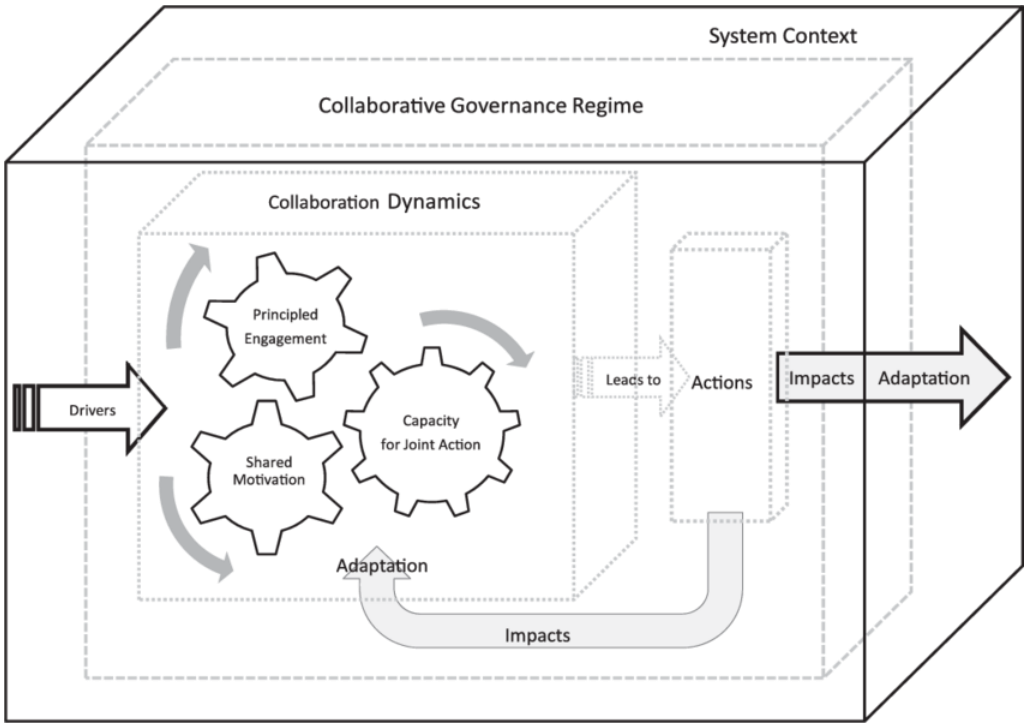
> the process and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government,

[17] Mai & Francesch-Huidobro (2014) reflected on the theoretical limitation of existing frameworks such as multi-level governance, network governance, and governance networks. They pointed out the foundations of these frameworks, for instance, democratic theory and reflections on federalism, might constrain their explanatory power when being applied to the case of China.

and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished (Emerson et al., 2012, p.2).

Figure 6

The Integrative Framework for Collaborative Governance



Note. Reprinted from "An integrative framework for collaborative governance," by K. Emerson, T. Nabatchi and S. Balogh, 2012, *Journal of Public Administration Research and Theory*, *22*(1), 1–29, p.6.

This study follows the works of these authors as they extend the scope of collaborative governance to more a diverse range of entities and focus on the institutional design of the networks. This collaborative governance framework also offers a comprehensive set of elements to analyze, and is more relevant to institutional innovation as it "pushes beyond task integration to deliver break-thorough change" (Keast, 2016, p.446). Components of this framework encompass variables outlined by authors such as Mu et al. (2018) and Eaton & Kostka (2018) and overlaps with the ICA framework (see Table 3). Furthermore, it depicts how

collaborative networks for a public purpose are nested in larger systems, namely the *collaborative governance regime* (CGR) and the *system context*. These components operate in an iterative manner. They generate intermediate outputs (network actions) and end outcomes (impacts and adaptation) of collaboration (Emerson et al., 2012) which then feed into the system itself. Though the actions and impacts of the LCNs are premature in the case of the Demonstration Zone, these components are analyzed in this study to interpret potential implications of collaborations.

Table 3

Common elements that influence cross-jurisdictional collaborative environmental governance

Components	Variables	Authors
System Context	Political institutions; structural factors	(Eaton & Kostka, 2018; Schubert & Alpermann, 2019)
	Historical interactions (existing coordination mechanisms)	(Mu & Spekkink, 2018)
	Common interests; resource attributes (see Chapter 2.3.5)	(Cui, 2020; Suo, Kan, & Li, 2020)
Drivers	Imposed authority	(Suo et al., 2018; Yi et al., 2018)
	Metagovernance (various modes of steering); leaderships	(Mu et al., 2018; Schubert & Alpermann, 2019)
	Business interests; technology development;	(Eaton & Kostka, 2018; L. Westman & Broto, 2018)
Principled Engagement	Local coordination and collaboration mechanisms; Forms of IJAs	(Suo et al., 2018; Yi et al., 2018)
Shared Motivation	Historical interactions (mutual trust)	(Mu & Spekkink, 2018)
Capacity for Joint Actions	Power asymmetries	(Zhou & Tao, 2011; Cui, 2020)

	Leaderships	(Mu et al., 2018)
	Local officials' characteristics and networks	(Eaton & Kostka, 2018)

2.3.4 Defining Local Collaborative Networks for Institutional Innovation

One main function of local collaborative networks (LCNs) is to institutionalize coordination and collaboration mechanisms for cross-jurisdictional environmental management. Coordination precedes collaboration, it partly constitutes interactions during the initial stage of collaboration (Mai & Francesch-Huidobro, 2014). The initial stage involves "mutually perceived crisis" or the "threat of adverse regulation, protest, or negative publicity" (Hartman, Hofman, & Stafford, 2002). In the YRD, a long history of cooperation in the economic sector could also be a contributor to sustainability partnerships (Mu & Spekkink, 2018). Coordination interactions can be divided into *inter*governmental and *intra*governmental dimensions (Mai & Francesch-Huidobro, 2014). The former concerns the interactions within the structure of vertical hierarchy (governments of different ranks) and horizontal relations (governments of similar ranks); the latter deals with the interaction between different departments or agencies within one government. For instance, the aforementioned IJAs situate in the *inter*governmental dimension, while the RCS is more concerned with the *intra*governmental dimension.

These interactions serve functions such as resolving conflicts and building consensus through active networking among participating jurisdictions and other entities that have authority, resources, and information. Governmental departments and local officials are key actors in these interactive processes. They have the decision-making capacities and

responsibilities to resolve conflicts (i.e., through negotiation and bargaining) and foster meaningful relationships among a diverse range of network members. Ideal types of LCNs for regional integration are not ad hoc or piecemeal arrangement, but long-lasting and evolving.

Collaboration occurs when autonomous stakeholders progress from underorganized systems to tightly organized systems (Hartman et al., 2002). Through coordinated decision-making, stakeholders develop interdependency, compromise and handle differences, and have joint ownership of decisions and collective responsibility for environmental outcomes. Collaborative actions are produced through interactive and iterative processes that include *principled engagement,*[18] *shared motivation*, and *capacity for joint actions* (Emerson et al., 2012). These components generate internal legitimacy among participants, which confirms "participants in a collective endeavor are trustworthy and credible, with compatible and interdependent interests, legitimizes and motivates ongoing collaboration." (Emerson et al., p.14). Together they constitute the *collaborative dynamics* which is nested within CGR and general system context.

The system context is similar to the "conditions" mentioned in the previous section but not identical. They are the underlying political, socioeconomic, environmental and cultural factors that influence the dynamics of the networks, and in turn, affected by the collaborative actions. Emerson et al. (2012) further separated *initial drivers* from contextual factors. These drivers are necessary variables "without which the impetus for collaboration would not

[18] As described by the authors, "Principled engagement occurs over time and may include different stakeholders at different points and take place in face-to-face or virtual formats, cross-organizational networks, or private and public meetings, among other settings." (Emerson et al., 2012, p.10).

successfully unfold" (p.9). Elements within these drivers are *leadership, consequential incentives, interdependence,* and *uncertainty.*

Institutional innovation could be understood as "a political process in which actors contributed to a larger solution by recombing inherited practices, technologies, and institutions to address their own unique and partisan interests" (Hargrave & Van De Ven, 2006, p.865). In China, IJAs has been considered as institutional innovation in regional governance (Chen, Ma, & Suo, 2015). In combination with the general public's growing concerns for the environment and demands for higher living standards, technological advancement, especially the widespread information technology is also a main component in institutional innovations (Hsu, Yeo, & Weinfurter, 2020; Kostka, Zhang, & Shin, 2020). In the environmental sector, public participants have long been marginalized in the policy-making processes (Feng, Wu, Wu, & Liao, 2020; Kostka & Zhang, 2018). Hence, institutional innovations entail a new mixture of market, voluntary, and informational instruments, in addition to making the collaborative networks more open to the general public and social supervision (Feng et al., 2020; Guo & Bai, 2019).

Deriving elements from the works of Emerson et al. (2012) and Mai & Francesch-Huidobro (2014), LCNs in this research is conceptualized as: the iterative and interactive processes among a plurality of local actors, while maintaining their autonomy and administrative affiliations, achieving the shared objective of resolving cross-jurisdictional environmental pollution through a range of activities that involve formal and informal agreements, collective decision-making, and resource mobilization.

2.3.5 Shortcomings and Differences of LCNs in Transboundary Pollution

Although collaboration is often framed as a normative strategy for complex environmental issues, it is not without shortcomings. It tends to marginalize politically weaker groups, as "the distribution of environmental costs and benefits might be skewed toward the advantage of relatively powerful social groups, and inhibits fundamental changes in social values and forces that contribute to environmental destruction (Hartman et al., 2002, p3). Westman & Broto's (2019) findings on urban environmental politics in China echoes this notion, inclusion in policy-making favors those who have technical expertise and economic leverage. Feng et al., (2020) also find environmental decision-making in China mainly involves participants with professionalism or an affinity with the environmental departments due to the vague scope in the legislation. In China, the line between state and non-state actors is also rather blurred. The space of non-state actors in Western context is dominated by public service units[19] (事业单位, *shiye danwei*) and state-owned enterprises; and ENGOs are not completely independent of the government (Guttman et al., 2018). In the case of environmental governance, relevant public service units include the China Academy of Environmental Planning and the local environmental monitoring and inspection bodies entrusted by the EEBs (Guttman et al., 2018; Y. Ma, 2017).

There are also distinctions in transboundary environmental collaboration according to specific environmental issues. When comparing the differences between air and water pollution collaborative management in the YRD from 2009 to 2018, Suo, Kan, & Li (2020)

[19] This term is often translated as "public institutions" or "service organizations". It refers to social service organizations affiliated with state agencies or other organizations that use state-owned assets for the purpose of social welfare.

shows the level, methods, and network structures of collaboration vary significantly. Using the ICA approach, they find that these differences are rooted in *asset specificity* and *service measurability*.[20] Air pollution demonstrated low asset specificity as its fluidity and spatial spillover made governance subjects and stakeholders less certain about the geographic boundaries and the beneficiaries of collaborative actions. Thus, the forms of collaborative governance on air pollution are more flexible and the networks are more loosely organized. Water pollution management, on the contrary, has high asset specificity and high service measurability, so it is easier for local governments to enter into agreements and clarify the division of rights and responsibilities of the parties. This explains the large number of basin-level ecological compensation agreements signed in recent years. These distinctions are taken into consideration when examining LCNs in the Demonstration Zone.

3. Methodology and Analytical Framework

3.1 Methods

This thesis uses a case study approach as it is explorative by nature. As described in previous chapters, environmental collaborative governance and institutional innovations in China are multifaceted and quantitative studies often show contradicting results. A case study has advantages compared with other methods in understanding the "how" and "why" research questions in a contemporary phenomenon (Yin, 2009). Through qualitative modes of enquiry, this study investigates policy initiatives surrounding two key transboundary environmental

[20] Asset specificity is defined as "the extent to which a specialized investment needed for the production of one service can also be used for the production of another"; service measurability refers to "the relative difficulty in measuring and monitoring the outcomes of the services"(Andrew, 2008)

issues: water pollution and air pollution. The main research subject is a pilot site launched in 2019: the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone (长三角生态绿色一体化示范区, referred to as the "Demonstration Zone"), governed by three provincial-level administrative units: Shanghai, Zhejiang, and Jiangsu. The most directly involved administrative units are three district/county-level local government: Qingpu, Jiashan, and Wujiang.

The subject of this study is selected for several reasons. First, these neighboring jurisdictions have a long history of relations built on shared culture, economic integration, industrial structuring, and joint planning of infrastructure. In light of the YRD integration plan, extensive collaborative networks in the region have emerged as the flows of material and immaterial elements intensify. Affiliated with three of the most affluent municipalities/provinces in China, the local governments involved in the Demonstration Zone enjoy a relatively high degree of autonomy and have more potential in introducing trailblazing initiatives. Their strategic importance also allows them to have a strong influence through world city networks.[21] Secondly, in recent years, actors within these networks have been proactively engaged in interjurisdictional and interjurisdictional collaborations in various issue areas. Many new environmental policy instruments have been explored in the YRD and industries in the Demonstration Zone are subjected to the most stringent pollutant discharge

[21] According to GaWC 2020, Shanghai is classified as alpha+ (highly integrated cities, filling advanced service needs); Suzhou is classified as Gamma+ (cities that link smaller economic regions into the world economy) Source: https://www.lboro.ac.uk/gawc/world2020t.html

and emission standards in China.[22] The Demonstration Zone is constructed as a testing ground for localities to break administrative boundaries and promote institutional innovations. In fact, the policy-making processes in the Demonstration Zone has its significance in China's regional governance: two provinces and one municipality jointly introduce policies for adjacent jurisdictions with different administrative affiliations; nearly 40 departments are involved in the co-planning and implementation of these policies.

In order to operationalize the conceptual framework of LCNs and build the empirical case studies, data were collected from multiple sources in both Chinese and English. These sources include governmental reports, news publications, meeting summaries and environmental inspection disclosure on official publications (i.e., WeChat handles of the Demonstration Zone, local EEBs, River Chief Offices, and relevant environmental departments). Due to COVID-19, on-site fieldwork was substituted by semi-structured interviews with scholars who study interjurisdictional environmental relations in the YRD city cluster and informants from major stakeholder categories, including one environmental NGO dedicated to water protection on Taipu River Basin, one journalist from a major Shanghai-based newspaper, and one business employer of a local enterprise in the Demonstration Zone (see Appendix A). Each interview were roughly one to two hours in length, conducted between November 2020 to January 2021. Other secondary data include relevant urban study and environmental study literature on regionalization and inter-city cooperation, in addition

[22] According to the joint action plan issued by three provincial-level EEBs: the Pioneer Zone will implement the most stringent emission standards issued by the State, Shanghai, Jiangsu and Zhejiang industries, and specific regions for pollutant emissions from new industrial projects. The relevant requirements will be extended to the whole area of the Demonstration Zone. Source: https://sthj.sh.gov.cn/hbzhywpt2025/20201026/b2cb6957601141408b3e5c1944cb1ae1.html

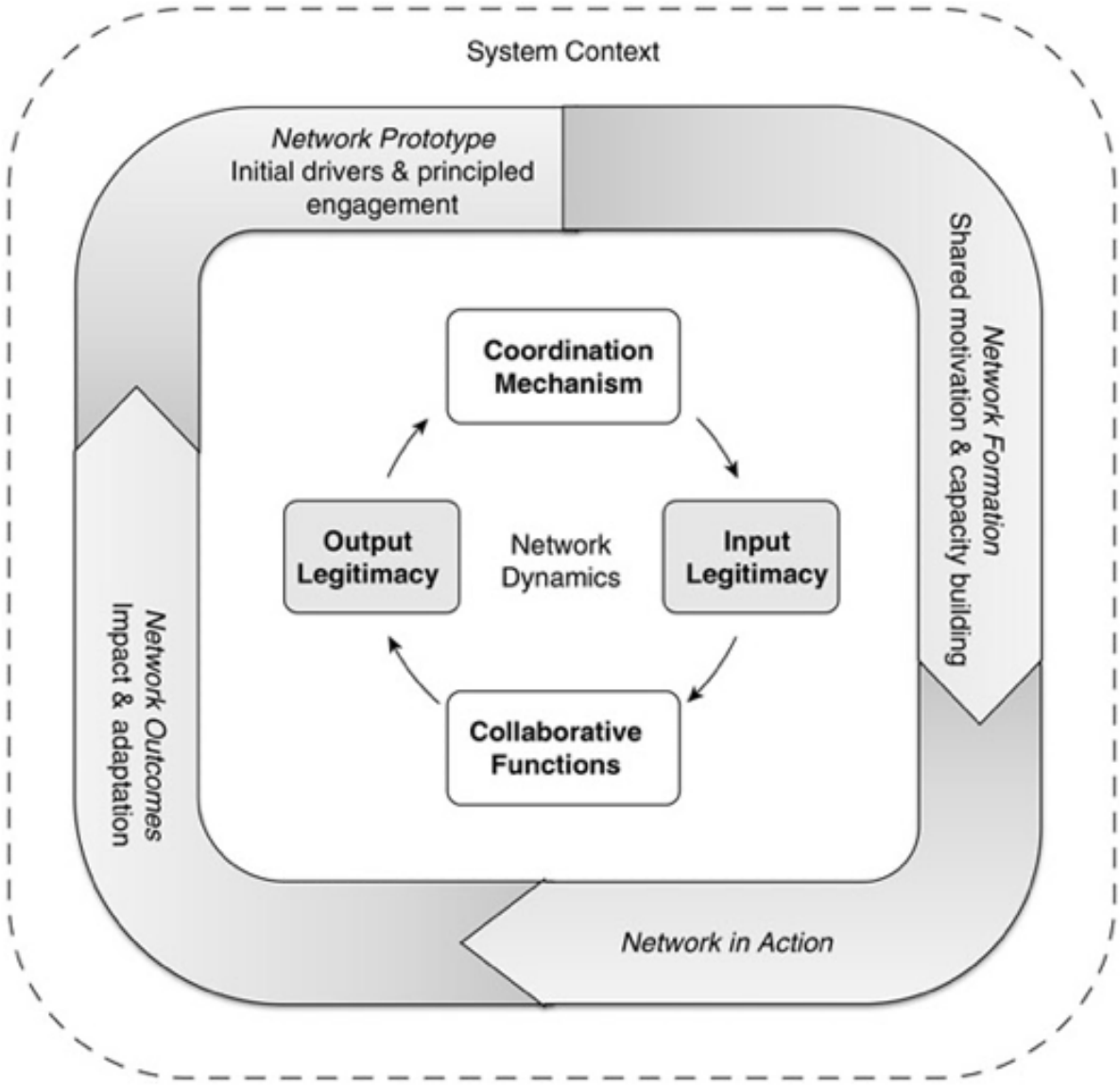
to policy documents, grey literature published by think tanks and research institutes that are involved in the YRD integration plan and projects in the Demonstration Zone.

3.2 Analytical Framework

This thesis follows the analytical framework proposed by Mai & Francesch-Huidobro (2014) propose. It focuses on the governance-design process and structural configuration of the collaborative governance framework (see Figure 7). The authors use two analytical tiers to represent the external and internal processes of collaborative networks. The external tier consists of four stages of network development. They are the varied forms of institutional design during the lifecycle of LCNs: 1) network prototype: initial drivers and principled engagement; 2) network formation: shared motivation and joint capacity building; 3) network in action: initiatives and new practices that are carried out by the actors in joint efforts; 4) network outcomes: impacts and adaptation of the network. The internal tier is the network dynamics embedded in LCNs. These are the coordination mechanisms and collaborative functions that create external changes in the overall network design. The legitimation process is also included in this framework, which is part and parcel of any collaborative governance. Input legitimacy is understood as the practical and adequate representation of those who are governed, including the inclusion of non-state actors to participate in the rule-setting processes (Karlsson-Vinkhuyzen, 2016; Mai & Francesch-Huidobro, 2014). Taking into account the scope and time frame of this study, network outcomes and output legitimacy are discussed interpretatively in the study as they deal with the effectiveness of partnership agreements. Nevertheless, important elements in all four stages are analyzed.

Figure 7

Analytical framework for the development of collaborative network



Note. This framework focuses on institutional design of the life cycle of collaborative networks. Reprinted from *Climate Change Governance in Chinese Cities (Routledge)* (p.54), by Q. Mai and M. Francesch-Huidobro, 2014, Routledge.

4. Case Study

This chapter provides the empirical context for the analysis of LCNs for transboundary pollution in the Demonstration Zone. Each stages of network development of LCNs are

examined in the following sections based on the analytical framework. The key question being addressed is: in regards to resolving transboundary pollution, how do local actors coordinate and collaborate so to realize institutional innovations?

4.1 General System Context: Opportunities and Constraints

General system context refers to the external dimension that influences and shapes the formation of LCNs. It determines the efficacy of the collaboration (Gash, 2016). Elements of the system are not just the "starting conditions" of LCNs as they may also influence the dynamics and performance of collaboration at any time during the life of the collective actions (Emerson et al., 2012). Several key elements are highlighted here. They include intertwined influences such as the socioeconomic, industrial, environmental, institutional conditions, as well as prior failures to address transboundary pollution among the local actors and the policy legal frameworks of the Demonstration Zone.

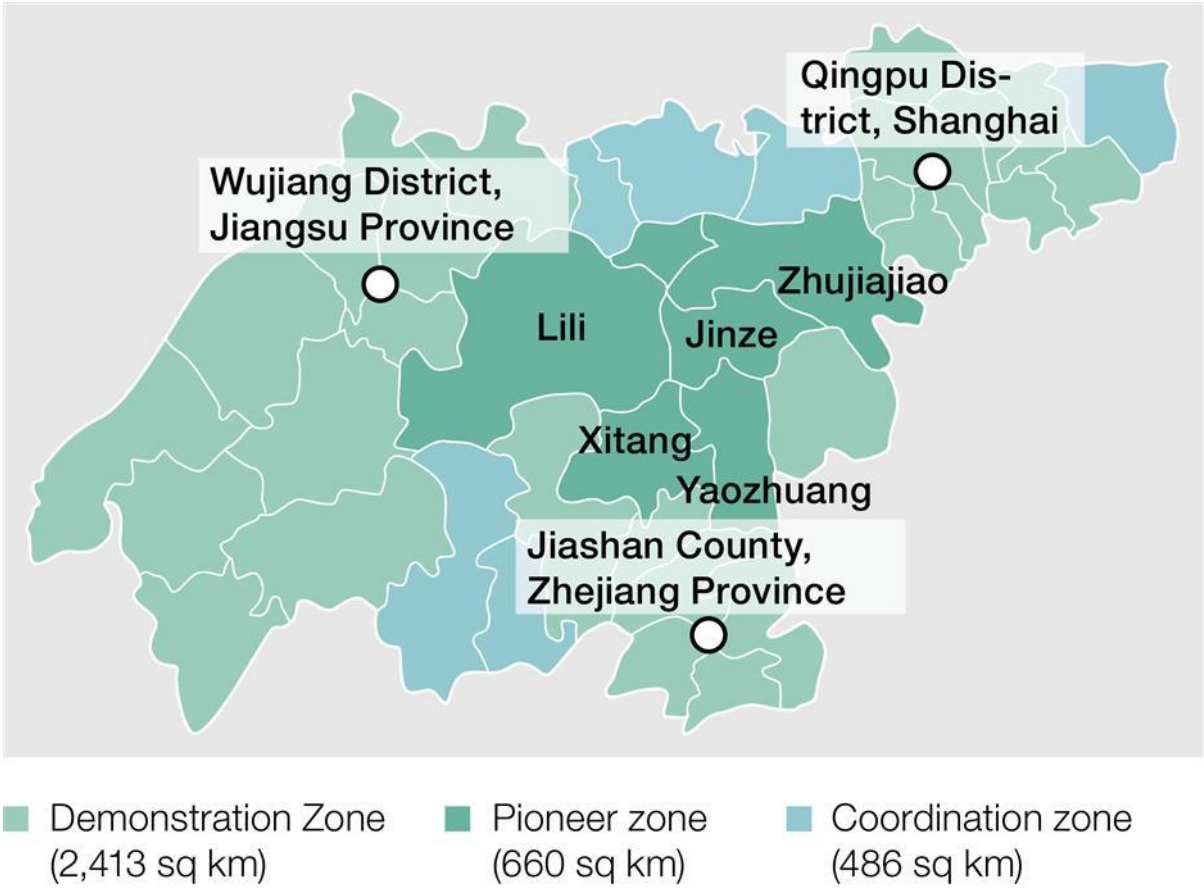
4.1.1 The Social-Economic Profiles of Three Localities

As early as the Ming and Qing dynasties, Shanghai, Jiangsu, and Zhejiang (also referred to as "two provinces and one municipality") have formed a triple-legged structure that supports frequent trade through water networks. They gave rise to a large number of industrial and commercial cities and counties in the YRD region. And they also represent a major part of the *Jiangnan* area, known for its fertile lands, high population density, and rich cultural heritage. The Demonstration Zone is located at the heart of two provinces and one municipality. It consists of two districts and one county (hereafter "three localities"): Qingpu district in Shanghai; Wujiang district in Suzhou, Jiangsu province; and Jiashan county in Jiaxing, Zhejiang province. The size of the Demonstration Zone is approximately 2,300 square kilometres, with

a water body of 350 square metres, and its population is expected to grow from 3.1 million to 3.8 million in 2035. Like numerous areas situated at China's administrative borders, it consists of many sites that were poorly managed, dubbed "neglected by three" ("三不管"地, *sanbuguan didai*). Such a location entails its strategic importance to test out integrative and innovative policies and serve as a role model for strengthening regional environmental protection linkages nationwide. The Demonstration Zone has five townships included in its Pioneer Zone (see Figure 8): Zhujiajiao and Jinze (Qingpu), Lili (Wujiang), Xitang and Yaozhuang (Jiashan), together they cover an area of 660 square kilometers. Reform policies can be implemented first in the Pioneer Zone and then applied to a larger scale. The nearby Coordination Zone was planned alongside the Demonstration Zone during the research period.

Figure 8

Location of the Demonstration Zone, Pioneer Zone, and Coordination Zone



Note. Reprinted from "Ecology, greenery zone plans open for public comment", by SHINE*, 2020, retrieved from* https://www.shine.cn/news/metro/2006180438/

The surrounding traffic infrastructure is relatively well-developed and links the Demonstration Zone with the rest of the YRD cities through Shanghai-Chongqing Expressway, Shanghai-Hangzhou Expressway, Tong Sujia Expressway, Shenjiahu Expressway. And the connectivity and interdependency among these cities will be further strengthened as more high-speed rails and inter-city railways are on the way. The Demonstration Zone is also unique in terms of its tourism appeal, known for a distinctive Chinese *Jiangnan* ancient town culture with ten towns ranked as "national-level historical and cultural town." The Demonstration Zone is set to be a "World-Class Water Villages and Living Environment."

The Overall Plan stipulates the Pioneer Zone to spearhead the process of "converting ecological advantages to development advantages". These townships share a similar culture, geographical conditions, and have a high degree of interactions with regards to businesses and population mobility. Their fiscal conditions and development capacities vary considerably (Table 4), however. Xitang, for instance, has the weakest fiscal condition. Emission reduction and monitoring are costly. It is not clear how economic supports for the Demonstration Zone are allocated among the three localities. According to local EEBs' annual financial accounts, in 2019, Qingpu spent 25.92 million yuan on emissions reduction (including monitoring and inspection) and 1.51 million yuan on pollution prevention. It received 20 million yuan from the governmental funds budget as subsidies for the demolition of industrial enterprises in the secondary protected areas of drinking water sources. Wujiang spent 23.84 million on monitoring and inspection, 25.25 million on pollution prevention, and received 16.32 million for automatic air monitoring stations and automatic water quality monitoring stations. Jiashan's expenditure on monitoring and inspection was 21.73 million while received no subsidy for environmental expenditure.

Table 4

General profile of the Pioneer Zone in the Demonstration Zone

District/ County	Town	Size (km^2)	Fiscal Revenue (100 million yuan)	Population (10,000 people)	Expenditure on emission reduction (million yuan)
Qingpu	Jinze	108.42	22.1	6.25	25.92
	Zhujiajiao	138	21.7	9.25	
Jiashan	Xitang	82.92	6.73	5.7	21.73
	Yaozhuang	74.5	10.38	4	

Wujiang	Lili	258	28.87	14.3	23.84

Note. Data acquired from five town/district councils and local EEBs.

4.1.2 Local Industrial Layout and Its Ecological Implications

Export-oriented manufacturing dominates the industrial structure of the Demonstration Zone. Qingpu is known for producing special materials and precision machinery; Wujiang hosts a large number of textile suppliers and photoelectric communication manufacturers; Jiashan's main industries are precision machinery and tourism. The urbanization process in recent decades has also led to rapid expansion and coarse land use in the area. According to planners involved in the Demonstration Zone, the average output value of its industrial land is considered low by the state standards (Liu, Hu, & Shen, 2019). As of 2018, its GDP per unit of construction land was around 480 million yuan/ km^2, which was in the middle and lower reaches among the suburbs of Shanghai and county-level administrative units in Suzhou and Jiaxing (National Development and Reform Commission, 2019b).

The overall environmental quality in the Demonstration Zone has improved in the last decade, but transboundary pollution remains prominent. As of 2018, PM2.5 and ozone concentration in the Demonstration Zone exceeded National II standards (35 ug/m) and the international concentration level (below 20 ug/ m^3) (Liu, Hu & Shen, 2019). The main water body of the Demonstration Zone, the Taipu River, also faces water safety risks. A dense industrial layout dominated by the textile industry and dyeing enterprises, bustling shipping and cargo transportation, as well as pollutants from the shoreline and nearby agricultural lands has led to persistent water eutrophication in the upstream (Yang et al., 2019).

Albeit the lack of innovative appeal, private entities in the Demonstration Zone are quintessential to their industries. They have also been the main targets for a range of "campaign-style"[23] environmental enforcement in recent years.

Jiashan: The Xitang town, aside from being one of the most famous historic water towns in China, is also dubbed "hometown of buttons", with button manufactures take up around 40% of the national market share. In 2014, the local government launched a "button industry special remediation", targeting wastewater management in addition to exhaust gas, noise, and solid waste. The relocation and removal of button producers through the remediation cut the number of local enterprises from 1,030 to 636.[24] Its neighbouring town Yaozhuang is more industrialized in comparison. Most of its GDP and job opportunities are generated by the precision machinery industry and communication electronics industry. In 2020, the Yaozhuang government launched six-month special remediation and dismantled 31 "low-end, small, and scattered"(低小散, *dixiaosan*) enterprises, and 108 existing enterprises in industrial parks have been rectified.[25]

[23] "Campaign-style governance" refers to the regulatory approach adopted by the CPC that is often enforced by various administrative agencies over a relatively short period of time. A large number of resources are mobilized for enforcement, with the involvement of the public and the media. Campaign-style enforcement has played a positive role in mitigating air pollution. However, this approach is also criticized for its one-size-fits-all logic which often results in unintended consequences and overlooks the root causes of environmental problems.

[24] Shangguan xinwen. (2019, October 9). *Zai dashun zuo niukou de renmen* [People who make buttons in Dashun]. https://k.sina.com.cn/article_3844617568_e528356002001bmo0.html

[25] Zhejiang zaixian (2020, September 11). *Jiashan Yaozhuang xianqi quanyu shengtai huanjing zhengzhi "fengbao" shouzhu meili chengzhen lvse "dixian"* [Jiashan Yao Zhuang set off the whole area of ecological and environmental improvement "storm" to keep the green "bottom line" of beautiful towns]. https://town.zjol.com.cn/gun/202009/t20200911_12287648.shtml

Wujiang: The Lili town adopted an administrative system that combines township and district (Fenhu high-tech development zone). It hosts the headquarter of Canny Elevator Co., Ltd which is a major player in the elevator manufacturing industry. There are around 200 elevator manufacturing businesses currently in Lili/Fenhu. By the end of 2019, the elevator industry in Wujiang accounted for one-sixth of the country's total output (Xiong, 2020). In recent years, concerns for market competition and energy consumption have driven the Wujiang government to turn to the semiconductor industry and high-end intelligent equipment for an industrial upgrade. The elevator manufacturers and "low-end" enterprises in Wujiang such as farming companies, timber markets, acrylic engraving, signage processing,[26] and chemical storage enterprises are deemed ill-fitted for the Demontration Zone. They are among the first entities to be eliminated after the integration was launched.[27]

Qingpu: Qingpu is the most water-rich district in Shanghai, with a water area accounting for nearly 40% of the total district, including all 21 lakes in Shanghai. Nearly half of Qingpu's population lives in rural areas. Its tourism hotspot Zhujiajiao is a traffic hub of Jiangsu, Zhejiang, and Shanghai, well-equipped with waterway transportation. Ecological protection has been a prerequisite for local investment attraction and is also seen as a constraint for its economic development. For instance, "the red line of farmland", a policy that converts inefficient construction land to cultivated land, restricts Zhujiajiao's from attracting social

[26] Engraving and signage production was another dominant industry in Wujiang.

[27] Lili renjia. (2019, June 12). Wei lvse shengtai fazhan tengnuo kongjian, Fenhu zhe chang gongjianzhan chengxiao xianzhu! [To make room for green ecological development, this defense battle in Fenhu is effective!] https://www.sohu.com/a/320093573_678180

capital.[28] After being classified as part of the Pioneer Zone, industrial upgrades have become the focal point for local government. Zhujiajiao's neighboring town Jinze is one of Shanghai's main sources of drinking water since 2016. Jinze has also been developing on the premise of ecological protection, which has limited its industrial expansion. The water area accounts for 25% of the entire town and includes one primary water source protection zone (the Jinze Reservoir) and one secondary water source protection zone (the area around the Dianshan Lake). Through a series of industrial structure adjustments and factory dismantling, Jinze has reduced the discharge outlet of enterprises in the protected areas to ensure water quality.

4.1.3 Interests and Conflicts over the Taipu River

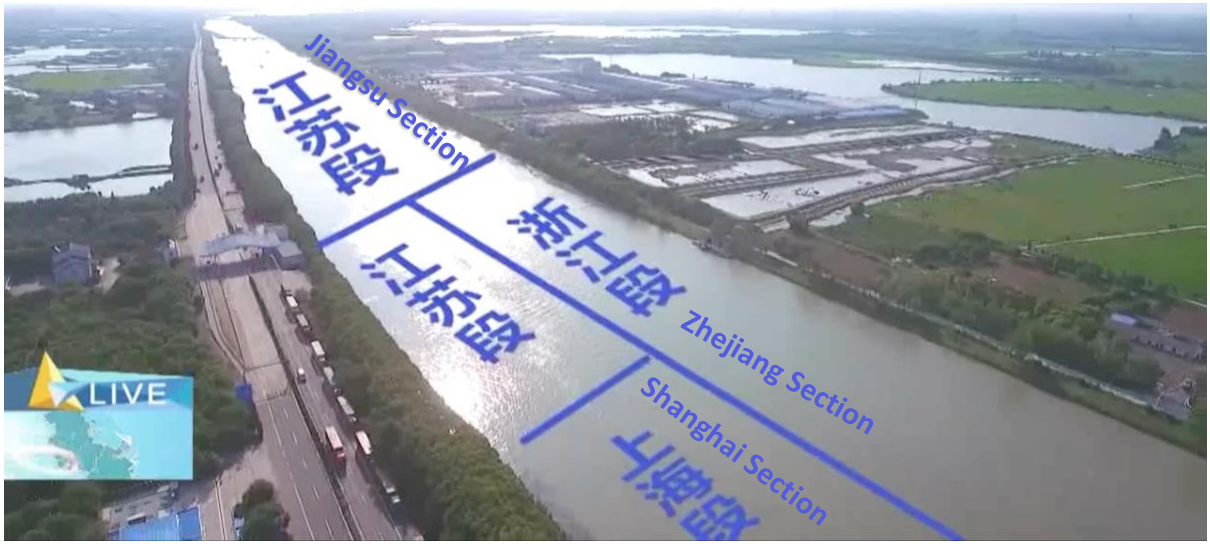
Water pollution is the main cross-jurisdictional environmental problem in the Demonstration Zone. The Demonstration Zone covers the Dianshan Lake area of the Taihu basin. One of the largest canals in the basin, the Taipu River, stretches through all three districts/counties and plays a major role in the social and economic development of the region (see Figure 9). Between the upstream area of Wujiang and the downstream areas of Jiashan and Qingpu, the Taipu River serves different functionalities. Its management has been compromised by conflicting interests and demands among the local governments (Wang, Gu, & Higano, 2006; Yang et al, 2019). The major conflict lies in the counter-intuitive usage of the water resources: the upstream user relies on its volume, while the downstream users rely on its quality (see Table 5). The frequent changes of water flows gave local officials an excuse to not take any

[28] Shanghai has restored inefficient construction land, such as illegal industrial land and scattered house bases, into agricultural land or ecological land through demolition and reclamation and other land improvements. According to the town mayor, rural land is tightly managed and there is a lack of land-use indicators. Source: https://www.thepaper.cn/newsDetail_forward_9780139_1

prompt action. The deputy chief of the River Chief Reform Administration in Wujiang described the situation between Wujiang and Jashan in an interview: “[during] the rainy season the current is strong, so the water hyacinth on the surface tends to flow towards the middle and to the downstream. That way we didn't have to clean them up” (Wu, 2020).

Figure 9

Aerial photography showing sections of Taipu River managed by three provinces/municipality.



Note. From Jiangsu News (2019, September 25). *Shuishuo sange heshang mei shui he? Zhe tiao he hu su zhe gong you, hai yue lai yue qingche!* [Who says three monks have no water to drink? This river is shared by Shanghai, Jiangsu and Zhejiang, and is getting clearer and clearer!]. [Video]. Ixigua. retrieved from https://www.ixigua.com/6740447579068170760 *Translated and modified by author*

Table 5

Conflicts of interests between upstream and downstream users of the Taipu Lake

Interests	**Upstream (Wujiang)**	**Downstream (Qingpu, Jiashan)**
Function	Flood control, shipping, irrigation	Drinking water supply; ‘Clearwater Corridor’
Cost	Increased cost and investment in water protection due to higher	Upstream user is obligated to ensure the quality of the water;

	standards; expect downstream users to compensate	have weak incentives to compensate
Standards	Higher standards create more constraints on local economic development; Challenges in technical transformation	Eliminate antimony pollution; Ensure the quality of drinking water supply
Water Right	Reluctant to increase discharge due to loss of water source	Expect upstream user to increase the discharge volume of the water source to ensure water quality

Note. Translated and modified based on Yang et al. (2019) by author

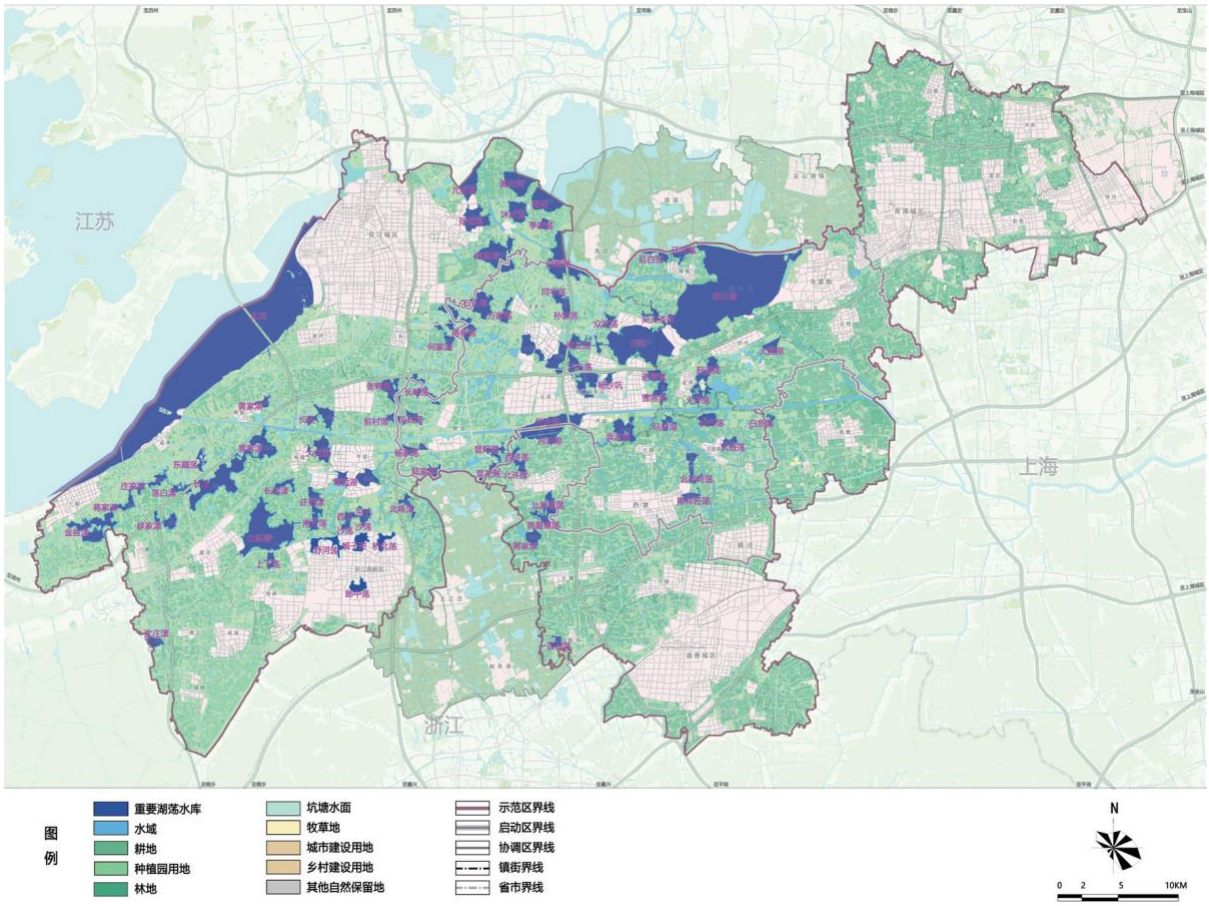
The recent construction of drinking water sources in Jiashan and Qingpu creates higher requirements for water environmental protection at upstream. Sufficient water supply has to be ensured. The mainstream water quality needs to meet the target of Grades II-III[29] and eliminate the risk of antimony pollution caused by Wujiang's textile industry (Yang et al, 2019). Therefore, Wujiang has strengthened the control of point-source industrial pollution and nonpoint-source agricultural pollution. When dealing with emergent cross-jurisdictional water pollution, Wujiang often takes a clear cut approach to reduce antimony content in wastewater, i.e., shutting down and limiting the production of relevant industrial enterprises, in addition to diluting wastewater by increasing the discharge volume, hence it bears the loss of water rights (Yang et al, 2019). Overall, there are over 47 cross-border rivers in the Demonstration Zone (shown in dark blue in Figure 10). Take Jiashan for example, 22 out of its 56 river channels are bordering Qingpu and 15 bordering Wujiang. Previous studies on the

[29] Grade II: mainly applicable to the primary protection zone of centralized domestic drinking water and surface water sources, habitats of rare aquatic organisms, spawning grounds of fish and shrimps, baiting grounds of young and juvenile fish, etc. Grade III: mainly applicable to secondary protected areas of centralized domestic drinking water and surface water sources, fish and shrimp overwintering and return passage, fishery waters such as aquaculture areas and swimming areas.

Taipu River call for both internal coordination mechanisms (ie. Eco-compensation) and external supports (ie. mediation from basin agencies and higher authorities) to minimize collective action dilemmas at the basin level (Huang & Xu, 2017; Yang et al, 2019).

Figure 10

Schematic diagram of the distribution of key water reservoirs and swamps in the Demonstration Zone



Note. Important lake reservoir (navy blue); water bodies (light blue). Reprinted from: *"The Overall Spatial Plan of Green and Integrated Ecological Development Demonstration Zone"* (Draft) by Planning and Land Resources Administration of Shanghai Municipality, 2019

4.1.4 Institutional Barriers and Prior Failure to Address Transboundary Pollution

The administrations involved in the Demonstration Zone were associated with many high-profile cross-jurisdictional environmental disasters. Since early 2000, ministerial authorities

such as the MEP have advised joint supervision mechanisms between cities, such as Suzhou and Jiaxing.[30] The World Bank also cooperated with the Jiangsu Province in 2006 and launched six community roundtables (Otsuka, 2019). In 2014, in light of the "Five Water Collaborative Governance" launched by the Zhejiang province, governmental actors, civic environmental activists, and governmental voluntary organizations had initiated and implemented some watershed multi-stakeholder roundtables with public participation (Liu, 2019). However, these participatory approaches received mixed results, most of them failed to operate sustainably due to the lack of institutional legitimacy (Liu, 2019; Otsuka, 2019). In general, intergovernmental coordination for environmental governance in the YRD city cluster was mainly driven by national-level and subnational authorities. They provide the foundational institutional settings for local networks to emerge. Table 6 highlights some of the key coordination mechanisms on transboundary environmental pollution in the YRD.

Table 6

Policy signals and coordination mechanisms from upper-level authorities

IJAs	Name	Entities	Year
Policy guideline	General scheme for integrated management of water environment in Taihu Basin	NDRC, MEP, MWR, Ministry of Housing and Urban-Rural Development,	2008

[30] Studies show that as early as the 1990s after the water quality was severely polluted and increasing conflicts emerged, the National Environmental Protection Inspection team had suggested Suzhou and Jiaxing form a joint supervision mechanism. It was not until 2002 after the MWR and MEP issued another suggestion for coordination of water pollution disputes and water conflicts at the Jiang-Zhe border, the two governments finally agreed to establish the mechanism. However, cross-jurisdictional conflicts regarding water pollution had not been fully resolved. In 2005, another severe water contamination incident caused by an alcohol company in Wujiang cut off the water supply for nearly 30,000 residents in Jiaxing. This water crisis occurred at the border between Wujiang's Tongluo town and Jiaxing's Xincheng town, which was not a key monitoring area appointed by the MWR and the former State Environmental Protection Administration.

		Ministry of Agriculture	
Joint meetings	System of inter-provincial and inter-ministerial meetings on integrated water and environmental management in the Taihu Basin	State Council, NDRC	2008
Eco-Compensation Mechanism	Pilot Implementation Plan for Water Environment Compensation in the Xin'an River Basin	Ministry of Finance, MEP	2011
Joint meetings	Twelfth Five-Year Plan for the Prevention and Control of Atmospheric Pollution in Key Regions	State Council, MEP	2012
Policy guideline	Implementation Rules for the Action Plan for the Prevention and Control of Air Pollution in the Yangtze River Delta Region	Shanghai, Jiangsu, Zhejiang, Anhui, and eight Ministries including MEP and NDRC	2014
Policy guideline	Implementation programme for joint monitoring of water quality in transboundary (provincial and municipal) water bodies	Shanghai, Jiangsu, Zhejiang, Anhui, and 12 Ministries including MEP, NDRC, MWR	2016

As mentioned in Chapter 2.3.2, factors that might hinder collaborative environmental governance in China are multifaceted, which requires policymakers to take into account its political, social, and economic dimensions. Previous studies find incentives and mechanisms from the central government are not sufficient for downstream users to take over the costs of water resource protection for Wujiang like implement ecological compensation or sharing

data across departments or jurisdictions (Huang & Xu, 2017; Yang et al, 2019). Respondents also confirmed that downstream users in the basin believe it is the upstream jurisdictions' obligation to safeguard the water quality (X. Jiang, Personal Communication, November 5, 2020). Unless a severe water crisis caught the attention of higher authorities and the public,[31] the downstream users are reluctant to take the initiative to offer compensation. For instance, in the case of the Huangpu River "dead pigs" incident, Shanghai later adopted indirect strategies such as issue linkage to provide technological and economic support for Jiaxing in the Zhejiang province (Huang & Xu, 2017). Expert claims that although a consensus has been built on environmental governance in the YRD, joint planning, standard-setting, environmental risks management, and deciding the scope of collaborative governance have been inadequate among the jurisdictions.[32] China's first pilot site for inter-provincial eco-compensation mechanism in the YRD has created shortfalls in local finance. Evidence from the Xin'an River basin shows a lack of technical standards for ecological value assessment. Increased environmental standards also further worsened the fiscal condition of the ecological protector whose major industry is tourism. Once entered the compensation scheme, the protector cannot "exit" and has to take on more loans to meet the raising

[31] A number of high-profile pollution crises have happened among the two provinces and one municipality. In 2001, the fishermen in northern Jiaxing, Zhejiang province raised one million yuan and used eight bulldozers and tens of thousands of sacks to sink 28 cement boats to cut off the river and block the waterway between Jiaxing and Shengze in Jiangsu. This was the "River Breaking Incident" that attracted great attention from the central leadership. Forty-seven fishermen in Jiaxing who suffered huge losses due to the pollution took 21 printing and dyeing companies in Shengze, Jiangsu Province to court. In 2007, the Taihu Lake cyanobacteria contamination incident occurred in Jiangsu, which caused serious contamination of tap water throughout the city of Wuxi. In 2013, over 16,000 dead pigs were found in Shanghai's Songjiang section of the Huangpu River, which is connected to the city's drinking water resources. The pigs traced back to neighboring town Jiaxing, dumped by farmers in a pig farm located at upstream of Shanghai.

[32] Yangtze Institute of Industrial Economics. (2019, December 5). *Guhuashan: changsanjiao quyu shengtai huanbao yitihua de Shijian tansuo yu kunjing tuwei.* [Gu Huashan: Practical exploration and dilemma breakthrough of ecological and environmental protection integration in the Yangtze River Delta region] https://www.sohu.com/a/358464171_701468

environmental requirements imposed by the ecological beneficiary (X. Jiang, Personal Communication, November 5, 2020). [33] In other words, collaborative environmental governance requires accurate compensation measurements and sufficient collaborative capacity from ecological protectors. Holding back development opportunities and eradicate existing enterprises in exchange for compensation could be detrimental to ecological protectors that are already fiscally weak.

Within the Demontration Zone, Liu, Hu, & Shen (2019) summarized three major issues in joint pollution prevention and control: 1) mismatch between institutional and environmental supervision scales; 2) fragmented management and lack of uniformity in environmental standards, monitoring, and law enforcement across jurisdictions; 3) lack of information-sharing among local departments. These problems lead to buck-passing among local authorities; incentivized businesses to transfer polluting production to nearby areas with laxer environmental constraints; and weakened the efficiency and accuracy of environmental sanctions and prosecutions. The ecological compensation mechanism also poses a challenge, as claims for compensation faced by one particular business may be common to the entire industry in the region (Zhang, 2019). Horizontal and vertical coordination in the intergovernmental dimension was rather weak as the tasks in the Demonstration Zone were designated by central governmental bodies (Liu, Hu, & Shen, 2019). As of 2019, the Leadership Group for Promoting the Integrated Development of the Yangtze River Delta, led by the Senior

[33] Huangshan, the city that bears the social and financial costs of ecological protection, invested a total of 12.06 billion yuan while receiving only 3.58 billion yuan in compensation from the central government and the neighbouring province Zhejiang. For several years, a large number of enterprises have been refused entry by the Huangshan government and the pace of shutting down and transforming existing industrial enterprises has been accelerated.

Vice Premier of the State Council, Hanzheng, was responsible for the overall planning of the YRD integration. Local authorities implement these plans separately and rely mainly on voluntary negotiations to resolve transboundary environmental issues. The actual operation of the Demonstration Zone is in need of private and voluntary sectors to join the force. In general, environmental governance in the Demonstration Zone is characterized by a highly complicated and fragmented organizational structure, and the administrative power among the local entities varies significantly. For an overview of the governing structure in the Demonstration Zone, see Appendix B.

4.1.5 Policy Legal Frameworks

Governments in the YRD has been exploring collaborative legislation since 2007. The three provinces and one municipality made the first attempt in 2014. Each jurisdiction enacted a regulation for air pollution prevention and control and set up a special chapter for regional collaboration. In 2018, the three provinces and one municipality signed two collaborative agreements to deepen the legislative collaboration in the YRD. As of 2019, no legislation had been specifically developed for the Demonstration Zone (Liu, Hu, & Shen, 2019). Its construction and management were guided by the Overall Plan and based on voluntary joint programmes and framework agreements. Collaborative legislation for environmental protection has not yet been formed between the National People's Congress (NPC) and the governments in the YRD city cluster.[34] Press release from the Shanghai People's Congress Research Association indicates that it is highly difficult to integrate the functions of the NPC

[34] The Pioneer Zone is a cross-administrative area, since detailed control plan cannot be prepared beyond the administrative area, in order to obtain a legal basis, it must be approved by the National People's Congress.

and the provincial-level governments, and to establish legislative coordination mechanisms that incorporate local regulations, rules, and normative documents (Zhong, 2020). For instance, even when local legislation standards on air pollution prevention and control among the three provinces and one municipality will be aligned, if pollution standards are not regularized (常态化, *changtaihua*) by relevant departments, the law could still be enforced in a differentiated manner. The Demonstration Zone is encouraged to try out collaborative legislation first, so it could be replicated in the YRD region.

There are two factors that influence the establishment of collaborative legislation in the Demonstration Zone: strategic positioning and cross-administrative division. Strategic positioning means the Demonstration Zone as a national strategy must rely on the state to coordinate its organisational structure, power allocation, and many other "top-level designs". Meanwhile, the Demonstration Zone straddles three provincial administrative divisions and there are inconsistent standards, rules, and disconnection of platforms among various administrative divisions. Therefore, there is also a need for establishing collaborative legislation on the horizontal plane. Currently, the five towns in the Pioneer Zone are exercising administrative power based on different legal norms. Except for national-level legislation, their legislative subjects, legislative levels, legislative powers, and legislative content at the local level vary considerably.[35]These differences may lead to conflicts in the application of legal norms and inconsistent law enforcement practices and results.

[35] Shanghai Municipal Bureau of Justice. (2020, February 25). *Changsanjiao shengtai lvse yitihua shifanqu fazhi baozhang yanjiu* [Study of securing the Yangtze River Green and Integrated Ecological Demonstration Zone Rule of Law] http://sfj.sh.gov.cn/ztzl_xsqk/20201126/9ca80035eb674fea9d9b132a0cbdd55c.html

The first concrete step on collaborative legislation was made in September 2020. The jurisdictions involved in the Demonstration Zone negotiated and jointly determined one document for exemplary terms ("Decision on Several Issues Concerning the Promotion and Protection of the Construction of the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone"), which was enacted on October 1. This is the first time the Standing Committees of the People's Congress of Shanghai, Jiangsu, and Zhejiang have made regulatory decisions simultaneously on the construction of the Demonstration Zone to ensure the implementation of a major national strategy. The Executive Committee (the main operational body of the Demonstration Zone) was given provincial-level authority for project management, which signaled a major step towards the streamlining of project approval procedures in the region. [36] The Standing Committee of the two provinces and one municipality's People's Congress and the NPC Standing Committee on legislative affairs jointly decided that the Pioneer Zone can use the format of "legal inquiry and reply"[37] (法律询问答复, *falv xunwen dafu*) to obtain the authorization from the NPC Standing Committee. They can then carry out local legislative coordination and jointly make decisions on the legal issues of the Demonstration Zone.

[36] According to the report from Shanghai People's Congress Research Association, in regards to major project approval authority in two provinces and one municipality, Jiangsu's Wujiang may need 4 levels of approval, Zhejiang's Jiashan may need 3 levels, while Shanghai's Qingpu only needs 2 levels.

[37] In terms of legal protection, the Decision specifies that in the Demonstration Zone, the provisions of the local regulations of the city shall be decided by the Standing Committee of the Municipal People's Congress in accordance with the law if they are inconsistent with the Overall Plan and need to be adjusted for implementation; if city-level regulations need to be temporarily adjusted or suspended for reform initiatives, the Executive Committee may make a proposal to the Standing Committee of the Municipal People's Congress, who shall decide in accordance with the law.

4.1.6 Section Summary

Interdependency, the need for an industrial upgrade, and prior failure to address transboundary environmental crisis contribute to the necessary context for collaborations to unfold. Governmental entities in the LCNs cannot address environmental problems on their own, while the institutional setting poses many constraints. There are common governance problems such as institutional fragmentation and the mismatch between biophysical environment and administrative units, and insufficient legal basis for joint legislation-making. The launch of the Demonstration Zone, hence, creates an ideal testbed for overcoming these barriers. Network actors are faced with unequal benefits and risks. Downstream jurisdiction like Shanghai will enjoy higher safety for water supply, while less affluent governments might be hit harder by tightened environmental regulations. Although the inequality between fiscal and political strength could also be a precondition for LCNs to form in the YRD (as elaborated in Chapter 2.3.2) (Zhou & Tao, 2011; Cui, 2020).

The unique characteristics of its legal framework play an important role in joint standard-setting and streamlining environmental regulatory processes in the Demonstration Zone. Whether extensive collaboration (i.e., establish formal, unified, and binding joint agreements) can be formed relies on how much such a unique legal framework could be altered, and to what extent provincial authoritative power could be devolved to lower-level governments for them to institutionalize collaboration at the most meaningful level.

4.2 Network Prototype: Initial Drivers and Principled Engagement

Once it has been decided that the general conditions of the Demonstration Zone provide the ideal context for collaboration, participants of the LCNs need to develop a shared

understanding of the problem definition and the policy landscape (Gash, 2016). Initial drivers are a set of elements that are different from contextual variables, without which "the impetus for collaboration would not successfully unfold" (Emerson et al., 2012, p.9). These essential drivers "induce the convening of participants by reducing the initial formative costs of collective action and setting the collaborative dynamics in motion" (Emerson et al., 2012, p.10). Principled engagement is about "getting the right people to the table": stakeholders address each element of a joint plan through exploring and understanding each participants' perspective. These dynamic learning processes among local actors iteratively occur over time. In the Demonstration Zone, some principled engagement, i.e., face-to-face dialogue and ad-hoc, bilateral collaborations had happened before the official launch of the integration plan, as elaborated later in this section.

4.2.1 Initial Drivers: Consequential Incentives and Leadership

Aside from interdependence and uncertainty generated by external factors, essential drivers for LCNs are the political signals from the central government and the establishment of an interjurisdictional governing body. Meanwhile, multiple leadership roles have emerged at different scales in the Demonstration Zone.

Consequential Incentives: Signals from the 'Top-Level' Design

Consequential incentives include both positive and negative incentives that must exist to induce leaders and participants to engage in collective efforts (Emerson et al., 2012). They are consequential as the urgency, pressure, or continued neglect of the problem would have negative impacts; or there is new funding or grant opportunities available if the problem is resolved. Environmental crises have been important negative external incentives to the LCNs.

Despite basin commissions and cross-jurisdictional cooperative team and mechanisms have been in place for more than a decade, recent studies find a high degree of eutrophication in the Taihu basin still exist. The majority of the pollutant discharge is from industrial and residential sewage (Bai et al., 2018; Wang, Pang, Wang, Shen, & Wang, 2017; Zhu, Lu, Shao, & Lin, 2020). A party secretary at Wujiang government recalled in an interview that the water of the Taipu River in 2017 was "very colorful" and one could even tell which type of factory discharged sewage in the water "just by looking at the colors" (Wu, 2020). It appears that incentives generated by the worsened environment and ministerial-level entities are not consequential enough to institutionalize collaborative mechanisms.

The promotion of the integration plan and the Demonstration Zone is more instrumental in comparison. It not only provides new funding opportunities[38] but also creates strong political incentives. Shortly after the YRD integration plan was elevated as a national strategy, Wujiang launched a "Blue Belt Plan" and shut down all enterprises within 200 meters along both banks of the Taipu River (Wu, 2020). It also became the first county in China to establish a Joint River Chiefs System (JRCS) with its neighboring district Xiuzhou, Zhejiang province. By the end of 2019, over 3,000 enterprises were vacated under the Blue Belt Plan.

[38] In the Outline of the Yangtze River Delta Regional Integrated Development Plan issued by the CPC Central Committee and the State Council, local governments are encouraged to jointly set up special funds for investment in the integrated development of YRD. In mid-2020, The two provinces and one municipality jointly fund the special financial funds for the Pioneer Zone, which is set to be no less than 10 billion yuan in total in three years. The fund is for the construction and development of the Pioneer Zone and related operations. On this basis, the two provinces and one municipality have increased financial support to the Demonstration Zone and actively seek financial support from the central government in terms of special transfer payments and local government bonds. In the meantime, financial "supportive policies" are given to the Demonstration Zone in the aspects of financial innovation and the development of green finance.

The secretary of the Party General Branch of Fenhuwan Village in Fenhu Hi-tech Zone (Lili Town, Wujiang) said in an interview:[39]

> Without the promotion of the Yangtze River Delta Green Demonstration Zone [sic], to be honest, for our village, we would not have taken the initiative to do this. Ecological green [means the] needs to vacate these enterprises.

In the last two months of 2019, Jiashan also dismantled over 40 dockyards and more than 800 steel operators. The political pressure on local governments was substantial at that time, which manifested in the behaviors of grassroots village officials whose main task was to negotiate and convince enterprise owners to relocate and coordinate factory relocations to the nearby industrial parks. The signals from the national-level are salient to governmental actors of the LCNs.

The Overall Spatial Plan of the Demonstration Zone is also a manifestation of political signals from above which mobilizes local actors to partake in joint planning. The plan is put forward by a large number of actors: provincial-level governmental agencies, a working group established by the Departments of Natural Resources at the provincial-level, prefecture-level, and district-level, and a core technical team led by the China Academy of Planning. The plan covers six key areas: water resources, ecological environment, transportation system, municipal infrastructure, industrial development, and cultural and tourism development. Following a few rounds of reporting, communication, and consultancy, it was approved by

[39] CZTV. (2019, December 19). *Taipu he zhi bian (er): quan liuyu chaiqian tengtui quanliuyu jiance zhege "xianxing yibu" lidu youdian da* [The change of the Taipu River (2): the whole basin demolition and retreat, the whole basin monitoring, this "first step" is a bit strong] http://n.cztv.com/news/13379442.html

the Governing Board of the Demonstration Zone then published online for public consultation in April 2020.

The Overall Spatial Plan and the Overall Plan specified expected and binding targets for environmental improvements (see Table 7). By 2025, at least 95 percent of major water bodies have to reach national standards. The Taipu River will reach the National Grade III standard. The Dianshan Lake will reach Grade IV standard (industrial use and entertainment which is not directly touched by human bodies). The average concentration of PM2.5 will be up to national standards in general, and the proportion of days with excellent air quality in cities at prefecture level and above will reach more than 80%. By 2035, the ratio of "blue-green space", referring to the river and lake system and areas covered with vegetation, is expected to reach a minimum of 68% and 75% in the Pioneer Zone. Differentiated binding targets on ecological red lines and water bodies were set for the Demonstration Zone, Pioneer Zone, Qingpu, Wujiang, and Jiashan. Indicators that concern transboundary water pollution mentioned in the Overall Spatial Plan are compiled below.

Table 7

Targets of the Demonstration Zone relevant to water pollution

Category	Indicator	2018	2025	2035	Type
Harmonious	Blue-green space (%)	–	68	68	Expected
Coexistence of human and nature (3 out of 7)	Ecological redline (square miles)	–	107.67	107.67	Binding
	Surface ratio of rivers and lakes (%)	20.3	20.6	Around 22	Binding
Public services and infrastructure	Urban sewage collection and treatment rates	Wujiang 96.9 Jiashan 93.3 Qingpu 95.4	98	≧99	Expected

sharing (2 out of 9)	Rural sewage collection and treatment rates	Wujiang 65.6 Jiashan 87.4 Qingpu 90	95	≧99	Expected
Jiangnan charm and small-town flavors in resonance (1 out of 3)	Percentage of living and ecological shoreline to major rivers and lakes (%)	≥ 80	≥ 90		Expected

Note. Selected excerpts from the Spatial Plan. This indicator system was included in the Spatial Plan opened to the public for comment, hence, air quality standards were not mentioned. Compiled and translated by author

Unifying regulatory standards is one major objective put forward to address transboundary pollution. These standards include industrial and shipping pollution emissions, urban and rural sewage treatment, and agricultural non-point source pollution. The strengthened requirements on industrial access and standardization of pollution regulations restated some of the key guidelines of the management of the Taihu Basin,[40] which were made in 2013. These overall plans consist of explicit targets and verbal goals such as "Clearwater Green Corridor" and "Integrate Ecological, Production, and Living Spaces". Replicable and scalable experience is anticipated by the end of 2035.

Objectives for institutional innovation are also covered by the guidelines. The main goal is to "take the lead in exploring regional institutional innovation for integrated ecological and

[40] According to the requirements of the "Overall Programme for the Comprehensive Management of the Water Environment in Taihu Basin (2013 Revision)", the three-level assessment system of the province city, and county would be improved, and a sound system of regulations and standards for industrial access, water resources management, control of the total amount of pollution in the watershed and supervision of pollution sources would be established in collaboration, so as to formulate more unified, stricter and more scientific standards for water pollution prevention and control, and promote the legal, systematic and normalized construction of water environment management in the Taihu Basin.

green development". As a site for policy experiment, the Demonstration Zone is prioritized for testing out integrative policies that support the YRD's shift from regional project-based coordination to a full-fledged regional integration. The rationale of institutional design is "breaking administrative boundaries without breaking administrative affiliation". Objectives that are relevant to environmental protection are shown below (see Table 8).

Table 8

Key objectives of institutional innovation in the Demonstration Zone

Institutional Innovation	Objectives	Details
Unified spatial planning	Unify planning and gradual implementation three lines and one list"[41]	Ecological red lines, permanent farmland, urban development boundaries, town development boundaries and cultural protection control lines and the environmental access list
Unified ecological and environment protection standards	Accelerate the establishment of a unified system for the protection of drinking water sources and ecological control of major water bodies	Coordinate and unify the functional objectives of pollution prevention and control mechanisms and assessment systems for the Taipu River, Dianshan Lake, Yuandang Lake and Fenhu Lake
	Accelerate the establishment of the	Implement the most stringent standards for pollutant emissions

[41] The Overall Spatial Plan used an altered version of conventional "three lines and one list", the three lines originally referred to "ecological red lines, minimum environmental quality baselines, and upper resource usage limits"; the list is an "environmental access list", which is a blacklist of environmentally-damaging activities that are not permitted.

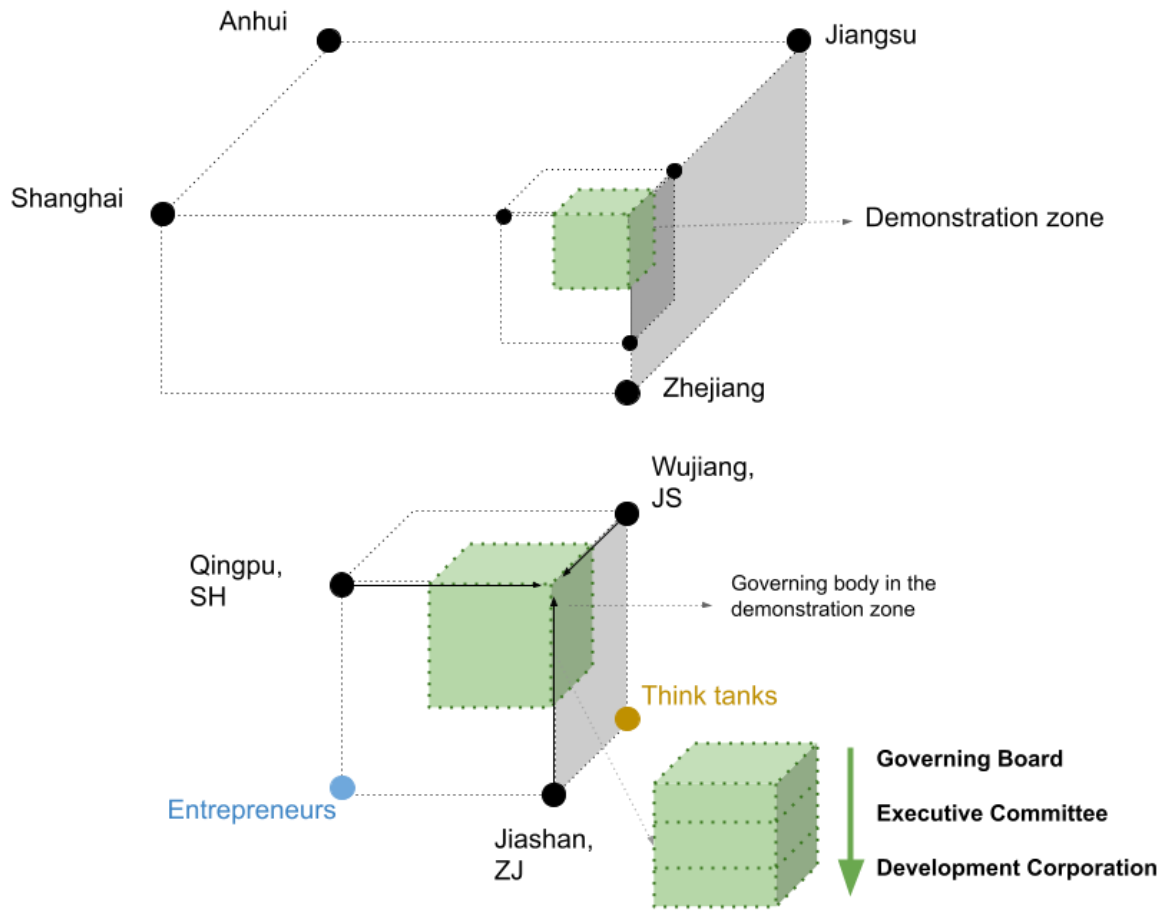
“Three Unifications” system:	Establish a shared platform for monitoring and surveillance of regional ecological environment and pollution sources
	Unify environmental supervision and law enforcement, formulate unified administrative norms and promote joint law enforcement and cross law enforcement.
Explore new mechanisms for ecological governance	Explore a diversified ecological compensation mechanism; Explore cross-regional market-based platform for ecological governance and a joint investment mechanism for interjurisdictional ecological project; Explore the establishment of an enterprise environmental risk rating system and a credit evaluation system

Note. Selected excerpts from the Overall Plan. Compiled and translated by author

The Demonstration Zone is governed by a three-tier hierarchical organization consisting of a Governing Board, an Executive Committee, and a “development company” (Figure 11). This organizational structure is said to be designed according to a governing framework that combines “public-private partnerships, statutory authority, and market operation”. Within the structure, the Governing Board enjoys the highest formal authority. The Executive Committee takes the lead in facilitating joint meetings and intergovernmental coordination.

Figure 11

Governing Structure of the Demonstration Zone



Leadership for the Overall Construction of the Demonstration Zone: The Governing Board

The Governing Board is chaired by the executive vice-governors of Shanghai, Zhejiang, and Jiangsu. Members of the board are from all major provincial-level and municipal-level departments in two provinces and one municipality, and the city/district governments of Suzhou, Jiaxing, and Qingpu. Representatives from enterprises and think tanks are invited to the board playing a role similar to an “independent director of a company”.

The Governing Board serves as a decision-making panel for all important matters relating to the construction of the Demonstration Zone. Members of the Governing Board conduct investigations and set plans, reform items, supportive policies, and coordinate the promotion of major projects. On issues such as the management and consultation of "three lines and one list", joint-planning and law enactment on drinking water protection, and the 14th Five-Year Plan on ecological and environmental protection and management, local governments in the Demonstration Zone need to draw up and submit a list of major issues to be resolved and consulted through the Governing Board. If necessary, they can request coordination from the Leadership Group for Promoting the Integrated Development of the Yangtze River Delta.

The Demonstration Zone's Developer Alliance/Development Corporation serve mainly a consultancy role. It also provides funding for large-scale, cross-jurisdiction infrastructures. As of November 2020, the organization is comprised of 25 corporations, including the China Three Gorges Corporation, Huawei Qingpu Research Institute, China-US Green Fund, and Alibaba. The China Three Gorges Corporation took the lead in preparing the implementation plan for the integrated management of the water ecology and environment in the Demonstration Zone. It also funded the environmental enhancement project for Wujiang's Huanyuan Dang shoreline. Internal partnerships in the Developer Alliance are established as well. The Fudan Research Institute for Development has taken the lead to develop a green development indicator system for the YRD alongside Guangming Daily Think Tank, Alibaba, and Unicom.

Leadership for Initiating Environmental Collaborative Efforts: Executive Committee and Provincial-level EEBs

The Executive Committee is composed of 35 cadres selected from Shanghai, Jiangsu, and Zhejiang governments. Its director Ma Chunlei (also the secretary general of the Governing Board) is the deputy secretary general of Shanghai Municipality and the director of Shanghai's NDRC. The Executive Committee is the management body of the Demonstration Zone. It is responsible for the examination, approval, and administration of all cross-jurisdictional investment projects (unless otherwise stipulated by the state).

In the LCNs, the Executive Committee is directly involved in initiating joint meetings, formal workshops, partnerships, and forming joint programme and framework agreements with various departments, basin-level bureaus, and local environmental agencies. The Executive Committee is not only an important entity in the LCNs but at the YRD regional level. Representatives of the Executive Committee have joined regular working meetings hosted by the YRD Regional Air and Water Pollution Prevention and Control Cooperative Team since January 2020.

The provincial-level EEBs are the leading units (*qiantou danwei, 牵头单位*) for a wide range of tasks. In the first year, these tasks mainly concern the standardizations of environmental regulations, such as setting up multi-partner coordination working mechanisms, forming standardized publication protocols, and accelerating the unification of standards and specifications. Some of the larger-scale projects, such as establishing observation networks for air pollution superstations and water system monitoring are led by provincial-level EEBs (mainly Shanghai's EEB). County/district-level EEBs are the leading units for environmental monitoring, assessment, and the implementation of joint law enforcement. The grassroot governors at the village and street level are assigned tasks by their superiors

and county/district-level EEBs. They directly handle the communication with enterprise owners and other polluting entities, and coordinate the relocation of enterprises.

Overall, all three provincial-level EEBs have to take up leadership roles at some point of the network development, while in the first year the leading unit is mainly the EEB of Shanghai. It is difficult to examine the commitment and willingness of the Shanghai government to absorb the high transaction costs of initiating collaborative projects, but this choice of leadership is rather self-explaining. Resource-wise, Shanghai could afford more staffing and technologies. Political-wise, it is where the major authority concentrates. Indeed, main authorities involved in the YRD integration have set up their offices in Shanghai: from Yangtze River Delta Regional Cooperation Office, the Office of the Yangtze River Delta City Economic Coordination, to Taihu Basin Authority of Ministry of Water Resources, and the YRD Regional Air and Water Pollution Prevention and Control Cooperative Team.

4.2.2 Principled Engagement: Deliberations and Determinations

Principled engagement concerns the actual development of the LCNs. This iterative process occurs over time and brings stakeholders with diverse interests to the same table and resolve conflicts. Through this process, members of the LCNs who represent different jurisdictions, departments, and sectors engage in collaborative learning phases, develop "a shared sense of purpose and a shared theory of action for achieving that purpose"(Emerson et al., 2012, p.11). Major elements in this process include the revealing of individual and shared interests (*discovery*), candid and reasoned communication (*deliberation*), and eventually making enumerable joint determinations such as agenda-settings, assigning workgroups, and reaching agreements.

Early engagement among the two provinces and one municipality could be traced back to intercity cooperation in the YRD city cluster for integrated economic development, which emerged from the Shanghai Special Economic Zone.[42] From the early 1990s to 2019, the cluster expanded to 27 cities with 41 cities voluntarily joined the YRD Urban Economy Coordination Council. Besides formal seminars, hard deliberation, and repeated heated debates have occurred during the regional integration processes. Prior to the integration plan, individual municipality prioritized their own needs, which compromised the consistency in regional agenda-setting. In 2018, the Yangtze River Delta Regional Cooperation Office was formed. The team contains 17 cadres from three provinces and one municipality, whose tasks were to coordinate the planning of infrastructure, public services, and environmental protection across sectors. Its first major task was to complete the formulation of the Three-Year Action Plan for the Integrated Development of the Yangtze River Delta (2018-2020) (hereinafter referred to as the "Three-Year Action Plan") within three months. A member of the office, the deputy director of the Basic Industries Division (NDRC department) of Jiangsu shared his experience:

> In the beginning, meetings and "quarrels" became my main way of working. Every day, I had to constantly hold various project discussions, communication and coordination meetings and text preparation meetings with comrades from industry departments, research institutions, and local cities and counties. On average, I had two to three meetings a day with different contents, and at most five meetings a day. At the end of the day, my

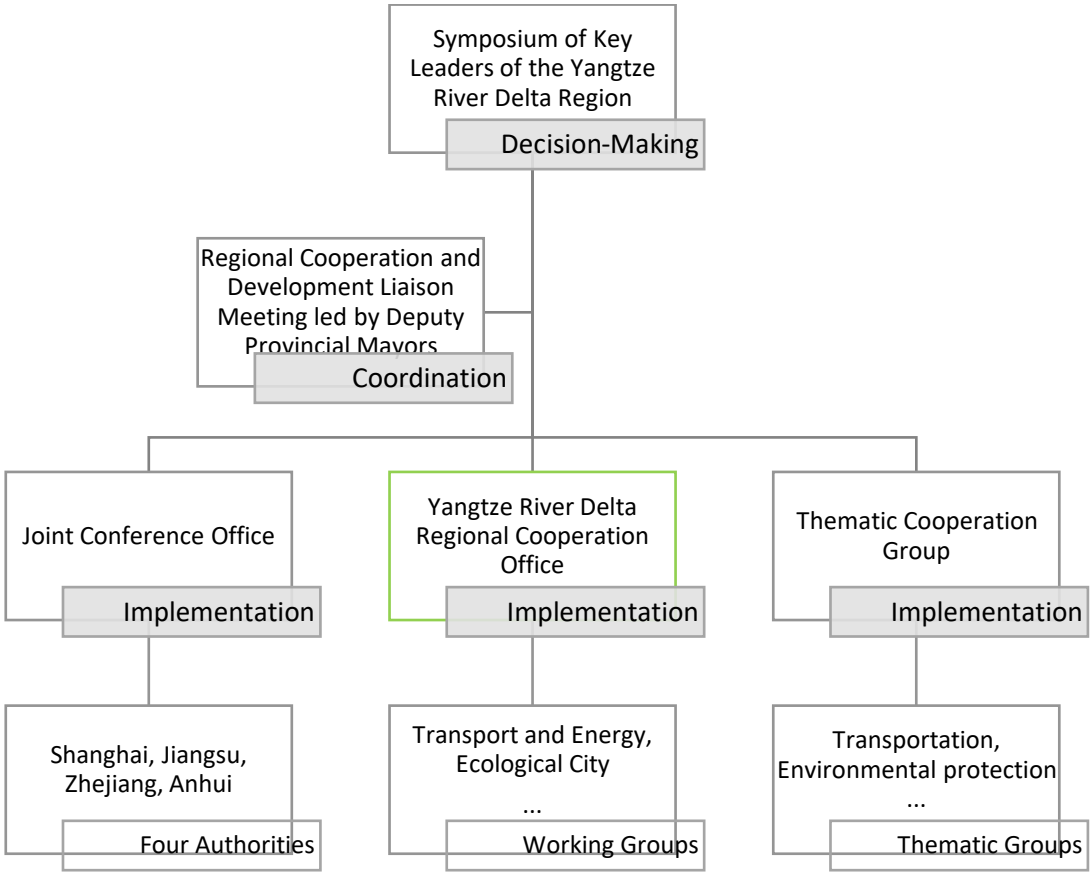
[42] Intercity cooperation in the YRD started with the 'Joint Meeting Mechanism for Economic Cooperation among 15 Cities in the Yangtze River Delta' established in 1992, later upgraded to the 'Yangtze River Delta Urban Economy Coordination Meeting', with a total of 16 meetings held and has undergone several membership expansions (Ma & Suo, 2019).

head was dizzy, my legs were numb, my hands were weak and I could not remember any of the work I had done throughout the day. I had to go out for an hour's walk after dinner to stretch my muscles and calm down (Luo, 2018).

Local governments were more enthusiastic about building transport infrastructure and placed high expectations on the Three-Year Action Plan to realize large-scale projects such as high-speed railways, airports, and ports. Disagreements occurred at each stage of the deliberation, from project arrangement, scheduling, to text expressions. Unlike previous engagements based on revealing individual interests without making substantive determinations, the establishment of a coordination office is instrumental in holistic regional management. As a jointly constituted body with management functions (see Figure 12), it translates the decisions made at the Symposium of Key Leaders of the YRD Region down to the local levels, facilitates information sharing, and assists in the development of unified standards and action plans across three provinces and one municipality.

Figure 12

The YRD city cluster three-layer organizational structure



Note. The YRD regional coordination adopts a rotation system. Each year the cooperation tasks are led by one province/municipality. The Environmental protection thematic group has a rotating leader and is also supervised by the YRD Regional Air and Water Pollution Prevention and Control Cooperative Team (composed of members from MEE and officials from three provinces and one municipality), which has its office at the EEB of Shanghai.

Disputes were common among local governments and environmental agencies in regards to resolving disagreements on the functionalities of the Taipu River. The deputy director of Wujiang EEB described in an interview that she had attended at least five rounds of discussions for the first draft of the joint protection programme of key water bodies (Special Programme on Joint Protection of Key Transboundary Waters in the Yangtze River Green and

Integrated Ecological Development Demonstration Zone).[43] The agreement covers a total of 47 transboundary water bodies and there were "very big differences in opinions" as the downstream localities proposed for stricter protection which would require upstream governments to vacate all enterprises close on the Taipu River shoreline in a short period of time. "It is true that faces were red and every time we had a meeting, we all had to argue… I have now met the relevant leaders from Shanghai more often than I have met the leaders in Suzhou." The JRCS later adopted in the Demonstration Zone took a year of negotiation to realize (F. Xiong, personal communication, November 9, 2020). Intense deliberations smoothened interprovincial coordination on water protections over time as members of the networks met more frequently and acknowledged each other's needs. Eventually, the members agreed to adopt a categorized and graded management approach and drew up a list of enterprises that needed to be eliminated or retained. By seeking common ground while reserving differences, the involved authorities and agencies eventually reached a consensus on the joint protection programme.

Informal information exchange also plays a big role in principled engagement. Officials of local EEBs have created an inter-provincial coordination WeChat group, in which around 80 members engage in frequent debates and discussions. The continuous communication helped streamline the mechanisms for working across jurisdictions. According to the aforementioned deputy director, previously when Taipu River pumping stations needed to be activated for downstream water supply, it would take levels of approval and take several days.

[43] Guangming wang. (2020, October 17). *Shanghairen jiangsuren zhejiangren meici kaihui dou yao chaojia, zhege fangan chutai bu rongyi* [Shanghai people Jiangsu people Zhejiang people quarrel every meeting they have, this program is not easy to introduce] https://www.sohu.com/a/425396663_162758

But now, “just a group message, there is an immediate response.” The procedures for grassroot cadres to carry out cross-jurisdictional site visits and learning sessions have also became simplified after the integration.

Since late 2019, several IJAs have been signed by governmental entities. They are in the form of procedural decisions such as setting up liaison systems and working groups to smoothen the coordination processes; and substantive determinations such as environmental agreements on supervision and law enforcement at cross-border areas. For instance, a total of nine departments, including local EEBs, local departments of Water Resources and Water Affairs, two Taihu administrations affiliated with MEE and MWR, as well as the Executive Committee had signed the joint protection programme on key cross-jurisdictional water bodies, further refined the tasks, scopes, and responsibilities for long-term collaboration. The law enforcement branch of local EEBs also signed a framework agreement on joint investigation and management of illegal discharge enterprises, environmental emergencies, cross-border pollution disputes, and collaborative environmental remediation.[44] In the intragovernmental dimension, local law departments have provided cross-sectoral support. The Public Prosecutor's Departments of the three localities signed an agreement to confirm the implementation of a joint case handling mechanism that covers the Taihu River Basin.[45] It aims to create a “one-shop stop” procedure

[44] The Framework Agreement on Integrated Ecological and Environmental Comprehensive Management of Qingpu District, Wujiang District and Jiashan County

[45] The Opinions on the Establishment of a Collaborative Mechanism for the Integrated Development of Public Interest Litigation on Ecological Resources in the Taipu River Basin by Qing Wu Jia Procuratorates made it clear that for cross-jurisdictional incidents that damage ecological resources and occur in bordering areas of upstream and downstream river basins, a joint case handling mechanism should be implemented, and when joint cross-jurisdictional investigations are required, the local procuratorate should provide assistance.

for cross-jurisdictional ecological and environmental law enforcement. Other important decisions and determinations are highlighted in Appendix C.

4.2.3 Section Summary

Political steering from above, or more precisely, the metagovernance produced by the center and higher-level authorities creates the consequential incentives for the formation of LCNs. The difference modes of governance include command-and-control style crack down on polluting companies and formal and informal forms of inter and intragovernmental coordination mechanisms. The metagovernance approach was made to address prior failures in the LCNs. Its rationale is to coordinate, integrate policies in both inter and intragovernmental dimensions in order to "decrease fragmentation, create coherency, aim for procedural harmonization, or reduce overlap" (Gjaltema et al., 2020). The main leadership of the Demonstration Zone is another metagovernance approach. High-ranking politicians not only involve in a large number of formal and informal deliberations and IJAs among the LCNs but also give recognition and assess negotiated outcomes, which lend more binding power to the IJAs. Furthermore, a wide range of actors across scales and departments are involved in the formulating and planning of these IJAs, which generate sufficient input legitimacy for formal collective actions to take place. Broad inclusion of private actors and general public, however, has not been generated in the field of pollution prevention.

Prior to collaborative determinations, there has been over a decade long of engagement among the network members, including years of repeated consensus-building. The launch of the Demonstration Zone made it urgent for local actors to take on multiple leadership roles in determining details for joint planning, settling concrete work plans, and

eventually assign routinized tasks to members in the LCNs. Though IJAs and joint projects are led by local entities in a rotation system, the Executive Committee is often the main initiator. This is consistent with the findings that higher-level authorities help to formalize the IJAs among members of LCNs (Yi et al., 2018). Institutional innovations are also further streamlined and expanded during these processes, such as the JRCS.

Engagement with non-governmental entities largely centered around the public service organizations and state-owned companies in regards to policies and research production. This phenomenon is consistent with previous studies (Westman & Castán Broto, 2019) and could be seen as a major deficiency of LCNs. These actors are heavily involved in the joint planning and management of the Demonstration Zone. Although there is some degree of public disclosure, there is no evidence showing small and medium-sized enterprises (SMEs) or the general public has played any significant role in the decision-making processes for environmental protection. The scope of public participation in environmental management in China is quite limited due to the unclear definition of environmental rights in the national legislation (Liu, 2019; Feng et al., 2020). And online announcement as a form of public consultation makes it harder for local people who live in rural areas to participate (Feng et al., 2020)

4.3 Network Formation: Shared Motivation and Capacity Building

An important aspect of LCNs is whether or not participates will be able to take repeated and long-term actions to accomplish their collaborative purpose. Therefore, the formation and maintenance of the LCNs are ongoing processes during which collaborative actions also take place. Two interactive components crucial to the network formation are *shared motivation*

and *capacity building*. Shared motivation is seen as the intermediate outcomes of principled engagement, which in turn generates new capacity. They are part of a self-reinforcing cycle and can also accelerate the principled engagement processes (Emerson et al., 2012). Furthermore, explicit procedural and institutional arrangements are demarcated in the formation of LCNs: "informal norms must be supplemented with more formal institutional design" in order to manage repeated interactions over time in a large and complex system (Emerson et al., 2012, p.15).

4.3.1 Shared Motivation: Turning Ecological Advantages into Economic Advantages

The notion of turning ecological advantages into economic advantages is a strong motivation for LCNs members to collaborate. The potential business opportunities to attract high-end enterprises who value beautiful scenery have been highlighted in a number of interviews with local governors. For instance, the multinational corporation Huawei chose Jinze to build its largest R&D centre to date. According to the vice secretary of the Party Committee and Mayor of Jinze, the town has always been prioritizing ecological protection and is not commercialized for tourists attraction. This mode of development is what differentiates Jinze from other historic towns nearby and appeals to companies and entrepreneurs:

> In the past, companies liked to hold meetings in high-rise office buildings in the city, but nowadays [they] have seen too many high-rise buildings and are tired of them. Instead, they are more interested in coming to our places where the environment is beautiful and the people are nice and friendly…I think the primary reason why Huawei chose to locate its R&D center in Jinze is that they saw its ecological environment and felt that its location

and ecological environment are similar to Huawei's headquarters at the Songshan Lake (Xiong, 2020a).

Regional integration is warmly embraced among local citizens and business owners (F. Xiong, personal communication, November 9, 2020), since a better business environment and access to medical care and education from core cities are promised to them. Zhujiajiao has taken on the task of creating services and amenities for its neighboring town Jinze, as Huawei expect to attract 30,000 R&D talents. Jurisdictions adjacent to the Qingpu district are also "more than happy to partner up, even being absorbed by Shanghai" (F. Xiong, personal communication, November 9, 2020). Take Wujiang as another example, although historically it has been affluent, the district needs to take on more opportunity cost as they face more regulatory pressure and strict monitoring along both vertical and horizontal lines (Huang & Xu, 2017). However, Wujiang is also seen as Suzhou's bridgehead to Shanghai. It is encouraged by its superiors to initiate deeper and faster integration into the core of the YRD. A shared belief in the value of a World-Class Water Villages and Living Environment soon begets collaboration outside of the Demonstration Zone as well. Local governments' participation in regional networks compelled other local governments to jump on the bandwagon, as they do not want to miss the opportunities (Chen et al., 2015). In 2020, Kunshan, an affluent county-level city in the southeastern Jiangsu province bordering Shanghai put three towns in the Coordination Zone and launched its construction. The government plans to integrate the transport system to the urban areas of Qingpu and build a "World-Class Lake District".

Previous failed environmental collaborations in the YRD city cluster were attributed to a goal-achieving logic: coordination from the higher-level entities were made in an ad-hoc

manner, with a sole purpose of fulfilling evaluation targets (L. Zhou, Personal Communication, December 27, 2020). These efforts did not help network actors to maintain the collaboration mechanisms. Once higher-level coordination petered out, the intergovernmental collaborations quickly fell apart or became a symbolic act. Earlier joint environmental law enforcement between Zhejiang and Jiangsu illustrates such a scenario, in which local officials had to secretly go over the border and investigate sources of pollution for concerns about causing misunderstanding.[46] Joint prevention and control became just a platform for neighboring localities to meet and share information without actually resolve pollution (L. Zhou, Personal Communication, December 27, 2020). A major reason behind this issue is the frequent turnover of personnel within China's cadre system, which hinders the stability of collaborations.

Decades-long cooperation in the economic, political, and cultural sectors have built a solid foundation of trust, adequate leadership, and resources to foster long-term collaboration among Jiangsu, Zhejiang, and Shanghai (X. Jiang, Personal Communication, November 5, 2020). On the basis of this trust, the establishment of formal leaders and accountability system for collaborative mechanisms is conducive to overcome the goal-achieving logic. A rotating system for leadership is applied to a wide range of organizations and institutions in the LCNs, including the Governing Board,[47] the Development Alliance, and

[46] On one occasion, a large number of pollutants floated down from the upper reaches of the Maaxigang (a bordering river between Zhejiang and Jiangsu), when the responsible county river chief of Wujiang went to Shengze to map the situation, he had to "surreptitiously driving a speedboat for fear of causing misunderstanding [with Shengze officials]".

[47] For instance, Jiangsu representatives are taking the lead for 2021, taking over the leadership role from Shanghai.

the lead units for environmental protection. A system for project tracking is also established to improve the accountability of local cadres once they left their positions. With the legitimacy provided by the center and provincial authorities, the new and permanent governing body in the Demonstration Zone creates the potential for LCNs to flourish in the long-run.

4.3.2 Capacity Building: The Institutionalization of Joint River Chiefs System (JRCS)

The institutionalization of the JRCS (联合河/湖长制, *lianhe he/huzhang zhi*) is one of the most prominent cases for generate new capacity. It is a local experimentation that came out of the joint protection programme. The system aims to routinize joint problem-solving among river chiefs from neighboring jurisdictions. Water management is carried out on a rotational basis among local cadres, in addition to regular joint river patrols and meetings. A lead unit is appointed every year and required to initiate joint river patrols and be held accountable for their designated tasks.

The JRCS serves a number of collaborative functions. First, it overcomes the scalar limitations of conventional local level RCS, which did not run across multiple provinces (Chien & Hong, 2018). Second, it increases the legitimacy for mutual supervision and raises the accountability among local governors, further enhances local chiefs' responsiveness and efficiency to take actions. Third, resources such as personnel and equipment are better mobilized, which balances the benefits and costs between upstream and downstream partners: the former realizes aiding the latter can reduce their own burden in the long run, while the latter gets more tangible support. Hence, this system incentives actors to improve their situation together and think in the long-term.

These interactions among river chiefs are also conducive to standardize practices and resolve cross-jurisdictional inspection and law enforcement loopholes exploited by polluting entities in bordering areas. The scope and rules of joint efforts are also redefined. Three-levels of Joint River Chiefs draw up lists of tasks and are assigned with a "management area" (包干区,*baoganqu*), which used to be made according to jurisdictional borders rather than river sections. These new rules and operating protocols are accompanied by several working/coordination mechanism agreements and informal joint activities during the network formation processes.[48]

An approach for capacity building among local environmental agencies that is perhaps unique to China is "party building and networking activities"(党建联建活动, *dangjian lianjian huodong*). For instance, a week before the joint environmental monitoring and data sharing programme[49] was signed, the party branches of local environmental monitoring stations from Qingpu, Wujiang, and Jiashan, the EEBs leaders, and youth representatives in the LCNs had joined this event. Named "Red and Green Actions" (see Figure 13), the event included speeches on party ideology, opportunities for constructing the YRD city cluster, organizational achievements; and presentations on topics such as smart alert system for drinking water and how to ensure a green integration. The attended party branches also signed a new agreement

[48] These agreements include: Party building to lead the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone Collaborative Water Management Agreement; Agreement on the Joint Working Mechanism for Joint Prevention and Treatment of the Water Environment in the Boundary Region; Working System for Joint River Chief and Lake Chief Patrol of Transboundary Rivers and Lakes in the Demonstration Zone. Informal activities include site visiting, water quality monitoring skills competition, press releases, and the launching of a Joint River Chief ceremony and a theme park.

[49] Joint Work Programme on Environmental Monitoring in the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone

at the event as a new mode of party building among environmental monitoring stations at the district/county-level.

Figure 13

Images from 'Red and Green Action' Party Building and Networking Event

Note. Reprinted from “青吴嘉三地环境监测站助力国家战略，开展“红行·绿动”党建联建活动”, by Qingpu EEB, 2020, retrieved from https://www.shqp.gov.cn/env/gzdt/20200701/661703.html

4.3.3 Section Summary

Under an authoritarian regime, mutual trust and understanding in the LCNs are supplemented by internal legitimacy provided by higher-level authorities, as the latter has the political power to push the participants to take actions (Mu & Spekkink, 2018). However, what is more attractive to the local actors is the potential economic value of beautiful scenery. It inspires a strong shared commitment among township mayors who are eager to convert “lucid waters and lush mountains” into “invaluable assets” and absorb positive spillover effect from Shanghai. Here we see the signs of the central government using economic incentives ideologically in addition to coordination mechanisms to steer actions within the LCNs.

Previous studies on interactive water governance in the Taihu Basin suggests the importance of institutional legitimacy (the degree of institutionalization officially approved

by the CPC) as a prerequisite for meaningful and active bottom-up initiatives (Otsuka, 2019). The case of JRCS shows a local experiment was implemented first (by Wujiang prior to 2018) and then being recognized by the national and provincial entities and adopted at a new site at the local level. This cycle is similar to Heilmann's (2008) findings on economic policy experimentation in China. Meanwhile, a number of practices have been created and adjusted to increase accountability and improve the mobilization of tangible and intangible resources. It appears that during the formation of LCNs, metagovernance is manifested through various process-oriented interventions from the central government, as a mean to optimize the "process design" of LCNs (Gjaltema et al., 2020) and increase their longevity. Evidence on shared funding and legal capacity is limited, however. The two provinces and one municipality have signed a supportive policy agreement to delegate project management authority to the Executive Committee and jointly establish a dedicated financial fund for the Pioneer Zone, with a total of no less than 10 billion yuan over three years.[50] But these supports are mainly devoted to economic innovation and green finance.

4.4 Network in Actions: New Management Practices and Channels for Public Participation

Collaborative actions constitute processes and outcomes that could be tied together (Emerson et al., 2012). They are the new mechanisms for collective actions and "determined by collaboration partners in accordance with their expressed or implied theory of action for accomplishing their preferred outcomes" (p.17). Meanwhile, they are also the actions that would not otherwise be taken by an individual entity in the networks. The actions that have

[50] Several Policy Measures on Supporting the High-Quality Development of the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone

been taken in the Demonstration Zone have been consistent with the collaborative determinations mentioned above. This section highlights three cases that concern air and water pollution: 1) joint protection of key river bodies; 2) the implementation of the "Three Unifications" system; 3) joint environmental inspections and law enforcement. These actions have created new management practices, monitoring implementation, and facilitated the engagement of civic actors.

4.4.1 Joint Protection of Key Transboundary Water Bodies

As of November 2020, the joint protection agreements among two provinces and one municipality have covered a total of 16 collaborative projects with 1.315-billion-yuan investment.[51] The joint treatment project for the pilot section of the Yuandang lake was completed in October. The joint protection and management of Taipu River (pilot project in Jiangsu) has also begun. As a main institutional innovation that came out of the endeavor of joint protection of river bodies, collective actions in the JRCS include the following aspects:

- *Joint Patrolling and Vacation of Polluting Enterprises*

As of October 2020, over 315 Joint River Chiefs have been employed in the Demonstration Zone which realized the full coverage of cross-jurisdictional water bodies. Regular joint river patrols (see figure 14) have been carried out by township-level river chiefs in three jurisdictions on weekly basis, and county-level river chiefs on monthly basis; joint meetings

[51] People's Daily. (2020, November 4). *Changsanjiao shengtai lvse yitihua fazhan shifanqu Shenhua xietong zhishui shifanqu lianhe hezhangzhi xinxihua pingtai shangxian* [Yangtze River Delta Green Integrated Ecological Development Demonstration Zone Deepens Collaborative Water Management Demonstration Zone Joint River Chief System Information Online Platform Launched] http://www.gov.cn/xinwen/2020-11/04/content_5557158.htm

are held every two weeks during high seasons of water hyacinth. Technology such as satellite remote sensing, high-definition cameras, and drones are used in the bordering areas to provide larger and more efficient monitoring. Best practices and resources have also been shared between jurisdictions. For instance, the Wujiang River Chief had helped their Jiashan counterpart to connect with a local enterprise that converts river sludge to bricks. A village party secretary in Wujiang described in an interview that, before the collaboration with Jiashan was established, cleaning up water hyacinth "depended on the wind. If the wind blows our water hyacinth over to their side, then they have to deal with it. If the wind goes the other way, it will be us who have a hard time."[52] Such experience postponed actions from both sides. Since the launch of the JRCS, downstream villages have been proactively assisting their upstream neighbor when the latter is in need of additional staff or cleanup ships. Some village leaders even feel comfortable to carry out cross-patrol. From October 21 to November 10, weeks before the third China International Import Expo, a total of 349 vessels, 166 vehicles, and 934 personnel were deployed to carry out water hyacinth inspections and management, around 4,294 tones of water hyacinth were disposed (Bao, 2020). At the end of 2020, Wujiang's JRCS was rewarded as a "Typical Case of China Reform in 2020" by the China Economic System Reform Magazine, a national magazine under the supervision of NDRC.

[52] Wenhui bao. (2019, December 4). *Lili: shuixiang keting shuxie lvse dajuan* [Lili: green answer sheet written in the living room of water town] https://www.163.com/dy/article/EVHV1VIO05506BEH.html

Figure 14

River Chiefs from Qingpu, Jiashan, and Wujiang patrolling the Taipu River in the Demonstration Zone

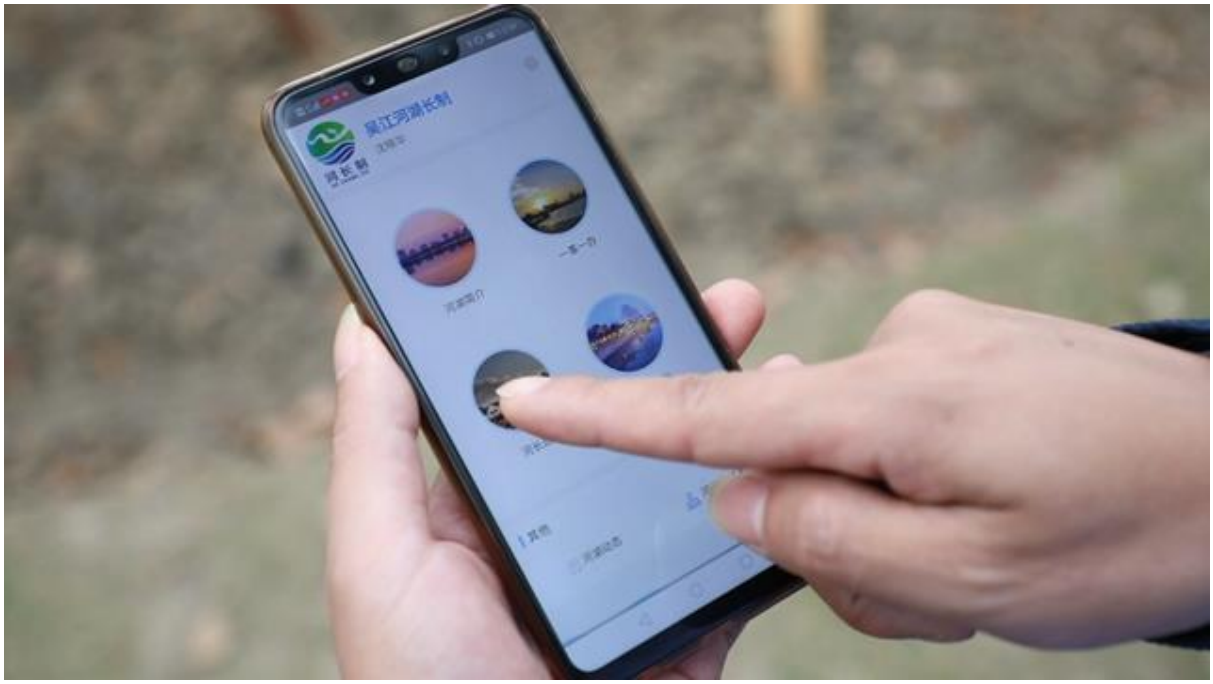
Note. Reprinted from "联合巡河 协同治水" by Xihuanet, 2020, retrieved from http://sh.xinhuanet.com/2020-10/16/c_139443770_3.htm

- *Information Platforms for JRSC*

In November 2020, Qingpu, Wujiang, and Jiashan launched a shared information platform for their Joint River Chief system as a new mechanism to strengthen pollution notification and communication. This platform was built in addition to the River Chief APP (see Figure 15), through which chiefs routinely submit and report water quality issues. Joint river chiefs also connect and exchange information via WeChat groups. At junction water bodies, the names, roles, and hotlines of joint river chiefs at three levels (district/county, township, and village) are displayed on billboards (see Figure 16). The public can also scan the QR codes to report water quality issues.

Figure 15

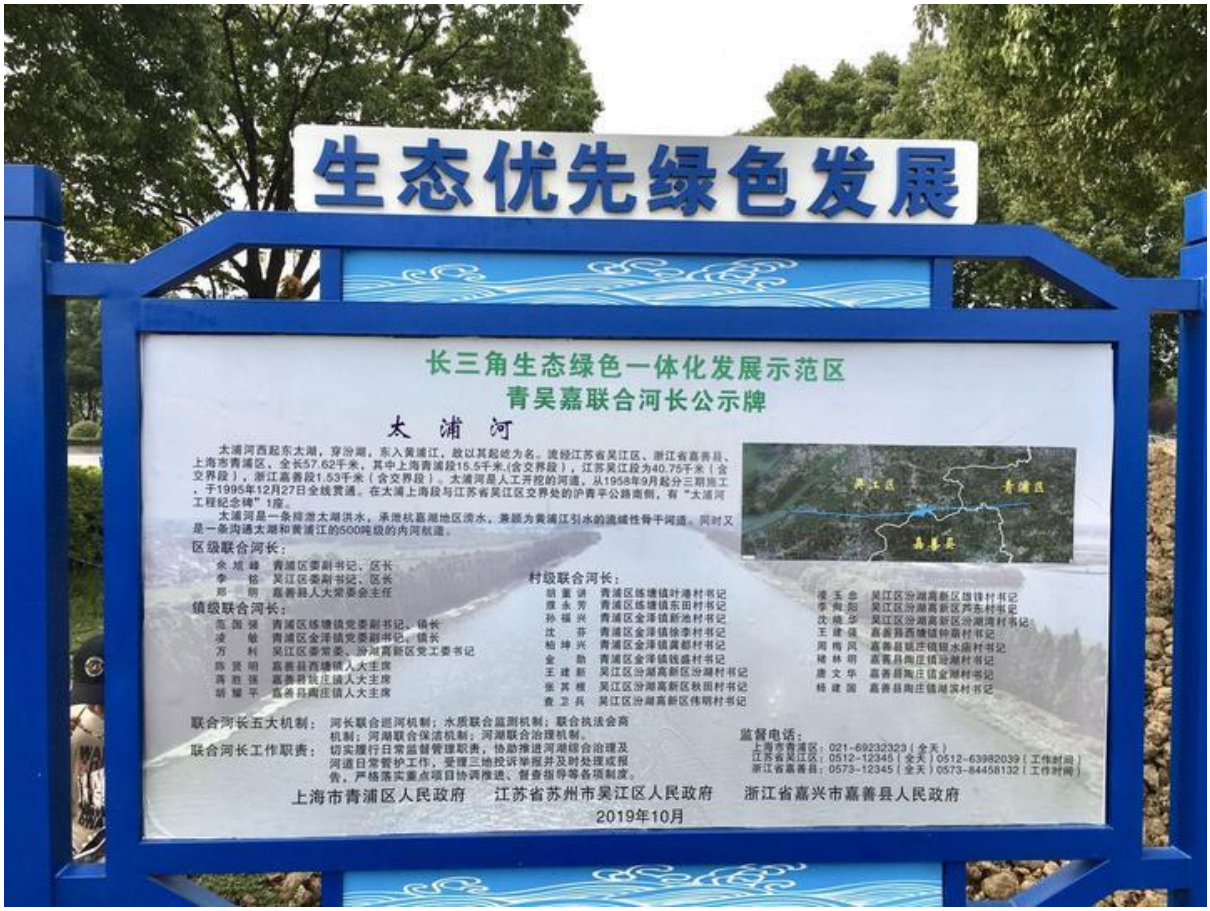
The River Chief App



Note. Reprinted from “Frank 打开长三角“盲盒”③ | 汾湖上的水葫芦去哪了？” by Xinhua Daily, 2020, retrieved from http://news.xhby.net/js/yaowen/202012/t20201204_6898961.shtml

Figure 16

Billboard displaying the info of three levels of JRCS (district, county, village) at the Demonstration Zone



Note. Reprinted from“长三角理想图”走读｜三省之河太浦河：联合河长制治污前后的推与帮 by Qianjiang Evening News, 2020, retrieved from https://www.163.com/dy/article/FE2DPRHQ0512GTK3.html

- *Civic River Chief*

Actors from civil society and the private sector have voluntarily participated in river and lake stewardship. The Civic River Chiefs are seen by scholars as an effective supplement to the administrative river chiefs. They are local citizens from all walks of life, including managers of factories and enterprises (dubbed “Enterprise River Chief”), farmers, retirees, and college students. Local NPC delegates are also hired to increase the “celebrity effects” of the RCS. Civic River Chiefs fulfill tasks such as patrolling, inspecting, reporting, liaison, promoting and

organizing river/lake management among local residents. A volunteer alliance termed the "River Youth" was also formed, initiated by the Communist Youth League committees of Wujiang, Jiashan, and Qingpu, as well as Wujiang's River Chief office. Civic River Chiefs and the River Youth have established connections from across villages upstream and downstream of the Taipu River. In one village in Lili, there are 90 volunteers responsible for inspecting water quality (Chen, 2019). Selected representatives from the volunteers also serve temporary leadership positions at neighboring villages to form closer alliances between upstream and downstream villages. It was reported that the local governments in the Demonstration Zone plan to engage more social supervision in river and lake governance started at these junction villages.

4.4.2 Implementation of the Three Unifications System

Reaching consensus among multiple localities on environmental standards is one of the most challenging problems. Aside from differences in the functionalities of natural resources, local governors tend to only fulfil the minimum required standards despite their capabilities (Kostka, 2016; Q, Huang, Personal Communication, December 20, 2020). In a recent news report on regional integration, the vice president of China Academy of Urban Planning and Design call for a mentality shift to "race to the top" among local cadres: "[implementing] the most stringent standards means that whoever has the highest standards, be it Suzhou, Zhejiang or Shanghai, will be the standard for all" (Fu, 2019). Relevant departments have been taking initiatives to work together and speeding up the implementation of unified standards. As of late 2020, some progress has been made:

- *Unification of Environmental Standards*

A list of key environmental standards has been identified and opened for public consultation, covering air pollutant emission standards for industries include the pharmaceutical industry, automobile repair, stationary internal combustion engines. A number of technical specifications have entered the expert review stage, including quality control and assurance of air monitoring "super stations" (air monitoring stations with multi-parameter, three-dimensional and higher temporal resolution than conventional ones) and control of volatile organic compounds emissions from equipment leaks. A study has been carried out to unify the discharge limits of urban wastewater treatment plants, in addition to a feasibility study to raise the discharge standards in Qingpu.[53]

- *Unification of Monitoring*

In July 2020, EEBs of the three jurisdictions issued a joint environmental monitoring and data-sharing programme in the Demonstration Zone. The scope of the programme focuses on ambient air, surface water, and drinking water sources. New rules are set for environmental emergencies, and routine monitoring of water quality has been jointly carried out monthly by the environmental monitoring station staff and the results of the sample analysis are shared through an intelligent environmental protection platform. A new ecological environmental monitoring liaison special working group is also established. The group is responsible for carrying out coordination and project tracking.

- *Unification of the Benchmarks for Environmental Administrative Penalties*

[53] Lvse Qingpu. (2020, October 29). Shifanqu shengtai huanjing guanli "santongyi", zhe zhang xinwen fabuhui wei nin xiangjie [Demonstration Zone ecological and environmental management "three unified", this press conference gave your detailed explanation] https://www.shqp.gov.cn/shqp/ttxw/20201029/800078.html

A key challenge to the harmonization of environmental law enforcement concerns the discretionary power of relevant departments over administrative penalties. Due to differences in administrative divisions, local industrial structures, and levels of economic development, the criterion for discretion over ecological and environmental administrative penalties varied considerably within the Demonstration Zone. The same environmental violations may result in different penalties at different places. For instance, the fines for discharging water pollutants without a discharge permit could range from a hundred thousand to one million yuan. The stringency of enforcement varied not only at the provincial level, but also at the prefectural-level within the same municipality, and can easily lead to mistrust and resentment among the public.

At the end of 2019, under the guidance of the MEE, a joint special working group led by the EEB of Shanghai was formed. Following the content of the memorandum, the EEBs from three provinces and one municipality simultaneously released their normative documents to unify the benchmarks for ecological and environmental administrative penalties. Various law enforcement officers and experts participated in the revision of these documents, and the final administrative Measures were enacted on September 1, 2020 (Shanghai Municipal Bureau of Justice, 2020). Such cross-jurisdictional unification for administrative penalty discretion is reported to be unprecedented in China.

4.4.3 Joint Task Force for Inspections and Law Enforcement

A joint law enforcement team was established by Qingpu, Wujiang, and Jiasha governments in May 2020, following a “five unification” principle: “unified command and control, unified team building, unified inspection procedures, unified enforcement efforts, and unified

discretion” and a new mechanism for “mutual recognition of evidence and penalty results”. In August, 12 officers from district and county-level environmental law enforcement corps carried out the first round of cross-border site inspection in the Demonstration Zone. This two-day inspection focused on ten key polluting enterprises in the pilot area of Qingpu. The enforcement and inspection operations were carried out in groups by employing a so-called “double random and one open”(双随机、一公开, *shuangsuiji yigongkai*) principle: random selection of subjects for inspection; and random selection of enforcement officers and inspection units. The randomization helps prevent unfair and lax law enforcement that may occur during point-to-point inspections, strengthens the supervision of polluting companies and the fairness of inspection procedures. The “one open” means the results and punishment of investigations will be promptly disclosed to the public.

Aside from standardizing and enacting law enforcement protocols and procedures, joint learning and knowledge exchange with private entities is another important outcome of the collaboration functions. For instance, in October 2020, a team of 86 officers inspected eight enterprises in Wujiang. Their tasks included exchanging information on local supervision requirements, standards, and regulations and a learning session with a clean energy power plant. As of December, 2020, the joint law enforcement team had conducted four rounds of cross-border site inspection. An appraisal was held at the end of the year, during which key law enforcement officers from the three jurisdictions shared their works and experience through case studies.

4.4.4 Section Summary

A considerable number of collaborative practices and measures have been carried out under the shared theory of action of the LCNs. They are bottom-up, cross-provincial initiatives that previously could not be realized by an individual organization or jurisdiction. Some of these actions concern the outputs of accomplishing targets, while others are related to improving the procedure fairness, efficiency of collaborative processes, especially the stringency of regulatory law enforcement. Institutional innovation like the JRCS has made progress on mobilizing resources and incorporated information technology and public participation to improve supervision. These joint actions are not solely the integration of tasks, but also include major changes in managerial practices. In most cases, the operating rationale for taking actions are explicitly made, even though realizing them remains a challenge, such as adopting the highest environmental standards among the three jurisdictions. And mutual supervision is another important feature of this rationale. These collective actions suggest a "will to improve" among local actors (Göbel & Heberer, 2017).

4.5 Network Outcomes: Impacts and Adaptations

In the collaborative governance framework, impacts result from the collaborative actions are classified as the third-order effect of results on the ground (Emerson et al., 2012). Third-order effects are distinguished from first and second-order effects, namely trust, intellectual capital, new partnerships, changes in practices, etc. They entail new collaborations, new institutions, norms, and discourses (Innes & Booher, 1999). Adaptation is the potential transformative change brought about by the LCNs regime. It could entail institutional change, change in the collaborative governance structure, integration of new participants, as "cross-boundary

engagement must generate 'returns' for partners to justify their continued involvement to their own organizations and constituents" (Emerson et al. 2012, p.19). Since most of the objectives of LCNs would not be realized until 2022, third-order effects are difficult to verify. Nevertheless, some of the early outcomes of collaborative efforts can be observed. The following section discusses the added value of the LCNs and the potential changes to the system context.

4.5.1 Horizontal Intergovernmental and Intragovernmental Collaboration

- *Joint Protection of Key Transboundary Water Bodies*

Since the launch of the JRCS, the number of rivers and lakes that reach Class III and above in Wujiang has increased from 21 to 76 out of 114.[54] The system has fostered more meaningful interactions among localities who previously were prone to carry out one-off, last-minute collaborations. Obvious progress has been made on water hyacinth management at cross-jurisdictional river segments. The sharing of perspectives, practices, personnel, and equipment have become a new norm between neighboring counties. Monthly joint patrol creates more trust and accountability among localities to form long-term collaborations. In other words, participants in the LCNs gained more legitimacy to carry out cross-jurisdictional actions and are better supported when doing their individual parts, which might in turn create positive effects on the larger system context.

[54] Suzhou Wujiang fabu. (2020, December 11). *Wujiang "kuajie lianhe hezhangzhi" ruxuan zhongguo gaige 2020 niandu 50 dianxing anli* [Wujiang's "cross-border joint river chief system" was selected as one of the 50 typical cases of China Reform 2020] http://www.isuzhou.me/2020/1211/107666.shtml

In regards to the policy-making processes of institutional innovations, both the RCS and JRCS started as local experiments in the Jiangsu province, which later being adopted on a much broader scale (Zhang & Wang, 2021). RCS is institutionalized nationwide and some provinces such as Zhejiang has established dedicated local regulations for the system. It is likely that the JRCS could follow suit. As of late 2020, the JRCS has also been implemented in the Coordination Zone with Kunshan government involved.

Information flows link network actors together and give them explicit signals to act upon, which have been intensified in the Demonstration Zone. River chiefs and environmental departments have set up new communicative platforms so that they could report problems at the first opportunity and further pushing the objective of creating "one network" for environmental governance. By making problems more visible, local river chiefs are more willing to take the initiatives to curb transboundary pollution.

Though the progress in joint protection of water bodies is worth acknowledging, interviewees comment that local river chiefs would continue to take actions mainly within their respective areas during joint operations, especially in regards to those that involved sharing financial resources (X. Gu, Personal Communication, December 24, 2020; Song, G, Personal Communication, January 28, 2021). This may have to do with the insufficient legislative support for the RCS at the provincial-level. [55] So far, only Zhejiang has established specific local legislation for the RCS.

[55] The village river chief does not have the power to carry out comprehensive management of the water environment, nor does he/she have administrative accountability. The village leaders can participate in water environment management, but not as administrative manager, rather, they can only complete the relevant

There are also fundamental flaws of the RCS itself which might not be overcome by simply enhancing horizontal bond. First, the system follows the logic of "rule by man" (Huang & Xu, 2019; H. Liu, Chen, Liu, & Lin, 2019). The outcomes of water management rely on the personal commitment, capability, and charismas of individual leaders. This notion aligns with the attitudes and self-imposed pressure at the local level observed by a respondent: "the township mayor of Shanghai was the most conservative, has an "I [only] do whatever the district told me to do' attitude", while his counterpart in Zhejiang "does everything he can to make a name for himself". According to the respondent, the Zhejiang provincial guidelines are "incredibly ambitious" (F. Xiong, personal communication, November 9, 2020). Secondly, the accountability review process of river chiefs is compromised by political rankings. Officials of the same ranking do not have the power to hold each other accountable. Village and township governors also have a much closer tie compared with their relationships with municipality governors. Yan & Dong (2020) show that when facing challenging issues, village river chiefs are not incentivized to submit a "jump scale report"[56] though such an option is available in the App. Doing so would imply their incapacity, increases the workload of their superiors, and the problem will eventually "flow back" to themselves. Furthermore, in the intragovernmental dimension, EEBs and environmental agencies who are responsible of the implementation of policies and water quality evaluation have lower political rankings than river chiefs at the same jurisdictional scale. Without the involvement of third-party auditing

water environment management tasks by signing contracts or agreements with the township government and street offices.

[56] The River Chiefs App features a "flexible reporting process": the referral of environmental issues does not have to follow a fixed set of referral procedures, the village river chief can report the problem to the township river chief, or "jump scale" to the district river chief office or district department, or even directly to the municipal river chief office or municipal department.

companies, as only a few cities in the YRD city cluster has started to introduce, the validity of the evaluation process cannot be guaranteed (Huang & Xu, 2017). Since water quality is directly linked to local cadre's political promotion, some chiefs also focus on short-term outcomes by taking a blunt force approach and other deceptive conducts (Huang & Xu, 2019).

There is no obvious progress made with respect to the eco-compensation mechanism. Its implementation suffers from: 1) inconsistent attitudes of the upstream and downstream jurisdictions towards compensation; 2) lack of knowledge in how to account for compensation standards; 3) lack of means to effectively communicate the results of the accounting to the relevant jurisdictions (M. Yang, Personal Communication, December 21, 2020). Another respondent confirms that "many compensation mechanisms have not yet been properly negotiated, involving economic and development issues" (X. Gu, Personal Communication, December 24, 2020). With the current cross-jurisdictional joint prevent and control mechanisms in place, how to effectively combine them with the eco-compensation mechanism becomes even more complicated (X. Gu, Personal Communication, December 24, 2020). Different levels of dedications for institutional innovation again shows in this case: Wujiang has started a new local experiment ahead of its peers and launched the first air quality eco-compensation in the YRD in late 2020. [57]

- *Unification of Environmental Standards and Benchmarks for Environmental Administrative Penalties*

[57] Xinhua Daily. (2020, November 30). *Quanli dazao changsanjiao yitihua shifanqu de "Wujiang yangban"* [Wujiang model" for the Yangtze River Delta integration Demonstration Zone] http://www.zgjssw.gov.cn/shixianchuanzhen/suzhou/202011/t20201130_6892155.shtml

The “Three Unifications” system is beneficial for preventing the transfer of pollution between jurisdictions. However, the legal frameworks mentioned in Chapter 4.1.5 remains a major constrain. Although regional coordination mechanisms have been stipulated in China’s Environmental Protection Law, in practice, there is no cross-administrative legal mandate, nor a regional environmental protection management body in place. To set up such a legal mandate requires changing legislations at the national level (Song, G, Personal Communication, January 28, 2021). Hence, collaboration on ecological legal frameworks still remains on the surface level, as authorities with local legislative power formulate legal documents separately and then only carry out the necessary coordination during the legislative processes. So far, the Executive Committee was granted only provincial-level project management authority by the Standing Committees of national and provincial People’s Congress. While local EEBs have not been authorized with more administrative power. Much remains to be done after the unification of the benchmarks for ecological and environmental administrative penalties in the Demonstration Zone.

Achieving the most stringent standards and highest level is a shared goal among local governments. It implies that the unification of environmental pollution prevention standards will be set according to whoever has the highest standards among three jurisdictions. This might be one of the most challenging tasks for LCNs, as consensus-building is time-consuming, especially when localities have unequal resources. There is no guarantee for obvious returns for *all* participants in the LCNs by complying the most stringent standards. Inconsistent standards persist in the Demonstration Zone, as the deputy director of Jiaxing EEB commented in an interview:

> The standards for sewage discharge into the sea are different from place to place. Some enterprises' emissions will be listed as environmental offences, while others can get away with it… Uniformity in law enforcement is just an entry point, regional environmental governance can only improve when multiple standards are linked and consistent. [58]

As mentioned in Chapter 4.1.1, local fiscal conditions vary in the Demonstration Zone. How will high environmental aspiration affect local governments who are fiscally weak? In the case of Xitang, a respondent reveal that the township's annual revenue is around 600 million yuan but their financial expenditure for the next three years is close to 20 billion yuan. For grassroots civil servants, the message from the superior was: "It is a political task and you have to achieve it. Let's talk about money later" (F. Xiong, personal communication, November 9, 2020). On the issue of vacating the highly-profitable button enterprises due to environmental pollution, the interviewee commented:

> Everyone wants to be high-end, digitalized, 5G… How do you turn buttons into a high-end industry? There's nothing wrong with buttons, they can make money and meet the needs of the market…Their entry criteria for industries are set so high that nowhere in the world would unwelcome such companies. The standards are very high, but the reality is quite bleak (F. Xiong, personal communication, November 9, 2020).

Another respondent sympathized with this comment yet go so far as to say "it is not important to talk about fairness because all the natural resources belong to the central

[58] Zhejiang ribao. (2020, August 20). *Sansheng yishi gongyong yiba zhifa biaochi dazao quyu huanjing zhili "changsanjiao moshi"* [Three provinces and one municipality share a law enforcement yardstick to create a regional environmental governance "Yangtze River Delta model"] http://www.zj.xinhuanet.com/2020-08/20/c_1126389248.htm

government. Everyone [local officials] understands that" (Song, G, Personal Communication, January 28, 2021). According to him, pollution control among enterprises is progressing quickly and the local governments know well how to balance the kind of enterprises will be removed:

> As long as the standards are met, "low, scattered, and small" is a generalization. The local governments will weigh up… The "three-line one list" is undergone restructuring, it has a lot of mistakes and its quality is rather poor… Even if these "scattered and dirty" [enterprises] are not demolished, the market would deem them obsolete anyway (Song, G, Personal Communication, January 28, 2021).

This underlying notion of all water resources belong to the state will certainly continue to influence local actors' decisions on making trade-offs between local and personal interests and water pollution prevention. It is difficult for them to rationalize taking efforts to protect an entity that on paper does not belong to them (Liu, 2019).

- *Joint Task Force for Inspections and Law Enforcement*

The joint law enforcement team is beneficial to enhance team members' understanding of the industrial layout of adjacent jurisdictions. Exchange best practices across jurisdictions and transfer the knowledge of enterprises with good environmental performance is conducive to the overall collaborative system. More importantly, this mechanism provides a more legitimate basis for implementation practices to be standardized. Previously, polluting boathouse owners and factories could avoid punishment from individual local inspection team by using their "double identities", as their property could be registered at both jurisdictions. Joint task force and patrolling helps prevent such exploitation of the system,

makes it much harder for polluters to dodge local investigation and punishment. The process of demolishing polluting factories and buildings have also become more efficient:

> The pace of our work is accelerating. It used to take at least three years to vacate the "scattered" areas, but now it can be completed within a year. And we are not the only village doing this, work is accelerating in surrounding villages as well. [59]

Due to legislation insufficiency, more efforts are needed for local law corps to make substantive change. In the cross-jurisdictional joint law enforcement team, there are leading law enforcement departments and collaborating departments, and "they all enforce the law in accordance with the relevant legal provisions within their own scope of authority." With regards to accountability, in practice, "there is indeed a phenomenon of everyone wants to take the credit while no one wants to be held accountable" (X. Gu, Personal Communication, December 24, 2020).

4.5.2 Vertical Intergovernmental Coordination

Chapter 4.2.1 shows vertical metagovernance is consequential to the formation of horizontal intergovernmental and intragovernmental collaborations. The central government as the metagovernor provides guidance, recognize local policy experiment, and together with the provincial governments they facilitate and mediate the collaboration processes. Compared with previous faltered collaborations, process-oriented, instead of target-driven interventions from the central government is more conducive to the stability of LCNs.

[59] Wenhui bao. (2019, December 4). *Lili: shuixiang keting shuxie lvse dajuan* [Lili: green answer sheet written in the living room of water town] https://www.163.com/dy/article/EVHV1VIO05506BEH.html

Through the devolution of state power, the Executive Committee in the Demonstration Zone serves as the "supervisor" that has the real authority to make strategic plans and facilitate coordination mechanisms with subordinates and sectoral departments. It is also heavily involved in various deliberations regarding main projects in the Demonstration Zone, as well as informal forms of communications to pass down the political signals from the central government. In a span of one year, the Executive Committee hosted 1,079 meetings at their office, with an average of four coordination meetings and work discussions per day; and 19,386 people (visits) attended these meetings.

This leadership setup for the Demonstration Zone mirrors the leadership groups that dominate national-level reform, who employ new modes of control and steering to improve institutional coherence (Schubert & Alpermann, 2019). Although the IJAs signed by the three jurisdictions (especially at the county-level) do not have a strong legal standing, the political incentives to implement collaborative policies are enhanced by higher-level authorities. The vertical intergovernmental hierarchy enables local actors' capacity for collaborations. In other words, soft steering mode of governance (guidelines under the names of "Suggestions" and "Opinions"), especially process-oriented interventions from the central government are critical at the outset, during the deliberation and determination of the LCNs development. The emerged institutional innovations and how they are recognized by the central government echoes the notion that "if cadres are able to turn a unique mix of local problems, resources, and motivations into very specific local policy innovations that are in line with the preferences of the central government, the result of their agency represents not a loss, but a gain for central state capacity" (Göbel & Heberer, 2017, p.475).

This brings to the question of, under the increased involvement of meta-governors, what kind of steering deficits might occur? Within the downward pressurized system, local governments are likely to defend their interests when pressure from above is high (Schubert & Alpermann, 2019). A few studies point to the counter-steering approaches (Huang & Xu, 2019; Yan & Zeng, 2020) that can also be expected from lower-level especially grassroot officials in the Demonstration Zone. First, information asymmetry between the principals and agents might be intensified. In the case of the RCS, village river chiefs are both policy implementors and information transmitters; the township-level chiefs are both their supervisors and evaluators. Hence, village chiefs have the incentive to report problems selectively through the River Chief App.[60] Honest reporting affects their performance review and the reported problems may eventually "flow back" to them through the system (Yan & Ze, 2020). Secondly, joint prevention and control mechanisms could be seen as a legitimized form of collusion among adjacent jurisdictions (Tang, 2010). By increasing the responsiveness of handling transboundary pollution, the local governments can "keep" social conflicts induced by pollution incidents at the same administrative level, without alerting higher-level governments or the media. While in the absence of such a mechanism, victims would be able to reach to the higher-level authority of their jurisdiction without the interference from polluter's jurisdiction. In other words, joint prevention and control mechanisms might be better at resolving social problems (economic conflicts or protests) while no so much as to improve environmental outcomes. A respondent from an ENGO dedicated to Taipu River Basin stewardship commented positively on the relationships between upstream and

[60] The River Chief App has a function whereby the River Chief Office at the upper-level can extract data from the backend of the app to produce a "River Chief Weekly Report", and through the "Red and Black Lists" and "Score Lists", they can commend or criticise river chiefs for outstanding or poor performance.

downstream users in recent years (B. Chao, Personal Communication, November 23, 2020). Whether or not joint prevention and control mechanisms can actually lead to positive environmental outcomes in the long run remains to be seen.

For grassroot governors, the launch of the Demonstration Zone means they are now under the supervision of two entities: their provincial-level superiors and the Executive Committee. One journalist who interviewed all five township mayors described grassroot public servants found the increased workload overwhelming. They work "'seven plus seven', meaning seven days seven nights, they barely have weekends" (F. Xiong, personal communication, November 9, 2020). Although enhanced accountability in the environmental sector is an encouraging change, it is questionable whether that would be sustainable in a pressurized system.[61]

4.5.3 Non-Governmental Participation

Within the LCNs, information disclosure and public supervision are the main domains that engage actors from the general public. Respondents suggested that, as environmental departments become more transparent, local communities have the will and sense of responsibility for environmental and ecological protection, following the idea of "local environmental problems require local solutions" (B. Chao, Personal Communication, November 23, 2020; G. Song, Personal Communication, January 28, 2021). In regards to the decision-making process, besides the Overall Spatial Plan (draft) published in 2019 that were

[61] Since 2019, a new Forest Chiefs System was launched, which operates under the same logic of the RCS. So far, three provinces in the YRD city cluster (Jiangsu, Anhui, Zhejiang) have started to implement the system.

open for public comments, a few air pollutant emission standards have also been made available for public consultation by local EEBs at three jurisdictions (pharmaceutical industry, the automobile repair industry, stationary internal combustion engines, and particulate matter control standards for building construction). Civic river chiefs are also involved in the planning scheme, although the degree of involvement is not clear. According to one respondent, the chiefs from local communities live and work in the immediate area of water bodies, and "this realistic urgency can inspire a strong sense of responsibility among the civic river leaders" (X. Gu, Personal Communication, December 24, 2020). As a complementary instrument to administrative river chiefs, it has a few advantages. First, administrative river chiefs are generally busy in their daily work, the civic river chiefs have the geographical advantage for water body supervision, so they share some burden with the official river chiefs. Second, civic river chiefs are involved in the development of river regulation planning schemes. They are able to communicate "upwards and downwards" and serve as a bridge between the government and the people. The main downside is that civic river chiefs do not have any administrative power so they still play a passive role in cross-jurisdictional water governance (X. Gu, Personal Communication, December 24, 2020).

One respondent suggested that the public and local NGOs has enough power to disclose issues on popular user generated platform like WeChat and Toutiao[62] and play a supervision role, and these actions are often "quite impactful" (G. Song, Personal Communication, January 28, 2021). So far, aside from the River Youth, which is a voluntary group affiliated with local Communist Youth League committees, there is no evidence showing there are

[62] Jinri Toutiao (今日头条) is a popular Chinese news and information content platform owned by ByteDance. The app works both as a blogging platform as well as tailored news feed list for users.

other voluntary organizations or ENGOs directly involved in the LCNs. More anecdotal evidence suggested the “environment has not improved”. Although online reporting quickly gets the attention from local EEB it still takes more than a week for them to take action:

> It's the same with complaints about blue algae in last Summer, [they] chose a particularly windy day to come over, cleaned it up casually, took some pictures, done, and a few days later it's the same. If [I] complain about electrofishing, they come over two or three days later and say they don’t find any while patrolling (X. Wang, Personal Communication, January 21, 2021). [63]

Although previous studies suggested public and private partnerships have increased in the Taihu basin since the water pollution crisis (Xu, Cheng, & Liao, 2018; Zhu, 2010) and new forms of roundtable meetings and stakeholder platforms have been explored (Dai & Qin, 2019; G. Liu, 2019), voluntary agreements between local enterprises and the governments have rarely been reported in the Demonstration Zone. An interviewee commented that regulatory instruments have so far been effective because “enterprises have adapted to the most stringent discharge standards and have been taking the initiative to improve their environmental information [disclosure], as good environmental performance is also a sign of overall competitiveness” (B. Chao, Personal Communication, November 23, 2020).

Engagement of the corporations mainly revolve around large, cross-jurisdictional infrastructure projects. And similar to Westman & Castán Broto's (2019) observation the inclusion of actors seems to have the most to do with technical expertise and economic

[63] The respondent made a complaint in January for an oil leaking incident at the Yuandang Shoreline which did not receive any action for more than a week.

leverage. As mentioned in Chapter 4.2.2, the Development Alliance in the Demonstration Zone was chaired by the China Three Gorges Corporation, who is a state-owned power company. The company's Shanghai institute worked with a number of national and municipal institutes, in addition to planning and design agencies on the implementation plan for the integrated management of the water ecology and environment in the Demonstration Zone. The company also funded one of the major cross-river shoreline restoration projects that connects Qingpu and Wujiang, which was completed in November, 2020 (see Figure 17).

Figure 17

Slow bridge for the demonstration section of the Yuandang shoreline restoration project

Note. The picture shows a sailing race sponsored by Bright Dairy & Food Co., Ltd (Guangming). In celebration of the one-year anniversary of the Demonstration Zone. Reprinted from *Jfdaily* website, retrieved from https://www.jfdaily.com/staticsg/res/html/web/newsDetail.html?id=306892

One possible reason that reduces the opportunities for citizen and enterprise engagements could be the dominance of public service units in research and decision-making processes (Guttman et al., 2018). These are entities such as environmental monitoring teams,

environmental inspection and law enforcement teams, and national and provincial Research Academy of Environmental Sciences. The latter took over a substantial share of service market from the private sector (G. Song, Personal Communication, January 28, 2021). The interviewee suggested that they "make profit and is also very close to the power" and "the market cannot compete with them". Meanwhile, the reform and downsizing of public-sector organizations that has been taken place in the past few years "is making very slow progress" (G. Song, Personal Communication, January 28, 2021). In mid 2020, the Wujiang government formed a strategic cooperation directly with the Environmental Planning Institute of the MEE. The institute has arranged for staff to be stationed in Wujiang and commissioned a professional organization to monitor and analyze the air quality of Wujiang on a weekly basis and make policy recommendations. The Shanghai EEB also established a partnership with Zhejiang Tsinghua Yangtze River Delta Research Institute to strengthen environmental protection and green development in the YRD.

4.5.4 Section Summary

The transformative change brought about by the LCNs might not be manifested until the later stage of the Demonstration Zone. However, a few intentional and unintentional changes of state within the system have emerged. First, the added value of LCNs is clear when it comes to information-sharing, changing perspectives, unifying practices and standards, and institutionalizing cross-jurisdictional collaborations among jurisdictions. We see the creation of new norms and local policy experiments are recognized by the central government. The progress that has been made in collaborative legislation (i.e., the power devolved to the Executive Committee and unification of environmental administrative penalties) is unprecedented in China and could serve as a stepping stone for future development.

Additionally, without the matching legislative supports, environmental management still faces the "rule by man" predicament and the constraints from political rankings. The discretion enjoyed by local actors give rise to creative bottom-up initiatives but also poses challenges for reaching their true potential, especially under the pressurized system. Affluent administrations like Wujiang is clearly more enthusiastic about implementing new policy instruments; while fiscally weak locality faces more challenges in local economic development and allocating resources.

Though joint protection and prevention mechanisms are perceived as normative strategies, they also further complicated market-based instruments like the eco-compensation scheme. Previous studies have already shown the technical complications of measuring compensation and the difficulties in negotiation. Furthermore, joint protection and prevention mechanisms might intensify the information asymmetries between principals and agents as local actors now have more means to "exclude" higher-authorities by keeping transboundary conflicts on the same administrative scale. On the street-level, grassroots officials are now under the leadership of two entities. Their workload has increased and it is unclear how they balance the tasks assigned by their superiors and the Executive Committee. Although JRCS has achieved positive short-term environmental outcomes, whether such an accountability system is sustainable or not is questionable.

The governing structure of the Demonstration Zone embrace the concept of public-private partnerships. Though majority of them are focused on green finance, green insurance, and environmental credit system. In the area of transboundary pollution, company-led partnerships are dominated by powerful state-owned enterprises. The engagement of the non-state actor mirrors previous findings on environmental governance in China. The public-

sector units are heavily involved in the planning. While for the general public, instead of directly involved in decision-making, they partake more in consultation, monitoring, social supervision and collaborative-based participation (Feng et al., 2020).

5. The Embeddedness of Environmental Protection in Regional Development

Based on the analysis of the LCNs, this chapter adopts eco-governmentality to explore the embeddedness of these collective actions within the larger context of regional development. As Jessop (2011) argue, metagovernance concerns not just institutional design but also the transformation of cultures and subjectivities. Yet governance theories do not pay sufficient attention to them. Hence, governmentality theory is used here as a complimentary analytical device. From what has been observed in the development of the LCNs, in addition to the regulatory and coercive form of policy implementation such as factory removal, what appeared to be more prominent is the shaping of local actors' subjectivities so they are instilled with the "will to improve" (Göbel & Heberer, 2017) and self-government through various techniques. They have strong implications on local governors' behaviors when making tradeoffs between environmental protection and economic development. Following in the lines of Foucault's "conduct" (*conduite*): the activity of conducting and the way in which one lets oneself be conducted (Burchell, 2009, p.193), this chapter engages in a broader discussion on how environmental protection and economic growth are being reconciled in contemporary China's pursuit of EC.

5.1 Eco-governmentality in the Making of World-Class Water Villages

Similar to its theoretical development in the West, eco-governmentality scholarship has grown in China as environmental degradation became an object of cross-scale governance

and a key location for the production of knowledge and power (Wang & Zhang, 2019). A wide range of subjects such as large scale grassland restoration (Kolås, 2014; Yeh, 2005) and hydro-politics (Choi, 2017; Sheng, Webber, & Han, 2018) are examined through the lens of eco-governmentality.

Scholars have also extended its application to China's eco-city movement. By evaluating the technical and ethical components of a garden city project, Hoffman (2011) illustrates how urban modelling as a governmental practice transformed the city's environment and produced new forms of value in the area. Gong (2019) documents how China's authorities practiced green governmentality through the removal of low-value added industries out of the PRD and turning farmers and migrants into factory workers. Wang & Zhang (2019) show an industrial park that coordinates the development of Shenzhen and its neighboring cities were "repacked into an ecological, knowledge city" based on a specific technocratic vision of eco-ness "that is hinged on advanced, international, post-industrial economy, and sustained economic-growth" (p.49). Pow's (2018) analysis on eco-city project goes beyond the technical rationale and highlights the aesthetics aspect of eco-governmentality. The eco-aesthetics governmentality "attends to bourgeois forms of middle-class environmentalism, at the same time imposing (eco)aesthetic norms and principles into governmental logics and every day practice" (p.3).

The governing strategies in the Demonstration Zone strongly resemble the "*how* of governing" in the abovementioned literatures. They include: first, the prioritization of green space and the removal of low-value manufacturing industry underpinned by a specific economic-technocratic vision of eco-ness; second, the fostering of a particular citizen-subject in the mode of self-governing (Hoffman, 2011); third, the production of eco-aesthetic

normativity (Pow, 2018). Undoubtedly, none of these strategies can function solely on its own. They coevolve and complement one another.

The first aspect of eco-governmentality deals with techno-scientific rationales. The way they are manifested in the YRD clearly indicates China's switch from a labor-intensive to a capital-intensive mode of production. Techno-scientific and calculative governmental logic render environmental problems visible, and local ecological conditions more intelligible and governable. This is shown in the large number of city planners, planning institutions, and research universities that engaged in joint meetings and working committees during the construction of the Demonstration Zone. Numerical (expected and binding) targets were made not only for the "blue-green space" and spatial restructuring of water villages, but also in the category of "Jiangnan charm and small-town flavors". As Pow (2018) concluded: "complex urban environmental problems are reduced to a set of measurable and politically neutral technical indicators" (p.8). These targets, statistics, and redlines although rather imperfect, justify the removal of tens of thousands of enterprises along the Taipu River, which used to be the main driver of local economic growth. Fish ponds were also cleared up within one kilometer from the Yuandang Lake shoreline to give room to less polluting arable lands.

The "Industrial Project Access Standards for the Demonstration Zone Pioneer Zone" (Trail) set four categories of criteria that new industrial projects and R&D headquarters have to meet: the degree of industrial fit, environmental friendliness, innovation concentration, and economic density. It stipulates that new industrial projects have to meet the control requirements of the "three lines and one list", implement the most stringent environmental emission standards issued by the state, Shanghai, Jiangsu and Zhejiang industries and specific regions, with energy and water consumption indicators reaching industry-leading levels, and

many other specific indicators for R&D human capital, activities, and output of industrial land.[64] Local governors are eager to transform the ecological conditions to cater to their needs. Tens of thousands of high-tech knowledge workers are introduced to the Demonstration Zone with new apartment buildings constructed for them. It seems that Jeffreys & Sigley's (2009) conclusion is still relevant one decade later: "Citizens in reform-era China increasingly are valued, and conversely, 'not-valued', according to their capacity to appreciate and engage with the marketized strategies of green city-building and protecting 'the environment'" (p.31). During the time when Jiashan dismantled hundreds of polluting companies in the last two months of 2019, nearly 20,000 people were reported to have their employments affected. A similar problem also occurred in Jinze after the remediation of garment factories. The local government has not made a resettlement plan for the unemployed villagers. One respondent who works in the Demonstration Zone described his experience:

> The Demonstration Zone is under strict environmental scrutiny. Exhibition factories are not allowed to open anymore. [Our] suppliers are moving more frequently and our costs are going up. [Our suppliers] moved five times a year, being chased after by the environmental protection bureau. They gave you two or three days, if you do not leave, they switch off the power. There used to be so many signages [factories] in Wujiang, now they are strictly investigated, all because of heavy metal pollution. Doing a bit of exhibition

[64] The proportion of scientific and technological personnel engaged in R&D and related technological innovation activities to the total number of employees is not less than 10%; the proportion of annual R&D expenses to total sales revenue is not less than 3%. The intensity of fixed asset investment in industrial projects on industrial land should not be less than 5 million yuan/mu, the intensity of output attained should not be less than 10 million yuan/mu/year, and the intensity of tax revenue should not be less than 1 million yuan/mu/year.

business is almost as daunting as drug trafficking (X. Wang, Personal Communication, December 3, 2020).

Another example is the RCS. The system contains complex management techniques including information-sharing, assessment of river chiefs, and public disclosure of environmental performance. When patrolling, the river chief's route and speed are monitored by the river chief App's GPS feature. These measures are accompanied by drones and satellite systems which can detect, trace, and clean up pollutants more efficiently. These eco-technical approaches have resulted in at least short-term improvement on emission reduction, but also created new sets of governance problems. Meanwhile, their accessibility excludes the participation of the elderlies, including some civic river chiefs who are retirees. Environmental improvement is still compromised by intensified information asymmetry and the pressurized system of China's bureaucracy.

The second aspect of eco-governmentality concerns how local actors govern their interactions with each other and themselves. This manifested again in the RCS, which assigns roles for government officials and general citizens from all walks of life to monitor and be more responsible for their environment. Governmental river chiefs (including village chiefs) are subjected to rewards and sanction based on their behaviors. They are also under the observation from each other in addition to the general public. Local environmental inspection teams have engaged in learning sessions with clean energy companies. New forms of local party building are created in the name of environmentalism. Meanwhile, serving as role models for numerous villages in China, the villages in the Demonstration Zone undergo modernization and transition to "Beautiful Villages" (美丽乡村, *meili xiangcun*). Various environmental behavioral change is expected from local villagers. The results will be ranked

and awarded by governmental agencies based on their level of agricultural modernization and tourism attractiveness. In some cases, local fishermen even helped remove the physical river barriers at boundary lines, and used the compensation they got from the government to open their bed and breakfast businesses. Education on waste recycling and pesticide use is also heavily promoted among the villagers. Some grassroots cadres have worked out their own reward and rating systems to incentivize villagers. In towns like Zhujiajiao, however, such endeavor is making slow progress due to a high proportion of elder population

The ideological reach of calculative logics is limited, while the vagueness of eco-aesthetic normativity allows different interests and political agenda to partake in ecological city-building (Pow, 2018). In the Overall Spatial Plan, alongside increasing regional prosperity and innovative appeal, "the natural ecological beauty of the water towns in Jiangnan" is highlighted in the first principle of the main guideline. Mobilization of aesthetic elements allows a diverse range of participants in the LCNs to act based on a shared imaginary of Jiangnan water towns that is both old-fashioned but also evokes the feeling of "world-class." Villages and their surrounding infrastructure are being reconstructed towards uniformity. The Yuandang village in Wujiang, for example, its surrounding landscape, including the width of the bicycle trails and service stations will all be aligned with Shanghai's standards.[65]

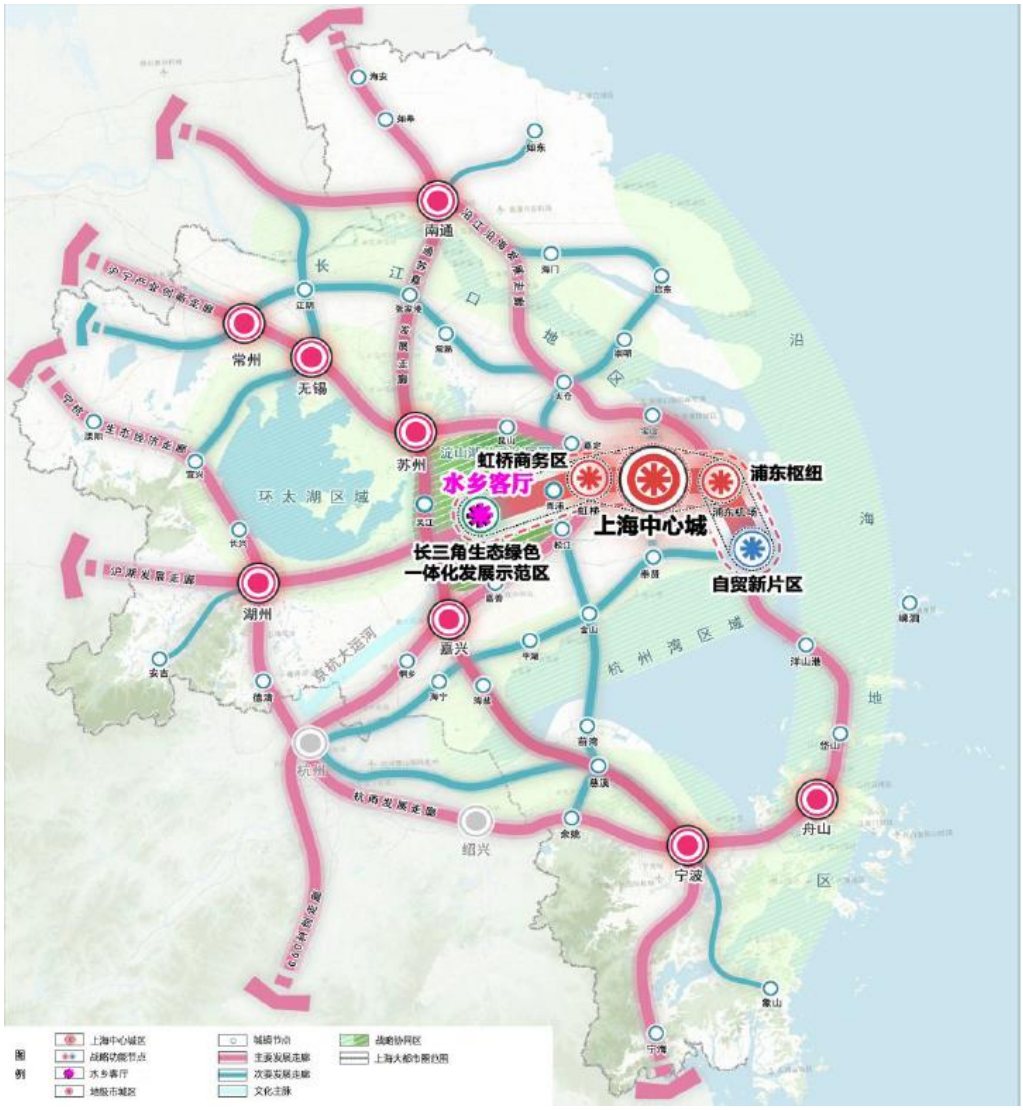
But setting in place a "hegemony of form" (world-class aesthetic) is not enough, it must "also be internally appropriated by the population it would govern; its vision of social order must be imprinted on their sensibilities, inscribed in their senses" (Ghertner, 2011, p.125).

[65] Xinminwang. (2020, May 8). *Shifan qu. Jiangnan feng | yuandangpan de meili xiangcun* [Demonstration Zone. Jiangnan style | Beautiful countryside by Yuandang] https://k.sina.cn/article_1737737970_6793c6f202000wjqm.html

For local officials, “wherever has a scenery has innovative economy”. The realization is that a beautiful landscape can be profitable. It attracts real estate developers, businesses, banks, and R&D talents that are associated with the process of de-industrialization; it is a demonstration of improved living condition; and it is what makes a town distinguishable and more competitive. Aesthetic normativity blurs the administrative boundaries and public-private divide. It also takes over the concepts of central business district and lifestyle branding. At the center of the Demonstration Zone, a “Water Town Living Room” (水乡客厅, hereafter “Living Room”) is being built (Figure 18). The Living Room will serve as a central activity and leisure area for citizens of the three localities. Its planning guideline stated its functions are to rejuvenate the traditional Jiangnan culture and showcase the results of the Demonstration Zone.

Figure 18

Location of the Water Town Living Room



Note. The Water Town Living Room (started in Magenta), Shanghai core urban area (stared in red), "key strategic nodes" such as free-trade zone and Pudong Air Port (starred in red and blue) and prefecture-level cities (pink dots). Reprinted from: *Planning and Land Resources Administration of Shanghai Municipality*, 2020, retrieved from http://ghzyj.sh.gov.cn/cmsres/e9/e9ab7b648b41406d94c6f0a86fa7a4b0/fc84f609fabe5fad3e9db9fa96de21ee.pdf

The idea of turning ecological conditions into high-quality economic development is a dominant interpretation of Xi's "Two Mountains Theory". In addition to the branding and re-appropriation of Jiangnan (see Figure 19), these guidelines and spatial plans create a set of

administrative truths that extend governmental practices to not only local cultural conditions but also local people's everyday life.

Figure 19

Ideologies of the developmental approach of the Demonstration Zone with typical Jiangnan scenery as the background image in the Overall Spatial Plan

Note. Reprinted from: "The Overall Spatial Plan of Green and Integrated Ecological Development Demonstration Zone" (Draft) by Planning and Land Resources Administration of Shanghai Municipality, 2019, retrieved from http://ghzyj.sh.gov.cn/cmsres/bc/bc13fd2cb2bc49fdaca4a9e4eb05a015/e0548fc582ab35fc9d0b325abbca2df6.pdf

5.2 Environment and Culture as Production Force for Global Capital

City clustering is a planning tool for the planning of material reality, it is also a framing device and a calculated political endeavor that addresses domestic challenges and signals global competitiveness (Chung & Xu, 2015; Harrison & Gu, 2019). China's socialist

governmentality, as Jeffreys & Sigley (2009) argue, is different from liberal western variants as it disregards the limit on what can be known about the object to be governed, and claimed that the "precise outcome of any possible intervention" could be predicted (p.10). This assumption prompted coercive interventions during Mao's war against nature. In the case of regional integration, the outcome of city clustering is already a conclusion itself—that it *will* be the solution for unbalanced and low-added value economic development. Similarly, for projects such as the Demonstration Zone, it is a known conclusion "already proclaimed by the Chinese state that sees the eco-city as a demonstration site where urbanization, capital accumulation, and nature can all coexist in a singular aesthetic urban experience" (Pow, 2018, p.12).

It is in this context that the LCNs unfold. As city clustering is deemed politically and economically more important than previous ways of organizing environmental governance (Chung & Xu, 2015), it enables actors in the networks to govern themselves and self-transform. On one hand, the institutional innovations that are undergoing in the Demonstration Zone indicate the can-do spirit of China that many find admirable; on the other hand, they are also the products of environmental crises and political pressure riddled with institutional myopia. If we see the Demonstration Zone as an important tool of place-marketing and place-making for urban government in China (Hoffman, 2011), then the widely used slogan "green is the background color (of development)" and the label "Green and Integrated Ecological Development" are as much of a marketing strategy as an aspiration for a better living environment. It offers a short-cut to de-emphasize the industrial history of the YRD and highlight a new green image. As an expert on the YRD integration said in an interview: "what the Demonstration Zone first needs to put into the test is the coordinated development

between ecology and economy, to truly realize 'lucid waters and lush mountains are invaluable assets' and turn the ecological environment into a productive force." [66] Environmental improvement is perceived by local actors as a mean to generate a productive force. Hence, protecting the environment is equalized with the protection of a new mode of production.

Heilmann's (2008) account on policy experimentation illuminates how the mobilization of bottom-up initiatives for innovative solutions contributed to China's economic success. He also argues that such a mode for governing has limited achievement in improving social and public goods like environmental protection, as it does not immediately benefit the short-term interests of local elites. Here, we see when the ecological environment is treated similarly to the terrestrial infrastructure for global capital (Luke, 1996), to a large extent local environmental experiment is intrinsically economic. It fits seemly well with local decision-makers' short-term, investment-seeking mindset. Will local institutional reforms also create an ecological success for China? We have certainly seen their potential in the YRD. Yet one might wonder if the processes of de-industrialization have indeed made the local sceneries any less conditioned by industrial processes.

6. Conclusions

Cross-jurisdictional environmental governance has become ever more important in light of China's ambitious city cluster plan. As a new paradigm for urbanization, city clusters are

[66] A quote from Xi's article published on Qiushi (qstheory), which stated: "To protect the environment is to protect productivity, to improve the environment is to develop productivity." Source: https://www.yicai.com/news/100197987.html

expected to improve institutional coherence, upgrade the industrial layout, and overcome inter-regional industrial isomorphism, all of them have tremendous implications on the environment. However, failures in resolving cross-jurisdictional environmental issues are multifaceted. Pollution prevention and control has been hampered by many constraints such as administration boundaries, the absence of an integrated regional management body, and the reliance on central government-imposed coordination mechanisms. Without overlooking the "shadow of hierarchy", this study analyzes the development of local collaborative networks that have emerged during regional integration. The analysis in Chapter four (see Table 9 for a summary) shows strong political signals from above have been the main drivers behind local institutional innovations. The increased promotion of regional integration as a national strategy and the establishment of multiple overarching leadership roles have made local actors to "row" harder. Their shared commitment in turning ecological advantages into economic advantages have resulted in more meaningful interactions and creative endeavor. Through trust and consensus building, local actors have developed new capacity, obtained joint ownership of decisions, and taken up more collective responsibility for environmental outcomes. The institutionalization of joint protection mechanisms and the "Three Unification" system have increased the efficiency and quality of collaborative efforts, and new norms have emerged for local actors to take actions beyond their respective administrations. The intensified networking allows them to generate considerable impacts on the environment and the system dynamics which they previously could not realize on their own.

Table 9

Development processes of the local collaborative networks

Network Development	***Institutional Design***	***Empirical Reality***
Network Prototype	Consequential Incentives	Policy guidelines from the central government: the promotion of national strategy and regional coordination mechanisms
		Expected and binding targets (including collaborative mechanisms) set and planned by provincial-level entities
	Leadership	Leadership Group for Promoting the Integrated Development of the YRD
		Governing Board and Executive Committee
		Provincial-level EEBs
	Deliberations	Establishment of the YRD regional cooperation office; Formal and informal inter and intragovernmental coordination mechanisms
	Determinations	Formal and informal IJAs, including liaison systems and working groups
Network Formation	Shared commitment	Aspiration for high-standard ecological conditions that are appealing to innovative industries
	Mutual trust and understanding	Historical cooperation in various sectors; changing perspectives resulted from hard deliberations
	Input and internal legitimacy	Involvement of nearly 40 departments in spatial planning; all major ministerial departments from three jurisdictions are engaged in joint planning; joint planning with public service units and general public consultation in standard-settings; institutional innovations endorsed by the central government
	Institutional arrangement and resource sharing	The institutionalization of JRCS; regular party building and informal networking activities
Network in Action	Management practices	Joint patrol and best-practices sharing; establishment of new information-exchange platforms; engage civic river chiefs
	Enacting law and policy	The implementation of “Three Unification” system
	Joint task force	Joint inspections and law enforcement
Network Outcomes	Horizontal inter and intragovernmental collaboration	Improvement in implementation procedures and division of responsibilities; progress in cross-jurisdictional collaborative legislation; further complicated eco-compensation mechanisms

	Vertical intergovernmental coordination	More soft-steering and devolution of power from the central government; increased involvement of meta-governors; potentially intensified information asymmetry and collusion
	Non-governmental participation	Increased channels for information disclosure and social supervision

Different from studies that emphasize China's top-down, coercive approach to environmental governance, this study incorporates the concept of metagovernance and shows that command-and-control is among different modes of governing that are being simultaneously employed by the central government. Though China does not necessarily follow Western European's shift towards horizontal governance, more reflexive and collaborative forms of governance are taking place at the local level. Some of these collective efforts are unprecedented in China and have the potential to push for substantial institutional change. Despite the tightened central control, there is indeed space at the local level for long-lasting collaborations and experiments to flourish. And they in turn can feed into national policies in an oscillating fashion. In most cases, the center steers policy diffusion through mediation and recognition, instead of coercion and mandates. It appears that during the development of LCNs, metagovernance is manifested through various process-oriented interventions from the central government, as a mean to fine-tune and optimize the "process design" of LCNs and their stability. These local networks are constructed in a way that ensures power can flow to the center. Their impacts have also signaled nearby administrations to quickly follow suit.

However, the strong commitment for boundary-breaking and the prioritization of environmental protection is more or less a privilege enjoyed by affluent jurisdictions, even within the YRD. As we can see from the weaker connectivity between Anhui and the other

three administration units. In addition, most of the IJAs and explorative regulations are centered around water pollution, a field easier to form collaborations and more prone to symbolic collaboration, while fewer agreements have been made for air pollution. There are also obvious challenges to the durability of these networks. The major constraints that hinder institutional innovations to reach full potential include inadequate legislation supports, managerial professionalism, technical limitations, and a downward pressurized system that make local cadre susceptible to short-term thinking. The refinement of these policies and legislation will take time to develop. Moreover, though the institutional design of the Demonstration Zone has given rise to many public-private partnerships in green finance, insurance, and infrastructure, but not many can be observed with respect to environmental pollution. This study confirms previous research on the limited inclusiveness and the scope of non-state actors' participation during the decision-making processes of environmental management.

This study also contributes to the discourse on how China reconciles the tension between economic growth and environmental protection as it enters a post-industrial era. Previous accounts on China's bureaucracy have criticized the growth-oriented behaviors of local governments. Yet this thesis calls for a refreshed look at how ecological development is internalized by local actors as the steering subjects influenced by Xi's thoughts. Chapter 5 brings forward the governmental strategies that have emerged at different scales. The Demonstration Zone is in fact a combination of a number of imperatives in contemporary China: ecological civilization, regional integration, pluralistic governance, and institutional innovation. Under each of these umbrella terms, we see a mixture of governing practices and how they complement each other. They not only deal with the reconfiguration of power and

institutional design but also the transformation of local social agents' subjectivities. Though the growth-mindset remains, local actors are also conditioned by an institution that increasingly incorporates cultural heritage and aesthetics sensibility to its ecological rationality, and frames nature and culture as a productive force for global capital. This perspective enriches previous political and economic explanations of China's environmental governance. It shows that different scales of the state have deployed diverse and discrete methods to enable network actors to govern and regulate themselves. Regional environmental governance in China is moving from "central leading, local following" towards "central guiding, local leading". And on this trajectory of regional integration, there are no clear boundaries between the re-assertion of central control and an expansion of local autonomy.

7. Recommendations

Based on the analysis, this section outlines policy recommendations for improving regional environmental governance and reflects on the limitation of this study. The first recommendation concerns cadre education and the cadre evaluation system unique to China's political system. Ecological-related indicators and accountability systems have weighed more in cadre assessment in recent years and since they generate most of the political incentives, adjustments could be made to 1) increase educations on morality at central and local party schools; 2) increase the weight of indicators on regional environmental collaboration. Party leaders in China are evaluated according to five personality characteristics: moral quality (德), capability (能), diligence (勤), achievements (绩) and integrity/incorruptibility (廉) (Ran, 2013; Göbel & Heberer, 2017). Environmental protection is an area that relies on governors' moral quality more than the others. The interviews

excerpts show local cadres' perception of nature and the environment is deeply influenced by materialism and developmentalism (Ran, 2015). If local governors cannot see the moral significance for accomplishing tasks that have no guarantee for immediate outcomes, or think it is morally permissible to form collusions and dodge central supervision, institutional innovation will be prone to formalism and short-termism. Central and local party schools are important sites for local leaders to receive training. They fill the gap in promoting ethical behaviors and environmental education.

Furthermore, hard indicators and process-oriented assessments on inter-regional environmental collaborations could serve as political incentives for more proactive actions among local cadres. In the last two years, the three localities have started to regularly dispatch municipality and county cadres to neighboring jurisdictions for leadership exchange (挂职, *guazhi*). Such a mechanism could also be replicated among environmental entities. Experts have also called for granting more administrative power to the joint environmental entities. The "will to collaborate" should go hand in hand with the "will to improve".

Political incentives might be less relevant for grassroots officials as only a small percentage of them can be promoted to higher-level administrations. Hence, to compensate for the increased workload at the grassroot level, flexible material incentives could be designed. Since 2019, generous incentive funds have been provided by the State Council to a few provinces and municipalities in China that implemented the RSC.[67] Similar financial

[67] In February 2019, the MWR issued the "Implementation Measures for Further Incentive Support to Places with Obvious Results in the Work of the River and Lake Chief System" (hereinafter "Implementation Measures"). Five provinces (autonomous regions), including Zhejiang, Fujian, Guangdong, Guizhou and Ningxia, were rewarded 50 million yuan by the State Council. In January 2020, the MWR further revised the

incentives could be designed to motivate grass-root officials. In the meantime, local governments have to increase the engagement of environmental NGOs to join in the decision-making processes and share their expertise with volunteers and local citizens through workshops and roundtable discussions.

One of the core issues of collaborative governance is the sharing of costs and benefits. Unequal fiscal conditions among localities in the YRD is a tricky problem to resolve. Jurisdictions involved in the Demonstration Zone have been working on a tax-sharing system and a coordinated budget management system to facilitate the integration of regional public services. Quantitative research is needed to understand how to construct these systems to balance the collaborative costs, clarify property rights, and incorporate market-based instruments such as horizontal eco-compensation plan, water right and emissions trading systems. Due to the limited data availability, this thesis is not able to open the "black box" of local bureaucracy, especially the informal interactions among grassroots actors. Future research can conduct longitudinal studies on the third-order effect from local actors' collaborative actions and analyze how variables such as drivers and incentives interact with each other.

Implementation Measures based on the experience of the implementation of the incentive policy and selected 20 municipality and counties for the incentive funds, each municipality were given 40 million yuan and each county (city, district) were given 10 million yuan.

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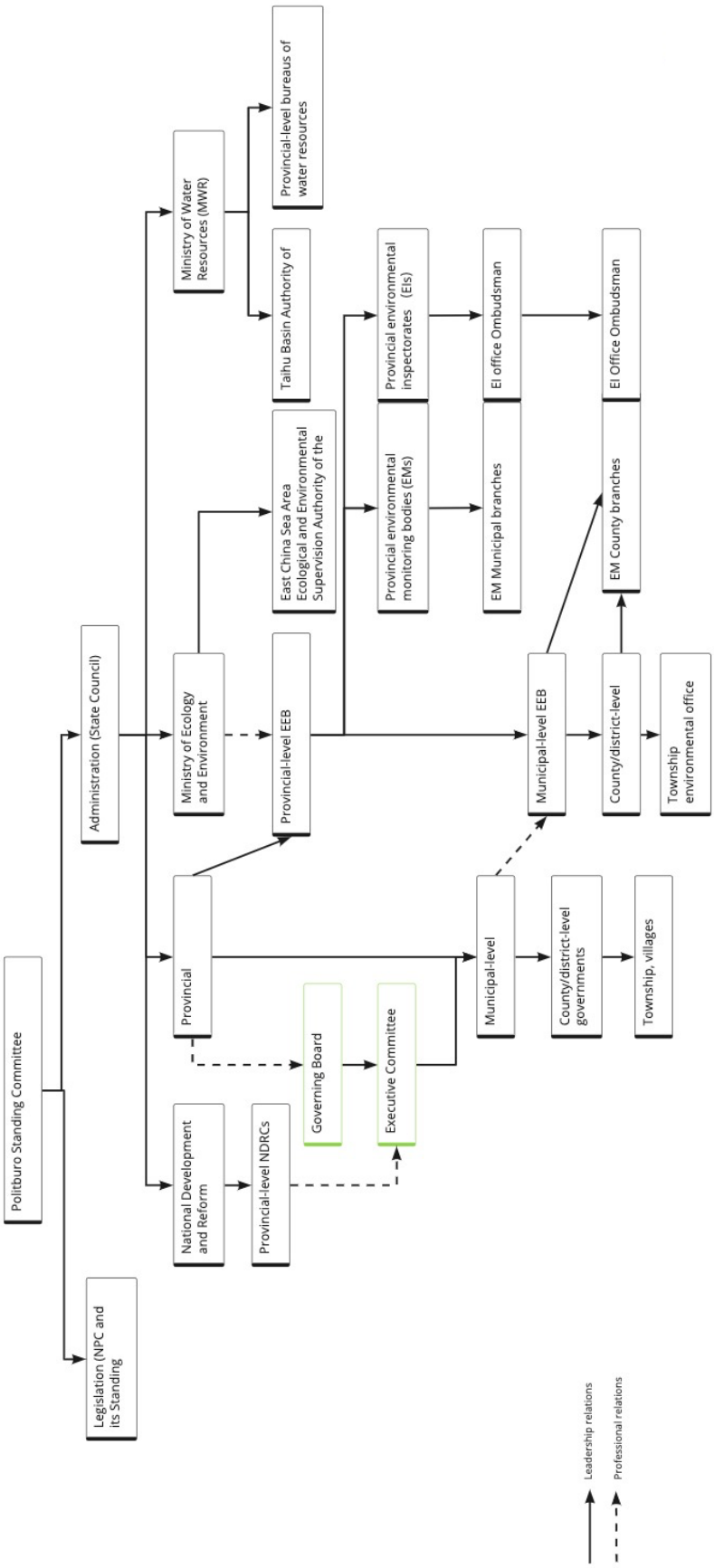
Appendix A. List of Interviewees

Interviewee	Description	Date
F. Xiong	Journalist (thePaper.cn)	November 9, 2020
Dr. X. Jiang	Scholar (Xin'an Jiang Eco-compensation mechanism)	November 5, 2020
B. Chao	Environmental NGO (Taihu Basin)	November 23, 2020
Dr. Q. Huang	Scholar (Water governance in the YRD)	December 20, 2020
Dr. M. Yang	Scholar (Water governance in Taihu Basin)	December 21, 2020
Dr. X. Gu	Scholar (River Chiefs system in the YRD)	December 24, 2020
Dr. L. Zhou	Scholar (Joint prevention and protection mechanisms in the YRD)	December 27, 2020
X. Wang	Business owner in the Exhibition Industry (the Demonstration Zone)	January 21, 2021
Dr. G. Song	Scholar (Environmental policy and environmental economics)	January 28, 2021

Appendix B. Governing Structure of the Demonstration Zone



Appendix C. Major IJAs for Joint Environmental Protection

Principled Engagement	**Name**	**Entity**	**Date**
Informal IJAs (joint meeting and site-visiting)	Symposium on Integrated Ecological and Environmental Management in the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone and Signing Ceremony	EEBs of Qingpu, Wujiang, Jiashan; EEB of Shanghai	June 15，2019
	Learning activities of the joint group of education on the theme of "do not forgetting the original heart and remembering the mission" (*buwang chuxin, laoji shiming*)	EEBs of Qingpu, Wujiang, Jiashan; Leaders of the Fifth Steering Group of Qingpu District Committee; representatives of EEBs of Shanghai, Suzhou, and Jiaxing	October 12, 2019
	Cross-jurisdictional coordination and meeting	EEBs of Jiangsu and Suzhou	March 25, 2020
	Joint working communication and site visiting for environmental law enforcement	EEBs of Qingpu, Wujiang, and Jiashan	April 2, 2020
	Investigation and research (调研, *diaoyan*)	Party Secretaries of EEBs of Jiangsu and Shanghai; deputy director of the Executive Committee of the	September 4, 2020

		Demonstration Zone; the head of the ecological planning and construction group of the Executive Committee	
	Emergency response exercises of “all elements”(全要素, *quan yaosu)*	EEBs of Suzhou, Qingpu, Jiaxing, Wujiang; Government of Wujiang, Wujiang Fenhu Economic Development Zone Management Committee; Wujiang district bureau of Public Security, Traffic, Health Committee, Water Affairs, Emergency, and Fire Brigade	November 3, 2020
Informal IJAs (memorandums)	Memorandum on Strengthening the Construction of Sub-Provincial Ecological and Environmental Collaboration Mechanism in the Yangtze River Delta Critical Area	Deputy Governors of Shanghai, Jiangsu, Zhejiang, and Anhui	May, 2019
	Memorandum on Information Sharing for the Comprehensive Management of Water Ecology and Environment in Taihu Lake Basin	Taihu Lake Basin Authority; Departments of Water Resources and Water Affairs, EEBs of Shanghai, Jiangsu, and Zhejiang	May, 2019

	Memorandum on Collaboration in Promoting the Integration of Ecological and Environmental Administrative Penalty Benchmarks in the Yangtze River Delta Region	EEBs of Shanghai, Zhejiang, Jiangsu, and Anhui	June 13, 2020
Formal IJAs	Framework Agreement on Cooperation on Integrated Ecological and Environmental Comprehensive Management Work	Governments and EEBs of Qingpu, Wujiang, and Jiashan	May, 2019
	The Program of Environmental Monitoring Linkage in the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone	EEBs of Qingpu, Wujiang, and Jiashan	July 6, 2020
	Special Program for Joint Protection of Key Transboundary Waters in the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone	A total of nine departments including EEBs and Departments of Water Resources and Water Affairs of two provinces and one municipality; Taihu Basin East China Sea Ecological and Environmental Supervision Administration (MEE); Taihu Basin	October 13, 2020

		Administration (MWR); and the Executive Committee of the Demonstration Zone	
	Action Plan for the Construction of "Three Unified" Systems for Ecological and Environmental Management in the Yangtze River Delta Green and Integrated Ecological Development Demonstration Zone	Governments of Suzhou, Jiaxing, Qingpu, Executive Committee, EEBs of Shanghai, Zhejiang, and Jiangsu	October 19, 2020
Coordination Office	Yangtze River Delta Regional Cooperation Office	NDRC, personels from the governments of Shanghai, Zhejiang, and Jiangsu	2018
	Yangtze River Delta Region Chinese People's Political Consultative Conference (CPPCC) Democratic Supervision Research Group	Chairman and Vice Chairman of CPPCC of Shanghai, Zhejiang, Jiangsu, and Anhui	2018
	Leading Group for Promoting Integrated Development of Yangtze River Delta	NDRC	November, 2019