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The Four Patterns of Experimentalist Environmental Governance: Constructing a Socialist Ecological Civilization in China

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Abstract

Why did the Chinese central government use very different experimentalist strategies in different environmental and/or ecological domains? To establish plausible explanations, this research proposes a typology and four hypothetical propositions that focus on how different policy conditions (i.e., policy goals and policy instruments) affect the timing and content of central government's deployment of experimentalist interventions in different environmental and ecological policy domains. This dissertation tests these four hypotheses using a wide array of qualitative evidence from four different cases (national park, carbon trading, river chief, and comprehensive zone for ecological civilization construction) respectively. This disssertation argues that in the past two decades of ecological civilization construction, the central government has used four different experimentalist strategies (i.e., strict hierachical experimentation, cautious comparative experimentation, selective political recognition and pragmatic phased integration) on different policy occasions. These main findings have theoretical relevance and policy implications for China's environmental policy process and current environmental politics.

Key words: Experimentalist Governance, Environmental Politics, Experimentation, Political Recognition, Pragmatic Phased Integration

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Acrocym

ADB Asian Development Bank
AQI Air Quality Index
APP Application
BCS Bay Chief System
BDRC Beijing Development and Reform Commission
CACE China Association of Circular Economy
CAS Chinese Academy of Sciences
CBEEX China Beijing Environmental Exchange
CCCDR Central Commission for Comprehensively Deepening Reform
CCEPA China Civilian Education Promotion Association
CER Certified Emission Reduction
CCER China Certified Emission Reduction
CDM Clean Development Mechanism
CDRC Chongqing Development and Reform Commission
CDRLGs Comprehensive Deepening Reform Leading Groups
CET Carbon Emission Trading
CGP Comprehensive Governance Project for National Soil and Water Conservation Ecological Civilization Program
CNEEEX Shanghai Environment and Energy Exchange
CNY Chinese Yuan
CIS Common Implementation Strategy
CLGCDR Central Leading Group for Comprehensively Deepening Reform
COD Chemical Oxygen Demand
CPC Communist Party of China
CPCCC CPC Central Committee
CPPCC Chinese People's Political Consultative Conference
CSER China Society of Economic Reform
CSWCP Clean and Small Watershed Construction Project for National Soil and Water Conservation Ecological Civilization Program
DRC Development and Reform Commission
ECCDZ Ecological Civilization Construction Demonstration Zone
ECC Ecological Civilization County for National Soil and Water Conservation Program
ECCP Ecological Civilization Construction Pilot
ECDZ Ecological Construction Demonstration Zone
ECHA European Chemicals Agency
NSWC Ecological Civilization Program for National Soil and Water Conservation
NSWCP Ecological Civilization Prefecture for National Soil and Water Conservation Program
EDF Environmental Defense Fund
EDZ Ecological Demonstration Zone
EIA Environmental Impact Assessment

ELV Emission Limit Value
EPA Environmental Protection Agency
ETS Emissions Trading Scheme
EU European Union
FYP Five-Year-Plan
GDP Gross Domestic Product
GDRC Guangdong Development and Reform Commission
GHG Greenhouse Gas
HDRC Hubei Provincial Development and Reform Commission
IUCN International Union for Conservation of Nature
KDZ Key Development Zone
KMT Kuomingtang (Nationalist Party of China)
LCS Lake Chief System
MAB Man and Biosphere Program
MECC Material and Energy Conservation Center
MECDZ Marine Ecological Civilization Demonstration Zone
MEE Ministry of Ecology and Environment
MEP Ministry of Environmental Protection
MOHURD Ministry of Housing and Urban-Rural Development
MLR Ministry of Land and Resources
MNR Ministry of Natural Resources
MPF Market Preserving Federalism
MPI Multiple Planning Integration
MRV monitoring, reporting and verification
MWR Ministry of Water Resource
NCSC National Center for Climate Change Strategy and International Cooperation
NDPC National Development and Planning Commission
NDRC National Development and Reform Commission
NECEZ National Ecological Civilization Experimental Zone
NESRC National Economic System Reform Commission
NFGA National Forest and Grassland Administration
NGO Non-governmental Organization
NH_3-N Ammonia Nitrogen
NO_X Nitrogen Oxides
NPA National Park Administration
NPC National People's Congress
NPS National Park System
NTLNP Northeast Tiger and Leopard National Park
ODS Ozone Depleting Substances
ODZ Optimized Development Zone
OECD Organisation for Economic Cooperation and Development
OMC Open Method of Coordination
OTC Over-the-Counter
PCPN Production and Construction Project for National Soil and Water Conservation

Ecological Civilization Program
PCP Production and Construction Project for Soil and Water Conservation Ecological Civilization Program
PDZ/PDZPEC Pilot Demonstration Zones for Promoting Ecological Civilization
PNP Panda National Park
PPP Public-Private Partnership
PRC People's Republic of China
RCS River Chief System
RDZ Restricted Development Zone
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals
RFF Resources for the Future
RDA Regionally Decentralized Authoritarianism
ROC Republic of China
RSS River Sheriff System
SASMGI State Administration of Surveying and Mapping Geographic Information
SAUC State Administration of Urban Construction
SCPSR State Commission for Public Sector Reform
SCOPSR State Commission Office for Public Sector Reform
SDS Sustainable Development Strategy
SEPA State Environmental Protection Administration
SEZ Special Economic Zone
SFA State Forestry Administration
SHA Scenic and Historic Area
SHDRC Shanghai Development and Reform Commission
SNJNPA Shennongjia National Park Administration
SOA State Ocean Administration
SOD Scientific Outlook on Development
SOE State-owned Enterprise
SZDRC Shenzhen Development and Reform Commission
TCX Tianjin Climate Exchange
TDRC Tianjin Development and Reform Commission
TN Total Nitrogen
TNC The Nature Conservancy
TP Total Phosphorus
TRSNPA Three-River-Source National Park Administration
UN United Nations
UNEP UN Environment Program
UNESCO United Nations Educational, Scientific and Cultural Organization
US/USA United States of American
VER Verified Emission Reduction
VOCs Volatile Organic Compounds
WECC Water Ecological Civilization Construction
WFD Water Framework Directive
WMNPA Wuyi Mountain National Park Administration

1. Overview of the Dissertation

"An experimentalist turn" has been adopted in many areas of the contemporary social sciences. It is well known that experiments are becoming increasingly popular not only in behavioral economics, but also in sociology, politics, planning, and architecture (Huitema, Jordan, Munaretto, & Hildén, 2018; McDermott, 2002). In practice, local and regional policy experiments are a transnational and global trend in public policy processes. The potential advantages of the experiments are of growing interest.

Policy trials, initiated by the western liberal democracies, aim to achieve local adaptation and collective learning by combining discretion in front line, regular reporting, information pooling, and comparison. For example, in the United State (US), experimentalism in nuclear power and food safety indicate that technological and economic changes have surpassed the capacity of established markets and governments to protect public interests; while the emergence of experimentalist architectures in public education or child protection services reflect that all parties in decades of debates have accepted interventions learned from promising local experience (Búrca, Keohane, & Sabel, 2014; Galle & Leahy, 2009; Karch, 2007; Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2015b, 2016). In emerging economies, regional policy experimentations have traditionally involved promoting economic growth, improving living conditions, and more recently, governing environmental (and more specifically climate) issues (Greenstone & Hanna, 2014; Heilmann, 2008a, 2008b; Mei & Liu, 2014; Vreugdenhil, Taljaard, & Slinger, 2012; Zhao, Zhu, & Qi, 2016; Zhu, 2013; Zhu & Zhao, 2018, 2021). In some policy domains, experimentalist interventions with characteristics similar to those of the western countries seem to be developing globally or transnationally (Zeitlin, 2015a). The Montreal Protocol regime, which is committed to reducing and eliminating of ozone-depleting substances (ODS) and thus protecting the ozone layer, and other international environmental regimes (such as the forestry certification and the international standards for Dolphin Safe tuna) demonstrate that experimentalist intervention is not limited to the regulatory system within sovereign states (Armeni, 2015; Búrca et al., 2014; Campbell-Verduyn & Porter, 2014; Zeitlin & Overdevest, 2020).

In this dissertation, I raise several questions about policy experimentation. In the environmental and ecological policy domains of China, are there unique mechanisms that facilitate

experimentation? If yes, what policy goals, instruments and mechanisms/procedures have the central authority employed to govern the environmental impacts of its unprecedented economic expansion? In national policy experiments, how did different policy conditions (i.e. policy goals and policy instruments) affect the timing and content of central government's deployment of experimentalist strategies in different environmental/ecological policy domains? Why did the Chinese central government use very different experimentalist strategies in different environmental/ecological policy domains?

Policy experimentation generally means the policy process, in which the experimenting organization tries various methods, tactics, and processes in order to find a proper solution to achieve stated goals or to tackle emerging (social and/or natural) challenges. If an experiment is designed by social scientists as a publicly or privately-funded pilot program, it is usually limited to fine-tuning operational technicalities, and there will be little in the way of complex bargaining processes or consideration given to political matters (Jowell, 2003). In the context of contemporary China, (transformative) economic policy experimentation or reorganization experiments (Heilmann, 2008b) are a purposeful and continuously coordinated process. They do not challenge the current political system, pattern, and order. Rather, they are injected into official decision-making under the strict control of the ruling party. Successful experiments may be copied at various scales and levels, and/or even officially incorporated into instructions issued by organs at different levels of the ruling party and the government. In some very successful cases, they may directly become laws passed by national legislative. In some bad cases, they may be partially adjusted. In very bad cases, they were terminated (such as the People's Commune).

I examine the Chinese style experimentalist environmental governance model in order to improve understanding of the dynamics of what could be called "*Shengtai Wenming Jianshe*" (Ecological Civilization Construction)[1]. The proposed analytical framework combines four political elements or institutional arrangements, namely, multilevel governance in the determination of policy goals and policy instruments, directional leadership from the central authority, local discretion in performance evaluation, and gradualism in the reform and international responses. First and foremost, the experimentalist environmental governance framework applied to the Chinese policy

[1] The "*Jianshe*" (construction) here differs from construction in the usual sense. It refers to the grand social project under socialist planning. In his political report made at the 17th National Congress of the Communist Party of China (CPC) in October 2007, Hu Jintao, the former General Secretary of the CPC and the former President of the People's Republic of China (PRC), said: "To construct ecological civilization . . . the quality of the ecological environment has improved significantly". Since then, the term "Ecological Civilization" has become an umbrella concept, which is used to refer to the CPC's manifesto, guidelines, and policies on ecological and environmental issue. Therefore, the term "Ecological Civilization Construction" is the synonym of China's environmental governance or environmental policy.

situation means that two policy condistions (goals and instruments) are formulated and developed not only at one level, but often also jointly by different organs at the central and/or local government levels.[2] This can be referred to as multilevel governance in the determination of policy goals and policy instruments.

Second, in view of China's environmental authoritarianism, a successful policy experimentation designed by the national government helps to maintain authority over local authorities (Zhu & Zhang, 2016; Zhu & Zhao, 2021; Zhu, X., 2016). For example, after 40 years of experimentation, the Shenzhen Special Economic Zone (SEZ) was upgraded to a Demonstration Zone for Promoting the Socialism with Chinese Characteristics domestically in 2019 (under the background of the Hong Kong protests). This factor can be referred to as directional leadership from the central authority, even though the concept of directional leadership is usually described as intentional exemplary leadership when used in the context of Western democratic systems (Gupta & Grubb, 2000; Wurzel, Liefferink, & Torney, 2019). I argue that Beijing's directional leadership also had a constructivist push component. Any demonstrative move by the local government must be approved by the central government before it can be implemented in other regions.

Third, local discretion, which is the other side of central-local relations, was subject to the last round of recentralization. In China, the central government or its commissioned public institutions evaluate the results and quality of local experiments through different scales and types of surveys or research, and use the obedience (complete and partial) or resistance (strong and moderate) of the local government as a criterion for judging whether the policy experimentation has successfully fulfilled the stated goal (and is therefore worth promoting elsewhere), needs to be

[2] In this dissertation, China's administrative levels are divided into six formal levels. (1) The first or highest level, is the "*Guojia Ji*" (national level), such as the CPC (represented by its central committee or central political bureau), the State Council of the PRC (government), the National People's Congress (NPC, legislature), the Chinese People's Political Consultative Conference (CPPCC, consultative body) and the Central Military Commission of the CPC and PRC (supreme Command of the National Armed Forces). Since 1993, the General Secretary of the CPC and the President of the PRC, often held by the same person, are referred to here as the supreme leader. The Premier of the State Council is also sometimes referred to as the top leadership. (2) The second level is the "*Bu Ji*" (ministry level), corresponding to province-level, for example, the administrative level of a central ministry is the equivalent to that of a provincial government. The secretary of the provincial party committee and the governor of the provincial government are both referred to as provincial leaders. (3) The third is the "*Ting Ji*" (bureau level), corresponding to prefecture-level, e.g. the administrative level of a department/bureau of a ministry is equivalent to that of a prefecture under a province. The head of such a department/bureau has the same administrative level as the mayor of a prefecture. (4) The fourth is the "*Chu Ji*" (division level), corresponding to county-level, e.g. the administrative level of Groundwater Division, Soil Bureau, Ministry of Ecology and Environment is equivalent to that of Changxing County, Huzhou Prefecture, Zhejiang Province. Such a division is at the same level as the government of a county. (5) The fifth is the "*Ke Ji*" (section level), corresponding to town-level, e.g. the administrative level of any office under the International Policy and Negotiation Division, the Climate Change Department, the Ministry of Ecology and Environment is equivalent to that of any town in Changxing County. Such an office is at the same level as the head of a town. (6) In many cases, there is also a sixth level that is not incorporated into the formal administrative hierarchy, namely urban communities or rural villages.

adjusted or should be abandoned (Mei & Pearson, 2014; Zhu & Wu, 2018; Zhu & Zhang, 2019; Zhu & Zhao, 2021). This factor can be referred to as local discretion in policy evaluation. The recentralization which occurred during the restructuring of environmental policy in the middle and latter 2010s has weakened the resistance of local authorities, and strengthened their obedience. Under the deterrence of strict political discipline, local defiance was reduced to a minimum. Thus, increasingly, local authorities cooperate with the central government to achieve the latter's policy intentions.

Fourth, China's domestic environmental (and especially climate) policy outputs (including goals and instruments) resulted from a complicated policy process that involved two levels of policy engagement (or disengagement). China took a relatively recalcitrant political position at the international/global level designed to protect itself from outside interference in its development decisions (Economy, 1994). Yet at the same time, it pursued a relatively proactive response accepting some foreign assistance, learning selectively from advanced foreign experiences, and itself contributing to addressing international/global environmental problems through a growing number of incremental institutional innovations (Naughton & Tsai, 2015). This factor can be referred to as pragmatism or gradualism in domestic reform and related international responses.

This framework of CPC-style experimentalist environmental governance suggests a typology of experimentalist environmental governance with Chinese characteristics which can be presented in a matrix composed of two dimensions: policy goals and policy instruments. Base on this preliminary typology, four (new) patterns are generalized and conceptualized: Strict Hierarchical Experimentation, Cautious Comparative Experimentation, Selective Political Recognition and Pragmatic Phased Integration. Specifically, I argue that the Chinese central government adopts very different experimentalist tactics to solve problems to be addressed by the so-called Socialist Ecological Civilization Construction.

I chose to focus on environmental policy or Ecological Civilization Construction in order to demonstrate the proposed topology and four hypotheses, because the ecological civilization construction are among the most challenging and diversified policy domains in China's contemporary public policy. They are built on mutually interdependent relationships and the joint efforts of the central and local governments. Therefore, this policy domain presents the public policy process in a more comprehensive and detailed manner than is normally done. The unfinished industrialization and urbanization process means many challenges remain. How China

deals with these challenges of environmental governance is of tremendous significance. The cases focused on in this dissertation include four main domains found in the Ecological Civilization Construction: national park system (NPS) pilot program, carbon emission trading (CET) pilot scheme, river chief system (RCS) experiment and comprehensive experimental zones for ecological civilization construction. Research data are mainly collected from official and local policy documents, and interviews and informal exchanges with university experts, officials and researchers working in environmental protection departments, and staff of professional associations and enterprises.

In the Socialist Ecological Civilization Construction, most of the regional and local policy experiments aim to achieve the goal of "fit". Unlike "testing for errors", fit sees experimentation as a means to test the match of policy instruments prepared by the central and/or local government. Experiments which aim to test the policy correctness may be slightly modified over time to compensate for any imperfections (Cai & Treisman, 2006; Chen, 2011; Lin, 1980; Lin, 1983; Ning, 2014; Pei, 2012; Ren, Sun, & Liu, 1980; Sung & Chan, 1987). This dissertation only focuses on the "testing for correctness" approach with the four empirical cases.

The adaptability of the Chinese governance system's trial and error mechanism is very important because China, with its largest population and vast territory, has been in a period of dramatic social transformation over the past four decades (Wang, 2008; Wang, 2009; Zhu & Wu, 2018). It is well accepted that China's political system allows for more diverse and flexible inputs than its formal structure would predict. This dissertation also supports the famous argument that the long-term revolutionary tradition of the CPC makes its guerrilla-style policy making, which emphasize continuous experimentation and timely adjustment of both policy goal and instrument, a creative way of dealing with ubiquitous uncertainty (Perry & Heilmann, 2011). The dissertation argues that this is the most important historical experience of the CPC-style experimentalist environmental governance.

My dissertation consists of seven chapters, which together address the four patterns of experimentalist environmental governance. Although there are many studies of China's climate change policy from the perspective of policy experimentation, there are still few studies that simultaneously explore these more nuanced domains in China's environmental policy or consider the diversified approaches to experimentalist governance. This research attempts to trace and assess the evolutionary path and current status of several environmental policy experiments in

China, and explore how the central-local relations have adapted with time, how they pursue policy goals and make use of different policy instruments. Chapter two develops a preliminary typology of experimentalist environmental governance and further derives four research hypotheses based on the modified framework, and also explains the methodology of the entire research. The framework and topology shows that China's experimentalist governance has both universal characteristics and its own strong style. And in view of the subject of this dissertation, this chapter also briefly explains the political tone and institutional reform background of the ecological civilization construction. In the four empirical chapters, the development context and policy changes of each environmental policy experiment are presented. Some of the sections are obvious research gaps. The discussion section revisits each experimental system, and then analyses them comparatively with the proposed typology presented above. Hypotheses are presented and tested. In the conclusion, contributions to comparative environmental policy research, experimentalist governance research, and China's policy process research are explored, and possible future research directions are considered. The empirical evidence highlights one main finding: the trajectories of experimentalism found in other policy fields also exist in the field of environmental protection to varying degrees. Therefore, the reality of China's environmental governance illustrates the need for more nuanced exploration of environmental democracy, ecological democracy, and environmental politics.

2. Experimentalist Environmental Governance in China: Framework, Topology, Hypotheses and Research Design

This chapter unpacks the theoretical, empirical, and methodological tools necessary to develop a typology of experimentalist environmental governance with Chinese characteristic. First, it reviews the classic definition and typical architecture of experimentalist governance as portrayed by western scholars. It argues that we are in need of deeper insights into regional variations of experimentalist governance in China-- the largest emerging economy. Second, it examines a set of empirical institutional arrangements and proposes a CPC-style experimentalist environmental governance framework. This framework, I argue, can be used to help understand variation in experimentalist governance between countries and across time. Finally, the chapter situates the dissertation at the boundary of public policy and environmental politics and shows how a typology can contribute to the analysis of contemporary China's environmental governance.

2.1 Experimentalist Governance: Original Definition, Typical Architecture, and Policy Mechanisms

"Governance" has been called many things, such as "a buzzword, a framing device…… a bridging concept, an umbrella concept, a descriptive concept, a slippery concept, an approach, a theory and a perspective" (Levi-Faur, 2012, p. 4). Academic interest in governance soared in the 1990s and has continued to grow. One well known definition of governance refers to it as "a complete set of institutions and its actors that are drawn from but also beyond government"; the author however also argues that "there is a divorce between the complex reality of decision making associated with governance and the normative codes used to explain and justify government" (Stoker, 1998, pp. 18–19). Governance is not a set of rules, nor an activity, but a process; the basis of the governance process is not command and control, but coordination and reconciliation; governance involves both the public sector and the private sector; governance is not a formal system, but continuous interaction (Yu, 2002). Various normative, empirical and theoretical contributions to

the study of governance have led to substantial differentiation so that we now refer to: deliberative governance (Joerges & Neyer, 1997), informal governance (Christiansen, 2003; Kleine, 2013; Windhoff-Héritier, 1999), network governance (Börzel, 1997; Kohler-Koch & Eising, 1999; Rhodes, 1997, 2017), transnational governance (Hale & Held, 2011; Zeitlin, 2011), global governance (Commission on Global Governance, 1995; Rosenau, 1997; Weiss, 2013; Zürn, 2018), multi-level governance (Enderlein, Wälti, & Zürn, 2010; Hooghe & Marks, 2003; Schreurs & Tiberghien, 2007), polycentric governance (Ostrom, 1990, 2006; Wurzel, Andersen, & Tobin, 2020), interactive governance (Torfing, 2012), innovative governance (Tömmel & Verdun, 2009), adaptive governance (Brunner, 2005), and soft governance (Oberthür, 2019). These perspectives within different functional areas and mechanisms of governance are not only important for understanding the internal politics of a given nation state and its domestic policy process, but also valuable for the analysis of international and transnational relations and world politics in an era of globalization.

Charles Sabel and Jonathan Zeitlin argue that the EU and US has been developing a new pattern of governance whose essence has not been seized by the above categorizations of modern governance. From the reform of local public services, such as education and child welfare, to the regulation of global trade in food and forest products, this governance pattern, which could be called "experimentalist governance", can be seen at numerous levels, sites and scales. Although experimentalism does not have a very high-profile in political science or policy discourse, it is widespread and prominent (if often imperfect) in regulatory and social welfare initiatives in the western countries. It refers to "framework rule-making and revision through a recursive review of implementation experience in different local contexts" (Sabel & Zeitlin, 2012b, p. 170). To what extent is experimentalist governance distinct from other kinds of governance patterns and corresponding practices? In writing about public regulation by private firms and the provision of services (e.g. education) by public institutions, Sabel and Zeitlin have portrayed experimentalist governance as "a recursive process of provisional goal-setting and revision based on learning from the comparison of alternative approaches to advancing them in different contexts" (Sabel & Zeitlin, 2012b, p. 170). The term "recursive" can be understood in the sense familiar in computational science, a method of problem solving, where the final solution depends on the effective solution of smaller instances of the same problem (Epp, 2011). Effective public intervention requires local variations and adaptation to changing conditions; public administration can integrate front-line discretion and stakeholder participation in a disciplined manner. For these reasons, experimentalist governance is unique and has obvious advantages (Sabel & Simon, 2011).

The most mature shape follows a multi-level architecture (see Figure 2.1), where ideally four aspects are integrated in an iterative cycle (Búrca & Scott, 2006; Overdevest & Zeitlin, 2014, 2018; Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2011, 2015a, 2016). First, the central government and local governments listen to the opinions of relevant civil society stakeholders, establish a general open framework goal and an indicator system for evaluating the achievement of set goals (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2015a, 2016). Second, lower-level government units are given greater discretion to pursue these goals based on local conditions. In the context of regulatory systems from western countries, the local units typically refer to firms or territorial authorities, such as regulators at the state level in the US, or authorities of the member states in the EU (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2015a, 2016). Third, as a prerequisite for this discretion and autonomy, subordinate units should regularly report on their governance performance and participate in a peer review process where their results will be compared with other units that use different means to achieve this goal (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2003, 2015a, 2016; Zeitlin, Pochet, & Magnusson, 2005). Finally, if the lower-level unit does not make good progress, it should propose a reasonable improvement plan based on the experience of the peers and adopt corrective measures. Governance goals, indicators, and decision-making processes will be revised repeatedly and regularly based on the problems and possibilities revealed by the review feedback. The above process is then regularly repeated in this logic of experimentalist architecture (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b; Zeitlin, 2015a, 2016).

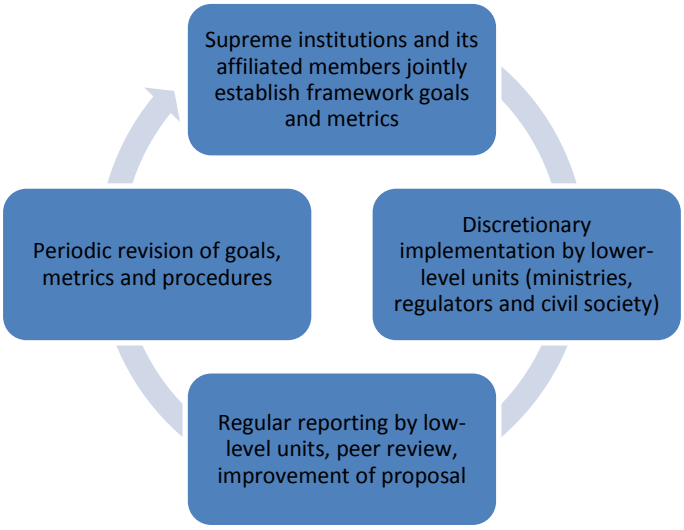

Figure 2.1 Architecture of experimentalist governance, cited and adapted from "EU experimentalist governance as an iterative, multi-level architecture" (Zeitlin, 2015a, p. 2).

Experimentalist governance takes its name from democratic experimentalism advocated by philosopher John Dewey (Sabel, 2006, 2012; Sabel & Simon, 2011; Sabel & Zeitlin, 2012a, 2012b). Dewey was a leader of the American pragmatism school, which viewed inquiry as a process that will continue to actively manipulate the environment to test hypotheses and re-adapt human organisms to the changing environment. In this way, successful human actions can be carried out again. Solutions are examined for incompleteness and deficiencies so that readjustments or re-calibrations of goals and means can be made. This often occurs through a comparison of different approaches to advancing generally declared goals (Sabel, 2006, 2012; Sabel & Simon, 2011).

Experimentalist governance aims to improve the effectiveness of policy practices through experimentalist thinking and methodology. Experimentalist architecture embodies several institutional characteristics (Liu & Deng, 2020). The first is vertical decentralization. In experimentalist intervention, higher levels of government endow lower-level governments with greater autonomy and action space, so that the latter have the time and energy to explore suitable governance approaches to complex and practical problems. The second is participatory cooperation. Original experimentalist governance emphasizes the construction of a pluralistic, open and interactive governance system, which to a certain extent makes up for the deficiencies of the traditional bureaucratic model. The third is progressive exploration. Experimentalist governance adopts the gradual exploration of "crossing the river by feeling the stones"[3] (trial and error), that is to say, policy units and departments first conduct experiments on a small scale, then sum up these experiences, and finally promote successful or effective experiences. The goals set by experimentalist governance and the means to achieve them can be revised, enhanced, and improved continuously based on practical needs.

There are three main operating mechanisms linked to experimentalist governance architecture: goal setting, differential exploration, and performance evaluation (Liu & Deng, 2020). (1) Goal setting. In the EU context, as Sabel and Zeitlin noted, the Open Method of Coordination (OMC) is an important decision-making method. It aims to include more and more stakeholders during the policy making process, so that goal setting and rulemaking are both open processes. Different from the traditional community method of policy making, where the policy planning and decision-making process is concentrated in the central authority, the OMC policy planning is

[3] This is the typical expression that Deng Xiaoping, the core of the second generation of CPC leaders, liked to say.

decentralized. The variability of the policy environment and the strategic uncertainty of new social issues mean that decision makers (often the central authority) cannot predefine their precise goals and the specific means to achieve them. As Sabel and Zeitlin illustated, the Water Framework Directive (WFD) and its Common Implementation Strategy (CIS) are the good examples of environmental policy to illustrate the goal setting mechanism within experimentalist governance architecture. In this outstanding example, with a single, comprehensive regulatory framework, the WFD, which was enacted in 2000, aimed to require member states to achieve "good water quality" by 2015. This general framework goal was clearly open, and its evaluation tools, metrics and values were developed through an implementation process guided by the above CIS (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b).

(2) Differential exploration. Experimentalist governance is seen as a rejection of and response to centralized decision-making and hierarchical governance. Experimentalist governance adapts to diversity by adapting framework goals to different local environments, rather than seeking a solution that applies to all situations. In other words, under the guidance of the framework goals set by a higher level of government, local governments can explore the differentiated governance approaches linking them to specific practical conditions. In these cases, they have higher autonomy and shared responsibility. Under the WFD framework, the CIS, conceived by member states' water authorities and approved by the European Commission, is a non-binding technical guidance document. The indicators and values in the document, which was pragmatically developed based on existing practices, needs to be continuously reviewed and updated after further practice (Sabel & Zeitlin, 2008, 2010, 2012a, 2012b). Furthermore, though it is not a pure case of experimentalist arrangement, the No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) contains some experimentalist arrangements. The most obvious experimentalist characteristic of the REACH regulation lies in its inclusiveness and flexibility which helps to deal with the political complexity and ever changing (scientific) nature of the problem (Biedenkopf). Public power is shared among many participants in the private and public spheres at different levels of this fragmented governance system; no actor has the right to make arbitrary decisions without consulting others (Scott, 2009b).

(3) Performance evaluation. In experimentalist governance, the prerequisite for the autonomy of lower levels of government is to regularly report on governance performance and perform comprehensive evaluations. Likewise, the peer review incorporated in policy experimentation is

also an open process. Governance methods, tools, metrics, and values are evaluated during the implementation process, rather than being set by the regulator in advance. Based on a measurement benchmark and indicator system provided by the overall framework goal, lower levels of government evaluate the governance experiments, looking into the innovativeness of their ideas, specific practices, governance processes, actual results, cost of gains and other aspects. The evaluation process involves longitudinal inspection, peer review, and third-party evaluation. The purpose of the evaluation is mainly to summarize and compare local experiences in a timely manner. In this way, successful solutions can be selected out of trials made in diverse localities, and then promoted in other regions. Under the WFD, for example, member states are obliged to submit regular reports on the implementation of the directive (such as river basin management plans). The European Commission formulates its own regular performance report based on the scoreboards and benchmarks subordinated to the issued CIS (Homeyer, 2010; Sabel & Zeitlin, 2012b; Scott, 2009a; Scott, J. and Holder, J., 2006). Also, in the above REACH structures and processes, as policy coordinator, the European Chemicals Agency (ECHA) evaluates compliance registrations; member states' authorities evaluate selected substances to clarify concerns about their use for human health and the environment; and national authorities and the ECHA's scientific committee evaluate whether the environmental/ecological risks can be managed.[4]

In addition, there are also policy iteration mechanism and policy learning mechanism within the typical experimentalist governance architecture (Liu & Deng, 2020). As for the iteration mechanism, since the goals themselves and the means to achieve them are all considered temporary and can be corrected based on diversified local experience, problems identified in a certain stage of experimentation can be corrected in the next stage. As for the learning mechanism, experimentalist governance architectture can be regarded as a knowledge-sharing governance model, seeking the best solutions to common concerns through the well known "learning by doing" and "learning from difference" tactics.

[4] For more information about the REACH's operation and the ECHA's function, see "Understanding REACH", available at: https://echa.europa.eu/regulations/reach/understanding-reach.

2.2 Experimentalist Environmental Governance with Chinese Characteristics: A Theoretical Framework

Policy experimentation can be an effective mechanism for generating institutional innovations that are conducive to economic growth and social progress (Mukand & Rodrik, 2002; North, 1990; Roland, 2000; Zweig, 2002). Sectoral and local policy experiments can be considered a unique and intrinsic property of China's economic miracle over the last four decades (Cao, Qian, & Weingast, 1999; Coase & Wang, 2012; Jefferson & Rawski, 1994; Naughton, 2007; Naughton & Tsai, 2015; Nee & Swedberg, 2005; Parris, 1993; Qian, 2003; Rawski, 1995; Woo, 1999). Policy experimentation generally means the policy process, in which the experimenting organization tries various methods and processes in order to find suitable solutions to achieve stated goals or to tackle emerging challenges. If an experiment is designed by social scientists as a government/corporate-funded pilot program, it is usually limited to fine-tuning operational technicalities, and there will be little in the way of power relations (Jowell, 2003).

CPC-style Policy Experimentation

In the context of China, (transformative) economic policy experimentation or reorganization experiments are a purposeful and continuously coordinated process (Heilmann, 2008b). They do not challenge the current political order. Rather, they are injected into official decision-making. Successful experiments may be copied at various scales and levels, or even officially incorporated into universal law, sector and/or local regulations, rules and technological specification. As early as the mid-1930s, the CPC had initially formed a set of procedures for carrying out land reform experiments (Heilmann, 2008a, p. 6; Zhou, 2012b, p. 53). The first was to select favorable sites. Then a task force led by competent cadre was sent to these sites to conduct small-scale experiments. Next, potentially capable cadres were trained in relation to the experiment, cadres and people from other localities were brought to see the results of the experiment, and then leading cadres in the local experiments reported on their results to their superiors. For example, Xingguo County, which had been recognized and praised by central government of the Chinese Soviet Republic[5], was designated as a demonstration area for land reform in the early 1930s. The

[5] The central government of the Chinese Soviet Republic (1931-1934) once existed in the Central Soviet Area, a vast mountainous area located in southern Jiangxi and southwestern Fujian. Mao Zedong (1893-1976), then a member of the Political Bureau of the CPC, served as chairman of this government. At this time, Mao was not the supreme leader of the party. This local separatist regime was not recognized by the central government of the ROC

Soviet governments at the Jiangxi Soviet region often organized cadres from other localities to visit experimental sites in Xingguo, emphasizing that "advanced sites should move forward, and other localities that were backward should catch up with advanced ones" (Mao, 1991, p. 140). Fourth, superiors were welcomed to inspect the experiment and summarize methods considered beneficial to the party. Finally, new capable cadres who emerged from the experimentation were sent to new sites to promote the experience.

From 1939 to 1942, the Taihang anti-Japanese Base, led by Deng Xiaoping, further refined these above-mentioned experimentalist steps and techniques (Heilmann, 2008a, p. 7; Zhou, 2012b, pp. 55–57). The first was to refine the overall goal of policy experiment in stages to determine the phased tasks, responsibilities and assessment standards. The second was to introduce a competition mechanism between experimental "*jidian*" (basic point, usually based on the village and party branch)[6] in the whole process. The third was that superior needs to regularly check the experimentation and find out the shortcomings in time to adjust the goals and instruments for the next stage. The policy experimentation in the revolutionary era was mainly used to determine policy instruments and adjust their pace, while those in Taihang period were also deployed to calibrate phased goals.

The traditional practice of nationwide policy making is set by the CPC and the PRC Government. They may form policies or programs that involve local policy experiments. This may be at the provincial, prefectural, county, town, and village level. In national policy formulation, instead of immediately issuing mandatory directives, the CPC's central committee (CPCCC) and State Council may allow or encourage regional or sectoral experimentation.[7] In successful cases, they may then promote local experiences that meet economic and/or political expectations "from point to surface"[8] (Heilmann, 2008b; Landry, 2008; Montinola, Qian, & Weingast, 1995; Woo, 1999;

controlled by the KMT.

[6] The basic point is the predecessor of the term "experimental point" or "pilot" (*Shidian*) commonly used in the reform era. With these leaders of the base area represented by Deng Xiaoping playing a pivotal role in the post-Mao era, the policy experiment concept and specific methods of Taihang period (1939-1942) naturally had a direct impact on the experimentalist style in the reform era, for more analysis, see Goodman (1994).

[7] The competent agencies of policy experimentation were mixed. In the early days of reform, the central ministry responsible for general policy experiment was the National Economic System Reform Commission (NESRC), which was established in May 1982. In March 1998, it no longer served as a ministry, and was replaced by the State Council's Economic System Reform Office. Some of its functions were merged into the former National Planning Commission to form the new National Development and Planning Commission (NDPC). In March 2003, the State Council established the National Development and Reform Commission (NDRC) by merging the functions of the Economic System Reform Office and the NDPC. And then, the NDRC became the central agency for organizing and supervising the policy experiment for economic and social system reform (the specific work is undertaken by its System Reform Division). Therefore, the NDRC appears many times in the empirical chapters when it comes to institutional reform.

[8] It has the same meaning as the Chinese expression "*You Dian Dao Mian*" mentioned later. The term indicates most major reform initiatives in contemporary China were introduced and tried out by means of experimental

Xu, 2011). The CPCCC and the PRC Government have formed a set of relatively stable procedures and coherent practices for "policy experimental points and zones"[9]. These can be divided into "two phases" with several linkages. The two stages refer to trying the experiments first in the selected site(s) and then scaling up. Linkages include selecting, organizing, supervising, propagating, evaluating, expanding, communicating, and summarizing. This kind of experimentalist tactics can be traced back to the revolutionary experience of the CPC before the founding of the PRC, and some of the local/sectoral/third party[10] experiences and practices in the Republican era (1912-1949) (Heilmann, 2008a; Heilmann & Perry, 2011; Perry, 2007; Zhou, 2011, 2012b, 2012a; Zhu & Zhao, 2021). The experimentalist epistemology and methodology had been passed down from generation to generation by different Chinese governments and had gradually become a unique but generally employed policy process on the Chinese mainland.

In post-Mao era, Deng Xiaoping and Xi Jinping had repeatedly asked the whole party to attach importance to the experimentalist approach in reforms. Deng repeatedly described the reform and opening up as a large-scale policy experimentation: "before the national unified plan is released, reforms can be started in one region or one sector and then gradually promoted" (CPCCC Document Editing Committee, 1993a, p. 150); "try boldly, venture out into the outside world boldly" (CPCCC Document Editing Committee, 1993b, p. 174); "in all reforms, we must focus on experimentation and encourage (local) exploration" (Literature Research Office of the CPCCC, 1991, p. 47); "experiment boldly and sum up experience in time" (Literature Research Office of the CPCCC, 1996, p. 40). Xi repeatedly emphasized that policy experimentation is essential to advance reform. "Paying attention to systemicity, integrity, and synergy are the inherent requirements and important methods for comprehensively deepening reforms" (Xi, 2017, p. 109),

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points or zones (see next foot note) before they were scaled up in the way of national laws/regulations or just promoted into other localities. A series of experimental terms were finally formed in the early days of PRC, and they still appeared everywhere in the reform era. In 1951, Primer Zhou Enlai, summed up six terms for the land policy experiment on a session of the First National Committee of the CPPCC: "*Dongyuan Ganbu*" or "*Xunlian Gongzuo Dui*" (training and mobilizing task forces and cadres to the rural area), "*Dianxing Shiyan*" (typical experimentation), "*Zhongdian Tupo*" (key breakthrough), "*You Dian Dao Mian*" (from point to face), "*Dian Mian Jiehe*" (point and face combination), and "*Wenbu Kaizhan*" (steady promotion), see Zhou (1951).

[9] Experimental point indicates "experimentation with new policies or institutions limited to a certain policy area or economic sector and carried out in limited experimental units", while, experimental zone means "geographical units and jurisdictions that are provided by the central authorities with broad discretionary powers, for example, to streamline the economic bureaucracy or to promote foreign investment and thereby generate or test new policy approaches", cited from Heilmann (2008b, p. 7). During the reform and opening up period, the content, form and scope of various policy experiments (both experimental point and experimental zone) expanded. These large scale experimental points/zones which were directly approved and supervised by the CPCCC and State Council were the most conspicuous: SEZ (1980), Economic and Technological Development Zone (1984), Coastal Economic Open Zone (1985), "stock market" pilot program (1990), pilot program of "establishing modern enterprise system" (1994), National Experimental Zone for Comprehensive Supporting Reform (2005), pilot program of"Urban Residents' Basic Medical Insurance" (2007), pilot program of "New Rural Social Pension Insurance"(2009), China Pilot Free Trade Zone (2013), and National Ecological Civilization Experimental Zone (2016).

[10] The third party is a collective term for other political parties other than the KMT and CPC.

at the same time, "we should continue to encourage policy experimentation and make breakthrough" (Xi, 2014, p. 68). "Top-level design and grass-roots exploration" should "give full play to the demonstration, breakthrough, and leading role of policy experimentation in overall reform"; "for some reform experiments with many contradictions and difficult problems, we must carefully organize and promote them based on summing up experience"; "according to reform needs and pilot conditions, the scope and level of pilot program shall be flexibly set"; "reform experiment must be closely integrated with the grand developmental strategy determined by central authority"; "for reform pilot programs involving risk factors and sensitive issues, it is necessary to ensure that the risks are controllable"; "it is necessary to strengthen the overall coordination and regular supervision of pilot projects" (Reporter of Xinhua Agency, 2015a).

China's Policy Environment in Terms of Central-local Relations

There have always been two distinct views on China's macro political economic institutions in which the policy experiment mechanisms operate (Xu, 2011). The first is the decentralized perspective (Landry, 2008). The most famous in this camp is "fragmented authoritarianism" (Lampton, 1987a; Lieberthal & Lampton, 1992; Lieberthal & Oksenberg, 1988). This model holds that although social forces are still excluded from the policy-making process, the power within a closed decision-making system is shared from top to bottom by decision-making departments and platforms that are highly divided vertically and horizontally. Unlike the early "bureaucratic pluralism", "fragmented authoritarianism" discovered the efforts within the Chinese political system to return to the tradition of collective decision-making during the reform era. However, it emphasizes the structural division of decision-making power between horizontal regions and vertical departmental systems in China's administrative system. Nevertheless, using this single terminology to describe the nature and characteristics of the Chinese political system would miss the observation of its complexity (Oksenberg, 2001). Likewise, the concepts of "plutocratic authoritarianism" and "elite authoritarianism" (Cabestan, 2004, 2014) put forward by French scholars believe that the emerging social and economic elites have begun to increase their control over the political system and process in various ways since the period of reform and opening up.

Some political economy scholars hold the idea that the political drive for China's sustained economic progress is "market preserving federalism" (MPF) (Montinola et al., 1995). As a special kind of federal system, the MPF contains a set of conditions that determine the distribution of authorities and responsibilities between various levels of government: "a hierarchy of

governments with a delineated scope of authority (for example, between the national and subnational governments) exists so that each government is autonomous within its own sphere of authority"; "the subnational governments have primary authority over the economy within their jurisdictions"; "the national government has the authority to police the common market and to ensure the mobility of goods and factors across sub-government jurisdictions"; "revenue sharing among governments is limited and borrowing by governments is constrained so that all governments face hard budget constraints"; "the allocation of authority and responsibility has an institutionalized degree of durability so that it cannot be altered by the national government either unilaterally or under the pressures from subnational governments" (Montinola et al., 1995, p. 55).

Nevertheless, the central authority's substantive control over personnel matters makes China's macro political system completely different from the federal system. Based on the inductive analyses, a comparative economics scholar has proposed the idea of "regionally decentralized authoritarianism" (RDA) (Xu, 2011). This camp emphasizes the causal link between decentralized economic systems and the rise or fall of the political status of local comrades, especially those governing regional competition and regional experiments in some major (economic and social) reforms (Florini, Lai, & Tan, 2012; Landry, 2008; Xu, 2011; Yang, 1997; Zheng, 2007). "The RDA system is characterized by highly centralized political and personnel controls at the national level, and a regionally decentralized administrative and economic system. Both decision-making and policy implementations in the RDA regime, from national strategic issues to concrete local matters, are deeply influenced by this combination of political centralization and economic decentralization"; "these features qualitatively differentiate China's regime from a federal state, a unitary state, and a totalitarian regime" (Xu, 2011, p. 1082).

Compared with the MPF, the RDA emphasizes differences between the Chinese and Soviet systems. China's centrally planned economy was regionally based (the block feature, *Kuaikuai* in Chinese), while the Soviet Union's centrally planned economy was sector-based (the bar feature, *Tiaotiao*) (Qian & Xu, 1993; Qian, Xu, & Dong, 1993). Although China's central government has ministries and commissions, the main real (operational and executive) power were in localities, and each local authority was relatively self-contained (Xu, 2011). This difference in institutional arrangements led to differences in the reforms introduced between China, on the one hand, and the Soviet Union and Eastern Europe, on the other. As a result, under the transition period (1978-), local officials in China were strongly motivated to reform, while under the Soviet system, it was difficult for local officials to motivate reform (Maskin, Qian, & Xu, 2000; Qian, Roland, & Xu,

2006; Qian & Xu, 1993; Xu, 2011).

Other decentralized perspectives, such as "consultative authoritarianism" (Tsang, 2009), "responsible government under authoritarian condition" (Li, 2009), "authoritarian yet participatory" (Geisslern, 2006), "local state corporatism" (Oi, 1995) and "economic localism" (Oi, 1999; Walder, 1995), are also quite helpful for understanding China's central-local relations, as they more or less capture the oscillating dynamics of the policy process.

The opposite view is the centralized perspective, which holds that the political foundation for promoting regional or local policy experimentation is "authoritarian centralization" (Cai & Treisman, 2006; Shirk, 1994; Woo, 1999). This camp challenges "the claim that decentralization had much to do with the success of China's reform and its dramatic growth." They argued that "grassroots initiatives did, of course, occur, and considerable administrative centralization took place in the mid-1980s. But the key reforms that reshaped China's economy began in the late 1970s and early 1980s, before any significant decentralization had occurred"; "in fact, China's authoritarian centralization helped speed the geographical spread of policies found to work well" (Cai & Treisman, 2006, p. 506). This model is clearly different from totalitarianism, which imagines the Chinese political system as a completely closed system. Some scholars of Chinese politics supported the centralization approach and further conceptualized it as "experimentation under hierarchy" (Heilmann, 2008a, 2008b, 2009; Miao & Lang, 2015; Roland, 2000). There were also theoretical debates about how China's restructuring of state power reshaped hierarchy (Xu & Yeh, 2012), but these discussions go beyond the topic here and thus are not further elaborated upon.

In addition, an intermediate perspective has taken hold in recent years. Supporters of this viewpoint collectively argue that China's political system, structure, and process have a certain degree of adaptability, flexibility, or resilience. The more famous perspectives are "bargained authoritarianism" (Lee & Zhang, 2013), "resilient authoritarianism" (Nathan, 2003), and "adaptive authoritarianism" (Shambaugh, 2008). While the concepts and models discussed above have captured different aspects or dimensions of China's policy environment, this dissertation adopts an eclectic perspective and proposes a relatively new analytical framework -- "CPC-style experimentalist environmental governance". This framework synthesizes empirical elements found in the China politics literature and the mechanisms extracted from the typical experimentalist governance architecture discussed in the previous section. My aim is to improve

understanding of the dynamics of local and sectoral experimentation in environmental governance, or more specifically, central-local relations in the process of ecological civilization construction. The trajectory of China's environmental policy reform, reform strategies, and outcomes are mainly determined by these political economic institutions. The analytical framework covers and integrates four political elements or institutional arrangements -- multilevel governance in the determination of policy goals and policy instruments, directional leadership from the central authority, local discretion in performance evaluation, and gradualism in domestic reform and international responses.

The CPC-style Experimentalist Environmental Governance

Chinese public policy scholars have taken and reshaped the framework of experimentalist governance and applied it to different Chinese policy domains. This scholarship demonstrates that policy goals and instruments can be formed and then developed separately and/or interactively by different departments both in the central and local governments (Li, Miao, & Lang, 2011; Zhu & Zhang, 2019; Zhu & Zhao, 2021). This is very different from studies that usually only consider the decisions regarding policy objectives and tools made by a government agency (Heilmann, Shih, & Hofem, 2013), and is more in line with the complex process of China's (national) policy formulation. The central government does sometimes decide policy goals and may design a range of policy instruments, but in many cases it has to formulate policy objectives without explicitly finalizing preferred policy instruments. In such cases, local governments are often required to conduct various policy experiments to provide the central government with a policy toolbox to choose from afterwards (Zhu & Zhao, 2016). In other words, the central government "used its multi-tiered administrative structure to test out new ideas at lower levels of government and then to scale them up after improvements have been made and lessons have been learned" (Schreurs, 2017b, p. 164). In other cases, the central government does not have a very clear policy goal or a decided policy instrument; rather it may only have a general policy direction or intention (or a policy image that is more blurred than the clear target which was quantified). Previous environmental policy studies on the role of local governments in China's environmental governance show that interactions between local activism and temporary central interventions in some eco-city initiatives occurred (Li et al., 2011; Mol & Carter, 2006). This can be referred to as multilevel governance in the determination of (environmental) policy goals and policy instruments; this is similar to the shared responsibility in the goal setting mechanism and differentiated exploration mechanism found within a typical experimentalist governance architecture.

Second, the role of central-local relations in the PRC's entire policy process is crucial; most of the time, in this unitary country, the initiative of central-local relations is in the hands of the central government (Chung, 1995, 2009; Gong & Wu, 2012; Holbig, 2004; Huang, 1996; Jacobs & Li, 2000; Lampton, 1987b; Li, L. C., 2010; Naughton & Yang, 2009; Sheng, 2010; Tao-chiu, 2010; Zhong, 2003; Zhu, X., 2016). Previous research suggested that local governments have very different preferences, different policy problems that they need to address, and different performances (He, Galligan, & Inoguchi, 2009; Lampton, 1987b; Landry, 2008; Moore, 2014; Shin, 2017a, 2017b; Solinger, 1996; Tsai & Dean, 2014). This risks creating distorted or simplistic empirical descriptions and theoretical generalizations of how central-local relations work. The de-ideologization and marketization of post-Mao China drastically altered the overall context of local governance (Choňg, 2007; Chu & Hsu, 1983; Li & Bachman, 1989; Shirk, 1993). Over time, changes in the central government's means of controlling local governments have been influenced by the enhancement of the CPC's adaptive governance capabilities. In order to maximize the manipulation of the social situation and maintain political stability, the central government has a strong concern with policy performance (Zhu & Zhao, 2016, 2021). The relationship between central and local governments has involved "complex and flexible dynamic adjustments" (Zhu & Wu, 2018). It has required adaptability in policy adjustments, heterogeneity of policies in different domains, and a diversity of policy instruments. This is a governance structure that can be described as having Chinese historical and cultural characteristics. It embraces decentralization of economic and social affairs but tight central control in relation to political and personnel affairs (Coase & Wang, 2012; Florini et al., 2012; Heilmann & Perry, 2011; Montinola et al., 1995; Walker, Avellaneda, & Berry, 2011; Wang, 2009; Xu, 2011; Yang, 2006; Zhu, 2014). The kind of interaction offers a solid institutional foundation for CPC-style environmental governance. This directional leadership emanates from central authorities in Beijing. When it comes to environmental matters, success in local environmental policy experimentation initiated by the central government can bring Beijing political benefits. In contrast, local experimentation failure will not cause huge damage to the authority of the central government; in such cases, local comrades become the scapegoats.

Third, the other side of central-local relations is local discretion. Ideal experimentalist intervention emphasizes that the performance of local authorities is subject to mutual monitoring and continuous peer review (Sabel & Zeitlin, 2008, 2010, 2012b; Zeitlin, 2015a). As aforementioned, a policy learning mechanism that emphasizes mutual supervision and peer review is embedded in

the experimentalist architecture. However, in reality, the Chinese government's evaluation process only makes limited use of assessment methods in evaluating alternative instruments used in local policy experiments. High level authorities in Beijing try to stay abreast of developments in local/sectoral policy experiments but leave evaluation of these pilots to local/sectoral leaders and their affiliated expert surveys. The ministry level departments, entrusted associations and research institutions obtain information about the effectiveness of policy experiments directly or indirectly from local officials and/or the public, thereby determining whether policy experiments should be further developed (Zhu, 2017b; Zhu & Wu, 2018; Zhu & Zhao, 2016, 2018, 2021). This increases the bargaining power of localities and departments relative to the central authority (Cai, 2004; Cai & Treisman, 2004; Mei & Pearson, 2014; O'Brien & Li, 1999; Shirk, 1993; Tsai, 2004). These review and monitoring processes are usually invisible to the outside world, and the public can only judge performance evaluation through the results of pilot project (such as continuation, revision, promotion and termination). There is thus a degree of local/sectoral discretion when it comes to performance evaluation.

General Secretary Xi began a new round of deepening reforms in 2013 mainly in an effort to strengthen the political authority of the central government and its ministries (for the details, see Section 2.3). In terms of the environmental policy domain, the Central Ecological and Environmental Protection Inspections (*Zhongyang Shengtai Huanjing Baohu Ducha* in Chinese), officially launched in early 2016 by the CPCCC and State Council, and implemented mainly by the Ministry of Environmental Protection (MEP)[11], has gradually covered all 31 provincial level regions (see Appendix III). The central authority hopes to break the bureaucracy of the local departments with these "campaign-style" (Fan, 2021, p. 33) inspections. These inspections have weakened the resistance of local party committees and governments and therefore strengthened their obedience (Wu, 2019; Zhou, H., 2016). To a certain extent, the central authority has

[11] At the beginning, the Central Environmental Protection Inspection Group was set up by the Ministry of Environmental Protection (MEP), with the participation of relevant comrades of CPC's Central Commission for Discipline Inspection and Central Organization Department. It carried out environmental protection inspections of party committees and governments of the provinces (autonomous regions, municipalities). The inspection experiment was initially conducted in Hubei Province between December 2015 and February 2016. Later, in the summer of 2016, the inspection was officially promoted, and the first round of central environmental protection inspections was launched. In the spring of 2018, as the Ministry of Ecology and Environment (MEE) replaced the MEP, its name was also changed to Central Ecological and Environmental Protection Inspection. The MEE serves as its office. In the summer of 2019, the second round of central ecological and environmental protection inspections was launched. The second round was more standardized and rule-based, given that the *Central Ecological and Environmental Protection Inspection Regulation* were issued in June 2019. According to the regulation, the members of leading group for the inspection come from the General Office of the CPCCC, Central Organization Department of the CPC, Central Propaganda Department of the CPC, the General Office of the State Council, the Ministry of Justice, the MEE, the National Audit Office, and the Supreme People's Procuratorate. For the inspection process, see "Inspection group stationed", available at: http://www.mee.gov.cn/ywgz/zysthjbhdc/dcjz/index.shtml.

strengthened its ability to act according to its own wishes-- centralization was consolidated during the past eight years. The attendant result is that, during environmental policy experimentation, local officials lived "in fear of retribution for veering off the officially sanctioned path" (Stepan, 2016). Despite this, some (environmental) policy experiments can still be found; but, these "tinkering changes" can usually only be carried out after the approval of the central government (Hasmath, Teets, & Lewis, 2019; Teets & Hasmath, 2020; Teets, Hasmath, & Lewis, 2017). In other words, in recent years, local discretion has always been under the shadow of recentralization. Therefore, the third point here only emphasize some limited horizontal peer review or evaluation, which were different from the third step in the typical experimentalist architecture (see Figure 2.1 and section 2.1).

Finally, China's domestic environmental policy outputs (including goals and instruments) can be understood as a multi-level response. This multi-level game perspective constitutes a unique approach to environmental policy analysis, helping to reintegrate the sub-fields of comparative environmental policy and international environmental politics (Schreurs, 2010; Schreurs, 2017b; Schreurs & Tiberghien, 2007; Zeitlin & Overdevest, 2020). There is a relatively recalcitrant political response from the Chinese central authority at the international level in response to matters involving sovereignty and political security. This is designed to protect the PRC from outside interference in its political development (Economy, 1994). In contrast, there is often a more proactive response from localities (provinces, prefectures, counties/county level districts) which are eager to accept foreign assistance and learn selectively from advanced foreign experiences (Gallagher & Xuan, 2018). In this way, China can contribute to addressing international environmental problems through a series of concrete technical measures and "a growing number of marginal institutional reforms in an incremental manner" (Naughton & Tsai, 2015, p. 12). This can be referred to as the fourth institutional element-- gradualism or pragmatism in domestic reform and international responses.

As will be discussed below, the ideas behind the national park system pilot, carbon emission trading pilot and comprehensive ecological civilization establishment cases analyzed in this dissertation originally all came from Western countries. All these policy practices are examples of policy learning, policy diffusion or policy innovation across nation state borders. Therefore, although this dissertation mainly focuses on the domestic domain, it must explain in advance the dimensions of environmental foreign policy that are also implicitly important.

2.3 Intensification of Environmental Intervention in the Latest Recentralization

In 2012, the *Constitution of the Communist Party of China (Amendment)*, adopted by the 18th National Congress of the CPC, included "Communist Party of China leads the Chinese people to build socialist ecological civilization". This marks that the top leadership put ecological and environmental issue into the so-called "Five-in-one Layout" (*Wuwei Yiti*)[12]. It was one year after the new collective leadership (Xi-Li leadership) took power that the environmental policy making was started with a real jump (see Appendix II and IV). In the spring of 2014, the *Environmental Protection Law of People's Republic of China*, approved in 1989, was revised. The revision placed "a stronger emphasis on environmental monitoring and enforcement", introduced "a system of cumulative daily fines for not meeting environmental standards"; called on "all levels of government to expand their financing for environmental protection and environmental awareness-building efforts", "establishes a new environmental national day and requires local governments (county level and above) to incorporate environmental protection into economic and social development plans" (Schreurs, 2017b, p. 168). Moreover, this new sector law also pointed out the neccesity of reviews for local officials' environmental performance.

In April 2015, the *Opinion on Accelerating the Construction of Ecological Civilization* carried out a comprehensive deployment of environmental policy reform. In September 2015, the *Overall Plan for Ecological Civilization System Reform* detailed the *Opinion on Accelerating the Construction of Ecological Civilization*, making it more operational. In the same year, the revised *Environmental Protection Law of the People's Republic of China* was implemented, and the *Air Pollution Prevention and Control Law* and the *Water Pollution Prevention and Control Law* were also successively revised. On August 24, 2016, General Secretary Xi Jinping stated when inspecting the pilot project of National Park System in Qinghai Province: "Now, we have reached the time when we must increase ecological and environmental protection efforts"; "the ecological and environmental problems accumulated over the years of rapid growth have become very

[12] The "*Wuwei*" (Five Aspects) includes (socialist) material civilization, political civilization, spiritual civilization, social civilization, and ecological civilization. This is the standard statement of the official ideology.

prominent, and the common people have many complaints"; "now the food and clothing problem has been steadily solved", "(so) we have the conditions and ability to solve (environmental) problem" (Xi, 2017, p. 392). In the past, great efforts had not been made to solve the problems of environmental pollution and ecological destruction because the central authority holds that economic growth and improvement of material life are the top priorities.

The most noteworthy thing at this stage was the Central Environmental Protection Inspection (for its details, see Appendix III). Such high-intensity in environment related disciplinary inspection was unprecedented. These developments were fundamentally altering traditional marginal position of environmental policy making in China. In March 2018, at the First Session of the 13th NPC, "ecological civilization" concept was enshrined in the PRC Constitution. At the same time, the NDRC's responsibility for addressing climate change and emission reductions, and the environment-related functions of other ministries were integrated into the newly formed MEE.[13] Previously, the MEP scrambled to improve its capacities to participate in climate matters, but it was too weak to push climate change mitigation (and adaption) on its own. The MEE succeeded in winning support from the ruling party. Moreover, as elaborated in the third chapter, the newly formed Ministry of Natural Resources (MNR) and National Forestry and Grassland Administration (NFGA) were entitled to more natural resource management and nature conservation authority. In this year, the newly promulgated *Environmental Protection Tax Law* and *Soil Pollution Prevention and Control Law* were also adopted.

In October 2016, the expression "the CPC Central Committee with Comrade Xi Jinping at its core" appeared for the first time in the communiqué issued by the Sixth Plenary Session of the 18th CPCCC. This marks that President Xi has become the most powerful national leader after Mao Zedong (1949-1976) and Deng Xiaoping (1978-1992). In May 2018, Xi delivered a long speech at the latest National Ecological and Environmental Protection Conference[14] (Reporter of Xinhua

[13] In 1973, the Office of State Council's Environmental Protection Leading Group (referred to as the State Environmental Protection Office) was formed. It was first placed in the State Planning Commission and later in the State Construction Commission. In 1982, the Ministry of Urban and Rural Construction and Environmental Protection was established. An Environmental Protection Bureau was set up within the ministry. In 1984, the Environmental Protection Bureau was elevated to the status of State Environmental Protection Agency. It was initially placed under the newly formed Ministry of Construction. In 1988, the State Environmental Protection Agency was placed directly under the State Council. The Office of the State Commission of Public Sectors Reform (SCOPSR) approved its administrative status be elevated to deputy ministerial level. In 1998, the State Environmental Protection Agency was expanded into the State Environmental Protection Administration (SEPA), which enjoyed full ministerial status. In 2008, the SEPA was elevated and extended to the Ministry of Environmental Protection (MEP), which had a full cabinet rank. In 2018, the MEP was renamed as the MEE. In the later chapters, most of these organs appear many times.

[14] From 1973 to 2019, a total of eight national environmental conferences were convened. The first six were called National Conference on Environmental Protection, the seventh was renamed National General Meeting on Environmental Protection, and the eighth time was renamed National General Meeting on Ecological and

Agency, 2018c). This meeting announced the birth of what could be called "Xi Jinping Thought on Ecological Civilization"[15]. One month later, *Opinion of the CPCCC and the State Council on Comprehensively Strengthening Ecological and Environmental Protection and Resolutely Fighting the Tough Battle of Pollution Prevention and Control* was issued. For the first time, it clarified what Xi Thought on Ecological Civilization is: "why to build an ecological civilization, what kind of ecological civilization to build, and how to build an ecological civilization" (CPCCC & State Council, 2018).[16]

With the slowdown of economic growth in the second half of 2010s, strengthening environmental protection is undoubtedly one of the most important ways for the CPC to consolidate its popular support and respond to international pressure. In view of the fact that environmental concerns are more common in China, climate change and other pollution control issues are not only supported by the economic planning and environmental departments as hot issues, but have also received repeated attention from the supreme leader of ruling party. Xi's career did suggest he is a man with much of an interest in the environment (Xi, 2014, pp. 207–212, 2017, pp. 389–400, 2020, pp. 319–330).[17] The stricter political disciplinary inspections and anti-corruption campaign that began in 2012/2013 have improved the executive power of central authority. Therefore, drastic policy change occur when these windows of opportunity open, policy sponsors exist, and there is enough energy in the institutional system for the strong sponsors to push their solutions onto the political agenda. At this stage, the initiative in the central-local relations is in the hands of central government.

Recentralization in the Environmental Policy Domain

In the later empirical chapters, many of the policy documents were reviewed and approved by a

Environmental Protection. While the first and the second meetings were separated by 10 years, the following six meetings were held every 2-6 years. The name change and frequency of these meetings reflects the growing significance of environmental protection undertaking in China.

[15] In the manifesto of the CPC, it is part of what could be called "Xi Thought on Socialism with Chinese Characteristics in the New Era". It is a summary of a series of ideas, strategies, and policy programs put forward by the supreme leader since the 18th National Congress of the CPC on the ecological civilization. Its goal is to ensure that by 2035, the quality of the "*Shengtai Huanjing*" (ecology and environment) should have been fundamentally improved.

[16] It was specifically divided into several points: "ecological prosperity means cultural prosperity"; "harmonious coexistence of man and nature"; "lucid waters and lush mountains are invaluable assets"; "good ecology and environment is the most inclusive people's livelihood and well-being"; "mountains, rivers, forests, fields, lakes and grass are a community of life"; "use strictest institutional system to protect the ecology and environment"; and "adhere to national action". For the details, see CPCCC and State Council (2018).

[17] When he was young, he lived for a long time in the Loess Plateau, where the ecological damage was severe. During his administration in Fujian and Zhejiang province, he was in charge of environmental affairs in rural areas for a long time.

new high level organ -- the Central Commission for Comprehensively Deepening Reform (CCCDR), which has been at the center of the recentralization. The CCCDR has been the top-level deliberative and coordinating body of the CPCCC on comprehensive deepening reforms in party-state institutions. In November 2013, the Central Leading Group for Comprehensively Deepening Reform (CLGCDR), the predecessor of CCCDR, was established at the 3rd Plenary Session of the 18th CPCCC. This group consists of more than twenty central leaders, and General Secretary of the CPC served as its monitor. There are six special groups under the CLGCDR. The first and foremost is the Special Group for Reform of Economic System and Ecological Civilization System[18]. Close supporters of Xi have been the leader of this special group. After the establishment of the new body, each province has established its own corresponding agency. In March 2018, in order to strengthen the centralized and unified leadership on major work involving the party and the state, to strengthen decision-making coordination, the *Deepening Party and State Institutional Reform Program* stated that "the Central Leading Group for Comprehensively Deepening Reform was changed to the Central Commission for Comprehensive Deepening Reform".

The construction of ecological civilization is essentially the collapse of previous superficial environmental regulations and the generation of more comprehensive environmental interventions rooted in economic and industrial structure policies. This is why the Special Group for Reform of Economic System and Ecological Civilization System emerged in the recentralization. The strengthening of environmental institutions and policies has been an integral part of comprehensively deepening the reform. To understand the political background of environmental policy experiments in the past decade, there is a need to clarify the recentralization, which has been deeply involved in ecological and environmental domains.

As of October 2017, among thirty eight CLGCDR meetings, twenty of them discussed problems and issues related to the ecological civilization construction (Reporter, 2017i). For example, the second meeting reviewed and approved the *Report on Major Reforms of the Special Group on Economic System and Ecological Civilization System*; the fourteenth meeting deliberated and formulated the *Eco-environmental Monitoring Network Construction Plan* and *Rule for the Investigation of the Responsibility of Party and Government Leading Cadres for Environmental Damage (Trial)*; the twenty first meeting heard the *Report on the Implementation of the Overall*

[18] Since 2015, Liu He, the Office Director of the Central Finance and Economics Committee of the CPC, served as the monitor. The work of this special group was led by this Office. In March 2018, Liu served as a vice premier. He has been one of Xi's main supporters in the recentralization, see Wang, Y. (2015b).

Plan for Ecological Civilization System Reform; the twenty seventh meeting deliberated and approved the *Rule for Evaluation and Assessment of Ecological Civilization Construction Goals*; the twenty ninth meeting deliberated and issued *Several Opinion on Delineating and Strictly Observing the Red Line of Ecological Protection*; and the thirty fifth meeting passed the *Several Opinion on Establishing a Long-term Mechanism for Monitoring and Early Warning of Resource and Environmental Carrying Capacity* (Reporter of Nanfang Daily, 2017).

This high intensity reflects that the top leadship of the ruling party hoped to break the bureaucracy of environmental department through the channel of the campaign-style governance, so as to achieve better results than ever. In the recentralization, the central authority developed consistent roadmap and timetable that integrates local diversities to unified national program. Through the recentralization, local experiences have been communicated, learned and diffused at national conferences, training platforms, administrative instructions, and even formal legislations. Therefore, the CPC-led recentralization has also served as a policy diffusion, policy learning, or policy innovation mechanism, which features experimentalism (Zhu, 2017b; Zhu & Zhao, 2018, 2021). It is in this sense that the theoretical framework is named "CPC-style experimentalist environmental governance".

2.4 CPC-style Experimentalist Environmental Governance Model: A Preliminary Typology and Hypotheses

This dissertation develops the typology of CPC-style experimentalist environmental governance (Table 2.1) by theoretically modifying and empirically synthesizing the diversified experimentalist patterns found in China's policy experiments related to rural reform, technological commercialization, social pension, local budgets and environmental management (Heilmann et al., 2013; Shin, 2017a, 2017b; Wang, G., 2019; Zhu, 2017b; Zhu & Zhao, 2021). These previously proposed patterns do not fully tap into some obvious empirical elements characterizing China's policy environment. The "hierarchical experimentation" pattern identified in pension experiments

(Zhu & Zhao, 2021, p. 24) and the "principle-guided" pattern found in rural reform experiments (Wang, G., 2019, pp. 40–42) do not consider the ever expanding (geographical or economic) representativeness of site selection. The "comparative trial" pattern (Zhu & Zhao, 2021, pp. 25–26) and the "designation" pattern (Zhu, 2017b, p. 278) unearthed in urban pension pilot schemes are not mainly used to test for correctness. The "recognition" pattern found in the urban poverty-alleviation pilots (Zhu & Zhao, 2018), the "community-driven" pattern in nature conservation experiments (Shin, 2017b, pp. 610–612), and the "selective integration" pattern discovered in technological innovation experiments (Heilmann et al., 2013, pp. 899–900) do not capture the dimension of deliberately guiding public opinion. The elements and processes of experimentalism do not mean that this kind of recognition is free of politics, or power tensions. The typology proposed here takes care of these easily overlooked political elements or power relations. Although it is indeed inspired by the above outstanding research, this typology has made obvious amendments to them to better conform to the reality of ecological civilization construction.

		Were there clear policy goals in the documents issued by the CPCCC and/or the State Council at the very beginning?	
		Yes	No
Did the central government have the policy instruments needed to promote the local experiment at the very beginning?	Yes	Strict Hierarchical Experimentation	Selective Political Recognition
		e.g. National Park System (NPS) Pilot Program, 2013-2019	e.g. River Chief System (RCS) Promotion, 2013-2018
	No	Cautious Comparative Experimentation	Pragmatic Phased Integration
		e.g. Carbon Emission Trading (CET) Pilot Scheme, 2011-2017	e.g. Comprehensive Experimental Zones for "Ecological Civilization", 1995-2017

Table 2.1 Typology of the CPC-style experimentalist environmental governance

The vertical or hierarchical experimentation pattern is the most common mechanism in China's public policy experiment. But what this typology proposes can be regarded as its subtype, that is, strict hierarchical experimentation. In the strict hierarchical experimentation pattern, the central government first determines policy goals, and then delineates policy instruments and rough plans. In order to establish power over local governments and legitimacy in a new domain, the national

government gives priority to regional or local experimentation to prove the rationality of policy goals and the correctness of policy instruments. The central government will specifically inspect such local policy experiments. Agenda setting is firmly in the hands of the central authority. At the first stage, the area of the pilot scheme chosen by the central government is mainly based on its uniqueness. In cases where experiments prove to work smoothly, the central government deepens the implementation in the pilot areas, and prepares to launch other pilot projects in accordance with the original plan. The central government at times also expands the number of pilot projects, considering the broadly representative nature of the selected site. When a pilot project proves to be a failure, the central government considers transforming it in other types of experiments, so that the deployed policy resources will not be wasted. The special consideration given to the geographical and ecological representativeness of the pilot project and the dynamic adjustmet of the pilot project itself improves the chance of success, expands the influence of the experiment, and consolidates the legitimacy of the central government. Therefore, this pattern is different from other vertical or hierarchical subtypes.

The second pattern of experimentalist environmental governance can be called cautious comparative experimentation where the central government designs a broad policy goal, but does not set uniform policy tools because of a lack of understanding of their likelihood of success. This pattern is a subtype of the famous comparative experiment. It is used to meet foreign expectations and fulfill international commitments. In order to test policy programs and select the best approaches for possible promotion, the central government specifically designates representative places for policy experiments. Among a group of more or less mutually comparable policy experiments, local governments and the pilots they are responsible for must basically follow the policy goals and directions determined by the central authority. Local government and its pilots do not simply implement the detailed requirements from the central authority, and the latter does not just supervise in a high handed manner. The central government has the responsibility to provide local pilots with relevant supportive policy frameworks. It allows them to introduce their own initiatives and innovations. This is very similar to the usual practice involving economic policy experiment. Some local pilots that have made breakthroughs in implementation steps or policy tools may then become models for future promotion. Local governments have certain autonomy and can decide to either participate in the pilot program or postpone their participation (or even not participate) according to their own conditions and interests. Unlike the first pattern of experimentalist environmental governance, which does not consider representative issues from the outset. Here, the central government chooses a larger number of representative locations in order

to clearly and comparatively test the correctness associated with unfamiliar policy tools or weed out policy tools that are inappropriate to a particular locality or problem. It is precisely because of this effort to "test for correctness" that the second pattern is different from the comparative trial pattern and designation pattern used to test errors in other policy domains. When conducting cautious comparative experimentation, the central government pays more attention to a pilot site's representativeness from the very beginning. Therefore, during the experimentation, the central government does not think it needs to adjust the number of pilot schemes. This may be the another difference from other subtypes of comparative experiment.

The third pattern of experimentalist environmental governance is called selective political recognition. This is the subtype with the most political implications in this typology. It usually appears in domestic environmental problems, where international expectations are not urgent and policy direction are clear. The central government frames a very broad policy vision, not knowing if it can achieve the vision. There is no focus on specific policy instruments or implementation steps. In contrast, local (or grass-roots) governments that are directly facing rapidly changing conditions and public needs are likely to try different small policy innovations based on established policy directions and local preferences. As long as the central authority is not challenged or the political order disrupted, the central government is open and tolerant of various local experiments which explore for suitable policy tools. The central authority typically reviews a substantial number of local policy initiatives and selects one as a national model. A basic necessary condition for a local program to be selected as a national benchmark is that the plan must be consistent with the central government's broad visions and policy directions. Another prerequisite is that this selected local program be tested and implemented in a place where the incumbent supreme leader was previously in power. This helps enhance the directional leadership of the authoritarian government. Unless the central ministry realizes the potential advantages of such political connections with incumbent supreme leader, it will not fully promote this regional experience. It is precisely because of this political implication that the third pattern is essentially different from other forms of policy experimentation. It is also important that the selected local model be quite successful in addressing the environmental conditions causing public displeasure.

The fourth pattern is called pragmatic phased integration. When the central government is unfamiliar with a new situation or is confronted by a new environmental issue, it may at first be unable to determine policy goals and delineate policy instruments. In such situations, local governments and/or ministerial-level departments independently initiate policy experiments.

These local and/or departmental efforts are not usually opposed by the central authority. These kinds of local and departmental experiments may be inconsistent or conflict with each other due to a lack of top-down coordination or horizontal reconciliation. The standards of ecological protection and environmental regulation vary from place to place and from sector to sector. In such cases, the central government and its powerful ministries have to determine relatively clear policy objectives and delineate applicable policy tools to remediate the situation and address the local and/or sectoral conflict. In this process, environmental considerations have been adopted by more and more central ministries, and existing experimental indicators have gradually been standardized and unified. As a variant of experimentalism, several rounds of experimental policy integration may result in recursive goal setting and revisions. These rounds of policy integration can be considered to be pragmatic because the decisions made were largely intended to minimize strategic uncertainty and local resistance. More importantly, these rounds of policy integration all belong to the so-called "environmental policy integration"[19]. In the literature on environmental policies of OECD countries, environmental policy integration refers to the efforts to incorporate environmental considerations into decision-making in non-environmental policy sectors, while minimizing inconsistencies between environmental policy and other sectoral policies by prioritizing environmental goods in principle (Jänicke & Jörgens, 2000; Lafferty & Hovden, 2003; Lenschow, 2002). In this pattern, several rounds of integration constitute a spiral or wavy evolution from "horizontal environmental policy integration" to "vertical environmental policy integration" (Jacob & Volkery, 2004).

Based on this typology of CPC-style experimentalist environmental governance, the following four research hypotheses are formulated.

Hypothesis I: In cases where policy goals are clear and policy instruments are established, the more guidance and intervention that comes from the central government level, the more likely it is that environmental policy experimentation will follow a strict hierarchical experimentation pattern.

Hypothesis II: In cases where policy goals are clear but there is a lack of established policy instruments, the more guidance and intervention that comes from the central government level, the more likely it is that environmental policy experimentation will follow a cautious comparative

[19] Although some international and supranational organizations had called for and made more integrated effort to facilitate environmental protection and improvement, the environmental policy integration is still a terminology that has hitherto been mainly applied to domestic context. For more explanation of this term, see Tosun and Lang (2017); Adelle and Russel (2013).

experimentation pattern.

Hypothesis III: In cases where policy instruments are established but there is a lack of clear policy goals, the more guidance and intervention that comes from the central government level, the more likely it is that environmental policy experimentation will follow a selective political recognition pattern.

Hypothesis IV: In cases where there is a lack of clear policy goals and established policy instruments, the more guidance and intervention that comes from the central government level, the more likely it is that environmental policy experimentation will follow a pragmatic phased integration pattern.

2.5 The Strategy of Evidence

The importance of China to the future of the ecological environment in Asia and at the global level is self-evident. China accounts for almost one-fifth of the world's population. As a result of rapid economic development and social progress, the demand for modern conveniences has been steadily rising. Similarly, the general public's attention to environmental pollution and ecological damage is also increasing rapidly. China became the world's largest emitter of greenhouse gases in the latter 2000s. The unfinished industrialization and urbanization process means many challenges remain. How China deals with associated environmental governance challenges is of tremendous significance. China's environmental governance system and its ecological civilization construction are one of the most challenging and diversified policy domains targeted in China's recentralization. Institutional reforms are influenced by the mutually interdependent relationship that exists among the top leadership, different central ministries, provincial governments, and local governments. This typology notes that the central authority applies different experimentalist strategies to tackle different problems in nature management and environmental protection policy domains.

Following the logic of "theoretical replication" (Yin, 2014, pp. 56–58) in the methodology of a comparative case study, four cases (NPS, CET, RCS, and comprehensive experimental zones for ecological civilization) are selected to explore the four research hypotheses formulated above. The

four cases are different from each other in several aspects. Geographically, these pilot localities are far away from each other. Qinghai's NPS pilot project covered a vast natural habitat in western China; CET pilot schemes took place in four municipalities directly under the central government, two southern provinces, and a "*Jihua Danlie Shi*" (city specifically designated in the state plan); RCS experiment originated from two developed coastal provinces; and the comprehensive experimental zones for ecological civilization construction were not specifically delimited. Second, their policy domains cover protected natural areas, climate change mitigation, water pollution prevention and control, and comprehensive ecological civilization establishment. Third, a different set of actors was involved. NPS pilot projects mainly involve the former forestry department; before 2018, CET schemes were mainly under the authority of the DRCs; RCS program mainly involves the water resources department; and comprehensive experimental zones primarily involve the environmental departments and also the DRCs. In addition, the first two experimental programs have learned from foreign experience, although this is not a focal point here.

Nonetheless, the two analytical components of environmental policy conditions -- environmental policy goals and instruments -- are sufficiently comparable across the four cases. First, even though different sets of governmental actors were involved, these four cases point to the central and local interaction in policy goals and instruments over time and across provinces or prefectures. Likewise, while not every specific practice was identical, Beijing's final adjudication and directional political leadership were evident in all four cases. Therefore, in such case, the confronting factors at the central-local interplay during policy experimentation have been controlled, given that the relevant central ministries and local governments have no final decision-making authority but are merely participants in the decision-making process of the CPCCC and the State Council. Third, more importantly, if the research question is deductive, it makes sense to "focus on the relevant independent variable" (Peters & Fontaine, 2020, p. 37). In this project, the research question is "in national policy experiments, how did different policy conditions (i.e. policy goals and policy instruments) affect the timing and content of central government's deployment of experimentalist strategies in different environmental/ecological policy domains?". Therefore, this design chooses environment related policy domains that differ maximally from each other except with regard to the independent variable (i.e. the presence of policy goals and policy instruments). Focusing on these two points facilitates direct comparison and the drawing of conclusions. Four, the differences between policy domains may of course be greater than the differences between sub-national units within a given country (Freeman, 1985). By examining the policy differences in four different environmental domains, this study can

determine to what extent the policy process within an unitary country is consistent across different policy domains, that is, the degree of variations in experimentalist strategies.

These cases are purposive choices aimed at controlling "extraneous conditions" (Peters & Fontaine, 2020, p. 22). In other words, the choice of cases is the most important means to control the extraneous variance. Although comparative method does not specify how to collect evidence, it can explain the observed differences in defined dependent variable through careful selection of cases. The case sampling pays more attention to the diversity of each case, and tries to explore the causal mechanism of each case, thus ensures that the sample is relatively complete and can answer research questions more accurately. Because the appropriate sample is selected, this dissertation can test each hypothesis by determining how the relationship between the variables works in each case. The four different cases demonstrate that experimentalist interventions may hold in a range of contrasting environmental policy settings. Furthermore, the findings and implications presented may be more generally applicable to other environmental policy domains. However, while overcoming some of the more obvious limitations of a single case study, this small N research design is not well suited to support much broader and more general propositions (King, Keohane, & Verba, 1994). Methodologically speaking, the most useful aspect of this policy analysis is the development of four propositions that are more limited in time and space.

Analogous to the "most different systems design" in comparative case studies, this project handles the situations "where the dependent variable resides at a sub-systemic level". The four policy domains related to China's environmental governance/ecological civilization construction constitute four different systems to be analyzed. As the dependent variable, each conceptualized experimentalist pattern or strategy exists only in its own system. But, unlike the "most different" design, there is no "traveling problem" (Gerring, 1999; Sartori, 1970) in this project, which has always been conducted in the same cultural and political environment. Even policy terms (such as ruling party, central authority, experimental point/zone, policy goal, and policy instrument) that seem to span different environment-related domains have the same connotation.

In addition, this comparative design also utilizes other methods and techniques for detailed comparison. First, in each case, the detailed development of policy goals and instruments is examined, and qualitative process tracing which "attempts to trace the links between possible causes and observed outcomes" (George & Bennett, 2005, p. 6) is pursued. This method enables the observation of causal relationships between factors and outcomes (King et al., 1994). Second,

because of China's vast territory, regional differences, and the uneven progress in the four different experimental types, the evidence provided by this kind of "multisite" research (HERRIOTT & FIRESTONE, 1983) is considered to be more useful. Third, there are still ethnographic engagement when participating in the activities (including on-site observations and information collection) of China Research Group on Socialist Eco-Civilization[20] and investigating ostensibly trivial but essential local practice (i.e. at the village and town levels) in each case. "Ethnographies have long been what anthropologists write and read, but recently we have also been using the term as a shorthand for fieldwork" (McGranahan, 2014, p. 23). Among the non-quantitative methodological tools, ethnography may be the one that can best provide insights into the behavior of individuals and small groups in the design of macro and meso-level policies (Howlett & Mukherjee, 2017). It requires a lot of time and energy to prepare open-ended questions and build trust and rapport through interaction with the community. In this project, ethnographic skills are needed to observe whether the unified policy program at the national and provincial level can finally be implemented at the grassroots level (i.e. urban community and rural village).

More than five years of direct and indirect observation flowed into the development of the case study chapters. The research data draws on hundreds of policy documents, dozens of semi-structured interviews and informal long-term communications with 1) experts from universities and government-owned research institutions, 2) reporters from official and social media, 3) staff members in relevant policy experiment management agencies, and 4) civil servants in central and local departments between 2016 and 2020 (Table 2.2 and Appendix I). A few interviews were conducted with retailed cadres and former employees of state-owned and private enterprises. In addition, my viewpoints were enriched by informal conversations with urban residents and rural villagers held during on-site field work. Thanks to the gradual standardization and promotion of e-government in China over the past two decades, many old documents and official notices are now publicly available on the websites of government, party organization, public institutions, and social media. Appropriate reference to public documents and official news avoids the problem of "reflexivity" of interviews (Yin, 2014, p. 112) to a certain extent. During the interview, experts may exaggerate a certain aspect of the story. Therefore, it is advisable to use some open documents and secondary materials.

[20] Its secretariat is located at the Center for Environmental Politics Research (Ecological Civilization Research Center), Peking University. The China Research Group on Socialist Eco-Civilization was established in June 2015, and dedicated to studying the theory and practice of China's socialist ecological civilization concept, building a national academic network, and participating in international dialogue that promotes green politics and policies.

Data collecting methods
Documents (government documents from open websites and media presentations)
Interviews (including face to face, email communications and phone interviews, n=76) and Some Informal Exchanges on Relevent Topics
Officials and civil servants in central departments (including retired ones) (n=11)
Officials, civil servants and staff members in local departments and specialized management agencies (n=13)
Experts and staff members in universities, colleges, party schools, and government-owned research institutions (n=35)
Staff Members in official media, social media, and (international) non-governmental organizations (n=10)
Officials and staff members in SOEs and private companies (n=7)
Residents in urban communities and rural village
On-site observations and indirect observations
Nature reserves, river sections, demonstration zones for ecological civilization construction
Local governments and their departments
Environmental management agencies involved (i.e. protected area management agencies, carbon trading agencies, the RCS offices)
Local neighborhood communities
Government consultation seminars
Academic conferences

Table 2.2 Data collection methods

The rigid political atmosphere in China since the latest recentralization effort made it somewhat difficult to get access to internal stories. Still, I was able to participate in several academic activities organized by the Center of Environmental Politics Research of Peking University and the Beijing Representative Office of Rosa Luxemburg Foundation over the past seven years. As noted above, their work points to how united national or provincial initiatives, policies and campaigns became feasible in a number of counties/county-level districts, towns/sub-districts, and rural villages/urban communities (see Appendix I). Some of the participants in these activities were interviewed. Many have valuable experience as authors of relevant policy survey reports required by local provinces and prefectures' environmental departments. These formal and informal exchanges helped me in screening out confounding factors, tracing information, and finalizing cases.

3. Case 1: NPS Pilot Program

This chapter explores the reasons behind the sweeping policy changes that occurred in China's protected area system in the latter 2000s and 2010s. It was during this period that China's own protected area system began to take shape, especially the NPS. Prior to this time, there was only limited national government involvement in nature conservation, primarily in the form of fragmented sectoral policy experiments. Well into the early 2000s, there were several kinds of protected areas in China, such as nature reserves, scenic (and historic) areas, forestry parks, and geo-parks. Protected area system establishment was, however, still perceived as a local or sectoral matter. As local authorities were not well positioned, the central authority introduced policy change that led to the NPS pilot program. Those changes began in the late 2000s and represented a major break with the past approach to nature conservation. The new interest and preference for nature conservation was a consequence of social progress and represented a concomitant change in environmental values.

More than 100 countries in the world have established protected areas as "national parks" over the last 150 years. However, the definition of national park varies from country to country. In 1994, the International Union for Conservation of Nature (IUCN) proposed the "IUCN Protected Areas Classification System", which established a protected area system with six categories intended to cover the diverse protection and management practices found in different countries and regions. National parks are covered by the second category. "*Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities*" (IUCN, 1994). This definition was recognized by international institutions, such as the United Nations, and also by many national governments, including the PRC government, as the global standard for defining and recording national parks.

As of 2016, more than 400 national nature reserves and 200 national scenic and historic areas (including 11 world natural heritage sites and 4 mixed sites) have been launched, approved to be established or listed. Nature reserves of various administrative levels account for more than three quarters of the original protected area system. This system was characterized by management shortcomings, such as fragmented management, unclear jurisdictional boundaries, management

agencies with unclear authority and responsibilities, and prominent contradictions between protection and economic development. The purpose of establishing a NPS was to protect the authenticity and integrity of natural ecosystems, and highlight the strict and systematic protection of natural ecosystems (Huan, 2017b; Tang, F., 2019). To achieve this, Chinese governments need to reform the previous fragmented management system of protected areas. The central government determined it was necessary to build a unified and efficient NPS with the goal of achieving national ownership, so that these natural areas can be enjoyed by the entire population, and inherited from generation to generation. An unified NPS is a step towards the establishment of a larger-scale nature protected area system in China (General Office of the CPCCC & General Office of the State Council, 2017).

Several projects in the NPS pilot program embody the features of a strict hierarchical experimentation pattern. The term "strict" is used here because these eleven projects (represented by the Three-River-Source NPS project in Qinghai Province) have received considerable attention and been promoted and supervised by the president and the central government. Five of these projects (Three-River-Source, Northeast Tiger and Leopard, Panda, Qilian Mountain and Hainan Tropical Rainforest) and the final *Overall Plan for Establishing the NPS* were jointly approved and triggered by the CPCCC and the State Council. These vertical efforts consciously increased the geographical and ecological representativeness of the NPS program. This would not have been possible at the initial stage of other three environmental policy experiments (i.e. CET, RCS, and comprehensive experimental zones).

3.1 Previous Fragmented Efforts

This and the following section introduce the fragmented protected area system which preluded the NPS policy experiment. They explain the perceived necessity of reforming the protected area system and discuss the evolution of the policy goals and instruments of two main protected areas (national nature reserves and national scenic and historic areas) as well as their defects.

3.1.1 Early Conservation Efforts

Nature Reserves (1956-2016)

The central government initially did not have a top-level design for (national) nature reserves. Therefore, compared with other types of protected areas, the institutional construction of national nature reserves takes a long time. The earliest national nature reserve in China is the South China Botanical Garden led by the Chinese Academy of Sciences (CAS), that is, *Dinghu Mountain Nature Reserve*. But at first, it was not called a national nature reserve. Because there is no difference between the national level and various local levels at this time. Nevertheless, this nature reserve, which was clearly defined as a national nature reserve in the later 1990s, is still considered as the first national nature reserve in China (Natural Ecology Protection Division of SEPA, 2004; Wang, J. et al., 2016).

Dinghu Mountain has been called a "treasure house for species" and a "gene storage pool" by Chinese biologists[21] (Dinghushan National Nature Reserve Administration, 2010b). At the third session of the First NPC in 1956, a group of natural scientists submitted a proposal. They asked the central government to delimit some forest areas in each province for scientific research. After the proposal was approved by this meeting, the Ministry of Forestry[22] and other relevant central and local departments formulated the *Draft of Delimiting Areas where Deforestation Is Prohibited (Natural Reserve)*. They also selected a number of areas including *Dinghushan* to become protected areas. The CAS and Guangdong Provincial Forestry Department designated the 17325-acre Dinghushan Forest Farm as the Dinghushan Arboretum (Nature Reserve) in June 1956. This natural reserve became the South China Botanical Garden of the CAS. In 1979, Dinghushan joined the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Man and Biosphere Program (MAB) Protected Area Network. In October 1988, the Dinghushan Nature Reserve Administration Office was officially established. Dinghushan was elevated and finalized as a national natural reserve by the SEPA on August 27, 1998 (Dinghushan National Nature Reserve Administration, 2010a).

[21] As of 2010, it has an area of 1155 hectares (or 17325 acres), and is home to 22 plant species that are protected by the national government, such as Cyathea spinulosa, bauhinia and agarwood; more than 900 kinds of medicinal plants, 38 species of mammals, 75 species of amphibians and reptiles, 214 species of birds, 117 species of butterflies, 15 species of termites, and more than 980 species of insects. This reserve includes 32 species of nationally protected wild animals. For more details, see its official website.

[22] In October 1949, the PRC government established the Ministry of Forestry and Reclamation. In November 1951, the central government established the Ministry of Forestry and transferred the management of reclamation to the Ministry of Agriculture. In May 1956, the Ministry of Forest Industry was established. In 1958, the Ministry of Forest Industry and the Ministry of Forestry were merged into the new Ministry of Forestry. From May 1970 to April 1978, the Ministry of Agriculture and Forestry was established to take over the business of the former Ministry of Forestry. From April 1978 to February 1979, the Ministry of Agriculture and Forestry was changed to the State Forestry Administration (SFA). In February 1979, the Ministry of Forestry was restored. In 1998, the Ministry of Forestry was relegated to the SFA at the deputy ministerial level.

By the end of 1978, a total of 34 nature reserves (not divided into national and local levels) were established nationwide, with a total area of 12,650 km^2, accounting for about 0.13% of the country's land area (Gao, Xu, & Zou, 2019, p. 25). However, the nature reserve management system in the planned economy era had not taken shape. More than 20 years after the establishment of Dinghushan Nature Reserve, no formal law or administrative regulation had been established regarding nature reserve management. This unsatisfactory situation was improved to a certain extent in the mid-1980s.

Policy Instruments in the Early Stage

On September 20, 1984, the 7th Session of the Standing Committee of the 6th NPC passed the *Forest Law of the People's Republic of China*, which generally stipulated that "the competent department of forestry under the State Council and the governments at provincial level shall demarcate nature reserves and strengthen protection and management in different forest areas"; "the administration measures for nature reserves shall be formulated by the competent department of forestry under the State Council and submitted to the State Council for approval and further implementation" (NPC, 2000). This law provided a legal basis for the forest department to intervene in the management of nature reserves. However, since it was not a special law for nature reserves, this law alone was not enough to support the management of various nature reserves that had been established and approved to be listed (Mei, 2006; Wang, 2011).

In June 1985, the 11th Session of the Standing Committee of the 6th NPC passed the *Grassland Law of the People's Republic of China* (NPC, 2013). It was implemented in October of the same year. Although there were no specific regulations on the management of nature reserves, it did play a role in the management of grassland nature reserves, such as Xinzhou Wutaishan Provincial Nature Reserve (Shanxi Province) and Yaojingzi Leymus Chinensis Grassland Provincial Nature Reserve (Jilin Province) established in 1986. These two grassland reserves were primarily under the jurisdiction of agriculture and animal husbandry departments at central and provincial levels. But there were also reserves controlled by other departments at that time, such as the Horqin Nature Reserve (Inner Mongolia Autonomous Region) established by environmental department in 1985, and Ancient Coast and Wetland Nature Reserve (Tianjin) established by marine department in 1984.

In the mid-1980s, a series of departmental laws related to natural resource management and protection were successively promulgated. These departmental laws, however, typically lacked detailed implementation rules and thus could not provide sufficient protection for the established nature reserves. In the 1980s, the CPC, which was busy with economic reform, had still not formulated any clear policy objectives for the management of various nature reserves at different administrative level (provincial, prefecture and county levels, for their respective quantities, see Table 3.1), nor did it have any specific goals or policy measures for a complete nature reserve management system. The State Council had yet to promulgate corresponding implementation rules.

In June 1985, the *Regulation for the Administration of Forest and Wildlife Nature Reserves* (*henceforth 1985 Regulation*) was approved by the State Council and issued by the Ministry of Forestry (State Forestry and Grassland Administration, 2017). It was formulated in accordance with the *Forest Law*. Although it adopted a broad definition of nature reserves, it only covered forest and wild animal nature reserves. The Ministry of Forestry and/or the provincial forestry department were made responsible for the management of national nature reserves (forest and wildlife types), and the forestry authority above the county level was made responsible for the management of local nature reserves (forest and wildlife types). As aforementioned, some of the national and provincial nature reserves belong to other types, such as grassland meadows and ancient biological relics. Moreover, there were still inland wetlands, ocean coasts, geological relics and other types of nature reserves that were not within the jurisdiction of the *1985 Regulation*.

According to the *1985 Regulation*, a nature reserve is an important base for protecting the natural environment and natural resources, saving endangered biological species, and conducting scientific research. It is of great significance for promoting the development of science and technology, production and construction, culture, education, and health care. The regulation clearly stipulated that the establishment of nature reserves should pay attention to the needs of local economic development and local people's production activities. It is important to note that this makes it far removed from the definition of a national park, which has its focus on conservation.

In addition, the regulation stipulated the main tasks of specific nature reserve management agencies and the conditions for establishing a nature reserve. It also classified nature reserves as

either national nature reserves or local nature reserves (provincial, prefectural, and county level). It stated that national nature reserves should be managed by the Ministry of Forestry or the provincial forestry authorities. The local nature reserves should be managed by forestry authorities above the county level. The management agencies of nature reserves are to belong to public institutions[23], and the area of the nature reserve should be divided into core areas and experimental areas[24](State Forestry and Grassland Administration, 2017). This regulation finally provided forest and wildlife type natural reserves with management regulations that can be clearly followed.

In May 1987, the State Council issued the *Outline of China's Nature Conservation*, which was the first macro strategic guidance issued by central government for the development of natural reserves. Nevertheless, the Outline, did not have the force of law as it was just a policy suggestion. By the end of 1989, 606 nature reserves at various levels had been established, of which 66 were national nature reserves (SEPA, 1990, p. 5). Around 1990, the number of nature reserves at different administrative levels increased rapidly. By 1993, a total of 763 nature reserves of various types had been established nationwide, with a total area of 661,800 km^2, accounting for 6.84% of the country's land area (Gao et al., 2019, p. 26). Among them, there were almost 80 national nature reserves. [25]

In the early 1990s, with the support of "*Guojia Biaozhun*" (National Standard), the fragmented management situation was relieved to some extent. In July 1993, the former State Environmental Protection Agency (*Guojia Huanbao Ju*) approved the *Principles for the Categories and Grades of Nature Reserves* (National Standard GB/T 14529—93), which clearly divided nature reserves into three types (including nine sub-types) and four administrative levels (national, provincial, prefectural, and county level) (State Environmental Protection Agency, 1993). All the established nature reserves were divided into three categories: 1.) ecosystem (forests, grasslands and meadows, deserts, inland wetlands and waters, oceans and coasts); 2.) wildlife (wild animals and wild plants); and 3.) natural relics (geological relics and ancient biological relics). Different types of nature reserves are to be supervised by different departments. For example, the forest subtype should be governed by the forestry department, the grassland and meadow subtype should be led by the

[23] In China, the public institution is a non-profit organization set up by the party and/or government, but it is not a government agency. Its staff is different from civil servants. Under normal circumstances, the government will provide financial subsidies to these institutions. They are mainly research institutes, educational units, cultural units, news, broadcasting, publishing units, health units, sports units, survey and design units, agriculture, forestry, water conservancy and meteorological units, social welfare units, environmental protection units, transportation, urban public, etc.

[24] The core area is for observational research only. Activities such as scientific experiments, teaching practice, inspections, domestication and cultivation of rare animals and plants can be carried out in the experimental area.

[25] The largest one is Xinjiang Altun Mountain Nature Reserve, which was approved by the State Council in March 1985. It covers an area of 45,000 square kilometers.

agricultural department, and the marine and coastal subtype by the oceanic department.

With the continuous expansion of different levels and types of nature reserves, the *1985 Regulation* appeared to be increasingly out of date. On September 2, 1994, the *Regulation of the People's Republic of China on Nature Reserve* (henceforth, *1994 Regulation*) was adopted at the 24th Standing Meeting of the State Council (State Council, 2005c).[26] It went into effect on December 1 of the same year. The *1994 Regulation* gave a clearer and expanded definition of nature reserves. A nature reserve refers to an area that is legally designated for special protection and management. It covers the land, land water body, or sea area where representative natural ecosystems, natural concentrated distribution areas of rare and endangered wild animals and plant species, natural relics of special significance, and other protection objects are located.

According to the *1994 Regulation*, the Chinese government should implement a comprehensive and sub-departmental management in nature reserves. The central environmental department has the power to comprehensively manage nature reserves across the country. The central forestry, agriculture, marine and other relevant administrative departments are only in charge of specific types of nature reserves within their respective responsibilities. The establishment and responsibilities of specialized departments responsible for the management of nature reserves in local governments at or above the county level are to be determined by provincial level governments. Although the environmental departments were given the comprehensive management authority for national nature reserves in the *1994 Regulation*, a large number of national nature reserves were still approved and managed by the forestry and other departments. In the second half of the 1990s, the *1994 Regulation* was not strictly implemented because the Ministry of Forestry at the ministerial level and the State Environmental Protection Agency at the deputy ministerial level failed to cooperate well.

Consistent with the *1985 Regulation*, the *1994 Regulation* also specified the conditions that should be met for the establishment of nature reserves, and the functional area division of (national and local) nature reserves. Nature reserves that have typical significance at home and abroad, have significant international importance for science, or have special scientific research value should be approved and listed as national nature reserves. For the establishment of a national nature reserve, an application is to be submitted by the government of the province, autonomous region, or municipality directly under the central government where the nature reserve is located or the

[26] Its English version is available at: http://www.lawinfochina.com/Display.aspx?lib=law&Cgid=10458&EncodingName=gb2312.

administrative department of the nature reserve under the State Council. After an application has been reviewed by the National Nature Reserve Review Committee, the environmental department at the central level is charged with making a recommendation regarding approval and submitting it to the State Council for a decision. The division of core area and experimental area was also refined and expanded, and a buffer zone was drawn between them. A certain area of buffer zone is to be delimited on the periphery of the core area, and only scientific research and observation activities are allowed there. However, as tourists are not always aware of the differences between the three zones, they often break into the buffer zone and core area, and this has negative impacts on eco-system preservation (Zhou, 2015).

In the *1994 Regulation*, the division of responsibilities and relationships among different administrative departments was vaguely described and not always clear. The central environmental department is to organize other relevant central departments to formulate technical norms and standards for the management of nature reserves nationwide. The other relevant central departments were authorized to formulate technical specifications for the management of specific types of nature reserves, and report them to the central environmental department. The national nature reserves were to be managed by the relevant provincial department where they are located or the relevant central department. The other three types of local nature reserves were to be managed by the relevant departments at or above the county level where they are located. The State Environmental Protection Agency, despite being the comprehensive management department of nature reserves, has not fully exercised its powers under the *1994 Regulation*. In the policy environment at that time, the environmental protection department had no authority to uniformly coordinate all relevant departments. As a result, the management of nature reserves was completely in a state of "departmental fragmentation", and no single department had mastered the situation of all nature reserves (Zhang, S., 2017).

In the *1994 Regulation*, the administrative department of the nature reserve shall set up a special management agency (with professional and technical personnel) for it. The *1994 Regulation* also specified in detail the main responsibilities of management agencies, sources of funding, establishment of public security agencies, prohibited activities and penalties. But, funding and staffing issues were often not given due consideration (Mei, 2006). A professor from the Department of Environmental Management of PKU who participated in the legislative consultation of protected areas organized by the NPC recalled:

> Once these problems are left over, the chance of resolving them would be very small. The lack of funding and staffing led to a certain number of nature reserve management agencies not being established and the professional personnel not being equipped. In the 2000s, less than 60% of nature reserves were established with specialized management agencies, and the nature reserves that were equipped with professionals account for less than 30% (Mei, 2016).

Because local governments attach different importance to the nature reserves under their jurisdiction, the administrative level of the leadership of the national nature reserve management agency is also different. The leaders of the special administrative agencies of national nature reserves generally enjoy the deputy county administrative level. But there are exceptions in some places. A rank-and-file official of a national nature reserve management agency in an economically underdeveloped area recalled:

> In practice, the leading cadre of the national nature reserve management agency often enjoy the status of county level (Two officers of Yunnan Dashanbao Black-necked Crane National Nature Reserve Administration, 2019).

This is because economically backward areas attach great importance to national reserves within their jurisdiction and hope to improve their popularity and gain momentum for development.

The *1994 Regulation* was amended respectively by the State Council on January 8, 2011 and October 7, 2017 (State Council, 2017a). These amendments did not change the management structure of all nature reserves. The State Council only modified contents involving scientific research, foreigners entering nature reserves, and administrative punishments in cases of violations of the regulation's provisions.

In January 1994, with the approval of the SCPSR, the State Council issued the *Plan for the Distribution of Functions, Internal Organizations and Staffing of the Ministry of Forestry* (General Office of the State Council, 1994). According to this plan, the Department of Wildlife and Forest Plant Protection under the Ministry of Forestry was made responsible for the management of all forests and wildlife-type nature reserves. This plan reaffirmed some principles of the *1985 Regulation*, thus causing the environmental departments to be unable to perform comprehensive management functions for a long time after 1994. It also led forestry department to continuously intervene in the matters of national park pilot program in the 2000s.

After the *1994 Regulation* was issued, different ministries began to take actions to fill policy loopholes. In May 1995, the former State Science and Technology Commission and the Ministry of Agriculture approved and issued the *Management Measure for Marine Nature Reserves* in accordance with the *1994 Regulation* (State Science and Technology Commission, 1995). In July, the State Environmental Protection Agency and the former State Land Resources Administration jointly issued the *Land Management Measure for Nature Reserves* in accordance with the Land Management Law, the Environmental Protection Law and the *1994 Regulation* (State Land Resources Administration, 1995). In October 1997, the Ministry of Agriculture issued the *Administrative Measure for Aquatic Animals and Plants Nature Reserve* in accordance with the Wild Animal Protection Law, the Fisheries Law and the *1994 Regulation* (Ministry of Agriculture, 1997).

Nevertheless, the central government still recognized that there were some serious problems in the management of all nature reserves (State Council, 1998). Some established nature reserves did not recognize the importance of natural ecosystem protection, but focused on improving economic benefits. Moreover, the central government found that the management agencies staff and equipment were insufficient to fulfill conservation goals. More than one-third of the nature reserves across the country had not yet established their own management agency. The geographical coverage of some nature reserves was not clearly demarcated, and land disputes were increasing. The serious shortage of funding restricted the sound functioning of many management agencies.

The SEPA, which had just been promoted to the deputy ministerial level, began to gain a stronger hold on national nature reserve policy. In August 1998, the State Council required all localities and central departments to strictly follow the *1994 Regulation*. The central authority instructed the SEPA to further strengthen the guidance, supervision and inspection of nature reserve management (State Council, 1998). Subsequently, the SEPA quickly required localities to conduct a law enforcement inspection of nature reserves in the first half of 1999, to improve nature reserves management agencies, and increase funding investment and capacity building in the near future (SEPA, 1998b).

In March 1999, the SEPA issued the *Organization and Working Mechanism of the National Nature Reserve Review Committee*. This rule clarified that the National Nature Reserve Review

Committee should be responsible for the review of the newly declared national nature reserves and the review of all national nature reserves and their functional area adjustments (SEPA, 1999c). In April, the SEPA required the implementation of the newly formulated *Evaluation Criteria for National Nature Reserve*, which clearly stipulated that only those provincial-level nature reserves that have been established for more than two years apply for upgrading to national level reserves (SEPA, 1999d). It also specified very detailed evaluation indicators and assignments.

Improved Policy Instruments in the New Century

By the end of 2001, a total of 1,551 nature reserves of various types had been established nationwide, accounting for 12.9% of the country's land area (SEPA, 2002f). The State Council approved *Regulation on the Scope, Functional Area Adjustment and Name Change of National Nature Reserves*, which was drafted by the SEPA, in January 2002 (SEPA, 2002a). It stipulated that the scope, functional areas and names of national level nature reserves shall not be adjusted and changed at will, and the specific conditions that must be met if adjustments and changes are required. It also established operational rules. In July, in accordance with the *1999 Organization and Working Mechanism* and *Evaluation Criteria*, the SEPA formulated the *Regulation on Field Inspection in National Nature Reserve Review* (SEPA, 2002d). By this time, the regulations and rules of national nature reserves had been largely completed.

At the end of 2002, the SEPA issued the *Notice on Further Strengthening the Construction and Management of Nature Reserves*, emphasizing again some management problems: the boundaries and land ownership of some nature reserves were still unclear; the conflict between development and protection had intensified; some of the nature reserves covered too large an area, with too many residents, and had weak management with insufficient protection capabilities; moreover, funding was insufficient (SEPA, 2002f). The bad situation of management defects repeatedly emphasized by the central government had not been alleviated. Shortly after, the SEPA once again issued an administrative instruction emphasizing that the management of nature reserves (the delimitation and marking of natural reserves, the confirmation of land rights, the adjustment of scope and functional areas, the supervision of resource development activities and the strengthening of institutional construction) must be based on the *1994 Regulation* and the instructions of the State Council of 1998. Despite these efforts, the situation had not improved.

According to the recommendations of the National Nature Reserve Review Committee, in 2003

and the first half of 2004, the relevant departments carried out management evaluations of the national nature reserves under their respective leadership. In January 2003, the SEPA issued the *Guideline for the Management and Evaluation of National Nature Reserves (for trial implementation)*, requiring that the assessment of national nature reserves under the environmental department system should be completed by the end of February 2004 (SEPA, 2003a).[27] In November 2004, the SEPA issued *Notice on Issues Concerning Strengthening the Management of Nature Reserves*, specifically emphasizing that various development and construction activities have had a negative impact on nature reserves (SEPA, 2004b). The SEPA clearly instructed that no new provincial nature reserves or declaration of new national reserves be allowed without the review and approval of the provincial nature reserve review committee. In December 2006, the *Rule for the Supervision and Inspection of National Nature Reserve* came into effect (SEPA, 2006b).[28]

With the improvement of the rules and specifications for the declaration, selection and assessment of all nature reserves, the number of nature reserves soared from about 1,700 to about 2,500 between 2002 and 2007. Most of the new additions were local-level nature reserves. During this period, the number of national nature reserves increased from 188 to 300 (MEP, 2008c, p. 38; SEPA, 2003c, p. 33). By the end of 2007, 2,531 nature reserves had been established nationwide, accounting for 15.19% of the country's land area. There were 303 national nature reserves, accounting for 61.7% of the total area of nature reserves. Of these, 28 nature reserves joined the UNESCO's MAB network, and 33 were included in the list of internationally important wetlands (MEP, 2008c, p. 38).

In the next eight years, the growth of the number of nature reserves slowed down because the central government's policy instruments became increasingly strict. Especially after Xi Jinping came into power, the central government almost no longer approved the establishment of new national nature reserves, but continuously improved the original rules. In August 2009, the newly upgraded MEP issued the *Guideline for the Standardized Construction and Management of National Nature Reserve (for trial implementation)*. This guideline made detailed requirements for

[27] In this guide, there was a scoring table containing 20 indicators (total score of 100 points), with each indicator divided into four value levels. Under this guideline, those reserves with a total assessment score of 60 points and more were qualified to pass the evaluation, and those with a total score of 59 points or less, and those with an index of 0 points were deemed unqualified. Unqualified reverses could apply for re-evaluation after one year. If the second time was again unsuccessful, the unqualified reserve would risk having its status downgraded.

[28] This rule stipulated measures that the central environmental department has the right to take when performing supervision and inspection duties, and spelled out the content of regular assessments and law enforcement inspections. This further increased the authority of the environmental department in the management of nature reserves.

management and protection facilities, scientific research and monitoring facilities, publicity and education facilities, office and auxiliary facilities, administration, boundary delineation and land ownership, resource management and protection, construction project management, scientific research monitoring, tourism activity management,community co-management, and ecological restoration (MEP, 2009b). This further regulated the management of national nature reserves, and at the same time increased the difficulty of obtaining the qualifications of national reserves. According to the rules previously issued, in the next seven years, almost all newly approved national nature reserves are selected from eligible provincial-level reserves. Some local nature reserves that failed to pass the assessment in the western provinces lost their status, while the eastern provinces gained many new nature reserves.[29] The reason is obvious. The economically underdeveloped areas failed to implement the staffing and financial input required for the establishment of specialized management institutions in accordance with the above regulations and rules.

On December 28, 2010, the General Office of the State Council issued the *Notice on Doing a Good Job in the Governing of Nature Reserves* (henceforth, *2010 Notice*) (State Council, 2010a). The *2010 Notice* pointed out that some nature reserves were frequently adjusted or illegally occupied, the habitats of some species were threatened, and most of the nature reserves faced increasing pressure due to the intensification of construction activities. On December 2, 2013, the State Council issued the *Regulation on the Adjustment of National Nature Reserves* (henceforth, *2013 Regulation*) (State Council, 2013a), applying fixed strict measures to the *2010 Notice*. The *Regulation on the Scope, Functional Area Adjustment and Name Change of National Nature Reserves* adopted in 2002 was then abolished. Under the *2013 Regulation*, local authorities were not allowed to make arbitrary adjustments to national nature reserve, and the adjustment of national nature reserves should avoid new overlaps with other types of protected areas. On May 6, 2015, the MEP and nine other ministries issued the *Notice on Further Strengthening Supervision and Governance of Development and Construction Activities Related to Nature Reserves* (Ministry of Environmental Protection, 2015). This was also a manifestation of a continuing effort to implement the *2010 Notice*.

During the Twelfth FYP period (2011-2015), ten ministry departments including the MEP carried out a series of special inspections to investigate and punish various illegal construction activities

[29] For example, from 2008 to June 2016, 39 reserves were revoked in Yunnan Province and 10 were revoked in the Inner Mongolia region. During this period, 65 new national and local nature reserves were approved for establishment in Heilongjiang Province, 62 were approved in Jiangxi, and 37 were approved in Guangdong.

involving nature reserves. Moreover, the MEP and six other ministries successively organized management assessments of institutional setting and staffing, resource background investigation and monitoring for more than 300 national nature reserves (Chen, 2016). When the NPS experiment was about to be put on the agenda, the NPC and the State Council began to summarize the experiences of managing different types of nature reserves over the past two decades. On June 30, 2016, at the 21st Session of the 12th NPC's Standing Committee, Chen Jining, then Minister of the MEP submitted a report -- *Situation on the Establishment and Governing of Nature Reserves*.

According to the report, by the middle of 2016, 2740 nature reserves had been established nationwide (Table 3.1). They covered a total area of 1.47 million square kilometers, accounting for almost 15% of the country's land area. There were 446 national nature reserves with a total area of 970, 000 square kilometers, 2294 local nature reserves with a total area of 500, 000 square kilometers (Chen, 2016). Among them, 33 nature reserves, including Guangdong's Dinghushan, joined the UNESCO's MAB network; 46 nature reserves, including Jilin's Xianghai, were included in the list of international important wetlands; and 35 nature reserves, including Fujian's Wuyishan, were designated as the world natural heritage sites (Editor, 2016a, 2016b, 2016c, 2016d, 2016e, 2016f). [30]

Provincial administrative region (Time span)	**National Natural Reserve**	**Provincial-level Natural Reserve**	**Prefectural-level Natural Reserve**	**County-level Natural Reserve**	**Total**
Beijing (1985.04-2005.04)	2	12	0	6	20
Tianjin (1984.10-2004.09)	3	5	0	0	8
Hebei (1983.11-2012.01)	13	25	2	4	44
Shanxi (1980.12-2007.12)	7	39	0	0	46
Inner Mongolia (1979.12-2005.07)	28	64	22	68	182

[30] Over 90% of terrestrial natural ecosystems in the country had representative nature reserves; 89% of nationally protected wild animal and plant species and most important natural relics were protected in these nature reserves. The number of giant pandas in the wild had reached more than 1,800, and the number of species, such as Northeast tiger, Northeast leopard, Asian elephant, and crested ibis, had increased significantly. For more details, see Chen (2016).

Liaoning (1980.08-2013.01)	17	30	33	24	104
Jilin (1960.04-2015.12)	20	23	4	4	51
Heilongjiang (1958.06-2015.12)	36	87	54	74	251
Shanghai (1991.11-2002.04)	2	2	0	0	4
Jiangsu (1981.08-2005.08)	3	10	9	8	30
Zhejiang (1975.06-2015.12)	10	12	0	13	35
Anhui (1979.01-2015.05)	7	30	2	66	105
Fujian (1957.06-2015.05)	16	22	9	45	92
Jiangxi (1972.04-2014.03)	14	39	2	145	200
Shandong (1982.01-2010.03)	7	38	21	22	88
Henan (1980.04-2007.11)	12	19	0	2	33
Hubei (1981.12-2008.09)	18	29	20	10	77
Hunan (1981.01-2009.12)	23	28	1	76	128
Guangdong (1956.02-2010.11)	15	62	114	193	384
Guangxi (1976.05-2015.05)	22	46	3	7	78
Hainan (1976.06-2006.05)	10	22	6	11	49
Chongqing (1979.04-2009.04)	6	18	0	33	57
Sichuan	30	64	28	46	168

(1963.04-2014.03)					
Guizhou	8	12	16	88	124
(1978.01-2014.01)					
Yunnan	20	38	55	46	159
(1980.03-2014.01)					
Xizang/Tibet	9	14	3	21	47
(1985.09-2010.02)					
Shaanxi	22	31	4	3	60
(1965.09-2011.12)					
Gansu	20	36	0	4	60
(1972.11-2005.12)					
Qinghai	7	4	0	0	11
(1975.08-2005.12)					
Ningxia	9	5	0	0	14
(1982.07-2002.12)					
Xinjiang	11	20	0	0	31
(1980.04-2007.01)					
PRC	427[31]				2740

Table 3.1 Number of nature reserves at different administrative levels, as of November 2016, adapted and cited from "Nature Reserve Directory" (Ministry of Environmental Protection, 2016)

The total number of full-time personnel at all management agencies in the country totaled 45, 000, including 13, 000 professional and technical personnel. Most of these management agencies were affiliated with forestry departments at all levels (for its number, see Table 3.2). More than ten relevant laws, such as the *Environmental Protection Law*, the *Forest Law*, the *Grassland Law*, the *Marine Environmental Protection Law* and the *Wildlife Protection Law*, explicitly required protection for nature reserves. The *1994 Regulation* established a governance structure that integrated the management by environmental departments with the management by specialized departments for forestry, agriculture, land resources, water conservancy, and marine resources. As noted, all these relevant departments successively issued regulations, such as the *Regulation on the Protection of Geological Relics*. Twenty four provinces issued provincial regulations and more than two hundred nature reserves adopted their own rules.

[31] As of May 2018, the number had risen to 474.

Authority	The number of national nature reserve
MEP	36
SFA	325
Ministry of Land and Resources	14
Ministry of Agriculture	16
State Oceanic Administration	14
CAS	1

Table 3.2 Number of national natural reserves under the supervision of different ministries, adapted and cited from "Nature Reserve Directory" (Ministry of Environmental Protection, 2016), compiled by the author

Well into the 2010s, the drawbacks of the nature reserve management system gradually established after the promulgation of the *1994 Regulation* were prominent, which constituted a serious obstacle to the construction of a unified and effective management system of the protected area. It lacked a comprehensive classification system. The provisions on land ownership were imperfect, and the property rights of natural resources were not very clear. The legal status of the management agencies was also not clear. As of the end of 2013, a total of 84 national nature reserves also held the titles of national scenic (and historic) areas, national forest parks, or national geological parks (Zhou, 2015).[32] In other words, some national nature reserve administrations are also national scenic (and historic) area administrations. The responsibilities and authorities of these specialized management agencies overlapped with each other but were not exactly the same. The financial investments in nature reserves were insufficient, especially in prefectural and county level reserves. The punishment for violation of regulations and rules was not detailed, and the regulatory effect was insufficient. Finally, the management system for nature reserves that had been gradually established after the issue of the *1994 Regulation* also lacked specific operational rules in terms of ecological compensation, community co-management, and franchising. Since the late 1990s, the pace of local nature reserve establishment was so fast that sound management had not yet started in most of them (Chen, 2006). A former senior researcher from the Kunming Survey and Design Institute of the SFA recalled:

> Only about 200 of the 428 national nature reserves had reached the strict standard of the IUCN. The actual management situation of local level nature reserves was very poor (Tang, 2016).

In view of these institutional drawbacks, there have been calls for the introduction of a sectoral

[32] For example, *Jiuzhaigou*, which is located in Sichuan, held the title of a national nature reserve, a national scenic and historic area, a national geological park, and a national forest park at the same time.

law on nature reserves. Although revised twice, the *1994 Regulation* still did not have the effect of a sectoral law (Wang, 2011). In 2001, the Environmental and Resources Commission of the NPC began to conduct a series of special investigations on the management of nature reserves. After the investigation, the Commission put forward legislative suggestions to the Standing Committee of the NPC. In march 2003, at the first meeting of the Tenth NPC, 30 deputies to the NPC put forward a proposal to speed up legislation on nature reserves (Wu, 2004). In the same year, some research institutions, such as the School of Environmental Science and Engineering of Peking University, submitted a similar proposal to the former SEPA (School of Environmental Science and Engineering, PKU, 2003). Since there had never been a nature reserve law, the protection of forest resources and wildlife protection in all nature reserves was subject to the *Forest Law of the People's Republic of China* and the *Wildlife Protection Law of the People's Republic of China* (Mei, 2006; Yang & Yang, 2015).

In the past four decades, other types of protected areas were gradually established. Each of them, however, was given its own regulations, rules and technical specifications, further aggravating the management fragmentation of protected areas. In 1982, the central construction department formally began to establish a system of scenic and historic areas, and approved a first batch of 44 national key scenic and historic areas. In September 1982, the forestry ministry officially designated the first forest park -- Hunan Zhangjiajie National Forest Park. A declaration and review mechanism for national geo-parks was set up in August 2000, and 11 national geo-parks were created in April 2001. In 2003, the State Council approved the *National Plan of Wetland Protection Project*. In 2005, Xixi Wetland Park officially became the first national wetland park pilot (Gao et al., 2019).

Scenic and Historic Areas (1982-2017)

Compared to nature reserves, the Scenic and Historic Area (SHA) in China have a shorter history although a relevant management regulation was enacted for them much earlier. In 1982, the State Council approved the first batch of 44 national SHAs. In 1985, the State Council promulgated *Interim Regulation on the Administration of Scenic and Historic Areas* (henceforth, *1985 Interim Regulation*) (Sate Council, 1985). The term "Scenic and Historic Area" (*Fengjing Mingsheng Qu*) in the 1985 *Regulation* referred to an area that has aesthetic, cultural or scientific value, a concentration of natural and anthropological sites, a beautiful environment and is suitable for tourism or for scientific and cultural activities. According to the regulation, the SHAs were divided into three administrative levels-- prefecture or county-level SHA, provincial SHA, and

national SHA. The Ministry of Urban and Rural Construction and Environmental Protection was in charge of the management of SHAs nationwide. It issued implementation rules for the regulation (Ministry of Urban and Rural Construction and Environmental Protection, 1985).

From the very beginning, the construction authority was responsible for the management of this kind of protected area. When government institutions were reorganized in 1988, the management authority of SHA was transferred to the newly-formed Ministry of Construction. In 1994, the central construction department made its first statement on the issue of "national parks" in the form of a "*Lu Pi Shu*" (green paper). The Green Paper entitled *The Situation and Prospects of Scenic and Historic Area in China* (henceforth, *1994 Green Paper*), clearly stated that "China's SHA corresponds to the overseas national park…… The English name of China's National SHA is 'National Park of China'" (Ministry of Construction, 1994). According to the *1994 Green Paper*, scenic and historic resources were divided into two categories: natural resources and human resources. The former includes mountains, rivers, lakes, seashores, islands, forests, flora and fauna, special geology, landforms, caves, fossils, and astronomical meteorology. The main functions of SHA include protecting ecology, biodiversity and the environment, developing tourism and enriching cultural life, carrying out scientific research and cultural education activities to promote social progress, and bringing about economic and social benefits through development. Although national SHAs were the first kind of protected area to try out the title of "national park" in China, national nature reserves were obviously closer to the IUCN's definition of national park.

In March 1995, on the occasion of the tenth anniversary of the implementation of the *1985 Interim Regulation*, the General Office of the State Council issued a notice on strengthening the protection and management of SHAs. In order to stop illegal construction activities, the central government required all localities to refrain from establishing development zones and resorts in SHAs (General Office of the State Council, 1995). In the meanwhile, at the symposium on the tenth anniversary of *1985 Interim Regulation*, the Minister of Construction called for the formulation of a SHA law (Hou, 1995). Hundreds of national SHAs and provincial level SHAs were constructed by different levels of governments in the 1990s and the first half of the 2000s. The *Regulation for Scenic and Historic Areas* (henceforth, *2006 Regulation*) was adopted at the 149th Executive Meeting of the State Council on September 6, 2006. It took effect on December 1 of the same year (State Council, 2006). It adopted the same definition of SHA as the *1985 Interim Regulation*. The central construction department[33] was also made responsible for the supervision and management

[33] On March 15, 2008, the 1st meeting of the 11th NPC approved the *Organizational Reform Plan of the State Council*. The plan stipulated that The Ministry of Housing and Urban-Rural Development (MOHURD) are formed.

of SHAs throughout the country. Other relevant ministries were made responsible for specialized aspects of supervision and management.

Generally, either national or provincial-level SHAs were formed. According to the *2006 Regulation*, if a natural or anthropological site is a good example of a major natural vicissitude or important historic or cultural development, is still basically in a natural or original historic state and is representative of the country, it can apply to become a national key SHA. To establish a national SHA, the provincial government shall submit an application to the central construction department. The latter and the competent departments of environmental protection, forestry, cultural relics and other relevant departments at the central level would review the application and submit the result of review to the State Council for decision. The proposal of a SHA includes the overall plan and operational plan. The making of the planning for national SHA shall be organized by the provincial construction department. The overall plan of the national-level SHA shall be reviewed and approved by the provincial government and then submitted to the State Council for approval. The operational plan for the national SHA shall be submitted to the construction department at the provincial level for review and approval. The *2006 Regulation* also stipulated more detailed penalties that were heavier than the penalties in the nature reserve regulation. The *2006 Regulation* was revised in February 2016 (State Council, 2016a). In the wave of reforms in which the Chinese government streamlined administrative examination and approval matters, approval authority for specific issues (such as construction of cable cars, ropeways and other major construction projects in SHA) was transferred from the central construction department to the provincial construction department level.

The State Council has approved a total of 244 national SHAs (as of March 2017) and 808 provincial SHAs (as of April 2016) in nine batches (China Association of National Parks and Scenic Sites, 2017). Among them, the first to sixth batches were originally called national key SHAs, and in 2007 they were renamed as national SHAs. Zhejiang Province has the most national SHAs (22), and Yunnan Province has the most provincial-level SHAs (54). The number of SHAs in the south was significantly greater than that in the north. The first batch was announced on November 8, 1982, and the ninth batch was announced on March 21, 2017 (State Council, 1982, 1988, 1994, 2002, 2008a, 2008b, 2009, 2012, 2017b, 2018). The NPC has promulgated more than ten laws closely related to the SHA management, such as the *Urban and Rural Planning Law*, the *Land Administration Law* and the *Environmental Protection Law*. The laws provide the legal basis

After 2008, the responsible department is the MOHURD.

for a comprehensive protection and management (NPC, 2007, 2012, 2014).

World Natural Heritage Sites in China (1987- 2018)

In January 1979, the first Sino-US *Scientific and Technological Cooperation Agreement* and *Cultural Agreement* proposed an exchange between China's SHAs and US national parks (Zhang, 2014). China carried out a series of international cooperation activities tied to value research, nomination reporting, resource monitoring, regular assessment, personnel training, protection management, capacity building, and youth education since joining the *Convention for the Protection of the World Cultural and Natural Heritage* in 1985. Such international cooperation not only helped China to gain more world heritage sites, but also improved the management capacity of SHAs. As of July 2018, there were 13 natural heritage sites and 4 mixed heritages in China (Table 3.3). They involved more than 30 national SHAs.

Serial number	**Natural heritage and mixed heritage name**	**Inscribed time and category**
1	Mount Taishan	December 1987, cultural and natural
2	Mount Huangshan	December 1990, cultural and natural
3	Huanglong Scenic and Historic Interest Area	December 1992, natural
4	Jiuzhaigou Valley Scenic and Historic Interest Area	December 1992, natural
5	Wulingyuan Scenic and Historic Interest Area	December 1992, natural
6	Mount Emei Scenic Area, including Leshan Giant Buddha Scenic Area	December 1996, cultural and natural
7	Mount Wuyi	December 1999, cultural and natural
8	Three Parallel Rivers of Yunnan Protected Areas	July 2003, natural
9	Sichuan Giant Panda Sanctuaries - Wolong, Mt Siguniang and Jiajin Mountains	July 2006, natural
10	South China Karst	June 2007, natural
11	Mount Sanqingshan National Park	July 2008, natural
12	China Danxia	August 2010, natural
13	Chengjiang Fossil Site	July 2012, natural

14	Xinjiang Tianshan	June 2013, natural
15	Hubei Shennongjia	July 2016, natural
16	Qinghai Hoh Xil	July 2017, natural
17	Fanjingshan	July 2018, natural

Table 3.3 China's World Natural Heritage and Mixed Heritage List, adapted and cited from "World Heritage List" (UNESCO, 2018)

Excessive commercialization had impacted the management of national SHAs (Ma, 2015; Xie, 2015). Some management agencies had paid too much attention to local economic interests, charged high-priced tickets, and tried every possible means to transfer their management rights to various private enterprises, thus negatively impacting public welfare. Some agencies' illegal construction activities or development decisions had resulted in damage to ecological resources. Some agencies neglected much needed capacity building, others failed to assure management functions were in place, or had insufficient funds to operate effectively. In addition, there had been some large-scale infrastructure projects that were arbitrarily built in or crossed into the jurisdiction of SHAs, with negative impacts for nature conservation. In response to these shortcomings, the MOHURD required some of the national SHAs to carry out management rectification in 2016, 2017 and 2018 (MOHURD, 2016, 2017, 2018). These shortcomings led some experts to call for greater attention to management efforts when establishing national parks (Ma, 2014; Tian & Yang, 2011; Zhou, R., 2016).

3.1.2 Intermittent Trials in Yunnan (2006-2014)

Located in the southwest, Yunnan is the Chinese province with the highest concentration of biodiversity.[34] In the past marketization, Yunnan officials had been committed to transforming their resource advantages into economic benefits. Therefore, the Yunnan Provincial Forestry Department proposed the idea of establishing a national park in the province as early as 1996 (Guo, 2009; Zhao, 2014). However, the central government did not respond positively to this.

[34] The former SFA set up the Kunming Survey and Design Institute in Kunming, the capital of Yunnan Province. It is a bureau-level institution directly under the SFA and also one of the five national forest resource monitoring institutes.

In May 2005, in order to implement a unified management of the Bitahai Provincial Nature Reserve and the Shuduhu Provincial SHA, the government of Diqing Tibetan Autonomous Prefecture established a county-level Bitahai/Shuduhu Area Administration, and put the Shangri-La Forest Ecotourism Company under its administration. In September, the Diqing prefectural government promulgated the *Provisional Rule for the Management of Scenic Spots at Meili Snow Mountain, Bitahai, and Shuduhu*. Meanwhile, under the entrustment of the Diqing government, Southwest Forestry University suggested to the provincial forestry department to re-plan the Bitahai-Shuduhu area and consider building a national park with the characteristics of Tibetan settlements (Ye, 2019).

In early 2006, the Yunnan Provincial Government agreed to establish a national park in the province (Li, Q., 2010). In May, the scenic areas of Bitahai and Shuduhu was renamed Potatso.[35] At the same time, the Diqing government commissioned the Department of Ecological Tourism of Southwest Forestry University to prepare the *Overall Plan of Potatso National Park* and formulate the *Regulation on the Protection and Management of the Shangri-La Potatso National Park in Diqing Tibetan Autonomous Prefecture*. In September, the Yunnan Provincial Forestry Department established the Yunnan's National Park Management Office. In October, the Bitahai/Shuduhu Administration was renamed the Potatso National Park Administration (Preparation).

In June 2007, the Diqing government approved the *Overall Plan of Potatso National Park* (for trial implementation). On June 21, Potatso National Park was officially inaugurated and put into trial operation. This marked the birth of the first protected area in mainland China officially named a "national park" by the provincial government (for its location, see Figure 3.1). On August 31, the Yunnan officials deliberately arranged for Jia Qinglin, the Chairman of the National Committee of the CPPCC, who was investigating the social development of ethnic minority communities in Yunnan, to visit Potatso. In the first three years of its operation, there was no big forest fire caused by large number of tourists, and the ecosystem remained intact and stable (Li, Q., 2010). A professor from the School of Ecotourism, Southwest Forestry University, recalled:

> In the first year of trial operation, Potatso park received 300,000 tourists, generated 120 million yuan in revenue and brought 2,000 jobs in surrounding communities (Ye, 2019).

Two local residents recalled:

[35] Potatso is a transliteration of Sanskrit and the original Tibetan name of Bitahai.

> This park attaches great importance to the integrity of the original ecology. Tourists rarely see traces of human interference. For example, we had repeatedly seen that some huge trees were blown down by strong winds and no one was in charge; there were feces of cows and sheep and the corpses of small animals that had been struck by lightning everywhere (Two workers of Lidi Power Station owned by Huaneng Lancangjiang Hydropower Co., Ltd., 2018;2018).

In May 2008, Diqing prefectural government issued the *Implementation Plan for Potatso National Park Tourism Re-feeding Community Development*. In June, the SFA officially approved Yunnan to carry out the national park policy experiment. Subsequently, Yunnan Provincial Forestry Department listed Potatso park as the province's first national park pilot project (Zhao, 2014). The "Tourism Re-feeding Community" program gave priority to providing jobs to rural community residents and encouraging them to participate in park sanitation, patrol, franchising and other activities. Since 2008, the rural communities that located in the park area have enjoyed an annual per capita fund of 5,000 yuan per year. Diqing government has established an operation model in which the company and the community share dividends (Deng, 2019). A resident and also environmental sanitation manager in Luorong Village, an original Tibetan village in the park area, remembered:

> After I graduated from high school, I became an employee of the Potatso Park. In the past, our family's main source of income was animal husbandry and matsutake picking. Now, we also have a fixed salary income and community subsidies. Our income situation has been greatly improved (Yi, 2019).

Potatso Park built a manor with Tibetan characteristics in Luorong Village to provide visitors with Tibetan folklore dining, accommodation and leisure. Luorong villagers can work in the manor, and the monthly salary is about 2,000 yuan for sanitation and mountain patrol positions.

In 2009, Yunnan Provincial Government prepared and conducted the "*National Park Development Strategy Research of Yunnan Province*" and the "*Yunnan Provincial National Park Development Plan (2009-2020)*" (Tang, 2011; Tang & Sun, 2009). Under the supervision of SFA, Yunnan government intended to expand the pilot projects (Ren, 2018). In addition, the Yunnan's National Park Management Office and the Yunnan Provincial Government's Policy Research Office jointly drafted the *Basic Conditions of National Park* (DB53/T 298-2009) in order to set a benchmark for other provinces in the near future (Zhang, Y., 2016).

Soon afterwards, the State Council issued an instruction that no local government would be allowed to organize new policy experiments in the name of "national park". As of the issuance of this instruction, 7 other pilot projects had been approved by the Yunnan Provincial Government.[36] Given that Yunnan is an economically underdeveloped area, the central government adopted a tolerant attitude towards these trials. The central government did not take further deterrent measures to curb the enthusiasm for "national park" pilots in this remote southwestern province. But, it also did not officially recognize these pilot projects. The acquiesced local policy experiment had not been supported by sufficient policy resources of Beijing.

Nevertheless, before the central government launched the NPS pilot program, the Yunnan government continued to conduct its own experiments in a low profile. In November 2010, the provincial government approved the implementation of the *Master Plan for Shangri-La Potatso National Park in Yunnan*. In 2012, at the Yunnan Tourism Industry Development Conference, a vice governor of Yunnan was still vigorously propagating that "by the end of the Twelfth FYP (2011-2015), Yunnan will have built up 12 national parks" (Li, 2012). The *Regulation on the Protection and Management of Shangri-La Pudacuo National Park in Diqing Tibetan Autonomous Prefecture* was adopted at a meeting of the Eleventh People's Congress of Diqing Prefecture in February 2011. It was approved by the Standing Committee of the Twelfth People's Congress of Yunnan Province in September 2013. In January 2014, the regulation came into force.

3.2 The Blocking Order from Beijing in 2009

In October 2008, the MEP and the former State Tourism Administration jointly launched a "national park" pilot project -- the *Tangwanghe Park* in Heilongjiang Province.[37] The two central departments aimed to introduce concepts and management models of national parks from abroad, so as to expand their voice on this policy issue. However, the State Council quickly suspended this

[36] The 7 parks were-- Meili Snow Mountain, Lijiang Laojun Mountain, Xishuangbanna Tropical Rainforest, Sun River Forest, Baoshan Gaoligong Mountain, Lincang Nangun River, and Honghe Dawei Mountain.

[37] Heilongjiang Tangwanghe Park is located at the southern foot of Xiaoxing'an Mountains. Its scope includes Tangwang River Primitive Forest Reserve and Tangwang River Stone Forest Area. The vegetation coverage in this area is over 99.8%. The coniferous and broad-leaved mixed forest dominated by Korean pine is the most complete and representative original Korean pine forest growth area in Asia.

project in 2009, prohibiting relevant central and local departments from conducting any further "national park" experiments (Tian & Yang, 2011). Before the NPS pilot program, Chinese government formed national nature reserve, national SHA, national forest parks[38], and national geological parks[39] when establishing a natural protected area (Table 3.4).

National level types	**Nature reserve**	**SHA**	**Forest park**	**Geo-park**	**Wetland park**	**Fishery genetic resources reserve**	**Total**
Number	446	225	827	189	98	523	2308
Area (10^4 Hectares)	9,695	11	1251	1199	36	1331	Some of them overlapped
Affiliation	Mainly SFA	MOHURD	SFA	MLR	SFA	Ministry of Agriculture	

Table 3.4 Number and area of different types of national-level nature protected areas, as of the end of 2016, adapted from "The number and area of natural protected area (until the end of 2016)" (Peng, Fan, Xing, & Cui, 2018, p. 317)

In the past six decades, it is the most common to set up a specialized management agency for each protected area. Most of the protected areas were directly managed by a specialized agency of this kind. In addition to the drawbacks mentioned in the previous section, this governance system also had defects involving the territorial dimension (Table 3.5, taking Potatso park as an example). Worse still, the management of resource protection, scientific research and environmental education in most of the protected areas are still in their infancy (Chen & Chen, 2018; Wang, L., Zhuo, J., & Su, Y., 2016; Yang, R., 2017; Zhao & Wu, 2015). Most of the operating funds of these specialized management agencies came from local finances (Qin, 2015). This is the main reason why Yunnan's local experiments can be carried out independently without the recognition and funds from the central government.

[38] The SFA issued a notice on February 28, 2006, deciding to activate the "China National Forest Park Special Sign" from then on, and issued the "Interim Measures for the Use of Special Signs for National Forest Parks in China". As of the end of 2015, there were 826 national forest parks in the whole country. For the complete list of national forest parks, see "National Forest Park Directory (as of the end of 2015)", available at: http://www.forestry.gov.cn/portal/slgy/s/2452/content-862762.html.

[39] As of the end of 2017, China has approved 218 national geological parks to be established (33 of which are include in the World Geo-parks). For more information, see "Geo-park in China", available at: http://www.geopark.cn/garden.

Agency type	Agency name	Related authorities and jurisdictions
Territorial administrative department	Diqing prefectural government	Prefecture administrative jurisdiction
	Shangri-La county government, Jiantang town government	Community administrative affairs, such as family planning, social security, agriculture and animal husbandry development
	Potatso National Park Administration (preparation)	Park planning, community coordination
	Former Bitahai Provincial Nature Reserve Administration[40]	Mountain patrol
Operating Enterprise	Diqing Tourism Development Co., Ltd.	Facility maintenance, tickets, sightseeing cars, cruises, restaurants, shopping, etc.
Other administrative department	Construction department	Planning and management of the provincial SHA
	Environmental department	Provincial nature reserve management
	Forestry department (the Office of Yunnan's National Park Administration)	Forest protection, access to national park
	Tourism department	Tourism market regulation: Potatso AAAA level scenic area

Table 3.5 Management agencies and their jurisdiction in Potatso protected area, adapted from "The Management Authorities in the Potasco Park" (Tian & Yang, 2011)

A deputy director of the Bills Office of the Environmental and Resource Protection Commission of the NPC, recalled:

> By the end of 2011, all protected areas had approached 20% of the country's land area. The area of nature reserves accounted for more than three quarters of it. The management departments involved in protected areas include forestry, environmental, construction, land, agriculture, ocean, water resources, science and technology, education, tourism, traditional Chinese medicine and so on. There were usually two levels of management: central and provincial levels. As for nature reserve, the prefectural and the county levels were also involved. Central and local departments involved in nature reserves were very mixed. The division of their financial responsibilities was not very clear. Therefore, it is difficult for most of the management agencies to carry out patrol management, resource investigation and other necessary activities (Wang, 2018).

[40] In April 2018, it merged with the original Potatso National Park Administration (preparation) to form the official Potatso National Park Administration

3.3 A National Strategy for NPS: Goals and Instruments (2013-2017)

Establishing a NPS was one of the key reform goals proposed by the 3rd Plenary Session of the 18th CPCCC. In the *Decision of the CPCCC on Several Major Issues Concerning Comprehensively Deepening Reform* (henceforth, *2013 Decision*), the CPC pointed out that "(we will) delineate the ecological protection red line; we will unswervingly implement the main functional zoning, establish a territorial space development and protection system… and establish a national park system"[41] (CPCCC, 2013). On April 25, 2015, the *Opinion of the CPCCC and the State Council on Accelerating the Construction of Ecological Civilization* (henceforth, *2015 Opinion*) was officially released (CPCCC & Sate Council, 2015a). In the section "Protecting and Restoring Natural Ecosystems", the central authority called on natural resource departments and environmental departments to "establish a national park system, implement vertical and unified management, and protect the authenticity and integrity of natural ecology and heritage".

In September 2015, the *Overall Plan for the Reform of Ecological Civilization System* (henceforth, *2015 Plan*) was issued by the CPCCC and the State Council. This plan was formulated to enhance the coordination of ecological civilization system, and eliminate the past fragmented governance model. The policy goal of the "*Shengtai Wenming Tizhi Gaige*" (ecological civilization system reform) is to build a relatively complete ecological civilization system consisting of eight sub-systems by 2020, and to promote the modernization of environmental governance capabilities.[42]

The *2015 Plan* put forward specific requirements for establishing a united NPS in the "territorial space development and protection system" part: "It is necessary to reform the system of setting up nature reserves, scenic and historic areas, cultural and natural heritage, geological parks, forest parks, etc. separately by various departments, reorganize the functions of the previous protected areas, and reasonably delimit the scope of national park"; "stricter protection of national parks is

[41] In December 2010 , the State Council issued the *National Plan for Main Functional Zoning*. It is the strategic plan for the development of territorial space (in Chinese, *Guotu Kongjian*). According to it, the term "territorial space" refers to the space under the jurisdiction of national sovereignty and sovereign rights. It is the site and environment for people to live, including land, land waters, inland waters, territorial waters, and airspace.

[42] These eight sub-systems are the natural resource property rights system, the territorial space development and protection system, the spatial planning system, the total resource management and overall conservation system, the paid use of resources and the ecological compensation system, the environmental law enforcement system, the relevant market system, and the (ecological civilization) performance evaluation and accountability system.

required"; "it is necessary not to harm the transformation of aboriginal living and production facilities and natural sightseeing, scientific research, education and tourism. In addition, other development and construction must be prohibited to protect the authenticity and integrity of natural ecology and natural cultural heritage"; "it is necessary to strengthen the guidance of national park pilot projects"; "it is necessary to study and formulate an overall plan for establishing a national park system on the basis of pilot projects" (CPCCC & Sate Council, 2015b).

Establishing a NPS was a clear stated goal for many times. It was part of the proposed territorial space development and protection system. It also involves other requirements of the *2015 Plan*, such as natural resource property rights system, space planning system, and environmental law enforcement system. These three documents indicate that the NPS establishment became a national strategy, and was no longer a local strategy left to provincial and sectoral initiatives as had been the case before. Top-level design was the distinctive feature of this goal (CPCCC & Sate Council, 2015b). This section illustrates the first phase of NPS policy experiment, taking the Three-River-Source program as an outstanding example.

3.3.1 Experimentation Directly Supervised and Followed by Central Authorities (2014-2017)

Before the policy goal was reconfirmed in the *2015 Opinion* and *2015 Plan*, relevant ministries and local governments had begun preparations to launch NPS pilot projects. After the *2015 Plan* was announced, the pace of experimentation began to accelerate. In January 2015, the NDRC and 12 ministries, including the SCOPSR, Ministry of Finance, MLR, MEP, MOHURD, Ministry of Water Resources, Ministry of Agriculture, and SFA, issued the *Pilot Program for Establishing National Park System* (henceforth *2015 Pilot Program*). The policy goal of the *2015 Pilot Program* was in line with the requirements of the *2015 Plan*, which was committed to solving the previous institutional obstacles (Su, 2018; 2019). The *2015 Pilot Program* put forward five tasks: highlight ecological protection, unify management systems, clarify natural resource ownership, establish innovative operation mechanisms, and coordinate local community development.

In the selection of experimental sites, the *2015 Pilot Program* had the following considerations.

The first is representativeness and reproducibility. That is, the policy experience gained through the experimentation should have a demonstrative effect. The second is operability. That is, the pilot area should have a considerable amount of state-owned (forest) land to facilitate the registration and subsequent management of land and other natural resources. Based on these principles, nine provinces and municipalities, including Beijing, Jilin, Heilongjiang, Zhejiang, Fujian, Hubei, Hunan, Yunnan, and Qinghai, were selected to carry out pilot projects. The *2015 Pilot Program* required each pilot province to select one site for a three-year experiment (from 2015 to 2017). In addition, the NDRC issued the *Outline of the Implementation Plan of the National Park System Pilot Program of the NDRC* and the *Key Points for the National Park System Pilot Program of the NDRC in 2015* (Wang, E., 2015). A researcher from the Development Research Center of the State Council who once participated in the review of local pilot projects recalled:

> The *2015 Pilot Program* omitted Sichuan, Hainan, and Guangdong, which have high resource value and also many management problems. This was a pity. The *2015 Pilot Program* also failed to give clear guidance on how to realize unified management of protected areas across provinces, such as *Wuyi Mountain* in Fujian and Jiangxi Province (Su, 2018; 2019).

These were obvious defects, but these were later made up for by the addition of the Panda pilot project (across Sichuan, Shaanxi, and Gansu), the Qilian Mountain pilot project (across Gansu and Qinghai) and tropical rainforest pilot project (in Hainan Island).

From the end of 2014 to the fall of 2017, the central government successively approved ten pilot projects. Under the direct guidance and close tracking of relevant ministries, most have achieved phased results (NDRC, 2017a). First, most of the pilot provinces have integrated previous fragmented management systems, and clarified management departments and agencies. In other words, a vertical and united management of natural resources in most of the pilot areas was realized to some extent. For example, Qinghai Province assigned the management responsibilities that were originally dispersed across the forestry, land, environmental protection, construction, water resources, agriculture and animal husbandry departments to the newly listed Three-River-Source National Park Administration (TRSNPA) in 2016 (Wang & Yang, 2016). A centralized and unified ecological protection planning and law enforcement has been implemented. The relevant personnel and assets of the former Three-River-Source National Nature Reserve Administration were officially integrated into the TRSNPA directly led by the Qinghai Provincial

Forestry Department.[43] Thanks to the high proportion of state-owned forest land, in the Northeast Tiger and Leopard National Park (NTLNP), natural resources are directly controlled by the central government. A specialized management agency was formally established in August 2017 (Gao & Zhang, 2017). This is China's first national park management agency directly managed by the central (forestry) department. Hubei Province established the Shennongjia National Park Administration (SNJNPA) through integrating the protection and management authorities of the former Shennongjia National Nature Reserve Administration, Dajiu Lake National Wetland Park Administration, and Shennongjia Forestry Administration. The SNJNPA took over the management and protection of natural resources in the 1170-square-kilometer experimental area at the end of 2016 (Zhai, 2016b). Fujian Province established a specialized management agency vertically managed by its provincial government-- the Wuyi Mountain (*Wuyishan*) National Park Administration (WMNPA) in 2017. As of September 2017, Zhejiang Province had also partially carried out preparations for the Qianjiang-River-Source (Qianjiangyuan) National Park Administration (Reporter, 2017g; Zhejiang Daily Reporter, 2016). In October 2017, Hunan Nanshan National Park Administration was officially listed and established. The Secretary of Chengbu County Party Committee served as its head. It integrated the authorities of the former Hunan Nanshan SHA Management Office, Jintong Mountain National Nature Reserve Management Office, Chengbu Baiyun Lake National Wetland Park Management Office, and Liangjiang Canyon National Forest Park Management Office (Nanshan National Park Administration, 2019a).

Second, diversified management models have been explored. Economic development and construction programs around pilot areas were required to serve the goal of natural ecosystem protection as much as possible. For example, Jilin Province has strictly regulated contracted business activities in the pilot area-- all expired contracted projects were suspended, and the daily supervision of business projects that have not expired was strengthened, thus improving the living space of the Northeast tigers and leopards (Zhang, K., 2018). Heilongjiang Province has actively carried out field patrols and carried out anti-poaching and field supplementary feeding work in a timely manner to ensure the survival and reproduction of Northeast tigers and leopards in the wild population (Liu, L., 2018). Sichuan Province has suspended the acceptance of the approval of newly declared prospecting rights and mining rights in the core protection areas and ecological

[43] For more information about the TRSNPA, see its official website "Three-River-Source National Park", available at: http://www.qhsjy.gov.cn/. In August 2000, Three-River-Source Nature Reserve was officially established. In January 2003, the State Council approved it as a National Nature Reserve. In 1995, Qinghai Provincial Government designated Hoh Xili area as a provincial nature reserve. In December 1997, the State Council approved it as a national level reserve.

restoration areas of the Panda National Park (PNP), and completed the orderly withdrawal of established mining rights; except for the major infrastructure projects planned by the central and provincial government, the provincial forestry department has suspended the acceptance of approvals for the requisition of forest land and forest logging in core protected areas and ecological restoration areas (Report, 2019). Before the Panda NPS project was launched, Shaanxi Province had carried out field patrol and monitoring work to continuously improve the habitat of the wild population of pandas (Official website of the NFGA, 2020; WWF China, 2006). Facing the situation of the high proportion of collective forest land[44], Zhejiang Province has adopted a replacement method to gradually transform the collective land to the state-owned land (Zhejiang Government, 2015). Fujian issued the *Implementation Plan for the Unified Confirmation and Registration of Natural Resources in the Pilot Area of the Wuyishan National Park System* in March 2017; since then, in-depth renovation of tea hills has been carried out, and 58,000 mu[45] of illegally cultivated tea hills have been removed, and 34,000 mu of afforestation has been completed (North Min Daily Reporter, 2018). Yunnan initiated the registration of natural resource asset ownership in the pilot area, and completed forest and wetland resource surveys during this period (Yunnan Provincial Government Information Office, 2018).

Third, supporting institutional systems have been constructed. Most of the pilot provinces have improved supporting institutional systems based on provincial legislation. A vice president of the Qinghai Provincial School of Governance who had submitted policy recommendations to a vice premier recalled:

> Qinghai Province has officially promulgated the *Three-River-Source National Parks Regulations (Trial)*, completed the *Three-River-Source National Park Overall Plan*, issued ten rules and technical specifications for scientific research popularization, ecological management and protection public welfare positions, franchising, budget management, project investment, social donations, volunteer management, visitor management, international cooperation and exchanges, grassland ecological protection subsidies and rewards (Ma, 2019).

By September 2017, the former SFA and four relevant provinces, had been preparing the implementation program and overall plan for the Northeast Tiger and Leopard NPS pilot program

[44] In China, ownership of state-owned land is exercised by the central government on behalf of the people. Collective land refers to the land collectively owned by farmers, that is, the land collectively owned by a small group of people.

[45] Mu is a unit of urban land area in China. One Mu is about 666.67 square meters, and 15 Mu is equal to one hectare.

and Panda NPS pilot program. The Standing Committee of the Hubei Provincial People's Congress listed the *Regulation on the Management of Shennongjia National Park* as its priority in 2017; and the draft passed the first round of review (Hubei Provincial Government Legislation Office, 2017). A Session of the Standing Committee of the Provincial People's Congress passed the regulation on November 29, 2017[46] (Qiao, 2017). Zhejiang formulated and implemented the *Administrative Rule for Mountains, Waters, Forests, Fields, and Rivers in Qianjiangyuan National Park*, set up an environmental resource circuit court, and conducted out-of-service audits of natural resource assets for town level cadres (Shen & Wu, 2017). Fujian issued the *Financial System Plan for the Wuyishan National Park Pilot Area*, and made the WYMNPA the provincial-level budget unit (Office of Fujian Provincial Financial Department, 2018). In the pilot area, the revenue from entrance tickets of SHAs, the franchise revenue from bamboo rafts and sightseeing cars, and the revenue from resource protection fees were directly incorporated into provincial finances (Cai, 2020; NDRC, 2017a).

Fourth, better community development has been realized in some of the pilot areas. In combination with the targeted poverty alleviation strategy, Qinghai created 7,421 public welfare posts of ecological management and protection ("*Shengtai Guanli Baohu*"). Each registered poor household got at least one post. These posts allowed poor herders to participate in the ecological protection while sharing the protection dividends, so that they gradually transform from grassland users to ecological guardians (Yang, J., 2017). Sichuan, Shaanxi, Gansu, Jilin, and Heilongjiang have respectively compiled implementation plans for the resettlement of residents within the pilot areas; the scattered settlements were concentrated in order to support the development of alternative livelihoods (NDRC, 2017a). The Joint Protection Committee established by Fujian preferentially selected and hired the relevant service personnel from local villagers; during the drafting of the *Wuyishan National Park Management Regulations*, the Committee organized several times of community forums (Wang, W., 2017). Hubei has used the grid management community to preferentially hire community residents in Shennongjia National Park as forest rangers, sanitation workers and other ecological management and protection personnel (Zhai, 2016a).

[46] It was officially implemented from May 1, 2018.

3.3.2 Two Examples

Two very different examples are outlined below, but they both reflect the strictness and verticality of this NPS experimentation.

Potatso Pilot Project

One year after the announcement of *2015 Pilot Program*, the *Regulation on the Management of National Park in Yunnan* was implemented on January 1, 2016. This was the country's first provincial regulation on national park matters. Through May 2016, another five "national park" pilot projects were approved by Yunnan provincial government.[47] However, only Potatso was eventually selected for a NPS pilot project. A researcher from The Nature Conservancy (TNC) recalled:

> Other local projects were embarrassingly becoming "*Zijian Zipi de Guojia Gongyuan*" (the "national parks" built and approved by provincial government). Some of them had been assisted by international environmental organizations, such as our TNC (TNC, 2016).

These local experiments, which were launched and led by the Yunnan Provincial Government, received some support from the former SFA. Nevertheless, there was little support from NDRC, the original organizer of NPS program. A middle level official in the Yunnan Provincial Forestry Department (Yunnan Province's National Park Office) recalled:

> As the central government has not clarified the approval procedure and management authority of national parks, and issued top-level design, there was nothing wrong ("*Bing Wu Bu Tuo*") with the local government approving these pilot programs (Zhao, 2017).

Ten NPS pilot projects were successively approved from the end of 2014 to mid-2016. In March 2015, the Yunnan Provincial Government applied to the NDRC to list Potatso Park as a NPS pilot project. In the first round of review, the NDRC did not agree to Yunnan's application. Experts who participated in the review revealed that Yunnan's proposal was criticized by experts as it proposed excessive economic development through tourism (Zhao, 2016). A researcher at the Development

[47] Another pilot projects were Baima Snow Mountain, Zhaotong Dashanbao, Chuxiong Ailao Mountain, Dulong River and Nujiang Grand Canyon.

Research Center of the State Council, who participated in the review, recalled and argued:

> Some local governments valued the title of "national park", arbitrarily developed tourism under this name, which was far from the requirements of the NPS pilot program. National park administration's daily management cannot be transferred to private enterprises (Su, 2018; 2019).

At last, the Potatso Proposal was officially approved in October 2016. The leaders of the NDRC finally made a compromise and argued that Yunnan could explore a model that suits its economic and ecological conditions.

From then on, the Potatso project faced a huge challenge of "re-starting". That is, to overturn the management model that had been formed earlier. In summary, the Potatso project has gone through two stages: a local government-led project from 2008 to 2015; and a NPS pilot project led by the central departments after 2015. In 2016, Yunnan established a leading group for the NPS pilot project, composed of the executive vice governor and heads of 13 relevant provincial departments (Yang, 2019). In early 2017, the Yunnan Provincial Government issued the *Key Task Decomposition Plan for the Potatso NPS Pilot Program*, which aimed to transform the Potatso project in strict accordance with the *2015 Pilot Program* (Tang, F., 2019). Based on the 141-square-kilometer Bitahai Provincial Nature Reserve, the new park expands its protected area to 602 square kilometers (Yang, 2019). At the first phase of NPS experiment, the Potatso project has begun to integrate the authorities and responsibilities scattered in the former provincial nature reserve management agency, provincial SHA management agency and other local departments of Diqing Prefecture.

Three-River-Source Pilot Project

The headwaters of the three big rivers (namely, the Yangtze River, the Yellow River and the Lancang River) are highly important for fresh water provision in the Chinese mainland. The Three-River-Source (*Sanjiangyuan*) area is highly sensitive to global climate change and one of the priority areas for ecosystem conservation. Nearly one year after the *2015 Pilot Program* was announced, on December 9, 2015, the 19th meeting of the CLGCDR reviewed and approved the *Three-River-Source National Park System Pilot Program* (henceforth *Three-River-Source Pilot Program*). This document was prepared by NDRC, SFA and Qinghai Provincial Government (Reporter of Xinhua Agency, 2015b). The *Three-River-Source Pilot Program* intended to build

this national park into a demonstration zone for ecological protection and restoration of the Qinghai-Tibet Plateau, and a natural conservation display and ecological cultural heritage zone. The *Three-River-Source* pilot project delineated 123,100 square kilometers from the entire 395,000-square-kilometers Three-River-Source area to carry out the NPS experiment. This is a sparsely populated area, which is also the jurisdiction of the former Hoh Xili National Nature Reserve. The projected area covered 4 counties, 12 towns, 53 villages, 17,211 households with 61,588 people, of which 24,000 were registered poverty-stricken people. [48]

Two days later, Luo Huining, the secretary of Qinghai Provincial Party Committee, presided over a high-profile meeting of the Standing Committee of the Provincial Party Committee to deploy the pilot project (Report of Qinghai Daily, 2015).[49] In the meeting, the provincial officials set up a leading group (and an affiliated office) for the *Three-River-Source Pilot Program*. The secretary and the provincial governor served as the group monitors. They made a roadmap and timetable intended to speed up the preparation of implementation plans.

On March 5, 2016, the General Office of the CPCCC and the General Office of the State Council issued the *Three-River-Source National Park System Pilot Program* (Reporter of Xinhua Agency, 2016b). Three-River-Source National Park was to include three branches, i.e. Yangtze River Source Park, Yellow River Source Park and Lancang/Mekong River Source Park (Reporter of Xinhua Agency, 2016b). On March 10, General Secretary Xi stressed at a deliberation process of the Qinghai delegation in the 4th Session of the 12th NPC: "We must do a good job in the Three-River-Source NPS pilot, coordinate the promotion of ecological engineering, energy conservation and emission reduction, environmental remediation, beautiful urban and rural construction, and build a national ecological security barrier" (Reporter of Xinhua Agency, 2016a).

On April 11, the Qinghai Provincial Party Committee and Qinghai Provincial Government jointly issued the *Opinion on the Implementation of the Three-River-Source National Park System Pilot Program*. The document proposed a timetable, that is, construct the institutional framework in one year, complete the pilot task in two years, and build up the national park in five years. It further identified 31 key tasks in eight domains, and finalized relevant operating agencies (Xing, 2017;

[48] The four counties are Maduo County in the Guoluo Tibetan Autonomous Prefecture, and Zaduo County, Qumalai County, Zhiduo County in the Yushu Tibetan Autonomous Prefecture.

[49] After his retirement, Luo Huining, known for keeping up with the supreme leader, was appointed as the director of the Central Government's Liaison Office in the Hong Kong Special Administrative Region (SAR), responsible for the interaction between Beijing and Hong Kong during a tense international political situation. This fully reflects the trust of the supreme leader in him.

Zhang, Y., 2017).

Three days later, the Provincial Party Committee and the Provincial Government held a mobilization meeting, deployed the pilot tasks and started the policy experiment in full (Zhang, H., 2016a). The main leaders of Qinghai authority attended the meeting. Secretary Luo stressed that "strengthening leadership…to adhere to the problem-oriented principle and form a work force" (Zhang, H., 2016a). The Provincial Governor restated focal points of the *Three-River-Source Pilot Program*. The Qinghai authority treated this NPS project as the Number One project of 2016 in Qinghai. They determined that a standing member of provincial party committee serve as the executive deputy monitor of the leading group. Detailed implementation plans for the three branch parks were also issued.

On May 11, the *Three-River-Source National Park Management Agency Setting Plan* was promulgated. The provincial government successively transferred 354 civil servant positions from provincial level agencies, relevant prefectures, and counties to form a specialized agency -- the TRSNPA. This agency integrated the management authorities of the former national nature reserve, water conservancy scenic spot, and internationally important wetland. In addition, other management and protection authorities, such as natural resource asset management, ecological protection planning, and environmental law enforcement, were also incorporated into the TRSNPA.

On June 7, the TRSNPA was openly and officially listed. Simultaneously, the management committees and offices of the three branch parks were also listed. This marked the birth of a brand-new ecological management institution in China (Report of Qinghai Daily, 2016a). In July, the provincial government launched a policy experiment of "public welfare post for ecological management and protection" in the pilot area. This experiment was fully rolled out by early September. As abovementioned, Qinghai's different levels of governments combined the NPS pilot tasks with the promotion of a targeted poverty alleviation strategy, setting up 7,421 new ecological management and protection posts. These posts and the original 2,554 forest and wetland management and protection posts together constitute the herdsman's ecological management and protection team. The number of posts reached 9,975 at the end of 2016. A middle-level officer of a prefecture government in Qinghai recalled:

> They received a monthly salary of about 2,000 yuan, an increase of more than 20,000 yuan a year in their

income, and their lives were greatly improved (Li, L., 2018).

Relying on these posts, a grid-based long-term inspection mechanism was established. A three-level management system (namely, town management and protection stations, village management and protection teams, and village team sections) was formed (Ma, 2016). A rank-and-file officer of the Ministry of Culture and Tourism who visited the pilot area several times recalled:

> In the park, you can see that the number of herders has decreased. But it seems that there are some guards who patrol the mountains everywhere. Under normal circumstances, they will not interrupt you to travel around and take pictures, unless you do things that destroy the natural environment (Fu, 2018).

The personal intervention and direct instructions of the General Secretary accelerated the progress of the Three-River-Source project. This was an advantage that Potatso project did not have. At the end of August, Xi came to the park area to inspect the policy experiment. He reemphasized that the wealth of Qinghai is in its ecological condition, and Qinghai officials' greatest responsibility is ecological protection. He required Qinghai government to give ecological civilization construction a prominent position (Reporter of Xinhua Agency, 2016c). At this key juncture, the visit of the supreme leader demonstrates that Three-River-Source park is the first true national park, in contrast to the previous local and sectoral trials in Yunnan and Heilongjiang. The recognition given to the park by the supreme leader constitutes the most distinctive feature of the NPS pilot program that distinguishes it from other concurrent environmental experiments.

Each step of this NPS pilot project was achieved under the direct interventions of the provincial party committee and the provincial government. In early September, Wang Guosheng, the newly appointed secretary of the provincial party committee, went deep into Yushu Prefecture to examine experimentation and rural community development. He mobilized the local cadres and emphasized that it is necessary to keep high standards, and "make Three-River-Source National Park a business card for China" (Zhang, H., 2016b). Afterwards, he presided over a meeting of the NPS program leading group on September 14. The Governor also attended this meeting where the image of Three-River-Source National Park was selected, the implementation of "public welfare positions for ecological management and protection" were primarily examined, and the drafts of ten detailed management rules and specifications were reviewed (Report of Qinghai Daily, 2016b). On September 26, the SCOPSR approved the *Three-River-Source National Park Management*

Agency Setting Plan. This new institutional set-up was accepted.

On October 19, Wang again hosted a leading group meeting. The Governor also attended. They discussed the *Three-River-Source National Park Overall Plan (2016-2025)*, the *2017 Infrastructure Project Proposal*, the proposal for establishing Three-River-Source National Park Research Institute and personnel training, and other task reports (Report of Qinghai Daily, 2016c).

On June 2, 2017, the 34th meeting of the Standing Committee of the 12th People's Congress of Qinghai Province passed the *Three-River-Source National Park Regulation (Trial)* (henceforth, *Three-River-Source Regulation*). It took effect on August 1, 2017 (Qinghai Provincial People's Congress, 2017). The *Regulation* detailed provisions along six aspects: management system, planning and construction, resource protection, utilization management, social participation, and legal liability. Article 4 stipulates that the natural resources of this national park are to be owned by the central government and shared by all the people. According to the *Three-River-Source Regulation*, the provincial government is to apply to the central government for the funds required for protection, construction and management. Therefore, a centralized and hierarchical management is to be implemented in this national park.

In the local management system, the TRSNPA serves as the main body, the three management committees of the three branch park serve as the supporting system, and the protection and management stations serve as the base point. The TRSNPA is to perform the duties of natural resource management and land use control in a unified manner. The management committee of each branch park is the branch of the TRSNPA. And each management committee contains several protection and management stations. The three management committees are exclusively responsible for the control of land use in their own jurisdiction, and are responsible for natural resource management, ecological protection, franchising, social participation, publicity and promotion in their own jurisdiction. The protection and management station undertakes the responsibilities of grass-roots ecological management and protection. Moreover, the prefecture government where the national park is located is responsible for coordinating and promoting the protection, construction and management of national park within its jurisdiction. The county government where the national park is located is responsible for the overall coordination of economic and social development, public services, social management, and market supervision within its jurisdiction. The town governments in the national park are to perform the duties of the protection and management station. The villagers' committees in the national park are to cooperate

with the station. The administrative responsibility for natural resource asset management and ecological protection of the county government where the national park is located was transferred to the TRSNPA.

The specialized national park management agency is to uniformly exercise the authority over previous protected areas within its jurisdiction. A comprehensive law enforcement agency for resources and environment was established to undertake forestry, land, environment, and grassland supervision, fishery administration, water resource management, water and soil conservation, and river management in the park area. All local agencies are to cooperate with the establishment of a system of public welfare posts in ecological management and protection.

As of 2018, the "one household, one post" system of ecological management and protection in the province had been fully realized. A total of 17,211 ecological management and protection staff members had been employed. The average annual income of these staff members was 21,600 yuan. The annual subsidy reached 372 million yuan. The subsidy funds needed were provided by provincial finances. The relevant management agencies cooperated with China Pacific Insurance Company (Group) Co., Ltd. to donate personal accident insurance to these grassroots staff members.

3.4 Expansion of Pilot Projects during the First Phase: Consciously Increase Representativeness (2016-2017)

Northeast Tiger and Leopard Project and Panda Project

According to the *2015 Pilot Program*, the pilot provinces were to select sites and submit the well-prepared pilot documents to the NDRC for further decisions before the end of July 2015. Moreover, some of the pilot projects that span provinces needed to wait for final approval by the CLGCDR. Almost all pilot provinces, however, lagged behind this timetable. In May 2016, the *Northeast Tiger and Leopard National Park System Pilot Program* was submitted to the NDRC. In August, Sichuan, Shaanxi and Gansu jointly handed in the *Panda National Park System Pilot*

Program. On December 5, the CLGCDR approved the *Panda National Park System Pilot Program* and the *Northeast Tiger and Leopard National Park System Pilot Program* on its 30th meeting (Reporter of Xinhua Agency, 2016d). These two cross-province pilot programs were deliberately submitted to the CLGCDR for approval. Only by issuing them in the name of the highest authority can possible local and departmental resistance be minimized.

Half a year later, the 36th meeting of the CLGCDR approved the *Qilian Mountain National Park System Pilot Program* on June 26, 2017 (Reporter of Xinhua Agency, 2017). This was only three months before the end of the first phase. Although Gansu Province was not a pilot province in the *2015 Pilot Program*, Qilian Mountain has obvious ecological significance.[50] It provides a northern barrier which protects the ecological security of the Qinghai-Tibet Plateau and the Three-River-Source area. In order to strength the ecosystem conservation and environmental governance in the vast Northwest area, relevant central departments applied to the highest authority to include the Qilian Mountain area in the pilot project of the NPS.

Qilian Mountain Pilot Project

From November 30 to December 30, 2016, the Seventh Central Environmental Protection Inspection Group conducted inspections for Gansu Province (see Appendix III). In order to attract attention from the central inspection group, two experts in ecology at the Northwest Institute of Eco-Environmental Resources of the CAS seized the opened window of opportunity to publish a newspaper article on *China Daily*. In January 2017, the newspaper article entitled "*Two Doctoral Supervisors Majoring in Ecology Ask Questions about the Ecological Protection of Qilian Mountains*" was widely spread on the Internet (Feng & Liu, 2017). According to this article, the large scale ecological destruction of the Qilian Mountains began in the late 1960s, with deforestation and illegal logging at the 1970s, mining in the 1980s, and small hydropower development in the 1990s. "The damage caused by mining and hydropower development has not yet been fully restored", and "the previous damage and the current threats are still prominent" (Feng & Liu, 2017). These two professors earnestly called on the central government to strengthen top-level design to resolve these long-term problems.

[50] The Qilian Mountain is one of the main mountain ranges in northwest China. It is 800 kilometers long from east to west, and has an altitude of 4000 to 6000 meters. There are more than 3000 glaciers in total, covering an area of about 26.53 thousand square kilometers. The former Qilian Mountain National Nature Reserve governs the water source of Hei River, Shule River, and Shiyang River that created the Hexi Corridor Oasis. The Hexi Oasis constitutes a barrier to the south invasion of the two deserts-- Badain Jaran and Tengger. The Qilian Mountain National Nature Reserve Administration, the Northwest Institute of Eco-Environmental Resources of the CAS, and the Qilian Mountain Water Conservation Forest Research Institute of Gansu Province were established to protect and research the natural resources here.

In response, the central inspection group conducted another specialized inspection on the Qilian Mountains area from February 12 to March 3, 2017. Four prominent aspects of ecological and environmental damage were identified: 1) the serious problem of illegal exploitation of mineral resources, 2) the illegal construction and operation of small hydropower facilities, 3) the problem of secretly discharging waste by surrounding enterprises, and 4) the ineffective rectification of previous outstanding problems. To make matters worse, the central inspection group also found that the rectification plan submitted by the Gansu provincial government in 2015 deliberately concealed 31 prospecting and mining projects; as of the end of 2016, there were still 72 production facilities that had not been cleaned up in accordance with the previous instruction of central government.

On April 13, the central inspection group gave feedback to the Gansu Provincial Party Committee and Gansu Provincial Government, arguing that "the ecological damage in Qilian Mountain nature reserve[51] is serious, and illegal mining and prospecting projects should be resolutely removed" (Liu, 2017; Zhang, K., 2017). Meanwhile, the inspection group reported the inspection results to the Office of the Central Environmental Protection Inspection (i.e. the MEP). And then MEP submitted this report to the State Council and the Secretariat of the CPCCC. The central leadership in charge of environmental affairs had generally expressed concern about this situation. In June, the Central Political Bureau of the CPC decided to punish relevant local leaders in Gansu in terms of party and government discipline. On July 20, the General Office of the CPCCC and the General Office of the State Council issued a circular on this incident involving Qilian Mountain National Nature Reserve (Reporter, 2017c). In the next six months or so, in accordance with the decision of the Central Commission for Discipline Inspection of CPC, a total of 100 local cadres were held accountable for the ecological and environmental damages in Qilian Mountain National Nature Reserve. These cadres included 3 provincial leaders, 21 prefectural level leaders, and 44 county level leaders; among them, 39 were given party disciplinary sanctions, 31 were government disciplinary sanctions, and 2 were transferred to judicial organs[52] (Report, 2018).

[51] The Qilian Mountain National Nature Reserve in Gansu Province was approved by the State Council in 1988. In 1997, the Gansu Provincial People's Congress promulgated the *Regulation on the Qilian Mountain National Nature Reserve in Gansu Province*. After three revisions, some provisions of this regulation were still inconsistent with the *Regulation of the People's Republic of China on Nature Reserves*. This regulation deleted the ban on logging, grazing, fishing, medicine, mining, quarrying, and sand digging in nature reserves.

[52] The three punished provincial leaders are Yang Zixing, then Vice Governor; Li Rongcan, a Standing Committee Member of the Provincial Party Committee (from May 2015 to November 2016, he served as the Vice Governor in charge of environmental affairs) and Luo Xiaohu, the Deputy Director of the Standing Committee of the Provincial People's Congress (from January 2014 to January 2015, he served as the deputy governor in charge of land development affairs). In addition, from January to October 2017, the procuratorates at all levels in Gansu Province approved the arrest of 16 people involved in 8 crime cases and recommended the administrative law enforcement agencies to transfer 30 people involved in 23 crime cases; and the public security organs investigated 15 people

As early as 2008, the Qilian Mountain area was identified by MEP as the ecological functional zones of water resource conservation (Office of Gansu Qilian Mountain National Nature Reserve Administration, 2016). As a matter of fact, in September 2015, the MEP and SFA had conducted an open interview with Gansu Provincial Forestry Department and relevant prefectural government on the prominent ecological problems. More importantly, General Secretary Xi had instructed that rectification must be carried out immediately. In May 2016, Gansu provincial officials once checked the follow-up rectification of ecological problems, but did not deal with illegal projects and crime cases. In the history of China's environmental governance, such large-scale inspection with high profile was "unprecedented" (Beijing News, 2017).

Different Progress in the First Phase

At the very beginning of NPS experimentation, experimental sites were selected without fully considering geographical and ecological representativeness. Later, the central government intended to increase the representativeness of pilot projects in order to increase the effectiveness of this policy experiment. The ten sites were finalized by the summer of 2017 (Figure 3.1). They had made different progress at the first stage (Huang et al., 2018). Among them, three were progressing smoothly. As noted, the Three-River-Source project had basically completed the experimental tasks proposed in its implementation plan. Although the Potatso project was approved relatively late, the relevant departments of Yunnan Province had made rapid changes to it in accordance with new requirements. Most of the experimental tasks in *Shennongjia* pilot project were rolled out. In August 2014, the Shennongjia Forestry District submitted a report to the Hubei Provincial Government and the NDRC to apply for a NPS pilot project. In May 2016, the NDRC agreed the *Implementation Plan of Shennongjia National Park System Pilot Program*. In November, the Shennongjia National Park Administration, which is directly controlled by the Hubei Provincial Government, was established.

Other three had been slightly lagging behind. Some of the experimental tasks in the *Wuyi Mountain*, *Qianjiangyuan*, and *South Mountain*, such as franchising, natural resources ownership confirmation and registration, and diversified funding mechanisms, were difficult to advance. In 2016, the *Implementation Plan of Qianjiangyuan National Park System Pilot Program* was approved by NDRC. By the September 2017, Zhejiang had approved the establishment of the

involved in 14 crime cases.

county-level Qianjiangyuan National Park Management Committee. In July 2016, the NDRC formally approved the *Hunan South Mountain National Park System Pilot Program*. As of the fall of 2017, the Nanshan National Park Administration had also been set up. By the end of the first stage, the WMNPA was established. National park management stations, which are the six branches of WMNPA, were set up in the 6 towns respectively in pilot area. Town chief concurrently served as the head of the management station.

Land ownerships in the pilot areas of the *Northeast Tiger and Leopard*, *Panda*, and *Qilian Mountain* were very complicated. These three projects started relatively late. In January 2017, the *Panda NPS Pilot Program* was issued. In May, the NDRC issued the *Letter on Promoting the Panda NPS Pilot Project*. In July, the *Summary of the "Quadruple Consultation" of the Panda NPS Pilot Program* was formed. In April 2017, the SFA appointed the head of the preparatory group for the specialized management agency of Northeast Tigers and Leopards project. In August, the Northeast Tiger and Leopard National Park Administration was listed and established. In September, its 10 branches were established. The Administration signed a responsibility contract for protecting tigers and leopards with each branch. The progresses of these three projects were slow, and most proposed tasks of them need to be completed in the second phase (2018-2020) (Huang et al., 2018).

Last, as the Beijing Municipal Government had been having difficulty promoting coordination between cultural and natural resources departments, the Beijing Great Wall pilot project made no obvious progress at this stage. It was terminated at the second phase in November 2018. Finally, it was transformed into a pilot project of "national cultural park"[53] (He, 2019).

[53] On December 5, 2019, the CPCCC and the State Council issued the *Plan for the Construction of the Great Wall, the Grand Canal, and the Long March National Cultural Park*.

Figure 3.1 Ten NPS pilot projects at the first phase, as of the fall of 2017, cited from "National Park Forum Opens in Northwestern Chinese City" (CGTN Graphic, 2019)

3.5 Institutional Reorganization and Site Adjustment at the Second Phase: Continuously Increase Representativeness

According to the timetable, the NDRC, which led the institutional reform, summarized the experience of the first phase in the autumn of 2017 and deployed the tasks of the second phase. In September 2017, the General Office of the CPCCC and the General Office of the State Council jointly issued the *Overall Plan for Establishing a National Park System* (henceforth, *2017 Overall Plan*) (General Office of the CPCCC & General Office of the State Council, 2017). The *2017 Overall Plan*, which was prepared by the NDRC, identified four aspects that need to be improved

in the second stage: continue to unify fragmented authorities; strengthen protection of natural ecosystems; promote coordinated development of local (rural) community, and improve legal system (General Office of the CPCCC & General Office of the State Council, 2017). The central government required all localities not to launch additional NPS pilot projects by themselves. The policy goal of the second phase is to build up a "unified, standardized and efficient" NPS; "effectively protect the authenticity and integrity of important national natural ecosystems"; and "form a new system and mechanism for the protection of natural ecosystems". By 2021, the pilot tasks had basically been completed[54] (for their progress at this phase, see Table 3.6).

Pilot project and relevant regulation	**Main institutional progress**
Three-River-Source, Three-River-Source National Park Regulation (Trial, adopted in June 2017)	It is the largest NPS pilot project. In December 2017, the Provincial Party Committee continued to resolve issues such as immigration resettlement, infrastructure construction, and mining rights withdrawal, and strengthened communications with national ministries. On January 12, 2018, the NDRC issued the *Three River Source National Park Overall Plan*, which was approved by the State Council (NDRC, 2018). In April 2018, two provincial technical specifications, the *Three-River-Source National Park Logo* and *Three-River-Source National Park Standard System Guidelines* were officially approved (Song, 2018).
Panda	The project aimed to improve the construction of corridors for panda habitats, connect isolated habitats, and realize genetic exchange between isolated populations. In December 2017, the *Implementation Plan for the Panda NPS Pilot Program* was issued. In October 2018, the Panda National Park Administration was established in Chengdu, Sichuan.[55] Subsequently, its three sub-administrations were also established. In April 2019, the *Responsibilities of the Management Agency of the Panda National Park* and the *Division of Tasks for the Panda NPS Pilot Project (2019)* were approved. In October 2019, the *Master Plan for the Panda National Park* was publicly solicited for comments and suggestions (Panda National Park

[54] On October 12, 2021, President Xi announced at the 15th Conference of the Parties to the Convention on Biological Diversity that China had officially established the first batch of national parks, including the Three-River-Source, the Panda, the Northeast Tiger and Leopard, the Hainan Tropical Rainforest, and Wuyi Mountain. In 2021, five pilot projects had completed the NPS experiment.

[55] The 27,134 square kilometer pilot area involves Sichuan, Gansu and Shaanxi, of which the Sichuan part accounts for 74%.

	Administration, 2020).
Northeast Tiger and Leopard	This project is located in the junction of Jilin and Heilongjiang, with a total area of 14,600 square kilometers. The Siberian leopard was listed as one of the most endangered species by the IUCN.[56] In October 2017, the *Master Plan for Northeast Tiger and Leopard National Park (for comments)* was announced. In 2018, the management and protection regulations of state-owned natural resource assets, and the *Management Rule for Northeast Tiger and Leopard National Park* were formulated (Northeast Tiger and Leopard National Park Administration, 2020; 2019; 2018).
Shennongjia, Regulation on the Protection of Shennongjia National Park (adopted in November 2017)	Located in northwestern part of Hubei, it has a subtropical forest ecosystem and a peat moss wetland ecosystem. The sanctuary is known as the green miracle of 31° north latitude. The *Regulation on the Protection of Shennongjia National Park* came into effect on May 1, 2018.
Qianjiangyuan	It is located in Kaihua County. The 252 square kilometer pilot area, which is the habitat of valuable wild animals, such as white-necked long-tailed pheasant, and black pheasant, involved the *Gutianshan National Nature Reserve*, *Qianjiangyuan National Forest Park*, and *Qianjiangyuan Provincial SHA*. In October 2017, the *Master Plan for the Qianjiangyuan National Park System Pilot (2016-2025)* was approved by provincial government. In the next year, the *Management Measure for Mountains, Waters, Forests, Fields and Rivers in Qianjiangyuan National Park* and *Qianjiangyuan National Park Standard System* were issued (Qianjiangyuan National Park Administration, 2018).
South Mountain	The pilot area covers 635.94 square kilometers. In 2018, the *Ecological Reconstruction and Exit Implementation Plan of Small Hydropower*, *Mining Rights Exit Implementation Plan*, *Ecological Resettlement Implementation Plan*, and *Implementation Plan for the Circulation of Collective Forest Management Rights* were issued. In March 2019, provincial government issued the *List of Administrative Authorities of Hunan Nanshan National Park Administration (Trial)* (Nanshan National Park Administration, 2019b).
Wuyi Mountain, Wuyi Mountain	The 982.59 square kilometer pilot area involved the *Wuyi Mountain*

[56] From 1998 to 1999, a joint survey conducted by experts from China, Russia and the US shown that there were only 12-16 Siberian tigers and 7-12 Siberian leopards here. From 2012 to 2014, Beijing Normal University and Jilin Provincial Forestry Department discovered through infrared equipment monitoring that the number of Siberian tigers had risen to 27 and the number of Siberian leopards had risen to 42.

National Park Regulation (for Trial Implementation, adopted in November 2017)	*National Nature Reserve*, *Wuyi Mountain National SHA* and *Jiuqu River Upstream Protection Zone*.[57] *Wuyishan National Park Regulation (Trial)* came into effect on March 1, 2018. The *Interim Rule for the Management of Franchising of Wuyi Mountain National Park* and the *Master Plan for Wuyi Mountain National Park* have all been put in place.
Beijing Great Wall	The pilot area covers 59.91 square kilometers, and the total length of the Great Wall included is 27.48 kilometers. It was based on the previous *Badaling-Mingling SHA (Yanqing part)*. The project aimed to achieve the goal of coordinated development of historic and natural resources. In August 2016, the NDRC formally approved the pilot project. Subsequently, the *Beijing National Park System Pilot Work Division*, the *Implementation Plan for the Unified Confirmation and Registration of Natural Resources in the Pilot Area (Preliminary Draft)*, and the *Master Plan for the Pilot Area of the Great Wall National Park System* were formulated. But, the project was terminated in November 2018 (Tang, 2020).
Potatso, Regulation on the Management of National Parks in Yunnan Province (Draft, adopted in December 2015)	As of April 2018, the merger and integration of the former Potatso National Park Administration (Preparation) and the former Bitahai Provincial Nature Reserve Administration had been completed, and their management authorities and staff members had been incorporated into the newly established Shangri-La Potatso National Park Administration. In May 2018, the protection infrastructure construction project in Potatso was launched. In September 2019, the *Implementation Opinion of the Yunnan Provincial Government on Implementing the Overall Plan for Establishing a National Park System* was issued. In February 2020, the Potatso National Park Administration was officially put under the new Provincial Forestry and Grass Department. In April 2020, the provincial government approved the implementation of the new *Overall Plan of Potatso National Park*.
Qilian Mountain	The pilot project covers 50,200 square kilometers. In February 2018, the SFA and the two provincial governments issued the *Implementation Plan of Qilian Mountain National Park System Pilot Program*. Relying on the Office of the Forest Resources Supervision Commissioner of SFA (Xi'an), the Qilian Mountain National Park Administration was established. The two Provincial Forestry Departments are its two branches. In 2018, the National

[57] In 1979, Wuyi Mountain was listed as a national nature reserve by the State Council under Deng Xiaoping's personal instructions, see Zhu (2020).

	Forestry and Grass Administration and two provincial governments set up a leading group for the pilot program. By the end of 2019, the Administration had formulated a series of trial rules, including industrial access list, franchise management, natural resource file management, construction project supervision and management, and national-owned natural resource management. By the mid-2020, the *Qilian Mountain National Park Regulation* had been awaited final approval; the two provinces had allocated nearly 3 billion yuan of funds from central and provincial finances for the ecological protection and restoration; the *Master Plan for Qilian Mountain National Park (Trial)* had been issued; and a total of 2,425 rangers and 1,036 village-level administrators had been employed in the Gansu area.

Table 3.6 Main institutional progress of each NPS pilot project at the second stage, as of the mid-2020, compiled by the author

Birth of the National Park Administration

In the second phase, the central government gradually transferred the dominant power of NPS program to the National Forestry and Grassland Administration (NFGA), an expanded version of the SFA. In February 2018, the 3rd plenary session of the 19th CPCCC approved the *Decision of the CPCCC on Deepening the Reform of the Party and State Institutions* and the *Deepening the Party and State Institutional Reform Plan* (Reporter of Xinhua Agency, 2018a). Reforming party and state institutions was an initiative of central leadership to strengthen centralization. The reform plan of state institution aimed to "form a law-based administrative system with clear authorities and responsibilities" (Reporter of Xinhua Agency, 2018a). In March, the 1st meeting of the 13th NPC accepted the *State Institutional Reform Plan* (Reporter of Xinhua Agency, 2018b). According to the plan, the MNR was newly formed. The previous MLR, State Oceanic Administration (SOA), and State Administration of Surveying and Mapping Geographic Information (SASMGI) will no longer be retained. The responsibility of MLR, the responsibility of NDRC in organizing major functional zoning, the responsibilities of Ministry of Agriculture in managing grassland resources survey, confirmation and registration, the responsibilities of SFA in managing forests and wetlands resource survey, confirmation and registration, the responsibility of SOA, and the responsibility of SASMGI were all integrated into the MNR (CPCCC, 2018).

Moreover, the SFA was expanded to the NFGA. The NFGA is subordinate to the MNR. The

Director of the NFGA becomes a deputy minister of the MNR. The authorities of the two natural resource departments were expanded and strengthened. The responsibilities and authorities of other ministries in managing grassland, nature reserves, SHAs, world natural heritage, national geological parks, national forestry parks were all integrated into the NFGA. Therefore, it becomes China's National Park Administration (NPA) (CPCCC, 2018). One of the main responsibilities of the NFGA is to establish a complete system of protected areas, promote the clean-up specifications and integration of various types of previous protected areas, and build a "unified, standardized and efficient" NPS (Tang, X., 2019)

In the new management system, national parks are mainly dominated by the NFGA, while the original nature reserves that have not been upgraded to national parks are to be gradually placed under the supervision of the MEE. If central government wants to designate a new NPS pilot project, the NFGA is to take the lead in relevant policy coordination. The NFGA's Department of Protected Area Management was made specifically responsible for "drafting laws, regulations, and departmental rules, drafting relevant plans and technical specifications for various protected areas"; "organizing reviews and inspections for various national-level protected areas"; "organizing and carrying out resource surveys, protection construction, ecological restoration, monitoring and evaluation of various protected areas"; "the natural resource asset management, and land use control of the national parks directly affiliated by the central government" (Official website of the NFGA, 2019b). The MEE, which was formed at the same time, set up a Protected Area Supervision Office ("*Chu Ji*") in its Department of Natural Ecological Protection. This division-level office was made specifically responsible for "organizing and formulating regulatory systems and supervising their implementation for various types of protected areas (mainly the national nature reserves)" (Official Website of MEE, 2018).

Under the new system, all national park management agencies are mainly under the jurisdiction of NFGA and provincial forestry and grass department where they are located. Three of them are directly controlled by the NFGA/NPA. As the dispatched agency, the Office of the Forest Resources Supervision Commissioner of the NFGA (Changchun, Jilin Province) serves as the Northeast Tiger and Leopard National Park Administration, taking over the authority and responsibility of natural resource asset management and land use control of this national park (Official website of the NFGA, 2019c). Likewise, the Office of the Forest Resources Supervision Commissioner of the NFGA (Chengdu, Sichuan Province) serves as the Panda National Park Administration, and the Office of the Forest Resources Supervision Commissioner of the NFGA

(Xi'an, Shaanxi Province) serves as the Qilian Mountain National Park Administration (Official website of the NFGA, 2019d, 2019e).

As of January 2019, various types of protected areas in China had accounted for almost 20% of its land area, including the nine projected national parks (Officials of the NFGA, 2019). In June 2019, the General Office of the CPCCC and the General Office of the State Council issued the *Guiding Opinion on Establishing a Protected Area System with National Park as the Main Body*, requiring the formulation of standards for classification and delineation of various existing protected areas[58], and gradual formation of a classification system of protected areas "with national parks as the main body, nature reserves as the foundation, and other kinds of natural parks as the supplements" (Reporter of Xinhua Agency, 2019).

Hainan Tropical Rainforest Project

As noted above, the Beijing Great Wall pilot project was terminated by NDRC at the first year of the second stage. Later, in early 2019, the NFGA and NDRC officially approved the Hainan Tropical Rainforest as the tenth NPS pilot project, given that Hainan Province has the most concentrated, best-preserved, and largest contiguous tropical rain forest in China. At the beginning of 2018, 14 central ministries and Hainan provincial government had planned to incorporate Hainan's tropical rainforest into the NPS program. The projected area covers 5 former national nature reserves (*Wuzhishan*, *Yinggeling*, *Jianfengling*, *Bawangling*, *Diaoluoshan*) and 4 former provincial nature reserves. In February 2018, the NFGA organized experts to review a preliminary application submitted by the provincial government. On April 13, President Xi openly called for the establishment of a national park at a meeting to celebrate the 30th anniversary of Hainan SEZ (Office of the NFGA, 2018). The *Guiding Opinion of the CPCCC and the State Council on Supporting Hainan's Comprehensive Deepening of Reform and Opening-up* issued in April 2018 clearly required the establishment of a tropical rain forest national park.

After the above institutional reorganization, this proposal was accepted by the NFGA/NPA and NDRC. On January 23, 2019, the sixth meeting of the CCCDR approved the *Hainan Tropical Rainforest National Park System Pilot Program* (Official website of the NFGA, 2019a). In line with the *2017 Overall Plan*, Hainan Program is to focus on the integration and reorganization of

[58] It includes nature reserves, SHAs, geological parks, forest parks, marine parks, wetland parks, glacier parks, grassland parks, desert parks, grassland scenic areas, aquatic germplasm resource protection areas, wild plant in situ protection areas (spots), nature reserve spots, important wildlife habitats, etc.

the previous protected area management agencies. On April 1, the Tropical Rainforest National Park Administration was officially listed in the former Diaoluoshan national nature reserve. This is the fifth NPS pilot document directly approved by the CCCDR/CLGCDR after the *Three-River Source, Northeast Tiger and Leopard, Panda,* and *Qilian Mountain*. A middle level official of the NPA argued:

> Establishing a specialized national park administration at the beginning of a NPS pilot project obviously benefits from the close interaction between the central and local departments brought about by the smooth operation of the new natural resources management system (Tang, X., 2019).

From the temperate zone to the tropics, from the coast to the inland, from the forest to the grassland, the geographical and ecological representativeness of China's national parks has been greatly expanded by the central and local departments.

In this case, the policy goals and policy instruments were established from the beginning. After four years of experimentation, with the deployment of the policy instruments (reorganize the fragmented protected area system, etc.), the original policy goal (i.e. establishing a complete NPS) was eventually expanded into a more ambitious goal (i.e. building a comprehensive protected area system with national parks at its core).

4. Case 2: CET Pilot Scheme

As the world's largest emitter of carbon dioxide, China has a major responsibility to reduce its emissions. Carbon emission trading is widely regarded as an effective way to reduce carbon emissions (Montgomery, 1972; Tietenberg, 1985). From the perspective of neo-realist international relations theory, in order to pursue policy independence and exert institutional influence on global carbon politics (Newell & Paterson, 2010), Chinese leaders determined it was important to first experiment with different local models for a united domestic carbon trading scheme. In this chapter, China's domestic market refers to the regional market formed by the seven provincial cap-and-trade schemes that were initiated and operated between 2011 and 2017.

More than 20 years ago, China began to control air pollutants in some places. In the early 2000s, Chinese government began to experiment with local sulfur emission trading. This eventually led to a comparative trial approach, receiving cautious attention from the central government. In the latter 2000s, various pilot projects for atmospheric pollution discharge rights trading directly served as policy preparation and even became a catalyst for the CET pilots. In a nutshell, these formal pilot programs in the last two decades acted as a preview to seven provincial carbon pilot schemes. This chapter takes these developments, including the emergence of local climate trading agencies, as an institutional background of the subsequent seven CET schemes.

One of the most important recent developments in China's climate policies is the launch of a national carbon trading scheme in the power generation industry. This scheme took years to form and has its roots in early efforts to address pollution from industrial facilities and power plants. Therefore, this chapter explores the six years between the time that these provincial experiments were first approved and the nominal launch of the national carbon market. To clarify, the main sections illustrate the seven provincial CET schemes, discuss their respective performance, and focus on sorting out their respective regulatory frameworks. This emissions trading experiment follows a cautious comparative experimentation model. It is called "cautious" because the central department not only launched the national market relatively late, but also narrowed down the industries covered. In addition, the central government did not easily approve other provincial pilots to join the CET experiment; this fact makes this experimentalist pattern clearly different from the strict hierarchical experimentation pattern.

4.1 Comparative Trials of Atmospheric Pollution Emissions Trading: The Local SO_2 Pilots

In the late 1980s, China's air pollution was concentrated in large and medium-sized cities, and the main pollutants were soot and sulfur dioxide. The soot were mainly in northern cities, and the sulfur dioxide were concentrated in southern provinces. According to the *Bulletin of the State of the Environment of China (1989)*, the area where acid rain occurred "had been expanding" (State Environmental Protection Agency, 1990, p. 1). In response to this challenge, Beijing began to prepare the local policy experiment with sulfur dioxide emission control (Carter & Mol, 2007; Morgenstem, 2004; Yang & J. Schreifels, 2003). After the third national environmental protection conference was convened in 1989, the State Council decided to conduct pilot total emission control projects and to issue pollution discharge permits in some cities with severe industrial pollution (Wang, 2002).

In July 1990, the State Environmental Protection Agency (*Guojia Huanbao Ju*) officially issued the *Pilot Program for Air Pollutant Emissions Permit System*. From 1990 to 1994, central and local environmental departments successively carried out the pilot Air Pollutant Emission Permit Systems in 16 cities, including Tianjin and Shanghai. In 1994, six further prefectures, Baotou, Kaiyuan, Liuzhou, Taiyuan, Pingdingshan, and Guiyang, were charged with trying out air pollutant emissions trading policies. Trades involved air pollution emission rights, and transactions were carried out as an index transfer (Lu, 2012).

However, the effect of the policy experiment was not ideal. According to the *Bulletin of the State of the Environment of China (1995)*, in general, the pollution level of sulfur dioxide was increasing; compared with other regions, the acid rain pollution in central China was the most serious (State Environmental Protection Agency, 1996, pp. 1–2). Nevertheless, no large cities in central region participated in the pilot program led by the central environmental department.

Although there was no large-scale policy experiment, the central government had repeatedly announced the policy direction. In 1996, the State Council ratified the *"9th FYP" National Total Emissions Control Plan for Important Pollutants* and the *China Trans-Century Green Engineering Project Plan* (State Council, 1996). These documents required that corresponding control targets should be designated and made it necessary to promptly formulate a total pollutant discharge

control system and corresponding management rules, as well as to establish a regular publicity system (SEPA, 1996a). After this time, local experimentation and research on total emissions control was gradually introduced nationwide. As an example, the Beijing Reform and Development Research Association[59] and the Environmental Defense Fund (EDF) jointly conducted research on emissions trading projects at the municipality level starting in 1997 (Lu, 2012).

By the end of the 1990s, the area where acid rain occurred had already accounted for about 30% of the country's land area. According to the monitoring results of 106 cities, 43 had an annual average pH value of precipitation lower than 5.6, accounting for more than 40% (SEPA, 2000b, p. 14). Obviously, China was still suffering from severe acid rain pollution as a result of increasing sulfur dioxide emissions.

Cooperation with developed countries had become the main way for the central environmental department to find a breakthrough at the turn of the century. The US had earlier introduced a sulfur dioxide emissions trading scheme to address its own acid rain problems. In April 1999, Xie Zhenhua, the new Director of the SEPA, and Carlo Brown, the Director of the Environmental Protection Agency (EPA), jointly signed a letter of intent to cooperate on a "Feasibility Study of Using Market Mechanisms to Reduce Sulfur Dioxide Emissions in China" (Wang, 2002). The policy goal was to introduce market mechanisms practiced in the US to reign in SO_2 emission in China. The EDF provided technical, personnel and funding support for this program. Subsequently, in September, the EDF and SEPA signed an agreement. They selected Benxi Prefecture (Liaoning Province) and Nantong Prefecture (Jiangsu Province) as the pilot sites to launch cap and trade experiments (EDF). Benxi is an old industrial base in a northeastern province, and Nantong is a newly industrialized city in an eastern province. Nantong has been at the forefront of China's contemporary environmental policy experiments. Some of the first environmental policies newly tried out by environmental departments were carried out here before being promoted in other localities. In September 2001, under the Sino-US cooperative framework, Nantong successfully finished its experiment with surfur dioxide emissions trading (Editor, 2001).[60]

[59] The Beijing Reform and Development Research Association was established by the Research Office of Beijing Municipal Government, the Beijing Institute of Socialism, and the Beijing Bei'ao Co., Ltd. . It took "Building Humanities Beijing, Green Beijing, Science and Technology Beijing" as its research goal.

[60] The seller, the Nantong Tianshenggang Power Generation Co., Ltd., was a State-owned Enterprise (SOE). Its plant was considered a first-class thermal power plant. At the end of the last century, it achieved remarkable results in upgrading its pollution control technologies and subsequently pollution level declined. Its annual sulfur dioxide emissions levels fell hundreds of tons below the emission quota approved by the local environmental department. The buyer, Nantong Acetate Fiber Co., was a large-scale chemical joint venture with an annual output value of several billion yuan which had obtained ISO14001 certification. As its market share continued to increase, the Nantong Acetate Fiber Co. was eager to obtain more emission rights. According to their agreement reached in

After entering the new century, international environmental cooperation continued to expand. In September 2001, the Asian Development Bank (ADB) and Shanxi Provincial Government launched a sulfur dioxide emissions trading project, which was implemented by the Resources for the Future (RFF) and the Chinese Academy of Environmental Science. In October, with a loan from the ADB, Taiyuan initiated sulfur dioxide emission trading. Soon after, China's first local regulation on sulfur dioxide emissions trading, the *Management Measure for Sulfur Dioxide Emission Trading in Taiyuan*, was approved and implemented (Morgenstem, 2004; Zhang, 2002). Twenty-six enterprises with high sulfur dioxide emissions in this coal-based municipality participated in the experiment. The management agencies involved were the Planning Commission (the predecessor of Development and Reform Commission), the Environmental Protection Bureau, and the Price Bureau.

After gaining some policy experience, the SEPA began to determine policy instruments and accelerate the pace of policy experiments. In January 2002, the SEPA, the former State Economic and Trade Commission, and Ministry of Science and Technology issued the *Technical Specification for Prevention and Control of Sulfur Dioxide Emissions from Coal Combustion* (SEPA, State Economic and Trade Commission, & MST, 2003). In the summer of 2002, the SEPA and EDF decided to jointly launch the *Research Project on Promoting China's Implementation of Total Sulfur Dioxide Emissions Control and Emissions Trading Policy* (henceforth, *"4+3+1" Pilot Project*). The former Director of the Pollution Control Department of the SEPA recalled:

> As the central government had included the total control and trading of sulfur dioxide emissions in the Tenth FYP, the SEPA decided to conduct this experiment in some representative localities (Lu, X., 2019).

The SEPA issued the *Notice on Carrying out the Demonstration Work of the Research Project on Promoting China's Implementation of Total Sulfur Dioxide Emissions Control and Emissions Trading Policy*, launching total sulfur dioxide emission control and emission rights trading experiment in four provinces (Shandong, Shaanxi, Jiangsu, Henan), three cities (Shanghai Municipality, Tianjin Municipality, Liuzhou Prefecture), and one SOE (China Huaneng Group Co., Ltd.). These sites were sufficiently representative in terms of geographical distribution, economic development stage and energy consumption structure (Chen & Gao, 2011).

2001, the seller was to transfer the right to discharge 1800 tons of sulfur dioxide for the buyer in the next six years. In this transaction, the sulfur dioxide emission right was transferred (300 tons per year) and the transaction costs were settled on an annual basis.

At that time, Shanghai and Jiangsu had the most developed economy and the highest degree of market development in the country. Shandong had the highest sulfur dioxide emissions of any province. Henan was the most populous province. Shanxi had the largest coal resources. Tianjin had largest number of heavy industries among the municipalities directly under central government control. Liuzhou (Guangxi Province) had started implementing an air pollutant discharge permit system in 1991, and had obtained experience in total emissions control. China Huaneng Group Co., Ltd., the only enterprise site, implemented a shareholding system, which accounted for one-tenth of national power generation capacity. This was the first time that a ministry conducted such a large-scale sulfur dioxide emissions trading experiment. During the First Session of the Tenth NPC and the First Session of the Tenth CPPCC in March 2003, the SEPA announced this program in a high-profile manner. In the summer of 2003, Taicang Port Environmental Protection Power Generation Co., Ltd. (Suzhou Prefecture, Jiangsu) aimed to expand its power generation capacity. The plant predicted that its sulfur dioxide emissions would increase by 2,000 tons per year. Despite the desulfurization devices which had been installed, the company still had a gap of 1,700 tons of sulfur dioxide emissions. At the same time, Xiaguan Power Plant (Nanjing Prefecture, Jiangsu) had managed to reduce its sulfur dioxide emissions by 3,000 tons per year bringing it well below the maximum amount of pollutants allowed by the local environmental department. The Jiangsu Provincial Environmental Protection Department proactively coordinated a trans-prefecture transaction between them. The two companies reached an off-site transaction in 2003. In the following two years, Taicang purchased 1,700 tons of emission right quotas from Xiaguan each year and payed 1.7 million yuan at a price of one yuan per kilogram. This transaction was the first sulfur dioxide emission trading across prefectural jurisdictions in China (Wang, Y., 2015a). It was an case in the above *"4+3+1" Pilot Project* (Chen & Gao, 2011).[61]

After the local experiment led by the SEPA made some progress, the central government began to consider promoting this market mechanism for pollution control nationwide. In December 2005, the State Council promulgated the *Decision on Implementing the Scientific Outlook on Development and Strengthening Environmental Protection* (henceforth, *2005 Decision*) (State

[61] In 2004, the phased research result of the "4+3+1" Pilot Project was published as a book and a journal article. The book was *China Acid Rain Control Strategy-- Sulphur Dioxide Emissions Trading Total Control and Emissions Trading Policy Implementation Demonstration*, which was published by China Environmental Press. The article titled *Economic Analysis of Sulfur Dioxide Emission Control in Power Industry in Yangtze River Delta* was published on a Chinese academic journal-- Research of Environmental Science, see Dudek (2005) and Project Team of China's Sulphur Dioxide Emissions Trading Total Control and Emissions Trading Policy Implementation Demonstration (2004).

Council, 2005b). In the Section "developing solutions to major environmental problems", the *2005 Decision* stated that "promoting air pollution prevention and control should focus on the reduction of total sulfur dioxide emissions". In Sub-section 24 "using market mechanisms to advance pollution control", the *2005 Decision* requested "eligible localities and units to implement sulfur dioxide emissions trading". For the first time, the sulfur dioxide emission trading scheme was officially accepted by the national strategic document.

To sum up, from the beginning, the pilot project of controlling general air pollutants has followed a path of comparative experimentation. The environmental ministry supported the sulfur dioxide trading proactively, by creating a playing field which allowed domestic players to experiment in different scales of sites; during the experimentation, local governments were responsible for preparing the detailed rules for these exchanges; private actors, however, had little effect on institutionalization of these pilot projects (Huang, 2013, p. 47). Although China had conducted some local emission rights trading experiments with international assistance starting in the latter 1990s, most of them were pre-legislative trials. They were not liked to any unitary regulation or rules issued by the national government.

4.2 Various Pilots of Pollution Rights Trading: The Emergence of Carbon Trading Agencies

In the late 2000s, in the process of the gradual institutionalization of pilot projects to control pollutants, while a series of clear policy objectives were introduced, some local institutions specialized in trading were established. The Eleventh FYP documentary released in 2006 stipulated a binding target for the total discharge of major pollutants to be reduced by 10% during this FYP period (2006-2010) (MEP, 2008b, p. 1).[62] By this time, the emission control of major pollutants became a mandatory requirement, and various localities began to actively plan pilot projects to help reduce emissions. China's local pollution discharge rights trading scheme began to be gradually institutionalized (Reporter, 2007g).

[62] That is, by 2010, Chemical Oxygen Demand (COD) and sulfur dioxide emissions should be reduced by 10% respectively from 2005. That is, the COD should drop from 14.142 million tons to 12.728 million tons, and the sulfur dioxide (SO_2) should drop from 25.494 million tons to 22.944 million tons.

In 2007, the Chinese government began to expand the experimental area and the types of pollutants traded. The southeast coastal areas once again took the lead in this action. On November 10, 2007, Jiaxing Prefecture of Zhejiang Province opened the first regular pollution rights exchange in the Chinese mainland, which officially launched the secondary market for pollution rights trading.[63] In the following six years, the MEP and Ministry of Finance successively approved 11 provinces to experiment with the paid use and trading of pollution rights. They were in Jiangsu, Zhejiang, Tianjin, Hebei, Henan, Inner Mongolia, Hunan, Hubei, Shanxi, Shaanxi, and Chongqing. In the process, provincial pollution rights exchanges (including carbon emissions or climate exchanges) were gradually established nationwide (Table 4.1).

Throughout the early and mid-2010s, nearly a hundred environmental and energy exchanges were established in China. They were relatively similar --these corporate institutions were approved by local governments and funded by SOEs, public institutions, and other private agencies. They started with pollution rights trading and participated in the Clean Development Mechanism (CDM), and later focused on CET pilot schemes. The proliferation of carbon trading agencies layed an institutional foundation for the provincial CET schemes that were to be launched in the following years. A former reporter of *Jingji Cankao Bao* (Economic Information Newspaper) revealed:

> Many of these local environmental exchanges even had no transaction in the first two or three years since they were officially established. Occasional trades were largely just a "show" performed by government agencies under the intentional promotion of policy experiments (Li, J., 2018).

Also in 2007, Jiangsu Province became the first province to carry out a trial for the paid use and trading of pollution rights. The focal point of the Jiangsu program was the paid use of pollution rights for the four main pollutants in the Taihu Lake Basin: COD, SO_2, Ammonia Nitrogen (NH_3-N) and Total Phosphorus (TP). Other provincial pilot programs also targeted to control the two pollutants determined by the Eleventh FYP: COD and SO_2.

The Twelfth FYP released in 2011 also stipulated a binding target for the total discharge of major pollutants to be reduced by 8-10% during this FYP period (2011-2015). Compared with 2010, the

[63] As of July 2010, seventy-seven percent of the old pollutant discharge units in Jiaxing had completed the purchase of initial pollutant discharge targets, see Zhejiang department of Ecology and Environment (2010). As of July 2014, the prefecture's trading and paid use projects had reached 3990, and the volume exceeded one billion yuan, see China Carbon Emissions Trading Network (2014).

total emissions of COD and SO_2 in 2015 should be reduced by 8%, and the total emissions of NH_3-N and Nitrogen Oxides (NO_X) should be reduced by 10%. Subsequently, all the pilot provinces included NH_3-N and NO_X in accordance with the FYP (Cui, 2018). [64]

Some pilot provinces included specific pollutants for the paid use and trading experiment based on their specific situations (Cui, 2013). For example, Jiangsu included TP due to the eutrophication of Taihu Lake. Shanxi, suffering from coal industry's pollution, contained soot and industrial dust in its pilot programs. The heavy metal polluted Hunan contained lead, cadmium, and arsenic in its paid use programs. Zhejiang adopted a more flexible approach. Each prefecture and county can decide trading targets based on their respective concerns (Table 4.1).

Before 2014, the specific mechanisms used in the eleven provincial pilot programs varied (Cui, 2013). There were two ways to obtain pollution discharge rights: direct paid use and trading/bidding. In terms of the experimental scope, most of the pilot areas only put forward requirements for new construction projects, while a few also proposed that pollution rights for existing projects should be paid for. In terms of pricing, the paid use fee was set by the governmental agency; it was generally lower than the trading price. The market bid was also based on the benchmark price set by the government. Since there was no unified regulation set by the central department, the validity period of the pollution rights certificate was also not uniform in all pilot areas. Some were set for one year, some for five years, and some were still to be determined.

After nearly seven years of experimentation, key problems facing the pollution rights trading were basically clarified (Su, 2013). A former manager of the China project of the EDF recalled:

> The Chinese government had paid sufficient attention to pollution rights trading. During the Eleventh FYP period, the national SO_2 emissions were reduced by 14.29%, and the national COD emissions were reduced by 12.45%, all exceeding the policy target in the FYP (Zhang, J., 2019).

Name	**Location, Launch/listed time**	**Relevant regulation, release time**	**Covered industries, targets at the beginning (mainly**

[64] In August 2011, the Inner Mongolia Autonomous Region began to cover all the four major pollutants in its experiment; in May 2012, Zhejiang Province began to conduct pilot project for the paid use and trading of emission rights for NH_3-N and NO_X; in September 2012, Hebei Province required bidding to obtain emission rights of NH_3-N and NO_X; Chongqing and Hunan included the emission rights of these two polltants in 2013; Shaanxi Province included all the four polltants in 2014.

			in pilot provinces)
Wuhan Optics Valley United Property Rights Exchange[65]	Wuhan, December 2006		
China Beijing Environment Exchange (CBEEX)[66]	Beijing, August 2008		
Tianjin Climate Exchange (TCX)	Tianjin, September 2008	Interim Measures for the Comprehensive Pilot Project of Emissions Trading in Tianjin, 2007	Pollution discharge units in the Binhai New Zone; SO_2
Shanghai Environment and Energy Exchange (CNEEEX)	Shanghai, August 2008		
Branches of the CNEEEX **Heilongjiang Branch** **Fujian Branch** **Ningxia Center** **Xinjiang Branch** **Hong Kong Branch**	Harbin, January 2010 Fuzhou, March 2010 Yinchuan, May 2010 Urumqi, July 2010 December 2013		
Hubei Environmental Resource Exchange Center	March 2009	Trial Measures for the Trading of Major Pollutant Emissions in Hubei Province, 2008	All industrial sectors; COD, NH_3-N, SO_2, NO_X,
Zhejiang Pollution Rights Trading Center (Zhejiang Property Exchange)	Hangzhou, March 2009	Guiding Opinion of the Zhejiang Provincial Government on Launching the Pilot Work of Paid Use and Trading of Emission Rights, July 2009; Interim Measures for the Administration of Pollution Discharge Rights in	Electricity (province); Hangzhou, Ningbo, and other prefectures determine their own industry coverage; COD, SO_2, NO_X

[65] China Hubei Carbon Emission Exchange (CHEEX), which was found in 2014, is leaded by Wuhan Optics Valley United Property Rights Exchange (OVUPRE), and funded by OVUPRE, Wuhan Iron and Steel Group, Daye Nonferrous Group Shareholding Co.Ltd, and Hubei Agricultural Means of Production Group Co.Ltd.. For more information, see its website, available at: http://www.hbets.cn/.

[66] It renamed China Beijing Green Exchange.

		Zhejiang Province, May 2010; Interim Measures for the Pilot Work of Paid Use and Trading of Emission Rights in Zhejiang Province, October 2010	
Guangzhou Environmental Resources Exchange [67] (Guangdong)	Guangzhou, April 2009	Administration Measures for Pilot of Paid Use and Trading of Pollutant Discharge Rights in Guangdong Province, April 2014	All industries; SO_2: throughout the province, and COD: within a defined watershed or region
Kunming Environment and Energy Exchange (Yunnan)	August 2009		
Chongqing Resources and Environment Exchange/ Chongqing Carbon Emissions Trading Center	Chongqing, December 2009	Interim Measures for the Administration of the Main Pollutant Discharge Rights Trading in Chongqing, August 2010	All Industries, animal husbandry, service industry; COD, NH_3-N, SO_2 and NO_X
Entrusted public resources trading agencies (Henan)	Started around the end of 2009 (in four prefectural pilots)	Interim Measures for the Paid Use and Transaction Management of Pollutant Discharge Rights of Major Pollutants in Henan Province, July 2014	All industries; SO_2, NO_X, COD, and NH_3-N
Hebei Environment and Energy Exchange	Shijiazhuang, February 2010	Notice of Hebei Province on Deepening the Work of Pollution Rights Trading, 2013	All industries; SO_2, NO_X, COD and NH_3-N
Shaanxi Environmental Rights Exchange	Xi'an, June 2010	Pilot Program for the Paid Use and Transaction of Nitrogen Oxide Emission Rights in Shaanxi Province (Trial), December 2011; Pilot Program for the Paid Use and Transaction of Chemical Oxygen Demand and Ammonia Nitrogen Emission Permit in Shaanxi	All industries; SO_2, NO_X, COD and NH_3-N

[67] On November 2, 2010, the Guangzhou Municipal Financial Office instructed the Guangzhou Stock Exchange Group to integrate resources to establish the Guangzhou Carbon Emissions Exchange (GCEEX) on the basis of the Guangzhou Environmental Resources Exchange. GCEEX was officially listed in September 2012.

		Province (Trial), Measures for the Administration of Paid Use and Transaction of Pollutant Discharge Rights of Major Pollutants in Shaanxi Province (Trial), July 2012	
Guiyang Environment and Energy Exchange	Guiyang, July 2010		
China Shenzhen Emissions Exchange	Shenzhen, September 2010		
Liaoning Environment and Energy Exchange /Liaoning North Carbon Emissions Trading Center	Shenyang; Yingkou; September 2010		
Qinghai Environment and Energy Exchange	Xining, December 2010	Measures for the Administration of Paid Use and Transaction of Pollutant Discharge Rights of Major Pollutants in Qinghai Province (Trial), February 2014	All industries; COD, NH_3-N, SO_2, and NO_X
Hunan Pollutant Rights Trading and Reserve Center (Hunan Provincial Public Resources Trading Center)	Changsha, April 2011	Implementation Rules for the Compensated Use and Trading of the Main Pollutant Discharge Rights in Hunan Province (Trial), June 2010; Administrative Measures for the Compensated Use and Trading of Pollution Discharge Rights for Major Pollutants in Hunan Province; January 2014	Nine industries in Changsha, Zhuzhou and Xiangtan Prefectures; COD, NH_3-N, SO_2, NO_X, lead, cadmium, arsenic
Jiangsu (Suzhou) Trading Center for Environment and Energy	Suzhou, 2011	Detailed Rules for the Pilot Program for the Paid Use and Transaction of Major Water Pollutant Discharge Rights in the Taihu Basin of Jiangsu Province,	Electricity, steel, cement, petrochemical, glass (province, Suzhou, Taizhou, Suqian,

		November 2008; Administrative Measures on the Use and Transaction of Sulfur Dioxide Emission Permits in Jiangsu Province (Trial), July 2013	Nanjing, Jiangyin); COD, NH_3-N, SO_2, NO_X, TP, Total Nitrogen (TN), volatile organic compounds (VOC_S)
North Environment and Energy Exchange[68] (Jilin)	Changchun, April 2011		
Liaoning Emission Exchange	Shenyang, June 2011		
Inner Mongolia Environment and Energy Exchange	Ordos, June 2011	Implementation Plan for Pilot of Paid Use and Transaction of Main Pollutant Discharge Rights in Inner Mongolia Autonomous Region, January 2011; Measures for the Administration of Paid Use and Transaction of Main Pollutant Discharge Permits in Inner Mongolia Autonomous Region (Trial), November 2011	All industries; SO_2, NO_X, COD and NH_3-N
Anhui Environment and Energy Exchange	Hefei, August 2011		
Sichuan United Environment Exchange	Chengdu, September 2011		
Shanxi Environment and Energy Exchange	Taiyuan, May 2012	Guiding Opinion of the Shanxi Provincial Government on the Implementation of Paid Use and Transaction of Pollution Rights, Shanxi Province Major Pollutant Emissions Trading Regulation (Trial), December 2009; Notice on Issues Related to the Implementation of Pollution	All industries; SO_2, NO_X, Soot, industrial dust, COD, NH_3-N

[68] In June, 2015, Jilin Environmental and Energy Exchange Co., Ltd. was renamed as Northern Environment and Energy Exchange Co., Ltd. with the approval of Jilin Provincial Department of Industry and Commerce.

		Rights Trading in the Province, 2012
Shandong Energy and Environment Trading Center (Shandong Public Resources Trading Center)	Jinan, March 2014	
Gansu Carbon Emissions Trading Center	Lanzhou, April 2014	
Lanzhou Environmental Energy Trading Center Co., Ltd.	Lanzhou, April 2014	
China Hubei Carbon Emission Exchange	Wuhan, April 2014	

Table 4.1 Pollution rights exchanges (including carbon emission exchanges) at provincial level and their respective regulations, as of July 2014, collected and adapted from open media and interview, compiled by the author

These local pollutant control experiments gained rich experience. First, the Chinese government was convinced that pollution rights trading is an effective means to reduce total pollution discharge. Second, pollution rights trading must be closely combined with China's unique policy environment. Third, institutional efforts are crucial. Pilot provinces and municipalities all issued their respective regulations, and local departments issued many supporting rules and specifications, which provided a solid regulatory foundation for the future promotion (Wang, 2014).

The main obstacles to the full implementation of pollution rights trading were identified. First, there were too many local regulations and rules. The price for pollution discharge rights were quite different. This has clearly formed a fragmented governance situation. Second, local governments paid more attention to the primary market, therefore, they lacked policy guidance for the secondary market.[69] As of the end of 2013, the total amount of paid use and trading in the eleven pilot provinces had reached 3.9 billion yuan (Wang, 2014), of which the trading volume was 1.9 billion yuan. Third, in primary and secondary markets, the role of government and market remains to be balanced. The government acted as "referee" and "athlete" at the same time (Su, 2013).

[69] The paid use fee for pollution discharge rights is collected on the primary market, and pollution rights are traded on the secondary market. In the local pilot phase, the fees levied on the primary market often exceed the transaction fees on the secondary market.

In August 2014, the General Office of the State Council issued the *Guiding Opinion on Further Promoting the Pilot Work of Paid Use and Trading of Pollution Discharge Rights* (henceforth, *2014 Guiding Opinion*) (State Council, 2014a). The *2014 Guiding Opinion* pointed out that the pollution discharge right refers to the type and quantity of pollutants that pollutant discharge unit is approved to discharge; establishing a paid use and trading system of pollutant emission rights is essential to the reform of environment policy field, and also an important part of the ecological civilization construction. The *2014 Guiding Opinion* clarified a policy goal: by 2017, the paid use and trading system of pollution rights in pilot areas will have been basically established (Table 4.2).

Province	**Relevant document**	**Issuance time**	**Pollutants regulated**
Fujian	Administrative Measure for the Paid Use Fee and the Pollutant Discharge Trading Price of Initial Pollutant Discharge Right Indicators in Fujian (Trial)	August 2014	SO_2, NO_X, COD, and NH_3-N
Hebei	Interim Measure for the Paid Use and Transaction Management of Pollutant Discharge Rights in Hebei Province	October 2015	SO_2, NO_X, COD, and NH_3-N
Shanxi	Measure for the Acquisition and Transaction of Pollutant Discharge Rights in Shanxi Province	December 2015	SO_2, NO_X, Soot, industrial dust, COD, NH_3-N
Shaanxi	Administrative Measure for the Paid Use and Transaction of Major Pollutant Discharge Rights in Shaanxi Province (Trial)	June 2016	SO_2, NO_X, COD, NH_3-N
Hubei	Measure for Paid Use and Transaction for the Discharge Rights of Major Pollutants in Hubei Province	November 2016	COD, SO_2, NH_3-N, NH_3 O
Liaoning	Measure for the Paid Use and Transaction Management of Pollutant Discharge Rights in Shenyang	July 2017	COD, NH_3 O, soot, SO_2, NOx, etc.
Jiangsu	Interim Measure for the Paid Use and Trading Management of Pollutant Discharge Rights in Jiangsu Province	August 2017	COD, NH3-N, TP, TN, SO_2, NOx, VOCs, etc.
Hainan	Administrative Measures for the Paid Use and Transaction of the Main Pollutant Discharge Rights in Hainan Province	November 2017	SO_2, NOx, COD, NH3-N, etc.

Table 4.2 Provincial regulations on the trading of pollutant discharge rights implemented between the issue of *2014 Guiding Opinion* and the end of 2017, collected and adapted from public media and interviews, compiled by the author

The promotion of pollution discharge rights transactions also became an institutional background and policy context for China's subsequent voluntary and compliance carbon trading experiment. Provincial environmental rights trading agencies were set up nationwide. Many of them then set up affiliates specializing in carbon emissions trading, or initiated carbon trading as a business.

4.3 Carbon Emission Reduction: Strategic Goals and Commitment for Climate Mitigation

The operation of a national CET requires a large number of policies, laws, regulations, implementation rules, technological specifications, transaction data, capacity building training, and a trading platform and mechanism. Therefore, initially, the central government had to conduct local experiments with a more cautious attitude. The policy pace of China's carbon trading scheme was in line with its policy experimentation style and governance approach in promoting marketization (Huang, 2019). Specifically, the development of carbon trading pilot schemes were in line with China's policy process in formulating and implementing GHG emission reduction strategies and goals (Table 4.3). The latter reflects Chinese government's increasing involvement and participation in global climate change governance. The central government's position on climate change has changed from being conservative and skeptical to being proactive, more flexible and open (see Appendix IV).

In April 2002, at the first China Climate Conference, Hu Qili, a vice chairman of the National Committee of the CPPCC, pointed out that "China's development faced three major problems: population expansion, resource shortage and environmental degradation, and the solution of these problems is related to climate conditions" (Quan & Meng, 2002). At this time the leaders of the CPCCC and the State Council did not pay attention to climate issue. Although the central government still had limited ability to influence the policy direction in the early and mid-2000s,

there were incremental changes to the climate institutions since global climate change issues were thrust upon China by western countries. Later, China did an about-face in its position on international climate issues.

The following instituional improvements were a prelude to drastic climate policy changes. In June 2007, the NDRC issued *National Climate Change Program*, which is China's first policy proposal for combating global warming. Although it was other two concerns-- foreign relations and economic competitiveness --that initially propelled the climate issues onto China's policy agenda, the central government began to invest more governmental resources in this domain (see Appendix IV). In March 2008, the Climate Department of NDRC, which has five divisions, was established.[70] In July 2009, US government and PRC government signed a *Memorandum of Understanding to Enhance Cooperation on Climate Change, Energy and the Environment* (US Department of State, 2009). In September 2009, at the UN General Assembly meeting, President Hu stated that Chinese would reduce the growth of its GHG emissions by "a notable margin" (Schreurs, 2017b, p. 166) by 2020. At the end of this year, in the Copenhagen climate negotiations, the central government officials announced their goal of reducing the country's GHG emissions per unit GDP by 40-45% by 2020. In 2010, the NDRC established a new public institution: the National Center for Climate Change Strategy and International Cooperation (NCSC). The NCSC mainly cooperates with the Climate Department in charge of policy research and international cooperation in the international negotiations on climate change and domestic compliance.[71]

In September 2010, in the *Decision to Accelerate the Development of Strategic Emerging Industries*, the State Council for the first time called on relevant ministries to establish a national carbon trading scheme. Soon after, the CPCCC also proposed to establish a domestic carbon market in its recommendations to the *Twelfth Five-Year Plan for National Economic and Social Development*. In order to implement the goal, in 2011, the NDRC issued the *Notice on Pilot Work on Carbon Emissions Trading* (NDRC, 2011).

At that time, Beijing was also improving the regulatory system of voluntary trading. In June 2012, the NDRC promulgated the *Interim Measure for the Administration of GHG Voluntary Emission*

[70] In September 1990, the National Climate Change Coordination Group was established. The group was led by the State Meteorological Administration (SMA). However, it did not include officials from the economic planning department and thus had no substantial policy coordination capabilities. In 1997, the main agency responsible for climate change negotiations changed from the SMA to the NDPC. This predecessor to the NDRC had substantial powers in economic planning and energy supervision. In 2003, the NDPC was reformed to the NDRC.

[71] In 2018, it was placed under the MEE along with the Climate Department. For more details, see its official website, available at: http://www.ncsc.org.cn/.

Reduction Trading, which defined and regulated the China Certified Emission Reduction (CCER) project transactions in detail in terms of trading products, trading entities, trading venues, trading rules, and registration and supervision systems (NDRC, 2012).[72] In October 2012, the NDRC promulgated the *Guideline for the Validation and Verification of GHG Voluntary Emission Reduction Project*, which clarified the filing requirements, working procedures and report formats of voluntary project validation and verification agencies (Green Finance Professional Committee of China Finance Association, 2016, p. 40).

While improving the regulation of voluntary trading, it was urgent to establish the regulation of pilot cap-and-trade scheme. International climate cooperation has also promoted emission trading to a certain extent. In November 2012, the 18th National Congress of the CPC reaffirmed that it is necessary to carry out national carbon trading scheme (see Appendix IV). In order to raise the challenge of climate change to a higher priority, China and US established a Sino-US Climate Change Working Group before the Strategic and Economic Dialogue in the summer of 2013 (State Council, 2013b). China's motion on carbon trading was welcomed by the Obama Administration. Soon after, the goal of launching a national carbon market was finalized in the third plenary of 18th CPCCC in November 2013 (Table 4.3). Almost at the same time, the earliest provincial pilot scheme officially started. In accordance with shared vision of two presidents, the Sino-US Climate Change Working Group immediately initiated actions on automobiles, smart grids, carbon capture, utilization and storage, energy efficiency, GHG data management, forestry and industrial boilers (State Council, 2014b). Through a series of joint actions, the two countries hoped to inject momentum into global climate negotiations and lead other countries to propose strong action targets preferably in the first quarter of 2015.

In December 2014, the NDRC issued the *Interim Regulation for the Management of Carbon Emissions Trading* (henceforth, the *2014 Interim Regulation*), establishing an overall institutional framework for every provincial scheme (NDRC, 2014b). The *2014 Interim Regulation* established a two-level management structure composed of NDRC and provincial DRC. It specifically stipulated the rules involving quota management, emissions trading, verification and quota clearing, supervision and management, and legal responsibility Afterwards, the NDRC issued

[72] Certified Emission Reductions (CERs) are a type of carbon credits issued by the CDM Executive Board for emission reductions achieved by the CDM projects and verified by a Designated Operational Entity under the rules of the Kyoto Protocol. The CCER is a kind of GHG emissions reduction, which is registered and put on record through the NDRC on the national voluntary emissions reduction trading registry, according to the *Interim Measure for the Administration of GHG Voluntary Emission Reduction Trading*. The emissions reduction can be traded in registered exchanges after being registered and put on record. Enterprises, international and domestic organizations, and individuals are all allowed to participate in the CCER transaction.

three batches of carbon emission accounting rules and reporting guidelines for twenty four industries, and formulated emission accounting and reporting standards for ten industries (Table 4.3).

In the Obama era, China-US climate cooperation played a role in urging China to start national carbon market om time. In September 2015, the first *U.S.-China Joint Presidential Statement on Climate Change* proposed that China plans to launch a national carbon emissions trading system in 2017, which will cover key industrial industries such as steel, power, chemicals, building materials, papermaking and non-ferrous metals (Xinhua Agency, 2015). In March 2016, the second *U.S.-China Joint Presidential Statement on Climate Change* recognized that climate change has become the backbone of Sino-US relations (Xinhua Agency, 2016). In January 2016, the General Office of the NDRC issued the *Notice on Doing a Good Job in the Key Tasks of Launching the National Carbon Emission Trading Market* (henceforth, *2016 Notice*) (NDRC, 2016b). The *2016 Notice* required that the enterprise to be included in national carbon scheme should be finalized as early as possible. A senior researcher of the NCSC recalled:

> At this time, it was initially envisaged that participating entities would be corporate entities or independent accounting entities whose businesses involve eight industries (petrochemicals, chemicals, building materials, steel, non-ferrous metals, papermaking, power, and aviation) and whose total energy consumption reached 10,000 tons of standard coal or more in any year from 2013 to 2015 (Chai, 2018).

The NDRC requested the State Civil Aviation Administration and local authorities to conduct a survey of the enterprises in these eight industries within their jurisdiction, and submit a list of enterprises that meet the above requirements before February 29, 2016. The NDRC also invited relevant industry associations and some centrally managed SOEs to conduct a survey of the enterprises in their industries or within the group, and submit a list of enterprises within the industry or within the group that meet the requirements of the *2016 Notice* before February 29, 2016 for cross-validation. In addition, the NDRC also required accounting, reporting, and verification of the historical carbon emission data of the companies to be included[73]; fostering and selecting third-party verification agencies and personnel; and strengthening capacity building.

[73] The enterprises to be included shall submit the emission report and the verification report issued by a third-party verification agency to the local authority of its registration location. According to the timetable, after local authority conducts the review and summarizes the company's GHG emission data in accordance with Annex 2 of the *2016 Notice*, the summary data and the verified emission report of a single company (including supplementary data) will be submitted to the NDRC before June 30, 2016.

Although the NDRC had repeatedly called on all parties to cooperate and coordinate, some of the prescribed report tasks were not completed as scheduled (An Employee of the SinoCarbon Innovation & Investment Co.,Ltd., 2018). According to the feedback from various localities, some provinces still had not yet completed the filing of third-party verification agencies before the end of June 2016. In many localities, the service quality of verification agencies was uneven, and a considerable number of verifiers had no sufficient professional competence (Meng, 2016).

As noted above, the earliest official trading occurred in the second half of 2013. As of November 2017, the cumulative volume of the seven pilots had exceeded 200 million tons of carbon dioxide equivalents, and the turnover had exceeded 4.6 billion yuan (NDRC, 2017c). More importantly, these pilot projects carried out a large number of attempts to verify the feasibility of building a provincial or even trans-provincial carbon market[74].

International commitment, policy goals and documents	**Policy domains and dimensions**	**Release time**	**Actions and initiatives**	**Government stance and relevant remarks**
Carbon emission reduction goal	Domestic reform	January 2017	Launched the third batch of national low-carbon city pilot	Establish a target system for controlling GHG emissions, and improve low-carbon development management capabilities
		December 2016	"13th FYP" Energy Conservation and Environmental Protection Industry Development Plan	Develop energy conservation and environmental protection industries
		November 2016	Work program for controlling GHG emissions in 13th FYP	Propose the main goal of reducing emissions by 2020
		November 2012	Launched the second batch of national low-carbon provinces and low-carbon cities pilot	Establish statistics and management systems for GHG emissions data

[74] The trans-provincial market refers to the Beijing pilot scheme.

		December 2011	Work program for controlling GHG emissions in 12th FYP	Propose the main goal of reducing emissions by 2015
	International commitment	January 2017	President Xi's speech at the UN headquarters in Geneva	Highly appraised the Paris Agreement and promised that China will bear 100% of its obligations
		July 2017	Xi's commitment at the summit of the G20 leaders in Hamburg, Germany	China and the other 18 government heads declared that the Paris Agreement is irreversible
		September 2016	Xi's opening speech at the summit of the G20 leaders in Hangzhou; Xi and Obama attend the deposit ceremony for the ratification of the Paris Agreement in Hangzhou	Jointly develop and implement the UN 2030 Agenda
		September 2015	US-China Joint Presidential Statement on Climate Change	Carbon emissions per unit of GDP in 2030 are 60-65% lower than in 2005
		November 2014	Sino-US Joint Statement on Climate Change	Carbon emissions peak in 2030 and reach as early as possible
Related policy documents and instruments	National government initiatives and planning	October 2017	Report of the 19th CPC National Congress	Accelerate the reform of the ecological civilization system
		December 2016	Notice on Printing and Distributing the "Green Development Indicator System" and "Ecological Civilization Construction Assessment Target System"	Carbon emission reduction is one of the basis for evaluation and assessment of ecological civilization construction
		November	Work program for	Full deployment of low carbon

	2016	controlling GHG emissions in 13th FYP	work during the 13th FYP period
	March 2016	Outline of the 13th FYP for National Economic and Social Development (2011-2015)	Promote the national market, and implement emission monitoring, reporting, verification (MVR), and quota management system for key units; improve the statistical accounting, evaluation and accountability system; increase the promotion and application of low-carbon technologies and products.
	October 2015	Resolution of the 5th Plenary Session of the 18th CPCCC	Establish and improve the initial allocation system of energy use rights, water rights, pollution discharge rights and carbon emission rights
	September 2015	U.S.-China Joint Presidential Statement on Climate Change	Launched the national carbon trading scheme in 2017
	September 2015	Overall Plan for the Reform of Ecological Civilization System	Deepening the carbon trading pilot
	November 2013	Resolution of the 3rd Plenary Session of the 18th CPCCC	Start the carbon trading pilot project
	November 2012	Report of the 18th CPC National Congress	Carry out pilot projects on carbon trading
	March 2011	Outline of the 12th FYP for National Economic and Social Development (2011-2015)	Explore the establishment of low carbon product standards, labeling and certification systems, establish and improve the statistical accounting system for GHG emissions, and gradually

			establish a carbon emissions trading market. Promote low-carbon pilot demonstrations.
NDRC regulations, rules and specifications	January 2016	Notice on Doing a Good Job in the Key Tasks of Launching the National Carbon Emission Trading Market	Ensure the launch of a national carbon market in 2017.
	December 2014	Interim Regulation on the Management of Carbon Emissions Trading	Strengthen the control and management of GHG emissions, regulate the operation of the carbon trading market
	October 2012	Guidelines for the Validation and Verification of GHG Voluntary Emission Reduction Project	Provision for the certification of CCER projects and the filing requirements of certification bodies
	2013	NDRC filed and announced the first batch of 10 industry enterprises' GHG emissions accounting rules and reporting guidelines (for trial), five voluntary emission reduction trading agencies, two batches of three certification and verification agencies, and two batches of 54 methodologies, approved the CCER Information Platform, and publicized a batch of voluntary emission reduction certification projects.	
	June 2012	Interim Measure for the Administration of GHG Voluntary Emission Reduction Transactions	Specification for the CCER project
	October 2011	Notice on the Pilot Work on Carbon Emissions Trading	Approved seven provinces and municipalities to conduct carbon trading experiment

Table 4.3 China's policy response to climate change and carbon market related policy instruments, from 2011 to 2017, collected and made by author from open information and interview, compiled by the author

4.4 Local Cap-and-trade Scheme: Representativeness and Discretion

On October 29, 2011, the General Office of the NDRC issued the *Notice on Conducting Pilot Work on Carbon Emissions Trading* (henceforth, *2011 Notice*) (NDRC, 2011). After a comprehensive consideration of economic, energy consumption, and geographic representativeness (see Table 4.4 and Figure 4.1), the NDRC agreed to conduct pilot projects on carbon emission trading in Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen. These pilot provinces and municipalities covered 250 million people, 14.2 trillion yuan in GDP, and 830 million tons of standard coal energy consumption, accounting for 19%, 27% and 24% of those in the country respectively. Shenzhen, Shanghai, Beijing, Guangdong, and Tianjin successively started trading in the second half of 2013, while Hubei and Chongqing also started trading in the first half of 2014. At the end of 2014, the NDRC promulgated the *2014 Interim Regulation* (NDRC, 2014b). By the end of 2017, the seven pilot schemes had all completed a three or four years of compliance.

Pilot province/municipality (location)	**Population (10 thousand)**	**GDP (1000 trillion CNY)**	**GDP per capital (10 thousand, CNY)**	**Proportion of the primary/secondary/tertiary industry accounted for GDP（%）**	**Energy consumption (ten thousand tons of standard coal)**	**Coal consumption (ten thousand tons of standard coal)**
Beijing (Capital, northern China)	2069	1.79	8.64	0.8/22.8/76.4	7178	2270
Tianjin (Coastal municipality, Northern China)	1413	1.29	9.13	1.3/51.7/47.0	8208	5298
Shanghai (Coastal municipality, eastern China)	2380	2.02	8.48	0.6/39.4/60.0	11362	5703
Chongqing (Inland municipality,	2945	1.44	3.87	8.2/53.9/37.9	9278	6750

western China)						
Hubei (Inland province, central China)	5779	2.23	3.85	12.8/50.3/36.9	17675	15799
Guangdong (Coastal province, southern China)	10594	5.71	5.39	5.0/48.8/46.2	29144	18439
Shenzhen (Coastal municipality/SEZ, southern China)	1058	1.30	12.29	0/44.3/55.7	3910 (2015)	>428 (estimated)

Table 4.4 Economic and energy consumption representativeness of the seven pilot areas in 2012, collected and adapted from "conference presentation of National Center for Climate Change Strategy and International Cooperation of the NDRC" (Chai, 2018), "the economic bulletins of National Bureau of Statistics and each province/municipality, China Energy Statistics Yearbook 2013" (Energy Statistics Department, National Bureau of Statistics, 2014), "Shenzhen Statistical Yearbook 2013" (Shenzhen Bureau of Statistics & National Bureau of Statistics Survey Office in Shenzhen, 2014), and "The 13th FYP for Shenzhen's Energy Development" (SDRC, 2016), compiled by the author

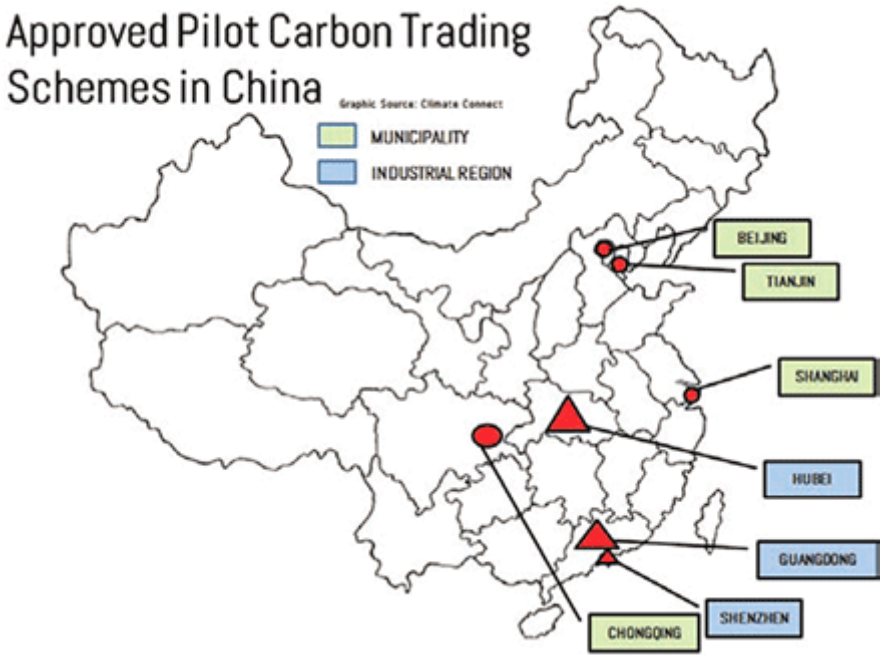


Figure 4.1 Geographic representativeness of the seven CET pilots[75]

[75] This map is quoted from the figure of "China's Pilot Emissions Trading Systems (Newsletter #3)", Carbon Market Watch, 2013, available at: https://carbonmarketwatch.org/2013/05/30/chinas-pilot-emissions-trading-systems/.

After the announcement of *2011 Notice*, all pilot provinces began to organize the preparation of implementation plan, to clarify the roadmap and timetable, and report the implementation plan to the NDRC for approval. Each pilot area formulated the provisional management regulation, clarified the basic rules of the pilot project, determined the total emission control targets, formulated allocation plans for emission indicators, and established a carbon emissions trading system and registry system during the experimentation. Meanwhile, companies and individuals that were not covered in the pilot schemes were encouraged to voluntarily offset their emissions.[76] The central government gradually clarified its "cautious attitude", and repeatedly emphasized the "incremental nature" of domestic carbon market development (Huang, 2013, p. 41).

4.4.1 Regulatory Framework of Each Scheme

Beijing

In October 2012, the *Beijing Carbon Emissions Trading Pilot Program (2012-2015)* was approved by NDRC (Table 4.5). On November 20, 2013, the *Notice of the Beijing Municipal Development and Reform Commission on Piloting Carbon Emissions Trading* was officially released (BDRC, 2013). The program had four provisions. The first was a market mechanism. During the pilot period, the municipality implemented a quota trading mechanism under the control of its total CO_2 emissions. The second was the trading targets. Emissions trading only targeted CO_2 and allowed participating entities to offset a small percentage of quotas through obtaining the CCER. The third was market participants. The municipality's carbon emissions trading scheme were mainly for emissions from fixed facilities within its jurisdiction. Among them, the units whose annual direct/indirect CO_2 emissions are greater than or equal to 10,000 tons (inclusive) were participants, which are required to be incorporated in carbon emission trading; other units with an annual comprehensive energy consumption of 2,000 tons of standard coal (inclusive) could participate voluntarily. Other units that meet the criteria could also participate in the transaction. The fourth was a trading platform. During the pilot period, Beijing's carbon trading platform was located at the China Beijing Environmental Exchange (CBEEX). On November 28, 2013, the CBEEX

[76] As aforementioned, the *2012 Interim Measure for the Administration of GHG Voluntary Emission Reduction Transactions* had designated the NDRC as the management institution and required the establishment of a national registry for Verified Emission Reduction (VER) transactions.

officially started carbon emission trading. As of the end of 2017, Beijing had completed four years of compliance.

Policy documents	Release source and time
Beijing Municipal Carbon Emissions Trading Program (2012-2015)	Beijing Development and Reform Commission (BDRC), Compiled in 2012
Decision on Beijing Municipality's Pilot Work on Carbon Emissions Trading under the Premise of Strict Control of Carbon Emissions	the Standing Committee of the Beijing Municipal People's Congress, December 27, 2013
Notice about Conducting Pilot Work on Carbon Emissions Trading	BDRC, November 2013
Beijing Municipality Enterprise (Unit) Carbon Dioxide Measuring and Reporting Guide (2013)	
Administrative Measure for Beijing Municipality's Carbon Emissions Trading Verification Agency (Trial)	
Quota Verification Method of Carbon Emissions Trading Pilot in Beijing Municipality (Trial)	
Reporting Process of GHG Emission Report in Beijing Municipality	
Operation Guide of Carbon Emissions Trading Registry System in Beijing Municipality	
Beijing Municipality Carbon Emissions Quota Over-the-Counter (OTC) Rules (Trial)	BDRC, Beijing Municipal Bureau of Financial Work, November 2013
Measure for the Administration of Carbon Emission Rights Trading in Beijing (Trial)	Beijing Municipal Government, May 2014
Measure for the Administration of Beijing Carbon Emissions Offset in Beijing (Trial)	BDRC, September 2014
Notice on Further Doing a Good Job in the Pilot Work on Carbon Emissions Trading	BDRC, December 2014
Beijing Enterprise (Unit) Carbon Dioxide Measuring and Reporting Guide (2014), Beijing Third Party Verification Procedure Guide on Carbon Emission Report, Compilation Guide on Beijing Carbon Emission Third Party Verification Report	BDRC, December 2014
Circular on Further Opening the Carbon Emissions Trading	BDRC, December 2014

Market and Strengthening the Work Related to Carbon Asset Management	
Notice on Adjusting the Scope of Key Emission Units	Beijing Municipal Government, December 2015
Notice on Cooperating to Carry out Related Matters Concerning Trans-regional Carbon Emissions Trading in Beijing and Inner Mongolia	BDRC, Inner Mongolia Autonomous Region Development and Reform Commission, Hohhot Municipal Government, Ordos Municipal Government, April 2016
Notice on Doing a Good Job in the Pilot Project of Carbon Emissions Trading in Beijing in 2017	BDRC, November 2016

Table 4.5 Relevant regulations for Beijing pilot scheme, collected from the official website of the BDRC, Beijing Carbon Emissions Electronic Trading Platform and the CBEEX, as of the end of 2017, compiled by the author

Tianjin

In December 2013, the Tianjin Development and Reform Commission (TDRC) issued the *Notice on Conducting Pilot Work on Carbon Emissions Trading* (TDRC, 2013). The notice clearly required that in the initial stage of the pilot project, the enterprises or units that emitted more than 10,000 tons of carbon dioxide in the key emission industries and civil construction fields in the steel, chemical, electric power, thermal power, petrochemical, oil and gas exploration, etc. in 2009 are to be incorporated. This notice also included eight annexes such as *Guidelines for Carbon Emission Accounting in Tianjin's Iron and Steel Industry (Trial)* (see Table 4.6). In March 2016, the General Office of the Tianjin Municipal Government issued the *Interim Measure for the Administration of Carbon Emissions Trading in Tianjin* for the next two compliance years. In May 2018, the Municipal Government issued a revised interim regulation. The new edition was also valid for two years.

Documents	**Release source and time**
Tianjin Carbon Emissions Trading Pilot Work Program	Tianjin Municipal Government, February 2013
Notice of the TDRC on the initial carbon verification of enterprises to be included in the pilot of carbon emission trading	TDRC, October 2013
List of enterprises included in the pilot project of carbon emission trading in Tianjin	TDRC, December 2013

Interim Measure for the Administration of Carbon Emissions Trading in Tianjin	TDRC, December 2013
Notice on the Pilot Work on Carbon Emissions Trading	TDRC, December 2013
Guideline for Carbon Emission Accounting in Tianjin's Iron and Steel Industry (Trial)	TDRC, December 2013
Guideline for Carbon Emission Accounting in Tianjin's Electric Power Industry (Trial)	
Guideline for Carbon Emission Accounting in Tianjin's Chemical Engineering Industry (Trial)	
Guideline for Carbon Emission Accounting of Tianjin's Refining and Ethylene Enterprises (Trial)	
Guideline for Carbon Emission Accounting for Other Industries in Tianjin (Trial)	
Guideline for the Preparation of Carbon Emission Reports for Tianjin Enterprises (Trial)	
Carbon Emission Quota Allocation Proposal for Enterprises included in the Pilot Program of Carbon Emission Trading in Tianjin (Trial)	
Operation Guide for Tianjin Carbon Emissions Quota Registration System (Trial)	
Notice on 2014 Annual Carbon Emission Report and Verification Work for Enterprises Enrolled in the Carbon Emissions Trading Pilot	TDRC, April 2015
Notice on Relevant Matters Concerning the Use of Offset Mechanism for Tianjin Carbon Emissions Trading Pilot	TDRC, July 2015
Interim Measure for the Administration of Carbon Emissions Trading in Tianjin	TDRC, March 2016
Tianjin Emissions Exchange's Carbon Emissions Trading Settlement Rule (Provisional)	TCX, October 2017
Notice on Doing a Good Job in Reporting, Verification and Performance of Carbon Emissions of Key Emission Units in Tianjin	TDRC, February 2018
Interim Measure for the Administration of Carbon Emissions Trading in Tianjin	TDRC, May 2018

Table 4.6 Relevant regulations for Tianjin pilot scheme, as of May 2018, collected from the official website of the TDRC and the TCX, compiled by the author

Shanghai

In July 2012, the Shanghai Municipal Government issued the *Opinion on Implementing Pilot Work of Carbon Emissions Trading in Shanghai Municipality* (Shanghai Municipal Government,

2012). It was committed to building a national carbon trading platform (Table 4.7). In November, the Shanghai Development and Reform Commission (SHDRC) issued the *Notice on the Publication of the List of Pilot Enterprises for Carbon Emissions Trading in Shanghai Municipality (First Batch)* (SHDRC, 2012a). It included almost 200 enterprises in Shanghai that were the first to be incorporated into the pilot scheme. Meanwhile, the *Trial Regulation for the Administration of Carbon Emission in Shanghai* was announced (SHDRC, 2012b).

Document title	**Release source**
Opinion on Implementing Pilot Work of Carbon Emissions Trading in Shanghai Municipality	Shanghai Municipal Government, July 2012
Trial Regulation for the Administration of Carbon Emission in Shanghai	Shanghai Municipal Government, November 2013
Distribution and Administration Proposal for Carbon Emissions Quota in Shanghai Municipality (2013-2015)	SHDRC, November 2013
Interim Provision on the Registration and Administration of Carbon Emission Quota in Shanghai	SHDRC, November 2013
Notice on the Publication of the List of Pilot Enterprises for Carbon Emissions Trading in Shanghai Municipality (First Batch)	SHDRC, November 2013
Shanghai GHG Emissions Measuring and Reporting Guide (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Guide for Shanghai Energy and Thermal Production Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Guide for Shanghai Steel Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Chemical Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Nonferrous Metals Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Textile and Paper Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Non-metallic Mineral Products Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Air Transport Industry (Trial)	SHDRC, November 2012
GHG Emissions Measuring and Reporting Method for Shanghai Tourist Hotel,	SHDRC, November 2012

Shopping Mall, Real Estate and Financial Industry Office Building (Trial)	
GHG Emissions Measuring and Reporting Method for Shanghai Transportation Site Industry (Trial)	SHDRC, November 2012
Interim Measure for the Administration of Third Party Institutions for Carbon Emission Verification in Shanghai	SHDRC, January 2014
Shanghai Carbon Emissions Verification Work Rules (Trial)	SHDRC, March 2014
Shanghai Annual Carbon Emissions Allocation Scheme in 2016	SHDRC, November 2016
List of Units in Shanghai's Carbon Emissions Trading Included in Quota Management (2016 Edition)	SHDRC, February 2016
Shanghai Annual Carbon Emissions Allocation Scheme in 2017	SHDRC, December 2017
List of Units in Shanghai's Carbon Emissions Trading Included in Quota Management (2017 Edition)	SHDRC, November 2017

Table 4.7 Relevant regulations for Shanghai pilot scheme, as of the end of 2017, collected from the official website of Shanghai municipal government and the SHDRC, and the CNEEEX, compiled by the author

Chongqing

In April 2014, the Chongqing Municipal Government issued the *Interim Measure for the Administration of Carbon Emissions Trading in Chongqing* (Table 4.8). It made the Chongqing Development and Reform Commission (CDRC) responsible for the comprehensive coordination of carbon emission trading. The Chongqing Municipal Finance Office was responsible for the daily supervision of carbon emissions trading, statistical monitoring, and taking the lead in handling risks. Other relevant departments, such as the Municipal Finance Bureau, the Municipal State-owned Assets Supervision and Administration Commission, and the Municipal Price Bureau conducted related management in accordance with their respective responsibilities (Chongqing Municipal Government, 2014). Among several pilot localities, Chongqing had the worst degree of information disclosure.

Document title	**Release source and time**
Decision of the Standing Committee of the Chongqing Municipal People's Congress on Issues Related to the Carbon Emission Trading Pilot (Draft)	Chongqing Municipal People's Congress, March 2014
Interim Measure for the Administration of Carbon Emissions Trading in Chongqing	Chongqing Municipal Government, April 2014
Chongqing Carbon Emissions Quota Regulation (Trial)	CDRC, May 2014
Chongqing Enterprise Carbon Emission Verification Specification (Trial)	CDRC, May 2014

Carbon Emission Accounting Report and Verification Rules of Chongqing Industrial Enterprises (for Trial Implementation)	CDRC, May 2014
Carbon Emissions Measuring and Reporting Guide of Chongqing Industrial Enterprises (Trial)	CDRC, May 2014
Carbon Emissions Trading Rule of Chongqing United Assets and Equity Exchange (Trial)	CDRC, June 2014
Measure for the Administration of Carbon Emissions Trading Settlement of Chongqing United Property Rights Exchange (for Trial Implementation)	
Measure for the Risk Management of Carbon Emission Trading of Chongqing United Property Rights Exchange (for trial implementation)	
Measure for the Management of Carbon Emission Trading Information of Chongqing United Property Rights Exchange (for trial implementation)	
Measure for Handling Violations in Carbon Emissions Trading of the Chongqing United Property Rights Exchange (for trial implementation)	

Table 4.8 Relevant regulations for Chongqing pilot scheme, collected from the website of the CDRC and Chongqing Carbon Emissions Trading Center[77], compiled by the author

Hubei

In February 2013, the Hubei Provincial Government issued the *Implementation Program for the Pilot Work of Carbon Emissions Trading in Hubei Province* (Hubei Provincial Government, 2013). In the first half of 2013, the *Measure for the Administration of Carbon Emissions Trading in Hubei Province* was formulated, and the institutional establishment including management system, quota allocation, trading platform and verification report was completed. From the second half of 2013 to 2014, Hubei government finally determined the list of enterprises to be incorporated into the pilot scheme (Table 4.9). In April 2014, the provincial government issued the *Interim Measure for the Administration and Transaction of Carbon Emission Rights in Hubei Province* (Hubei Provincial Government, 2014). In July, Hubei Provincial Development and Reform Commission (HDRC) issued the *Guideline for Monitoring, Quantifying and Reporting GHG Emissions of Industrial Enterprises in Hubei Province (Trial)* and *Guideline for the Verification of GHG Emissions in Hubei Province (Trial)* (HDRC, 2014).

Document title	**Release source**

[77] The Chongqing Carbon Emissions Trading Center is affiliated to the Chongqing Public Resource Trading Center (Chongqing United Assets and Exchanges Group).

Implementation Program for the Pilot Work of Carbon Emissions Trading in Hubei Province	Hubei Provincial Government, February 2013
Interim Measure for the Administration and Transaction of Carbon Emission Rights in Hubei Province	HDRC, April 2014
Hubei Province's 2014 Carbon Emissions Quota Allocation Scheme	HDRC, April 2014
Guideline for Monitoring, Quantifying and Reporting GHG Emissions of Industrial Enterprises in Hubei Province (Trial)	HDRC, July 2014
Guideline for the Verification of GHG Emissions in Hubei Province (Trial)	HDRC, July 2014
Notice on Matters Related to the 2015 Carbon Emission Offset Mechanism in Hubei Province	HDRC, April 2015
Regulation of Carbon Emission Quota Placement and Repurchase in Hubei (Trial)	HDRC, May 2015
Hubei Province's 2015 Carbon Emissions Quota Allocation Scheme	HDRC, November 2015
Hubei Province's 2016 Carbon Emissions Quota Allocation Scheme	HDRC, January 2017
Hubei Province's 2017 Carbon Emissions Quota Allocation Scheme	HDRC, January 2018

Table 4.9 Relevant regulations for Hubei pilot scheme, as of the beginning of 2018, collected from the official website of the HDRC and the Hubei Emission Exchange, compiled by the author

Guangdong

On September 7, 2012, the Guangdong Provincial Government issued the *Carbon Emissions Trading Pilot Working Program in Guangdong Province* (Guangdong Provincial Government, 2012). The program required the management system of carbon emission rights be rationally allocated, and a carbon emission trading mechanism to be formed by 2015 (Table 4.10). The *Trial Regulation for Carbon Emission Management in Guangdong Province* was announced by the provincial government in January 2014. It took effect on March 1, 2014 (GDRC, 2014).

Document title	**Release source**
Carbon Emissions Trading Pilot Working Program in Guangdong Province	Guangdong Provincial Government, September 2012
The First Allocation and Work Plan for Carbon Emission Rights Quotas in Guangdong Province (Trial)	Guangdong Development and Reform Commission (GDRC), November 2013
Trial Regulation for Carbon Emission Management in Guangdong Province	Guangdong provincial government, January 2014

Implementation Rule of Carbon Emissions Quota Management in Guangdong Province (Trial)	GDRC, March 2014
Implementation Rule of Carbon Emissions Information Reporting and Verification in Guangdong Province (Trial)	GDRC, March 2014
Implementation Rule of Enterprise Carbon Emissions Information Reporting and Verification	GDRC, February 2015
Implementation Rule for Carbon Emissions Quota Management	GDRC, February 2015
Guideline for Reporting Carbon Dioxide Emissions by Enterprises (Units) in Guangdong Province (Revised in 2017)	GDRC, February 2017
Guangdong Province Enterprise Carbon Emissions Verification Regulations (revised in 2017)	GDRC, February 2017
Implementation Plan for the Allocation of Carbon Emission Quota in Guangdong Province in 2014	GDRC, August 2014
Implementation Plan for the Allocation of Carbon Emission Quota in Guangdong Province in 2015	GDRC, August 2015
Implementation Plan for the Allocation of Carbon Emission Quota in Guangdong Province in 2016	GDRC, July 2016
Guideline for the use of CCERs to offset the actual carbon emissions in 2016	GDRC, January 2017
Interim Measure for the Administration of Generalized System of Preferences (GSP) Carbon Emission Reductions	GDRC, April 2017
Implementation Plan for the Allocation of Carbon Emission Quota in Guangdong Province in 2017	GDRC, August 2017

Table 4.10 Relevant regulations for Guangdong pilot scheme, as of the end of 2017, collected from the official website of the GDRC and the Guangzhou Emissions Exchange, compiled by the author

Shenzhen

On September 30, 2010, with the approval of Shenzhen Municipal Government, the Shenzhen Emissions Exchange was established (Table 4.1). As of April 2012, the Exchange's registered capital had increased from 15 million yuan to 300 million yuan, becoming the largest exchange of the same kind in China. On December 30, 2012, the Standing Committee of Shenzhen Municipal People's Congress passed the *Carbon Emission Regulation in the Shenzhen Special Economic Zone*, which was the first local regulation that specifically regulates carbon emission management. On June 18, 2013, Shenzhen became the first pilot project in the country to officially launch

carbon emissions trading (online). At that time, Shenzhen had initially built up the carbon emissions trading online system. On the basis of effective verification, a competitive game allocation method was adopted to allocate quotas to 635 industrial enterprises and 197 large public buildings with annual emissions of more than 3,000 tons (Table 4.11). The carbon emission allowance was about 100 million tons, which is more than 40% of the municipality's total carbon emissions from 2013 to 2015.

Document	**Release source and time**
Working Program for National Innovation City Macro Plan (2011-2013)	Shenzhen Municipal Development and Reform Commission (SZDRC), December 2011
Carbon Emission Regulation in Shenzhen Special Economic Zone	Shenzhen Municipal Government, October 2012
Specification and Guideline for Verification of GHG Emissions	Shenzhen Municipal Market Supervision Administration, November 2012
Specification and Guideline for Measuring and Reporting of GHG Emissions	
Shenzhen Carbon Emissions Trading Pilot Working Program	Shenzhen Municipal Government, June 2013
Interim Measure for the Administration of Carbon Emissions Trading in Shenzhen	Shenzhen Municipal Government, March 2014
Offset Credit Management Regulation for Shenzhen Carbon Emissions Trading Market (Provisional)	SZDRC, October 2015
List of units that have completed the 2014 annual performance obligations in the pilot project of carbon emission trading in Shenzhen	Shenzhen Emissions Exchange, July 2015
List of units that have completed the 2015 annual performance obligations in the pilot project of carbon emission trading in Shenzhen	Shenzhen Emissions Exchange, June 2016
Notice on Launching 2016 Carbon Emissions Trading Work	SZDRC, September 2016
List of units that have completed the 2016 annual performance obligations in the pilot project of carbon emission trading in Shenzhen	Shenzhen Emissions Exchange, June 2017
List of units that have completed the 2017 annual performance obligations in the pilot project of carbon emission trading in Shenzhen	Shenzhen Emissions Exchange, June 2018

Table 4.11 Relevant regulations for Shenzhen pilot scheme, as of June 2018, collected from the official website of the Shenzhen municipal government and the Shenzhen Emissions Exchange, compiled by the author

4.4.2 Market Performance and Local Discretion

In China's climate governance experiment, "policy direction is set nationally, but there is considerable room for local innovation" (Schreurs, 2017b, p. 169). Also, the market performance of the seven pilot schemes was mixed (Sun, 2017; Zheng, Liu, & Wang, 2015). During the experimentation, although the main market regulations, basic rules and total amount of quotas were uniformly approved by the NDRC, each pilot area had a certain degree of autonomy (Sun, 2017; Yi, Li, Yang, & Liu, 2018). As is well known, there were large differences in the industrial coverage, turnover, transaction price, offset ratio, compliance date and punishment (Table 4.12). From the perspective of compliance, Shenzhen and Shanghai performed best, and Chongqing performed worst (Table 4.13). Chongqing inherently lacked a carbon trading market atmosphere, its financial market information was not transparent, and there were signs of strong governmental intervention everywhere (Luo, 2016).

In 2017, the market activities of the seven schemes increased. But, there were still a large number of transactions concentrated around the compliance date. Chongqing pilot scheme changed the previous sluggish market performance, and its transaction volume and activity increased rapidly. Tianjin market was closed throughout the year, and the transaction volume was very low. Hubei surpassed Guangdong to become the pilot area with the largest turnover, and the transaction volume that was concentrated around the compliance date was also the lowest. In general, this situation was not conducive to launching a unified national market immediately (Lin & Xia, 2018; Sun, 2017; Tan, 2017; Zheng et al., 2015). Two staff members in two carbon trading consulting companies argued:

> This is why the national carbon market was launched later than expected (An Employee of the IdeaCarbon Co.,Ltd., 2018; An Employee of the SinoCarbon Innovation & Investment Co.,Ltd., 2018).

Pilot	**locality,**	**Industrial**	**Quota**	**Offset**	**Emission**	**report**	**Punishment**

total emission allowance, and threshold of inclusion (at the beginning)	**coverage (at the beginning)**	**allocation method**	**ratio**	**time/Verification report time/Compliance date**	
Beijing, About 50 million tons, 5,000 tons of carbon dioxide or more	415 enterprises in power and heating, cement, petrochemical, and other industrial enterprises, and service businesses (In 2015, 430 companies and 26 companies in Inner Mongolia region were included)	Baseline and historical	Not more than 5% of the annual quota	March 20/---/June 20	Fines 3-5 times the average market price
Tianjin, About 160 million tons, 20,000 tons of carbon dioxide or more since 2009	109 companies in steel, chemical, electric power, petrochemical, oil and gas exploration, etc.	Baseline and historical	No more than 10% of actual emissions in the year	April 30/April 30/June 30	Correction within a time limit, no preferential policies for 3 years
Shanghai, About 156 million tons, industry (20,000 tons), non-industrial (10,000 tons) (2010-2011)	210 companies in steel, building materials, nonferrous metals, electricity, petrochemicals and aviation, ports, airports, railways, etc.	Historical and baseline	Not more than 5% of the annual quota	March 31/April 30/June 1-30	50,000-100,000 yuan
Guangdong, About 388 million	242 companies in the power, steel,	Baseline and	No more than 10%	March 15/April 30/June 20	Double deduction next year, fine of

tons in 2013, 20,000 tons	cement, petrochemical, paper, civil aviation and other industries (in 2013)	historical	of actual emissions in last year		50,000 yuan
Shenzhen, about 30 million tons, More than 3,000 tons (for industries), 10,000 square meters or more (for large public buildings)	635 companies in 26 industries and 197 large public buildings	Total control method	No more than 10% of actual emissions in the year	March 31/April 30/June 30	Deducted next year; a fine of 3 times the average market price
Hubei About 281 million tons, Comprehensive energy consumption of 60,000 tons of standard coal or more (2010-2011)	138 enterprises in 12 industries including electricity, steel, cement and chemicals	Historical and leverage	No more than 10% of the annual emission allowance	Last working day of February/ Last working day of April/ Last working day of June	1-3 times the average market price within 150,000 yuan, and double deduction next year
Chongqing, about 130 million tons, 20, 000 tons	254 companies in the power, metallurgy, chemical, building materials and other industries	Total control combined with historical method	No more than 8% of certified emissions	February 20/---/June 20	3 times the average price of the quota in the month before the expiration of the payment period

Table 4.12 Basics of the Seven CET Pilots, adapted from "Study on China's Carbon Finance Market" (Green Finance Professional Committee of China Finance Association, 2016, pp. 41–45), compiled by the author

Pilot name	**Year 2013**	**2014**	**2015**	**2016**
Beijing	97.1(403/415)	100.0(543/543)	100.0(543/543)	100.0(945/945)
Tianjin	96.5(110/114)	99.1(111/112)	100.0(109/109)	100.0(109/109)

Shanghai	100.0(191/191)	100.0(190/190)	100.0(191/191)	100.0(310/310)
Hubei	---	100.0(138/138)	100.0(168/168)	100.0(242/242)
Guangdong	98.9(182/184)	98.9(182/184)	100.0(186/186)	100.0(244/244)
Shenzhen	99.4(631/635)	99.7(634/636)	99.8(635/636)	99.0(803/811)
Chongqing	---	Not yet announced, about 70 (estimated)		

Table 4.13 Performance of each pilot scheme from 2013 to 2016 (%), quoted from "Review and Prospect of China's Carbon Trading Scheme" (Wang & Chen, 2018, p. 28).

This kind of comparative experiments caused some difficulties in launching a united national market. These provincial markets were mainly based on the local rules and national administrative regulation (Table 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11). The cap-and-trade scheme, moreover, lacked a special law and unifrom rules, which inhibited the formation of stable market expectations. The quota allocation method was relatively simple, and the auction ratio was low (Table 4.12). The carbon allowance allocation method also needed to be optimized.

4.5 Policy Instruments Finalized: a National Carbon Market with Incremental Growth

On June 17, 2015, at the 3rd Shenzhen International Low-Carbon City Forum, a deputy director of the Domestic Division of the Climate Department of the NDRC, revealed that the central authorities hopes to launch a unified national market by the end of 2016 or early 2017. This county-level cadre pointed out that from 2015 to 2016, the Climate Department will pay more attention to issuing regulations on the management of carbon emission rights, formulating plans for the total amount and allocation of national allowances, and formulating management rules for trading agencies and other rules for third-party verrification agencies (Wang, Z., 2015). In July, the Climate Department organized the Hearings on Administrative Licensing Issues Concerning the National Regulation on Carbon Emission Trading Management (Draft). Representatives from the Legislative Affairs Office of the State Council, the Laws and Regulations Department of the NDRC, the China National Institute of Standardization, the China Electricity Council, the World Bank, the United Nations Development Program, and some relevant enterprises attended the

hearings and expressed their opinions on the new administrative licensing issues involved (Laws and Regulations Department of the NDRC, 2015).

As noted, in January 2016, the NDRC issued the *Notice on Doing a Good Job in the Key Tasks of Launching the National Carbon Emission Trading Market* (NDRC, 2016b). In March, the *Regulation on the Administration of Carbon Emissions Trading* was included in a preparatory project for the legislative plan issued by the General Office of the State Council (State Council, 2016b). On June 13, Liu He, the Deputy Director of the NDRC[78], presided over a special meeting and proposed to accelerate the institutional preparation of the carbon emission trading scheme (NDRC, 2016c). The convening of this meeting indicated that the preparations for the launch of the national market lagged behind expectations. Shortly after, a prefectural level inspector (*Xunshi Yuan*) from the Climate Department revealed:

> Although there was a delay, it was possible to announce the launch of a national market in 2017 (Xie, 2018).

Under the promotion of NDRC, the first batch of seven carbon market capacity building centers was established from March to August 2016 (Table 4.14). Except for Sichuan, the other six were in pilot localities. According to the *2016 Notice*, these pilot areas were required to provide personnel guarantees for the launch and future operation of a national market. For administrative departments, capacity building is to strengthen training in top-level design, operation management, registration system application and management, and market supervision; for participating companies, they need to strength training on basic knowledge about carbon emissions trading, carbon emissions accounting and reporting, use of registration systems, market transactions, and carbon asset management; for third-party verification agencies, they are to focus on training on data reporting and verification; for trading agencies, they are to focus on market risk prevention and control (An Employee of the IdeaCarbon Co.,Ltd., 2018).

Title	**Affiliated exchange**	**Launch time**	**Remarks**
Carbon Market Capacity Building Center (Shenzhen)	China Shenzhen Emissions Exchange	March 19, 2016	In the first three months after its establishment, it has organized 19 training sessions on carbon market capacity building for more than 1,200 trainees from Henan, Shaanxi, Yunnan, Guangxi, Gansu, Xinjiang, Hunan,

[78] At that time, he was also the Director of the Office of the Leading Group of the Financial and Economic Work of the CPCCC. A more year later, he became a vice premier.

			Baotou, Shenyang, Dalian, Qingdao, Ningbo and Xiamen.
Carbon Market Capacity Building Center (Hubei)	China Hubei Carbon Emission Exchange	April 27, 2016	Mainly for the development of carbon market capacity building training for the central and western provinces.
Carbon Market Capacity Building Center (Beijing)	CBEEX	May 19, 2016	It has already gone to Jiangxi, Henan, and Dalian to carry out carbon market capacity training in the first three months. Its main task is capacity training around the cross-regional carbon trading market scheme (Beijing -Hebei and Beijing-Mongolia).
Carbon Market Capacity Building Center (Chongqing)	Chongqing Carbon Emissions Trading Center	May 24, 2016	The first national carbon market capacity building center in the western China.
Carbon Market Capacity Building Center (Shanghai)	CNEEEX	July 11, 2016	At the very beginning, it also reached cooperation intentions with seven other provinces and some centrally managed SOEs (Datang, Shenhua, China Energy Conservation and Environmental Protection Group Co., Ltd.) on the joint construction of capacity building base.
Carbon Market Capacity Building Center (Chengdu)	Sichuan United Environment Exchange	July 9, 2016	The first capacity building center in non- pilot areas.
Carbon Market Capacity Building Center (Guangdong)	Guangzhou Carbon Emissions Exchange	August 3, 2016	It has gone to neighboring Guizhou, Guangxi and other cities in the Pearl River Delta to carry out capacity building training at the very beginning.

Table 4.14 Seven Carbon Market Capacity Building Centers, adapted from the relevant pages of the official website of the "IdeaCarbon"[79], compiled by the author

During this period, Sichuan and Fujian were actively seeking to join the provincial pilot scheme. A staff member of a carbon trading consulting company recalled: "In order not to frustrate the proactive provincial authorities, the NDRC neither officially approved nor completely rejected these applications" (An Employee of the Tanpaifang Net, 2019).

[79] IdeaCarbon (*Tan Dao*) is the earliest open platform for China's carbon market information. Its website is available at: http://www.ideacarbon.org/.

In fact, these two provinces made a lot of achievements in reducing carbon emissions. In May 2016, the Sichuan United Environment Exchange became the first carbon trading agency in the non-pilot area to be registered with NDRC. Chengdu Municipal DRC completed its carbon emission verification of 25 enterprises with annual carbon emissions of 10,000 tons and above in steel, petrochemical, cement, electric power, and electrolytic aluminum sectors as well as in other industries in any year from 2013 to 2015. In the *Chengdu Low-Carbon City Construction Annual Plan (2017),* Sichuan Provincial DRC planned to strive for the landing of a national carbon emission trading platform in its capital city. In addition, it also wanted to compete with Chongqing Municipality for the status of western trading center. In 2015, Sichuan produced about one-fifth of the country's clean energy, and its non-fossil energy accounted for 30% of the local primary energy consumption (Reporter, 2016a). In June 2016, the official website "Fujian Carbon Emission Trading Market" hosted by Fujian Provincial DRC was officially online. Shortly after, Fujian DRC issued an implementation plan for the provincial carbon market, proposing to realize the formal operation by the end of 2016.[80] The emission units to be included in the Fujian provincial program were corporate or independent accounting units that had a total comprehensive energy consumption of more than 10,000 tons of standard coal in any year between 2013 to 2015 among the 9 industrial sectors (electricity, petrochemical, chemical, building materials, steel, nonferrous metals, papermaking, aviation, ceramics) (Zhou, l., 2016).

Faced with these local ambitions, the hesitant leaders of the NDRC were very cautious about the expansion of provincial pilot schemes. It would rather allow the original pilots to continue unsatisfactorily than approve new provincial pilots that are willing to join. This unclear policy situation lasted for almost one year. Although there were rumors that a national carbon trading market covering eight industries would be launched in the middle of 2017, this was not the case. On August 16, 2017, the Climate Department of the NDRC presided over the "National Carbon Market Planning and Construction Symposium" (Reporter, 2017e). The participants were still discussing the launch, operation, and supervision issue of the national market. A senior researcher of the NCSC reminded:

> The construction of a national carbon market is a political task. There is a long way to go. The breadth of horizontal policy coordination involved in this policy experiment reflects Beijing's determination to fulfill its international climate commitments (Chai, 2018).

[80] For more information, see "Fujian launched its carbon market", official website of the State Council, available at: http://www.gov.cn/xinwen/2016-12/22/content_5151566.htm.

On December 18th, the NDRC and 29 further ministries jointly issued the *National Carbon Emissions Trading Market Construction Program (Power Generation Industry)* (henceforth, *2017 Program*) (NDRC, 2017b). These ministries included all the environment related departments and government affiliated research institutes, such as the MLR, MEP, MHURD, MWR, SFA, CAS, and SOA. The central government proposed eight high-energy-consuming industries to be included in the national scheme in 2015. But in fact, a big discount was made in the end. During the experimentation, the power generation industry was the most qualified. Its data was the most complete, and the scale of its carbon emissions was comparatively larger. The total carbon emissions of more than 1,700 power enterprises had reached more than 3 billion tons. Starting from the power generation industry was very beneficial for China in terms of further expanding the national scheme. The scale of the carbon market in the power generation industry exceeded the overall size of the carbon market in any other country. Enterprises or other economic organizations with annual emissions of 26,000 tons of carbon dioxide equivalent (comprehensive energy consumption of about 10,000 tons of standard coal) and above are to be incorporated in the national scheme. Self-provided power plants in other industries with annual emissions of 26,000 tons of carbon dioxide equivalent and above will also be incorporated.

At that time, a popular view in the carbon trading policy community was that China's national carbon market needs to go through three stages: the initial preparation stage (2017-2020), the formal operation stage (2021-2030), and the mature stage (after 2030) (Chai, 2018). Therefore, the issuance of the *2017 Program* only marked the nominal launch of the national market.

	2017-2020	**2021-2030**	**2030-**
Emissions included	3 billion tons per year	4.5-5.5 billion tons per year	6-7 billion tons per year[81]
Spot trading volume	0.09-0.15 billion tons per yea	0.45-0.825 billion tons per yea	1.2-2.1 billion tons per yea
Average spot price	50 yuan per ton	100 yuan per ton	200 yuan per ton
Spot scale	4.5-7.5 billion yuan	45-82.5 billion yuan	240-420 billion yuan
Futures to Spot Ratio	0-2	5-10	20-30

Table 4.15 Phased expectations of the national carbon market, adapted from "The development stage and scale expectation of the national carbon market" (Chai & Fu, 2018, p. 42)

On December 19th, in a mobilization conference, the NDRC finally decided that Hubei and

[81] After reaching peak in 2028 (as estimated), the scale will gradually shrink.

Shanghai are to take the lead in constructing a national registration system and transaction system, respectively (NDRC, 2017c). In the conference, a director of the Climate Change Department[82] repeatedly emphasized the incremental nature of this policy-oriented market and required all localities to advance the construction of the national market step by step without affecting economic development. The Chinese policy community argued that there would be significant differences in the market scope, industry coverage, total and quota allocation methods, and policy priorities at different stages (Table 4.15). It is necessary to implement an experimentalist strategy that aims at positive incentives and is oriented towards the lowest risk in the initial preparation stage. Therefore, the central government took a very cautious look at the expectations of the carbon market and was committed to reducing the risk of errors as much as possible to ensure the steady start of the national market (Chai, 2018).

The NDRC had been carrying out relevant methodological research and preparing for more industries to be incorporated into the national market in the years to come (NDRC, 2017d). The *2017 Program* required the NDRC and relevant departments to jointly implement hierarchical supervision of the national carbon market (NDRC, 2017b). The NDRC, in conjunction with relevant industry authorities and associations, are to formulate quota allocation plans and technical specifications of verifications and also supervise their implementation. Relevant departments are to respectively supervise third-party verification agencies and transaction agencies according to the division of authorities. The departments involving climate change response at the provincial level and in *Jianhua Danlie Shi* (Cities Specifically Designated in the State Plan) are to supervise the work of data verification, allocation of quotes, and compliance of key emission units within their own jurisdiction (NDRC, 2017d).

In the this case, there was only one clear policy goal (i.e. carbon reduction and climate mitigation) at the very beginning. During the comparative experimentation, the central authority had expressed opposition to the overdevelopment of independent provincial pilot schemes. Nonetheless, the policy instrument (i.e. a national carbon market covering the power generation industry) was finally established without changing the original goal.

[82] In March 2018, the Climate Change Department was integrated into the newly established MEE.

5. Case 3: RCS Experiment

With the expansion of the growth model at the expense of the environment, China's river pollution problem was becoming more and more serious in the 1990s and 2000s. The law had long established broad provisions on the government's responsibility for river (water) pollution prevention and control. However, there were no clear rules and specifications on how to implement them. Paralleling the lack of clear policy goals for improving water quality throughout the country, the central authority also did not take advantage of existing legal provisions. A county-scale RCS governance structure appeared in local documents for the first time in 2003. But before that, there was no specific law nor administrative regulation explicitly stipulating implementation details.

Nevertheless, in the 2000s, the relevant legal framework, administrative regulation or rule was improved, and the responsibility for water pollution control was delegated to local government officials. In June 2008, the revised *Law on the Prevention and Control of Water Pollution* stipulated that "the local government at or above the county level is to take measures to prevent and control water pollution and be responsible for the quality of the water environment in the jurisdiction", and "the central government" "regards the completion of water environmental protection objectives as the content of assessment and evaluation of local governments and their responsible cadres" (NPC, 2008). These legal provisions went beyond the previous clauses that lacked specific operational details. Local RCS experiment began to gain momentum. In the 2010s, there were two key nodes in the development of the RCS experiment. In 2014, the RCS was transformed from local autonomous exploration within provincial jurisdictions to a specific pilot program proactively advocated by the Ministry of Water Resources (MWR). In 2016, the RCS was officially elevated to a political campaign. In the latter 2010s, this river-related environmental management model was gradually spread to other water bodies, including lakes, bays and beaches.

In general, the national experiment of RCS went through three stages. The first involved individual, local trials, which were not centrally planned. Second came trials followed by a scaling-up to other areas that was planned and coordinated by provinces and ministries. Third came the strong promotion and backing from the central government. The final stage is a typical mass political mobilization. The entire process of RCS experiment followed the pattern of selective political recognition.

5.1 The Origin of the RCS Experiment (2003-2009)

Every May or June since 1990, the central environmental department has issued a bulletin on China's environmental status. The *Bulletin of the State of the Environment of China (1995)*, issued in May 1996, was the first to report on water pollution status according to the four categories: main water systems, lakes and reservoirs, sea areas and fishery water areas (SEPA, 1996b, pp. 2–6). This bulletin solemnly pointed out that "with the exception of a few inland rivers and large reservoirs, pollution was increasing, especially in water bodies near the industrially developed municipalities" (SEPA, 1996b, p. 2). The *Bulletin of the State of the Environment of China (2002)*, issued in May 2003, had 45 pages. And the "water environment" section alone occupied ten pages. Nevertheless, at this time, the central government only had a general understanding of the state of water pollution across the country (SEPA, 2003e, pp. 5–14).

Taking Taihu Lake[83] as an example, the *Bulletin of the State of the Environment of China (2002)* pointed out that "among the 20 monitoring points in Taihu Lake, the points belonging to Grade I-III, Grade IV, Grade V, and inferior Grade V accounted for 5%, 35%, 5%, and 55%, respectively"[84] (SEPA, 2003e, p. 11). That is to say, the body of Taihu Lake was in a state of mild eutrophication in 2002. At the time, the central government did not initiate any national unified water pollution control project for the country's major lakes. As far as Taihu Lake was concerned, the SEPA and former Ministry of Supervision first organized an annual inspection of the implementation of the *Taihu Lake Basin Water Pollution Prevention and Control Plan during the Tenth Five Year Plan (2001-2005)*. This monitoring was, however, not backed up by higher-level authorities or coordination among ministries, and did not bring about major improvements in water quality.

[83] Located on the southern edge of the Yangtze River Delta, Lake Tai (also Taihu Lake) is one of the five largest freshwater lakes in China, with a water area of more than 2,300 square kilometers. It faces Wuxi Prefecture (Jiangsu) in the north, Huzhou Prefecture (Zhejiang) in the south, Yixing Prefecture (Jiangsu) in the west, and Suzhou Prefecture (Jiangsu) in the east (Figure 5.1). There are more than 50 rivers flowing into and out of it.

[84] In April 2002, the former SEPA and former General Administration of Quality Supervision, Inspection and Quarantine jointly issued the *Environmental Quality Standards for Surface Water (GB3838-2002)*. This standard divides the levels of surface waters into the following five categories. "Grade I is applicable to the source water and national nature reserves. Grade II is applicable to the first-level protection zone of the surface water source of the centralized domestic drinking water, the habitat of rare aquatic organisms, the spawning grounds of fish and shrimps, the feeding grounds of larvae, juveniles, etc.. Grade III is applicable to the second-level protection zone of the surface water source, the fishery waters and swimming areas such as fish and shrimp overwintering grounds, migration channels, aquaculture areas, etc.. Grade IV is applicable to the general industrial water areas and recreational water areas where the human body is not in direct contact. Grade V is mainly applicable to the agricultural water areas and water areas with general landscape requirements." Quoted from *Environmental Quality Standards for Surface Water (GB3838-2002)* (SEPA, & General Administration of Quality Supervision, Inspection and Quarantine, 2002).

In this policy contexts, the water chief system (represented by the RCS) originated in Taihu Lake Basin in the densely populated and economically developed Yangtze River Delta (Figure 5.1). The earliest trial was a temporary measure taken by Changxing County (Huzhou Prefecture, Zhejiang Province) in order to obtain the honorary title of "National Clean City" (*Guojia Weisheng Chengshi*) in 2003. Zhejiang provincial officials did not, however, promote this practice throughout their jurisdiction. In fact, what appeared in Zhejiang at this time was only a three-level or county-scale RCS framework (county, sub-district/town, and community/village). It obviously lacked vertical intervention and coordination at the prefectural and provincial levels. Still, this local governance structure was upgraded in 2007 by Wuxi Prefecture (Jiangsu Province) as a policy initiative to tackle the pollution in Taihu Lake caused by cyanobacteria, a problem which had created a politically awkward situation. In 2008, aiming to promote a cadre performance evaluation to alleviate water pollution, Jiangsu experimented with the RCS in Taihu Lake Basin. As of June 2008, 15 provincial and prefecture-level officials, including the then governor, had received the new official title of chief of the river flowing into Taihu Lake. A five-level or provincial scale RCS framework (province, prefecture, county/county level district, town/sub-district area, and village/urban community) began to emerge.[85] This section details these overlooked factual developments.

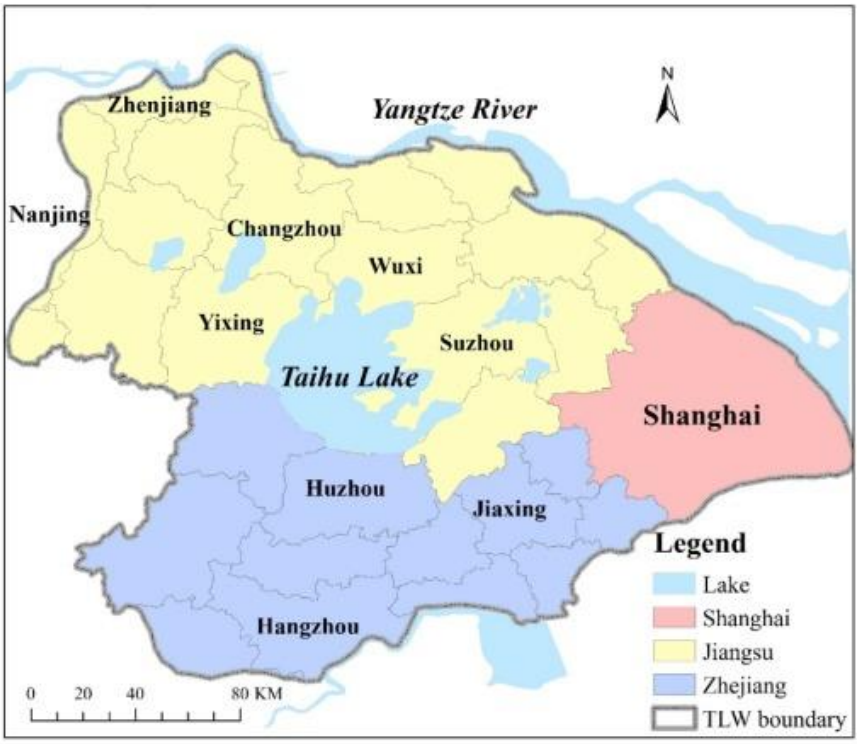
5.1.1 A County-scale RCS Framework in Zhejiang

The prototype of the county-scale RCS governance structure originated in Changxing (Huzhou, Zhejiang) in 2003. Based on this, with the official support of Zhejiang provincial authority, the media affiliated to the Zhejiang Provincial Government hyped: "Changxing County took the lead in launching the RCS; as a pioneer to try the RCS, Zhejiang's practice has reference significance for other localities" (Zhejiang Video [Zhe Shipin], 2018).[86] As a matter of fact, what appeared in Zhejiang at this time was only a three-level RCS framework (county, sub-district/town, and community/village) restricted to a specific county. It obviously lacked vertical intervention and

[85] Since rural village/urban community did not have a legal administrative status, the complete five-level RCS could also be called the formal four-level RCS in the later.

[86] In June 2018, a video with detailed introduction of the RCS in Changxing was released. On June 7, 2018, China's first RCS exhibition hall was officially opened in Changxing. This exhibition expounds the RCS practice in Changxing from 2003 to 2018. This exhibition was highly recognized by the MWR.

coordination at the prefectural, provincial and higher levels.



Note: TLW=Taihu Lake Watershed

Figure 5.1 Basics of the Taihu Lake, including the geographical position of later relevant prefectures[87]

Changxing is located on the southwest shore of Taihu Lake, and hosts dense river networks and developed water systems[88] (Office of Changxing County Government, 2016). It had often suffered from flooding and also had a long tradition of related grassroots self-governance. A rural resident of Changxing recalled:

> Historically, the local people built embankments (*Wei*[89]) to resist flood disasters. After the establishment of the PRC, those water conservancy facilities called Wei were managed by "Wei Chiefs" determined by the village committees. In this way, the "*Wei* Chief System" was born. These chiefs were mainly responsible for patrolling the embankment for 24 hours during flood season (Li, 2020).

Wei chief is the predecessor of river (section) chief. "*Wei* Chief System" is a management mechanism that delecting water governance responsibility to a specific people. But it was not a

[87] This picture is quoted from the relevant figure of the article "Water crisis, environmental regulations and location dynamics of pollution-intensive industries in China: A study of the Taihu Lake watershed", *Journal of Cleaner Production*, Vol. 216, 2019, pp.311-322, available at: https://www.sciencedirect.com/science/article/abs/pii/S0959652619301969.

[88] There are more than 500 rivers, 35 reservoirs, and 386 mountain ponds within its jurisdiction, with a total water area of 88.8 square kilometers.

[89] It generally refers to the water-proof dikes around low-lying areas in the Yangtze and Huai River basins.

formal policy program taken by local government in its effort to make cadre performance evaluation. The "*Wei* Chief System" once played the role of autonomous organizations in grassroots water governance.

Since the 1980s, Changxing had been a locality where heavy polluting industries were concentrated. By the early 2000s, its energy-intensive and highly polluting industries, such as cement, building materials and storage batteries, had caused serious environmental pollution and ecological damage (Reporter, 2016g). At that time, water-jet loom manufacturers were scattered around the main rivers, and sewage was directly discharged into the rivers. A former deputy county head of Changxing (also the first county-level river chief in Changxing), recalled:

> Although the economy had grown, the rivers and lakes had turned black, and the water sources had been polluted. At that time, the cadres and the masses were very anxious (Jin, 2018).

In 2003, in order to coordinate with Huzhou Prefecture to win the honorary title of "National Clean City", the Changxing County Government launched a governance responsibility delegating system to manage sanitary condition of the blocks, roads, and lanes. A group of "*Lizhang*" (block chief), "*Luzhang*" (road chief) and "*Linongzhang*" (lane chief) were appointed. This governance approach indeed improved the sanitation status. In October of that year, the Changxing County Party Committee and County Government promoted this governance responsibility delegating approach in the rivers within its jurisdiction (for the document, see Figure 5.2). A deputy county head became the first county-level river chief. The heads of the county's water resource bureau and environmental bureau served as the first batch of town level river chiefs. They were to build the county's three-level RCS (county, township, village).

Before this responsibility delegating system was initiated, Baoyang River, the most important source of drinking water in the county, was heavily polluted. In March 2005, the county's river chief office appointed the mayor of Shuikou Town as the chief of the upper reaches of Baoyang River. This town level river (section) chief was responsible for controlling the pollution of water jet looms, dredging, cleaning the river surface, and landscaping the river bank. In July, the RCS was implemented for the tributaries, including Zhushan Port, Jiashan Port, and 700 Mu Port around the Baoyang River. The village/community heads served as the lowest level river chiefs, which carry out the responsibilities of river dredging and cleaning, agricultural non-point source pollution treatment, and water and soil conservation treatment and restoration. As widely

recognized, the effect of water pollution control was very "obvious" (Guangming Reporter Team, 2018).

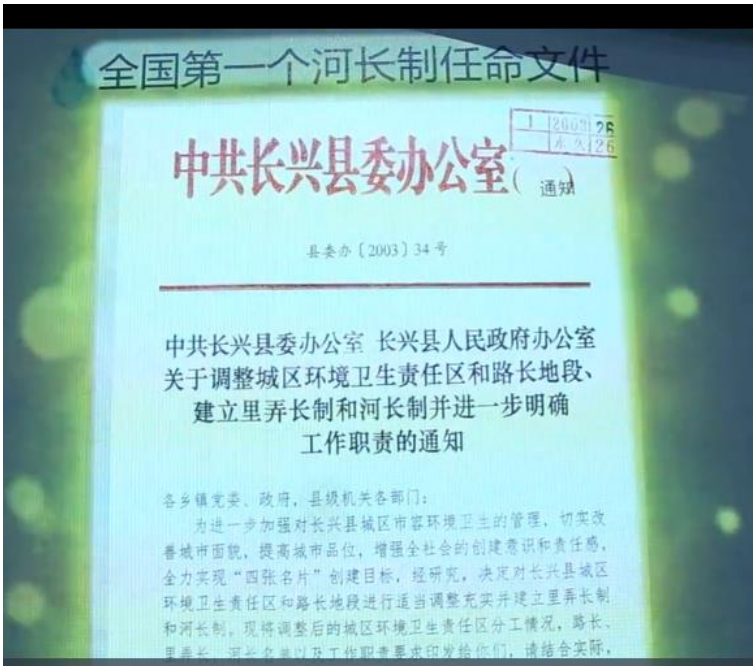


Figure 5.2 Audio screenshot of the first RCS document, quoted from "RCS in Changxing" (Zhejiang Video, 2018)

On August 15, 2005, Xi Jinping, then Secretary of Zhejiang Provincial Party Committee[90], came to Yu Village (Anji County, Huzhou) to inspect environmental protection measures. Nine days later, he wrote a famous editorial entitled "*Lushui Qingshan Jiushi Jinshan Yinshan*"[91]. In May 2007, affected by the outbreak of cyanobacteria in Taihu Lake Basin, some rivers in Huzhou were polluted. Without a secretary of the provincial party committee with strong environmental awareness, Zhejiang officials reacted indifferently to the pollution incident. Nevertheless, in 2008, Changxing independently launched a "Clear Water into the Lake" project on the rivers flowing into Taihu Lake. The four deputy heads of the County Government respectively served as the chiefs of the four main rivers. They were to coordinate the control of industrial pollution, agricultural non-point source pollution, and river course improvement. As of the end of 2008, Changxing had formed a three-level and county-scale RCS governance structure by itself.

[90] On October 12, 2002, Xi Jinping became the acting governor of Zhejiang Provincial Government. On November 21, he was promoted to Secretary of the Zhejiang Provincial Party Committee. On January 22, 2003, he concurrently served as the director of the Standing Committee of the Zhejiang Provincial People's Congress. On March 24, 2007, Xi was reassigned as Secretary of the Shanghai Municipal Party Committee. After taking office as the Party-state's supreme leader, many of his cronies and subordinates in Zhejiang were reused. The most famous of these is Li Qiang, who served as Secretary-General of the Zhejiang Provincial Party Committee in the 2000s, was promoted to Secretary of the Shanghai Municipal Party Committee in 2017, and will become Premier of the State Council in 2023.

[91] In English, "Lucid Waters and Lush Mountains are Invaluable Assets". It was also the argument put forward by Xi Jinping, in August 2005 in Anji County. As he became the president, this sentence became the propaganda slogan of promoting Zhejiang's experience and routine in environmental policy domains.

5.1.2 An Initial Prefecture-scale Experiment in Jiangsu

The cyanobacteria outbreak in Taihu Lake in the summer of 2007 put Jiangsu Province at the forefront of the RCS experiment. The main water body of Taihu Lake is in Jiangsu Province (Figure 5.1). This practice of independently conducting an comprehensive RCS experiment at four formal administrative levels (province, prefecture, county, and town) originated in Jiangsu. The most important political impetus is the strong promotion of the then Vice Governor Qiu He and the support of the then Secretary of the Provincial Party Committee Li Yuanchao, especially considering that Li is the cadre valued by Hu Jintao. In Jiangsu, where Comrade Li Yuanchao[92] was in power, this incident unexpectedly became a catalyst for the rapid implementation of the RCS framework across the province.

In May and June of 2007, serious cyanobacteria pollution occurred in the Taihu Lake Basin, causing pollution of drinking water source in Wuxi. There was a serious shortage of drinking water, and "bottled water in many supermarkets and stores was snapped up" (Reporter, 2007a). The negative impact on tap water was due to the accumulation of cyanobacteria near the water sources. During the anaerobic decomposition process, a large amount of odorous substances, such as NH_3, thiol and hydrogen sulfide, were produced. The municipal government stated that it was caused by the persistent high temperature. But, the SEPA argued that "it was a disaster both natural and man-made" (Reporter, 2007e).

Although this cyanobacteria outbreak did not affected the neighboring big cities: Suzhou (the prefecture with highest GDP in Jiangsu) and Shanghai Municipality (the largest municipality in the country) (Reporter, 2007d), it also aroused the attention of central leaders (Wu, 2009). On June 11, at the Taihu Lake Water Pollution Prevention Symposium, a Vice Premier publicly conveyed the instructions from Premier Wen Jiabao: "The water pollution control work in Taihu Lake had

[92] Li Yuanchao, served as the Secretary of the Jiangsu Provincial Party Committee from 2003 to 2007. Before the 17th National Congress of the CPC, Li Yuanchao and Xi Jinping were all candidates for Hu Jintao's successor. At this party congress in October 2007, Xi became a member of the Politburo Standing Committee, which presides over the work of the Central Secretariat. Li Yuanchao was a member of the Politburo, which oversees the Central Organization Department. In the CPC's political ranking, Li was significantly lower than Xi. In November 2012, at the 18th National Congress of the CPC, Xi became the General Secretary of the CPCCC. The following year, Xi became the President of the PRC, and Li, a member of the Politburo, was only assigned an honorary vacancy-Vice President.

been carried out for many years, but it has not solved the problem completely. The pollution incident has sounded an alarm for us and must be highly valued. It is necessary to seriously investigate and analyze the causes, increase the intensity of comprehensive management, and research and propose specific treatment plans and measures" (Reporter, 2007c). In response, Li Yuanchao stressed: "The central government clearly required that the responsibility for Taihu Lake governance is mainly in local government. We must resolutely implement central authority's deployments" (Reporter, 2007b). On July 7, at the Taihu Lake Water Pollution Control Work Conference, Li emphasized again: "No matter how prosperous and developed the Jiangsu's economy is, if the government can't supply clean water, the people will not recognize our development model. In such case, Jiangsu's Moderately Prosperous Society (*Xiaokang Shehui*) would be subverted" (Reporter, 2007f). Material wealth without a healthy environment could be considered unsatisfactory. A set of measures and institutional innovations should be adopted to ensure that the natural environment of this province will be enhanced in support of the welfare of the people. Thus, the provincial officials made up their mind to control the pollution of Taihu Lake by governing rivers in the Taihu basin.

In the context, Wuxi Prefecture was duty-bound to be at the forefront of piloting RCS governance structure (Che, 2014; Ding, 2017; Li, Y., 2017; Zhang, 2010; Zhu, 2015). In August 2007, the Wuxi Municipal Party Committee and Wuxi Municipal Government jointly issued the *Water Quality Control Targets and Assessment Measures for the River Sections (Lakes, Reservoirs, Ponds, Springs) in Wuxi (Trial)*. The program explicitly required that the monitoring results of the water quality of 79 river sections be included in the performance evaluation of the main responsible comrades of each county level leader (i.e., county level river chief). Shortly after, the principals of the party and government at all levels in the prefecture were appointed as the chiefs of 64 rivers and their major river sections. The promulgation of the above document was considered to be the institutional origin of RCS framework in the province. One year after, the water quality compliance rate of 79 river sections in Wuxi was raised from 53.2% to 71.1% (Ding, 2017).

Gradually seeing positive results, Wuxi prefectural officials decided to fully promote this governance structure in its jurisdiction. In 2008, the Wuxi Municipal Party Committee and Wuxi Municipal Government jointly issued the *Decision on the Comprehensive Establishment of the River (Lake, Reservoir, Pond, Spring) Chief System to fully Strengthen the Rectification and Management of the River (Lake, Reservoir, Pond, Spring)* (Development Research Center of the

Ministry of Water Resource, 2017). It clarified the management institution framework, work flows, accountability mechanisms and assessment methods, and required the full implementation of RCS throughout the prefecture.

A Protagonist of RCS in Jiangsu and His Patron

Recently, there was no state media to report on how Jiangsu Province began to conduct RCS policy experiments in its southern region. The contribution of Qiu He to promoting this governance method can no longer be mentioned. A former reporter of *Southern Weekend* recalled:

> When the RCS framework was initiated and gradually implemented in southern Jiangsu region, Comrade Qiu He[93] was serving as the Vice Governor of Jiangsu, in charge of urban and rural construction, transportation, production safety, and environmental protection affairs. During his two years in Jiangsu Provincial Government, he was the provincial-level leader directly responsible for environmental governance. The pollution control in Taihu Lake Basin was one of his most important political achievements (Ju, 2018).

On July 7, 2007, at the conference aforementioned, witnessed by more than 300 comrades, on behalf of the provincial government, Qiu signed the *Eleventh FYP Taihu Lake Water Pollution Control Target Liability Contract* with the mayors of Wuxi, Suzhou, and other three prefectures respectively (Ju, 2008). At that time, Qiu He was well acknowledged as a protagonist of the New Public Management (NPM) in China; he gave strong support to the RCS experiment (Zhu, 2017a). Under his leadership, the RCS framework was designated as an effective tool for cadre performance evaluation. A retired cadre at the Party School of Jiangsu Provincial Party Committee recalled:

> Li Yuanchao, who was the supreme leader of Jiangsu at the time, had high opinion of Qiu He and directly delegated this arduous task to him (A Retired Cadre at the Party School of Jiangsu Provincial Party Committee, 2019).

[93] Qiu He served as the Deputy Mayor of Suqian Prefecture, Jiangsu Province in 1996. In 2001, he was appointed the Secretary of the Suqian Municipal Party Committee. In 2006, he served as the Vice Governor of Jiangsu Province. In 2008, he served as the Secretary of the Kunming Municipal Party Committee (a member of the Standing Committee of the Yunnan Provincial Party Committee, whose political ranking is higher than a vice governor). In 2011, he was appointed as the Deputy Secretary of the Yunnan Provincial Party Committee. During Qiu's tenure as the secretary of Suqian Municipal Party Committee, Shuyang officials set up a large billboard at a highway intersection to welcome guests. There were four people on it, Hu Jintao, Li Yuanchao, Qiu He, and the then Secretary of the Shuyang County Party Committee. Therefore, there was a rumor that this was aimed at telling the locals that Li belongs to Hu's faction, Qiu belongs to Li's faction, and the county party secretary belongs to Qiu's faction.

As a matter of fact, Qiu He had always been a local official strongly supported by Li Yuanchao. In December 1996, Qiu He, the Deputy Mayor of Suqian Prefecture[94], concurrently served as the Secretary of the Shuyang County Party Committee. After taking office, Qiu He made some effective but controversial reforms to govern this backward county[95] (Zhang, 2004). Quickly, Qiu had won the support of general public in the county. Later, he scaled up his NPM style reform in Suqian Prefecture, such as selling the houses of state-owned agencies, restructuring the SOEs owned by the prefectural government, auctioning the town health centers, hospitals, and promoting the privatization of public schools.

In 2001, the Jiangsu Provincial Party Committee and Provincial Government jointly issued a document instructing: "allow and support Suqian Prefecture to adopt more flexible policies and practices and explore new ways to accelerate development without violating national policies and regulations" (Zhang, L., 2018). Obviously, at that time, in Jiangsu Province, there was general acquiescence in Qiu's iron-fisted approach. More importantly, Hu Jintao, the then General Secretary, praised Qiu during his inspection of Jiangsu Province in April 2004 (A Professor at the School of Public Administration, Tsinghua University, 2019).

After being affirmed by the central leader, the provincial leaders began to promote Qiu. At the end of 2005, Li Yuanchao recommended Qiu He to the Central Organization Department of the CPC as the Vice Governor of Jiangsu. At that time, the local environmental departments were duty-bound in implementing the SOD; the construction department was in charge of the Socialist New Rural Construction; and the frequent occurrence of production accidents was of political significance. Qiu was assigned to take charge of these matters. It was well accepted that he had good political prospects (A Retired Cadre at the Party School of Jiangsu Provincial Party Committee, 2019). At a session of the Provincial People's Congress where Qiu was officially appointed as the Vice Governor, the Standing Committee of the Provincial People's Congress selected 8 out of more than 600 proposals and suggestions to carry out a follow-up supervision. Among them, three were in Qiu's jurisdiction: "Focus on people's livelihood, strengthen water source protection legislation and law enforcement, and ensure the safety of drinking water sources", "Proposal on increasing financial investment and accelerating the construction of environmental governance infrastructure", and "Recommendations on promoting the utilization of

[94] Suqian is located in northern Jiangsu. In 1996, in order to speed up the development of this impoverished area, the State Council approved the merger of four counties and one county level district to form Suqian Prefecture.
[95] Such as order thousands of civil servants to act as cleaner, mobilize dozens of police station chiefs to rotate in different stations to quickly improve public security situation, collect evidence to actively fight corruption, deduct a ten percentage of the salary of civil servant to build high speed roads, and require houses in rural areas to be converted into two-story buildings (i.e., first floor for commercial use and second floor for residential use).

sewage sludge resources" (A Retired Cadre at the Party School of Jiangsu Provincial Party Committee, 2019). This indicated that the provicial leaders intended to give Qiu an opportunity to show his governance skills.

Since serving as the Vice Governor, Qiu had specifically faced the increasingly severe environmental problems across the province. In October 2006, the Jiangsu Provincial Government announced the *Special Remediation Plan for Chemical Production Enterprises in the Province*. At that time, chemical industry was one of the pillar industries of Jiangsu. Qiu personally served as the leader of the rectification task force for the chemical industry in the province. In December 2006, with the support of Li Yuanchao, Qiu personally presided over the first phase of the Municipal and County Leaders' Environmental Protection Seminar. Half a year later, the cyanobacteria crisis in Taihu Lake provided him with an opportunity to display his skill to the full. He not only signed responsibility contracts with the leaders of relevant prefectures, but also appointed himself as the provincial level chief of Taihu Lake. He became the first lake chief in the country (Wu, 2009; Zhu, 2017a). In this way, he set an example to delegate the pollution control responsibility: the responsibility for water pollution control was directly assigned to specific local leader.

5.1.3 Policy Transfer to Dianchi Lake Basin: Another Prefecture-scale Experiment

After Li Yuanchao took office in the Central Organizational Department of the CPC, Qiu He was appointed as the Secretary of the Kunming Municipal Party Committee, i.e. the supreme leader of the capital of Yunnan Province (for Qiu's resume, see Footnote 93). As expected, the RCS governance structure was transplanted from southern Jiangsu to central Yunnan region. Qiu vigorously promoted an RCS experiment in the pollution control of the Dianchi Lake[96].

[96] Since the 1990s, the pollution of cyanobacteria in Dianchi Lake was very serious. Every year at the two sessions (i.e. NPC and CPPCC), there were always Yunnan representatives repeatedly complaining that central government had invested too little in the water pollution control for Dianchi Lake. Before 2007, Yunnan spent nearly 10 billion yuan on Dianchi Lake, but the water quality of Dianchi Lake still hadn't improved. In 2006, cyanobacteria broke out in Dianchi Lake. According to the *Bulletin of the State of the Environment of China (2007)*, the overall water quality of Dianchi Lake is inferior to Grade V. Among eight key monitoring sections, five was lower than Grade V. For the "Bulletin of the State of the Environment of China (2007)", see SEPA (2008b).

On New Year's Day in 2008, when inspecting Kunming's environmental protection, Qiu claimed that "to control pollution, we must first govern people, and to govern people, we must first govern cadres" (Lu, 2010). Shortly after, 35 rivers flowing into and leaving Dianchi Lake had their respective river chiefs. In May 2008, Qiu appointed himself as the general river chief of Kunming, immediate superior of these 35 chiefs. To solve river environmental problems on site, all the chiefs were to patrol the river once every half month. Moreover, he regarded the performance of environmental governance as a binding indicator of Kunming's cadre performance evaluation. Inspired by this reform, task force, which was supervised by the river chief, organized worker teams to demolish illegal constructions on both sides of the rivers, move livestock breeding near the water bodies, and introduce a ban on the dumping of raw sewage at rivers (Lu, 2010).

Comprehensive improvement of river course was the focal point of pollution control in Dianchi Lake Basin, and the main feature of Kunming's RCS experiment. In accordance with the principle of "inspect the source of pollution, clean up the pollution, eliminate non-point source pollution, and prohibit the breeding of livestock and poultry in the watershed protection zone", in the first half of 2009, the water quality of these rivers in the basin were significantly improved. Although the water quality of the Dianchi Lake itself was not greatly improved, compared with the same period in 2008, the comprehensive pollution index of 26 rivers flowing into Dianchi Lake all declined to varying degrees from January to April 2009 (Editor, 2009). Nevertheless, the RCS experiment was not promoted throughout the province.[97]

From 1997 to 2014, Qiu He indeed played a role of enthusiastic administrative reformer at the local levels. The recognition of central and provincial authorities was a decisive factor for the spread of Qiu-style policy experimentation. As was known to all, Li Yuanchao was his patron, and more importantly, Hu Jintao was Li's patron (A Professor at the School of Public Administration, Tsinghua University, 2019). In September 2008, China Reform Meritorious Award, sponsored by the Urban Development and Environmental Research Center of the Chinese Academy of Social Sciences, was announced. Qiu was the only serving provincial/ministerial level official to receive this honor (Wei, 2008). Relying on eight-month selection process, this award enjoyed high public support. After being affirmed by his superiors, the self-righteous Qiu had transferred his governance style from northern Jiangsu to southern Jiangsu, and then from Jiangsu to Yunnan.

[97] In 2008, in order to protect the Erhai Lake, Dali Bai Autonomous Prefecture piloted the RCS in Eryuan County. Meanwhile, Shenyang and Dalian Municipality (Liaoning Province), and Zhoukou Prefecture (Henan Province) had also begun similar experiments.

Qiu's Downfall (2015-2016)

The good times didn't last long. In March 2013, at the first meeting of the 12th NPC, President Hu retired as expected. Li Yuanchao was appointed as the Vice President of PRC, an honorary post with no real power. Before that, at the 18th National Congress of the CPC, he also failed to enter the highest political rank: the Standing Committee of the Central Political Bureau of the CPC. Since then, he began to fade out of political arena. Later, the scandal of Qiu's acceptance of bribes began to ferment. For a time, news about him was about to fall one after another. In March 2015, Qiu He, then deputy secretary of the Yunnan Provincial Party Committee, was investigated by the Central Commission of Discipline Inspection of CPC on suspicion of serious violations of party discipline and state law. In July 2015, the Central Political Bureau decided to expel him from the party and public office, and transferred the clues about his suspected crime to judicial organs.[98] At last, in December 2016, an intermediate court sentenced Qiu He to 14 years and six months in prison for accepting bribes (Reporter, 2016f). This may be the reason why the RCS experiments in Yunnan and Jiangsu can no longer be set as a national model by central ministry and state media: the political image of their protagonist was greatly damaged. As will be mentioned later, almost at the same time, the RCS governance structure, one of his main political achievements, was finally recognized by the central government and began to spread across the country (CPCCC & State Council, 2016a; Zhu, 2017a).

5.2 A Formal Four-level RCS Governance Structure in Jiangsu (2008-2013)

After Li and Qiu left Jiangsu one after another, the RCS continued to be carried out in an orderly manner. Whether this continues to be cared for by Li Yuanchao is unknown. In June 2008, the Jiangsu provincial government decided to fully promote the RCS framework in the southern Jiangsu. It issued the *Notice on Implementing the Double River Chief System in the Main Lakes and Rivers in Taihu Lake Basin* (Jiangsu provincial government, 2008). The provincial government required to implement a "Double RCS" in 15 rivers entering and leaving the Taihu

[98] It was said that he took 24.33 million RMB in bribes.

Lake[99]. Some prefectures and counties even appointed incumbent leaders of local people's congress and local CPPCC committee as the river chiefs (Jiangsu Water Resource Information Center, 2016). In 2009, the Wuxi Prefectural Government fixed the duties of river chief in a local administrative regulation-- the *Regulation on River Governance in Wuxi* (Development Research Center of the Ministry of Water Resource, 2017). By 2010, Wuxi had achieved full coverage of RCS framework at its 5635 village-level river sections. River chiefs at the four local levels (prefecture, county, town, and village) were all appointed, and their respective governance responsibilities were clarified. 25 major rivers were all supervised by county-level river chiefs. River (section) chiefs all had listed their own "river chief noticeboard" publicly (see Figure 5.3), which contains the basic situation of the river, the name, position, responsibility and contact details of the chief (Development Research Center of the Ministry of Water Resource, 2017). The office of Wuxi Prefecture's RCS leading group, i.e. Wuxi Prefectural RCS Office, was located in the Prefectural Water Resource Bureau. The staff members of this office were from the prefecture's relevant administrative bureaus involving water governance and environmental protection.

[99] The leaders of the provincial government, the leaders of the relevant provincial departments served as the river chiefs at provincial level. The river chiefs at the local level were the government officials of the prefectures and counties (or county level districts). These river chiefs were to organize comprehensive environment improvement program for the rivers, and also inspect the implementation.

Figure 5.3 An example of river chief noticeboard[100], taken by the author, August 2021

Wuxi Prefecture also issued the *Administrative Measure for Governing Taihu Lake and Protecting Water Sources*, and *Opinion of the Organization Department of the Wuxi Municipal Party Committee on Implementing "One-vote Veto" Mechanism on Major Decision-making Arrangements*. The Disciplinary Committee of the Wuxi Prefectural Party Committee and the Wuxi Municipal Supervision Bureau conducted talks on responsible cadres who were ineffective, procrastinating, and not performing duties; and held accountabilities for negligence, and malfeasance. Through regular, random, and special inspections, Wuxi RCS Office conducted a phased assessment and year-end assessment of the RCS in each county (or county-level district), and timely reported on assessment results.

By 2012, a prefectural scale RCS governance structure (prefecture, county/county level district, town/subdistrict, village/community) had been completely established (Development Research Center of the Ministry of Water Resource, 2017). This structure has a four-level framework [101] (Zhu, M., 2016). Under this top-down approach, a regular joint meeting mechanism, departmental liaison officer mechanism, and information sharing mechanism were established among each level. In this way, departmental relations were actively coordinated, and water governance tasks were decomposed. This governance structure has three features: the first is clear division of responsibilities and strict accountability; the second is reasonable allocation of governmental resource and coordination; and the third is moderate goal setting and strong enforcement. The most notable feature is to strengthen accountability and improve enforcement (Zhu, X., 2018a). Wuxi's RCS experiment had achieved good results. Its water relevant agencies were integrated and reconciled to maximize their institutional capacity. In 2008, Jiangyin County (Wuxi Prefecture) issued the *Interim Regulation for RCS Assessment*, carrying out a "percentage" assessment mechanism in its RCS experiment. In the mechanism, the water quality of river or lake section accounts for 20 points, and the completion of policy measure accounts for 80 points. The water quality was assessed monthly, and the policy measure completion was thoroughly examined

[100] This noticeboard is located in a urban community, located in Taiping Sub-district, Zhaoyang District, Zhaotong Prefecture, Yunnan Province. It indicates the sections of this river; county, town, and community-level river chiefs and their contact information; their governance responsibilities; and the telephone number for reporting. This is a small river with a length of 27 kilometers. It has only three-level chiefs (county level, town level and community level).

[101] The main party and government leaders of the prefecture served as the first-level river chiefs for the major rivers. The main leaders of relevant municipal bureaus (such as water resource, environmental protection, and sanitation division) and counties (county level districts) served as the second-level river chiefs. The leaders of relevant county bureaus (such as water resource, environmental protection and sanitation division) and relevant towns served as the third-level river chiefs. And the heads of villages and urban communities were the forth-level river chiefs.

quarterly. This county's three-level framework (county, town/sub-district, and village/urban community) had responsed to the problems of water environment within a very limited time period (Editor of The Environmental Economy, 2009).

In September 2012, the Jiangsu Provincial Government issued the *Opinion on Strengthening the RCS Work of River Governance in the Jiangsu Province* (Jiangsu Water Resource Information Center, 2016). There were policy copying and imitation, as well as new development in the transfer process within Jiangsu's different prefectures (Table 5.1). In 2012, Suzhou Prefectural Government issued the *Notice on Strengthening the Implementation of the "RCS" Work in Suzhou Municipality*. In 2013, Xuzhou Prefecture was identified by the MWR as a pilot city for the "Water Ecological Civilization Construction" program (for its details, see Section 6.4). The municipal government implemented the *Opinion on Establishing the River Chief System to Ensure Xuzhou's Water Clearer*, clarifying the responsibility of party and government officials at four administrative levels for the management of rivers and lakes (Jiangsu Provincial Department of Water Resource's RCS special column, 2018). In the early 2013, Changzhou issued the *Opinion on Strengthening the River Governance of the RCS in Changzhou*, clarifying the departmental responsibilities and the scope of water safety protection. In September 2013, the newly revised *Implementation Measure for Changzhou River Channel Management* was promulgated, which clarified the river management scope and management authority (Jiangsu Provincial Water Resource Department RCS special column, 2017). In May 2013, the Nanjing Prefectural Government issued the *Notice on Strengthening the Work of the "RCS" in the Nanjing Municipality*; the Lianyungang Prefectural Government issued the *Notice on Strengthening the Work of the "RCS" in Lianyungang*. In January 2014, the Nantong Prefectural Government issued the *Notice on Strengthening the Work of the "RCS" in Nantong Prefecture*.

Before the central government decide to carry out a RCS experiment throughout the country, Jiangsu's RCS experiment had gone through three stages: voluntary transfer between prefectures, voluntary transfers advocated by provincial governments, and mandatory transfers required by provincial governments (Zhou & Xiong, 2017). The first stage is the policy experiment conducted in Wuxi, and policy learning and policy promotion in other southern prefectures led by provincial government. The second stage is the voluntary policy transfer and policy diffusion between prefectures. The provincial government positively recognized Wuxi's RCS experiment but had not ordered to promote. At this stage, there were already four prefectures that had carried out the transfer and diffusion of RCS framework, including Suqian, Huai'an, Yancheng and Taizhou.

These were the prefectures that were deeply influenced by Qiu He's governance style. The third stage is the mandatory policy promotion led by the provincial government. The *Opinion on Strengthening the RCS Work of River Governance in the Jiangsu Province* required remaining eight prefectures to launch their respective RCS experiments. These developments reflected the continuous strengthening of provincial government's intervention. A professor at a university in Nanjing recalled:

> Despite these developments, propaganda efforts related to the Jiangsu practices remained relatively small in scale and received relatively little attention from Beijing's official media (Cao, 2018).

Prefecture	Experiences and Innovations gained from the promotion of RCS experiment
Yancheng	A comprehensive governance mode, including river dredging, water system connection, control of pollution source, and pollution discharge reduction, was formed. A "Four in one" (road, river course, garbage and landscaping) management mode for the medium-sized river was formed.
Changzhou	The follow-up supervision, accountability, regular evaluation and dynamic clean-up mechanism for water administrative approval was launched and improved. The demarcation, confirmation and registration of basin-type rivers, large and medium-sized reservoir dam management and reservoir area management were also launched.
Zhenjiang	Two management models had been experimented. One is the PPP model. The other is to hand over the management and protection of river course to water conservancy service enterprise.
Nanjing	A civil RCS was formed, combining the civil RCS with the formal RCS, covering the "vacuum" zone of daily supervision.
Xuzhou	combine the RCS with the pilot project of "Water Ecological Civilization Construction", the creation of water conservancy scenic areas, and the water conservancy project construction
Nantong	The "seven-in-one"[102] management of rural environment was formed.

Table 5.1 Experiences of Jiangsu's prefectures in promoting the RCS, adapted from "The New Development of the RCS in Jiangsu's Prefectures" (Zhou & Xiong, 2017, p. 40)

[102] It refers to seven aspects: 1) rural river course improvement, 2) agricultural roads, bridges and culverts management, 3) landscaping management, 4) garbage collection and treatment, 5) livestock and poultry manure control, 6) prohibition of burning straw, and 7) prohibition of illegal construction.

5.3 Policy Diffusion in Seven Further Provinces (2013-2016)

General Secretary Xi delivered a speech on national water security in March 2014. Then, central water resource ministry and some provincial officials felt "unprecedented pressure" from the top leadership (Fujian Department of Water Resource, 2016). Since 2013, seven central and eastern provinces and province-level municipalities had independently conducted RCS experiments after obtaining the acquiescence of the MWR. As of the November 2016, most of them had implemented the RCS framework throughout their respective jurisdictions. In these pilot provinces, except for Tianjin, Beijing and Anhui, other four provinces have high water resources per capita (Table 5.2). This is probably because the water resource ministry argued that areas with abundant per capita water resources are particularly exemplary for the promotion of RCS experiment.

Province	Time of launching RCS experiment	Per capita water resources (cubic meters per capita, decimal point omitted)
Tianjin	January 2013	76
Zhejiang	November 2013	2057
Fujian	August 2014	3218
Jiangxi	November 2015	3601
Anhui	December 2015	1285
Beijing	May 2016	95
Hainan	August 2016	4266

Table 5.2 Basics on the RCS experiment in seven provinces, as of September 2016, adapted from "China Statistical Yearbook 2016" (National Bureau of Statistics, 2017) and the relevant table of the article "RCS: How Is Continuous Innovation Possible?" (Zhou & Xiong, 2017)

Zhejiang

As aforementioned, as of August 2008, a three-level RCS framework (county, town and village) was initially formed in Changxing County (Reporter, 2017k). Shortly after, Huzhou Prefecture began to experiment with the RCS (Hu, 2015). As of 2013, Changxing had appointed a total of 547 chiefs at four levels (county, town/subdistrict, village/urban community, and even sub-village levels) (Reporter, 2017k). The county leaders served as the county-level river chiefs for 16 major

rivers, the town-level cadres served as the chiefs of main river sections or cross-village river sections, the village head served as the village-level chief. Moreover, the cadres of contracting group served as the sub-village level chiefs. The total length of river in the county is about 1,660 kilometers. They were governed by these 547 chiefs. By the end of 2016, Changxing had completely eliminated the "garbage river" and "black river" (see Footnote 104) (Reporter, 2017k). However, Zhejiang's RCS experiment did not keep up with those of Jiangsu. As of November 2013, only a few prefectures in Zhejiang, including Jiaxing, Wenzhou, Jinhua and Shaoxing, voluntarily conducted the RCS experiment.

In November 2013, Zhejiang Provincial Party Committee and Zhejiang Provincial Government jointly issued the *Opinion on Full Implementation of the RCS and Further Strengthening Water Environment Governance* (henceforth, *2013 Opinion*), clarifying that the river chief at each administrative level should be responsible for "governing, controlling and safeguarding"[103] (Zhejiang department of water resource, 2016). Since then, a five-level RCS (province, prefecture, county, town and village) had been gradually established across the province. In May 2015, the Zhejiang Provincial Party Committee issued the *Several Opinions on Further Implementing the RCS to Improve the Long-Term Mechanism of Cleaning Three Kinds of River*[104](henceforth, *2015 Opinion*), further clarifying the achitecture of RCS framework, the requirement of river chief's noticeboard, and the inspection mechanism (Zhejiang department of water resource, 2016). It reemphasized that the river chiefs at all levels are to fulfill the "three in one" responsibility: "governing, controlling and safeguarding". The *2015 Opinion* required that local government should establish an inspection mechanism and a complaint reporting system for river chiefs. As for the former, prefecture-level river chief should inspect water environment monthly, county-level chief twice monthly, town level chief three times monthly, and village-level chief four times monthly. Every inspection must be well recorded. As for latter, the river chiefs and their respective offices should record the complaints of the masses, and promptly hand over the relevant local departments for handling, and then tracking implementation and feedback. Also, a supervision mechanism for river chief should be established. The river chiefs at all levels were to strengthen the supervision and guidance for the lower-level chiefs.

By 2015, Zhejiang had also built up an River Sheriff System (RSS). The public security organs across the province were required to correspond to the five-level RCS framework. The public

[103] The "governing" is to monitor the water quality and prevent the rebound of pollution. The "controlling" is to coordinate the remediation of pollution sources. The "safeguarding" is to supervise the daily work of dredging, cleaning, and maintenance.
[104] The "Three kinds of river" refer to garbage river, black river and stinky river.

security organs at each level corresponded to the river chiefs at each level. River chief and river police at each level cooperate with each other to complete pollution control law enforcement. Supported by the RSS, the effect of water quality governance was improved. Same as Jiangsu's experience, Zhejiang local governments also paid attention to the role of entrepreneurs and civil activists, appointing "enterprise river chief" and "civil river chief" to improve public participation (Zhejiang department of water resource, 2016).

Zhejiang accelerated the pace of RCS implementation after the *2013 Opinion* was promulgated. Its limelight gradually overshadowed Jiangsu. Before the release of *2015 Opinion*, Zhejiang had already formed a five-level RCS governance structure, appointing 6 provincial-level river chiefs, 199 prefectural-level river chiefs, 2,688 county-level river chiefs, 16,417 town-level river chiefs, and 42,120 village-level river chiefs (Reporter, 2016d). Zhejiang provincial officials took almost three years to eliminate 6,500 kilometers of the "garbage river" and rectified more than 5100 kilometer "black and stinky" rivers (Reporter, 2016e). In 2015, among the monitoring surface water points, 72.9% of the points had Grade III surface water quality and above, an increase of 9.1 percentage points from 2013 (Zhejiang department of water resource, 2016). In the first half of 2017, the water quality compliance rate of the province's surface water was 81%, another increase of 8.1% from 2015.

Tianjin

Tianjin Municipality is located in the lower reaches of Haihe River. It is the estuary of six rivers[105]. Since 2008, Tianjin government successively implemented two rounds of comprehensive treatment for the water environment (2008- 2011, 2011- 2013) (Tianjin Water Affair Bureau, 2016). This municipality began to experiment with the RCS governance structure in January 2013. Three phased goals for 2013, 2015 and 2020 were determined. Four main tasks were put forward: strengthen pollution interception and control, strengthen cleaning of bank water surface, strengthen river landscaping, and establish a long-term management mechanism.

The municipal government had established a leading group for river water environment management (hereinafter referred to as the leading group). A deputy mayor served as group

[105] They are Haihe River, Yunhe River, Chaobai River, Yongding River, Daqing River, and Ziya River. Its water area covers 1,256 square kilometers. By 2007, due to excessive sewage discharge, the proportion of the river courses with inferior Grade V water quality exceeded 70%, and the water quality compliance rate of surface water was only about 20%.

monitor. The leaders of construction, transportation, finance, environmental protection, land, agriculture, forestry, and water affair departments made up group members. This group was responsible for deploying and supervising the implementation of river water environment governance plans, reviewing river water environment management standards, specifications, assessment methods and assessment results, and coordinating and solving major river water environment problems. Tian Municipal RCS office (located in the Municipal Water Affair Bureau) was responsible for implementing the decisions of the leading group. At the same time, each district/county government had also established a corresponding leading group and office. The district/county head or deputy head served as the group leader. The leaders of relevant district/county departments made up the group members. In this way, Tianjin's water environmental protection and governance responsibilities were assigned to the administrative leaders at all levels. A three level RCS governance structure (district/county, town/industrial park, and villages/community) was established.

Moreover, Tianjin's RCS Office had issued the *Working System of the Leading Group Office for River Water Ecology and Environment Management in Tianjin*. establishing regular meeting, liaison officer, assessment, report, publicity systems. These systems were to coordinate the water governance responsibilities spread across different municipal departments, such as garbage disposal, sewage treatment, river course improvement, and riverside greening (Tianjin Water Affair Bureau, 2016). Each district/county government had set a goal of water environment management and maintenance. All districts and counties established their respective water environment assessment agencies. These full-time assessment agencies adopt a combination of regular and irregular assessments.

In order to enhance public participation, Tianjin promulgated the *Tianjin Municipality's Measure for the Employment and Management of Social Supervisors for River Water Ecology and Environment*. More than 400 social supervisors were hired throughout the municipality. Each river or river section had a river chief noticeboard, announcing a 24-hour social monitoring telephone number. As of November 2016, river courses with abnormal sensory water quality decreased from 210.9 kilometers to 34.18 kilometers, river courses that did not meet environmental sanitation standards decreased from 53.3 kilometers to almost zero, river courses with excellent assessment result increased from 620.3 kilometers to 2274.29 kilometers; and the "garbage river", and "black and stinky river" were basically eliminated (Tianjin Water Affair Bureau, 2016).

Fujian

Fujian have densely distributed river systems.[106] In 2014, Fujian became the first provincial-level site for the Pilot Demonstration Zone for Promoting Ecological Civilization. The "Ecological Province" pilot program implemented by central environmental ministry ten years ago was upgraded to a national strategy recognized by top leadership.[107] In the spring of 2014, the leaders of Provincial Water Resource Department carried out a series of research activities on major river basins, such as the Minjiang River and the Jiulong River, in an effort to solve the water environmental problem. Half a year later, the research results were drafed.[108] The leaders of Fujian Provincial Party Committee and Fujian Provincial Government instructed the Provincial Water Resources Department to promulgate detailed measures (Fujian Department of Water Resource, 2016). Afterwards, the *Several Opinions of the Fujian Provincial Government on Further Strengthening the Protection and Management of Important River Basins and Practically Ensuring Water Security* and the *Implementation Program for the River Chief System in Fujian Province* were completed (Fujian Department of Water Resource, 2016).

In August 2014, the provincial government issued the *Implementation Program for the River Chief System in Fujian Province*. It specially convened a video meeting for mobilizing the protection and management of major river basins, and further called for the implementation of a comprehensive four-level RCS framework. In the RCS implementation, five large rivers that cross the prefectures were governed by the provincial-level river chiefs, and the leaders of prefectures, counties (county level districts), and towns in these basins served as the river section chief in their own jurisdiction. In other river basins, the leader of prefecture, county, town governments served as the river (section) chief in their own jurisdiction. The special administrator was set up at rural village/urban community level. The list of river (section) chiefs at all levels was announced to the public. As of the end of 2014, the RCS framework had been implemented throughout the province (Fujian Department of Water Resource, 2016).

Three deputy provincial governors respectively served as the river chiefs of the three major rivers

[106] There are more than 700 rivers. Each of them have a rain-collecting area of approximately 50 square kilometers. The total length of these rivers is almost 25,000 kilometers. The largest six are "Five Jiang and One Xi". They are Minjiang River, Jiulong River, Ao River, Jin River, Ting River, and Mulanxi River.

[107] See the next chapter for details on the Pilot Demonstration Zone for Promoting Ecological Civilization and the "Ecological Province" pilot program.

[108] They were "Investigation and Thinking on Protecting the Mother Rivers in Fujian", and "Investigation and Measures on Promoting the Transformation and Upgrading of Small Hydropower in Fujian".

(Minjiang River, Jiulongjiang River and Aojiang River). The three provincial-level river chiefs hold an annual on-site meeting for the RCS governance structure. Their RCS offices were located in the Provincial Water Resource Department. Each office had four task forces: comprehensive, business, technical support and publicity. The provincial-level river chief was to guide the implementation of cross-basin protection management and comprehensive water environment improvement plans, coordinate and solve major environmental problems, and conducte supervision and inspections for lower levels of chiefs. Prefecture and county-level river (section) chief was to guide the protection and management of the contracted river, supervise the lower-level chiefs and relevant local departments, coordinate and handle watershed protection management and water disputes between upstream and downstream, and organize water environment remediation and water environment emergency handling. The governance responsibilities of river section chiefs and special administrators at the town (sub-district) level, and villages (urban community) level had been clarified by the prefecture and county governments. The liaison agency of the river (section) chief was to assist the river (section) chief, regularly conduct daily inspections, and report to the chief in time when problems are found. Fujian had incorporated the RCS experiment into the performance appraisal of governments at all levels. The assessment results were used as the basis for the cadre performance evaluation.

Anhui

In 2015, the Wuhu County Government organized task forces from the county's water conservancy, agriculture, environment and construction departments to learn RCS experiences from Zhejiang. The Anhui Provincial Water Resource Department selected Wuhu County to conduct an RCS pilot program (Anhui Department of Water Resource, 2016). In 2016, Wuhu County Government formulated the *Pilot Program of River Chief System in Wuhu County*. The county party committee listed it as one of its priorities. The county party committee secretary and county governor served as the commanders of the RCS program. A water ecological treatment and protection project was directly led by the chairman of the county's CPPCC committee. Every town/sub-district and village/urban community had designated its own river chiefs and specific managers. Wuhu had clearly clarified the goal of the RCS pilot program: "two cleanliness and two improvements" (Anhui Department of Water Resource, 2016). The county implemented the five major projects in its effort to conduct the RCS experiment (Anhui Department of Water Resource, 2016). The first is industrial pollution prevention projects. The second is agricultural pollution prevention and control project. The third is dredging and bank protection projects. The fourth is

rural cleaning project. The fifth is residential pollution control project. The five major projects were implemented by the County's Environmental Protection Bureau, Agricultural Commission, Water Conservancy Bureau, and Construction Commission (Anhui Department of Water Resource, 2016). [109]

Jiangxi

In 2014, Jiangxi was also included in the sites of the Pilot Demonstration Zones for Promoting Ecological Civilization. Jiangxi's RCS experiment was an integral part in fulfilling the "Jiangxi model of Ecological Civilization" proposed by the General Secretary Xi. On November 1, 2015, the Jiangxi Provincial Government officially issued the *Work Program for the Implementation of the RCS in Jiangxi Province* (Jiangxi Department of Water Resource, 2016). Jiangxi Province had basically established an RCS framework at five levels (provincial, prefecture, county, town and village) in 2016. The secretary of the provincial party committee served as the province's general river chief, and the governor served as the province's deputy general chief. The other seven provincial level leaders respectively served as the provincial level chiefs for the "Five Rivers, One Lake and One Jiang".[110] 23 provincial departments were relevant agencies for the experiment. The 11 prefectures and 100 counties (county level districts) had all appointed their own river chiefs. Jiangxi had appointed a total of 88 prefecture-level river chiefs, 822 county-level river chiefs, 2,422 town-level river chiefs, 13,916 village-level river chiefs, and 19,544 special administrators. All levels of the RCS offices were also established (Jiangxi Department of Water Resource, 2016).

In early March 2016, the *Key Points and Evaluation Plan for the River Chief System in 2016* was issued and then implemented. The prefectures and counties in the province had all formulated their respective working program. The Provincial General River Chief Meeting, the Provincial Level River Chief Meeting, and the Provincial Joint Meeting of Relevant Agencies, were held each year. Through collecting data and disseminating information, 7 briefings and 1 bulletin were issued. The evaluation results were incorporated into the cadre performance evaluation system. The *Rule for the Evaluation of the River Chief System in Jiangxi Province in 2016* was formulated and

[109] As of November 2016, Wuhu had mobilized more than 3,000 cadres and activists, dispatched more than 600 cleaning boats, dispatched more than 450 vehicles, cleared more than 200 river channels and ditch banks, standardized 24 RCS noticeboards, greened 35,000 square meters of river banks, restricted 4650 acres of surface aquaculture, prohibited more than 1,100 acres of surface aquaculture, and banned 160 unlicensed fishing nets.
[110] They are Ganjiang River, Fuhe River, Xinjiang River, Raohe River, Xiuhe River, Poyang Lake and Yangtze River.

issued. To support the RCS experimentation, the *Implementation Rule for the Investigation of the Responsibility of the Leading Cadres of the Party and Government in Jiangxi Province for Ecological Environmental Damage (Trial)* was also implemented (Jiangxi Department of Water Resource, 2016).

Beijing

In May 2014, the secretary of the municipal party committee and the mayor all instructed to implement the RCS governance structure in Beijing. At the beginning of 2015, Beijing municipal government selected the highly populated Haidian District as the first site of the RCS experiment (Beijing Water Affair Bureau, 2016). Haidian District implemented the *Work Plan for Strengthening Water Environmental Protection and Implementing the River Chief System in Haidian District*. By the end of the year, Haidian had established a working leading group. A deputy district head served as the group leader. And group members comprised the leaders of relevant district departments and all the town (sub-district) heads. The district's RCS office was located in Haidian District's Water Affair Bureau, which was responsible for the inspection of RCS experiment in each sub-district and town. The inspection and assessment for the RCS experiment were mainly composed of two parts: a monthly self-inspection for each town and a bimonthly inspection led by the working leading group (Beijing Water Affair Bureau, 2016).

After one year of experiment, at the end of 2015, the Beijing Municipal Water Affair Bureau formulated the *Opinion on Implementing the Responsibility System of Local Administrative Leaders for River and Lake Ecological Environment Management in Beijing*. In June 2016, the Beijing Municipal Government officially issued the *Notice on Printing and Distributing the "River Chief System" Work Plan for Beijing's River and Lake Environment Management*. On July 15th, then deputy mayor in charge of water resource management presided over the municipality's RCS deployment meeting. The capital's RCS work plan was to implement four mechanisms and three main tasks. The first is the "general river chief" mechanism. At the municipality and district levels, there were "General River Chief" and "Deputy Chief River Chief" respectively.[111] The office of the general river chief is located in the water resource department at the same level, and the office director was to implement the decision and deployment of the "general river chief" and

[111] The general chiefs were respectively held by the leaders at the same administrative level and were to supervise the environmental quality of the rivers and lakes in their respective jurisdictions. The deputy general chiefs were the overall dispatchers of the environmental management of rivers and lakes in their respective jurisdictions. They were to inspect the RCS experiment in their own jurisdictions.

"deputy chief river chief" (Beijing Water Affair Bureau, 2016). The second and third mechanisms are the analogy of the first mechanism at district (county) level and sub-district (town) level. The fourth mechanism is daily management mechanism, including regular inspection of river chief, regular work meetings, supervision and assessment. The three tasks were (1) inspecting direct discharge of sewage, inspecting garbage dumps, and inspecting illegal construction; (2) clearing river banks, clearing river surfaces, and clearing river bottoms; (3) treating black and odorous water bodies, treating non-point source pollution, and treating the ecological environment of banks.

As of the end of 2016, the *River Chief System Assessment Measures in Beijing* was formulated, the *River Chief Information Board Template and Setting Requirements* were issued; the *Beautiful River and Lake Selection Measures in Beijing* were formulated. Some training and working meetings were carried out to promote the assessment systems for the RCS experiment in every districts (Beijing Water Affair Bureau, 2016).

Hainan

By May 2015, in Hainan, the proportion of surface water monitoring points inferior to the Grade V standard was more than 20%. They were mainly in densely populated tourist areas, such as Haikou Prefecture and Sanya Prefecture. To improve the water environment, the provincial government formulated the *Three-year Action Plan for Water Pollution Control of Urban Inland Rivers (Lakes) in Hainan Province* in accordance with the "Ten Articles of Water"[112]. The plan was implemented in September 2015. It called for the implementation of RCS governance structure at all the prefectures, counties (districts), and towns (sub-districts) (Hainan Department of Water Resource, 2016). On September 18, the provincial government convened a special action video-and-telephone conference. On November 19, an on-site meeting was convened to mobilize an RCS experiment across the province. The provincial water resource department had erected river chief noticeboards along the 64 inland rivers (lakes) in the province to disclose the each chief's responsibilities and contact information; formulated assessment methods, and regularly announced assessment results.

[112] The State Council issued the *Action Plan for Prevention and Control of Water Pollution* (referred to as "Ten Articles of Water") in April 2015. This is a strategic deployment to launch a national battle for water pollution prevention and control. The "Ten Articles of Water" clarified key pollutants, key industries, and key areas, and also paid attention to the role of market mechanism, science and technology, and rule of law. For the details, see the next section.

By 2016, all prefectures and counties had established their respective RCS leading group to supervise the RCS experiment and formulated annual plan. On August 17, 2016, the provincial water resource department formulated the *Implementation Measure for the River Chief System of Urban Inland Rivers (Lake) in Hainan Province*. The leader of each prefecture, county (district) government was appointed as the river (lake) chief within its jurisdiction, and the town (sub-district) leaders through which the inland river (lake) flows served as the river (section) chief. At the same time, the provincial government organized an assessment for the cadre performance every six months (Hainan Department of Water Resource, 2016). The Sanya Municipal People's Congress passed the *River Ecological Protection and Management Regulations in Sanya*, which was implemented at the end of 2016 (Hainan Department of Water Resource, 2016). Haikou Prefecture, which is the provincial capital, adopted a PPP model, allowing professional enterprises to manage 32 polluted water bodies for 15 years. As of November 2016, the province had formulated treatment plans for 92 water bodies, of which 60 water bodies had begun to be treated (Hainan Department of Water Resource, 2016).

5.4 Promotion across the Country (2016-2018)

As of October 2016, without any mandatory order from the central government, a total of nine provinces had conducted RCS experiments either autonomously or with the consent of the MWR. Based on these local experiences, the central government formulated and issued an united experimental program. On October 11, 2016, the 28th meeting of the CJGCDR, chaired by General Secretary Xi, approved the *Opinion on the Full Implementation of the River Chief System* (henceforth, *2016 Opinion*) drafted by MWR (Reporter, 2016b). The top leadership emphasized that protecting rivers and lakes is of great significance to the well-being and sustainable development of the Chinese nation. This meeting specially emphasized that those who cause damage to the water ecology and environment shall be held accountable in strict accordance with relevant laws and regulations.

5.4.1 A National Strategy: Policy Goal Finalized

On November 28th, the General Office of the CPCCC and the General Office of the State Council jointly issued the *2016 Opinion* (Reporter, 2016c). The *2016 Opinion* pointed out that in recent years, some regions actively experimented with the RCS, which had effectively promoted water resource protection, waterfront management, water pollution prevention, and water environment governance; therefore, the full implementation of RCS governance structure is an integral part of constructing an (socialist) ecological civilization (CPCCC & State Council, 2016a). The policy goal of *2016 Opinion* is that local party committees and governments at all levels should establish the RCS framework by the end of 2018. The party committees and governments of all provinces shall report the implementation of the previous year to central government before the end of each January. Soon thereafter, the MWR and MEP jointly formulated an implementation plan for the *2016 Opinion*. They planned to carry out a mid-term evaluation for the RCS experiment at the end of 2017.

The central government required a formal four-level RCS (province, prefecture, county, and town) be built up across the county. The supreme leader of each province should serve as the provincial general river chief. All provinces should set up provincial-level river chief for major rivers and/or lakes within their jurisdictions. These provincial level chiefs should be provincial level leaders. River chiefs at the county level and above must set up their respective RCS offices. The staff of the RCS office should mainly come from the water resource department and the environment department at the same administrative level. River chiefs at all levels were to organize the management and protection of the corresponding rivers and lakes, including water resource protection, waterfront management, water pollution prevention, and water environment governance. River chiefs at all levels were to organize and coordinate the clean-up and rectification of prominent ecological and environmental problems (occupation of rivers, reclamation of lakes, excessive discharge of pollutants, illegal sand mining, damage to waterways, and electric poisonous fish frying). The RCS office was to implement the decision of the river chief at the same administrative level.

The RCS governance structure have six main tasks[113] (CPCCC & State Council, 2016a). In terms

[113] The first is to strengthen water resource protection (i.e., implement the most stringent water resource management system, implement the dual control for total water consumption and intensity, implement the discharge requirement according to the pollutant holding capacity and total pollutant discharge determined by

of performance assessment and accountability, local governments were to implement differentiated performance evaluation, and take the result of natural resource asset audit for leading cadre. River chiefs at the county level and above were to organize the assessment of corresponding lower-level river chiefs. The assessment results were used as the basis for local cadre performance evaluation. Local government was to implement a lifetime accountability system for the damage to water ecology and environment. The central government required all localities to establish information release platform, and erect river chief noticeboard[114] at prominent location on the bank of river and lake. The *2016 Opinion* called on local government to hire social supervisor to evaluate the result of management and protection, and raise public participation.

5.4.2 Mutually Reinforcing Policy Programs

Before the national experiment was launched, the strategic goals, laws and administrative regulations for water pollution prevention and control were all in place. First, the RCS governance structure and experiment did have an appropriate legal basis. Its first legal source is the *Environmental Protection Law of PRC* passed in December 1989.[115] Article 6 of this law stipulated that "local governments at various levels shall be responsible for the environmental quality within their jurisdictions". The second legal source is the *Law on the Prevention and Control of Water Pollution*. The RCS is a concrete account and implementation approach of these general provisions.

In May 1984, the *Law on the Prevention and Control of Water Pollution* was passed at the 5th meeting of the Standing Committee of the 6th NPC (NPC, 2017). Article 3 of this law stipulated

water functional zoning). The second is to strengthen management and protection of river and lake shoreline. The third is to strengthen water pollution prevention and control (i.e., implement the Ten Articles of Water, investigate the sources of pollution into rivers and lakes, and optimize the layout of sewage outlets into rivers and lakes). The fourth is to strengthen water environment management (i.e., determine the water quality objectives of various water bodies in accordance with water functional zoning). The fifth is to strengthen water ecological restoration (i.e., implement returning farmland to lakes and wetlands, returning fishing to lakes, restore the natural connection of rivers and lakes, carry out the health assessments of rivers and lakes, and promote an ecological protection compensation mechanism). The sixth is to strengthen law enforcement and supervision (i.e., establish and improve laws and regulations, establish the joint law enforcement mechanism between departments, improve the linkage mechanism between administrative law enforcement and criminal justice, establish the daily supervision and inspection system for rivers and lakes, and severely crack down on the illegal activities involving rivers and lakes).

[114] The informations on this noticeboard are river chief's responsibilities, river and lake overview, management and protection goals, and telephone numbers for social supervision.

[115] It was amended at the 28th meeting of the Standing Committee of the 12th NPC on June 27, 2017.

that "relevant departments of State Council and local governments at all levels must incorporate water environmental protection work into their plans and adopt measures to prevent and control water pollution". Article 4 stipulated that "environmental protection departments at all levels are the organs that implement unified supervision and management of water pollution prevention and control", and "water resources departments at all levels" shall "cooperate with the environmental protection departments to implement the supervision and management of water pollution prevention and control". On March 20, 2000, the State Council promulgated the *Regulation for the Implementation of Law on the Prevention and Control of Water Pollution*[116] (State Council, 2000).

To improve supporting institutional systems for the RCS experiment, on June 27, 2017, the 28th meeting of the Standing Committee of the 12th NPC decided to amend the *Law on the Prevention and Control of Water Pollution* (Reporter, 2017b). The RCS was explicitly included in the new revision. Article 4 of the revised law stipulates that "local governments at all levels are responsible for the quality of water environment in their jurisdictions and shall take timely measures to prevent and control water pollution". Article 5 stipulates that "provinces, prefectures, counties, and towns are to establish the river chief system, and organize water resources protection, waterfront management, water pollution prevention and control, and water environment governance of rivers and lakes within their jurisdiction". And Article 6 stipulates that "the central government implements a water protection target responsibility system and an cadre performance evaluation system, and regards the completion of water environmental protection targets as the assessment and evaluation for local government officials" (Reporter, 2017b). The Director of Institute of Environmental Law, Wuhan University, argued:

> The amendment helped to strengthen the legal basis for the experiment of RCS governance structure (Qin, 2019).

Second, the *Action Plan for Prevention and Control of Water Pollution* was also of great significance for achieving the goals proposed by the *2016 Opinion* (Director of Water Environment Department, Ministry of Environmental Protection, 2016). In April 2015, the State Council issued the *Action Plan for Prevention and Control of Water Pollution* (henceforth "*Ten Articles of Water*") (State Council, 2015a). *Ten Articles of Water* was a strategic deployment to launch a national battle for water pollution. In response to the urgency, complexity, and

[116] On March 19, 2018, the State Council abolished it.

arduousness of water pollution prevention and control, the *Ten Articles of Water* set forth short-term goals: by 2020, the water environment quality should be improved in stages, seriously polluted water bodies should be greatly reduced, the level of drinking water safety should be improved, over-extraction trend of groundwater must be strictly controlled, the increasing trend of groundwater pollution must be initially curbed, the environmental quality of the coastal waters has been steadily improving, the water ecological environment in Beijing-Tianjin-Hebei, Yangtze River Delta, and Pearl River Delta should be improved. It also put forward the mid-term goals.[117]

The *Ten Articles of Water* had assigned ten measures. Some of these measures were later repeated in the *2016 Opinion* and included in the national RCS experiment. While others focused on improving the water pollution prevention and control system in terms of economy, science and technology, and public participation. For example, the second was to promote transformation and upgrading of the economic structure; the fourth was to strengthen scientific and technological support; the fifth was to give full play to the role of the market mechanism; and the tenth was to strengthen public participation and social supervision. Moreover, the central ministries regularly published the list of ten prefectures with worst and best water environment across the country. After the release of *Ten Articles of Water*, the MEP signed a target responsibility contract with each province. This contract decomposed and delegated water pollution prevention and control tasks to each province. By analogy, policy objectives and tasks were refined and assigned to every prefecture, county and town in a traditional top-down approach. In this way, party committees and governments at each local level had to undertake the task of water pollution prevention and control.

In this way, before the national RCS experiment was launched, the strategic goals, laws and administrative regulations for water pollution prevention and control were all in place. So the time is ripe for change. All these constituted favorable institutional factors for rapid promotion of RCS governance structure (A Cadre of the Department of Water Environment Management, MEP, 2018).

[117] By 2030, the overall quality of the national water environment must be improved, and the functions of the water ecosystem should be restored. Specific indicators to achieve these 2020 goals were also determined. The short-term targets were as follows. By 2020, the seven key river basins including the Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River, and Liaohe River should have an overall good water quality ratio of more than 70% (up to or better than Grade III). Black and smelly water bodies in built-up urban areas (at prefecture level city and above) should be controlled within 10%, the proportion of centralized drinking water sources in cities (at prefecture level and above) that meets or is better than Grade III should higher than 93%. The proportion of extremely poor groundwater nationwide must be controlled at about 15%. The proportion of coastal waters with good water quality (Grade I to II) should reached about 70%. In the Beijing-Tianjin-Hebei region, the proportion of water bodies that were useless (i.e. below Grade V) should be dropped by about 15%. The Yangtze River Delta and Pearl River Delta regions should basically eliminated water bodies that were useless.

5.4.3 Strong Push by an Inter-ministerial Mechanism

On December 10, 2016, the MWR and MEP jointly issued the *Implementation Program for the Opinion on the Full Implementation of the RCS* (MWR & MEP, 2016). The ministries required all localities to prepare their respective working programs, refine objectives, main tasks, organizational forms, supervision and assessment measures, and determine timetables and roadmaps. Specifically, the first was to determine rivers and lakes grading list, the second was to establish RCS office, the third was to refine main tasks, the fourth is to strengthen top-down guidance, and the fifth was to clarify progress. By this time, Beijing, Tianjin, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, and Hainan had fully implemented the RCS governance structure. The ministries required these eight provinces and provincial-level municipalities refine and improve their RCS framework according to the *2016 Opinion*. Before the end of June 2017, their respective provincial-level RCS programs were required to be issued. The *Implementation Program for the Opinion on the Full Implementation of the RCS* also required the eight provinces to complete RCS related institutional systems by the end of 2017. Other provinces and municipalities were required to introduce their respective provincial programs before the end of 2017, and complete their respective institutional systems before the end of June 2018. The actual progress was faster than this timetable (Table 5.3). Three days later, the MWR, MEP, NDRC, Ministry of Finance, MLR, MHURD, Ministry of Transport, Ministry of Agriculture, National Health and Family Planning Commission, and SFA jointly held a video conference to mobilize various localities. By this time, excerpt for the eight provinces that had completed the RCS framework, there were 16 provinces that had partially experimented with the RCS (MWR, 2016). At the mobilization conference, Zhejiang, Jiangsu and Jiangxi were required to introduce their experiences and lessons in the RCS experiment.

In January 2017, the MWR and MEP jointly issued the *Notice on Establishing an Information Reporting System for the Progress of the River Chief System Work* (MEP, 2017b). They required the provincial-level river chief's office to submit implementation progress every two months. Shortly before, in his New Year Message for 2017, President Xi stated that every river will have its chief in this year (Reporter, 2016h). On March 24, 2017, the 33rd meeting of the CLGCDR reviewed inspection report on the RCS experiment throughout the country (Reporter, 2017a).

General Secretary Xi required party and government leaders at all levels continue to promote and improve the RCS governance structure.

Shortly after, an inter-ministerial coordination mechanism began to gain momentum. On May 2, 2017, the first plenary meeting of the *Inter-Ministerial Joint Conference on the Full Implementation of the River Chief System* was held (MWR, 2017a). The national promotion of RCS framework was highly policy-oriented and time-limited. Since the release of *2016 Opinion*, the MWR had worked with relevant ministries within this coordination mechanism. By this time, 31 provinces and Xinjiang Production and Construction Corps (XPCC) had all established their respective RCS frameworks. They all identified provincial-level river chiefs, established corresponding RCS office, and refined river governance responsibility. All the provincial-level RCS programs and implementation plans had been completed. But, the progresses of different provinces were mixed. 30 provincial-level RCS plans had been issued or approved by the provincial party committee and provincial government. 25 provinces had appointed their respective provincial-level general chiefs and provincial-level chief of major rivers and lakes. In some localities, the progress was slower than expected. In some localities, the pertinence and operability of implementation plan still needed improvement.

Four months later, the MWR held the second plenary meeting of this inter-ministerial coordination mechanism on September 25 (MWR, 2017b). By this time, 95% of the prefectures, 89% of the counties, and 81% of the towns had implemented their respective RCS programs and implementation plans. 14 provinces had completed their respective four-level RCS frameworks (provincial, prefecture, county and town). The number of appointed river chiefs at the four administrative levels was about 250,000. 78% of the prefectures and counties had set up their respective RCS Offices (MWR, 2018b). [118]

Province program (Issued time)	**Promulgator**	**The time when a formal four-level RCS framework basically completed**
Working Program for Further Promotion of RCS in Beijing (July 19, 2017)	Beijing Municipal Party Committee, Beijing Municipal Government	By the end of 2017
Opinions on the Comprehensive	Tianjin Municipal Party	By the end of 2017

[118] At this conference, the MWR required all localities to follow the *Guide for "One River (Lake) One Approach" Program Preparation (Trial)*. This guide aimed to further refine protection task for each river (lake) and also called upon localities to establish the river (lake) directory.

Implementation of RCS in Tianjin (May 11, 2017)	Committee, Tianjin Municipal Government	
RCS Working Program in Hebei Province (March 1, 2017)	Hebei Provincial Party Committee, Hebei Provincial Government	By the end of 2017
Program for Comprehensive Implementation of RCS in Shanxi Province (April 14, 2017)	Shanxi Provincial Party Committee, Shanxi Provincial Government	By the end of 2017
Program for Full Implementation of RCS in Inner Mongolia Autonomous Region (May 24, 2017)	Party Committee of the Inner Mongolia Autonomous Region, government of Inner Mongolia Autonomous Region	By the end of 2017
Working Program for Implementing RCS in Liaoning Province (February 11, 2017)	Liaoning Provincial Party Committee, Liaoning Provincial Government	By the end of June 2018
Working Program for Comprehensive Implementation of RCS in Jilin Province (May 2, 2017)	Jilin Provincial Party Committee, Jilin Provincial Government	By the end of 2017
Working Program for the Implementation of RCS in Heilongjiang Province (Trial) (June 30, 2017)	Heilongjiang Provincial Party Committee, Heilongjiang Provincial Government	By the end of 2017
Program for the Comprehensive Implementation of RCS in Shanghai (January 20, 2017)	Shanghai Municipal Party Committee, Shanghai Municipal Government	By the end of 2017
Opinions on Full Implementation of RCS in Jiangsu Province (March 2, 2017)	Jiangsu Provincial Party Committee, Jiangsu Provincial Government	By the end of May 2017, the five-level RCS (province, prefecture, county, town, and village) has been fully launched.
Working Program for Comprehensive Deeping of RCS in Zhejiang Province (June 22, 2017)	Zhejiang Provincial Party Committee, Zhejiang Provincial Government	By the end of June 2017, the five-level RCS (province, prefecture, county/district, town/sub-district, and village/community) has been fully established.

Working Program for Full Implementation of RCS in Anhui (March 6, 2017)	Anhui Provincial Party Committee, Anhui Provincial Government	By the end of December 2017
Program for Full Implementation of RCS in Fujian (February 27, 2017)	Fujian Provincial Party Committee, Fujian Provincial Government	By the end of 2017
Working Program for the Full Implementation of RCS in Jiangxi (Revised) (May 4, 2017)	Jiangxi Provincial Party Committee, Jiangxi Provincial Government	By the end of June 2017
Working Program for Full Implementation of RCS in Shandong (March 31, 2017)	Shandong Provincial Party Committee, Shandong Provincial Government	By the end of 2017
Working Program for Full Implementation of RCS in Henan (May 19, 2017)	Henan Provincial Party Committee, Henan Provincial Government	By the end of 2017, a five-level RCS (province, prefecture, county/district, town/sub-district, and village/urban community) has been built up.
Opinions on the Full Implementation of the River and Lake Chief System in Hubei (January 21, 2017)	Hubei Provincial Party Committee, Hubei Provincial Government	By the end of 2017
Opinions on the Full Implementation of RCS in Hunan (February 17, 2017)	Hunan Provincial Party Committee, Hunan Provincial Government	By the end of 2017
Working Program for Full Implementation of RCS in Guangdong (May 9, 2017)	Guangdong Provincial Party Committee, Guangdong Provincial Government	By the end of 2017, a five-level RCS framework (province, prefecture, county, town and village) has been built up.
Working Program for the Comprehensive Implementation of RCS in Guangxi Zhuang Autonomous Region (May 30, 2017)	Guangxi Provincial Party Committee, Guangxi Government	By the end of 2017
Working Program for the Comprehensive Implementation of RCS in Hainan (March 30,	Hainan Provincial Party Committee, Hainan Provincial Government	By the end of 2017

2017)		
Working Program for the Comprehensive Implementation of RCS in Chongqing (March 16, 2017)	Chongqing Municipal Party Committee, Chongqing Municipal Government	By the end of 2017
Working Program for the Comprehensive Implementation of RCS in Sichuan (May 5, 2017)	Sichuan Provincial Party Committee, Sichuan Provincial Government	By the end of 2017
Overall Program for the Comprehensive Implementation of RCS in Guizhou (March 30, 2017)	Guizhou Provincial Party Committee, Guizhou Provincial Government	By the end of 2017
Opinions for the Comprehensive Implementation of RCS in Yunnan (April 27, 2017)	Yunnan Provincial Party Committee, Yunnan Provincial Government	By the end of 2017, a five-level RCS framework (provincial, prefecture-level cities, counties, towns and village) has been established.
Working Program for the Comprehensive Implementation of RCS in Tibet Autonomous Region (April 1, 2017)	Party Committee of the Tibet Autonomous Region, government of Tibet Autonomous Region	By the end of June 2018
Program for the Comprehensive Implementation of RCS in Shaanxi (February 7, 2017)	Shaanxi Provincial Party Committee, Shaanxi Provincial Government	By the end of June 2018
Working Program for the Comprehensive Implementation of RCS in Gansu (July 3, 2017)	Gansu Provincial Party Committee, Gansu Government	By the end of 2017
Working Program for the Comprehensive Implementation of RCS in Qinghai (May 27, 2017)	Qinghai Provincial Party Committee, Qinghai Provincial Government	By the end of 2017
Working Program for the Comprehensive Implementation of RCS in Ningxia Hui Autonomous Region (April 19, 2017)	Party Committee of the Ningxia Hui Autonomous Region, Government of Ningxia Hui Autonomous Region	By the end of 2017

Working Program for the Implementation of RCS in Xinjiang Uygur Autonomous Region (July 3, 2017)/	Party Committee of the Xinjiang Uygur Autonomous Region, Government of Xinjiang Uygur Autonomous Region /	By the end of June 2018
Working Program for the Implementation of RCS in Xinjiang Production and Construction Corps (April 20, 2017)	Party Committee of the XPCC and the XPCC	

Table 5.3 RCS documents at the provincial level, as of the middle of 2018, adapted from the "Column -Working Program for the RCS in Provinces" (Information Center of the MWR, 2017), compiled by the author

Such a large-scale campaign-like mobilization would not have been possible without the institutional preparations for recentralization in the field of environmental policy. However, similar to previous campaign-like governance, the actual implementation of RCS was not perfect. There were some obvious difficulties in the national promotion of the RCS governance structure. First, some localities had not appointed major (party and government) leaders to serve as river chiefs in their jurisdictions. Some cadres of grassroots water stations and heads of grassroots autonomous organization were appointed as river chiefs. They were the grass-roots executors of the RCS governance structure and did not have the ability to allocate administrative resources to coordinate river management and protection. Moreover, in some places, river chiefs were only nominally appointed, and there was no supporting institutional system. The RCS architecture that can play a role is a dynamic process, not just a few information on the noticeboard. It requires comprehensive planning, meticulous design, strict management, and enough investment in capital and manpower. Without these real policy inputs and actions, the river chief noticeboard will not help. The RCS governance structure clearly required party and government leaders at all levels to assume the responsibility for river management and protection within their jurisdictions, but how they should coordinate subordinate governmental resources to fulfill the requirements of the RCS needed further exploration.

5.5 A Political Recognition in the Recentralization

After the 19th National Congress of the CPC, Zhejiang Province had drawn attention in the promotion and integration of the RCS, the Bay Chief System (BCS) and the Beach Chief System. It is worth noting that Zhejiang is the province where General Secretary Xi Jinping had been in power for four and a half years (see Footnote 90). And the famous slogan-- "Lucid Waters and Lush Mountains are Invaluable Assets" (see Footnote 91) was also proposed by him in Zhejiang. When Beijing carried out the recentralization of reform policy, this sentence became a catchphrase to vigorously promote Zhejiang's experience and practices in the field of environmental and ecological policy. The MWR and state media all paid disproportionate attention to the pilot experiences in Zhejiang. Doing so was conducive to helping the central government build directional leadership in environmental policy domains (Liu, W., 2018; Mao, 2017; Wang & Liu, 2016; Wang, J., 2017a; Zhao & Bo, 2016). This section describes how Zhejiang Province eventually became a model for the national roll-out of the RCS governance structure.

5.5.1 Lake Chief System

In 2016, according to the monitoring results of 118 major lakes across the country, only 23.7% of the monitoring sites maintained at Grade I to III (surface water quality), 58.5% were maintained at Grade IV to V, and 17.8% were below Grade V. Compared with before, the points from Grade I to III had dropped further (A Cadre of the RCS Office, MWR, 2019). Therefore, it was imperative to launch a unified nationwide program to protect lake water quality. Lake is an integral part of the river system, and it plays an irreplaceable role in flood control, water supply, navigation, and water ecology. The implementation of the LCS governance structure in lakes is the inevitable result of the nationwide promotion of the RCS. On November 20, 2017, the 1st meeting of the CCCDR, chaired by General Secretary Xi, approved the *Guiding Opinion on Implementing the Lake Chief System in Lakes* (*2017 Guiding Opinion*) (Reporter, 2017j). On January 4, 2018, the General Office of the CPCCC and the General Office of the State Council issued the *2017 Guiding Opinion* (Reporter, 2018a). In fact, the previous experiment of the RCS had consciously covered the lake waters. As early as 2007, Qiu He, the then Vice Governor of Jiangsu Province,

already served as the provincial level chief of Taihu Lake. The LCS framework is the supplement, improvement and support of the RCS framework.

Encouraged by the smooth promotion of the RCS, the *2017 Guiding Opinion* called for each province (autonomous region and provincial level municipality) to establish its own four-level LCS framework (province, prefecture, county and town) by the end of 2018. At the end of 2017, the promotion of the RCS was progressing better than the central government expected. By this time, almost all the working programs at four administrative levels (province, prefecture, county, and town) across the country had been issued. All RCS offices at the county level and above had been established[119] (A Cadre of the RCS Office, MWR, 2019).

The *2017 Guiding Opinion* required that for the major lakes in each province and the lakes that cross provinces, the provincial leaders serve as their lake chiefs; for the lakes that cross prefectures, the provincial leaders also serve as their lake chiefs; for lakes across counties, the prefecture-level leader serves as their lake chiefs. The prefectures, counties and towns where the lakes are located were to establish lake chiefs in accordance with their administrative levels. Grid management should be used to ensure that all waters in the lake area are included in the LCS governance structure. The highest lake chief of each lake is the first responsible person for the management of the lake; the highest lake chief was to coordinate the governance of lakes and rivers entering the lake, and determine the goals and tasks; the highest lake chief was to formulate an "One Lake, One Approach" plan and clarify the responsibilities of the subordinate lake chiefs; the highest lake chief was to rectify the outstanding problems such as reclamation of lakes, occupation of water areas, excessive discharge of pollutants, illegal breeding, and illegal sand mining in accordance with the law. Other subordinate lake chiefs at all levels were to manage and protect lakes within their respective jurisdictions, and implement lake management and protection according to the division of responsibilities. Watershed management agencies were called upon to play their coordinating and supervision roles.[120]

[119] The governance structure of the RCS nationwide had basically become complete. There were more than 300,000 river chiefs at four-levels. 13 provinces had also appointed river chiefs all the way down to the village/urban community level. There were 620,000 village-level river chiefs nationwide. By the end of 2017, 23 provinces had completed the establishment of their own four-level RCS governance structure.

[120] They are Yangtze River Water Resources Commission, Yellow River Water Resources Commission, Huaihe River Water Resources Commission, Haihe River Water Resources Commission, Pearl River Water Resources Commission, Songhua River and Liaohe River Water Resources Commission, and Taihu Basin Authority. They are all prefectural level agencies under the MWR. For trans-provincial lakes, the river basin management agency was to, in accordance with the requirements of water functional zoning, delineate prohibited and restricted areas for sewage outfalls into the river; to urge the provinces to implement the control of the total amount of sewage discharged into the lake; to establish a communication and consultation mechanism with the provinces, and strengthen the coordination, supervision and monitoring for lake governance.

To establish a national LCS framework, there were six tasks to complete: strictly manage and control the space of lake waters; strengthen the management and protection of lake shorelines; strengthen the protection of lake water resources and pollution prevention; strengthen the comprehensive improvement of lake water environment; carry out lake ecology restoration; improve law enforcement and supervision mechanisms (MWR, 2018c). The central government required the MWR to guide the establishment of the LCS governance structure in various regions in conjunction with the member units of the aforementioned Inter-ministerial Joint Mechanism. Each province was to strengthen the classification guidance for lake management and protection based on the characteristics and existing problems of different types of lakes (i.e., plateau lakes, inland lakes, plain lakes, urban lakes, etc.).

To conduct strict assessments, all provinces were to improve the accountability mechanism. Lake chiefs at the county-level and above were to organize the assessment of the lower-level lake chiefs. The assessment results were used as an important basis for the comprehensive cadre performance evaluation. To establish a life-long accountability system for lake ecology and environment damage, all localities were to investigate the units and individuals that caused ecological and environmental damage (i.e. lake area shrinkage, water body deterioration, and ecological function degradation). To improve public participation, all regions were to accept social supervision through various methods such as Lake Chief's noticeboard, Lake Chief APP, WeChat public account, and social supervisors.

5.5.2 A Comparison: Different Attitudes from the Central Departments

At the turn of 2017 and 2018, Jiangsu's independent RCS experiment (2007-2013) was not favored by the MWR and official media. On December 27, 2017, Provincial Department of Water Resources of Jiangsu held a press conference, announcing that Jiangsu had established a RCS framework in an all-round way. This is the first province to announce the completion of the formal four-level RCS framework (Cheng & Zhu, 2017). At the same time, the *Regulation on River Management of Jiangsu Province* was approved by the Standing Committee of the Provincial People's Congress. It took effect on New Year's Day in 2018. But the MWR and state media did

not have any positive response. This is mostly because of the replacement of political leaders. In Xi Jinping's second term (2017-2022), the star officials of the Hu Jintao era gradually exited. It is worth noting that at the 19th National Congress of the CPC not long ago, Li Yuanchao withdrew from the Central Political Bureau. Shortly after, in March 2018, Li officially withdrew from the post of the Vice President.

In sharp contrast, every move of Zhejiang Province at this time was appreciated by the MWR and the official media. On July 28, 2017, the 43rd meeting of the Standing Committee of the 12th Zhejiang Provincial People's Congress passed the *Regulation on the River Chief System in Zhejiang Province*. This is the first provincial-level legislation on the RCS framework. In October, the regulation took effect. From the beginning of 2017 to the middle of 2018, Zhejiang Provincial Government had welcomed more than 20 delegations from other provinces wanting to learn about its RCS experiment. (Deng & Shi, 2018). In January 2018, in the mid-term evaluation of the RCS promotion, the MWR and MEP argued that "Zhejiang started the RCS experiment early and has been in a leading position in the country" (Di Wu, Zheng, & Xu, 2018). A former reporter of a well-known media managed by the Central Propaganda Department of the CPC revealed:

> At the beginning of 2018, Guangming Daily sent a special report team to Huzhou, Quzhou, Hangzhou and other prefectures to conduct in-depth surveys on Zhejiang's experience in implementing the RCS through seminars, interviews, and on-site observations (Ji, 2019).

The team leader was the head of Guangming Daily: the Editor-in-Chief. [121] On February 2, the Guangming Daily reported Zhejiang's RCS experiences in a full-page article in a high-profile manner. The reporter stated that "as the pioneer of RCS, Zhejiang's practice is of reference to the implementation of the RCS in other provinces"; "at the end of 2016, the central government issued the *Opinion on the Full Implementation of the River Chief System* to promote Zhejiang's experience" (Guangming Reporter Team, 2018). The report was full of political propaganda: "As one of the provinces that pilot the RCS framework in the country, Zhejiang had initially formed a long-term water governance mechanism with the RCS as the core, achieving the goal of a more beautiful water, a more beautiful scenery, a more prosperous industry, and a more prosperous people"; "Zhejiang's exploration and experience have significance for the in-depth promotion of the RCS in various regions" (Guangming Reporter Team, 2018).

[121] Since August 1994, Guangming Daily has been a news agency directly managed by the CPC's Central Propaganda Department. As a bridge between the central authorities and intellectuals, it had a high political status. Its head, the Editor-in-Chief, enjoys deputy ministerial status.

On June 7, 2018, Changxing County's RCS Exhibition Hall, the first RCS exhibition hall in China, was officially opened. The construction of this exhibition hall began in January 2018. It was completed in May. It demonstrates the course of the RCS practice in Changxing County after 2003. This was not only supported by Zhejiang Provincial Government, but also acquiesced by the MWR. E Jingping, the new Minister of the MWR, personally attended the inauguration (Li, K., 2018). Without the support of the central government and the invitation of Zhejiang Province, ministerial cadres will not go to a county to participate in such ritual activities. It is worth noting that Zhejiang Province was the province where General Secretary Xi had been in power for four and a half years. During the Xi era, many governance measures in Zhejiang became the benchmark of the country. This political connection with the highest leader is not available in Jiangsu Province. For Jiangsu and Zhejiang, achieving early success proved not be particularly beneficial.

In recentralization, the selection process of a provincial-scale policy experimentation as a national model was completed through an asymmetric mutual recognition between the central and local governments. The explicit and implicit political recognition or acceptance from the central government is essential for a provincial experimentation to be given a national benchmark image. On the eve of the official announcement of the national coverage of RCS governance structure, Jiangsu did not receive any formal attention from the MWR and the state media. Its exemplary role in the RCS experiment and its promotion was helplessly eventually erased. Nevertheless, a professor from Soochow University still insisted:

> In fact, the formal four-level RCS governance structure originated in our province (Fang, 2018).

However, this was of little avail. There was no official document confirming that Zhejiang Province is a model for the promotion of the RCS governance structure across the country, but these apparently biased moves by the central government imply a strong sense of selective recognition.

On July 17, 2018, the Minister E announced at a press conference in Beijing that by the end of June 2018, 31 provinces had fully established the RCS framework, half a year earlier than originally planned. There were a total of more than 300,000 river chiefs at four formal administrative levels (province, prefecture, county and town). In addition, 29 provinces had

appointed more than 760,000 village-level river chiefs (Reporter, 2018b). The number of river chiefs at all five levels (province, prefecture, county/district, town/subdistrict, and village/community) nationwide exceeds one million. The Minister disclosed that "in the past year and a half, nearly 700 river chiefs at different levels have been held accountable" (MWR, 2018d). At the same time, the Minister also issued an article in the *People's Daily*, calling for the effective operation of the RCS framework (E, 2018).

5.5.3 Birth of an All-round Model: BCS and Beach Chief System Combined

In the policy experiment of the BCS, Zhejiang also achieved outstanding results. At the beginning of 2017, the SOA listed the launch of BCS experiment as a focal point of that year, and put forward a pilot BCS plan (Tao, 2017; Wang, J., 2017b). Some coastal localities responded positively. Qinhuangdao Prefecture (Hebei), Jiaozhouwan Prefecture (Shandong), Lianyungang Prefecture (Jiangsu), Haikou Prefecture (Hainan), and Zhejiang Province were selected as the experimental sites (Reporter, 2017f). The SOA hoped that the BSC experiment could be an effective approach to improve marine environmental protection. In September, it issued the *Guiding Opinion on Launching the Pilot Work of the Bay Chief System* (henceforth, *2017 Guiding Opinion*) (SOA, 2017).

The *2017 Guiding Opinion* proposed "one mechanism" and "one checklist". As for the "one mechanism", it called for the establishment of a "general bay chief" in each pilot area. The bay chiefs at all levels were concurrently assumed by the local party committees or government principals at the same level. The different levels of bay chiefs were to establish the special deliberation mechanism and the coordination mechanism. The "one checklist" referred to the determination of responsibilities and task lists.[122]

[122] Specifically, the first category was to control the discharge of pollutants, and promote the implementation of the total pollutant discharge control system and the pollutant discharge permit system. The second was to strengthen the management and control of marine space resources and landscape improvement, strictly control the newly added reclamation, and carry out the clean-up of floating garbage, beach garbage and seabed garbage. The third was to strengthen the protection and restoration of marine ecology, strengthen the management and control of the marine ecological red line area, and implement renovation and restoration projects such as "Blue Bay" , "Mangrove Forest in Southern and Tamarix in Northern" and "Ecological Islands". The fourth was to prevent the marine ecological and environmental disaster risks and strengthen the emergency monitoring system and capacity building for marine disasters and emergencies. The fifth was to strengthen the law enforcement supervision and

Moreover, the *2017 Guiding Opinion* clarified that the pilot areas should be well connected with the RCS framework to achieve a simultaneous environmental improvement of the river basin and the sea area. To do this policy coordination, the first was to actively connect the BCS pilot program with the pollution control and water quality monitoring of the main rivers entering the sea. The second was to establish a joint meeting system and an information sharing system for bay chiefs and river chiefs.

Later, Shanghai, Guangxi Province, and Guangdong Province also applied for this BCS experiment. But, among the 11 coastal provinces, only Zhejiang was fully included in the pilot area. In subsequent experiments, the SOA also paid too much attention to Zhejiang. As the RCS framework was about to cover the whole country, Zhejiang Province was ready to show its own advantages in the combination of RCS, BCS and Beach Chief System. In this combination, Zhejiang came out on top. Therefore, in the policy experimentation of several types of water area management systems, its status as a national benchmark is even more unshakable.

The first on-site meeting of the National Leading Group for the BCS Pilot Program was held in March 2018 in Taizhou Prefecture, Zhejiang. Delegations from other provinces were required to observe the operation of the bay (beach) chief system in Shitang Town, Wenling County, Taizhou (Chen, 2018a; Chen, 2018b). A vice governor of Zhejiang stated in a high profile at the on-site meeting that Zhejiang had specially established a provincial leading group for the RCS pilot program, and introduced a series of supporting measures. A deputy county level cadre in Jinhua Prefecture recalled:

> He also emphasized that all levels and departments of our province were to follow the "Outlook on Ocean" proposed by General Secretary Xi during his administration in Zhejiang, and closely integrate the pilot of bay (beach) chief system with provincial government's other strategic deployments (Liu, X., 2018).

Consciously or not, the province has emphasized its political ties to President Xi. In an authoritarian environment where the top-down approach prevails, it is helpful for local governments to pursue some of their own strategies by showing some kind of political connection with the incumbent president at every opportunity.

BCS Pilot Project in Zhejiang: Connected with Beach Chief System

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establish a routine supervision inspection system and a cross-departmental joint law enforcement supervision mechanism.

The practice of combining the RCS/BCS experiment with the Beach Chief System really originated in the Taizhou Prefecture of this Province. The following takes the Taizhou as an example to describe in detail the practice of linking the BCS and the Beach Chief System. The coastal beaches of Zhejiang are vast. This is Zhejiang's natural advantage on the issue of Beach Chief System. Before the *2017 Guiding Opinion* was issued, this province had experimented with the Beach Chief System (Quan & Gu, 2018). In July 2017, the Zhejiang Ocean and Fisheries Department issued the *Opinion on the Implementation of the "Beach Chief System" on the Coast of the Province*, requiring the implementation of beach chief system in the province (Zhejiang Ocean and Fisheries Department, 2017). To better cooperate with the BCS, the Beach Chief System has several tasks to complete. The first was to ban illegal fishing gear and "three no" fishing boats[123] on beaches. The second was to strengthen the supervision of sewage outfalls into the sea and pesticide clearing. The third was to strengthen the supervision of illegal occupation of beaches and illegal ship repair, construction and dismantling. The fourth was to strengthen the shoreline management and remediation.

The goal of the Beach Chief System program was, by the end of 2017, Zhejiang should established a three-level beach chief system (prefecture, county/ district, and town/sub-district). The implementation was led by the interim Zhejiang Fisheries Restoration and Revitalization Coordination Group. The monitor of this group was then deputy secretary of provincial party committee.[124] In November 2017, the symposium on the Beach Chief System in Zhejiang Province was held. The meeting requested that all the coastal localities should complete the governance structure of Beach Chief System by the end of this year (Reporter, 2017d). At the same time, the pilot program of Bay (Beach) Chief System was included in the province's "deepening the reform of the ecological civilization system". The "bay and beach integration" was the most obvious feature of the BCS experiment in Zhejiang.

By the end of 2017, Zhejiang had basically formed a five-level BCS framework. The bay chiefs were at provincial, prefecture and county levels, and the beach chiefs were at town and village levels. The province had appointed nearly 2,000 bay chiefs and beach chiefs. As of March 2018,

[123] The "three no" refers to the fishing vessels without ship name, ship certificate (no valid fishery ship inspection certificate, ship registration certificate, fishing license) and ship port. This was proposed by the Ministry of Transportation.

[124] According to the *Opinion on the Implementation of the "Beach Chief System" on the Coast of the Province*, leaders of the prefectural party committee and prefectural government were to serve as the prefecture-level beach chiefs. The county level leaders were to serve as the county level beach chiefs. The town/sub-strict level leaders were to serve as the town level beach chiefs. Beach chief at the prefecture or county level was to set up beach chief office. The office should be located in the marine and fishery authority at the same administrative level.

Taizhou had done the best in the combination of the BCS and the Beach Chief System. Taizhou is the prefecture with the most bays in the province. The prefecture issued the *Taizhou Prefecture's Comprehensive Implementation Plan for the "Bay (Beach) Chief System"* in the autumn of 2017 (An official of the Taizhou Municipal Bureau of Oceans and Fisheries/Taizhou BCS Office, 2019). In the following six months, Taizhou officials accelerated implementation progress so as to set a benchmark for other localities. The Second Meeting of the Fifth Municipal Party Committee and the Third Meeting of the Fifth Municipal People's Congress all required that the bay (beach) chief system should be fully implemented in the prefecture. On January 18, 2018, one meeting of the Leading Group for Comprehensive Deepening Reform of the Fifth Municipal Party Committee continued to push the implementation of the bay (beach) chief system. The Taizhou "Bay (Beach) Chief System" Work Conference, which was held on January 29, called for the continued improvement of the combination of the BCS and the Beach Chief System (An official of the Taizhou Municipal Bureau of Oceans and Fisheries/Taizhou BCS Office, 2019). As of the end of February 2018, Taizhou had built up a four-level BCS framework. Five prefecture level bay chiefs, 7 county level bay chiefs, 15 county-level beach chiefs, 86 town level beach chiefs, and 346 village level beach chiefs was appointed (Jin & Ding, 2018).

As of March 2018, Taizhou's Wenling County had established a three-level bay (beach) chief system at county, town and village levels. 5 county-level bay chiefs, 56 town-level beach chiefs, and 136 village-level beach chiefs had been appointed. Another 69 beach chief liaison managers and 42 beach inspectors were hired through the PPP approach. 152 noticeboards of the bay (beach) chief had been set up, and a "chief assistant" APP had been activated. To realize the remote monitoring of port wharves and important beaches, the county had integrated the "skynet project", fishing port visualization system and coastal defense monitoring system (Chen, 2018a). Jiaojiang District had combined the implementation of the bay (beach) chief system with the establishment of "three no" fishery towns. The problems, such as the "nets without owners" in tidal flats and "dirty, chaotic, and bad" dikes and ponds, had been effectively solved (Jiaojiang District Ocean and Fishery Bureau, 2017). Linhai County took the lead in using drones to patrol beaches, assisting the marine surveillance inspections and beach management (Shen, 2017). Luqiao District had vigorously promoted the combination of the bay (beach) chief system and the grid management. The beach area of Luqiao covers 52.2 square kilometers, which is divided into 124 grids. The district government leader served as the "general beach chief", the town leader served as the "beach chief, and the village level cadre served as the "grid chief". A total of 124 grid chiefs were deployed. To realize a multi-level monitoring (i.e., district's grid information center, town's

command platform, village's grid area, and each grid area's staff), Luqiao District invested more than 1 million yuan to set up 41 high-definition surveillance cameras at tidal flat points (Yu & Zhou, 2018). The Ocean and Fishery Bureau of Yuhuan County had specially launched a "Beach Chief Assistant" APP, which containd the columns such as "beach patrol records" and "tidal flat information". The APP also had a positioning function. In the daily inspections, the beach chief could directly upload information through the APP if a problem is found. The APP's background could receive information in real time. The relevant county departments could process it immediately (Shen, 2018). As of September 2017, with the help of the APP, Yuhuan had banned 58 "three no" ships, confiscated more than 17,000 kilograms of illegal fishing, and filed 119 cases (Wu, 2017).

By the early 2018, Taizhou had completed the *Comprehensive Pollution Control Program (2014-2017)* for the three bays (Taizhou Bay, Sanmen Bay, and Yueqing Bay). The prefecture established a network of sewage treatment facilities covering all the coastal towns. The water quality of four rivers entering these bays had all met the requirements of the *Ten Articles of Water*. A total of 126 sewage outlets for industrial, municipal and domestic services were verified. Nine of them had completed the expert demonstration of the standard setting of sewage outlets, and the other 117 had been blocked (Zhu, X., 2018b).

In this case, China's top-down administrative structure and recentralization reform offered a policy instrument on standby --- devolving pollution governance responsibilities to local government officials. With the promotion of the RCS governance structure as a policy instrument in some of the provinces (provincial level municipalities), the policy goal of promoting the RCS framework nationwide was finally clarified in the third stage. In this stage, three other water area management systems (the LCS, the BCS, and the Beach Chief System) were also established. In Zhejiang, a favourable situation has emerged in which these four management systems are interconnected and mutually reinforcing. At the end of the experimentation, with the political recognition coming from Beijing, Zhejiang became an all-round model for promoting the formal four-level RCS.

6. Case 4: Comprehensive Experimental Zones for Ecological Civilization Construction

This chapter presents the evolutionary trajectory of comprehensive ecological civilization policy experiments, which pursue a holistic approach to cope with ecological degradation. In the mid-1990s, the former State Environmental Protection Agency began to preside over experimental programs known as Ecological Demonstration Zones (EDZ). Environmental departments saw the establishment of EDZs as a means to implement Sustainable Development Strategy (SDS) domestically. In the subsequent refinement and adjustment over the next ten years, the evaluation indicators of this policy experiment were repeatedly modified by the central environmental ministry, resulting in a series of designations (or pilot programs) covering various geographical scales, such as "Ecological Province", "Ecological Prefecture", "Ecological County", "Ecological Town" and "Ecological Village". Within these, the number of the Ecological Town pilot projects quickly increased. The environmental ministry did not have sufficient policy coordination capacity to conduct such designations (or pilot programs) in larger geographical areas.

Economic growth in China during the 2000s came with significant costs on the environment. Environmental problems became a national concern. In the latter 2000s, the central environmental ministry began to upgrade some approved EDZs (mainly the Ecological Counties) to the newly designated title: "Ecological Civilization Construction Pilot" (ECCP). This was the beginning of the first round of pragmatic policy integration. Paralleling this round of policy integration led by MEP, starting from 2013, the NDRC led the another round of pragmatic integration in order to overcome the fragmented situation caused by the host of different policy experiments led by different central ministries. As noted above, during the 12th FYP (2011–2015), the national leadership expressed a new vision of "(Socialist) Ecological Civilization Construction". The 13th FYP (2016–2020) saw a restructuring of experimental programs. In the latter part of 2016, based on the two rounds of integration, the central authority initiated a third round of pragmatic integration. The specifics were presided over by the NDRC and MEP/MEE. Throughut several years of collaboration, the central environmental ministry and the central economic planning ministry have sought to balance economic progress with ecological civilization construction.

These examples of policy integration can be considered to be "pragmatic" because the decisions

made were just calibrations and enhancements to previous evaluation indicators and were largely intended to minimize strategic uncertainty and local resistance and to improve policy effectiveness. The first round of integration was dedicated to arranging pilot projects at all five administrative levels[125]. The second round focused on the deepening of projects at the county and prefecture levels. In the last round of integration, the Ecological Province pilot program that was launched hastily in 2003 finally obtained reliable policy support and an effective implementation platform in the new form of the NECEZ.

6.1 Announcement of the Ecological Demonstration Zone

In 1992, the Chinese delegation that participated in the UN Conference on Environment and Development promulgated the *Environment and Development Report of the People's Republic of China*, proposing to support the implementation of a SDS domestically. On March 25, 1994, the *China's Agenda 21: White Paper on China's Population, Environment and Development in the 21st Century* was approved by an executive meeting of the State Council. It put forward specific policies and actions for the central and local governments to implement the SDS. As a matter of fact, the former State Environmental Protection Agency made a series of policy efforts to alleviate the trend of ecological deterioration[126] by "preventing and controlling town industrial pollution, pesticides and fertilizer pollution, developing ecological agriculture, managing ecologically degraded areas, and strengthening environmental supervision of construction projects" (State Environmental Protection Agency, 1995) in the early and mid-1990s.

Ecological agriculture ("*Shengtai Nongye*") pursued in affluent areas of eastern China, such as the Pearl River Delta and Yangtze River Delta, has effectively utilized bioenergy for some time. One example is the micro-ecological cycle system called "*Sang Ji Yu Tang*" (mulberry-based fish pond)[127]. In the early 1980s, some rural areas in northern China also began to experiment with this

[125] Refers to province/autonomous region/municipality, prefecture/prefecture level district, county/county level district/county level city, town/sub-district and village/urban community.

[126] By early 1995, "the natural resources and environment were severely damaged in China; the soil erosion area was 3.67 million square kilometers, accounting for 38.2% of the country's land area; the desertified land covered 334,000 square kilometers, and it was still expanding at a rate of 2,100 square kilometers every year; there were more than 2 million hectares of abandoned land in mining areas that urgently need to be restored", cited from State Environmental Protection Agency (1995).

[127] That is, mulberry is grown to raise silkworms, silkworm excrement is used to feed fish, and pond mud containing fish manure is used to fertilize the mulberries.

kind of ecological agriculture model. Comrade Zhang Zhanlin, former Secretary of the Party Branch Committee of Liuminying Village (Changziying Town, Daxing District, Beijing Municipality), recalled:

> Since 1982, Liuminying Village began to carry out similar ecological agriculture practices under the guidance of the Beijing Environmental Protection Research Institute. By the early 1990s, a micro-ecosystem connecting agriculture, forestry, animal husbandry and fishery was formed with biogas as a link. The village also formulated an eco-village agricultural forestry plan with the Chinese Academy of Forestry in 1991 (Zhang, Z., 2019).

Liuminying Village was officially recognized as "China's First Ecological Agriculture Village" by the United Nations Environment Programme (UNEP) in October 1986. In June 1988, Shanyi Ecological Village (Changhe Town, Xiaoshan District, Hangzhou Municipality) was awarded an international environmental prize: the Global 500 Roll of Honour for Environmental Achievement (Globe500)[128]. These agricultural communities deployed a variety of material recycling structures (planting industry-- animal husbandry-- biogas-- fishery) to coordinate the improvement of economic benefits and the protection of human settlements. In the early 1990s, several more eco-villages were awarded with the "Globe500" designation (Zhu, G., 2018).

After seeing these gratifying results, some localities which were willing to try the ecological agriculture model imitated ecological demonstration projects and scaled these up by introducing "Ecological Town", "Ecological County" and "Ecological Prefecture" titles. In order to fulfill the central government's international commitment to implement the SDS[129], the State Environmental Protection Agency decided to launch the EDZ, integrating these different levels and scales of local practices. At its beginning, the EDZ aimed to promote the ecological agriculture model and improve rural settlements. On August 12, 1995, the State Environmental Protection Agency issued the *Notice on Launching the Pilot Work for the Construction of the National Ecological Demonstration Zone* (henceforth, *1995 Notice*). The *1995 Notice* clearly required the EDZ designation as an experimental area demarcated by administrative regions under the guidance of "ecological economics", in which "economy, society and environmental protection develop in harmony" (State Environmental Protection Agency, 1995). The pilot EDZ project was proposed to

[128] As of 2002, a total of 25 organizations and individuals from the PRC (excluding Hong Kong and Macau) had won the award. In 2004, the UNEP established the Champions of the Earth Award to replace it.

[129] In December 1997, the "National Comprehensive Experimental Zone for Social Development" was renamed the "National Experimental Zone for Sustainable Development". However, this was a comprehensive pilot program for local economic development promoted by the former State Science and Technology Commission, which is beyond the scope of this dissertation project.

integrate "regional ecological construction" with "local economic development".[130] The *Planning Outline for the Construction of National Ecological Demonstration Zone (1996-2050)* and *Regulation for the Application of Pilot Ecological Demonstration Zones* were attached to the *1995 Notice* (State Environmental Protection Agency, 1995).

The policy goal of the *1995 Notice* was to form a number of local models that would coordinate regional ecological construction and economic development by 2020, so that they could be promoted throughout the country. The key tasks of this program were divided into two categories[131]. At that time, the central environmental agency intended to solve the problem of rural environment pollution through experimenting with the EDZ. In the *Planning Outline for the Construction of National Ecological Demonstration Zone (1996-2050)*, the State Environmental Protection Agency proposed the idea of having "the effectiveness of EDZ project as an important index of the performance evaluation of local government officials". This concept was not, however, taken up and implemented until twenty years later.

As of October 1998, 111 prefectures, counties, and districts, such as Yanqing County (Beijing), had been approved by the SEPA as pilot EDZ areas (see the Appendix II for a table showing the changes in the number of comprehensive pilot projects for ecological designation).[132] In order to enhance assessment and acceptance reviews, the SEPA issued the *Interim Provision on the Acceptance of National Ecological Demonstration Zone Pilot Project* (henceforth, *1998 Interim Provision*) on November 9, 1998 (SEPA, 1998a). The *1998 Interim Provision* included the *Assessment and Acceptance Indicator of National Ecological Demonstration Zone Pilot Project* (see Table 6.1). As noted above, the EDZ experiment primarily focused on the promotion of the ecological agricultural economic model. Among the four types of indicators, the economic indicatior (e.g., annual per capita net income of farmers, energy consumption per unit of GDP in urban areas, and percentage of environmental protection investment in GDP) ranked first. The division of the three categories of regions was based on economic development levels (see Table 6.1). This was very different from the subsequent ecological programs that paid more attention to ecological conservation rather than economic growth. This was because of the limited level of

[130] The "regional ecological construction" included biodiversity protection; prevention and control of town enterprises, pesticides, and fertilizers' pollution; marine environmental protection; rational development, utilization and protection of natural resources; development of ecological agriculture; and restoration of ecological damage.
[131] First are "regional ecological construction" tasks. These involved several kinds of demonstration zones, including ecological agriculture, reasonable planning and layout of towns, eco-tourism, eco-cities, and agriculture, industry and trade integration. Second are demonstration zones involving restoration of ecological damage, including mining areas, comprehensive improvement of rural environments, the rational development, utilization and protection of wetland resources, and comprehensive improvement of land degradation.
[132] In March 1998, the State Environmental Protection Agency was elevated to the SEPA.

public environmental awareness at that time (Sun, 2002; Zhou, 2018).

Types of indicators		**Third category**[133]	**Second category**[134]	**First category**[135]
Socioeconomic development	Annual per capita net income of farmers (yuan)	1600	2700	4000
	Energy consumption per unit of GDP in cities and towns (tons/10,000 yuan)	1.5-1.6 (north) 1.4-1.5(south)	1.4-1.5(north) 1.3-1.4(south)	1.3-1.4(north) 1.2-1.3(south)
	Natural population growth rate (‰)	Comply with local policy	Comply with local policy	Comply with local policy
	Qualified rate of drinking water in villages (%)	⩾60	⩾80	⩾90
	Percentage of environmental protection investment in GDP (%)	1.0	1.1	1.2
	Water consumption per unit of GDP (m^3/10,000 yuan)	＜600	＜400	＜200
Regional ecological environment protection	Forest coverage	Meet the relevant national standards	Meet the relevant national standards	Meet the relevant national standards
	Greening of the plain	Reach the national advanced county standard for plain greening	Reach the national advanced county standard for plain greening	Reach the national advanced county standard for plain greening
	Grassland overload rate (%)	＜10	＜5	0
	Treatment rate of degraded land (%)	＞60	＞70	＞80
	Irrigation quota (cubic/mu)	Dry land <300	Dry land <250	Dry land <200
	(Executed in areas with precipitation less than 400 mm)	Paddy field<500	Paddy field<400	Paddy field<300
	Water productivity (kg/m3)	0.9	1.2	＞1.5
	Area of protected area	10	10	10

[133] Refers to the areas where per capita income is less than or equal to 400 yuan.
[134] Refers to the areas where per capita income is 400-1000 yuan.
[135] Refers to the areas where per capita income is greater than 1,000 yuan.

	(%)			
	Mine land reclamation rate (%)	>30	>40	>50
Rural environmental protection	Comprehensive utilization rate of straw (%)	>70	>80	>90
	Livestock and poultry manure treatment rate (Recycling)%	>80(30)	>90(40)	100(50)
	Fertilizer application intensity(Kg/ha)	<280	<280	<280
	Comprehensive prevention and control rate of agricultural and forestry pests and diseases (%)	>30	>50	>70
	Pesticide application intensity (Kg/ha)	<3.0	<3.0	<3.0
	Recovery rate of agricultural film (%)	>80	>85	>90
	Protected basic farmland area (%)	>80	>85	>90
Urban environmental protection	Urban atmospheric environmental quality	Meet the functional zoning standard	Meet the functional zoning standard	Meet the functional zoning standard
	Environmental quality of water	Same as above	Same as above	Same as above
	Water environmental quality of coastal waters	Same as above	Same as above	Same as above
	Urban noise environmental quality	Same as above	Same as above	Same as above
	Treatment rate of urban solid waste (%)	Respectively meet the relevant national standards	Respectively meet the relevant national standards	Respectively meet the relevant national standards
	Per capita public green area in urban area (square meters)	>7	>8	>10
Reference indicators				
	Penetration rate of sanitary toilets (%)	>35	>50	>70
	Resident gas penetration rate (%)	>50	>75	>90
	Urban sewage treatment rate (%)	>30	>40	>50
	Compliance rate of	>80	>90	100

	tourism (%)	environment

Table 6.1 Assessment and acceptance indicator of the EDZ pilot project, quoted from "Assessment and Acceptance Index of National Ecological Demonstration Zone Pilot Project" (SEPA, 1998a)

On March 3, 2000, the SEPA issued the *Decision on Naming the First Batch of National Ecological Demonstration Zones* (SEPA, 2000a). It decided to formally confer the title of EDZ on the pilot projects that passed inspection, assessment, and acceptance reviews.[136] Thirty-three pilot projects, such as Yanqing County (Beijing), Sanya Prefecture (Hainan), and No. 291 Farm (Heilongjiang Provincial Farm Reclamation Bureau), were approved as the first batch of national EDZs (SEPA, 2000a). From the perspective of senior officials in SEPA, the EDZ program helps to promote economic development in these experimental areas (Zhu, 2000).[137] As reported, the GDP growth rate of the 39 pilot areas remained above 10% for several consecutive years. The most eye-catching growth was in the Jinzhou District (Dalian Municipality, Liaoning Province). This was a county-level district dedicated to the development of ecological agriculture. Compared with 1995, Jinzhou's GDP, per capita GDP and rural per capita annual net income in 1998 increased by 48.3%, 46.4%, and 28.4% respectively. Some of these fast growing pilot areas became the first choice for foreign countries to import agricultural products from China (Zhu, G., 2018).

Under an authoritarian system, local leaders' attention and personal intervention was the main catalyst behind local enthusiasm to become an pilot EDZ project. A retired middle-level cadre of SEPA recalled:

> The provincial party committee secretary and provincial governor had played a huge role in launching the pilot "Ecological Province" project in Hainan, Jilin, Heilongjiang, and Fujian (Sun, 2018).

Before the 16th National Congress of the CPC, the SEPA approved a total of 82 EDZ designations from seven batches of pilot EDZ projects, covering different geographical areas (SEPA, 2002c).[138] They cover different levels and scales of jurisdictions, including villages, townships, counties,

[136] As of March 2000, 154 EDZ pilot projects at provincial, prefectural and county-level had been launched, including two pilot provinces (Hainan and Jilin provinces), 16 pilot prefectures, and 129 pilot counties, see the Appendix II, SEPA (1999a, 1999b), Zhu (2000).

[137] A counter arguement is that it was not the designation as a pilot EDZ project that promoted economic growth, but rather the fact that the SEPA only approved those areas with strong economic momentum as pilot EDZ projects.

[138] In March 2002, the SEPA approved a second batch of 49 EDZs, see the Appendix II, SEPA (2002b). As of January 2003, Heilongjiang, Fujian and Zhejiang had been approved as the pilot Ecological Province projects (Although at this time, provincial-level pilot EDZ project is the official name, these provinces began to use the title: pilot "Ecological Province" project on their own),see SEPA (2000c, 2002e, 2003b). As elaborated later, at this time, Xi Jining, the governor of Fujian Province, expressed his strong support for pilot "Ecological Province" project.

prefectures and large state-owned farms. In November 2002, the report of the 16th National Congress of CPC proposed to promote the "whole society to embark on a path of civilized development with a prosperous life and good ecology". The "ecological civilization" term did not appear in the report.[139] Gao Shangquan, the former deputy director of the NESRC and the honorary president of the China Society of Economic Reform (CSER) recalled:

> The concept of "Ecological Civilization" was discussed during the drafting of the political report, but the policy community did not come up with a broad-enough definition to encompass different views. Moreover, the central economic planning departments argued that early advocacy of the concept may make economic growth lose its appeal. Therefore, the supreme leader did not approve it to be included in the report (Lu, Q., 2019).

In other words, seven years after the launch of the pilot EDZ program, the central government still had no clear idea of "ecological civilization", not to mention how to put it into practice. The "ecological civilization" concept did appear in the *Decision of the CPCCC and the State Council on Accelerating Forestry Development* issued on June 25, 2003. This document proposed to "build an ecological civilization society with beautiful mountains and rivers" (State Council, 2003). An executive director of the Chinese Society for Ecological Civilization Research and Promotion, who once served as a middle level officer of the SFA, recalled:

> The SFA had carried out a research project -- "China's Sustainable Forestry Strategy" participated by several CAS academicians before 2003. Their research report underscored the concepts of "ecological construction", "ecological security" and "ecological civilization". Then, the "ecological civilization" concept was accepted by the central forestry department (Li, Z., 2019).

Nonetheless, the "ecological civilization" concept with its strong environmental protection implications did not arouse great interest from any powerful policy sponsor within the ruling party at that time. The comprehensive pilot program entitled "ecological civilization" only took root incrementally thereafter.

[139] In April 1999, Wen Jiabao, a Vice Premier of the State Council, proposed at the 18th plenary meeting of the National Greening Committee that "the 21st century will be a century of 'ecological civilization'". His speech was drafted by the SFA. The SFA was the first ministry to accept this concept.

6.2 A Refinement of the EDZ Program: Designations of the Ecological County, Ecological Prefecture and Ecological Province

In November 2002, although the 16th National Congress of the CPC did not formally put forward the concept of "ecological civilization", it has included environmental protection as the main goal of "building a Well-off Society in an All-round Way" (*Quanmian Jianshe Xiaokang Shehui*) (MEP, 2003, p. 5). After the party congress, Hu Jintao succeeded as General Secretary of the CPC. Later, Wen Jiabao became Premier of the State Council. In April 2003, when President Hu inspected the prevention and control of atypical pneumonia epidemic in Guangdong, he proposed that the Chinese government should insist on "promoting the sustainable development in harmony between man and nature". Soon after, he formally put forward the Scientific Outlook of Development (SOD). Xie Zhenhua, the then director of the SEPA, recalled:

> In 2003, the SEPA completed the *Report on the National Environmental Security Strategy*. The report noted that in many localities, the environmental costs of economic growth had offset its gains. At the time, in China, many of its views were avant-garde (Zhang, H., 2017).

At the same time, the SEPA independently made some adjustments to the EDZ program in order to cope with the changes brought about by the new Hu-Wen leadership.[140]

On May 23, the SEPA issued the *Construction Indicators for Ecological County, Ecological Prefecture, and Ecological Province (Trial)* (henceforth, *2003 Construction Indicators*) (SEPA, 2003d) (Table 6.2, 6.3, and 6.4). According to this program, the designations of "Ecological County", "Ecological Prefecture" and "Ecological Province" could serve as the continuation and enhancement of the EDZ designation. The SEPA required approved EDZ projects to carry out the pilot projects of the "Ecological County", "Ecological Prefecture" and "Ecological Province" in accordance with the *2003 Construction Indicators*. The indicators evaluating economic

[140] At the Third Plenary Session of the Sixteenth CPCCC held in October, Hu clearly stated the SOD: "(We must) adhere to a comprehensive, coordinated and sustainable development concept". Also in this year, the SEPA conducted the *Survey on the Status quo of the Ecology and Environment in the Central and Eastern Regions*. The reporter revealed some outstanding problems, such as partial shrinkage of lakes, drying up of natural wetlands, decline in water conservation and regulation, outstanding urban ecological and environmental problems, serious agricultural non-point source pollution, and increased land area damaged by mineral mining. For more details, see MEP (2003).

development ranked first among all indicators; the larger the pilot area, the more general the requirements. The pilot "Ecological County" project had more indicators than the pilot "Ecological Prefecture" project, and the pilot "Ecological Prefecture" project had more indicators than the pilot "Ecological Province" (Table 6.2, 6.3, and 6.4). The economic indicators required by this enhancement were more specific and detailed than those in the EDZ: they not only stipulated the per capita GDP and the annual income of farmers, but also added the annual disposable income of urban residents (Table 6.2, 6.3, and 6.4). Nonetheless, failure to distinguish between binding and reference indicators created an awkward situation. The more comprehensive the requirements were, the fewer pilot projects passed the later acceptance review. A retired senior researcher of the Policy Research Center of the SEPA, recalled:

> As far as the administrative capacity of the then environmental department is concerned, it was appropriate to launch only the pilot "Ecological County" program. This is why no pilot "Ecological Province" projects were finally approved as Ecological Province, and only a few pilot "Ecological Prefecture" projects were approved as Ecological Prefecture later (Sun, 2018).

Types of indicator	Indicators	Unit	Value
Economic development	1.GDP per capita Developed area; Underdeveloped areas	Yuan / person	⩾33000; ⩾25000
	2.Annual revenue per capita Developed area; Underdeveloped areas	Yuan / person	⩾5000; ⩾3800
	3.Annual per capita net income of farmers Developed area; Underdeveloped areas	Yuan / person	⩾11000; ⩾8000
	4.Annual per capita disposable income of urban residents Developed area; Underdeveloped areas	Yuan / person	⩾24000; ⩾18000
	5.Energy consumption per unit of GDP	Tons of standard coal/ten thousand yuan	⩽1.2
	6.Water consumption per unit GDP	m^3/ten thousand yuan	⩽150
	7.Proportion of organic and green products in major agricultural products	%	⩾20
Environmental protection	8.Forest coverage Mountains; Hilly area;	%	⩾75 ⩾45 ⩾18

	Plain area		
	9.Proportion of protected area in total land area Mountain and hilly areas; Plain area	%	⩾20; ⩾15
	10.Degraded land restoration rate	%	⩾90
	11.Air quality	Meet the functional zoning standard	
	12.Water ambient quality; water ambient quality in coastal waters		
	13.Noise ambient quality		
	14.COD emission intensity	Kg/ten thousand yuan	＜4.5 And does not exceed the national total control target
	15.Centralized treatment rate of urban domestic sewage; Industrial water repetition rate	%	⩾60; ⩾40
	16.Harmless treatment rate of urban domestic garbage; Disposal and utilization rate of industrial solid waste	%	100 ⩾80 No hazardous waste discharge
	17.Urban public green area per capita	m^2	⩾12
	18.Environmental compliance ratio of tourist area	%	100
	19.Proportion of new energy in rural life energy consumption	%	⩾30
	20.Comprehensive utilization rate of straw	%	100
	21.Comprehensive utilization rate of manure in large-scale livestock and poultry farms	%	⩾90
	22.Recycling rate of agricultural plastic film	%	⩾90
	23.Comprehensive prevention and control rate of agricultural and forestry pests	%	⩾80
	24.Fertilizer application intensity	Kg/ha	<250
	25.Water quality compliance rate of centralized drinking water sources; Health qualification rate of drinking water in villages and towns	%	100
	26.Penetration rate of rural sanitary toilets	%	100
	27.Rural sewage irrigation compliance rate	%	100
	28.Disaster resilience of agricultural production system (disaster loss rate)	%	<10
Social progress	29.Natural population growth rate	‰	Compliance with national or local policies

	30.Penetration rate of junior middle school education	%	≥99
	31.Level of urbanization	%	≥50
	32.Engel coefficient	%	<40
	33.Proportion of poor population Developed area; Underdeveloped areas	%	<0.2; <3
	34.Gini Coefficient		0.3-0.4
	35.Popularization rate of environmental protection publicity and education	%	>85
	36.Public satisfaction rate	%	>95

Table 6.2 "Ecological County" construction indicators, quoted from "Construction Indicators of Ecological County" (SEPA, 2003d)

Types of indicator	**Indicator**	**Unit**	**Value**
Economic development	1.GDP per capita Developed area; Underdeveloped areas	Yuan / person	≥33000; ≥25000
	2.Annual revenue per capita Developed area; Underdeveloped areas	Yuan / person	≥5000; ≥3800
	3.Annual per capita net income of farmers Developed area; Underdeveloped areas	Yuan / person	≥11000; ≥8000
	4.Annual per capita disposable income of urban residents Developed area; Underdeveloped areas	Yuan / person	≥24000; ≥18000
	5.Ratio of tertiary industry to GDP	%	≥45
	6.Energy consumption per unit of GDP	Tons of standard coal/ten thousand yuan	≤1.4
	7.Water consumption per unit GDP	m^3/ten thousand yuan	≤150
	8.Proportion of enterprises that should implement cleaner production; The ratio of large-scale enterprises that have passed ISO-14000 certification	%	100; ≥20
Environmental protection	9.Forest coverage Mountains; Hilly area; Plain area	%	≥70 ≥40 ≥15
	10.Proportion of protected area in total	%	≥17

	land area		
	11.Degraded land restoration rate	%	≥90
	12.City air quality Southern region; Northern region	Number of days/year better than or equal to Grade II standard[141]	≥330; ≥280
	13.Water quality compliance rate in urban water function zones; Water ambient quality compliance rate of coastal waters	%	100, and the city has no water body below the Grade IV standard[142]
	14.Main pollutant emission intensity SO_2;COD	Kilograms/ten thousand yuan	<5.0; <5.0 Do not exceed the national total emission control target of major pollutants
	15.Water quality compliance rate of centralized drinking water sources; Centralized treatment rate of urban domestic sewage; Industrial water repetition rate	%	100; ≥70; ≥50
	16.Coverage rate of noise standard area	%	≥95
	17.Harmless treatment rate of urban domestic garbage; Industrial solid waste disposal utilization rate	%	100; ≥80 No hazardous waste discharge
	18.Urban public green area per capita	m^2/person	≥11
	19.Environmental compliance ratio of tourist area	%	100
Social progress	20.Integrity rate of urban lifeline system	%	≥80
	21.Level of urbanization	%	≥55
	22.Penetration rate of city gas	%	≥92
	23.Central heating penetration rate in heating areas	%	≥65
	24.Engel coefficient	%	<40
	25.Gini Coefficient		0.3-0.4
	26.Higher education enrollment rate	%	≥30
	27.Popularization rate of environmental	%	>85

[141] According to the *Ambient Air Quality Standard (GB3095-1996)* adopted in 1996 (abolished in 2016), ambient air quality functions are divided into three categories. Grade I areas are nature reserves, SHAs and other areas that need special protection. Grade II areas are residential areas, mixed commercial and residential areas, cultural areas, general industrial areas, and rural areas identified in the urban planning. Grade III areas are specific industrial areas. The air ambient quality is divided into three levels. The standard division depends on the concentration values of these pollutants: SO_2, TSP, PM10, NOx, NO_2, CO, O_3, Pb, BaP, F, quoted from "Ambient Air Quality Standard (GB3095-1996)", SEPA and The State Bureau of Quality and Technical Supervision (1996). On January 1th, 2016, it was replaced by the *Ambient Air Quality Standards(GB 3095—2012)*, see MEP and General Administration of Quality Supervision, Inspection and Quarantine (2012).

[142] See Footnote 84.

	protection publicity and education		
	28.Public satisfaction rate	%	>90

Table 6.3 "Ecological Prefecture" construction indicators, quoted from "Construction Indicator of Ecological Prefecture" (SEPA, 2003d)

Types of indicator	Indicator	Unit	Value
Economic development	1.GDP per capita Developed area; Underdeveloped areas	Yuan / person	⩾33000; ⩾25000
	2.Annual revenue per capita Developed area; Underdeveloped areas	Yuan / person	⩾5000; ⩾3800
	3.Annual per capita net income of farmers Developed area; Underdeveloped areas	Yuan / person	⩾11000; ⩾8000
	4.Annual per capita disposable income of urban residents Developed area; Underdeveloped areas	Yuan / person	⩾24000; ⩾18000
	5.Proportion of environmental protection industry	%	⩾10
	6.Ratio of tertiary industry to GDP	%	⩾45
Environmental protection	7.Forest coverage Mountains; Hilly area; Plain area	%	⩾65 ⩾35 ⩾12
	8.Proportion of protected area in total land area	%	⩾15
	9.Degraded land restoration rate	%	⩾90
	10.Species diversity index; Protection rate of rare and endangered species	%	⩾0.9; 100
	11.Annual water consumption of major rivers Rivers in the province; Interprovincial river	<40% Does not exceed the amount of water resources allocated by the central government	
	12.Groundwater overexploitation rate	%	0
	13.Main pollutant emission intensity SO_2;COD	Kilograms/ten thousand yuan	<6.0; <5.5 Do not exceed the national total emission control target of

			major pollutants
	14.Annual average value of precipitation PH; Acid rain frequency	PH; %	≥5.0 <30
	15.Air quality	Meet the functional zoning standard	
	16.Water ambient quality; Water ambient quality of coastal waters		
	17.Environmental compliance ratio of tourist area	%	100
Social progress	18.Natural population growth rate	‰	Compliance with national or local policies
	19.The level of urbanization	%	≥50
	20.Engel coefficient	%	<40
	21.Gini Coefficient		0.3-0.4
	22.Popularization rate of environmental protection publicity and education	%	>90

Table 6.4 "Ecological Province" construction indicators, quoted from "Construction Indicators of Ecological Province Program" (SEPA, 2003d)

In June 2004, the SEPA established a specialized Management Office to be responsible for the daily management of the pilot programs of the EDZ, Ecological Province, Ecological Prefecture, and Ecological County (SEPA, 2004a). Half a year later, the *Ecological County and Ecological Prefecture Construction Planning Outline (Trial)* and its implementation rules were formulated and issued (SEPA, 2004c). In the meanwhile, the First On-site Conference of National Ecological Prefecture/County Construction was held in Suzhou, Jiangsu (Hang, 2004), while Heilongjiang Province held the First Ecological Province Construction Forum (Yang, 2004). These conferences and forums aimed to promote the ecological civilization concept to the general public (SEPA, 2005a; Zhu, 2004).

In November 2005, the SEPA adjusted two indicators in the *2003 Construction Indicators*: "annual per capita net income of farmers" and "annual per capita disposable income of urban residents". With this calibration, the values of the indicators were reduced because they had been set too high[143] (SEPA, 2005b). In December 2005, the *State Council's Decision on Implementing the Scientific Outlook on Development and Strengthening Environmental Protection* (henceforth, *2005 Decision*) was issued in response to the Scientific Outlook on Development (SOD) proposed

[143] In 2005, the nationall per capita net income of rural residents was almost 3 000 yuan, and the per capita disposable income of urban residents was almost 10 000 yuan.

by General Secretary Hu in July 2003[144] (State Council, 2005a). In the same month, the SEPA issued the *National Ecological County and Ecological Prefecture Assessment Plan (trial)* (SEPA, 2005c). The assessment objects of the plan are counties and prefectures that had formulated Ecological County and Ecological Prefecture implementation plans (or outlines) and implemented them for more than two years. In the spring of 2006, the *National Ecological County and Ecological Prefecture Assessment and Acceptance Procedures* was issued (SEPA, 2006a).[145] It was based on the *2003 Construction Indicators* and *National Ecological County and Ecological Prefecture Assessment Plan (trial)*. At the end of this year, the *National Ecological Village Construction Standard (Trial)* was issued (SEPA, 2006c). [146]

With the acceleration of economic growth, environmental problems across the country were intensifying. In April 2006, at the Sixth National Conference on Environmental Protection, Premier Wen Jiabao called for the "*Sange Gaibian*" (Three Transitions) (MEP, 2011b).[147] At the beginning of 2007, the SEPA issued the *Guiding Opinion on Strengthening the Construction of Ecological Demonstration* (henceforth, *2007 Guiding Opinion*) (SEPA, 2007).[148] This notice was also in response to the *2005 Decision*. The policy goal of *2007 Guiding Opinion* was to have 15 provinces launched as Ecological Province pilot projects, 15 entitled Ecological Counties and Ecological Prefectures, and 10,000 Ecological Town and Ecological Village pilot projects. Among the several main tasks proposed in the *2007 Guiding Opinion*, the development of a circular economy and the promotion of an ecological economy model ranked first.[149]

On October 15, 2007, General Secretary Hu stated in the political report of the 17th National Congress of CPC: "(We want to) *build ecological civilization and basically form an industrial*

[144] See Footnote 140.
[145] The assessment included several procedures: declaration and self-inspection, provincial environmental department's assessment, technical inspection led by SEPA, assessment and acceptance led by SEPA, deliberation and review, publicity, final approval.
[146] This was in response to the *2005 Decision*. In the section "Strengthening Rural Environmental Protection", the *2005 Decision* required the launching of the "Beautiful Town" and "Civilized and Ecological Village" programs. In the SEPA document, "Beautiful Town" became Ecological Town, and "Civilized and Ecological Village" became Ecological Village.
[147] The first is "the transition from a focus on economic growth to one on environment and development". The second is "the transition from environment as a secondary objective to one of equal importance with economic growth". The third is "the transition from the primary use of administrative methods of environmental management to a more comprehensive system", for English translation, see Xue, Simonis, and Dudek (2007, p. 294).
[148] By this time, a total of 13 provinces and municipalities (Hainan, Jilin, Heilongjiang, Fujian, Zhejiang, Shandong, Anhui, Jiangsu, Hebei, Guangxi, Sichuan, Liaoning, and Tianjin) had become pilot Ecological Provinces. Zhangjiagang, Changshu, Kunshan, Jiangyin (Jiangsu), Minhang District (Shanghai), Anji (Zhejiang) had been designated as an Ecological Prefecture or Ecological County. Four hundred and twenty-five towns had been given the title of Ecological Town and a total of 320 localities had been named as national EDZs.
[149] In 2002, President Jiang Zemin pointed out at the Second General Assembly of the Global Environment Facility that only by taking the road of circular economy can the Sustainable Development Goals be achieved. In 2008, the *Circular Economy Promotion Law of the PRC* was passed.

structure, growth mode, and consumption pattern that conserve energy resources and protect the ecological environment. ...The concept of ecological civilization should be firmly established in the whole society" (CPCCC, 2007). For the first time, the ruling party elevated the construction of "ecological civilization construction" to a strategic height parallel to economic/material, political/institutional, cultural/spirit, and social construction. Since then, constructing a socialist ecological civilization has gained the significant status of a national strategy. As it was discussed together with industrial structure, ecological civilization construction was placed under the economic planning department. This paved the way for the NDRC to intervene on behalf of this national goal.

Announcement of ECCP

In January 2008, the SEPA, which would soon be upgraded to a full ministry (directly under the State Council), issued the *Ecological County, Ecological Prefecture, and Ecological Province Construction Indicators (Revised Draft)* (SEPA, 2008a). On the basis of the *2003 Construction Indicators*, this revision streamlined all three indicator systems. It lowered the number of indicators tied to economic growth, and also identified binding and reference indicators. In order to cope with the goal of the 17th national party congress to start ecological civilization construction, the experimental program entitled "Ecological Civilization Construction" began to emerge. A former deputy director of SEPA recalled:

> The MEP issued the *Guiding Opinion on Promoting the Construction of Ecological Civilization*, clearly requiring the pilot projects of ecological civilization construction be divided into three stages. The first is the EDZ. The second is the Ecological Province, the Ecological Prefecture, and the Ecological County. The third is the ECCP (Zhu, G., 2018).

In the last section of this document[150]: "perfecting safeguard measures", it clearly stated that the policy experiment of Ecological Province, Ecological Prefecture, or Ecological County is the prerequisite for being selected as an ECCP (MEP, 2008a).[151] In other words, the requirements for the ecological civilization construction planned by environmental ministry were higher than those of the previous programs of the EDZ, Ecological County and Ecological Prefecture. MEP,

[150] This document was removed from the official website of the MEP/MEE and the State Council.
[151] Although the *2008 Guiding Opinion* clearly required the pilot process of ecological civilization construction to be broken down into three stages (EDZ -- Ecological Province/Prefecture/County -- ECCP), these pilot projects in practice were still divided into six catogories (Ecological Province, Ecological Prefecture, Ecological County, Ecological Town, Ecological Village and Eco-industrial Park).

however, did not stipulate any detailed administration regulation, implementation rule or technical specification for the ECCP designation. As of June 2009, the MEP had launched two listings of ECCPs. All approved ECCP designations fell into the catogories of "Ecological Prefecture" and "Ecological County" (MEP, 2009a).

6.3 The First Round of Pragmatic Integration: from the ECCP to Ecological Civilization Construction Demonstration Zone (2010-2016)

On January 28, 2010, the MEP issued the *Opinion on Further Deepening the Work of the Ecological Construction Demonstration Zone* (henceforth, *2010 Opinion*) (MEP, 2010a). The *2010 Opinion* required the construction indicators of EDZ designation issued in 1995 be transformed into local standards, and stopped work on the EDZ program. [152]

6.3.1 Designation of the Ecological Construction Demonstration Zone (2010-2013)

The *2010 Opinion* clearly proposed the title of "Ecological Construction Demonstration Zone" (ECDZ) be the collective name used for the designations of the "Ecological Province", "Ecological Prefecture", "Ecological County", "Eco-industrial Park", "Ecological Town", and "Ecological Village". The ECDZ could be regarded as a transitional stage on the way to

[152] As of the end of 2009, 14 provinces and municipalities (Hainan, Jilin, Heilongjiang, Fujian, Zhejiang, Shandong, Anhui, Jiangsu, Hebei, Guangxi, Sichuan, Liaoning, Tianjin, and Shanxi) had been selected as pilot "Ecological Province" projects. More than 500 prefectures and counties had carried out pilot "Ecological Prefecture or Ecological County" projects. Of these, 11 counties had been designated as the formal Ecological Counties. They were Zhangjiagang, Changshu, Kunshan, Jiangyin, Taicang (Jiangsu); Anji County (Zhejiang); Minhang District (Shanghai); Miyun County, Yanqing County (Beijing); Rongcheng (Shandong); and Yantian District (Shenzhen). One thousand and twenty-seven towns were designated as the formal Ecological Towns. In the 2000s, Jiangsu Province had the largest number of "Ecological County" designations in the country, see the Appendix II, MEP (2010a). For the achievements of Jiangsu's environemntal governance, see relevant sections of the Chapter 5.

establishing an ECCP. The *2010 Opinion* intended to merge the two first categories clarified in the *2008 Guiding Opinion*. The EDZ title was officially abolished.[153] To clarify, the ECDZ was introduced as a unified title covering a wide array of designations and did not mean there were now unified requirements.

This was the first time that a central ministry made pragmatic efforts to integrate previously fragmented pilot programs with different titles and different evaluation indicators.[154] Starting from 2012, following the pattern of experimentalist governance, the ECDZ designations that passed MEP's approval were required to submit an annual report to provincial environmental department. Provincial environmental departments were to submit ECDZ reports to MEP every two years. The *2010 Opinion* required the MEP to conduct spot checks and reviews, define reward and punishment measures, and establish a dynamic monitoring system.

In October 2011, the *State Council's Opinion on Strengthening Key Environmental Protection Work* clearly identified policy directions for the near future. These included achieving a comprehensive framework for environmental laws and regulations and improving environmental institutional capacity (Reporter of China Environment News, 2011). Later, in December, at the National General Meeting on Environmental Protection, Li Keqiang, who was about to take over as premier, noted that the situation of overall environmental deterioration had not fundamentally changed (MEP, 2012b). This statement from a top leader was a recognition that previous central authorities had not fully realized the arduous and long-term nature of environmental protection. As an example, the "Fifth FYP" approved in December 1978 included the naive idea that environmental problems could be solved within the following ten years (Wang, Y., 2019).

Encouraged by this sober statement, the MEP began to propose some realistic and targeted policy goals and instruments. From April 25th to 27th, 2012, a National Pollution Prevention and Control Work Conference was held in Nanjing. At the meeting, the MEP proposed to realize a strategic transformation from passive response to proactive prevention and control during the "Twelfth FYP" period (Xinhua Newspaper Network, 2012).[155] Later, the MEP issued the *Regulation for the*

[153] As of 2011, the MEP had approved 7 batches of national EDZ designations, 528 in total, see the Appendix II, MEP (2011a).

[154] This integration effort faced urgent problems. Local governments had different understandings about how to integrate previous pilot programs with the implementation of SOD. In many localities, the environmental departments did not have enough policy coordination capacity.

[155] This was manifested in "four transformations". In terms of prevention and control objects, the MEP called for a transformation from conventional pollutants to both conventional pollutants and highly toxic and refractory pollutants. In terms of prevention and control approaches, the MEP called for a transformation from mandatory command control to comprehensive collaborative control. In the prevention and control style, the MEP required a transformation from extensive to refined management. In terms of prevention and control goals, the MEP required

Administration of National Ecological Construction Demonstration Zone on April 30 (henceforth, *2012 Regulation*) (MEP, 2012a). The *2012 Regulation* mainly regulated the programs of Ecological Prefecture and Ecological County. It was also applicable to the administration of the Ecological Province program. The *2012 Regulation* noted that the previous *National Ecological Town Declaration and Management Regulations (Trial)* (MEP, 2010b) and *Standard for National Ecological Village Construction (Trial)* (MEP, 2006) are still valid.[156]

Including some of the already designated Ecological Prefectures and Ecological Counties, the MEP approved four ECCP batches in 2008, 2009 and 2011, amounting in total to 53 designations (Reporter, 2012).[157] Some areas that had already received the Ecological Prefecture or Ecological County title were directly turned into ECCPs. The MEP did, however, encourage these areas to formulate and achieve higher policy goals. Some river basins, such as *Taihu Lake* and *Liaohe River*, carried out projects as Basin-based ECCPs, and explored an "resource-saving and environment-friendly society" model. As of October 2013, the MEP had approved six ECCP batches (MEP, 2013b).

6.3.2 Ecological Civilization Construction Demonstration Zone (2013-2016)

Designation of the ECCP Demonstration Zone

In November 2012, the 18th National Congress of the CPC clearly incorporated the ecological civilization construction into the "Five-in-one Layout" (*Wuwei Yiti*)[158], which indicated that large-scale (socialist) ecological civilization construction was about to be launched. Compared with the report of the 17th national party congress, the report of the 18th party congress more clearly summarized the "ecological civilization concept": respect nature and protect nature; give

a transformation from total amount control to improvement of environmental quality, see Xinhua Newspaper Network (2012).

[156] The *Regulation for the National Eco-industrial Demonstration Park (Trial)* was issued in 2015, see MEP (2015).

[157] As of December 2012, 15 provinces (autonomous regions or municipalities) had carried out Ecological Province pilot projects. More than 1,000 counties and prefectures carried out Ecological County and/or Ecological Prefecture pilot projects. Of these, 38 counties or prefectures were given the title of Ecological County or Ecological Prefecture and 1559 towns received the title Ecological Town, see the Appendix II, Reporter (2012).

[158] For details, see Section 2.3, Chapter 2.

priority to conservation and natural restoration; control the intensity of development and leave more space for natural restoration; cherish nature more consciously and protect ecology more actively. Specifically, the report elaborated on the focus of "ecological civilization construction": optimizing the pattern of territorial space development, comprehensively promoting resource conservation, increasing ecological and environmental protection efforts, and strengthening the relevant institutional system. What this party congress demonstrated is by no means just a sober assessment of the urgency of the ecological civilization construction by the ruling party, but more importantly, the CPC's more comprehensive and reasonable deployment of the cause of socialist modernization.

In order to cope with the policy changes brought about by the Xi-Li leadership, the MEP planned to formulate construction indicators for the ECCP designations that had not yet been clarified. On May 23, 2013, the *Indicators for National Ecological Civilization Construction Pilot Demonstration Zone (Trial)* (henceforth, *2013 Indicator*) was issued (MEP, 2013a). This included indicators for county-level and prefecture-level designations (Table 6.5). The ECCP program, which had not been universally promoted, was directly renamed as the ECCP Demonstration Zone ("Prefecture/County"). The Director of the Ecological Civilization Research Center, Peking University, argued:

> The biggest feature of this indicator system is that it adopted the functional zoning strategy[159] and divided the projected area into the key development zone, optimized development zone, restricted development zone and prohibited development zone[160]. This was to actively cooperate with the implementation of the functional zoning strategy led by the central authority in the field of environmental protection (Huan, 2016).

Some economic indicators (e.g., proportion of tertiary industry) were categorized as reference indicators, and a larger number of environmental indicators (e.g., emission intensity of carbon and other major pollutants) became binding (Table 6.5). Compared with the previous indicators for the Ecological Prefecture designation (Table 6.3), the number of indicators also increased.

Types of Indicator	Unit	Value of Indicator

[159] In December 2010, the State Council issued the *National Plan for Main Functional Zoning*. It is the strategic plan for the development of "territorial space" (in Chinese, *Guotu Kongjian*). Territorial space refers to the space under the jurisdiction of national sovereignty and sovereign rights. It is the site and environment for people to live, including land, land waters, inland waters, territorial waters, and airspace. For more details, see State Council (2010b).

[160] The "development" (in Chinese, *Kaifa*) here refers to large-scale industrialized and urbanization development with high-intensity, see State Council (2010b).

indicator			indicator	attribute
Ecological economy	1.Resource output increase rate	%		Reference
	Key development zone (KDZ)		⩾15	
	Optimized development zone (ODZ)		⩾18	
	Restricted development zone (RDZ)		⩾20	
	2.Production value per unit of industrial land	100 million yuan per square kilometer		Binding
	KDZ		⩾65	
	ODZ		⩾55	
	RDZ		⩾45	
	3.Recycling rate of renewable resources	%		Binding
	KDZ		⩾50	
	ODZ		⩾65	
	RDZ		⩾80	
	4.Ecological asset retention rate	-	＞1	Reference
	5.Fresh water consumption per unit of industrial added value	Cubic meters per 10,000 yuan	⩽12	Reference
	6.Carbon intensity	Kilograms per 10,000 yuan		Binding
	KDZ		⩽600	
	ODZ		⩽450	
	RDZ		⩽300	
	7. Proportion of tertiary industry	%	⩾60	Reference
	8.Industrial structure similarity	-	⩽0.30	Reference
Ecological environment	9. Emission intensity of major pollutants	Tons per square kilometer		Binding
	COD		⩽4.5	
	SO_2		⩽3.5	
	NH_3-N		⩽0.5	
	NOx		⩽4.0	
	10.Proportion of protected land in the land area	%		Binding
	Mountainous area, hilly area		⩾20	
	Plain area		⩾15	
	11.Forest and grass coverage	%		Binding
	Mountainous area		⩾75	
	Hilly area		⩾45	
	Plain area		⩾18	
	12.Remediation rate of contaminated soil	%	⩾80	Binding
	13.Ecological restoration rate	%		Binding
	KDZ		⩾48	
	ODZ		⩾64	
	RDZ		⩾80	
	Prohibited development zone		100	
	14.Extent to which native species were protected	%	⩾98	Binding
	15.Proportion of water quality reaching the standard in national control, provincial control	%	⩾95	Binding

	and municipal control sections			
	16.Proportion of reclaimed water	%	60	Reference
Ecological habitat	17.Proportion of new green buildings	%	⩾75	Reference
	18.Proportion of ecological land	%		Binding
	KDZ		⩾40	
	ODZ		⩾50	
	RDZ		⩾60	
	Prohibited development zone		⩾90	
	19.Public satisfaction with environmental quality	%	⩾85	Binding
Ecological institution	20.Proportion of eco-environmental investment in fiscal revenue	%	⩾15	Binding
	21.Proportion of ecological civilization construction work in the assessment of local party and government performance		⩾22	Reference
	22.Proportion of energy-saving and environmentally friendly products and environmental labeling products in government-procurement		100	Reference
	23.Environmental impact assessment rate		100	Binding
	24.Environmental information disclosure rate		100	Binding
Ecological culture	25.Proportion of cadres participating in ecological civilization training	%	100	Reference
	26.Knowledge popularization rate of ecological civilization	%	⩾95	Binding
	27.Proportion of eco-environmental education hours	%	⩾10	Reference
	28.Proportion of expenditures on environmental protection public welfare activities of enterprises above designated size to the total expenditure of public welfare activities	%	⩾7.5	Reference
	29.Proportion of public energy saving, water saving, and public transportation	%		Reference
	Popularity rate of energy-saving appliances		⩾90	
	Popularity rate of water-saving appliances		⩾90	
	Proportion of public transport		⩾70	
	30.Local characteristics		Customize	Reference

Table 6.5 Construction indicators of the National ECCP Demonstration Zone (Prefecture Level)/National Ecological Prefecture, quoted from "Indicators for National Ecological Civilization Construction Pilot Demonstration Zone/National Ecological Prefecture" (MEP, 2013a)

As elaborated later, the NDRC launched the *Pilot Demonstration Zones for Promoting Ecological Civilization* in the second half of 2013. This pilot program received more support from the top

leadership. The MEP made use of its discourse power on this matter, even though the powerful NDRC was not aready to give up its agenda setting power. While the central government provided more support to the NDRC's program, it did not terminate MEP's ECCP program but instead instructed the MEP to cooperate with the NDRC (Huan, 2017a).

The *Opinion of the CPCCC and State Council on Accelerating the Construction Ecological Civilization*, issued in May 2015, clearly proposed the establishment of "an green development indicator system" (CPCCC & State Council, 2015). In response to this, MEP issued the *Administrative Regulation of the National Ecological Civilization Construction Demonstration Zone (Trial)* and the *National Ecological Civilization Construction Demonstration County/Prefecture Index (Trial)* (henceforth, *2016 Indicator*, Table 6.6) in January 2016 (MEP, 2016). This effort was committed to integrating the titles and construction indicators of previous pilot programs led by itself. The "Ecological Civilization Construction Demonstration Zone" (ECCDZ) program officially ended the first round of policy integration led by the central environmental ministry alone. The *2016 Indicator* is an expanded version of the *2013 Indicator*. It set 38 indicators for demonstration counties, and 35 indicators for demonstration prefecture along six categories. The addition of an "ecological space" category (Table 6.6, only indicators for prefecture presented) reflected that the *2016 Indicator* adopted the functional zoning strategy led by the NDRC. Also, cultural indicators that are not easy to measure were classified as reference indicators. Later, the first batch of ECCDZs, approved in September 2017, was integrated into the new platform, the National Ecological Civilization Experimental Zone (MEP, 2017a).[161]

Functional zoning	**Task**	**Indicator, status (binding or not)**	**Unit of measurement, value**
Ecological space	(I) Optimization of spatial pattern	1.Ecological protection red line, Yes	-, -[162]
		2.Arable land red line, Yes	-, -[163]
		3.Proportion of protected area(Mountain, Hilly area, Plain area), Yes	%, ≥33,≥22,≥16
		4. EIA implementation rate, Yes	%, 100
Ecological	(II) Resource	5.Energy consumption per unit of	Tons of standard coal / 10,000

[161] As of November 2020, the environmental ministry has approved a total of 262 ECCDZ designations in four batches.
[162] For the specifications, see the *Guideline for Delineation of Ecological Protection Red Lines* issued in May 2017.
[163] Ibid.

economy	Conservation and Cleaner Production	GDP, Yes	yuan, ⩽0.70 and the total energy consumption does not exceed the target value
		6.Water consumption per unit of GDP (Eastern Region; Central Region; Western Region), Yes	M^3 / 10,000, The total water consumption does not exceed the control target value (⩽50; ⩽70; ⩽80)
		7.Industrial added value per unit of industrial land (Eastern region; Central region; Western region), No	Ten thousand yuan / mu, ⩾ 85; ⩾70; ⩾55
		8.Proportion of compulsory cleaner production enterprises passing the audit, No	%, 100
Ecological environment	(III) Environmental quality improvement	9.Ambient air quality[164] (percentage of excellent days), Yes	%,⩾85
		10.Surface water environmental quality [165] (ratios of water quality meets or exceeds Grade III), Yes	%,⩾70
		11.Soil environmental quality-quality improvement goals, Yes	-, Does not decrease and meets the assessment requirements
		12.Total emission reduction of major pollutants, Yes	-, Meets the assessment requirements
	(IV) Ecosystem protection	13.Eco-Environmental Condition Index, Yes	-, ⩾55 without reduction
		14.Forest coverage (Mountain area; hilly area; plain area; alpine or grassland area), No	%, ⩾60;⩾40;⩾16;⩾70
		15.Protection of biological species resources (alien species invade), No	-, not obvious
	(V) Environmental risk prevention	16.Safe disposal rate of hazardous waste, Yes	%, 100
		17.Environmental supervision system for polluted sites, No	-, set up

[164] For the details, see *Ambient Air Quality Standard (GB 3095-2012)*.
[165] For the details, see Footnote 84.

		18.Severe and major environmental emergencies, Yes	-, does not happen
Ecological life	(VI) Habitat improvement	19.Excellent water quality in centralized drinking water sources, Yes	%, 100
		20.Urban sewage treatment rate, Yes	%, 95
		21.Harmless treatment rate of urban domestic garbage (Eastern region; Central region; Western region), Yes	%, ⩾95,⩾90,⩾85
		22.Green area of parks per capita in cities and towns, No	M^2/person, ⩾13
	(VII) Green lifestyle	23.Proportion of New Green Buildings in Towns (Eastern Region; Central Region; Western Region), No	%, ⩾50,⩾40,⩾30
		24.Public green travel rate, No	%, 50
		25.Energy-saving and water-saving appliances penetration rate (Eastern region; Central region; Western region), No	%, ⩾80,⩾70,⩾60
		26.Government green procurement ratio, No	%, ⩾80
Ecological institution	(VIII) Improve the system and guarantee mechanism	27.Ecological civilization construction planning, Yes	-, formulate and implement
		28.Proportion of construction of ecological civilization in performance evaluation of party and government, Yes	%, ⩾20
		29.Eco-environmental damage accountability system, No	-, Set up
		30.Coverage rate of fixed source sewage permits, Yes	%, 100
		31.Proportion of national ECCDZ (County), Yes	%,⩾80
Ecological	(IX) Popularization	32.Proportion of party and	%, 100

culture	of ideas	government leading cadres participating in ecological civilization training, No		
		33.Public awareness of ecological civilization knowledge, No	%, ≥80	
		34.Environmental information disclosure rate, No	%, ≥80	
		35.Public satisfaction with ecological civilization, No	%, ≥80	

Table 6.6 Construction indicators of the National ECCDZ (Prefecture), quoted from "Indicator for National Ecological Civilization Construction Demonstration Zone (Prefecture)" (MEP, 2016)

6.4 Another Wave of Fragmented Efforts

As aforementioned, in 2011, the *State Council's Opinion on Strengthening Key Environmental Protection Work* required the development of a comprehensive framework for environmental laws and regulations. In November 2012, the *Constitution of the Communist Party of China* was amended to include the statement: "the CPC leads the Chinese people to build socialist ecological civilization". Beijing put ecological and environmental protection into the Five-in-one Layout. The increasing urgency of environmental protection called for policy actions from all central ministries. The most notable programs that energed were experiments entiled "ecological civilization" conducted by the water resource department and marine department.

Ecological Civilization Program for National Soil and Water Conservation

In the 2000s, soil erosion prevention and control were no longer limited to the geographical areas stipulated by the *Law on Soil and Water Conservation*.[166] During this period, the trend of

[166] As early as 1991, the *Law on Soil and Water Conservation* was promulgated. However, in the next two decades, the law enforcement was weak. The policy measures for soil erosion prevention and control were not enough. As mentioned earlier, by the middle of 1990s, the problem of soil erosion was still serious, please see Footnote 126.

worsening soil erosion was curbed. In 2010, the area of soil erosion caused by water erosion still accounted for 16.8% of the country's land area (MEP, 2011c, p. 18). Soil and water conservation needs to be greatly improved. The revised *Law on Soil and Water Conservation* was formally implemented on March 1, 2011 (NPC, 2010). The supporting law was subsequently improved, providing a legal foundation for the relevant pilot program (Nie & Zhao, 2011; State Council, 2015b).

On September 27, 2011, the MWR issued the *Notice on the Establishment of the Ecological Civilization Project for National Soil and Water Conservation*, and decided to carry out an "ecological civilization" experimental program for soil and water conservation throughout the country (MWR, 2011a). At its beginning, the Ecological Civilization Program for National Soil and Water Conservation (henceforth, NSWC) included the "Ecological Civilization Prefecture for National Soil and Water Conservation Program" (henceforth, ECP), the "Ecological Civilization County for National Soil and Water Conservation Program" (henceforth, ECC), and the "Production and Construction Project for Soil and Water Conservation Ecological Civilization Program" (henceforth, PCP). The NSWC program had several policy goals. First was launching a first batch of NSWC pilot projects. Acceptance reviews for these pilots were conducted by 2012. Second was for 10% of pilot prefectures, 20% of pilot counties, and 10% of projected production and construction projects to have become NSWCs by 2015. Third was for 20% of prefectures, 30% of counties, and 30% of production and construction projects to complete NSWC establishment by 2020. The *Measures for the Evaluation of Ecological Civilization Projects for Soil and Water Conservation (Trial)* was attached. It included evaluation criteria for ECPs, ECCs and PCPs (MWR, 2011b). On February 26, 2013, the MWR issued the *Decision on Naming the Ecological Civilization Project for National Soil and Water Conservation (2012)*.[167]

On July 16, 2014, the MWR issued the *Notice on Further Improving the Creation of the National Ecological Civilization Project for Soil and Water Conservation* to further promote the NSWC program (MWR, 2014a). The ECP and the ECC were integrated into the "Comprehensive Governance Project for National Soil and Water Conservation Ecological Civilization Program" (henceforth, CGP). The PCP was renamed as the "Production and Construction Project for National Soil and Water Conservation Ecological Civilization Program" (henceforth, PCPN). Meanwhile, the "Clean and Small Watershed Construction Project for National Soil and Water

[167] After a year and a half of declaration, selection and review, two prefectures (Luoyang, Henan, and Quzhou, Zhejiang) were designated as ECPs, 11 counties were designated ECCs, and 6 projects were designated PCPs, MWR (2013c).

Conservation Ecological Civilization Program" (henceforth, CSWCP) was included.[168] The detailed assessment indicators for the CGP, PCPN and CSWCP were attached (MWR, 2014b).

Water Ecological Civilization Construction

On January 5, 2013, the MWR issued the *Opinion of the MWR on Accelerating the Construction of Water Ecological Civilization* (henceforth, *2013 Opinion*) (MWR, 2013a). The focal point of the Water Ecological Civilization Construction (WECC) program was introducing a stringent management system for water resources. The *2013 Opinion* required the establishment of the "*Three Red Lines*" and *"Four Systems"* as soon as possible.[169] Subsequently, the MWR selected a group of representative cities (prefecture and county level) to carry out the pilot WECC projects. The pilot projects that passed acceptance review were designated as "National Water Ecological Civilization City".

On March 14, the *Notice on Launching the Pilot Work of National Water Ecological Civilization Construction* was issued (MWR, 2013b). The notice identified six specific pilot conditions and set an experimental time span of 3-5 years. On July 31, the *Notice on Accelerating the Pilot Work of Building National Water Ecological Civilization City* was issued (MWR, 2013d). Forty-five cities were selected as pilot cities. The *Compilation Outline of the Implementation Plan for the Pilot Project of Water Ecological Civilization City Construction* was appended to the notice (MWR, 2013d). After five years, the "*First List of Cities Accepting the Acceptance of Pilots for National Water Ecological Civilization Construction*" was announced on March 15, 2018 (MWR, 2018a). As of 2018, forty-one pilot cities had completed experimental tasks, and passed the acceptance review. The WECC program was the enhancement of the ECP and ECC. The task given by the central government to the water resource department was to promote the comprehensive prevention and control of soil erosion. The MWR was not the main agency in charge of establishing an ecological civilization; nevertheless, soil and water conservation work is an indispensable part of ecological civilization construction (A reporter from China Water Resources

[168] In March 2015, the MWR approved 10 counties (including Miyun County, Beijing) as the CGP, 7 projects (including Beijing-Shanghai High-speed Railway, China-Myanmar Oil and Gas Pipeline Project (domestic section)) as the PCPN, and the Haotang Small Watershed (in Pingqiao District, Xinyang Prefecture, Henan Province) as the CSWCP, MWR (2015).

[169] The "Three Red Lines" refers to water resources utilization control, water efficiency control, and restrictions of pollution for water functional zone. The "Four Systems" refers to water permit and paid use and demonstration management system for water resources; "three simultaneous" system for water conservation facilities and major project of construction projects; management system for classification of water functional zone; and management responsibility and assessment system for water resources.

News, 2018; Zhang & Wang, 2016; Zhang & Zhang, 2017).

Marine Ecological Civilization Demonstration Zone

Marine environmental protection is also an indispensable part of ecological civilization construction. As a synonym for marine ecological conservation and environmental protection, the construction of "marine ecological civilization" was imminent. China's territory has a long coastline[170] (MEP, 2011c, p. 41). The quality of the coastal waters showed a downward trend in general. On January 31, 2012, the SOA issued the *Opinion on the Construction of the Marine Ecological Civilization Demonstration Zone* (SOA, 2012a). The Marine Ecological Civilization Demonstration Zone (MECDZ) program was to build up 10 to 15 national MECDZs by the end of 2015. Four tasks were assigned.[171] In September, the SOA issued the *Interim Measure for the Construction and Management of Marine Ecological Civilization Demonstration Zone* and the *Construction Index System for Marine Ecological Civilization Demonstration Zone (Trial)* (SOA, 2012b). The *MECDZ Construction Planning Outline*, *National MECDZ Declaration Form*, *MECDZ Construction Survey Questionnaire* and the *Interpretation, Calculation and Scoring Method for the MECDZ Construction Indicators* were issued. The indicator system clarified binding and reference indicators. The total value of these indicators is 90 points, and another questionnaire survey accounts for another 10 points. Only pilot projects that scored 85 points and more[172] can be approved as MECDZ.

In March 2013, the SOA approved 12 localities as the first batch of MECDZs (SOA, 2013).[173] In July, the SOA issued the *Implementation Program for the Construction of Marine Ecological Civilization of the State Oceanic Administration* (2015-2020) (hereinafter referred to as the "*Implementation Program 2020*") (SOA, 2015a). The *Implementation Program 2020* provided a roadmap and timetable for the construction of marine ecological civilization during the 13th FYP period (2016-2020). The *Implementation Program 2020* put forward 31 tasks in 10 domains.

[170] The total length of China's coastline is 32,000 kilometers, including 18,000 kilometers of mainland coastline. In 2011, the monitored area of coastal waters reached 279,000 square kilometers. Based on the monitoring points, the points meeting Grade I and Grade II water quality decreased by 10.2%, the points meeting Grade III water quality increased by 8.1%, and the points meeting Grade IV water quality and below increased by 2.1%.

[171] The first is to optimize the industrial structure of coastal areas and transform the development mode. The second is to strengthen the management and control of pollutant discharge into the sea to improve the quality of marine environment. The third is to strengthen the marine ecological protection and construction to maintain marine ecological security. The fourth is to cultivate the awareness of marine ecological civilization.

[172] The binding indices must reach 30 points and above.

[173] They are Weihai Prefecture, Rizhao Prefecture, Changdao County (Shandong); Xiangshan County, Yuhuan County, Dongtou County (Zhejiang); Xiamen Municipality, Jinjiang Prefecture, Dongshan County (Fujian); Hengqin New District in Zhuhai, Nan'ao County, and Xuwen County (Guangdong).

These tasks were categorized into four aspects: strict prevention at the source, strict management of the process, strict investigation of the consequences, and institutional system building. In order to effectively complete the main tasks, the *Implementation Program 2020* proposed 20 major projects in four categories.[174]

The *Implementation Program 2020* was regarded as the enhanced and extended version of *2012 Opinion*. The Chinese government has gradually realized that the "marine ecological civilization" includes not only marine economic development, but also marine environmental protection and ecological restoration (Li, Q., 2019). In December 2015, the SOA approved the second batch of MECDZ designations (SOA, 2015b).[175] In 2018, the SOA was merged into the MNR. Since then, the MNR led the MECDZ program and the *Implementation Program 2020*.

6.5 The Second Round of Pragmatic Integration: Pilot Demonstration Zones for Promoting Ecological Civilization (2013-2015)

Five years after the 17th National Congress of the CPC formally proposed the concept of "Ecological Civilization", the 18th party congress clearly called for the systematic ecological civilization construction. Since then, China's environmental governance has began to undergo substantial changes. The supporting industrial structure adjustment, energy structure adjustment and corresponding cadre assessment were put on the agenda. In order to cope with the paradigm changes brought about by the highest political rank, the State Council issued the *Opinion on*

[174] In the "governance and restoration" category, it proposed four major projects: the comprehensive management of the Blue Bay, the restoration of the Silver Beach, the restoration of the Southern Red and the North Willow wetland, and the protection and restoration of the ecological island. In the "capacity building" category, it put forward three major capacity building projects: basic marine environmental monitoring capabilities, sea area dynamic monitoring system, and island overseeing and monitoring system. The "statistical investigation" category proposed four tasks: marine ecology, marine pollution baseline, sea area status survey and evaluation, and island statistics. The "demonstration" category proposed five projects: the ongoing MECDZ, marine economic innovation demonstration zone, total amount of pollutant entering the sea control demonstration, sea area integrated management demonstration, and island ecological construction experimental base.

[175] These demonstration zones were Panjin Prefecture, Lushunkou District of Dalian Municipality (Liaoning Province); Qingdao Municipality, Yantai Prefecture (Shandong Province); Nantong Prefecture, Dongtai Prefecture, (Jiangsu Province); Jixian County (Zhejiang Province); Huizhou Prefecture, Dapeng New District of Shenzhen Municipality (Guangdong Province); Beihai Prefecture (Guangxi Zhuang Autonomous Region); and Sanya Prefecture, Sansha Prefecture (Hainan Province).

Accelerating the Development of Energy Conservation and Environmental Protection Industries (henceforth, *2013 Opinion*) on August 1, 2013 (State Council, 2013c). The *2013 Opinion* had two policy goals. The first is a significant increase in the level of industrial technology. The second is that domestically produced equipment and products can provide enough technical support for achieving the goals of energy conservation and environmental protection. In its sixth part "creating a favorable market and policy environment," the *2013 Opinion* requested 100 Pilot Demonstration Zones for Promoting Ecological Civilization (PDZPEC or PDZs) be selected to explore ecological civilization construction models, aiming to promote investment and consumption in energy conservation and environmental protection, and improve comprehensive capabilities in energy conservation and emission reduction.

On December 2, 2013, the NDRC, Ministry of Finance, MLR, MWR, Ministry of Agriculture, and SFA issued the *Implementation Program on National Pilot Demonstration Zones for Promoting Ecological Civilization (Trial)* (henceforth, *2013 Implementation Program*) (NDRC, 2013a). The *2013 Implementation Program* aimed to form a development pattern in PDZs that conforms to the main functional zoning strategy[176] and also to establish a resource recycling system after five years of experimentation (NDRC, 2013a).[177] These comprehensive goals were very closer to the later National Ecological Civilization Experimental Zone. The main functional zoning oriented ecological civilization system was eventually confirmed by the central authorities (Huan, 2016).

The *2013 Implementation Program* identified tasks in eight domains (NDRC, 2013b). The first is to implement the main functional zoning strategy, adjust and optimize the spatial structure, and build a scientific and reasonable urbanization layout, agricultural development layout, and ecological security layout. The second is to adjust and optimize the industrial structure, accelerate the development of high-tech industries and strategic emerging industries (such as energy conservation and environmental protection, and non-fossil energy such as hydropower, nuclear

[176] The main functional zoning is the medium and long-term land development master plan, which involves the future agglomeration of population and industries, as well as the protection of ecological and food security patterns, see Footnote 41.

[177] The other goals of the PDZ program were: the decline in energy conservation, emission reduction and carbon intensity indices exceeds binding indices required by higher-level government; the resource output rate, gross production value per unit of construction land, water consumption per 10,000 yuan of industrial added value, effective utilization coefficient of agricultural irrigation water, urban and rural domestic sewage treatment rate, and harmless treatment rate of domestic garbage have been among the highest in the country or the province; the water supply sources in cities and towns have fully met the standards; the area and quality of forests, grasslands, lakes, and wetlands have gradually increased; the area of soil erosion and desertification, desertification and rocky desertification has been significantly reduced; the quality of cultivated land has steadily improved; species has been effectively protected; an ecological cultural system covering the entire society has basically been established; green lifestyles have been generally promoted; the most stringent farmland protection system, water resources management system, and environmental protection system have been effectively implemented. For more information, see NDRC (2013b).

power, wind power, solar energy, and biomass energy) in accordance with local conditions. The third is to set compliance indicators to reduce energy consumption, carbon emissions, land consumption and water consumption intensity, control total energy consumption, total carbon emissions, and total emissions of major pollutants, and strictly observe the ecological red lines of cultivated land, water resources, forests, wetlands, rivers and lakes. The fourth is to strengthen resource conservation in the whole process of production, circulation and consumption. The fifth is to implement ecological restoration projects. The sixth is to establish an ecological cultural system and promote the ecological civilization concept. The seventh is to incorporate the ecological civilization indicator into the evaluation criteria for regional development, establish a lifelong accountability system for leading cadres, and implement the outgoing audit of the natural resource assets and environment for leading cadres. The eighth is to strengthen the capacity building in statistics, monitoring, standards, and law enforcement.

In the application report, prospective sites needed to underline the integration of ecological civilization construction and economic, political, cultural, and social construction in their respective jurisdictions. Hundreds of localities (including provinces, prefectures, and counties) applied for the experimental qualification. Each provincial DRC, together with other provincial departments of finance, land, water resource, agriculture, and forestry, conducted reviews of the applicatons in accordance with the requirements. Among the 51 indicators formulated by the NDRC, the efficiency of resource and energy utilization accounted for 19 items (Table 6.7). Unlike the past, the *2013 Implementation Program* did not limit the specific value of each indicator (Table 6.7). The focus was to check the initial and target values of each indicator. Then, after approval by provincial government, the implementation plan was to be reported to the above six ministries. These six ministries organized experts to review the implementation plan. The *2013 Implementation Program* required the NDRC and other relevant ministries to carry out follow-up supervision, inspection and evaluation of approved PDZs. A designated PDZ that failed the assessment was to be disqualified (NDRC, 2013a).

Types of indicator	**Indicator**		**Unit**
Economic development quality	1	Per capita GDP	Ten thousand yuan
	2	Income ratio of urban and rural residents	-
	3	Proportion of added value in three industries	-
	4	Proportion of added value of strategic emerging industries in GDP	%
	5	Proportion of pollution-free, green and organic agricultural products in agricultural products	%

Economic use of resource and energy	6	Land development intensity	%
	7	Cultivated land holdings	Ten thousand hectares
	8	Gross production value per unit of construction land	100 million yuan per square kilometer
	9	Total water use	One hundred million cubic meters
	10	Utilization use rate of water resources	%
	11	Water consumption per 10,000 yuan of industrial added value	Ton
	12	Effective utilization coefficient of agricultural irrigation water	-
	13	Utilization of unconventional water resources	%
	14	GDP energy consumption	Tons of standard coal / 10,000 yuan
	15	GDP carbon dioxide emissions	Tons / 10,000 yuan
	16	Proportion of non-fossil energy in primary energy consumption	%
	17	Total energy consumption	10,000 tons of standard coal
	18	Resource yield	10,000 yuan / ton
	19	Three rates of mineral resources (mining and recovery, mineral processing, comprehensive utilization)	%
	20	Proportion of green mines	-
	21	Comprehensive utilization of industrial solid waste	%
	22	Proportion of new green buildings	%
	23	Comprehensive utilization of crop straw	%
	24	Recycling of major renewable resources	%
Ecological construction and environmental protection	25	Forest land holdings	Ten thousand hectares
	26	Forest cover rate	%
	27	Forest stock	Ten thousand cubic meters
	28	Comprehensive coverage degree of grassland vegetation	%
	29	Wetland holdings	Ten thousand hectares
	30	Area prohibited for development	Ten thousand hectares
	31	Soil erosion area	Ten thousand hectares
	32	Newly treated area of desertified land	Ten thousand hectares

	33	Natural shoreline retention rate	%
	34	Public green area per capita	Square meter
	35	Total discharge of major pollutants	Ten thousand tons
	36	Proportion of Good AQI	%
	37	Water quality compliance rate of water function area	%
	38	Water quality compliance rate of urban water supply sources	%
	39	Centralized treatment rate of urban sewage	%
	40	Harmless treatment rate of domestic garbage in urban area	%
Ecological culture cultivation	41	Popularization of ecological civilization knowledge	%
	42	Proportion of party and government cadres participating in ecological civilization training	%
	43	Public transport ratio	%
	44	Market share of secondary and above energy efficient household appliances	%
	45	Popularity rate of water-saving appliances	%
	46	Compliance rate of domestic garbage classification in urban residential quarters	%
	47	Proportion of government green procurement of products	%
Construction of institutions and mechanisms	48	Proportion of ecological civilization construction in party and government performance appraisal	%
	49	Ratio of resource conservation and eco-environmental investment to fiscal expenditure	%
	50	Share of research and experimental development funds in GDP	%
	51	Publicity rate of environmental information	%

Table 6.7 Construction indicator of the PDZ, quoted from "Indicator system of Pilot Demonstration Zone for Promoting Ecological Civilization" (NDRC, 2013b)

In the first half of 2014, these six ministries entrusted the China Association of Circular Economy (CACE)[178] to conduct a check and review of the implementation programs from various localities. Fifty-five sites, including provinces, prefectures and counties, were approved in the first batch of PDZs in June 2014 (NDRC, 2014a). This ecological civilization policy experiment was led by the DRC system and had the support of the land, water conservancy, agricultural and forestry

[178] The CACE is a cross-regional and cross-industry organization (public institution, see Footnote 25), its establishment was approved by the Ministry of Civil Affairs (August 15, 2013). It is managed by the State-owned Assets Supervision and Administration Commission (SASAC) of the State Council. For more information, see its website, available at: http://www.chinacace.org/.

departments. This is an advantage that the previous experimental programs led by the MEP did not have. As aforementioned, the *Opinion of the CPCCC and the State Council on Accelerating the Construction of Ecological Civilization*, which was issued in May 2015, required relevant ministries and sites to carry out PDZ programs. Approved PDZ sites were required to sum up experiences and lessons in a timely manner. Compared with the policy experiments led by MEP, the central authority was more supportive of those led by NDRC.

In the autumn and winter of 2015, the NDRC, MEP and seven other ministries entrusted the Material and Energy Conservation Center (MECC)[179] to conduct an acceptance review of the implementation program submitted by a variety of localities (NDRC, 2016a). Another forty-five areas were selected to be in the second batch of PDZs (NDRC, 2015). By this time, a total of 100 pilot areas were finalized. Recognizing that the supreme leader's support for the PDZ program was greater than for its own, the MEP proactively joined this round of acceptance reviews. At the same time, it began to revise the *2013 Indicators*. In order to cooperate with the main functional zoning strategy supervised by NDRC, the "optimization of spatial pattern" indicator became the first binding index (Table 6.6). In this way, policy coordination on the ecological protection between ministries was further improved (Huan, 2017a).

6.6 The Third Round of Pragmatic Integration: National Ecological Civilization Experimental Zone (2016-)

From the perspective of policy process, there were various institutional problems in the experimental zones hosted by the MEP, MWR, NDRC and other central ministries. The policy objectives of these comprehensive pilot programs covered the policy objectives of specialized programs such as building a reasonable territorial space development system (e.g., NPS program), emission reduction (e.g., CET scheme), and water pollution prevention and control (e.g., RCS).

[179] The MECC was formally approved by the former Ministry of Labor and Personnel on July 3, 1986. In 1990, it was clearly defined as a deputy bureau-level public institution. The organizer is the SASAC. It is now managed by the China Federation of Logistics and Purchasing. Since its establishment, the center has been adhering to the tenet of serving the government and enterprise, and has undertaken the tasks entrusted by the SASAC, NDRC, Ministry of Finance, Ministry of Industry and Information Technology, etc., and actively provided technical services to enterprises.

The overlap and repetition of experimental tasks among pilot programs can easily increase the cost of policy implementation. The pilot areas were mostly counties and prefectures (Table 6.2, 6.3, 6.5, 6.6), and there was a lack of experience and lessons in coordinating policies related to provincial-scale ecological civilization construction.

As noted before, recognizing the challenges that Chinese governments had faced in implementating some of its previous experimental goals, the *2015 Opinion* "focused on the need for deep reforms both to governance approaches and to awareness building and urged measures that would promote innovation, give a greater role to the market, strengthen science and technology, and promote education to make ecology a core value of the socialist value system" (Schreurs, 2017a, p. 167). Shortly thereafter, in October 2015, in order to implement these reform goals, the Fifth Plenary Session of the 18th CPCCC proposed to establish a unified ecological civilization experimental zone dedicated to building a comprehensive platform to integrate and unify previous related experimental projects.

In August 2016, the General Office of the CPCCC and the General Office of the State Council jointly issued the *Opinion on Establishing Unified and Standardized National Ecological Civilization Experimental Zone* (henceforth, *2016 Opinion*) and the *Implementation Plan of the National Ecological Civilization Experimental Zone (Fujian)* (henceforth, *Fujian Program*) (CPCCC & State Council, 2016b). The National Ecological Civilization Experimental Zone (NECEZ) program aimed to establish a more complete ecological civilization system in experimental zones, and form a number of institutional achievements that could be replicated and promoted throughout the country. In the end, it took 13 years for the top leadership to make up their minds to fully institutionalize "ecological civilization construction". [180]

The NECEZ is presented as a comprehensive platform for undertaking reform of the ecological civilization system and encouraging local pioneers to carry out experiments in five domains. The first domain covers the natural resource property rights system, preparation of natural resource balance sheets, and coordination of various spatial planning based on the main functional zoning strategy: "Multiple Planning Integration (MPI)" (*Duo Gui He Yi*). The second incorporates ecological environment supervision mechanisms, paid use of resources, and compensation mechanisms for ecological protection. The third includes the institutional systems that are conducive to promoting the "supply-side structural reforms" (*Gongjice Jiegouxing Gaige*), such as

[180] In 2003, the "ecological civilization" term was adopted by the *Decision of the CPCCC and the State Council on Accelerating Forestry Development*, for more details, see Section 6.1.

ecological protection and restoration investments and technological support mechanisms, a green financial system, and green industry. The fourth covers the systems for total resource management and saving, green development mechanism for internalization of environmental external costs at different development stages, and an evaluation and assessment system for ecological civilization goals. Finally, the fifth institutional system encourges the spirit of local initiatives.

There were two considerations in the selection of pilot provinces. First, three southern provinces with good ecological conditions and strong environmental carrying capacity were selected as sites.[181] Fujian is a relatively developed region, while Jiangxi and Guizhou are developing regions. Second, as will be elaborated later, the officials of the three provinces have attached relatively high importance to ecological protection. Among them, the selection of Fujian also involves the central government's conscious shaping and publicity of the green political image of the incumbent supreme leader. Moreover, the *2016 Opinion* called for attention to the historical techniques of "gradual promotion" (*Zhubu Tuiguang*) and "typical demonstration" (*Dianxing Shifan*)[182].

This pilot program was very successful in unifying and integrating previous pilot projects and demonstration zones. Behind this success was the integration of policy resources. All types of special pilot projects deployed in accordance with the *2015 Overall Plan* were prioritized in this new platform. Comprehensive ecological pilot programs and demonstration areas that had been carried out in the three pilot provinces were integrated and unified to ensure coordination among different departments. In addition, there was a strict restriction of other types of pilot projects and demonstration zones. Since the *2016 Opinion* was issued, ministries could no longer launch any pilot programs, demonstration zones, or bases designated "ecological civilization" without the approval of the CPCCC and the State Council. Various ecological civilization pilot projects and demonstration zones that had been carried out by minitries on their own were terminated by the end of 2020.

The party committee and government at the each NECEZ formulated detailed implementation plans, proposed road maps and timetables, determined task lists and divisions of labor, and identified experiment areas, objectives, progress, and supporting policies for each task. Each NECEZ was implemented after being first reported to and approved by the CLGCDR. The

[181] In May 2019, the *Implementation Plan of the National Ecological Civilization Experimental Zone (Hainan)* was issued. Hainan became the fourth NECEZ program.
[182] For more details, see Section 2.2.

provincial government in each NECEZ conducted a self-evaluation of the completion of reform tasks every year, and reported progress to the central government. The NDRC, MEP/MEE, and other relevant ministries organized evaluation and follow-up inspections of each NECEZ, and summarized experiences and lessons when they found it necessary (NDRC, 2020). [183]

6.6.1 Fujian Province: from a Pilot Ecological Province to a NECEZ

Fujian here is similar to Zhejiang in the Chapter 5. From June 1985 to October 2002, General Secretary Xi worked in Fujian for more than 17 years. He successively held leadership positions in Xiamen Municipality, Ningde Prefecture, Fuzhou Prefecture, Fujian Provincial Party Committee and Provincial Government. In 1996, he became the deputy secretary of the provincial party committee, in charge of agricultural and rural work.[184] He made it clear that rural non-point source pollution ("*Mianyuan Wuran*") must be dealt with. In 1999, he was appointed as Provincial Governor. Governor Xi took the lead in issuing a directive around the country to designate a prohibited area for livestock and poultry breeding (The Writing Group, 2021). Subsequently, Xi personally urged Fujian to carry out the task of "One Control, Dual Compliance" (*Yikong, Shuangdabiao*)[185] as directed by the State Council. A retired middle level official of the provincial government recalled:

> At the very beginning of 2000s, under the active advocacy of Governor Xi, Fujian was one of the first provinces to apply for a pilot Ecological Province (Li, Z., 2017).

[183] In November 2020, a total of 90 reform experiences were promoted in other regions. They were categorized along 14 domains: natural resource asset property rights, territorial space development and protection, domestic waste classification and management, comprehensive improvement of water resources and water environment, rural human settlements improvement, ecological protection and restoration, green recycling and low-carbon development, green finance, ecological compensation, ecological poverty alleviation, ecological justice, ecological civilization legislation and supervision, ecological civilization assessment and audit. For more details, see NDRC (2020).

[184] In Fujian's mountainous area, the excessive use of pesticides and fertilizers in agriculture was common and soil erosion was serious by the mid-1990s. As an example, Changting was once one of the counties with the most serious soil erosion in the southern red soil region. In rural areas, pollution from livestock and poultry breeding, especially pig breeding, was quite serious. The animal waste from pig farms polluted water bodies, intensifying their eutrophication.

[185] The "One Control" is to control the total amount of pollutants discharged. "Dual Compliance" means that enterprises must meet the standards for discharging pollutants, and the environmental quality of key cities must meet the standards set by main functional zoning.

Fujian was approved to join pilot "Ecological Province" program as early as 2002. Governor Xi visited Changting County five times for environmental protection investigations. A retired county head of Changting recalled:

> Comrade Xi Jinping personally promoted Changting's comprehensive management of soil erosion project to be listed as a key concern of the provincial government. He presided over the reporting of Changting as a "National Key County for Soil and Water Conservation", which gained support from the MWR (Zhong, 2017).

The environmental protection performance in Fujian was one of Xi's most important achievements before he entered the highest political ranks. He actively proposed the "Ecological Fujian" strategy, and promoted the reform of the collective forestry property rights system. In the Xi era, Fujian's experience in ecological conservation and environmental protection has been vigorously promoted by central government and its official media (The Writing Group, 2021). Therefore, this province was selected as the first NECEZ.

In March 2014, the State Council issued the *Opinion on Supporting Fujian Province to Further Implement the Ecological Province Strategy and Speeding up the Construction of the Pilot Demonstration Zones for Promoting Ecological Civilization* (henceforth, *2014 Opinion*), three months earlier than the official announcement of the first batch of PDZs. The *2014 Opinion* set two phased goals[186] for the Fujian PDZ and proposed a total of 18 tasks in 6 domains[187] (NDRC, 2016d).

Two years later, inspired by Xi's instructions on building a Fujian with "active mechanism, excellent industry, rich people, and ecological beauty" (NDRC, 2016d), the *Fujian Program* put forward the overall requirements, key tasks and safeguard measures for the Fujian NECEZ in

[186] The first is that by 2015, the energy consumption and carbon dioxide emissions per unit of regional GDP must be 20% or more lower than the national average; the proportion of non-fossil energy in primary energy consumption should be 6 % higher than the national average; the air quality in cities should meet or exceed Grade II standards; the proportion of water systems meeting Grade I to III water quality should be more than 90%; the area of coastal waters that meets or is better than Grade II water quality should reach 65%; the area of land used per unit of GDP should drop by 30% compared to 2010; water consumption per 10,000 yuan of industrial added value should drop by 35% compared to 2010; the forest coverage rate should reach more than 65.95%. The second is that by 2020, energy resource utilization efficiency, pollution prevention and control capabilities, and ecological environment quality should be significantly improved.

[187] In terms of optimizing the development pattern of territorial space, it proposed to carry out ecological protection and restoration in key ecological functional zones. In terms of increasing environmental protection, it proposed to carry out comprehensive environment remediation for water bodies, promote in-depth treatment of wastewater from key industries, and improve sewage treatment facilities. In terms of strengthening the ecological civilization system, it proposed to carry out pilot projects for the trading of energy saving, pollution discharge rights, and water rights, and launch carbon trading.

August 2016. The central government supported the Fujian NECEZ to "lead the reform of the ecological civilization system, transform ecological advantages into development advantages, promote the formation of green production and lifestyles, and provide new green momentum for accelerating economic and social development" (NDRC, 2016d). The provincial scale NECEZ program can be regarded as the deepening and expansion of the PDZ program. In September 2016, the Provincial Party Committee and the Provincial Government issued the *Plan for the Division of Tasks in the Implementation Plan of the National Ecological Civilization Experimental Zone (Fujian)*. It clarified in detail the tasks of various regions and departments in the province.

The *Fujian Program* is committed to creating a number of typical experiences for the ecological civilization construction. Specifically, by 2020, the development and protection system of territorial space tends to be improved, the natural resource asset property rights system should be basically established; the environmental governance system should be basically formed; and an ecological civilization performance evaluation and accountability system must be universally implemented. Furthermore, the *Fujian Program* delineated several clear targets. By 2020, the proportion of water systems meeting Grade I to III should be more than 86%. The area of coastal waters that meets or is better than Grade II water quality should be more than 81%. The forest coverage rate should reach more than 66% (CPCCC & State Council, 2016b).

The *Fujian Program* assigned 26 key tasks in 6 domains: the territorial space planning and use control system, the ecological protection market system, the diversified ecological protection compensation mechanism, the environmental law enforcement system, the natural resource asset property rights system, and the green development performance evaluation and assessment (CPCCC & State Council, 2016b). These domains covered almost all the tasks of previous ecological civilization experiments. (1) In terms of advancing the NPS pilot program, the implementation plan of *Wuyi Mountain NPS Pilot Program* was issued in 2016, which helped to integrate fragmented protected areas, and establish the WMNPA directly led by provincial government. A unified registration, protection and management of the natural ecological space in the pilot area was carried out. Special protection areas, strict control areas, ecological restoration areas and traditional utilization areas were delineated. By the latter 2017, a protection and management model for Wuyi Mountain national park had been basically formed. (2) Regarding the establishment of a provincial CET scheme, the Fujian official issued the *Fujian Province Carbon Emissions Trading Implementation Rule*. The rules of emission information reporting and verification, emission rights quota management and allocation, and carbon trading operation were

formulated and issued. A provincial carbon trading platform was established. A pilot forestry carbon sink trading was approved, and the forestry carbon sink trading rules and operating methods were completed. (3) In terms of improving the river basin governance mechanism, the Fujian NECEZ full experimented the RCS, strengthened the territorial responsibilities of water environment governance, and implemented "One River, One Approach". By 2018, three "Blue Line" management systems had been established for river bank protection, drinking water source protection, and groundwater alert protection. A pilot project for river-basin based environmental law enforcement agencies had been carried out, and various forms of cooperation mechanism for river-basin based water environmental protection had been established.

The CPCCC and the State Council required the Special Group for Reform of Economic System and Ecological Civilization System[188], NDRC, and MEP/MEE to strengthen guidance, support, and follow-up supervision for Fujian NECEZ (CPCCC & State Council, 2016b). Troops stationed in Fujian were actively integrated into the construction of the experimental zone. Fujian Provincial People's Congress and its Standing Committee, and Fujian Provincial Government had formulated relevant local regulations and rules. As an experimentalist intervention, the program required relevant central and provincial departments to summarize experience in a timely manner, strengthen the follow-up supervision and effect evaluation, and commission a third-party agency to conduct independent evaluation when necessary (CPCCC & State Council, 2016b). Some reform measures and innovative experiences that were effective were summarized and promoted to other provinces (NDRC, 2020).

As a pragmatic integration, the *Fujian Program* was very eye-catching in terms of the merger and integration of previous pilot programs and demonstration zones. The first was to unify and integrate comprehensive demonstration areas such as the Fujian PDZ and ECCDZ (e.g., Changtai County), and carry out these projects under the title of NECEZ (Fujian). The second was that various specialized pilot projects and demonstration zones were integrated into the NECEZ platform, including the pilot project of "Main Functional Zoning" (e.g., Taining County), the pilot project of "MPI" (Xiamen Municipality), the NPS pilot project (Wuyi Mountain), the ECP (e.g., Changting County), the WECC pilot project (e.g., Putian County), and the MECDZ (Xiamen).

[188] It is under the CLGCDR/CCCDR framework, for the details, see Section 2.3.

6.6.2 Promotion of NECEZ Program: Jiangxi Province and Guizhou Province

One year later, the *Implementation Plan of the National Ecological Civilization Experimental Zone (Jiangxi)* (henceforth, *Jiangxi Program*) and the *Implementation Plan of the National Ecological Civilization Experimental Zone (Guizhou)* (henceforth, *Guizhou Program*) were issued in October 2017 (CPCCC & State Council, 2017; Reporter, 2017h). In the second round of pragmatic integration, Jiangxi and Guizhou were already approved as the PDZs. They represent the central and western regions, but they are all in the south. No northern provinces were included in the NECEZ program.

6.6.2.1 Jiangxi Program

As early as the beginning of reform and opening up, Jiangxi Province, which was not economically developed, began to pay great attention to ecological conservation. In the early 1983, Jiangxi began to implement a "Mountain, River, and Lake" project in Poyang Lake Basin.[189] This pilot project received attentions at home and abroad. A professor from East China University of Science and Technology (Nanchang, Jiangxi) recalled:

> At the UN Conference on Environment and Development in 1992, this pilot project was listed as one of the priorities of the *China's 21st Century Agenda*. In 1997, several ministries began to promote Jiangxi's experiences in the "Mountain, River, and Lake" project to neighboring provinces (Hua, 2020).

Among all the central provinces, Jiangxi has the best environmental conditions.[190] More importantly, Jiangxi was the main experimental site for the "Ecological Poverty Alleviation" strategy[191]. All these factors promoted the province to become an candidate for the NECEZ

[189] Poyang Lake is the largest freshwater lake in China. This project was supported by the former State Planning Commission and State Science and Technology Commission. This pilot project proposed to protect "mountains, rivers, forests, fields and lakes" in the basin as a complete system.

[190] According to the *Communiqué on the State of the Environment in Jiangxi Province (2016)*, the proportion of water quality sections (monitoring points) (Grade I to III) in the province is 81.4%; the proportion of days with good air in the urban areas (prefecture-level cities) in the province is 86.4%. For more details, see Jiangxi Provincial Department of Environmental Protection (2017). Regarding the *Communiqué on the State of the Environment in Jiangxi Province* from 2009 to 2020, see Jiangxi Provincial Department of Ecology and Environment (2021).

[191] Ecological poverty alleviation aimed to increase support for the poor by implementing ecological restoration projects, increasing ecological compensation, and developing ecological industries, thereby achieving a win-win situation in promoting poverty alleviation and building ecological civilization system in poverty-stricken areas. For

program. President Xi demanded Jiangxi "to create a 'Jiangxi model' for Beautiful China" (CPCCC & State Council, 2017).

The main goal of the *Jiangxi Program* was to build a systematic ecological civilization system. Specifically, by 2020, the territorial space development system and the diversified ecological compensation mechanism should be more complete; the ecological protection market system should be more perfect; the coordinated supervision and governance system of gas, water and soil should be more perfect; the green value sharing system for all should be basically established; significant progress must be made in the ecological poverty alleviation; an evaluation system that reflects the concept of green political performance should be basically established (CPCCC & State Council, 2017). Correspondingly, the *Jiangxi Program* set specific targets[192] (CPCCC & State Council, 2017).

In terms of establishing and improving the property rights system of natural resource assets, the *Natural Resources Unified Confirmation and Registration Measures (for Trial Implementation) in Jiangxi Province* was formulated and promulgated in 2018; the province's state-owned natural resource asset management agencies were integrated in 2017. In terms of improving the territorial space development system, the *Spatial Plan of Jiangxi Province* was issued in 2017; the *Implementation Rule for the Use of Natural Ecological Space in Jiangxi Province* was promulgated in 2019. As far as the ecosystem protection and restoration system is concerned, by 2020, Jiangxi had completely stopped the commercial logging of natural forests; in areas with important ecological functions, such as national nature reserves, pilot projects of logging ban subsidies, non-state forest redemption (replacement), and contracted enclosures have been independently carried out; the total amount management of wetland resource has been implemented, and the monitoring and early warning mechanism of the Poyang Lake wetland has been established. In terms of improving the market-based mechanism for ecological protection, the *Implementation Rule for the Trading of Pollution Tights in Jiangxi Province* was formulated in 2019; a statistical accounting system for GHG emissions has been established, forestry carbon

example, as described in Chapter 3, the Three-River-Source National Park Administration recruited a large number of herdsmen to serve as ecological management and protection staff.

[192] By 2020, the province's forest coverage rate should be stabilized at 63%; the proportion of surface water meeting Grade I to III water quality should be increased to 85.3%; the water quality compliance rate of important rivers and lakes should reach 91% or more; the water quality compliance rate of the Poyang Lake Basin should reach more than 90%; the water bodies with water quality of Grade V and inferior to Grade V should be completely eliminated; the area and intensity of soil erosion should be significantly reduced; the ratio of days with good air quality in cities should reach 92.8% or more; the annual average concentration of fine particles should be reduced to less than 39 micrograms/m^3; the wetland area should not be less than 910,000 hectares; the comprehensive vegetation coverage of grassland should reach 86.5%; energy consumption per 10,000 yuan of GDP, water consumption per 10,000 yuan of GDP, GHG and major pollutant emissions should be further reduced.

sink trading has been experimented, and the framework of carbon trading system has been established. In terms of improving the comprehensive management system of the river basins, the policy document on strengthening the protection and restoration of the Poyang Lake basin was issued in 2018; the *Compensation Measure for River Basin Ecological Protection in Jiangxi Province* was revised in 2018; the RCS was fully implemented on time, and the main agency and funds for river and lake management were implemented.

As an experimentalist governance characterized by the pragmatic integration, Jiangxi NECEZ was very successful in merging and integrating previous pilot platforms. It unified and integrated the comprehensive demonstration areas that had been carried out, such as the PDZ (Jiangxi) and the pilot "Ecological County" projects, and carried out them under the name of the NECEZ (Jiangxi). Various specialized pilot programs and demonstration zones were integrated into the NECEZ platform, including the "Main Functional Zoning" pilot project (e.g., Suichuan County), the "MPI" pilot project (e.g., Yudu County), the ECCP (Jingdezhen Prefecture), the ECP (e.g., Xiushui County), and the WECC pilot project (e.g., Nanchang).

6.6.2.2 Guizhou Program

Among the western provinces, Yunnan and Guizhou have the best ecological or environmental condition (Table 6.8). However, in the last decade, the political atmosphere in Guizhou is more suitable for implementing central government's directives.[193] In addition, the *Regulation on the Promotion of the Construction of Ecological Civilization in Guizhou Province*, the country's first provincial-level regulations for the ecological civilization construction, had been implemented in July 2014.[194] More importantly, it only took one year to complete the draft of the *Guizhou Program*.[195] A cadre from the Guizhou Provincial Department of Ecology and Environment recalled:

> Guizhou Provincial Government had solicited opinions from relevant provincial departments and public for

[193] The bad atmosphere in the officialdom of Yunnan was well-known throughout the country. In the 2010s, two consecutive secretaries of Yunnan Provincial Party Committee were expelled from the party due to violations of party discipline and state law. While, three secretaries of the Guizhou Provincial Party Committee were promoted to the national level leaders.

[194] According to this regulation, in areas with fragile ecological environment, GDP assessment has been cancelled; the ecological civilization construction has become one of the main evaluation indicators for local governments. In contrast, the *Regulation on the Promotion of Ecological Civilization Construction in Fujian Province* came into effect in November 2018, while the *Regulation on the Promotion of Ecological Civilization Construction in Jiangxi Province* came into effect in January 2020. These two regulations were passed after the policy experiment started.

[195] This is in sharp contrast to the Yunnan local government's inability to implement Beijing's intentions in the NPS experiment. See Chapter 3 for details.

more than 20 times. The draft of the *Guizhou Program* document was distributed to the Plenary Session of the Provincial Party Committee for further discussion. The Provincial People's Congress and the Provincial Party Committee also conducted special inquiries on the *Guizhou Program*. At the central government level, the draft was finally submitted to the CLGCDR meeting for decision after soliciting opinions from relevant ministries four times (Li, Y., 2019).

	Proportion of water bodies (Grade I to III water quality) at major river monitoring points	Proportion of average days with good air in the urban area where prefectural government is located	Forest coverage	Average sound value of the road monitoring point in the urban area where prefectural government is located
Guizhou	96%	97.1%	50% (2015)	49.8-59.0dB
Yunnan	81.7%	98.3%	59.3%	63.2-70.5dB

Table 6.8 Environmental basics of Guizhou and Yunnan in 2016, adapted from "Communiqué on the State of the Environment of Guizhou Province in 2016" (Guizhou Provincial Department of Ecology and Environment, 2017), "Communiqué on the State of the Environment of Yunnan Province in 2016" (Yunnan Provincial Department of Ecology and Environment, 2017), compiled by the author

Also, the policy goal of the *Guizhou Program* was to establish an systematic provincial-scale ecological civilization system (CPCCC & State Council, 2017). Specifically, By 2020, a number of major institutional achievements that could be replicated and promoted throughout the country should be formed in domains such as the development and protection of territorial space, the property rights system of natural resources, the management system of natural resources and assets, the ecological environmental governance and supervision, the ecological civilization legal construction, the ecological civilization performance evaluation and accountability. Some typical experiences should be created in the fields of ecological poverty alleviation, big data, ecological tourism, and international exchanges and cooperation of ecological civilization construction. To achieve these ends, the *Guizhou Program* set some specific goals[196] (CPCCC & State Council, 2017).

In terms of improving the spatial planning system, the provincial-level spatial planning preparation method was promulgated in 2017. The *Implementation Rule of Natural Ecological Space Use Control in Guizhou Province* was formulated in 2018. Regarding the unified

[196] The development intensity of territorial space should be controlled within 4.2%, the construction land should be controlled within 744,000 hectares, the urban space should be within 1.2% of the province's area, the urban green buildings should account for 50% of new buildings, the urban sewage treatment rate and the harmless treatment rate of domestic garbage should reach above 93% and above 90% respectively, the area of rural residential areas should be within 1.9% of the province's area, and more than 90% of the household garbage in the village should be effectively treated.

confirmation and registration of natural resources, in 2017, the pilot program of unified confirmation and registration of natural resources was carried out in five counties, and the *Implementation Plan for the Unified Confirmation and Registration of Natural Resources in Guizhou Province* was formulated. In terms of establishing and improving the natural resource asset management system, in 2017, the *Implementation Plan of Natural Resource Asset Management System Reform in Guizhou Province* was formulated, and the pilot program of natural resource asset management system was launched. In terms of improving the atmospheric environmental protection system, in 2018, the plans for the delineation of coal-burning areas and non-coal-burning areas (cities above the county level) were formulated. In 2017, the framework of the carbon trading system was established, and the rules for forestry carbon sinks were formulated, and a management information system for pollution rights trading was also completed. In terms of improving the water resource protection system, the RCS was fully implemented on time, and the main agencies and funds of river and lake management and protection were implemented; a monitoring and evaluation system for the carrying capacity of water resources and water environment has been established. By 2020, the current evaluation of the carrying capacity of regional water resources and water environment (at the prefecture and county levels) has been completed; the control system for groundwater exploitation and utilization has been established, and groundwater pressure extraction plans in different regions have been compiled. Also, the monitoring system of users who use more than 50,000 cubic meters of groundwater per year has been achieved.

As an experimentalist governance characterized by the pragmatic integration,, Guizhou NECEZ also incorporated various specialized pilot programs and demonstration zones into the platform of NECEZ. They were the PDZ, the ECDZ (Bijie Prefecture), the provincial-level spatial planning pilot project, the "Main Functional Zoning" pilot project (e.g., Lino County), the ECCP (Southeast Guizhou Autonomous Prefecture), and the WECC pilot project (e.g., Guiyang Prefecture).

In this case, the central government had no clear goal and instrument at the very beginning. The policy goal and policy instrument were finalized after a long period of local and sectoral experimentation. In the third stage of this case, with the deployment of a large scale environmental policy integration, the central government finally established the NECEZ program (i.e., an upgraded version of the previous pilot "Ecological Province" program) as an ideal carrier for the provincial-scale ecological civilization construction.

7. Discussion, Comparison and Conclusion

This chapter summarizes the major findings of this research project, assesses how the CPC-style experimentalist environmental governance model has led to a better understanding of China's environmental governance and discusses what this study contributes to policy process studies and comparative environmental politics. It begins with the overview of main findings of each case and compares between them. Then, the second section compares these evolutionary clues with the elaboration of each experimentalist environmental governance pattern, returning to the four hypotheses introduced in Chapter 2. My aim is to clarify whether these research hypotheses can be formally finalized as propositions. The final section points out the contribution of this research to the studies on experimentalist governance, China's public policy process, and environmental politics. It also proposes possible future research directions.

Chapter 2 of this dissertation introduced the framework of CPC-style experimentalist environmental governance that has come to play an increasingly important role in China. CPC-style experimentalist environmental governance is a policy process in which the national and local governments jointly set policy goals and policy instruments based on sectoral and/or local experiments. It has four main features. The first is the multilevel governance in determination of policy goals and policy instruments, this can be seen in the shared responsibility in goal setting and differentiated exploration mechanisms found within typical experimentalist architecture. The second is the directional leadership coming from a central authority, especially the incumbent supreme leader in the recentralization. The third is that local discretion in performance evaluation changes over time; this was especially the case in the recentralization epoch. The fourth is that China's domestic environmental policy output involves a relatively recalcitrant political response from the central level, and a more proactive response from the local level (provinces, prefectures, counties and towns).

Using the CPC-style experimentalist environmental governance framework as a basis, four new patterns of environmental governance were conceptualized: strict hierarchical experimentation, cautious comparative experimentation, selective political recognition, and pragmatic phased integration. These patterns are illustrated with the cases of NPS, CET, RCS, and comprehensive experimental zone. For each specific target group, the policy goals and instruments were jointly drawn up by the central and local environment related departments and implemented through

sectoral and local policy experimentation.

7.1 The Four Cases Revisited and Compared

This section summarizes and compares the main developments tied to each experimental program. Based on this, four research hypotheses are explained in detail and then transformed into formal propositions in the next section.

7.1.1 The Policy Goals and Instruments at the Start of Each Experiment

As can be seen in Table 7.1, not every experimental system has clear policy goals and policy instruments at the outset. While in the first case, policy goals and policy instruments were established from the beginning, in the fourth case, neither existed at first. In the second case, there was only one clear policy goal. In the third case, China's top-down administrative structure and recentralization reform offered a policy instrument on standby--- devolving pollution governance responsibilities to local government officials.

		Were there clear policy goals in the documents issued by the CPCCC and/or the State Council at the very beginning?	
		Yes	No
Did the central government have the policy instruments needed to promote the sectoral/local experiment at the very beginning?	Yes	NPS pilot program (2013-2019): Goal (establish a comprehensive national park system [*Decision of the CPCCC on Several Major Issues Concerning Comprehensively Deepening Reform*]); instruments (reorganize the fragmented protected area system, etc.)	RCS implementation (2003-2018): Instrument (devolve responsibility for water pollution control to local government officials)

	No	CET pilot scheme (2011-2017): Goals (Establish a national carbon market to promote energy conservation and emission reduction, etc. [*The Twelfth Five-Year Plan for National Economic and Social Development*])	Comprehensive Experimental Zones for Ecological Civilization Construction (1995-2017)

Table 7.1 Policy goals and instruments at the very beginning of each experimental system

Chinese governments at all levels designated, approved or listed more than 400 national nature reserves and more than 200 national SHAs (including nearly 20 world natural heritage sites). Most of these protected areas had, however, obvious institutional defects, which made it imperative to launch a united management program. In the NPS case, the central government first determined policy goals, delineated policy instruments and set rough plans (Table 7.1). In November 2013, the *Decision of the CPCCC on Several Major Issues Concerning Comprehensively Deepening Reform* defined the goal of a comprehensive NPS. This decision elevated the NPS to the height of a national strategy. One year later, the *Overall Plan for the Reform of Ecological Civilization System* put forward more detailed requirements for the NPS establishment. First and foremost was to integrate a previously fragmented protected area management system (i.e. nature reserves, scenic and historic areas, cultural and natural heritage, geological parks, forest parks, etc) that had in the past been controlled by a wide range of different central ministries and local departments.

After policy goals and policy instruments were roughly determined, the relevant central ministries began to give priority to the NPS pilot program, a trans-provincial governance experiment. They did this in order to test the rationality of their goals and the fit of policy instruments. They also had an interest in securing their power over localities in this environmental policy domain. Before the release of *2015 Overall Plan*, the NDRC and some provincial governments had begun preparations for the possible pilot projects. In January 2015, the NDRC and 12 further ministries jointly issued the *Pilot Program for Establishing a National Park System*. They did this in a low profile manner. There were almost no official media reports. The policy goal of the *2015 Pilot Program* was in line with the *2015 Overall Plan*. After the *2015 Overall Plan* was announced, the pace of preparation began to accelerate.

In the CET case, the central government initially designed a broad but realistic policy goal, but did not set uniform policy tools because of a lack of understanding over the likelihood of success (Table 7.1). In September 2010, in the *Decision to Accelerate the Development of Strategic Emerging Industries*, the State Council for the first time called on relevant ministries to prepare a

national carbon trading scheme. In early 2011, the CPCCC proposed to establish a domestic carbon market in its recommendations to the *Twelfth Five-Year Plan for National Economic and Social Development*. In October 2011, the NDRC issued the *Notice on Conducting Pilot Work on Carbon Emissions Trading*. These pilot carbon trading schemes launched during the 12th FYP opened the government-led phase of comparative carbon reduction experimentation. In order to test the policy programs and select the best approach for future country-wide promotion, the NDRC specifically designated representative sites (Beijing, Shanghai, Tianjin, Chongqing, Guangdong, Hubei and Shenzhen), but did not provide any united or specific legal provisions, administrative regulations or implementation rules for the cap-and-trade schemes. Nonetheless, the pilot areas all had to follow the same policy directions determined by the central government: build a provincial carbon trading scheme and implement a carbon emissions reduction strategy.

Unlike the vertical experimentation of the NPS case, which did not consider the representativeness of selected experimental sites from the outset, the central government in this case started by choosing a larger number of representative localities in order to clearly and comparatively test the fit of the still unfamiliar policy tools and to weed out those policy tools that were inappropriate to a particular locality or problem. As the country's capital, Beijing needed to set an example of energy conservation and emission reduction for other parts of the country. Tianjin is the provincial-level municipality with the highest level of heavy industry pollution, so it was imperative for it to achieve carbon emission reductions. Shanghai and Shenzhen were the places with the most developed market economy in China, and the market atmosphere for carbon trading was likely to be the best. Tianjin and Shanghai were also representative sites as they had the highest per capita carbon emission intensity in the country. Guangdong and Hubei were the provinces with the highest levels of carbon emissions, and their governments actively supported the launch of their respective provincial schemes. Chongqing is the only western province-level locality here. Although its economy is less developed, its status as a Municipality Directly under the Central Government had certain exemplary significance. A similar environmental experiment was carried out by the SEPA ten years ago. At that time, the eight pilot sites launched for SO_2 trading were considered to be sufficiently representative in terms of their geography, economies, and energy consumption levels. Here, in the CET case, the NDRC applied the fimiliar approach to new issue.

In the RCS case, the central government first set a very broad policy vision in framework legislation (i.e. protecting water bodies so as to maintain good water quality), but did not set any

clear goals and metrics. As early as 1979, the *Environmental Protection Law of the People's Republic of China (for Trial Implementation)* already stipulated that it is necessary to "protect rivers, lakes, seas, reservoirs and other water areas to maintain good water quality". Ten years later, the revised *Environmental Protection Law* strengthened these provisions. Nonetheless, these general provisions were not backed up by any detailed implementation rules and technical sprcifications. This was a general defect of China's early environmental policy making.

Appropriate policy tools for water pollution prevention and control were first proposed and initially formed at the local level. Local (or grass-roots) governments that were directly facing ever changing social conditions were likely to continuously try different small policy innovations based on established policy directions. In the early 2000s, a county-scale policy instrument dedicated to the prevention and control of water pollution, originated in the Yangtze River Delta. In 2003, in order to obtain the designation of "National Clean City", Changxing County put the responsibility for sanitation management onto urban communities. Once success was achieved, Changxing subsequently placed river governance responsibility onto the community and village level officials within the county. This new governance experiment was, however, not scaled up to the Huzhou prefecture and Zhejiang province.

Instead, it was improved and elevated as a prefectural-scale RCS framework in 2007 by Wuxi Prefecture in its efforts to tackle the cyanobacteria pollution in the Taihu Lake Basin. In May and June 2007, an outbreak of cyanobacteria put Wuxi and other prefectures in southern Jiangsu region at the forefront of RCS experimentation. This incident aroused the attention of the then premier, who instructed Jiangsu's authorities to solve this problem as quickly as possible. In response, Qiu He, the then Vice Governor in charge of environmental affairs, took the governance responsibility devolved system that he had used in the economically backward areas of northern Jiangsu to the field of water pollution control in southern Jiangsu. Within the period of several months, the water quality of the water bodies in Wuxi had improved considerably. Thus, in 2008, Wuxi officials decided to promote the RCS across their jurisdiction. Later, the practice of independently conducting an cross-prefecture RCS experiment at four formal administrative levels (province, prefecture, county, and town) originated in Jiangsu. As an effective tool for water pollution control, the RCS was also spread from eastern developed areas to western developing areas in the absence of any order directly from Beijing.

In the comprehensive experimental zone case, central authorities promised the international

community to implement the SDS at home, but they were not very familiar with the concept of sustainability. Therefore, they was unable to determine suitable policy goals and to delineate policy instruments. At the time, most governmental resources and attention were being invested into economic growth. Various localities began introducing “ecological agriculture” models. The number of locally designated “Ecological Village”, “Ecological Town”, “Ecological County”, and “Ecological Prefecture” began to increase. As the State Council had not yet issued any uniform plan or administrative regulation, the former State Environmental Protection Agency started an united pilot program based on its existing knowledge base in 1995. From the perspective of the central environmental agency, the formation of an ecological economy model with ecological agriculture as the core was seen as a realistic way to implement international commitments. Thus, the EDZ pilot program was to conducted to integrate the various local designations.

The policy goal of the EDZ program was to establish a number of regions that could coordinate regional ecological protection and economic development. In 1998, the first batch of EDZ pilot projects was approved by the SEPA. The evaluation indicators of the EDZ designation focused on the economic growth of pilot site. This was very different from subsequent experimental programs designated “ecology”, “ecological civilization”, and “ecological civilization construction”. At the start of this experimental system, neither clear policy goal nor established policy instrument existed. In the next two phases, as the central government’s understanding of the “ecological civilization construction” has deepened, both of them have become more and more clear.

7.1.2 Central-local Interplay and Calibrations of Goals and Instruments

Table 7.2 illustrates the stages in which policy experiments developed in order to show the difference in the two policy consitions (policy goals and instruments) in the four cases. In addition, concomitant institutional restructuring and the results of each experiment are presented.

NPS	CET	RCS	Comprehensive Experimental Zones for Ecological Civilization Construction
Beginning of experimentation			

2013	2011	2003	1995
Number of research phases			
2 (2013-2017; 2017- 2021)	2 (2011-2014; 2014-2017)	3 (2003-2013; 2014-2016; 2016-2018)	3 (1995-2012; 2013-2016; 2016-)
The first stage			
First, nine pilot provinces were designated, and ten pilot projects were approved one after another	Each pilot area independently formulated provincial rules (and specifications) and started intra-provincial transactions	Prefecture or county scale trials in the Taihu Lake Basin (and Dianchi Lake Basin); an intra-provincial promotion led by the Jiangsu Provincial Government	The designations of EDZ and ECDZ at different levels and scales were led by the environmental ministry; lack of collaborative participation from other central ministries
The second stage			
Under the supervision of Beijing, a pilot project was terminated and a new project was added	After the central government promulgated a unified national regulation, each pilot area continued to experiment; No new pilot province joined	Seven further provinces promoted the RCS framework, of which Zhejiang done the best	The PDZ program was led by the NDRC; the water ministry and marine ministry also conducted local pilot "ecological civilization" programs
The third stage			
		National promotion under the central government; Zhejiang was designated as a national benchmark	The central government ordered all the ecological civilization-related pilot programs to be merged into the provincial-scale NECEZ
Concomitant institutional restructuring			
The MLR was expanded to the MNR; the SFA was expanded to the NFGA; the NPA was designated	The Climate Department of the NDRC was integrated in the MEE	Water resource departments at all levels became the RCS office of the government at the same level	The SEPA was expanded to the MEP; the MEP was improved to the MEE; the grand goal of ecological civilization construction was enshrined in the Constitution of the PRC and the Constitution of the CPC
Result of each experiment			
The goal of building a protected area system with national parks as the core was finalized	A national uniform carbon market for power generation industry was launched	The formal four-level RCS framework was established in every province; LCS and BCS were also promoted	The fourth NECEZ was successfully launched; the experiences of the first three NECEZs were promoted

Table 7.2 Phase comparison of the four experimental systems

In the NPS case, the central authority closely traced and supervised the *Three-River-Source* pilot project, the biggest NPS pilot project. On December 9, 2015, the CLGCDR approved the *Three-River-Source National Park System Pilot Program*. The central government had high expectations for this project. Just two days later, the Standing Committee of Qinghai Provincial Party Committee decided to set up a provincial leading group (and working office) for the *Three-River-Source* pilot project. In the following two years, the Qinghai authorities closely followed the instructions and suggestions coming from Beijing. The intensive interplay between Beijing and Qinghai officials in 2016 and 2017 is the main reason why this project's development was ahead of the other nine NPS projects. The central government aimed to promote other NPS pilot areas through the demonstration effect of the *Three-River-Source* project.

On March 5, 2016, the CPCCC and the State Council officially issued the *Three-River-Source National Park System Pilot Program*. Just five days later, Xi Jinping participated in the 4th Session of the 12th NPC and stressed the importance and model role of this NPS pilot project. On April 11, the Qinghai Provincial Party Committee and the Qinghai Provincial Government jointly issued the *Opinion on the Implementation of the Three-River-Source National Park System Pilot Program*. Three days later, they began to mobilize the relevant provincial departments to fully launched the project in a high profile. On May 11, the *Three-River-Source National Park Management Agency Setting Plan* was issued by the provincial government. On June 7, the TRSNPA was officially listed, and the respective administrative committees and offices of the three branch parks were established simultaneously. At the end of August, General Secretary Xi came to Qinghai personally to inspect the experiment. He reemphasized that the wealth of Qinghai is in ecology and required the Qinghai authorities to give ecological civilization construction a prominent position. In early September, the newly appointed secretary of the provincial party committee went deep into the pilot area to examine the experimentation. On September 14, he presided over the provincial NPS leading group meeting where the logo of Three-River-Source National Park was selected and other relevant matters were examined. On October 19, the new secretary again hosted a leading group meeting, discussing the compilation of the *Three-River-Source National Park Overall Plan (2016-2025)*, the *2017 Infrastructure Project Proposal*, and the proposal of establishing the Three-River-Source National Park Research Institute. Later, the 34th meeting of the Standing Committee of the 12th People's Congress of Qinghai Province passed the *Three River Source National Park Regulation (Trial)*, which took effect on August 1, 2017. In January 2018, after the consent of the State Council, the NDRC officially issued the *Three River Source National Park Overall Plan* prepared by Qinghai Provincial Government.

In this project, the agenda setting was firmly in the hands of the central government. The NDRC and SFA chose pilot areas and pilot schemes on the basis of their uniqueness rather than their broad representativeness. Geographically and ecologically, the *Three-River-Source* region is very unique. To expand geographical and ecological representativeness, the *Panda National Park System Pilot Program* and the *Northeast Tiger and Leopard National Park System Pilot Program* were later submitted to the CLGCDR for approval. These two programs also involved trans-provincial policy coordination. In 2017, a Central Environmental Protection Inspection which was carried out by central authorities played an unexpected role in the site selection. Thanks to the ecological protection problems reported by this inspection, central leaders determined it was imperative to put the Qilian Mountains National Nature Reserve into the NPS pilot program. In June 2017, the *Qilian Mountain National Park System Pilot Program* was officially approved by the CLGCDR.

Although the central government intended to advance the progress of Three-River-Source project to set an example for other nine projects, the expected demonstration effect was limited. Of the ten pilot projects, the Three-River-Source project performed the best. It involved a relatively simple land ownership situation. More importantly, there was extensive interplay between central and provincial authorities. Qinghai provincial officials completed the pilot tasks proposed. The other nine projects had mixed results. The pilot projects which were making little progress and realizing feww reforms risk being suspended.

In September 2017, the central government issued the *Overall Plan for Establishing a National Park System*. This marked the beginning of the second phase of the NPS experiment. In the first year of the second phase, these ten pilot projects continued to concentrate on four pilot tasks: unifying fragmented responsibilities, strengthening protection of ecosystems, promoting coordinated development of the community, and improving the legal system. In the beginning of 2018, a new NFGA, which serves as China's NPA, was formed. The main supervision responsible for the NPS experiment was transferred from the NDRC (and SFA) to the NFGA. At the end of this year, the Beijing Great Wall pilot project was terminated. During the experiment, beijing municipal government failed to realize the proposed horizontal coordination between its cultural resource management agencies and natural resource agencies. The NDRC and NFGA argued that it is difficult for such a pilot NPS project to achieve coordinated protection of human landscapes (i.e. Great Wall) and natural resources (i.e. Yanshan Mountains). In response, in 2019, the State

Council transformed the Beijing Great Wall project into a pilot "National Cultural Park" project.

In January 2019, the *Hainan Tropical Rainforest National Park System Pilot Program* was approved. This was the fifth NPS pilot document directly adopted by the CLGCDR/CCCDR. Aiming at expanding geographical and ecological representativeness, the NFGA expanded its NPS sites to include not only inland but also a remote southern island. In June 2019, the *Guiding Opinion on Establishing a Protected Area System with National Park as the Main Body* required the formation of a classification system of protected areas with "national parks as the main body, nature reserves as the foundation, and various natural parks (e.g., forest park, geological park, wetland park, etc.) as the supplements". After four years of experimentation, the goal of establishing a comprehensive NPS was expanded to a more ambitious goal of establishing a systematic governance framework for different kinds of protected areas.

As noted above, in the CET experiment, the seven pilot localities only needed to follow general requirements coming from Beijing. The central government had the responsibility to provide pilot areas with supportive policy frameworks and allowed them to take their own initiatives. In October 2011, a NDRC notice instructed seven pilot areas to prepare their respective CET scheme. Three years later, the *2014 Interim Measure for the Management of Carbon Emissions Trading* stipulated general rules for quota management, emissions trading, verification and quota clearing, supervision, and legal responsibility.

During the experimentation, pilot areas did have certain autonomy. First, they chose whether to participate in the pilot program from the beginning or to postpone their participation according to their own preferences. The time for the official start of trading in each pilot area was different. Shenzhen, Shanghai, Beijing, Guangdong, and Tianjin successively started trading in 2013, and Hubei and Chongqing started trading in the first half of 2014. Second, as was well known, there were large differences in the technical specifications (industrial coverage, turnover, transaction prices, offset ratios, compliance dates and punishments) of the seven schemes. Third, the market performance of these pilot schemes was mixed. From the perspective of compliance, Shenzhen and Shanghai performed best, and Chongqing performed worst. In 2017, Hubei surpassed Guangdong to become the pilot area with the largest turnover, and the transaction volume that was concentrated around the compliance date was also the lowest. In general, this situation was not conducive to launching a unified national market immediately.

During the comparative experimentation, the NDRC was hesitant to allow Sichuan and Fujian to launch their respective provincial carbon trading schemes. This is because the top leadership had expressed opposition to the overdevelopment of independent provincial schemes. In the second last week of 2017, the NDRC, at last, issued the *National Carbon Emissions Trading Market Construction Program (Power Generation Industry)*. This was almost half a year later than the outside world expected. Nevertheless, with this united program, the national carbon emissions trading scheme, the policy instrument of this experimental system, were finally determined. There were as many as 30 central ministries involved in launching the national market.

In this case, some of the pilot areas that had performed better were considered to be the registration and/or trading platform for national market. Hubei Province was selected to take the lead in constructing a national registration system. Shanghai was designated to constructe a national trading system. During the four-year experimentation, the power generation industry's data was the most complete, and the scale of its carbon emissions was comparatively large. Thus, the first launch of a national carbon market in the power production industry was of great significance to the continued promotion of national carbon trading in other industries in near future. The scale of the carbon market in the power generation industry exceeded the overall size of the carbon market in any other country. Enterprises or other economic organizations with annual emissions of 26,000 tons of carbon dioxide equivalent (that is, energy consumption of about 10,000 tons of standard coal) and above were to be incorporated into the national scheme. In a series of mobilization conferences, the NDRC repeatedly emphasized the incremental nature of this policy-oriented market. All provinces were to join the national market step by step without affecting their economic development.

In the RCS case, as long as the central authority was not challenged or the political order disrupted, the central government was open and tolerant of local and sectoral experiments which were used to explore the suitability of policy instruments. In China's authoritarianism, devolving water pollution control responsibilities to local government officials did not challenge political normality. In June 2008, Jiangsu Provincial Government issued the *Notice on Implementing the Double River Chief System in the Main Lakes and Rivers of Taihu Lake Basin*. This administrative order devolved the responsibility for the prevention and control of water pollution in the Taihu Lake Basin to several south prefectures, including Wuxi. By the end of 2009, in Wuxi prefecture, all the

815 river sections had chiefs at and above the town/sub-district level. By August 2010, Wuxi Prefecture had achieved the full coverage of four level RCS framework (prefecture, county/county level district, town/sub-district, village/urban community). As of early 2012, the formal four-level RCS governance system had covered the Taihu Lake Basin and southern Jiangsu region.

In September 2012, Jiangsu Provincial Government issued the *Opinion on Strengthening the RCS Work of River Governance in the Jiangsu Province*. Jiangsu Province was the first province to devolve responsibility for water pollution prevention and control within the province. At this time, the remaining prefectures that had not fully experimented with the RCS accelerated their pace. Before 2013, Jiangsu was the best province in terms of experimentation and promotion of the RCS framework. It had the potential to become a benchmark for the central government to promote the RCS to other provinces.

But, things backfired. The situation began to reverse at the end of 2012. At the 18th national party congress, Li Yuanchao, who had given Qiu He strong support, failed to enter the Standing Committee of the Central Political Bureau. Subsequently, he was assigned to an honorary post with no real power: Vice President of the PRC. In contrast, the former Secretary of Zhejiang Provincial Party Committee, was successfully promoted to General Secretary of the ruling party and President of the PRC. In this political environment, Jiangsu's RCS lost its backing from the highest political rank. Zhejiang, where General Secretary Xi ruled from 2002 to 2007, firmly seized this window of opportunity to vigorously carry out its experiment with the RCS framework. This province expected its RCS experiment to be recognized by Beijing as a national blueprint.

In November 2013, Zhejiang Provincial Party Committee and Zhejiang Provincial Government issued the *Opinion on Full Implementation of the RCS and Further Strengthening Water Environment Governance*, identifying the task of quickly promoting the RCS throughout the province. Over the next three years, Zhejiang came from behind with its promotion and publicity of the RCS. In May 2015, Zhejiang Provincial Party Committee issued the *Several Opinions on Further Implementing the RCS to Improve the Long-Term Mechanism of Cleaning Three Kinds of River*. This further strengthened and improved some practices of the RCS that had been implemented before. Before the central government issued a formal promotion order, Zhejiang had formed a complete five-level RCS framework, including 6 provincial river chiefs, 199 prefectural river chiefs, 2,688 county river chiefs, 16,417 town river chiefs, and 42,120 village river chiefs. This RCS framework was also equipped with river sheriffs, enterprise river chiefs,

and civilian river chiefs. As of October 2016, despite the absence of formal uniform orders from Beijing, nine provinces and municipalities had also carried out RCS experiments.

In October 2016, the CLGCDR approved the *Opinion on the Full Implementation of the RCS.* The central authority required local party committees and governments at all levels to fully establish RCS frameworks by the end of 2018. In December 2016, in order to implement the goal set by the CPCCC/CLGCDR, the MWR and MEP mobilized the promotion. By this time, eight provinces had fully established their own RCS frameworks, and 16 further provinces had partially carried out their RCS experiments. At a national conference, Zhejiang and Jiangsu were selected to introduce their experience and lessons. In May 2017, the MWR started an inter-ministerial joint mechanism, requiring the speed up of the RCS's promotion. With the help of this inter-ministerial joint mechanism, in September, the MWR saw that the progress in the implementation of RCS had moved faster than expected.

For Jiangsu and Zhejiang, however, achieving early success proved not be particularly beneficial. On December 27, 2017, Jiangsu Province officially announced that it had established a comprehensive provincial-scale RCS framework. Jiangsu was thus the first province in the country to complete a formal four-level RCS governance structure. Yet although the *Regulation on River Management of Jiangsu Province* taking effect on January 1, 2018, neither the MWR nor the official media responded positively to these developments in Jiangsu. In contrast, the central departments paid considerable attention to the actions of Zhejiang. In October 2017, Zhejiang promulgated the first RCS provincial regulation in China: the *Regulation on the River Chief System in Zhejiang Province*. At the beginning of 2018, *Guangming Daily*, a state media directly under Publicity Department of the CPCCC, reported Zhejiang's RCS experiences in a full-page article in a high-profile manner. This report claimed that "as a pioneer of the RCS experiment, Zhejiang's practice is of reference to the implementation of the RCS in other provinces". On June 7, 2018, Changxing County's RCS Exhibition Hall, the first RCS exhibition hall in China, was officially opened. The Minister of the MWR personally attended the inauguration. By mid-2018, Zhejiang Provincial Government had welcomed more than 20 delegations from other provinces wanting to learn about its RCS experiment.

Of course, a basic necessary condition for Zhejiang to be selected as a national blueprint was that the experiment and promotion of the RCS in Zhejiang were consistent with Beijing's policy directions. Another helpful factor was that this pilot province was a place where the incumbent

General Secretary was previously in power. Choosing it as a national model was useful to help General Secretary Xi in his efforts to establish a green political image, and also to establish green directional leadership from the central government. Therefore, the MWR, SOA and state media all paid disproportionate attention to Zhejiang's RCS experiment. The province was finally selected as a role model used in the promotion of the RCS and other three types of water management systems.

In the last case, local governments and central agencies independently initiated policy experiments on the onset. These local and departmental efforts were not opposed by the State Council. They were carried out across the country. As of March 2000, 154 EDZ pilot projects had been launched. Of these, 33 were designated as the EDZs. In March 2002, another 49 EDZ designations was approved. By 2003, the number of the EDZ pilot projects increased drastically. Without a mandatory evaluation criteria, these local efforts were hardly compatible with each other and may have gradually generated contradictions and fragmentation problems. In May 2003, the SEPA refined the *1998 Indicator* and issued the *Construction Indicators for Ecological County, Ecological Prefecture, and Ecological Province (Trial)*. The SEPA encouraged those approved EDZs to carry out the new experiments in accordance with the *2003 Construction Indicators*.

These departmental efforts were not blocked by the ruling party. Of course, they also did not receive cross-ministerial support or a formal legislative response. In January 2007, the SEPA issued the *Guiding Opinion on Strengthening the Establishment of Ecological Demonstration*, requiring a strengthening of the experimental designations of "Ecological Prefecture", "Ecoogical County", "Beautiful Town" and "Civilized and Ecological Village". This indicated that the "ecology" pilot projects at the town and village levels were also to be launched.

In October 2007, the 17th national party congress elevated "ecological civilization" to a strategic height parallel to economic/material civilization, political civilization, spiritual/cultural civilization, and social civilization. Although the central government had not directly issued any specific pilot programs, the existing experimental programs entitled "ecology" hosted by SEPA gained momentum. In response to the vague "ecological civilization" concept, the SEPA officially issued the *Ecological County, Ecological Prefecture, and Ecological Province Construction Indices (Revised Draft)* at the beginning of 2008. Based on the *2003 Indicators*, this revision lowered the number of indicators for economic development, and highlighted both binding

indicators and reference indicators. In the summer, the newly established MEP issued the *Guiding Opinion on Promoting the Construction of Ecological Civilization*, clearly proposing that the pilot projects of ecological civilization be divided into three stages. The first is the EDZs. The second is the designations of the Ecological Province, Ecological Prefecture, and Ecological County. And the third is the ECCPs. The ECCP program was committed to carry out more strict environmental standards than the EDZ program. This was the preamble of the first round of pragmatic policy integration led by environmental ministry (Figure 7.1).

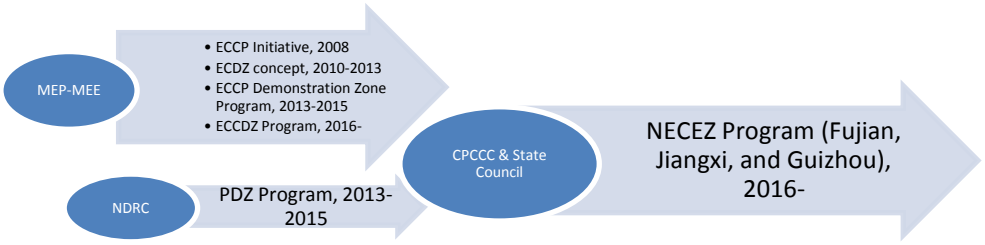

Figure 7.1 Three rounds of policy integration in the comprehensive experimental zones for ecological civilization construction

In January 2010, the *Opinion on Further Deepening the Work of the Ecological Construction Demonstration Zone* clearly stated that the title of ECDZ is just the collective name of the previous pilot programs. From 2010 to 2013, the previously approved designations of EDZ, Ecological Prefecture, Ecological County, Ecological Town, Eco-industrial Park, and Ecological Village were collectively referred to as the ECDZ designations. The *2010 Opinion* also terminated the EDZ program. This adjustment was the official start of the first round of pragmatic policy integration (Figure 7.1). In April 2012, the *Regulation for the Administration of National Ecological Construction Demonstration Zones* finalized the management rules for the designations of Ecological Prefecture and Ecological County. The *2012 Regulation* also respectively specified the *National Ecological Town Declaration and Management Regulations (Trial)*, *Standard for National Ecological Village Construction (Trial)*, and *Regulation for the*

National Eco-industrial Demonstration Park (Trial).

Before the powerful NDRC engaged in the comprehensive programs of "ecological civilization" designation, the MEP, MWR, and SOA had already carried out more than three types of pilot programs successively. The policy goals, policy progress, and policy instruments of these programs were very different. In November 2012, the 18th national party congress called on a systematic and large-scale "ecological civilization construction". In order to amplify its discourse power in implementing the ruling party's strategic deployment, the MEP quickly issued the *Indicators for National Ecological Civilization Construction Pilot Demonstration Zone (Trial)* in May 2013. The ECCP program, which had not been universally promoted, was renamed and elevated to the ECCP Demonstration Zone (Prefecture/County) program (Figure 7.1).

In the same time, in order to better grasp the agenda setting power in implementing the CPC's deployment, the NDRC also began to intervene in the domain of comprehensive "ecological civilization" experimental zones. The *Opinion on Accelerating the Development of Energy Conservation and Environmental Protection Industries* required that 100 representative areas should be selected as the PDZs. Through this program, the capacity for energy saving, emission reduction and ecological civilization was to formed. At the end of 2013, the NDRC and five further ministries issued the *Implementation Program on National Pilot Demonstration Zones for Promoting Ecological Civilization (Trial)*. In the first half of 2014, 55 localities, including provinces, prefectures and counties, were approved as the first batch of PDZs. One year later, another 45 localities were approved as the second batch of PDZs. Recognizing that the central government's support for the PDZ program was greater than for its own, the MEP proactively joined the second round of PDZ selection. By this time, the second round of pragmatic policy integration was completed (Figure 7.1). Compared to the first round of integration which was led by a single ministry, the second round was conducted by at least nine ministries. In January 2016, the MEP further adjusted the ECCP Demonstration Zone program to the ECCDZ program. The new proposed ECCDZ program was a continuation of the first round of policy integration. The MEP firmly grasped its agenda setting power on this issue, even though it had already been involved in the second round of integration led by the NDRC.

The first two rounds of policy integration had just been deployed, and the CPCCC and the State Council immediately initiated a broader and deeper round of integration: the NECEZ program (Figure 7.1). The NECEZ program aimed to integrate all the existing comprehensive and

specialized experiments into a uniform platform to avoid duplication and waste of governmental resources to the greatest possible. The breadth and depth of the last round is unprecedented in the history of China's environmental governance. As a kind of experimentalist governance, the first three NECEZ programs were very successful in unifying and integrating the previous pilot programs and demonstration zones entitled "ecological construction", "ecological civilization", and "ecological civilization construction".

7.1.3 The Four Experimental Systems in Three Waves of Intensified Environmental Intervention

Figure 7.2 shows the four experimental systems in the three waves of ever-increasing environmental policy interventions. (1) at the beginning of the first wave of intensified environmental policy intervention (see Appendix II), then General Secretary Hu proposed the SOD in the summer of 2003. This was followed by a refinement of the EDZ program, which was represented by the new designation of Ecological County, Ecological Precfecture and Ecological Province. In the following ten years, these programs was promoted throughout the country and eventually upgraded to the ECCDZ program. (2) The second wave of intensified measures appeared after the 17th national party congress in 2007 (see Appendix II and IV). This was followed by the RCS, which was promoted by a Vice Governor of Jiangsu who later was sentenced for taking bribes. This new designation was first given to Taihu Lake Basin when an outbreak of cyanobacteria affected drinking water sources. In the following eleven years, this governance structure was promoted throughout the country and enshrined in the *Law of Water Pollution Prevention and Control*. During the second wave of intensified environmental intervention, as the international community continued to urge China to take actions to mitigate against climate change, provincial scale CET pilots were introduced in the Chinese mainland. Problems, however, continued as China's environmental institutions and policies were not sufficiently strong. China's environmental departments lacked capacity to propose ambitious policy goals and implement stricter measures. Increasing awareness of large-scale environmental and ecological problems did trigger revision in official ideology as exemplified by the (socialist) ecological civilization concept and led to the creation of the institutions for the environment, such as the MEP and the Climate Department of the NDRC, in the latter 2000s. During most of this

period, with growing demand for energy and resources, environmental problems became increasingly serious and gained in political prominence. The MEP scrambled to improve its capacities to address environmental pilot programs, but it was too weak to push them on its own. (3) Encouragingly, the next wave of intensified environmental programs appeared in the mid-2010s (see Appendix II, III and IV). President Xi, the incumbent supreme leader of the national government, was more invested in green ideology and personally promoted two deeper and broader policy experiments: PDZ and NECEZ programs. Embedded in these improved comprehensive programs, the NPS pilot program representing a more systematic protected area system was particularly eye-catching. Bursts of experimental activity leading to such drastic changes were rare in the 1990s and 2000s.

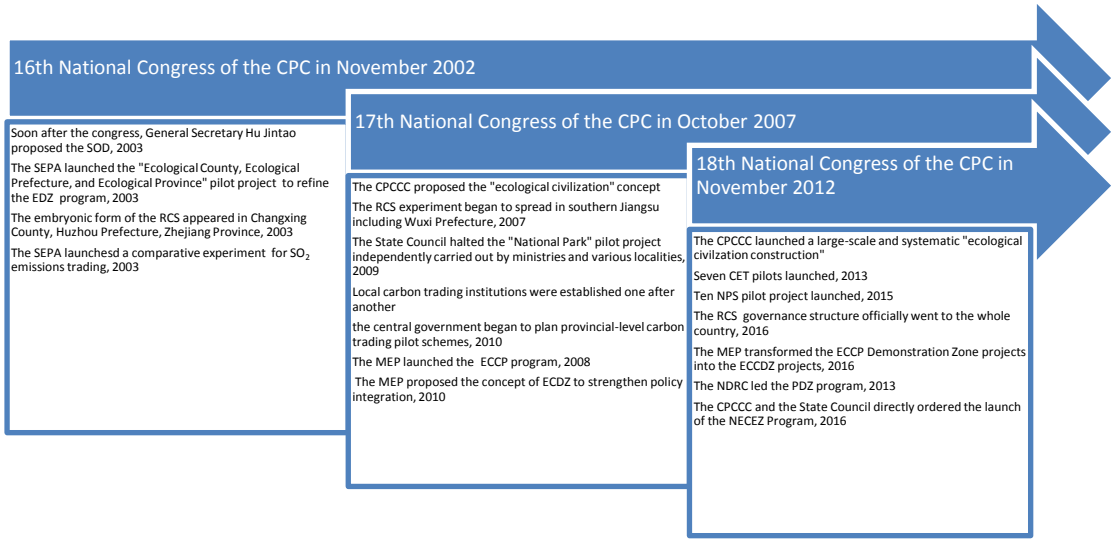

Figure 7.2 The four experimental systems in three waves of intensified environmental intervention

There were a growing number of experimental programs marking these three waves of changes. Three outstanding experiments that reflect this growing political focus on domestic environmental matters are water pollution control, carbon emission reduction, and national park establishment. With water pollution prevention and control, there was a shift in approach from an outdated concept that water protection was primarily a local (town, county and prefecture) affair to one where water protection came to be recognized as requiring trans-prefectural and trans-provincial governmental efforts. Carbon trading schemes and nature protected area systems represent full-blown trans-provincial and national environmental issues. These three domains are embedded in the comprehensive experimental zones for ecological civilization construction.

7.2 Major Findings: a CPC-style Experimentalist Environmental Governance Typology and Its Four Patterns

As noted in Table 2.1, a preliminary comparison of the dissertation project's four cases suggests a series of hypotheses about how the policy conditions (policy goals and policy instruments) shape the timing and content of experimentalist intervention led by the central government across different environmental policy domains. This section elaborates on the four research hypotheses respectively. Based on this, these hypotheses are formally used as the formal propositions.

At the beginning of the experimentation, the policy goal was clear and the policy instrument was established. At its very beginning, the goal of establishing an NPS was promoted to the height of a national strategy by a plenary session of the CPCCC. And the policy instrument for this goal -- the NPS pilot program -- was determined by the *Pilot Program for Establishing a National Park System*. By early 2015, the nine pilot provinces had been designated. Each pilot province was required to select one experimental site. Shortly after, the *2015 Opinion* and *2015 Overall Plan*, issued by the CPCCC and State Council, reconfirmed the goal of establishing a NPS and initiating a NPS pilot program. This pilot program was dedicated to establishing a new national park management system with unprecedented restructuring efforts.

In order to set an exemplary role in respect to closely following the central government's instructions, more and more governmental resources obtained from Beijing were invested into the Three-River-Source pilot project, the first and biggest pilot project, from 2015 to 2017. In the past, the establishment of a new national nature reserve only required the approval of a daily office meeting of the State Council. In December 2015, a CLGCDR meeting, hosted by the General Secretary Xi, reviewed and approved the *Three-River-Source National Park System Pilot Program*. Just two days later, Qinghai's authorities began to deploy the Three-River-Source NPS pilot project. As elaborated in Chapter 3, Qinghai provincial officials attached great importance and urgency to this NPS project and kept step with the policy pace of national government continuously. Thus, this project progressed smoothly. By mid-2017, the Three-River-Source NPS pilot project had achieved its expected results. In June 2017, the *Three-River-Source National*

Park Regulation (Trial), which is the first provincial regulation for a national park, was officially promulgated. At the end of 2016, two cross-provincial NPS pilot programs-- *Panda National Park System Pilot Program* and *Northeast Tiger and Leopard National Park System Pilot Program* -- were also approved by the CLGCDR. Half a year later, another trans-provincial program-- *Qilian Mountain National Park System Pilot Program* -- was also approved.

In the summer of 2017, when the first phase of the NPS program was nearing its end, the ten pilot projects were determined by the central government. During this first phase, the ten pilot projects had progressed to varying degrees. At the beginning of 2018, the former SFA was replaced by the NFGA, becoming China's NPA. This institutional reorganization further injected new impetus into the second phase of the NPS program. In late 2018, the Beijing Great Wall project was transformed into another pilot program. It is the only pilot project that was terminated. At the same time, on the remote Hainan Island, a new NPS pilot project was being planned. At the beginning of 2019, the *Hainan Tropical Rainforest National Park System Pilot Program* was approved. This was the fifth NPS pilot decument directly adopted by the central government. Beijing continued to increase the representativeness of pilot sites in order to maintain its own power over localities in this ecological conservation domain. The development of NPS policy experiment between 2013 and 2019 conforms to what was introduced in the Chapter 2 as the first hypothesis. Therefore, Hypothesis I can be transformed to Proposition I. *Proposition I: In cases where policy goals are clear and policy instruments are established, the more guidance and intervention that comes from the central government level, the more likely it is that local environmental policy experimentation will follow a* ***strict hierarchical experimentation*** *pattern.*

Well into the early-2010s, China remained committed to its international climate commitments and domestic climate policy vision. These were to be achieved via energy conservation and emission reduction. China's climate policy goals were delineated by the CPC, legislated by the NPC, and given weight with the public statements made by President Xi on important international occasions (e.g. UN general meeting, G20, and COPs of UNFCCC). In order to implement these commitments, the State Council decided to promote carbon emission reduction through the carbon trading market. *Yet, while the world's biggest GHG emitter argued that it cannot stand aloof, in the early 2010s, the relevant ministries were not very familiar with either the operation or management of a national carbon market.* Although some ministries had conducted comparative experiments on pollutant gas control before, the provincial scale

cap-and-trade scheme was still an unfamiliar policy tool for the Chinese government.

In order to quickly find an effective policy instrument, starting in the second half of 2011, the central government began issuing a series of climate policy measures. In October 2011, seven pilot localities were selected by the NDRC. Each of these localities was expected to establish a full-time agency, prepare an implementation plan, formulate management regulations and basic rules, and build a provincial trading platform. In June 2012, the NDRC issued the *Interim Measure for the Administration of GHG Voluntary Emission Reduction Transactions*, establishing a basic management framework, transaction processes and supervision rules for the voluntary carbon emissions trading mechanism. In October 2012, the *Guideline for the Validation and Verification of GHG Voluntary Emission Reduction Project* was also promulgated. In November 2012, the 18th national party congress reaffirmed its commitment to carrying out a carbon trading experiment.

In November 2013, the policy goal of launching a national carbon market was officially determined in the third plenary of 18th CPCCC. In 2013, the NDRC announced five voluntary emission trading agencies, and three verification agencies, allowing the CCER Exchange Information Platform to go online. Also in this year, five of the pilot localities launched their respective cap-and-trade schemes. In the first half of 2014, the remaining two pilot provinces started their respective schemes. The *2014 Interim Regulation*, which took effect in January 2015, stipulated the general rules for emission allowance management, trading products, emission verification, supervision responsibilities of the NDRC and provincial DRC, and legal responsibilities of the emitters participating in the transaction. It provided flexibility for each pilot scheme to determine its own industry coverage, threshold of inclusion, quota allocation method, offset ratio, and compliance date among other aspects.

During the experimentation from 2013 to 2017, the market performance of the seven pilot schemes was mixed. On the one hand, they accumulated considerable practical experiences in accessing the national market, but on the other hand, these independent carbon trading schemes made it more difficult to start a unified national market. As a result, in 2016 and 2017, not only did the NDRC block the launch of new provincial carbon trading schemes, it also delayed the launch of the national market. The *National Carbon Emissions Trading Market Construction Program (Power Generation Industry)* issued in December 2017, marked the nominal launch of the national market. This was at least half a year later than expected. The industrial coverage of the projected national scheme was also narrowed. These seven cap-and-trade schemes featured the pattern of

cautious comparative experimentation. Therefore, Hypothesis II can be transformed into Proposition II. Proposition II: *In cases where policy goals are clear but there is a lack of established policy instruments, the more guidance and intervention that comes from the central government level, the more likely it is that local environmental policy experimentation will follow a* ***cautious comparative experimentation*** *pattern.*

In China, to achieve a national goal, it is commonplace to devolve governance responsibilities to lower levels of government. As long as governments at the local levels fulfill their targets, then national targets can be met. *As a conventional policy tool, the (pollution prevention) responsibility devolution system is consistent with legal provisions, administrative regulations and traditional top-down governance approaches.* When the RCS governance structure was introduced in the Taihu Lake Basin, it complied with existing Chinese laws and administrative regulations. In the 2000s, in the absence of a unified national water pollution prevention and control target, various local governments independently tried out various policy tools.

The RCS experiment, one of the main policy instruments for water pollution prevention and control, went through three stages-- independent local trials, experiments led by provinces and ministries, and mandatory promotion led by the national government. As mentioned earlier, in the first and second phases, Jiangsu Province performed best. In the winter of 2012, Jiangsu began to fully experiment with the RCS throughout the province, thus becoming the first province to fully implement the formal four-level RCS governance structure. Yet, despite Jiangsu's progress, China's political developments put Zhejiang's RCS experiment in an increasingly advantageous position in the competition to become a national model. In the first half of 2018, Zhejiang defeated Jiangsu and became a RCS role model for the other provinces. It is noteworthy that General Secretary Xi had been in power for more than four years in Zhejiang. With the political recognition coming from Beijing, Zhejiang became an all-round example for the popularization of the RCS experiment. As far as the promotion of the RCS experiment is concerned, Hypothesis III is qualified to become Proposition III. *Proposition III: In cases where policy instruments are established but there is a lack of clear policy goals, the more guidance and intervention that comes from the central government level, the more likely it is that local environmental policy experimentation will follow a* ***selective political recognition*** *pattern.*

By the mid-1990s, with the acceptance of the central government, various localities had independently carried out "ecology" pilot projects, such as the designations of "Ecological Village" and "Ecological Town". The central government, at this time, however, still had no clear concept of the term "ecological civilization". In the absence of strategic goals and specific ecological civilization policy instruments, the former SEPA presided over a series of pilot programs. It hoped to use these program to fulfill the central government's international SDS commitments. The EDZ designations rapidly grew in number so that there were dozens of EDZs by the early 2000s. These approved EDZs included not only counties (usually tens of thousands to hundreds of thousands of people), townships (usually thousands of people) and villages (usually hundreds of people), but also state-owned farms. These sectoral and local experiments mainly focused on the dimension of "ecological agriculture" and aimed to promote economic growth.

After the 16th national party congress, the central government and the environmental ministry still had not proposed a clear conception of "ecological civilization" or "ecological civilization construction". Due to the lack of top-down coordination, the SEPA only made a marginal adjustment to the EDZ program. The designation of EDZ, a very general title, was subdivided into programmatic categories: " Ecological Village", "Ecological Town", "Ecological County", "Ecological Prefecture", and "Ecological Province".

In October 2007, the concept of "ecological civilization" was defined in the political report of the 17th national party congress. Nonetheless, the national government and SEPA still had no targeted projects for implementation. Shortly afterwards, in 2008, the *Guiding Opinion on Promoting the Construction of Ecological Civilization* started the first round of pragmatic integration of the comprehensive experimental zones intended to achieve ecological civilization construction. One year later, the MEP took a step towards the further integration of these comprehensive experimental programs. The *Opinion on Further Deepening the Work of the Ecological Construction Demonstration Zone* clearly required the designations of ECDZ were seen as a transitional stage prior to the establishment of the ECCP program. In April 2012, the MEP finalized the relevant regulations and rules for all the ecological pilot programs. Almost at the same time, the SOA and MWR also began to launch their respective "ecological civilization" experiments. These departmental efforts led to a serious fragmentation of the comprehensive experimental zones by the mid-2010s.

This trend was even intensified in the short period of time after the 18th national party congress.

This party congress deployed a large-scale and systematic ecological civilization construction. At the core of the conception is finding a proper balance in the relationship between man and nature. The ruling party argued that (socialist) ecological civilization construction would help to solve the environmental problems linked to China's economic growth. Encouragingly, the change of the top leadership opened a window of opportunity for greater and deeper policy integration. Significant changes in the policy domain of "ecological civilization" experiments occurred in 2013 and 2014. In order to follow the "functional zoning strategy" in the environmental policy domain, the MEP revised the previous evaluation indicator system of the ECDZ and issued the *Indicators for National Ecological Civilization Construction Pilot Demonstration Zone (Trial)*. The State Council required the selection of 100 sites to carry out the PDZ program and explore effective "ecological civilization construction". In 2014 and 2015, the NDRC led the PDZ program in a high-profile manner. This was the second round of pragmatic integration of the comprehensive experimental zones for ecological civilization construction. The second round commenced with the horizontal cooperation of nine ministries.

The third round of policy integration was directly demonstrated in the joint efforts made by the CPCCC and the State Council -- the birth of the NECEZ program. At this time, the policy goal and policy instrument for a systematic ecological civilization construction were completely determined. This integration, officially announced in the latter half of 2016, was not to abolish all the previous designations and pilot programs, but to promote them in a coordinated way to save governmental resources. In this new NECEZ platform, not only the PDZ, which was the result of the second round of integration, could be continued, but the ECCDZ, which was the result of the first round of integration, was also retained. The results of the third round of pragmatic integration were four pilot provinces: Fujian, Jiangxi, Guizhou and Hainan. By this time, the pilot "Ecological Province" program proposed in the early 2000s finally had a realistic implementation platform. The development of comprehensive experimental zones entitled "ecological civilization" features the pattern of pragmatic phased integration. Therefore, the Hypothesis IV can become Proposition IV. *Proposition IV: In cases where there is a lack of clear policy goals and established policy instruments, the more guidance and intervention that comes from the central government level, the more likely it is that local environmental policy experimentation will follow a* ***pragmatic phased integration*** *pattern.*

The four cases can be loosely ordered by this experimentalist environmental governance typology.

These four propositions suggest the four pathways by which environmental policy experiments can be successfully promoted, helping to explain different experimentalist strategies that central government officials can use in different environmental and ecological domains. In the above cases, local and sectoral environmental experiments could be deployed to test policy goals and policy instruments designed by the central and/or local authorities, and thus provide a series of alternatives to Beijing reflecting local preferences and interests. In their efforts to detect emerging environmental policy defects, form unitary environmental policy goals, and synthesize appropriate policy instruments, the central authorities learned from the local and sectoral environmental governance experiences and lessons.

7.3 Conclusion: Theoretical Relevance and Policy Implications

Policy experimentation is an important aspect of China's domestic reform process. This dissertation studies environmental policy experimentation because of an interest in the diversified evolution of policy goals and policy instruments. This project has sought to understand which goals are represented in experimentation, which instruments are chosen, and how problems and solutions are interpreted and acted upon. It also has sought to shed light on how the central and/or local government deals with environmental and ecological risks that may affect domestic and transregional commons.

The CPC-style experimentalist environmental governance framework, typology and propositions help to focus on the evolutionary process and interaction of two policy conditions (goals and instruments) in China's socialist ecological civilization construction. They have theoretical and practical relevance to China's environmental policy process. They help to further demonstrate how national and subnational governments interactively contribute to the formation and implementation of national environmental policies. As the process of socialist ecoloical civilization construction is multi-dimensional and multi-faceted, different environmental policy instruments and tools at different scales and with different scopes can be deployed to reach a certain environmental policy goal. Making use of these experimentalist environmental governance

patterns, the central government gave local and/or sectoral experiments political priority and adjusted local actions in a timely manner to reduce strategic uncertainties and local resistance. In this way, the Chinese governments continued to protect natural eco-systems, mitigate climate change, and eliminate air and water pollution while only requiring incremental institutional reforms. In terms of areas being given political priority, good examples are the high-profile promotion of the Three-River-Source NPS pilot in 2016, the support given to Zhejiang Province as a benchmark for the RCS experiment in 2018, and the support shown Fujian Province as a benchmark for the provincial scale ecological civilization construction in 2014 and 2016. In terms of adjusting local actions, examples are the termination of Heilongjiang's national park experiment in 2008, the acquiescence of Yunnan's independent national park experiment in the early-2010s, the lack of attention paid to Sichuan's enthusiasm for joining the formal provincial CET scheme in 2016, and the neglect of the model role of Jiangsu's RCS experiment in 2018. In a nutshell, this research agenda has sought to explain how different policy conditions (policy goals and policy instruments) have shaped the timing and content of experimentalist intervention led by the central government across different environmental/ecological policy domains.

The four experimentalist patterns indicated in the above section are relatively stable. Each pattern was formed under different policy conditions. In the first case, with deployment of the policy instrument, the original policy goal was eventually expanded into a more ambitious goal. In the second case, the policy instrument was finally established without changing the original policy goal. In the third case, with large-scale application of the policy instrument in various localities, the clear national goal was finally clarified. In the fourth case, the policy goal and policy instrument were finalized after a long period of local experimentation and departmental exploration. It is very likely that policy goals and policy instruments in other aspects of the socialist ecological civilization construction (e.g. soil pollution prevention and control, marine ecological and environmental protection, solid waste and chemical management, nuclear and radiation safety supervision) in China combine along one of these four evolutionary trajectories. This project has not covered all aspects of the socialist ecological civilization construction. Thus, the explanatory capacity of the typology may have some limitations. To expand the explanatory capacity of this typology and its four propositions, future research is needed to explore the experimentalist trajectories in other aspects of the socialist ecological civilization construction.

This comparative case study on China's ecological civilization policy complements the literature addressing China's public policy process, socialist environmental institutions and environmental

politics. First, it makes a contribution to understanding China's environmental policy process. As noted, over time, more and more experimentalist strategies emerged to address China's domestic environmental pollution and ecological degradation. It remains difficult for the party-state to formulate a comprehensive policy program, which can effectively respond to multi-scalar issues (i.e., natural ecosystem protection, pollution prevention and control, and climate change mitigation) in a short period of time. Deploying a series of pilot programs enhances the capacity of the government to cope with emerging social issues, increasing public pressures and heightening the expectations of the international community. In the 1980s and 1990s, when economic growth was still the main focus of the ruling party, the Chinese government tried to build a system of nature protected areas mainly in the form of national nature reserves. In the latter 2000s, when carbon trading became common in western countries, governments at all levels tried to build several professional carbon trading agencies on the basis of some local environmental rights exchanges. In the mid-2000s, some provincial officials turned to existing policy frameworks and delegated responsibility for water pollution prevention and control to local and grassroots levels. In the mid-1990s, when the central government was at a loss as to how to implement its SDS commitments, environmental protection departments at all levels promptly launched "ecology" demonstration zones and pilot programs mainly at the village, town, and county-level jurisdictions. These experimentalist programs proved conducive to refining policy programs, resolving conflicts of interest internally, and stabilizing governance structures. The diversified interplay between central and local authorities supplemented national environmental policy-making processes but also made them more complex.

As discussed in Chapter 2, in 2013, President Xi began a new round of deep reforms in an effort to strengthen the political authority of the central government and its ministries. To a certain extent, the central authority strengthened its ability to act and consolidated its position through centralization efforts made in the subsequent eight years. As a result, during environmental policy experimentation, local officials increasingly feared punishment for deviating from centrally approved goals and paths when they embark upon environmental policy experiments. Examples of this were described in Chapter 3 and Chapter 6. The Potatso NPS project in Yunnan was delayed because Yunnan officials did not act in accordance with the requirements of the NDRC; thanks to the high-profile intervention of the Central Ecological and Environment Inspection in 2017, the Qilian Mountains National Nature Reserve was incorporated into the NPS program; and, since the launch of the NECEZ program, the central government no longer allows ministries and local governments to launch any new "ecological civilization" designations.

Table 7.3 introduces a matrix, composed of policy goals and policy instruments, which can be used to demonstrate the institutional restructuring tied to the socialist ecological civilization construction. In this matrix, institutional reforms in contemporary China can be understood as three types of governance: "evolutionary governance", "experimentalist governance", and "design governance" (Li, W., 2019). China's environmental institutions and policies have been undergoing a policy paradigm transition over the past dozen years, from evolutionary governance and experimentalist governance to a greater focus on design governance. In the experimentalist typology introduced in this dissertation, pragmatic phased integration is similar to evolutionary governance, strict hierarchical experimentation is very close to design governance, and cautious comparative experimentation and selective political recognition amount to typical types of experimentalist governance. The Central Ecological and Environmental Inspection in the first case and the last round of policy integration in the fourth case actually feature design governance. In the foreseeable future, there could be more and more "top level design" or design elements in China's environmental policy experiments. Local discretion is likely to be more limited due to recentralization.

	Policy goals are controlled by the central government	**Policy goals are controlled by the local government**
Policy instruments are controlled by the central government	Design governance	Experimentalist governance
Policy instruments are controlled by the local government	Experimentalist governance	Evolutionary governance

Table 7.3 Governance patterns embodied in China's last round of recentralization, quoted from a relevant table of the Chinese article "governance patterns embodied in China's institutional reform" (Li, W., 2019).

Second, this project also makes a contribution to understanding reforms that have been made to China's socialist environmental institutions. Since its birth, the socialist governance approach has been a large-scale and systematic policy experiment. The socialist system with Chinese characteristics is quite different from the Soviet Union's classical socialist system. As framed in Chapter 2, the CPC's conception and use of experimentation are rooted in Chinese traditional governance practices and political culture. The adaptability of the trial-and-error mechanism in China's environmental governance system relies heavily on state intervention from a powerful central government. China has the world's largest population and a vast territory. The Chinese

people have experienced dramatic economic and social transformations over the past four decades. During this period, there was substantial incremental reform and adaptive governance within the supervision from the central government. China's ruling party is always willing and good at using incremental and gradual reform. Many a little make a mickle. As can be seen in the empirical chapters, the central government initially approved and promoted local incremental institutional reforms in response to the country's most urgent environmental problems. For example, in the 1990s, a large number of national nature reserves were approved and established to address the overall degradation of ecosystems (see Chapter 3). In the late 1990s and early 2000s, the former SEPA responded to large swathes of acid rain with local sulfur dioxide emissions trading (see Chapter 4). In 2007, in the face of public dissatisfaction with the pollution of drinking water sources, Jiangsu provincial government launched its RCS experiment (see Chapter 5). In response to the insufficient administrative authority and capacity in environmental policy planning and coordination, the central government elevated the SEPA (deputy ministerial level) to the SEPA (ministerial level); and then renamed the SEPA as the MEP, which had a full cabinet rank (see Chapter 2).

As noted in Chapter 2, it was not until the mid-2010s, when the central government initiated deeper policy changes, it began to pursue recentralization in its efforts to achieve systematic reform of the country's environmental institutions. The most striking examples are found in the *Opinion of the CPCCC and the State Council on Accelerating the Construction of Ecological Civilization* issued in April and the *Overall Plan for the Reform of Ecological Civilization System* issued in September 2015. With the help of incremental governance experiment, the authoritarian government has achieved a systematic restructuring of the environmental governance system. In 2018, to enhance the capacity of the environmental administrative system, the MEP was transformed into an even more powerful MEE. With the support of the Central Commission for Discipline Inspection of the CPC, the MEE organized and implemented the Central Ecological and Environmental Protection Inspection (see Appendix III). Moreover, a more powerful NFGA replaced the former SFA. By the end of 2021, the first batch of five national park (management system) was largely established; a carbon market covering the world's largest power generation industry had emerged; the RCS covering all the four formal administrative levels (i.e., province, prefecture, county and town) had been in operation for three years; and four southern provinces had achieved reform results that could be replicated in comprehensive ecological civilization experiments.

Third, there are also (theoretical and practical) implications for contemporary environmental politics. This empirical assessment of the relationship between China's experimentalist governance structure and environmental policy output has yielded mixed conclusions. Although democracies generally exhibit better environmental performance than non-democracies, the latter may also perform well in some environmental regulatory domains. Studies of environmental authoritarianism tend to argue that a hierarchical and centralized policy response featuring a strong state can help to avert environmental catastrophe (Humphrey, 2007; Shearman & Smith, 2007). China's environmental authoritarianism has experienced political recentralization and a certain degree of greening of the ruling party's ideology. China's rulers have, over time, pursued stronger environmental ambitions, introduced an accountability system, and made more international climate/environmental commitments. A growing number of local and provincial governments are participating in experimental efforts supervised by the central government. As a result, in the last decade, China has shifted domestically from "a stance of ambivalence" (Schreurs, 2017b, p. 172) on environmental action to active involvement and systematic experimentation. China's "strategic pragmatism" (Gallagher & Xuan, 2018) has indeed generated a more proactive environmental policy approach. These findings suggest that future studies of environmental authoritarianism should take "a more nuanced approach" (Pickering, Bäckstrand, & Schlosberg, 2020) and pay more attention to the complicated development of experimentalist skills in local and grassroots governance.

There is, however, still much room for improving the degree of public participation and rule of law in China's environmental policy experimentation. In the NPS pilot project of the Three-River-Source, thousands of herdsmen familiar with the local community acted as ecological guardians. Such large-scale public engagement, however, did not take place in every pilot NPS project. In the CET pilot schemes, many transaction details were not disclosed. In the RCS experiment, the beneficial practice of assigning enterprise river chiefs and civil river chiefs to each river section as pioneered by Zhejiang Province has not been adopted in all provinces. In the comprehensive pilot programs for the ecological civilization construction, many scoring details of the evaluation were not publicized.

The quantity and complexity of the ecological and environmental issues confronting China today have overwhelmed the capacity of even the best-prepared and strongest of governments. The government cannot be expected to take care of all social matters. For such a centralized system in China, socialism should not only mean strong state intervention, but also have moderate,

unrepressed and pluralistic democratic elements. Greater inclusion of public supervision, participation and social autonomy in policy experimentation could enhance local efforts at ecological conservation and environmental protection. China could strengthen its ecological civilization construction by providing greater transparency of information concerning environmental policy evaluation. Since the People's Congress System is the fundamental political system of socialist China, the role of People's Congresses at all levels in supervising the policy experiment of ecological civilization should be strengthened. The consultative function of CPPCC at all levels in ecological civilization construction should also be strengthened.

Furthermore, more efforts are needed to ensure that "all environmental policy tools have an appropriate legal basis" (Xue et al., 2007, p. 296). Improving the rule of law in ecological civilization construction could maintain the continuity of environmental policies. In June 2017, a meeting of the Standing Committee of the Twelfth NPC incorporated the RCS governance structure into the newly revised *Water Pollution Prevention and Control Law*. But, the central government has yet to enact a law on national park management and carbon trading scheme. The concept of socialist ecological civilization was enshrined in the Constitution of the PRC, but there is no unified legal statement on what specific policies should be included in ecological civilization. In this regard, the relevant legislative role of NPC should also be strengthened.

China's experimentalist environmental governance provides both many opportunities and some constraints. This section only presents a preliminary conclusion. China's socialist ecological civilization construction is still evolving. Further research on other environmental policy experiments (i.e., soil pollution control, marine ecological protection, and solid waste and chemical management) is needed to better understand transitions in China's governance approaches. To establish greater policy coherence vis-à-vis domestic and international environmental issues, there is also a need for more empirical and theoretical research that can help us understand how international developments affect the timing and pace of domestic authorities' deployment of experimentalist environmental governance approaches.

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Appendices

Appendix I Interviews and Communications

1. Questionnaires

Listed below is an outline of all the questions used in the semi-structured interviews. The questions were adapted for each interviewee based on their relevances to the experimentation.

(1) Case 1

a. Before the national park system experiment started, what did the Chinese governments do with regard to the protected area management? What were the common types of protected areas approved in the past? What progress had been made in the nature reserves and the scenic and historic areas? What were the obvious institutional flaws in the previous protected areas?

b. Why was Yunnan Province so enthusiastic to independently conduct national park experiment? Why did the central government suddenly terminate the local experimental projects in the name of "national park"?

c. How did the goal of establishing a comprehensive national park management system come up step by step? What policy instruments did the central ministries adopt to implement this goal? Which ministry was mainly responsible for the initiation and implementation of the new experimental program of national park management system?

d. Why did Beijing choose the Three-River-Source region as the most outstanding pilot project? How did the Qinghai provincial officials respond to the instructions of the central government? Why did Qinghai always follow the pace of the central government? Why was the will of the General Secretary Xi so firm? What were the main institutioal achievements of the biggest pilot project?

e. Why was the Qilian Mountain pilot project approved to join the pilot program at the end of the first phase? How was the progress of each pilot in the first phase? Has any pilot project been terminated? If so, what measures has the central government taken to respond?

f. Was the overall progress of the ten pilot projects in line with the expectations of Beijing? When did the second stage begin? In the new stage, what institutional adjustment has the central

government adopted?

g. In the second stage, what key experimental tasks have the central government put forward to focus on? Was there any newly designated pilot project? What progress has been made in the national park management agency? What is the status of national park in the newly projected protected areas system?

(2) Case 2

a. When did China's environmental rights trading begin? What were the official documents and measures in this regard? When did China's emissions trading start? How did the policy experiment of sulfur dioxide emissions trading begin? In the selection of the experimental site, what factors had been taken into account? What were the institutional features of the local sulfur dioxide trading scheme?

b. How was the pilot program for paid use and trading of pollution discharge rights conducted? What were the differences between pilot provinces? In what ways were there differences? Why did these differences occur? As of 2017, what were the progresses and obstacles in the pilot program of paid use and trading of pollution rights?

c. In the gradual promotion of pollution rights trading institutions, what policies had been adopted on the establishment of domestic carbon trading institutions? Were there specific timetables or roadmaps?

d. What carbon emission reduction visions, goals, and roadmaps had been put forward by the central government? Which department was specifically responsible for carbon emission reduction and carbon trading? What were the central government's attitudes toward the development of the domestic voluntary market?

e. Why did the central department choose seven carbon trading pilot areas? What factors had been taken into account in the site selection? What were the similarities between the carbon trading pilot and the previous pollution rights program?

f. How did each pilot area respond to the instructions of the central government? What were the differences between the carbon trading schemes in the seven pilot regions? Why did these differences occur? What institutional characteristics did these differences indicate? Were there fixed timetable and roadmap at the national and/or local level?

g. Why were other provinces trying to join the pilot area? What was the attitude of the central ministry? Why was the launch of the national market repeatedly delayed? Why was the national market launched only in the power generation industry? How did this differ from outside expectations?

(3) Case 3

a. What was the prototype of the river chief system? Where did it appear? Why here? Did this governance structure have a legal basis? Did it fit with Chinese governance tradition?

b. Why did Wuxi quickly promote the river chief system after the Taihu Lake pollution incident? Why was Jiangsu the first to implement a four-level river chief system? Why didn't Zhejiang Province promote the practice of Changxing County? Why did Kunming, Yunnan, which is far away from Jiangsu, start the experiment of the river chief system immediately after Jiangsu? In the beginning, what was the central government's attitude towards the local experiment of the river chief system?

c. Which province was the first to experiment with a provincial-scale river chief system? In which province did the formal four-level river chief system first take shape? Before the central government officially issued the mandate order for the experiment, which other provinces also started to experiment with the river chief system? How were they progressing? After the central government's order was issued, how was the progress in various provinces?

d. What was the central government's attitude towards the promotion of the river chief system throughout the country? What policy goals has the central government put forward and what timetable and roadmap had it formulated?

e. How did relevant central ministries implement the order of the ruling party and the State Council? What was the progress of the nationwide promotion? In order to support the promotion, what efforts had the central government made to prevent and control water pollution? What were the shortcomings found in the national implementation of the river chief system?

f. Who was the first to announce the completion of the provincial-scale governance structure of the river chief system? What was the attitude of the central ministries and state media? Why did this attitude arise? Which province was finally designated as a national model for the experiment of the river chief system? What were the characteristics of the river chief system experiment in this model province? Why had these features?

g. Why was this recognition made? Why was this recognition selective and political? From the perspective of central-local relations, what were the pragmatic considerations for this recognition?

(4) Case 4

a. When did the comprehensive experimental zone program entitled the "ecology" originate? Why did it appear at this time? What were its policy goals and instruments? What kind of issues did this pilot program respond to?

b. Why did the designations of Ecological County, Ecological Prefecture and Ecological Province appear? What issues were they responding to? Were there any unified evaluation criteria for these programs? What policy instruments did the central government adopt to promote these pilot programs? What was the number of their respective pilot projects and the number of designations that had passed the acceptance?

c. Why did the environmental ministry proposed the Ecological Civilization Construction Pilot? How was the progress of this pilot program? Why did the ministry put forward the title of Ecological Construction Demonstration Zone? Why did the ministry designated the Ecological Civilization Construction Pilot Demonstration Zone? Why had it been adjusted as the Ecological Civilization Construction Demonstration Zone program? What was the difference between them?

d. In addition to the pilot programs launched by the environmental ministry, have other ministries launched pilot programs named after ecological civilization? If so, which were there? What were the respective policy goals, instruments and progress?

e. Why did the State Council launched the program of the Pilot Demonstration Zone for Promoting Ecological Civilization? What were the policy goals and policy instruments of this program? How was it progressing? Why was the economic planning ministry leading this program?

f. What was the attitude of the environmental ministry towards pilot programs led by other ministries? What was the attitude of the central government to these pilot programs led by different central ministries?

g. Why did the ruling party launched the National Ecological Civilization Experimental Zone? What were policy goals and policy instruments of this program? What factors had been taken into account in the selection of the pilot provinces? What were the pilot province's respective integration measures?

h. When did the ruling party put forward the concept of ecological civilization? When did the central government propose to build an ecological civilization? In order to carry out systematic ecological civilization construction, what enhancements or adjustments had the central government made to the previous pilot programs led by central ministries?

2. List of Interviewees and Informal Exchanges

Interviews, taking the form of semi-structured interviews, have been carried out with the individuals listed below. The institutional positions referred to were those held at the time of the interview.

Interviews and interviewee's affiliation	Time	Contact's or interviewee's location
Interviews, phone interviews, and email communications with Executive Director, Ecological Civilization Research Center, Institute of Socialism with Chinese Characteristics for the New Era, Peking University	April 2016; March 2017; May 2018; May 2019	Berlin; Beijing
Interviews with an employee, Beijing Representative Office, Rosa Luxemburg Foundation	April 2016; March 2017; May 2018; May 2019	Berlin; Beijing
Phone interviews, and email communications with two professors at the Research Center for Environmental Politics, School of Politics and Public Administration, Shandong University	November 2018; November 2020	Qingdao, Shandong
Informal conversations on the topic of environmental protection in border provinces with a professor and two associate professor, Sichuan University	May 2019	Chengdu, Sichuan
Interviews and email communications with one Consulting Experts, China Ecological Civilization Research and Promotion Association	April 2016; March 2017; May 2018; May 2019	Berlin; Beijing
Interviews with a professor at the Institute of Oceanography, Peking University	March 2017; April 2017	Beijing
Interviews with the Deputy Dean of South China Sea Research Institute, Sun Yat-sen University	April 2016	Berlin; Potsdam
Interviews with a professor at the School of International Studies, Peking University	April 2017	Beijing
Interview with a Chief Researcher, Energy Economy Institute, China National Offshore Oil Corporation	March 2017	Beijing
Informal conversations on the topic of international cooperation in China's climate governance with an associate professor at the University of British Columbia	December 2015; April 2016	Berlin
Email communication with an associate professor at the School of International Studies, Renmin University of China	March 2017	Beijing
Email communications with a professor at the Institute of National Development and Strategy, Renmin University of China	March 2017	Beijing
Interviews and email communications with a professor at the School of Environmental Science and Engineering, Peking University	December 2017; March 2018	Beijing
Informal conversations on the topic of China's nature protected areas with a associate professor at the School of Environmental Science and Engineering, Peking University	March 2018	Beijing
Interview with an associate professor at the School of Environmental Science and Engineering, Peking University	April 2016	Berlin; Potsdam
Interview with a Deputy Director of the Bills Office of the	March 2018	Beijing

Environmental Resources and Resources Commission, NPC		
Interview with a reporter, China Daily's Yunnan Reporter Station	May 2019	Kunming, Yunnan
Phone interview with a villager in Luorong Village, Pudacuo National Park area	May 2019	Diqing, Yunnan
Interview with Deputy Director, National Park Management Office, National Forestry and Grassland Administration	July 2019	Beijing
Email communication with a researcher in the Forestry Department of Yunnan Province (Yunnan Provincial National Park Management Office)	August 2016	Kunming, Yunnan
Interview with a former reporter, The Paper	March 2017	Beijing
Informal conversations on the topic of excursion experience in the national parks with two staff members of Lidi Power Station, Huaneng Lancangjiang Hydropower Co., Ltd./two residents in Diqing Prefecture	February 2018; March 2018	Diqing, Yunnan; Zhaotong, Yunnan
Interview with a staff member of Dashanbao Black-necked Crane National Nature Reserve Administration, Yunnan Province	March 2019	Zhaotong, Yunnan
Interview with two researchers from Southwest Forestry University	May 2019	Kunming, Yunnan
Interviews with a staff member of the Department of Finance, Ministry of Culture and Tourism	August 2016; April 2017; April 2018; May 2019	Beijing
Interviews with a staff member of the Office of Policy Research, NDRC	April 2017; May 2018	Beijing
Interview with a staff member of the Department of Defense, Ministry of Finance	May 2018	Beijing
Phone Interviews with the Deputy Director of the Government Office of Pingan District, Haidong Prefecture, Qinghai Province	May 2018	Haidong, Qinghai
Email communications with a Vice President of Party School of Qinghai Provincial Committee of the CPC/Qinghai Provincial Academy of Governance	March 2019	Xining, Qinghai
Interviews with a chief researcher and official at the China Forest Exploration and Design Institute in Kunming	August 2016; March 2019	Kunming, Yunnan
Interview with a professor at the Fujian Normal University	May 2019; November 2020	Fuzhou, Fujian
Phone interview with a staff member of Guizhou Provincial Department of Ecology and Environment	May 2019	Guiyang, Guizhou
Phone interview with a Mayor of Town, in Xinjiang Uygur Autonomous Region	May 2019	Kizilsu Kirgiz Autonomous Prefecture
Phone interview with a deputy county level cadre, in Xinjiang Uygur Autonomous Region	May 2019	Kizilsu Kirgiz Autonomous Prefecture
Email communications with a staff member, WWF China	May 2019	Beijing

Email communications with a senior researcher, Development Research Center of State Council/a member of National Park System advisory council, NDRC	May 2018; May 2019	Beijing
Email communication with an assistant researcher, Chinese Academy of Sciences	August 2020	Beijing
Phone interview with an assistant researcher, Beijing Institute of Economic and Social Development	November 2020	Beijing
Email communications with a staff member, Office of National Park Administration	May 2019; November 2020	Beijing
Interview with the former director, the Pollution Control Department, State Environmental Protection Administration	May 2019	Beijing
Interview with a former reporter, Economic Information Newspaper	April 2018	Beijing
Interview with a former manager of the China Program, EDF	May 2019	Beijing
Phone interview with a senior researcher of the National Center for Climate Change Strategy and International Cooperation	April 2018	Beijing
Phone interview with an prefecture-level inspector, Department of Climate Change, NDRC	May 2018	Beijing
Interview and email communications with a staff member, Tianjin Climate Exchange	April 2018	Tianjin
Interviews with a staff member of the research department, the China Beijing Environmental Exchange	April 2018	Beijing
Phone interview with a staff member of the IdeaCarbon	April 2018	Beijing
Phone interview with a staff member of the An Employee of the SinoCarbon Innovation & Investment	April 2018	Beijing
Phone interview with a professor at the Ecological Civilization Research Center, Chinese Academy of Social Sciences	December 2017; September 2018	Beijing
Email communication with a staff member, the Green Finance Professional Committee, China Finance Association	December 2017	Beijing
Interview and Email communications with an associate professor, School of International Relations and Public Affairs, Fudan University	May 2018	Shanghai
Informal conversations on the topic of international cooperation in China's environmental governance with an adjunct professor at the Department of Political and Social Sciences, FU Berlin	April 2016	Berlin
Phone interview with a resident, Changxing County, Huzhou Prefecture, Zhejiang (also a doctoral student at Peking University)	April 2019; March 2020	Beijing; Berlin
Phone interview and email communication with the Head of the Research Center for Ecological Civilization Construction System, Jiangxi Province	October 2016	Nanchang, Jiangxi

Interviews with a professor at the East China University of Technology	October 2016; November 2020	Wuhan; Nanchang
Informal conversations on the topic of environmental policy experiment in Jiangxi with a former vice president of the East China University of Technology	October 2016	Nanchang, Jiangxi
Interviews and email communications with a professor at the Soochow University/a contact expert of the Secretary of the Suzhou Municipal Party Committee	June 2015; November 2017; October 2018	Beijing; Nanjing; Haikou
Interviews with a professor at the Nanjing Forestry University	June 2015; November 2017; October 2018	Beijing; Nanjing; Haikou
Phone interviews with the Mayor of Huangdian Town, Lanxi County, Jinhua Prefecture, Zhejiang Province	October 2018	Jinhua, Zhejiang
Informal conversations on the topic of Qiuhe style governance with some civil servants and residents in Kunming, Yunnan Province	March 2018; March 2019; August 2020	Kunming, Yunnan
Informal conversations on the topic of current water quality of local river with some residents in several counties, Yunnan Province	March 2018; March 2019; August 2020	Zhaotong, Yunnan
Informal conversations on the topic of current water quality of local rivers with several residents in Jiangsu Province, Zhejiang Province	June, August, October, December 2019	Berlin, Dusseldorf Germany; Amsterdam, Venlo, Netherlands
Informal conversations on the topic of water pollution control with some residents in Beijing, Tianjin and Shanghai	April 2017; June 2018; August 2019	Beijing; Berlin
Phone interviews with the Mayor of Zaoxia Town, Fengxin County, Yichun Prefecture, Jiangxi Province	October 2018; May 2019	Yichun, Jiangxi
Informal conversations on the topic of promotion of RCS with some staff members in Water Resources Bureau of Zhaotong Prefecture, Yunnan Province	April 2019	Zhaotong, Yunnan
Informal conversations with some staff member in Natural Resources and Planning Bureau of Zhaotong Prefecture Zhaotong Prefecture, Yunnan Province	April 2019	Zhaotong, Yunnan
Phone interview and email communication with a senior researcher, Institute of Resources and Environmental Policy, Development Research Center, State Council	May 2019	Beijing
Interview with a retired professor at the Party School of Jiangsu Provincial Party Committee	May 2019	Nanjing, Jiangsu
Interview with a professor at the School of Public Administration, Tsinghua University	May 2019	Beijing
Interview with two former reporters, Southern Weekend, Southern Press Media Group	May 2018	Guangzhou, Guangdong
Interview and email communications with the Director of Institute of Environmental Law, Wuhan University	April 2019	Wuhan, Hubei
Email communication and phone interview with a retired official, Development Research Center, State Council	May 2018; May 2019	Beijing

Email communications and interviews with an former reporter, Guangming Daily	August 2019	Hong Kong
Phone interview with an official of the Taizhou Municipal Bureau of Oceans and Fisheries/Taizhou BCS Office	May 2019	Taizhou, Zhejiang
Informal conversations on the topic of bay chief system and beach chief system with several residents of Taizhou Prefecture, Zhejiang	April 2020; May 2020	Taizhou, Zhejiang
Phone interview with a former Director, the Economic Development Research Center, State Forestry Administration	May 2019	Beijing
Phone interview with a former Deputy Director, the former State Environmental Protection Administration	May 2018	Beijing
Interview with the Deputy Director of the Internet and New Economy Special Committee, China Society of Economic Reform	May 2019	Beijing
Interviews with a former researcher of the Environmental and Economic Policy Research Center, the former State Environmental Protection Administration	April 2018	Beijing
Phone interviews with an associate professor, Fujian Normal University	May 2018; July 2020	Beijing; Fuzhou, Fujian
Informal conversations on the topic of green political achievements of supreme leader in Fujian with a county level cadre, Longyan Municipal Party Committee, Fujian	March 2016; May 2019; July 2020	Venice, Italy; Longyan, Fujian
Informal conversations on the topic of national park with a civil servant, Sanya Municipal Government, Hainan Province	April 2018; March 2020	Sanya, Hainan
Interviews with a former staff member of a financial company affiliated to the Chongqing Municipal Government	October 2016; October 2018; July 2019	Chongqing; Berlin
Informal conversations on the top of promotion of RCS with several civil servants in Urumqi Municipality, Changji Prefecture, Xinjiang Uygur Autonomous Region	March, April, May 2020	Zhaotong, Yunnan
Informal conversations on the topic of environmental policy experiments in Sichuan Province with a lecturer at the Civil Aviation Flight University of China	May 2019; March 2021	Chengdu, Sichuan; Zhaotong, Yunnan
Interview and email communication with an executive director, the Chinese Society for Ecological Civilization Research and Promotion	May 2019	Beijing
Phone interview with one staff member, Office of Mountain-River-Lake Development Committee, Jiangxi Province	May 2020	Nanchang, Jiangxi
Informal conversations on the topic of environmental governance in Gansu with several residents in Gansu Province, Shaanxi Province, and Shanxi Province	February 2016; April 2017; October 2018; May 2018; March 2020	Berlin; Beijing; Yunnan
Email communication with a former reporter, China Water	April 2018	Beijing

Resources News		
Informal conversations on the topic of ecological civilization experimental zone with a reporter, Xinhua Agency	April 2017	Beijing
Informal conversations on the topic of ecological civilization experimental zone with a reporter, People's Daily	May 2018	Beijing
Phone interview with the Vice President, China Ecological Civilization Research and Promotion Association	April 2019	Beijing
Interview with the former Secretary of the Party Branch Committee of Liuminying Village (Changziying Town, Daxing District, Beijing Municipality)	May 2019	Beijing
Email communication with an associate Professor, Ocean University of China	August 2020	Qingdao, Shandong

3. Annual Conferences and Themes of the China Research Group on Socialist Ecological Civilization

Serial number	**Title**	**Theme**	**Time**	**Place**
1	2020 Annual Conference	Driving Force and Operating Mechanism of the Construction of Socialist Ecological Civilization; Practical Logic and Challenges of the Socialist Ecological Civilization System-- Taking the River Chief System as an Example; Obstacles in the Two National Park System Pilots (Wuyi Mountain and Three-River-Source) and Their Solutions; Jiangxi Experience in the Systematic Governance of Ecological Civilization; Green Transformation of Collective Economy in Jiangsu Province; etc.	November 7, 2020	Online
2	2019 Annual Conference	The Institutional Framework of Socialist Ecological Civilization; Local Practices of Socialist Ecological Civilization; International Comparison and International Communication of Ecological Civilization Thought	October 26-27, 2019	Shandong University (Qingdao), Qingdao, Shandong
3	2018 Annual Conference	Social Ecological Transition Theory and Socialist Ecological Civilization; Transcendence Development Theory and Socialist Ecological Civilization; System Framework and Transition of Socialist Ecological Civilization	October 25-28, 2018	Hainan Normal University, Haikou, Hainan
4	2017 Annual Meeting	The Green Leftist School and the Theory of Socialist Ecological Civilization; The Accurate Meaning and Cultivation Path of the Concept of Socialist Ecological Civilization	November 3-5, 2017	Nanjing Forestry University, Nanjing,

				Jiangsu
5	2016 Annual Meeting	Field Research Report and Discussion on Socialist Ecological Civilization; The Political Philosophy Foundation of Socialist Ecological Civilization; Research on Socialist Ecological Civilization from the Perspective of Green Left	October 28-30, 2016	Zhongnan University of Economics and Law, Wuhan, Hubei
6	2015 Annual Meeting	Theory and Practice of Social Ecological Transition in Europe and America; Theory and Practice of Chinese Socialist Ecological Civilization	November 26-27, 2015	Fujian Normal University, Fuzhou, Fujian
7	Inaugural Conference	Theoretical Research on the Construction of Socialist Ecological Civilization; Case Studies of Socialist Ecological Civilization; Social-Ecological Transition Theory and the Construction of Socialist Ecological Civilization; The Research Group on Chinese Socialist Ecological Civilization: Working Mechanism and Research Topics	June 27, 2015	Peking University, Haidian, Beijing

Appendix II Number of Comprehensive Pilot Projects for the Ecological Civilization Construction

The table is made by the author, and informations are colleted from the relevant official website pages and social media.

Deadline, Lead central department	**Policy program**	**Number of pilots**	**Cumulative number of pilots that officially passed acceptance**
March 2000, SEPA	EDZ	154	33
March 2002, SEPA	EDZ	-	33+49=82
December 2004, SEPA	EDZ	-	82+84=166
March 2006, SEPA	EDZ	-	166+67=233
January 2007, SEPA	EDZ	-	233+87=320
January 2007, SEPA	Ecological Province, Ecological Prefecture, Ecological County, Ecological Town, Ecological Village	13 pilot provinces	6 designated Ecological Prefectures and Ecological Counties, 425 designated Ecological Towns,
May 2008, MEP	EDZ	-	320+69=389
August 2008, MEP	Ecological Province, Ecological Prefecture, Ecological County, Ecological Town, Ecological Village	-	11 designated Ecological Prefectures and Ecological Counties
January 2010, MEP	Ecological Province, Ecological Prefecture, Ecological County, Ecological Town, Ecological Village	14 pilot provinces, more than 500 pilot prefectures and counties,	1027 designated Ecological Towns
October 2011, MEP	EDZ	-	389+139=528
August 2012, MEP	ECCP	53	-
December 2012, MEP	Ecological Province, Ecological Prefecture,	15 pilot provinces, more than 1000 pilot prefectures and	38 designated Ecological Prefectures and Ecological

	Ecological County, Ecological Town, Ecological Village	counties,	Counties, 1559 designated Ecological Towns
March 2014, State Council	Ecological Province, PDZ	1 (Fujian Province)	
June 2014, NDRC	PDZ	55 sites, including provinces, prefectures, counties and river basin (including Jiangxi Province and Guizhou Province)	
December 2015, NDRC	PDZ	45 sites, including provinces, prefectures, counties watersheds, bay areas, and ecological barriers	
August 2016, CPCCC and State Council	NECEZ	1 (Fujian Province)	
September 2017, MEP	ECCDZ	-	46 prefectural and county level designations
October 2017, CPCCC and State Council	NECEZ	2 (Jiangxi Province and Guizhou Province)	
December 2018, MEE	ECCDZ	-	46+45=91 prefectural and county level designations
January 2019, CPCCC and State Council	NECEZ	1 (Hainan Province)	
November 2019, MEE	ECCDZ	-	91+84=175 prefectural and county level designations
October 2020, MEE	ECCDZ	-	175+87=262 prefectural and county level designations
October 2021, MEE	ECCDZ	-	262+100=362 prefectural and county level designations

Appendix III Two Rounds of the Central Ecological and Environmental Inspection

The table is made by the author, and informations are colleted from relevant pages in the official website of the State Council and the MEE.

Round	Batch	Time period	Sequence of Central Inspection Team	Object	Re-inspection time
Experimental phase		January 4 to February 4, 2016		Hebei Province	From the end of May to the beginning of July 2018
1	1	Mid-July to mid-August, 2016	1	Inner Mongolia Autonomous Region	
			2	Heilongjiang Province	
			3	Jiangsu Province	
			4	Jiangxi Province	
			5	Henan Province	
			6	Guangxi Zhuang Autonomous Region	
			7	Yunnan Province	
			8	Ningxia Hui Autonomous Region	
	2	From the end of November to the end of December, 2016	1	Beijing Municipality	
			2	Shanghai Municipality	
			3	Hubei Province	November 2018
			4	Guangdong Province	
			5	Chongqing Municipality	
			6	Shaanxi Province	November 2018
			7	**Gansu Province**	
	3	From the end of April to the end of May, 2017	1	Tianjin Municipality	
			2	Shanxi Province	November 2018
			3	Liaoning Province	November 2018
			4	Anhui Province	November 2018
			5	Fujian Province	
			6	Hunan Province	November 2018
			7	Guizhou Province	November 2018
	4	Mid-August to mid-September, 2017	1	Jilin Province	November 2018
			2	Zhejiang Province	
			3	Shandong Province	November 2018

			4	Hainan Province	
			5	Sichuan Province	November 2018
			6	Tibet Autonomous Region	
			7	Qinghai Province	
			8	Xinjiang Uygur Autonomous Region (including Xinjiang Production and Construction Corps)	
2	1	Mid-July to mid-August 2019	1	Shanghai	
			2	Fujian	
			3	Hainan	
			4	Chongqing	
			5	Gansu	
			6	Qinghai	
			7	China Minmetals Corporation	
			8	China National Chemical Corporation	
	2	From the end of August to the end of September 2020	1	Beijing	
			2	Tianjin	
			3	Zhejiang	
			4	Aluminum Corporation of China Limited	
			5	China National Building Materials Group Co., Ltd.	
			6	NEA	
			7	NFGA	
	3	Early April to early May 2021	1	Shanxi	
			2	Liaoning	
			3	Anhui	
			4	Jiangxi	
			5	Henan	
			6	Hunan	
			7	Guangxi	
			8	Yunnan	
	4	From the end of August to the end of September 2021	1	Jilin	
			2	Shandong	
			3	Hubei	
			4	Guangdong	
			5	Sichuan	
			6	China Nonferrous Metals Mining Group Co., Ltd.	

			7	China Gold Group Co., Ltd.	
	5	Early December 2021 to early January 2022	1	Heilongjiang	
			2	Guizhou	
			3	Shaanxi	
			4	Ningxia	

Appendix IV The Continuation and Evolution of Chinese Central Government's Attitudes towards Different Issues in Global Climate Change Governance

The table below is adapted from: Qingzhi Huan, Huiming Li, Qing Li, et al. ed., *The Responsibility of a Great Power --- Coping with Climate Change and Building an Ecological Civilization* (*Daguo Dandang de Jing Yu Jian*, in Chinese), China Forestry Publishing House, 2022, pp. 186-187.

Specific issues	1991	1997	2001	2005	2007	2009	2011	2012	2013	2014	2015	2016	2018	2020
Adhere to the principle of "common but differentiated responsibilities"	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Willingness to promote the development of renewable energy		√	√	√	√	√	√	√	√	√	√	√	√	√
Support CDM			√	√	√	√	√	√	√	√	√	√	√	√
Voluntary GHGs Reduction Commitments					√	√	√	√	√	√	√	√	√	√
National Climate Change Plan					√	√	√	√	√	√	√	√	√	√
Quantitative metrics for reducing carbon intensity							√	√	√	√	√	√	√	√
Legally binding international commitments								√	√	√	√	√	√	√
Agree to adopt national carbon market								√	√	√	√	√	√	√
Officially set carbon peaking deadline (2030)										√	√	√	√	√
A willingness to play a leading role											√	√	√	√
Officially set carbon neutrality deadline (2060)														√