

Research on the Status Quo of Coordination of Water Environment Control Policy Tools in the Yangtze River Delta: Analysis of Policy Text Based on the Yangtze River Delta

Shi Hai-Ling*, Ding Yixin, Wu Wenyu

Business School, Hohai University, Changzhou 213022, China

*Corresponding Author

Keywords: Component, Water environment governance, Synergy mechanism, Policy tool

Abstract: Analyze the policy texts issued by the governments of three provinces and one city in the Yangtze River Delta, and build a framework of policy tools for collaborative water environment management. Based on the analysis of 128 policy texts between 1990.8 and 2021.5, Filter out 337 policy tools and code them for statistical analysis. Inspect and review the types, distribution and development trends of policy tools adopted by local governments in the process of collaborative water environment management. The study found: (1) The government's coordinated governance of the water environment has shown an obvious growth trend in recent years; (2) The government pays more attention to clear responsibilities and division of labor in the governance of the water environment. Although the coordinated governance of the government is receiving increasing attention, it is still in a relatively weak position. Government departments need to carry out coordinated actions to continuously break down departmental, organizational and regional boundaries, and use various policy tools to achieve coordinated government governance from four aspects: joint supervision, joint execution, standardized docking, and information sharing.

1. Introduction

As a basic natural resource and a strategic economic resource, water is a unique basic element for human survival, economic and social development, and an important material basis for achieving sustainable development. In a sense, the most important resource for human survival is not land or food, but water^[1]. After 40 years of reform and opening up, China has improved its economic level, and its people's living standards and overall national strength have been enhanced. However, ecological problems brought about by extensive economic development methods and rapid development at the expense of the environment have become increasingly prominent. With the rapid growth of population and economy, the rapid development of industrialization and urbanization, a large amount of non-renewable resources and raw materials are consumed, a large amount of waste water and sewage are discharged, water resources are depleted, the water environment is deteriorating, and the contradiction between water supply and demand has become prominent. "Water qualitative water shortage" has exacerbated the problem of water shortage, and water resources and water pollution have become important "bottleneck" restricting the sustainable development of China's economy and society[2].

In the past ten years, both the central government and local governments have attached great importance to water environment governance, and strived to fight the defense of clear water to reduce the negative impact of water pollution on the economy, society, and people. A large number of notable achievements have been made, including unified planning and management of key river basins, establishment of a comprehensive monitoring system for environmental management, closure of polluting enterprises, promotion of cleaner production technologies, reduction of wastewater discharge, establishment of urban sewage treatment plants, etc., especially in the formulation of plans and laws. A lot of work has been done in terms of clauses and important speeches, such as the "Guiding Opinions on Building a Modern Environmental Governance

System”, the “Action Plan for the Protection and Restoration of the Yangtze River”, and the revision of the “Water Pollution Prevention and Control Law of the People's Republic of China”.

The Yangtze River Delta region has a developed economy and is also in the forefront of the country in terms of water environment management and ecological environment construction. In 2019, the Central Committee of the Communist Party of China and the State Council issued the “Outline of the Yangtze River Delta Regional Integration Development Plan”, pushing the integrated development of the Yangtze River Delta to the national strategic level. Since the Yangtze River Delta strategy became a national strategy, local governments in Shanghai, Jiangsu, Zhejiang, and Anhui have issued a series of water environment prevention and control laws, policy documents and other normative documents. However, the water environment governance model is mainly based on administrative divisions, and water resources and water environment management are divided into different sections, which does not fundamentally improve the water quality of the river basin. On the contrary, due to differences in the water pollution control capabilities, pollution control standards and methods of the parties, the inconsistent information between regions and the differences in the content and form of local government legislation have led to the lack of regional responsibility and fairness. This division of responsibilities leads to obstacles to the coordination and management of regional water environment, which is not conducive to the advancement of water environment governance. At the same time, due to limited regional resources and ecological carrying capacity, the Yangtze River Delta has become one of the most urgent areas for coordinated construction of water ecology and joint prevention and control of water pollution in China. Therefore, understanding and analyzing the actions of governments in the Yangtze River Delta region to coordinate water pollution control, mining and exploring the participants and content of collaboration when the government coordinated water pollution control, especially the use of coordinated policy tools, are useful for better promoting joint prevention and control of water pollution. Work to improve and increase the efficiency of joint prevention and control of water pollution is of great significance.

2. Theoretical Analysis and Frame Design

Policy tools refer to the means to achieve goals, that is, a series of effective means, technologies, methods and mechanisms adopted by the government in order to greatly improve the effect of water pollution control [3]. At present, there are two classification methods for the research on policy tools. One is to distinguish between market and administrative functions, and policy tools are divided into command-controlled tools and market-oriented tools; the other is divided into command-controlled (direct control) and market-incentive types. Tools (market-based) and voluntary tools (informal) [4]. Generally speaking, the policy tools in the coordinated governance of water environmental pollution can be divided into authoritative, motive, abilities, values and beliefs, and environmental differences among policy makers in terms of the policy target groups or policy executors’ actions. Encouragement type, capacity building type, symbol and advice type, learning type [5]. Some scholars have shown that my country has formed a preliminary system of new environmental policy tools, including market-based tools, voluntary tools, and information tools [6]. Among them, the information tool is mainly based on environmental labels, which is a new tool that combines oriented recommendation and certification information. At present, most of my country's environmental policy tools are authoritative and command-type, which have the defects of high control cost and insufficient performance. Voluntary and economic environmental policies will become the development direction of future environmental policies [7].

| | | | |
|---------------------------|--|---|---|
| Joint supervision (Y4) | J1: Joint punishment J2: Joint monitoring J3: Case transfer J4: Joint inspection J5: Joint review J6: Joint interview | K1: Establish an environmental responsibility system K2: Agency accepts monitoring commission K3: Public report K4: Hire social supervisors K5: Public litigation | L1: Cross-regional joint monitoring L2: Upstream and downstream handover responsibility system |
|---------------------------|--|---|---|

| | | | |
|--------------------------|---|---|---|
| Joint execution (Y3) | G1: Joint law enforcement G2: Emergency linkage G3: Joint dispute resolution | H1: Institutions accept governance mandates H2: Environmental Pollution Liability Insurance | I1: Regional joint law enforcement I2: Linkage with water ecological protection I3: Linkage water ecological restoration I4: Linkage emergency treatment |
| Standard docking (Y2) | D1: Joint designation mechanism D2: Jointly develop evaluation standards D3: United Water Certification D4: Joint approval D5: Co-editing the protection plan | E1: Agency accepts technical evaluation commission E2: Participate in project environmental assessment E3: Participate in the formulation of environmental protection plans | F1: Establish a joint mechanism F2: Coordinating cross-border pollution disputes F3: Joint regional planning |
| Information Sharing(Y1) | A1:Flood prevention plan A2: Environmental Monitoring Network A3: Information exchange A4: Build information systems A5: Law enforcement information sharing A6: Case notification | B1: Public monitoring information B2: Public Participation Information Platform B3: Information disclosure | C1: Environmental information platform C2: Regional information sharing C3: Environmental Monitoring Network |
| | Inter-departmental collaboration (X1) | Inter-organizational collaboration (X2) | Inter-regional collaboration(X3) |

Fig.1 The Framework of the Government's Coordinated Governance of Water Environment Policy Tools

3. Data Collection and Statistical Analysis

3.1 Data Collection

The analysis unit of this article is the policies and regulations concerning water environment prevention and control promulgated by the governments of three provinces and one city in the Yangtze River Delta region. Select the policies and regulations issued by the three provinces and one city in the Department of Ecological Environment (bureau) and the Department of Water Resources (bureau) as the source of the policy text. The retrieved text is published between August 8, 1996 and May 10, 2021. The searched records are 2908, and the final screened records are 128. The selection of policy texts follows the following principles: (1) Except for the Taihu Lake Basin Administration, the issuing agency is the government department of three provinces and one city in the Yangtze River Delta region; (2) The content is closely related to the prevention and control of water environment; (3) Policy type exclusion announcements and notices , Letters, replies, technical specifications, mainly retaining laws and regulations, methods, notices, implementation rules, etc.

For the 128 selected policy texts, further analysis was conducted to identify the clauses involving the government's coordinated management of the water environment. The specific screening conditions are as follows: According to the three-dimensional subject dimension of the policy tool framework, (1) Multiple subjects of water environment prevention and control mentioned in the selection clauses, For example, different departments within the government, government and business entities, and public subject in the same region or in different regions. At the same time, clauses that only refer to a single subject are excluded, and general descriptions such as “government departments” are also excluded.; (2) Choose behavior clauses that can express “coordination” among multiple subjects. For example, words such as “convergence”, “delegation” and “coordination” are used to express the synergistic relationship between multiple subjects.

The clauses that meet the requirements are screened out and coded according to the policy tools involved. Among them, for some policy texts that have no chapters, the chapter code is 0 for coding. For example, Chapter 2 of the “Regulations of Shanghai Municipality on Environmental Protection” in the No. 1 text, Article 12 stipulates that “The municipal environmental protection department shall, in conjunction with the relevant administrative departments of this city, organize the compilation of the municipal environmental protection plan and related environmental protection special plans, and report to the municipal people. The government approves.” Encode this clause as “1-2-12”. At the same time, this clause involves the need for the municipal environmental protection department to work with other administrative departments. This belongs to the “inter-departmental coordination X1” and “normative docking Y2” in the framework. The specific practices can be classified into the “Joint Preparation (Environment) Waters Protection Plan D5” “, so according to the encoding format, the term is finally encoded as “D5-1-2-12”.

3.2 Data Analysis and Statistical Results

Analyze the type and quantity changes of policy texts, the type and quantity of policy tools through frequency statistics, and consider factors such as the release time of policies and regulations to analyze the types, distribution and development trends of the government’s coordinated water environment governance policy tools. The status quo of the government of three provinces and one city in the Yangtze River Delta region of Qing Dynasty adopting policy tools in the coordinated management of water environment.

3.2.1 Time-Series Analysis of Policy Text

First of all, from the perspective of the types of policy texts, regulations (accounting for 32.8%), notices (accounting for 24.2%) and specific operational regulations (accounting for 42.2%, including methods, regulations, plans, rules, opinions, decisions, systems) , This shows to a certain extent that the Yangtze River Delta region government pays attention to coordinated governance actions for the water environment. From the perspective of the number of policy texts, the average number of policy texts issued per year is about 5, and the number of policy texts has remained at 2 to 6 in most years. The number of policy texts increased sharply to 11 in 2012, and experienced 2013-2016 After the decline phase, the number of policy texts increased rapidly during 2017-2020 (more than 10 policy texts per year), especially in 2018, when the number of policy texts this year reached 22 (Figure 2). To a certain extent, this shows that the government has paid more and more attention to coordinated prevention and control of water environment in the past 10 years.

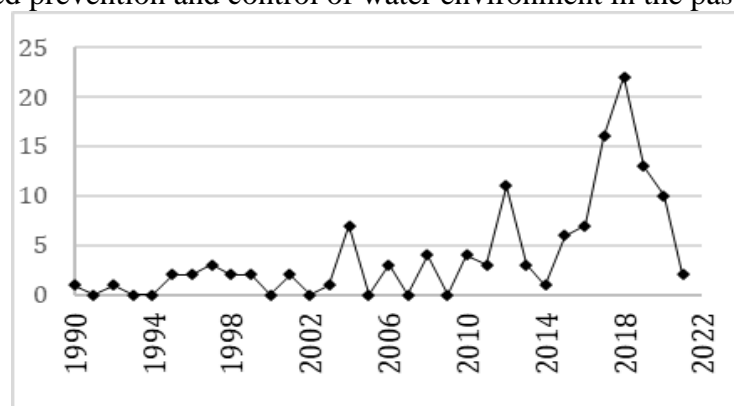


Fig.2 1990.8-2021.5 Policy Text Frequency Change Status

3.2.2 Analysis of the Types and Changes of Policy Tools

In Fig 1, through the analysis and summary of the methods and measures of collaborative water environment management involved in the policy text, a total of 46 types of collaborative behavior entities (X1-X3) and four types of collaborative content (Y1-Y4) are determined. Policy tools, these 46 types of policy tools are distributed in 12 intervals formed by the X-axis and Y-axis. Among 128 policy texts, the frequency of 46 policy tools totals 337, and the average frequency of policy tools in

each policy text is about 2.6. This shows that the government involves the policy of coordinated water environment governance in the design of policy texts. Fewer tools. From the perspective of time, the average number of policy tools per year is about 11, and the frequency change trend of policy tools is as shown in the figure below, which is similar to the change trend of the number of policy texts (Fig 3).

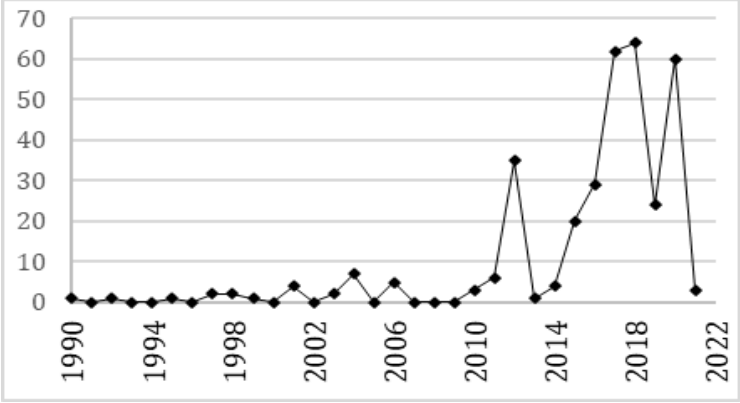


Fig.3 1990.8-2021.5 Frequency Change Status of Policy Tools

From the perspective of the nature of governance entities (X-axis), there are significant differences in the proportion of the number of policy instruments involving different participating entities to the total number. For example, the number of policy tools distributed in the X1 interval (inter-departmental coordination) is 129, accounting for 38% of the total number, while the frequency of the number of tools distributed in the X3 interval (inter-regional coordination) is only 70, accounting for 21% of the total number , The number of policy tools that the participating entities coordinated between organizations in X2 is 138, accounting for as much as 41%. In terms of quantity alone, the policy tools involving inter-organizational coordination are close to twice as large as inter-regional coordination. This situation shows that the government focuses on the coordinated prevention and control of the water environment through inter-departmental coordination and inter-organizational coordination, and focuses on the coordinated prevention and control of the water environment by encouraging public participation, participation of social institutions and organizations, joint development of departments, and information sharing. However, the use of coordinated policy tools across regions is relatively small. In terms of time series, the number of policy tools in the inter-organizational coordination interval has increased rapidly and fluctuates greatly; secondly, the number of policy tools distributed in the inter-departmental coordination interval has increased and fluctuated greatly, and finally the number of policy tools in the inter-regional coordination interval. The growth is the slowest, as shown in the figure below.

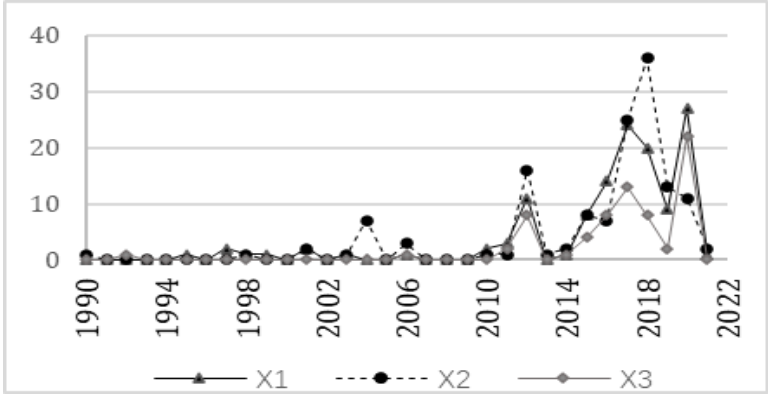


Fig.4 1990.8-2021.5 X-Axis (Participating Main Body) Policy Tools Frequency Change Status

From the perspective of collaborative content (Y-axis), the number of policy tools is relatively evenly distributed among different collaborative content intervals. Among them, the policy tools distributed in the Y4 joint supervision interval accounted for the most, accounting for 27% of the total number, followed by the policy tools distributed in the Y2 normative docking interval

accounting for 26.4% of the total number, and the policy tools distributed in the Y3 joint implementation interval accounted for 25.5% of the total quantity. This quantitative distribution shows that the government pays attention to the use of a variety of collaborative content, and conducts coordinated prevention and control of the water environment through joint supervision, standardized docking, joint execution, and information sharing. In terms of time series, after the slow growth of policy tools from 1990 to 2010, the number of policy tools began to surge. In 2012, there was a small climax of coordinated policy tools in the four ranges. Since 2015, the frequency of use of coordinated policy tools has increased. The policy tools distributed in different intervals of the Y-axis have different trends in different years, but overall, the policy tools distributed in each interval are relatively balanced, as shown in the figure below.

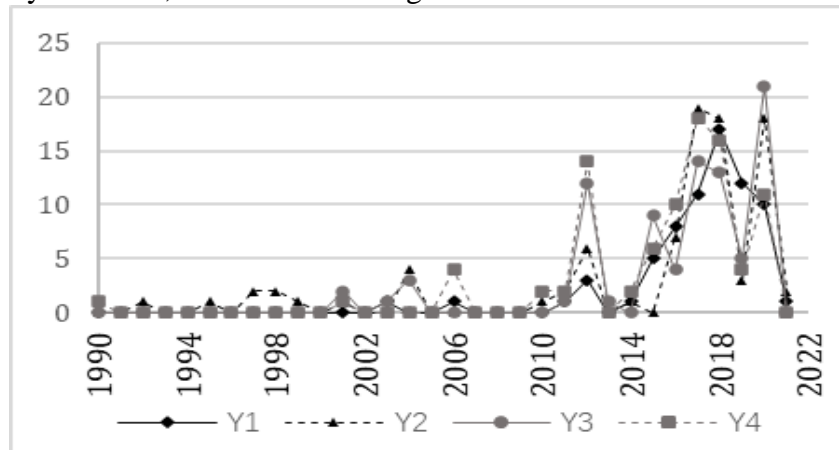


Fig.5 1990.8-2021.5 y Axis (Collaborative Content) Policy Tools Frequency Change Status

3.2.3 Analysis of the Quantity and Distribution Characteristics of Policy Tools

In the policy tool framework shown in Figure 1, the frequency of policy tools in A~L is different. In these 12 intervals, the average value of the policy instrument frequency in each interval $\bar{X}=28.1$, the standard deviation $S=15$, the maximum value $Max=61$, the minimum value $Min=10$, and the range of variation $Range=51$, which indicates that each interval's policy The frequency distribution of tools is relatively discrete, and the distribution status is unbalanced. According to the frequency of use of policy tools in the interval (indicated by Z), they are classified into the following three levels: high frequency interval (R) ($Z \geq 30$), intermediate frequency interval (M) ($20 \leq Z < 30$), low frequency Interval (S) ($Z < 20$), where the R grades are A, D, H, I, K, the M grades are B, E, G, and J, and the S grades are F and L.

Among the 46 policy tools, the average frequency of the policy tool is 7.3, the minimum frequency is 1, and the maximum frequency is 39. As far as policy tools are concerned, their distribution also has a strong dispersion, which is the same as the dispersion of the 12 interval distributions. Consistent. Just look at the frequency of policy tools. Among them, 34 types of policy tools are used with frequency (indicated by W) lower than 10, and there are three types with $W > 20$, namely D5, H1, and K3.

4. Conclusions and Recommendations

4.1 Conclusions

Based on the results and discussions presented above, the conclusions are obtained as below:

(1) The government's coordinated management of the water environment has shown an obvious growth trend in recent years. According to the analysis of the types of policy texts, the number of documents issued, and the types of policy tools, and the number of time series changes, it can be seen that the number of policy texts and the number of policy tools fluctuates year by year, especially in the past ten years, the government has increasingly paid attention to coordinated governance of the water environment.

(2) The government pays more attention to clear responsibilities and division of labor in the treatment of the water environment, which means that although the coordinated governance of the government has received increasing attention, it is still in a relatively weak position. On the one hand, the average frequency of collaborative governance policy tools in each policy text is only about 2.6, which is low. In the policy text, it is more important to emphasize what certain departments should be responsible for, and to divide governance responsibilities; secondly, Compared with issues in areas such as air pollution control, collaborative governance policy tools still have a lot of room for use in water environment governance; at the same time, compared with inter-departmental collaboration and inter-organizational collaboration, inter-regional linkages still need to be improved. In particular, the work of inter-regional joint supervision and information sharing needs to be improved.

4.2 Recommendations

As water environment pollution has the characteristics of rapid diffusion of pollutants, large scope of pollution, and multiple and complex pollution sources, water environment governance has become a public issue that requires regional collaborative governance. To this end, government departments need to carry out coordinated actions to continuously break through departmental boundaries, organizational boundaries and regional boundaries, and use various policy tools to realize the government's coordinated governance needs from four aspects: joint supervision, joint execution, standardized docking, and information sharing.

First, break through the limitations of the division of responsibilities between functional departments within the government, strengthen collaboration between different departments, break departmental boundaries, and take water environmental governance as the common goal, through effective means such as joint development of standards, joint preparation of plans, and law enforcement information sharing among departments. Strengthen collaboration;

Second, strengthen collaboration with public groups such as enterprises, social organizations, and individuals. The disclosure of monitoring information by enterprises, the implementation of testing activities by professional agencies appointed by the government, and the implementation of public participation in project environmental assessment and public supervision can all promote inter-organizational collaboration, break the barriers between governments, enterprises, and individuals, and encourage public participation, social institutions and organizations. Participate to realize the atmosphere of the whole society to jointly manage the water environment;

Third, at the same time focus on developing cross-regional cooperation and strengthening inter-regional collaboration. Establish a cooperation group for water environment management in the Yangtze River Delta, design and construct a regular consultation system, etc. At present, the integrated demonstration area of the Yangtze River Delta has implemented a unified standard for air pollution control, and the coordinated control of the water environment should also be put on the agenda. Other regions should learn from the experience of the demonstration zone to achieve cross-regional coordination.

References

- [1] Brown L R. How water scarcity will shape the new century.[J]. Water science and technology: a journal of the International Association on Water Pollution Research,2001,43(4):
- [2] Chen Wen. Research on Dynamic CGE Model Construction and Policy Evaluation of China's Water Pollution Control[D]. Hunan: Hunan University, 2012.
- [3] Wang Yanhong. The use of government policy tools for collaborative air pollution control--Based on the policy text analysis of three provinces and one city in the Yangtze River Delta[J]. Jiangnan Forum, 2020(04): 26-32.

- [4] Wu Yun, Zhao Xinfeng. Research on the Changes of Air Pollution Control Policy Tools in the Beijing-Tianjin-Hebei Region--Based on the 2004-2017 Policy Text Data[J]. Chinese Administration, 2018(10): 78-85.
- [5] Du Qinnan. Preference and optimization of policy tools for cooperative governance of environmental issues: content analysis based on 34 policy texts[J]. Journal of Fujian School of Administration, 2019(06): 48-58.
- [6] Wang Huina. New policy tools in regional environmental governance[J]. Academic Research, 2012(1):55-58,65.
- [7] Li Weiwei. The evolution of China's environmental policy and analysis of policy tools[J]. China Population, Resources and Environment, 2014(S2).
- [8] Li Hui, Ren Xiaochun. Research on collaborative governance from the perspective of good governance[J]. Science and Management, 2010, 30(06): 55-58.