Environmental Information Quality Guarantee System Based on the Perspective of Policy Tools

Wuyue Jiang¹, Liang Cao²,* and Yanmei Huang³
¹,²,³School of Politics and Public Administration, Hainan University, Haikou, Hainan, 570228, China

*Corresponding author email: 1227665498@qq.com

Abstract. This paper analyzes the evolution of China's environmental quality guarantee system and provides some Suggestions for future environmental policy tool selection. Based on the perspective of policy tools, this paper sorts out the policy texts issued at the central level and divides them into three categories: command control, market incentive and public participation. The content analysis method and Nvivo11plus qualitative data analysis tool were used to carry out qualitative analysis on the three types of policy tools, and the change chart of China's environmental policy tool selection was drawn. In general, the use of three kinds of policy tools in China has gradually changed from simple, "obligation standard" and direct regulation to complex, "right standard" and joint regulation, but there is still a large deviation in the use of environmental policy tools.

Keywords: Policy tool; Environmental information quality guarantee system.

1. Introduction

Over the past 40 years of reform and opening up, China's unprecedented economic growth has not only created miracles, but also caused a sustained increase in environmental costs. Environmental issues are more than just issues of people's livelihood, they also play an important role in affecting the stable development of China's economy as well. In addition, the falsification of environmental monitoring data in some regions has caused the CPC Central Committee and the State Council to attach great importance to environmental monitoring in recent years, especially its data quality. In May 2017, the Central Leading Group for Comprehensively Deepening the Reform deliberated and passed the “Opinions on Deepening the Reform of Environmental Monitoring and Improving the Quality of Environmental Monitoring Data”, which set out requirements for ensuring the comprehensiveness, accuracy, objectivity and authenticity of environmental monitoring data. High-quality environmental information is the prerequisite for effective environmental governance. Falsifying environmental monitoring data will not only lead to policy mistakes in environmental management, delay the opportunity of environmental governance and affect its quality, but also damage the ecological environment and public health, thus greatly compromising the government credibility.

At present, domestic scholars' researches on the quality of environmental information mainly focus on selecting a certain industry or a listed company to explore the influential factors of enterprises’ environmental information disclosure quality or make comparative studies. For example, Qiang Li empirically studied the correlation between executive incentives and environmental information disclosure quality. Huige Kong studied the status quo of environmental information disclosure and its influential factors from the perspective of stakeholders by adopting the method of panel
regression\cite{2}. Maohua Jie compared the environmental information disclosure quality of different ownership companies through the case analysis\cite{3}. Hongjing Li evaluated the current situation of environmental information disclosure quality of listed companies in heavy pollution industries and explored the influential factors\cite{4}. In addition to the above research, Kaixu Sun\cite{5} and Guoqun Li\cite{6} put forward improving measures by investigating the analytic status and governing factors of environmental monitoring data respectively. Besides, some scholars try to explore ways to improve the reliability of the environmental monitoring data, such as Yali Zhu\cite{7}, Xiqun Bu\cite{8} and so on. From reviewing the domestic scholar's researches, they are mostly empirical studies on the influential factors of the quality of environmental information, but lack textual analysis. And they mainly focus on the enterprise or the technical level of environmental monitoring, while less focus on the level of system which supports and guarantees the quality of the environment information. Therefore, based on the view of policy tools, this paper tries to explore the evolvement of environmental information quality guarantee system by studying the use of environmental information quality guarantee policy tools in China, so as to provide improvement for the selection of policy tools in the future.

2. Methodology

This paper is based on the view of policy tools. Policy tools are incentive measures, including positive and negative incentives, which are formulated to promote relevant actors to comply with relevant policies and effectively perform their duties and obligations. The selection and using ratio of policy tools are intuitive factors to study the behavior of the government and legislators, they can reflect the degree of change in the diversity and complexity of the use of environmental policy tools in the development process of environmental information quality system in China. The choice of policy tools in this paper is based on the study of environmental policy system, drawing on the division experience at home and abroad and combining with the text of environmental policy in this paper. Internationally, The Organisation for Economic Co-operation and Development (OECD) divides environmental policy tools into command and control, economic incentive and persuasive instruments\cite{9}. Foreign scholar Kemp (1997) roughly divided environmental policy tools into three categories: means of command, means of market and means of communication\cite{10}. On the domestic side, Haizhen Peng and Rongming Ren (2003) divided environmental control tools into command-and-control, economic incentive and commercial-government cooperation types from the perspective of government behavior\cite{11}. Wanlei Mao (2014) divided China's environmental policy tools into command and control type, economic incentive type and voluntary type based on the mandatory policy tools for the regulated\cite{12}. Xinfeng Zhao (2016) and others are divided into three categories based on the practice of regional air pollution control in China: regulatory, market-based and voluntary policy tools \cite{13}. On the basis of the above research at home and abroad, this paper finds that "degree of coercion" is the first choice of environmental policy tools. Therefore, this paper also takes this kind of index as the division basis, and combines the environmental protection policies and regulations issued by the central level of our country, combing the policy tools used in environmental information quality guarantee system into three categories: command control, market incentive and public participation, and counting and classifying these three kinds of policy tools respectively. The counting rule in laws and regulations is that there is no provision of sub clause or only one counting for multiple times involving the same type of policy tools. If there are multiple sub clauses, they are counted by sub clauses, and different types of policy tools involved in the same clause are counted separately.

This paper uses the content analytical method to carry on the research. And with the combination of Nvivo11Plus to analyse the three kinds of policy tools qualitatively. In order to classify the policies and analyze the evolution trend, the text semantics will be summarized briefly as reference points of three-level coding, and then extract keywords as second-level nodes. Finally, extract and combine second-level nodes into important first-level nodes. The evolution of China’s environmental information quality guarantee system will be outlines through the method.

Data and materials used in this paper come from the magic weapon of Peking University. We choose nearly 320 environmental protection policies since reform and opening up and select the regulations and policies which were unveiled by the central level of our country with strong correlation to the subject through positioning "environmental protection", "pollution prevention", "pollution", "ocean", "soil" and
other keywords related to environmental information quality guarantee system. After final combing, 83 valid samples were obtained, and the policy was introduced as early as 1982.

3. Result and Analysis
In this paper, we divide the policy text into semanteme, and count every time when a specific policy tool is counted. Finally, we draw a policy map of China's environmental information quality guarantee policy tools by changing the proportion line map. (see Figure 1 below). We also conclude their advantages and disadvantages. (see Table 2 below).

![Figure 1. Use of environmental information quality guarantee policy tools in China.](image)

Table 1. The advantages and disadvantages of environmental information quality guarantee policy tools in China.

| POLICY TOOLS            | COMMAND CONTROLLED                                                                 | MARKET DRIVEN                                                                 | PUBLIC PARTICIPATION                                                                                                                                 |
|-------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| CONCEPT DEFINITION      | The use of compulsory planning and control means for management and control will be punished if it does not comply with its provisions. | Based on the market, incentives are provided through capital subsidies, market cultivation, and service outsourcing to improve the quality of environmental information. | Rely on education and publicity, information release, recognition, encourage social organizations and public supervision to stimulate social attention and social strength. |
| ADVANTAGE               | Mandatory; Quick acting.                                                            | Reduce government operating costs, increase green development and credibility.                       | Reduce the cost of government environmental decisions and improve the quality of decisions. Expand the coverage of environmental supervision.                       |
| DISADVANTAGE            | It has led to various types of fraud, increased the difficulty and cost of supervision. It lacks flexibility and incentive for technological innovation. | It requires a perfect market mechanism, so the government needs to take measures to cultivate and supervise the market. It’s profit driven. | The compulsory management and control capabilities are not strong, and the timeliness is low. |

3.1. Command Control Tool
Command control tool can also be called mandatory control, which refers to the government's use of mandatory planning and control means, such as standards, prohibitions, responsibilities, systems and other measures to control the quality of environmental information. If they are not in accordance with the provisions, they will be severely punished. In China, command and control tools were mostly used in the early stage, and the proportion decreased in 1989, the lowest in 2012, down to 45%. Specifically,
from 1982 to 1996, ban, monitoring, punishment and other direct control means were almost used, accounting for more than 90%, including environmental monitoring management system, environmental monitoring vertical management system below the provincial level, accountability of leaders, party and government cadres, and the disciplinary measures against all kinds of real and accurate information that destroys environmental information. For example, in the Law of the People's Republic of China on the prevention and control of soil pollution in 2018, a fine of more than 20000 yuan but less than 200000 yuan shall be imposed on the key supervisory units of soil pollution who tampers with or forges monitoring data. If serious consequences are caused, a fine of not less than 200,000 yuan but not more than two million yuan shall be imposed. This kind of policy tool is dominated by the administrative order of the government, which has the advantages of compulsion and quick effect. However, the game between regulators and data producers has existed for a long time, which leads to various kinds of fraud methods emerge in endlessly, and also increases the difficulty and cost of supervision. Moreover, it is difficult to make timely responses to environmental conditions and technological changes, which will hinder the role of the market. It also lacks flexibility and incentive for technological innovation of enterprises.

3.2. Market Incentive Policy Tool
The market incentive policy tool is based on the market, through policy support, economic incentives and other policy means, such as financial subsidies, market cultivation, service outsourcing and other measures to promote the establishment and operation of environmental information quality related industries, enterprises and institutions, and to stimulate the sewage enterprises and institutions voluntarily choose the more advantageous behavior of environmental information quality, thereby improving the quality of environmental information. In 2004, market incentive tools began to appear, accounting for only 12.5% of that year. It began to increase gradually in 2011, and the use of such tools reached up to 26.6% in 2018. For example, in 2015, the Construction Plan of Ecological Environment Monitoring Network proposed that efforts should be made to improve the subsidy policy for environmental protection monitoring posts, actively cultivate and open the service monitoring market, and encourage social environmental monitoring institutions to participate in various pollution monitoring of pollutant discharge organizations. This kind of policy tool not only reduces the operating cost of the government, but also promotes the green development of enterprises and the promotion of public trust. It is a more effective and economic policy tool. But this kind of policy tool requires a perfect market mechanism and a clear interest drive. The government needs to take effective measures to cultivate and supervise the market.

3.3. Public Participation Policy Tool
Public participation policy tools are also called persuasive tools and voluntary tools, which refer to all tools except command control tools and market incentive tools. Public participation tools mainly appeared after 1999, but its proportion was less than 30%. After 2008, the public participation has been increasing, and the maximum in 2012 is 35%. In environmental information quality guarantee system, public participation tools mainly rely on education and publicity, information release, commendation and encouragement of social organizations and public supervision to stimulate social attention and social forces. The specific expression is to open environmental information, improve reporting mechanism, conduct flight inspection and regular inspection according to reporting, and provide strong disciplinary measures so as to ensure the quality of environmental information. For example, the Environmental Protection Law of the People's Republic of China in 2014 was proposed to improve public participation procedures to facilitate the participation and supervision of environmental protection by citizens, legal persons and other organizations. This kind of policy tools can effectively reduce the cost of government environmental decision-making, improve the quality of decision-making, expand the coverage of environmental supervision, form the social power of universal supervision, and make environmental information fraud no escaping. However, due to the lack of control capabilities, the timeliness is often not high.
4. Concluding Remarks and Suggestions

Whether environmental information quality guarantee policies can play an effective role largely depends on the choice of policy tools. By combing and analyzing the policy tools used in environmental information quality guarantee in China, this paper draws the following conclusions:

In terms of types, the use of policy tools has changed from simple to complex. China's environmental information quality guarantee system presents a general trend from a single command control oriented to a combination of three policy tools, and the use of policy tools is more abundant.

From the perspective of legislative orientation, the choice of policy tools gradually changes from "obligation standard" to "right standard". The feature of command control tool is to require its control object to comply with mandatory requirements, that is to say, to fulfill obligations as the main feature. Market incentive tools emphasize that enterprises participate in environmental monitoring and evaluation from the perspective of maintenance and practice and get corresponding policy preferences, that is, the main feature is the right to benefit. The core of public participation tool is the right and obligation to participate in management. It emphasizes more on the right of public supervision and the protection of government's right, which is essentially rights based. Command and control policy tools are still in the majority, but public participation tools are being used more frequently.

From the perspective of the role of policy tools, it transferred from direct regulation to joint regulation. In recent years, China has gradually joined the mode of social supervision and government punishment while emphasizing direct control. For example, the supervision and reporting of falsification of environmental monitoring data has been included in the acceptance scope of "12369" environmental protection report platform and "12365" quality and technical supervision report platform. Or the list of dishonest enterprises and environmental information falsification enterprises has been made public. And the supervision of industry associations has been encouraged. After 2004, the overall trend of joint regulation mode is on the rise. In 2019, the use of market incentive and public participation tools accounted for about 40% of the total, nearly 2-3 times higher than before, so as to participate in environmental information quality guarantee system more comprehensively.

Although the policy tools gradually show a trend of three types of combined use, it can also be seen that the proportion of command-and-control tools in recent years is nearly 20% higher than the sum of market incentives and public participation tools’ proportion, which indicates a large deviation in the use of environmental policy tools. The situation dominated by a single tool should be avoided, market incentive policy tools can play a good role of positive externalities, more encouragement should be given to tap the potential space[14], and market-oriented ecological compensation mechanism should be improved[15]. And the public participated tools are also necessary since the practice proved that the stronger public environmental awareness, the regional control of environmental pollution effect is more obvious[16]. These two kinds of tools still have vast space for development. It is necessary to promote the complementary advantages of three policy tools, and gradually build an environmental information quality guarantee policy tool system that adapts to the changing institutional environment.

In addition, there are still shortcomings in this study. Since the selected samples of environmental policies and regulations are mainly issued at the central level, it may not be of guiding significance for the selection and use of policy tools at the local level.

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