

# Study on Cross-boundary Governance of Water Pollution in Huaihe River in China

Zhihua Bai<sup>1</sup>

<sup>1</sup> Ph.D. Candidate, School of Political Science and Public Administration, China University of Political Science and Law, Beijing, China

Correspondence: Zhihua Bai, Ph.D. Candidate, School of Political Science and Public Administration, China University of Political Science and Law, Beijing 100088, China. E-mail: arthur2006@163.com

Received: July 18, 2015 Accepted: July 23, 2015 Online Published: September 27, 2015

doi:10.5539/jsd.v8n8p241

URL: <http://dx.doi.org/10.5539/jsd.v8n8p241>

## Abstract

Governance of basin water pollution aims to break through contradictions between integrated river and divisibility of administrative divisions. It depends on the power of the government, the market and the public and constructs a network structure of governance with the major paths of intergovernmental cooperation, market regulation and public participation. It realizes cross-boundary governance of water pollution by means of design of the system and improvement of the mechanism. In the process of the current governance of water pollution in Huaihe River, problems exist at all the levels of inter-governmental cooperation and multi-participation of the market and the public. This paper embarks on the study of re-construction of the institutional framework of local inter-governmental cooperation, strengthening of cooperation between the government and market subjects in cross-boundary governance, reinforcement of participation of the public and non-governmental organizations and improvement of institutional arrangement of water resource law to construct and remodel the path of water pollution governance in Huaihe River.

**Keywords:** Huaihe River, basin water pollution, cross-boundary governance

## 1. Huaihe River Water Pollution Governance and Governance Theories

### 1.1 Summary of Huaihe River Basin

Huaihe River, called Huaishui in ancient times, has approximately an overall length of one thousand kilometers. It is one of the seven main valleys in China. Huaihe River basin strides across the five provinces of Henan, Hubei, Anhui, Jiangsu and Shandong. It embraces 36 municipal cities and 182 cities and towns, involving more than 170 million. Its population density occupies the top of the seven main valleys. The entire Huaihe River basin has an area of 270 thousand kilometers or so. Split by the Abandoned Huanghe River, the entire basin is divided into the two major river systems of Huaihe River and YiShiSihe River, respectively with an area of 190 thousand kilometers and 80 thousand kilometers. The following figure is the overview of Huaihe River basin. On the upper right side of the figure is the YiShiSihe River system constituted by Sihe River, Yihe River and Shuhe River. On the left side of the figure are the three main tributaries of Huaihe River, including Guohe River, Yinghe River and Shahe River. In the middle of the figure is the mainstream of Huaihe River.

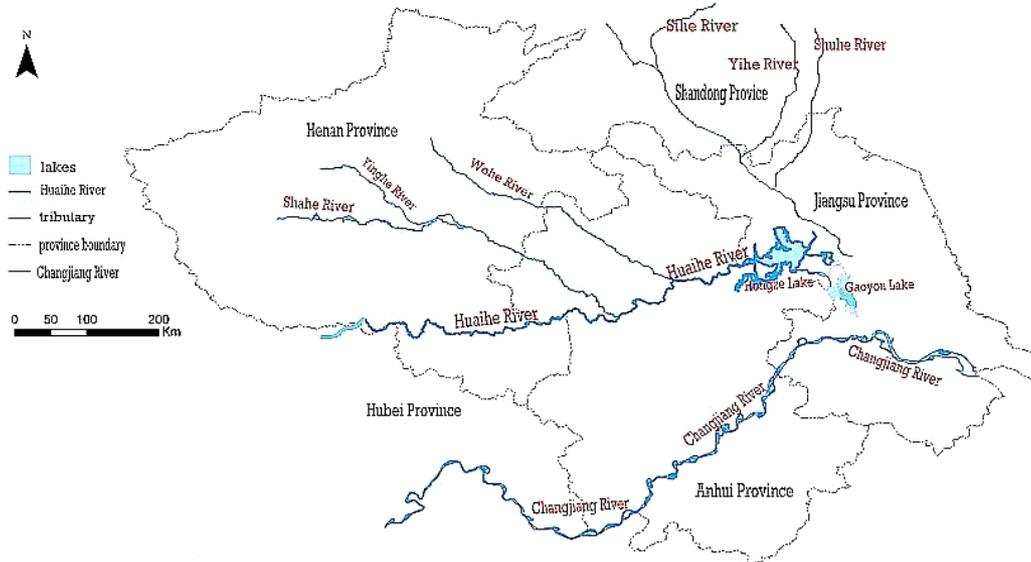


Figure 1. Schematic diagram of Huaihe River basin

Earlier since the beginning of the 90s in the 20<sup>th</sup> Century, with large-scale development of township enterprises along the Huaihe River, a large quantity of industrial sewage has been directly discharged into the river without any disposal, which has resulted in swift deterioration of the Huaihe River water. As a consequence, the domestic water of residents along the Huaihe River is directly influenced. A large part of fish and shrimp in the river vanish and incidence of cancer increases among residents in the areas along the river. Thus, the central government has, in succession, formulated programs of “the ninth Five-Year Plan”, “the tenth Five-Year Plan”, “the eleventh Five-Year Plan”, and “the twelfth Five-Year Plan”, and has made an accumulative investment of nearly 100 billion Yuan in construction of supporting facilities. After water pollution governance for two decades, until now, the water quality of Huaihe River has been improved. Nevertheless, considering the monitoring data in the past few years, the situation is still not optimistic. Let’s take the monitoring data of June in 2014 as an example. According to the monitoring data offered by Huaihe River Water Conservancy Committee, the comprehensive water quality evaluation result of 36 trans-provincial rivers and 40 provincial cross sections of Huaihe River basin shows, there are four cross sections with category V of water that is polluted, accounting for 10% of the total cross sections; there are seven cross sections with category inferior V of water that is seriously polluted, accounting for 17.5% of the total cross sections. According to the water quality standard of China, category I to category III is the category of drinking water and category IV to category inferior V is polluted water, among which category inferior V of water has no function of use any more. Thus, it can be found that Huaihe River water pollution governance is still facing an austere challenge.

Water pollution governance is an endless process, which calls for cooperation from all social subjects. Water pollution governance network should be constructed at an inter-governmental level and between governments and non-governmental organizations. Cooperation should be made at multiple levels to form a multi-centric governance system and pattern.

### 1.2 The Theory of Governance and Cross-boundary Governance

When the World Bank summarized the situation of Africa at that time in 1989, the phrase “crisis in governance” was used for the first time. The word governance in English originated from Latin and ancient Greek. Its original meaning is to control, guide and manipulate and is mainly used in administrative activities and political activities correlated with national public affairs. Its representatives are James N. Rosenau and the Ostrom.

In 1995, the Commission on Global Governance defined governance in “Our Global Neighborhood” as sum of the numerous methods by all kinds of public or private individual institutions in management of the common affairs. It is a persistent process in which all conflicting or different interests get reconciled and a joint action is taken. It includes formal system and rules that have the right to compel people to obey and also includes all kinds of formal institutional arrangements that are agreed on by people or that they believe comply with their interests.

The School of Institutional Analysis represented by Ostrom put forward the theory of multi centric governance. According to this school, mono center means that, as the unique subject, the government conducts exclusive

administration on social public affairs, whereas multi center means that in the process of administration of social public affairs, the government is not the unique subject. Instead, there are a large number of decision making centers, including the central government, local government, non-governmental organizations, private institutions and individual citizens. Under the constraint of certain rules, all the above subjects together exercise the authority as a subject in various forms. The multi centric governance structure requires that in the domain of public affairs, the nation and the society, the government and the market and the government and the public participate together to form a cooperation, consultation and partnership relationship and to form an interactive, at least bi-directional, and, possibly, a multi-dimensional administrative process. In terms of administration of the national public affairs, social public affairs and even internal affairs of the governmental sector, it is necessary to resort to power from multiple parties to assume the responsibility and realize maximization of the public interests.

Cross-boundary governance is the process in which two or more governance subjects, including the government (the central government and local government), enterprises, non-governmental organizations and the civil society, jointly participate in and govern the public affairs based on their pursuit of both the public interests and public value.

## **2. The Path of Water Pollution Governance in Huaihe River in China**

### *2.1 Government Leadership and Inter-governmental Cooperation*

Inter-governmental cooperation is to construct formal or informal cooperation relationship between all administrative governments which are involved in cross-boundary river pollution, with the aim of unite efforts to resolve cross-boundary public problems. This kind cooperation can be conducted between governments at different levels. As a matter of fact, at present, resolution of public problems concerning trans-boundary at home usually involves cooperation and participation of the central government, local governments at the provincial level as well as local governments at the municipal and county level. Inter-governmental cooperation focuses on resolution of problems and is a process the target orientation or action orientation that is advocated in the new public management theory. It requires the administrative officials to take all kinds of measures and adopt different methods and paths to prepare and conduct a series of constructive work. Inter-governmental cooperation can be divided into formal inter-governmental cooperation and informal inter-governmental cooperation. The former is constructed based on protocol and organization, while the latter is constructed based on the personal or team relationship between administrative officials.

Inter-governmental cooperation in water pollution governance in Huaihe River basin mainly has three features, namely, cross administrative division, cross administrative department and cross timeliness. Cross administrative division means that the action of water pollution control needs cooperation between governments at different levels. This not only contains horizontal cooperation between governments at the same level, but also contains longitudinal collaboration between superior governments. Cross timeliness means that river basin pollution governance needs all stakeholders to sustainably concentrate on and respond to the governance within a considerably long period of time. It has been almost two decades ever since the governance of water pollution in Huaihe River in 1995. Even though no crisis event generated by leak of sudden source of pollution has occurred during this period, it is also required that all governmental sectors at all levels input plenty of time and capital for control. Once river pollution all over the world is generated, the cycle of governance is often very long and improvement of water quality also needs relatively long period of time.

Ever since implementation of the water pollution control programming, the “ninth Five-Year Plan” of the Huaihe River, four provincial governments have positively carried out all the tasks in the programming. During the period of governance, all the governments seriously conduct drinking water source protection division and water quality monitoring and formulate emergency plan for pollution of drinking water source. All the areas vigorously carry forward industrial structure adjustment and shut down a multitude of heavy pollution enterprises engaged in chemical fertilizer, papermaking and leather. Shandong Province issues more serious local emission standard for papermaking industry; Henan Province formulates and puts into effect water pollutant emission standard for such industries as papermaking and synthesis ammonia. It formulates water pollution governance technical specifications for such industries as chemical fertilizer, papermaking, leather and sulfuric acid. Jiangsu and Shandong take the lead in evaluating the ecological security of Hongze Lake and constructing artificial wetland in Nansi Lake.

### *2.2 Market Regulation*

Currently, the approach of market regulation for governance of water pollution mainly contains three aspects, namely, pollution rights trading, taxation and regional eco-compensation. The primary aim of market regulation

is to weaken negative externality by means of marketization. From the perspective of economics, the mechanism of market mainly covers price, mechanism, competition and risk control mechanism. This mechanism governs the external behavior of environmental pollution by means of the constraint relationship and effects of such market elements as price, competition, supply and demand, interest rate and risk, etc.

Pollution rights trading is a kind of environmental policy method that applies the market value law and realizes optimal resource allocation by means of pollution rights trading. It mainly has two patterns, inter-governmental pollution rights trading and pollution rights trading between enterprises. Then, it is regional eco-compensation. "In a narrow sense, eco-compensation refers to the general term of a series of activities, including compensation, recovery and comprehensive governance of the damage to the ecological system and natural resources caused by social and economic activities of human kind and of the pollution to the environment. Eco-compensation, in its general sense, also includes the compensation to and policy preference for residential capital, technique and material objects within the areas which lose the development opportunity due to the environmental protection as well as the expenditure on education and scientific research for enhancing the consciousness of the environmental protection and improving the environmental level." (Lv, Zhongmei, 2003) Eco-compensation is a process of internalization of externality. Basin eco-compensation is an important part of the eco-compensation. When the upper basin presents positive externality of water environment, the downstream basin is supposed to compensate the upper stream, whereas the upper basin presents negative externality, the upper stream is supposed to compensate the downstream basin.

### *2.3 Participation by Social Organizations*

The process of water pollution governance of Huaihe River involves participation of a lot of non-profit social organizations, such as, "Huaihe River Defender", "Xinxiang Environmental Protection Volunteers Association", "Friends of Green in Jiangsu Province", "Green Earth Volunteers", and "Friends of Nature" which are some representative examples.

"Huaihe River Defender" is the first non-governmental environmental protection organization across the Huaihe River basin. "The Hope Project to Rescue Huaihe River", an environmental protection project of this non-governmental environmental protection organization, on one hand, makes persistent follow-up survey and supervision on Huaihe River basin water pollution and its governance. On the other hand, this project launches an investigation in the cancer villages and appeals to the whole society to boost and carry out "clean drinking water salvation" and "medical care and health salvation". Huaihe River is characterized by taking root in the first line and taking positive actions, and exposes "all a dream after pollution control for a decade" and "pollution giving rise to the cancer villages". In 2002, it come up with the concept of "development of economy based on human orientation", which has aroused attention of the high level decision making. It also promoted the government to launch the "rural safe drinking water project" and "research on diseases caused by pollution nuisance of Huaihe River".

## **3. Problems Existing in Cross-boundary Governance of Water Pollution in Huaihe River in China**

### *3.1 Dilemma Encountered in Inter-governmental Cooperation*

#### *3.1.1 Lack of Information Sharing Mechanism*

Construction of information sharing mechanism is able to enhance trust of relevant subjects and, furthermore, enhance possibility and effectiveness of cooperation. Currently, water pollution control information (including pollution source, yield of water and quality of water, etc.) between local governments across the Huaihe River basin is merely restricted to construction of partial network within all individual provinces. There has not yet been information sharing formed between different provinces. In the case of basin river water quality monitoring, both horizontal and longitudinal information can't be shared.

#### *3.1.2 Lack of Interest Coordination Mechanism*

All the local governments across the basin have the tendency of going after maximization of their own interests. Interest difference and win-win give rise to competition, exclusion and cooperation between local governments. The pollution costs engaged in disposal of Huaihe River water pollution incorporate construction cost of infrastructure, negotiation cost and supervision cost, etc. According to the current financial system, local government often carries out financial contract system. This means that the pollution discharge expense fees levied by provinces of the upper stream can merely be used for water pollution prevention of the upper stream, rather than for the downstream prevention of water pollution. Seldom is there any capital support of pollution charges for projects of water pollution prevention cross provincial boundaries. In order to realize maximization of their own interests, the local governments either pursue to obtain the maximum value with the least

investment, or attempt to cut down on their costs and expenses. In addition, local governments enhance inputs in water pollution governance, which means basin water resources present overflow of positive externality. It is mainly the downstream areas that benefit from cooperative pollution prevention. Nevertheless, the degree of the benefit is hard to evaluate and it is difficult to share the costs engaged. Due to existence of political tournaments, "all officials internalize the 'overflow effect' of their own behavior in the political tournaments. They regard the 'overflow effect' which is favorable to the competitors as unfavorable to themselves, and they regard what is unfavorable to the competitors as favorable to themselves". (Zhou, Li'an, 2008, pp.250-251) Therefore, it is not at all surprising that the different interests are hard to coordinate.

### *3.2 Defects of the Market Mechanism*

The market mechanism contains quite a lot of modes, such as, taxation, pollution charges and basin eco-compensation. Here, we take eco-compensation in river basin as an example to illustrate problems encountered in the process of its actual operation.

Certain achievements have been made in different degrees when the eco-compensation mechanism in river basin is set up and carried out. Currently, there are mainly the following several problems existing in the eco-compensation mechanism in river basin. In the first place, the nature of eco-compensation in river basin is not explicit. In the second place, eco-compensation in river basin is a government-dominant model and the proportion of the compensation is too large. In the third place, there has not been any complete legal provision concerning the substance and procedure of eco-compensation. At present, the extant legal provisions on ecological compensation in China are relatively scattered, lacking in the compensation subject, object, content, scope and responsibility, etc. Relevant provisions in some individual laws concerning ecological compensation are too principle and abstract. Meanwhile, there are no express terms regarding the content that is concerned with the procedures, such as, the approach of the ecological compensation, the mode, standard and supervision, etc. In terms of administrative penalty, the intensity of penalty is too slight. As a result, some enterprises would rather get fined than shut down. Some individual enterprises directly prepare cash in hand and have no fear that the law-executors directly investigate and penalize them. The interior defect of the market mechanism gives rise to "market failure". Thus, it is unlikely to resolve the problem of pollution prevention by merely the means of marketization.

### *3.3 Insufficient Social Participation*

#### *3.3.1 Insufficient Participation by the Public*

Deficiency of participation by the public is mainly manifested in the following several aspects. First, the channel of participation is deficient. Although some local governments adopt the pattern of questionnaire and interview to organize citizens' feedback opinions, the effect is to little avail. Neither is normalization formed. Currently, the channel for participation of the public in governance of Huaihe River embraces telephone hotline, questionnaire survey and network feedback, etc., which mostly become a mere formality, lacking in credibility. Second is the singleness of information acquisition. Third is lack of an effective organizational carrier. Monitoring on rivers is only confined to "line" and "surface", lacking in "point". Yet, the public is the main force in monitoring of "point". In the "Zero Action" in the year 2003, discovery of a large part of hidden sewage draining exits was owing to the information provided by the nearby residents. However, the problem is that collection and feedback of information from the public has no corresponding organization as a carrier. There is no one to organize collection of the information, and even if the information is collected, there is no way to report the information. This directly constrains the degree of participation of the public in governance of river basin water pollution.

#### *3.3.2 Insufficient Participation by the Enterprises*

In the process of governance of Huaihe River, participation of enterprises along the Huaihe River is insufficient. At the time when modern enterprises seek profits, they also have partial responsibility to protect the environment. Nonetheless, in fact, in the process of governance of Huaihe River water pollution, not only have the enterprises not given full play to their role in protecting the environment, but also they have become a chief culprit for water pollution of Huaihe River. Leaving aside acquisition of pollution disposal facilities, only the one crime of stealing emission and excessive release of waste water exposes unawareness of the enterprises in environmental protection in the process of pollution prevention. For pursuit of personal gains, some enterprises not only pollute surface water, but even resort to high pressure water pump to directly discharge the waste water to underground network of rivers through the mouth of a well, as a result of which the groundwater resources are polluted.

### 3.3.3 Insufficient Participation by Non-profit Organizations

The scale of the large majority of non-governmental organizations is small that engaged in the process of Huaihe River water pollution governance and their power is limited. At present, shortage of human resources and financial resources generally exists in more than ten influential organizations, including “Huaihe River Defender”, “Xinxiang Environmental Protection Volunteers Association”, “Friends of Green in Jiangsu Province”, “Green Earth Volunteers”, and “Friends of Nature”, and so on. Currently, Huaihe River Defender only has nine formal employees. Although there are more than one thousand registered volunteers in this organization, only a few are able to take part in its daily activities. Besides, the phenomenon of shortage of capital exists in “Huaihe River Defender”. Nowadays, insufficient participation of these social organizations in Huaihe River water pollution governance is mainly manifested in the following three aspects. First, the approach to information disclosure is restricted. In addition to website, the organizations, by and large, resort to issuing leaflets and holding career talks and panel exhibition, which only cover a limited amount of people. Second, a mechanism of interaction with local government has not yet been established. Some local governments have no trust in the similar environmental protection organizations and fail to provide necessary policy support, as a result of which the information is unlikely to be shared. Third, as a result of lack in human resources and financial resources, the information monitoring capacity is limited and information sharing between environmental protection organizations is restricted.

As a kind of collaborative governance with multiple subjects, cooperation has been realized between the central government and local governments, between local superior and subordinate governments, between different local governments, between local government and enterprise, between local government and non-governmental organization and the civil society, and an all-around strategic partnership relationship has been established. However, the process of Huaihe River water pollution governance also exposes such a lot of problems as lack of information sharing mechanism, lack of interest coordination mechanism and insufficient participation by the public, etc. This calls for institutional reconstruction of the path of cross-boundary governance so as to realize both the efficacy and efficiency of water pollution governance.

## 4. Re-construction of the Path of Cross-boundary Collaboration Governance of Water Pollution in Huaihe River in China

### 4.1 Re-constructing the Institutional Framework of Cooperation between Local Governments

#### 4.1.1 Construction of Inter-governmental Cooperation Mechanism

##### 4.1.1.1 Construction of Inter-governmental Joint Law Enforcement Mechanism

The aim of joint law enforcement is to overcome the problem of scarce capacity of a single administrative subject in law enforcement. It is generally recognized “joint law enforcement means that two or more administrative subjects with different functions respectively dispatch a certain number of working staff to constitute a temporary law enforcement team or institute to together handle public administration and administrative penalty. This is aimed to resolve the problems that have been accumulated for long as a result of improper law enforcement at ordinary times or other relatively prominent problems.” (Wang, Chunye, 2007)

Joint law enforcement mechanism mainly covers joint inspection mechanism and joint disposal mechanism for water pollution accidents. “The first is joint inspection mechanism. The scope of inspection is mainly the adjacent areas, including the industrial and commercial enterprises which may generate cross-boundary pollution, concentrated sewage disposal works and the water area and watercourse at a junction. The second is joint disposal mechanism for water pollution accidents. Joint disposal mechanism contains three aspects. Firstly, the two governments and environmental protection sections of the adjacent administrative regions have to take the lead in focusing on people’s rights of subsistence and investigating and disposing in time any water pollution accident. Secondly, the cause of an accident has to come out in the wash and the person in charge has to be punished seriously. Thirdly, the masses who suffer from losses have to get compensation.” (Yu, Xijun, 2006) There are some issues to be noticed in constructing basin joint law enforcement mechanism. First and foremost is to provide necessary procedures and specifications for joint law enforcement on water pollution prevention. Secondly, it is to strengthen heterogeneously joint law enforcement and extensively mobilize public security officers and tax administrative organs to join in joint law enforcement. Thirdly, it is to improve the supervision and restriction mechanism. This requires to set up a supervision mechanism including administrative supervision, political supervision, judicial supervision and public supervision to ensure legality and legitimacy of the behavior of joint law enforcement and avoid such improper and even illegal administrative behaviors as abuse and misuse of law enforcement.

#### 4.1.1.2 Construction of Inter-governmental Water Quality Joint Detection System

Construction of cross-boundary water quality joint detection mechanism mainly contains three aspects. The first aspect is to set up an automatic water quality monitoring station at the junction. The monitoring project, location of monitoring and frequency of monitoring are initiated by the superior environmental protection department and determined through consultation by the two environmental protection departments at the junction. The monitoring technical specifications are implemented according to the unified regulations of the State Environmental Protection Administration. The second aspect is for the government to invite a water quality monitoring specialist. The two governments at the river junction jointly invite several water quality monitoring specialists. The monitoring specialists have two major duties. The first duty is to extract water samples, at regular or irregular intervals, at the tributary junction that does not have an automatic water quality monitoring station and deliver the water samples for test in the monitoring station. The second duty is to monitor the up-to-standard release of water polluting enterprises. The government should entrust these monitoring specialists with certain rights, equip them with certain equipment and pay them corresponding rewards. The third aspect is the junction water quality monitoring job carried out by the basin water environmental management department.

#### 4.1.1.3 Construction of Information Sharing Mechanism

Water environment information sharing mechanism in river basin means that various information related to water pollution prevention is shared and exchanged between government environmental protection departments in different administrative regions of the upstream and downstream of the river basin, between relevant functional government departments involved in river basin environmental protection and between the governmental departments and the public. The information involves river basin water quality monitoring data, river basin pollution source distribution, experience and difficulty in river basin environmental protection governance, joint monitoring and joint law enforcement between environmental protection departments, etc.

Several provinces are involved in Huaihe River basin. Thus, construction of information sharing platform and mechanism is not only favorable for a national macro decision-making, but is also beneficial for improvement of efficiency of collaborative governance between local governments and for prevention and resolution of cross-boundary water pollution accidents. At present, construction of information sharing mechanism in Huaihe River basin should take into account the following three levels. The first one is to construct inter-governmental information sharing mechanism, information sharing and interaction between all the administrative regions along the Huaihe River and regional environmental protection administrative institutes, such as, Huaihe River Waster Conservancy Committee, etc. The second one is the trans-departmental information sharing mechanism, namely, information interaction between the departments of the central government and local governments. The third one is the information sharing mechanism between the government and the public.

#### 4.1.2 Construction of Inter-governmental Expression of Interests and Compensation Mechanism

The aim of local government participation in cooperation is to enhance the effectiveness of cross-boundary water pollution governance and to realize the common interests. At the same time, appeal to self-interests constitutes an intrinsic incentive for participation in the cooperation. Thus, at the time when a local government realizes the common interests, it should also give consideration to its individual interests. In the case of Huaihe River water pollution governance, the pollution rights trading and ecological benefit compensation mechanism constitute important content of effective governance of Huaihe River water pollution.

Ecological compensation is a means to resolve economic externality. It originates from forest ecological benefit compensation and has, in the past ten years, been gradually used into water environmental governance domain. It is used to resolve the benefit loss and compensation problem between the upstream and the downstream. Establishment of trans-provincial basin ecological compensation mechanism needs to focus on the following several problems. Firstly, the government takes the lead and the market plays the role of driving. Division of functions and power between the central government and local government should be definite. Governments at all levels should give full play to their leading role in the process of constructing basin ecological compensation mechanism. The policy and legal rule regarding the management model of marketization should be standardized. The public are guided to participate in constructing diversified capital collection modes and market-oriented compensation modes. Secondly, it is to make clear the subjects of compensation, define the standard for compensation and construct diversified compensation modes. Thirdly, it is necessary to set up basin ecological compensation management institute and construct a consultation platform for trans-provincial basin ecological compensation. Longitudinally, the central government is required, at appropriate times, to compensate and stimulate insufficient investment in ecological construction by local government by means of longitudinal transfer payment. Horizontally, it is necessary to establish a horizontal financial transfer payment system to

realize basin resources and interests sharing and basin protection responsibility sharing.

#### 4.1.3 Construction of Local Governmental Cooperation Supervision Mechanism

As local governments generally have interest appeal at a deeper level, sorts of self-serving behaviors may appear in the process of cross-boundary cooperation, which may harm the whole interests of the river basin. Thus, reinforcement on supervision is the key to ensure effective running of cross-boundary governance. Political interests and economic interests are the core interests of the government, so both political constraint mechanism and economic constraint mechanism constitute the cooperative supervision mechanism of the local governments.

Construction of political constraint mechanism is mainly reflected in three aspects. The first is to improve the system of government performance examination. The second is to strengthen administrative accountability. The third is to reinforce supervision of the People's Congress at all levels on behaviors of local governments. Construction of economic constraint mechanism is mainly reflected in the following four aspects. The first is to improve reform of public financial system and establish special funds related to trans-boundary water pollution governance. Fund appropriation has to be cut down on those administrative regions that are incapable of governance by the means of financial transfer payment. On the contrary, extra financial incentives are rewarded. The second is to strengthen the capacity of economic constraint from basin management institutions on local governments. The third is the overall application of such economic means of finance, tax, investment and financing, etc. The fourth is to strengthen the economic constraint between relevant economic divisions and build an inter-regional economic compensation system by signing a covenant or contract so as to consolidate mutual constraints between all regions.

#### 4.2 Strengthening Cooperation between the Government and Market Subjects in Cross-boundary Governance

The basic pattern of cooperation between the government and the market is marketization operation of environmental governance. In the form of a contract, the government or a pollution discharge enterprise and a professional pollution control enterprise reach a sewage disposal protocol. The pollution control enterprise is paid with water pollution disposal expenses, which ensures the pollution control enterprise has the space to make profits. The water pollution control enterprise is guided in terms of segmented integration, scale operation and moderate competition. The pollution control enterprise is entrusted by the pollution discharge enterprise or a government department to contract with and operate construction and running of pollution control facilities as well as pollutant disposal in a professional way.

##### 4.2.1 Innovation of Environmental Governance Model

The government at a provincial level initiatives in establishing a professional governance company. Then, the local governments within the administrative region negotiate on such detailed specifications as capital investment mode, organizational mode and management regulation, etc., to set up a river improvement limited liability company. This company signed a terminable service contract with the government. The local governments within the river basin, as shareholders, hold the board of directors at regular intervals. The performance is assessed in accordance with the service contract. "The pollution discharge enterprises within the river basin are compelled to entrust pollution governance. Through the mode of entrusting the third party (professional pollution control enterprises) to control pollution, the pollution discharge enterprises within the river basin are compelled to entrust pollution governance. That is, pollution discharge enterprises have to sign a contract regarding pollution governance entrusted with a qualified professional pollution control enterprise. The environmental protection department makes a follow-up measurement and approval on the situation of pollution discharge enterprises, ascertain the annual package fess involved in the pollution control entrusted, and supervise that the pollution discharge enterprises pay the pollution control enterprises with the expenses involved in pollution control." (Zhu, Demi, 2010)

##### 4.2.2 Building of the Partnership between the Government and Enterprises

"The production and operation of pollution discharge enterprises have to comply with requirements of the national environmental protection and with stipulations of industrial standards, and execute in strict rotation the up-to-standard release. Relevant functional government departments should enforce the law strictly by examining production and operation of the enterprises at regular intervals and supervising the situation of pollution discharge by the enterprises. Local governments and the enterprises need to enhance mutual trust and build a partnership relationship. The enterprises should attach importance to the environmental protection and formulate carefully and execute in strict rotation emergency plan for environmental pollution accidents. It is necessary to communicate ahead of time with relevant governmental departments if the emergency plan needs any support and assistance from these governmental departments. Requests of the governmental departments

should be responded with great support and cooperation from the enterprises. The purpose of close cooperation between government and enterprise is to diminish and even put an end to damages to the ecological environment and make efforts together for prevention and control and pollution and for protection of the environment". (Ding, Huang & Ye, Hanxiang, 2013)

The enterprises have the responsibility to publicize positively knowledge in environmental protection and enrich publicity of environmental protection by the governmental departments by means of colorful publicity activities. It is also their responsibility to actively take part in environmental protection activities organized by the government. They can support the government by means of dispatching employees, donating funds and offering occasions, etc.

#### *4.3 Reinforcing Participation of the Public and Non-Governmental Organizations in Basin River Governance*

##### 4.3.1 Participation of the Public in Environmental Decision Making and Supervision

"In the first place, it is necessary to build and improve the channels for participation of the public in environmental decision making and maintain the environmental interests of the public. In the second place, the government needs to encourage the masses to report all kinds of environmental pollution behaviors and illegal environmental behaviors, for which certain material incentives will be rewarded. In the third place, it is necessary to invite representatives of the public as a river environment supervisor. Environment agencies at the municipal, district and town level invite representatives of the public to take the post of environmental protection supervisor. The environmental protection supervisor takes the responsibility for supervising the work of environmental agencies at the municipal, district and town levels and reports to the environmental protection department the opinions of the public. In the fourth place, it is suggested to launch mass environmental protection activities at regular intervals by means of government entrusting the community or encouraging the community to train and publicize among community residents environment policies, environmental legislations and environmental protection knowledge in a spontaneous way." (Wang, Yuming, 2012)

##### 4.3.2 Participation of Non-Governmental Organizations in Basin River Governance

The government should gradually transfer partial management items to non-profit organizations to realize public and private cooperation. Non-profit organizations may either assume the duty of the government to publicize environmental protection or replace the government in clean production audit. Clean production audit involves different technical standards and has the features of speciality and technicality. It is a good choice for the functional government departments to send these technical data with strong speciality to non-profit organizations for audit who, in return, report their audit opinions. At the same time, these governmental departments need to lay emphasis on recommendations from the non-profit organizations and encourage these organizations to take part in policy formulation and administrative law enforcement. Non-profit organizations are quite familiar with local economic and social development and the ecological environmental protection and have the right of speech in pertinence and maneuverability of government plans. Therefore, it is better for local governments to invite non-profit organizations and listen to their opinions when they formulate water pollution prevention plans and ecological environmental protection plans and supervise pollution prevention of enterprises, especially when they examine the situation of pollution prevention and control in the enterprises.

## **5. Concluding Remarks**

As a kind of cooperative governance in which multiple participate, the concept of cross-boundary governance has surpassed the narrow localism and offset defects in government governance. This concept has broken away from the reform idea that focuses on government organizational organization and optimization of the flow and has become the mainstream direction in governance development and reform in the future. That is to emphasize establishment of the cooperative relationship between the central government and local governments, to encourage joint actions between local governments, to focus on establishment of the public and private partnership relationship and encourage positive participation by non-governmental organizations and the civil society. This kind of cooperative governance with multiple subjects engaged will become an effective governance instrument in resolving regional problems, promoting regional cooperative governance and realizing regional sustainable development in the current society. Basin water pollution governance needs local governments collaborate with the market subjects, the public and social organizations to set up the new idea of sharing, win-win, teamwork and cooperation based on the value orientation of public interests. Participation of subjects at multiple levels helps to realize cross-boundary governance of water pollution.

## **References**

Ding, H., & Ye, H. X. (2013). On Building Partnerships between Multiple Governing Subjects of

- Cross-boundary Governance: A Case Study of Prevention and Control of Water Pollution in Liangzi Lake in Hubei Province. *Nanjing Journal of Social Sciences*, (1), 63-70.
- Lv, Z. M. (2003). *Surpassing and Conservatism: Innovation of Environmental Law in the Perspective of Sustainable Development*. Law Press China.
- Mao, X. Q, Zhong, Y., & Zhang, S. (2002). Conception, Theory and Mechanism of Eco-compensation. *China Population, Resources and Environment*, (4), 38-41.
- Quan, Y. B. (2014). Analysis on Regional Cooperative Governance from the Perspective of New Regionalism. *Chinese Public Administration*, (4), 78-81.
- Wang, C. Y. (2007). A New Study on Administrative Integrated Law Enforcement. *Journal of Yan cheng Teachers University (Humanities & Social Sciences Edition)*, (3), 28-31.
- Wang, Y. M. (2012). Cooperative Governance of Inter-regional Water Pollution in River Basin – Case Study of Governance of Danshui River in Shenhui. *Journal of Guangdong Institute of Public Administration*, (5), 28-33.
- Yang, Y., & Sun, T. (2009). Study on the Mechanism of Local Government Cooperation in Interregional Environment Governance. *Chinese Public Administration*, (1), 66-69.
- Yi, Z. B, & Ma, X. M. (2009). On Environmental Cooperation Governance towards Industrial Society. *Journal of Social Sciences*, (3), 20-25.
- Yu, X. J. (2006). Efforts to Build the Cooperative Mechanism of Inter-District Water Pollution Prevention. *Statistical Theory and Practice*, (2), 14-16.
- Zhang, C. F., Li, H. C., & Bian, X. H. (2012). Inter-regional Governance: Model, Mechanism and Dilemma. *Chinese Public Administration*, (3), 102-109.
- Zhou, L. A. (2008). *Local Government in Transition - Bureaucrat Incentives and Governance*. Gezhi Press, pp.250-251.
- Zhou, Y. H. (2008). The Dilemma and Solution of Basin Ecological Compensation – Case Analysis of Dongjiang River Basin. *Journal of Public Management*, (2), 79-85.
- Zhu, D. M. (2010). Are Local Government and Enterprises able to Form a Collaborative Relationship of Environmental Management? *The Journal of Shanghai Administration Institute*, (1), 56-66.

### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).