

Problems and Countermeasures of the Groundwater Resource Protection Legislation in China

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Abstract

With the intensified development and utilization of groundwater resources, the pollution has become increasingly serious than before. However, many deficiencies still exist in China's groundwater resource protection legislation. Based on the legal protection status of China's groundwater resources, this article analyzes the problems in the legislation, which include The existing laws and regulations are not systematic, legal system requires to be improved, protection of groundwater resources in rural areas is absent, management system requires to be improved, Scientific and reasonable legal provisions on legal liability are absent, and awareness of protecting groundwater resources needs to be improved. In the end, the author proposes corresponding suggestions for progress: Improve the legal system to protect groundwater resources, develop the scientific and effective legal measures, strengthen the protection of groundwater resources in rural areas, clarify the regulatory responsibilities on groundwater resources, set up strict legal liabilities, and increase incentives to improve the awareness to protect groundwater resources.

Key words: Ground water; Pollution prevention and control; Legal liability; Incentive system

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INTRODCUTION

Groundwater resources take an irreplaceable position in China's national economy and life, and more than half of the water supply in many Chinese provinces and cities comes from groundwater. Groundwater is used to irrigate more than 40% of China's farmland, and for about 70% of the drinking water in the dry northern and northwestern regions. According to Opportunities and Challenges in the Chinese Groundwater Science, a 2009 report sponsored by China's National Natural Science Foundation and China Geological Survey (CGS), part of the Ministry of Land and Resources (MOLR), the past few decades have seen groundwater extraction increasing by about 2.5 billion cubic metres per year to meet these needs. Consequently, groundwater levels of the arid North China Plain have dropped as fast as 1 metre a year between 1974 and 2000, forcing people to dig hundreds of metres to access fresh (Scanlon, 2010). Already, water is scarce for two-thirds of China's 660 cities. And as China's economy expands, so will its demand for water. The country will consume 750 billion cubic metres of water a year by 2030, about 90% of the total amount of usable water resources in the country. With the development of production, the pollution problems in the development and utilization of groundwater resources have become more and more serious, which have seriously affected the survival of human being. Due to the imperfect legislation of groundwater resource protection, inconsistent coordination among various administrative departments and incomplete judicial relief in China, the protection of groundwater resources has become even more difficult.

1. CURRENT LEGAL STATUS OF GROUNDWATER RESOURCE PROTECTION IN CHINA

Groundwater resource protection is an important content of the laws and regulations of groundwater resource

protection in China, and rational development and effective protection of groundwater resources is conducive to the sustainable development of China's production and life. China has set up legal protection for the development and management of groundwater resources from the national and local levels.

1.1 At the National Level

Our country has realized the importance of groundwater resource protection very early. In 1993 the State Council promulgated the *Measures for the Implementation of Water-Taking Licensing System* to specify groundwater exploitation and license application procedures for water-taking; in 1994 the Ministry of Geology and Mineral Resources promulgated the *Groundwater Quality Standard* to specify groundwater quality classification, groundwater quality monitoring, evaluation methods and groundwater quality protection; in 1999 the Ministry of Water Resources issued the *Implementation Details of Conservancy Industry* which provides that, administrative departments of water industry at all levels should give an overall consideration to the groundwater hydrology and water resource supply and demand, stipulate the minimum control level, develop protection plans for overdraft areas, delineate no-taking zones and restricted taking zones, and take measures to prevent water depletion and other adverse effects. For groundwater resources for drinking, all areas should take effective measures to protect and ensure water security; the 2002 *People's Republic of China Water Law* (hereinafter referred to as the *Water Law*) and the 2008 *People's Republic of China Water Pollution Prevention Law* (hereinafter referred to as the *Water Pollution Prevention Law*) explicitly integrate groundwater resources into their regulatory scopes, and make relevant provisions on groundwater development, use, protection and pollution prevention. In 2011 the State Council approved the *National Groundwater Pollution Prevention Plan (2011-2020)*, which further clarifies China's determination and confidence to strengthen groundwater resource protection and to effectively control groundwater pollution. In China's 12th five-year plan and the report of the 18th Chinese Communist Party National Congress, the construction of ecological civilization has been placed into an important position, and the establishment and improvement of a most stringent water management system has also become a center of environmental protection. Thus, China's water resource management and groundwater resource protection have always held a positive attitude and taken practical acts.

1.2 At the Local Level

China is a country with vast territories and abundant resources. The resources vary widely in different regions, and the management approaches to develop and utilize groundwater resources also vary vastly due to the geographic, economic and technological factors.

Currently, the management measures to develop and utilize groundwater resources have only been established in Xinjiang Uygur Autonomous Region, Inner Mongolia Autonomous Region, Liaoning Province, Yunnan Province and Shanxi Province, and most of the provinces and municipalities have included groundwater development and management into their regional water resource management regulations. Some provinces have developed their regional approaches to manage groundwater in urban areas, such as Henan Province and Hebei Province, but it has been more common for large and medium-sized cities to develop the regional groundwater management measures, which is closely related with the local geological features and administrative enforcement strength. It cannot be ignored that China's many areas in serious water shortage, such as Gansu Province, Ningxia Hui Autonomous Region, Qinghai Province and other places, have not yet developed high level of rules and regulations in groundwater exploitation. Therefore, it can be seen that the formulation of groundwater management measures have no absolute positive correlation with a region's economic development and resource geological distribution, but has a close relation with the region's recognition degree to resource protection.

2. THE PROBLEMS IN CHINA'S GROUNDWATER PROTECTION LEGISLATION

Groundwater accounts for one-third of the water resources in China and is indispensable for water supply and ecological support in many areas, especially in North China. But unreasonable groundwater development has caused some serious geo-environment problems such as land subsidence, surface collapse, and seawater intrusion. Moreover, groundwater has been polluted by industrial, domestic and agricultural activities. Groundwater monitoring in China started in early 1950's and a fundamental network of 23,800 monitoring wells in national level, provincial level and local level combined with the corresponding ground water monitoring and research institutes has been established. It distributed in the 31 provinces or regions controlling nearly 1 million square kilometers. The national monitoring institute and the provincial counterparts have successively set up the groundwater database. Framework of data collection, transmission, analysis, and information release has been established. Auto-monitoring of groundwater and real-time data transmission is in trial in 3 pilot areas. System of hierarchical management and information release of monitoring data is on the way to be sophisticated (Zhou & Li, 2006).

Although China has realized the importance of groundwater protection very early and the national and local governments have introduced a series of laws

and regulations in this regard, groundwater protection in the existing legal framework has been beset with difficulties due to the overall shortage of water resources, unreasonable water development and utilization, underdeveloped technologies and other reasons.

2.1 The Existing Laws and Regulations Are Not Systematic

The existing laws and regulations of groundwater protection are scattered in the *Water Law* and *Water Pollution Prevention Law*. The *Water Law* has only made provisions on groundwater exploitation control, hydrogeological hazards, groundwater taking permits and paid use system, etc., and the *Water Pollution Prevention Law* has only involved pollution prevention in groundwater construction, pollution prevention in groundwater infiltration, pollution treatment responsibilities and other simple regulations. The two laws have only an overlap in terms of groundwater construction, namely it is necessary to ensure water volume as well as prevent contamination during the process of groundwater construction and development. Specialized management measures and related regulations at the local level are not many, which are in lower legislative level and lack an overall consideration in balanced development among regions. The lack of systematization and coordination results in the over-exploitation of regional groundwater resource, dropped the water level, serious pollution and destroyed the overall water balance in China. China has begun to rebuild its groundwater legal system, and part of this process has been to pass a great number of new statutes. If these laws are widely considered and interpreted, they will have positive effects. There is, however, the danger of having too many statutes and not enough wisdom. We have too many laws but too little enforcement. As a Chinese proverb holds, “the more laws are promulgated, the greater the number of thieves.” Passing statutes are not a substitute for devoting resources to capacity-building in terms of the personnel and institutions needed for a “rule of law” to develop in China. A similar risk may appear in a Chinese tendency to criminalize conduct rather than to focus on systemic changes.

2.2 The Legal System Requires to Be Improved

Groundwater exploitation has its own unique character, and irrational exploitation will cause land subsidence, seawater intrusion and other serious ecological problems. Therefore, the legal system of groundwater resource protection is not entirely equal to surface water, but should firmly implement the precautionary principle and take preventive measures at the source. China lacks appropriate regulations in groundwater resource evaluation system, which caused widespread disruptive behaviors in the development and utilization and serious threats to groundwater resource balance. Groundwater

artificial recharge system is an effective technique to restore the decreased water level in groundwater overdraft areas. Although the *Water Pollution Prevention Law* and its implementing regulations have made corresponding provisions on the water quality in groundwater artificial recharge, the provisions don't meet the requirement of artificial recharge system and make it more difficult in practice (Lan, 2011). In addition, legal system is lack of public participation. The *Water Pollution Prevention Law* accept public participation is an fundamental principle, but no legal regimes and procedural law prescribed it clearly enough, this defect of law has caused many disadvantages in practice, such as the public do not have access to get relevant information until the project has been completed; the interest party do not be consulted when the project take environmental impact assessment; that's made people difficult to find the way to implement their environmental right.

2.3 Protection of Groundwater Resources in Rural Areas Is Absent

Water in rural areas, especially water for agricultural production accounts for a significant proportion in China's total water consumption. In some areas in lack of surface water or with inadequate agricultural conservancy facilities, groundwater has become a major source of agricultural production. The use of fertilizers and pesticides in agricultural production, sewage discharge, improper reclamation and deforestation can also cause varying degrees of pollution and destruction to groundwater resources. Throughout China's existing legal system, we can find there are few laws and regulations for groundwater protection in rural areas, which affected our work to extensively protect groundwater resources in rural areas and to effectively control all kinds of destructive exploitation and groundwater pollution (Wang et al., 2011).

2.4 Management System Requires to Be Improved

In China, groundwater resources have been jointly managed by people's governments and water administration departments at all levels. On the one hand, based on administrative division, local people's governments above the county level have uphold the principle of integrated and coordinated development, established rational plans to develop and utilize groundwater and taken effective measures to prevent groundwater contamination. On the other hand, water administrative departments at all levels have worked to maintain a reasonable level of groundwater, to supervise and manage the rational groundwater development and utilization (Zhu, 2003). However, the actual management power of urban groundwater is in the hands of urban construction departments. Such a mechanism of coordination and cooperation among various departments

is conducive to the protection of groundwater resources, but due to the absence of clear provisions in relevant laws and regulations on the specific duties and authorities of local people's governments at all levels, water administration departments and urban construction departments, adverse phenomena such as unclear responsibilities, struggles for power, prevarication and the like exist in practice, reducing the actual operability of the laws and affecting the smooth progress of the groundwater resource protection.

2.5 Scientific and Reasonable Legal Provisions on Legal Liability Are Absent

The legal liabilities for the destruction of groundwater resources have been regulated in the "legal liabilities" parts of the *Water Law* and *Water Pollution Prevention Law*, which list some prohibitions to groundwater pollution, but are apparently not enough to cover all groundwater polluting behaviors. Furthermore, the existing laws impose the fines only up to 100,000 yuan without more stringent penalties, which cannot achieve the purpose of restraining polluters from destroying groundwater and cannot effectively prevent the emergence of new polluters. Protection of groundwater resources falls into a strange cycle of "low law breaking cost, but high law compliance cost".

2.6 Awareness of Protecting Groundwater Resources Needs to Be Improved

Based on the legislation of groundwater protection in many areas and the current situation of groundwater development and utilization, it can be found that Chinese people's awareness to protect groundwater resources still needs to be improved. Despite some provinces, cities and regions have established many rules, regulations and management measures on groundwater resource protection, legislation in many areas is still a blank. In order to compete against economic interests, a number of local governments connive at enterprises' uncontrolled exploitation of groundwater resources, resulting in a lot of serious cases of groundwater pollution. Since China is focusing on exploiting shale gas now, we should take an objective view to the groundwater pollution in the shale gas development in the United States, and take measures to prevent the recurrence of such tragedies in China.

3. IMPROVEMENT OF CHINA'S LEGISLATION IN GROUNDWATER PROTECTION

With the deepen exploitation and utilization of groundwater resources, the improvement of relevant laws and regulations has become an important means to protect groundwater resources and maintain ecological balance.

Sound legal norms not only enable us to use resources correctly and rationally, but also enable our country to get on the right path of sustainable development.

3.1 Improve the Legal System of Groundwater Resource Protection

The establishment and improvement of a sound legal system of groundwater resource protection is the premise and basis to exploit groundwater resources rationally and fulfill the strategy of sustainable development. For the current situation of groundwater resources in China, we should refer to the *Water Law* and *Water Pollution Prevention Law*, establish special groundwater pollution prevention laws, specify the legal principles and legal systems of groundwater exploitation systematically, establish a series of scientific and rational groundwater development and utilization standards, and form a regulatory system of whole process. Different areas can develop their local laws and regulations more stringent than the national groundwater pollution prevention laws based on their own characteristics, and form a vertically deepen and horizontally extended legal system of groundwater resource protection. In addition, Funding of state and local groundwater management programs is often a challenge, we should set up a national institution responsible for groundwater funds management.

3.2 Improve Laws and Regulations to Protect Groundwater Resources

Completed laws and regulations are in favor of strengthening the operability of legal system in practice. In order to protect groundwater resources, we should establish and improve a groundwater resource evaluation system. Groundwater resource evaluation system refers to the comprehensive analysis, calculations and reasoning on the values and economic benefits of groundwater quality and quantity under certain natural and artificial conditions (Lin et al., 2011). Although groundwater resource evaluation system has been referred in the *Water Law*, it has not been elaborated and thus should be improved and supplemented to provide a scientific basis for the rational development of groundwater resources. Groundwater resource evaluation should include the following aspects: Firstly, groundwater quantity evaluation; secondly, groundwater quality evaluation; thirdly, exploitation technology evaluation; fourthly, environmental benefit evaluation; fifthly, protective measure evaluation. On the basis of the evaluation of the quality, groundwater can be classified into drinking water, industrial water and agricultural production water for differentiated protection, and above all, the source of drinking water should be included into China's drinking water protection framework for strict protection.

Ecological compensation mechanism is to protect the environment, the promotion of harmony between man and nature, according to the value of ecosystem

services, ecological conservation costs, development opportunity cost, comprehensive use of administrative and market means to adjust environmental protection and construction related parties with an interest in environmental and economic policies. It focus on regional ecological protection and pollution prevention field, is an economic incentive, and “the polluter pays principles” of coexistence, based on the “beneficiaries paid and predators billing” principles of the environmental and economic policies, it’s helpful to enhance people’s awareness and raise environment protection funds. Establish this mechanisms in China is carrying out scientific development concept of important initiatives, promote groundwater protection work to adopt administrative measures to implement from the primary to the general legal, economic, technical and administrative means, to promote the sustainable use of groundwater resources, and to speed up the construction of environmental-friendly society.

Groundwater artificial recharge system is an important means to restore groundwater resources, which not only play a role in supply, but also improve groundwater quality, prevent seawater intrusion and maintain soil stability. China should make detailed provisions on groundwater artificial recharge system, clarify the prerequisites for implementation, clarify requirements of recharged water quality, selection of recharge sites and monitoring issues. It’s required to plan artificial recharge systems as an alternative of an emergency plan before the development and utilization so as to provide against the future.

3.3 Strengthen Groundwater Resource Protection in Rural Areas

We should set up special environmental regulatory authorities in rural areas, equip them with enforcement power to facilitate groundwater management and protection. China has long operated a ‘Polluter Pays Principle’ when it comes to environmental pollution. However, in the past, local governments may hesitate when it came to enforcement as the polluting enterprises may have been large taxpayers. But in the face of monumental public discontent and central government direction, some vested interests are side-stepped as provincial governments appear to be stepping up its anti-pollution drive. In cooperation with the specialized agencies and local water administrative departments, we should investigate rural groundwater status regularly, find out the situations of the exploitation, utilization, pollution and destruction in China’s rural areas. We should develop practical and effective provisions and measures, strictly supervise and control groundwater exploitation due to the needs of rural production and living, and prevent all kinds of pollution and excessive exploitation of groundwater resources. We should take precaution measures to the regions with a high incidence of pollution, avoid spread

and work on remediation in the places where pollution have occurred, improve the rural water conservancy facilities, properly utilize surface water and groundwater, rationally allocate groundwater resources in rural areas, make greater water saving efforts, promote drip irrigation, subsurface irrigation and other technologies, improve the farmers’ awareness of water saving and guide them to exploit and use groundwater resources economically and rationally.

3.4 Clarify the Responsibly in Supervising Groundwater Resources

Enhancement of administrative management and supervision is an important way to strengthen groundwater protection. Local people’s governments at all levels should fully understand the dangers of groundwater contamination and the urgency of remediation, should include groundwater resource protection into the region’s sustainable development strategy and the agenda of improving the ecology and environment. We should appropriately expand the power of environmental authorities, giving them effective supervision power, decision-making power and necessary administrative enforcement power. For the projects which do not meet the requirements of groundwater protection, we must not approve and take environment as the priority in groundwater resource protection. At present, China has no national groundwater management authorities. We should establish groundwater management authorities at the national, provincial and municipal level to unify groundwater planning, management and protection. In the regions with serious overexploitation and pollution, we should set up special groundwater management institutions and give them practical and effective administrative enforcement power.

3.5 Identify Liabilities and Increase Incentives

For the behaviors polluting and destroying groundwater resources, we should strictly implement the principle of “those who cause pollution have to curb the pollution; those who protect the environment will benefit from it”, combine civil liability, administrative liability and criminal liability, fully play the deterrent force of legal liability, and appropriately increase the ways to fulfill legal liability, such as restoration, compensation and the like. We should appropriately lift the upper limit of compensation for pollution damages, include indirect losses into the scope of compensation, and stipulate corresponding ecological compensation to make polluters pay for their actions. We should change the current situation of “low law-breaking cost but high law-compliance cost”, introduce incentives, give financial or tax incentives to the companies or individuals who can make timely remediation to contaminated groundwater or implement water saving technology, so as to promote groundwater protection in the whole society.

3.6 Enhance the Awareness of Protecting Groundwater Resources

We should strengthen public education and popularize the knowledge of groundwater protection. We need to pay close attention to the development of groundwater resource management and protection laws, rules and regulations, continuously improve the people's legal awareness, strengthen public participation, and make greater efforts in legal supervision and management. We should improve administrative officers' awareness to administrate in accordance with law and to enforce law strictly. For the assessment of administrative departments and administrative staff, we should take green GDP as one of the assessment items to avoid the reoccurrence of attracting foreign investment in pursuit of economic interests but at the expense of environment.

Everyone can and should do something to protect groundwater. For starters, 99% of all available freshwater come from aquifers underground. Being a good steward of groundwater just makes sense. Not only that, most surface water bodies are connected to groundwater so how you impact groundwater matters. Furthermore, many public water systems draw all or part of their supply from groundwater, so protecting the resource protects the public water supply and impacts treatment costs. If you own a well to provide water for your family, farm, or business, groundwater protection is doubly important. As a well owner, you are the manager of your own water system. Protecting groundwater will help reduce risks to your water supply.¹

CONCLUSION

Because excessive development of groundwater resources and drainage of underground mining activities, groundwater contamination is intensifying and groundwater environment is deteriorating over a large area of China. This is threatening human being and endangering social public-safety. It is now stringent to strengthen the protection of groundwater resources and remediation of the ecological environment. China's fresh water reserve has declined sharply and groundwater has become an important resource for maintaining people's daily lives. In order to maintain social stability and economic development, China is in an urgent need to improve the relevant laws and regulations,

strengthen the operability of the legal system to protect groundwater resources better, in order to manage and safeguard groundwater resources scientifically and utilize groundwater resources more rationally.

Environmental protection and economic development are dialectical unity, mutual contradiction, and unity of opposites. Some area in China forced to trade unemployment for environmental pollution, to exchange a shrinking local economy to toxic dump. Expense the environment for development is very common in China. The related laws and policies usually ignored the environment. In other words, economy-wide reforms designed to promote growth have been encouraged with little regard to their environmental consequences. For example, particularly in the early stages of economic development pushed by the government, increased pollution is considered as an acceptable side effect of economic growth. However, when a country has attained a sufficiently high standard of living, the government should give greater attention to environmental amenities. This leads to necessary for the protection of the environment.

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