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Recovering the Costs of Water Services in the People's Republic of China: Lessons from Article 9 of the European Union Water Framework Directive

Liping Dai*

1. Introduction

The cost recovery of water services, as a central target of the European Union's Water Framework Directive (WFD), is becoming known as an important element for water management internationally. A simple explanation of the cost recovery of water services might read: to recover all of the costs associated with a water system, programme or service to ensure long-term sustainability.¹ Some 12 years have passed since the adoption of the WFD,² and the success of this comprehensive directive is visible today, and many water managers from non-EU countries aspire to have something like the WFD in place.³ For the People's Republic of China (PRC), which has grown rapidly during the past 30 years, water is increasingly one of the most limiting factors in social development at the current stage; the issue of water pricing is seen as being of central importance in water sector reform,⁴ the Central Government of the PRC has sent several delegations to Europe to learn how the WFD works and, in the meantime, there is also some interest from Europe in how the PRC manages its water resources. But few studies have paid attention to comparing the EU and the PRC in terms of recovering the costs for water services.

Against this background, this article provides a comparison of the backgrounds and contents of costs recovery for water services in the related articles of the WFD – specifically, Article 9 – and the current regime in the PRC. The main research questions – what the shortcomings of the costs recovery for water services-related systems in the PRC are and what lessons the PRC can learn from the WFD – will be answered from a legal point of view. It will be of interest to legal scholars, policy and decision-makers and interested members of the public.

This is a comparative study to analyze the differences and similarities in recovering the costs of water service systems between the two regimes of the European Union (EU) and the PRC and to look for legal solutions in the European framework that can be useful for the PRC. A comparative approach will be adopted in this study. The relationship between the EU and its Member States in water management and Article 9 of the WFD will be introduced first (Section 1), and then I will describe water management in the PRC (Section 2), and, following the introductory comments, Article 9 will be separated into three

* Ph.D. candidate at the Institute for Constitutional and Administrative Law, Utrecht University School of Law, Utrecht (the Netherlands), email: l.dai@uu.nl. Thanks are owed to Prof. H.F.M.W. van Rijswijk; without her, this article could not have been completed.

1 R. Cardone & C. Fonseca, *Financing and Cost Recovery*, 2003, p. 15.

2 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327, 22.12.2000, p. 1.

3 K. Falkenberg, 'The EU Water Framework Directive-Aspirations and Lessons learned', 2010 *Stockholm Water Front*, no. 2, pp. 10-11.

4 L. Zhong & A.P.J. Mol, 'Water Price Reforms in China: Policy-Making and Implementation', 2009 *Water Resources Management* 24, no. 2, pp. 377-396.

parts for discussion purposes: water services (Section 3), cost recovery (Section 4) and the meaning and the role of the polluter pays principle (Section 5). In each part, the corresponding content of Article 9 will first be addressed, followed by the situation in the PRC. After each comparison, a brief comment will be given. An overall conclusion will finally be provided.

2. Water management policies in the European Union and the Water Framework Directive

2.1. The relationship between the European Union and the Member States

The EU, which is made up of 27 Member States,⁵ is neither a regular international organization nor a federal state.⁶ It operates through a system of supranational independent institutions and intergovernmental decisions by the Member States.⁷ There are seven institutions in the Union: the European Parliament, the European Council, the Council, the European Commission, the Court of Justice of the European Union, the European Central Bank and the Court of Auditors.⁸ See Table 1.

Table 1 The function of the institutions of the European Union

<i>Institutions</i>	<i>Functions</i>
<i>The European Parliament</i>	<ul style="list-style-type: none"> • Debating and passing European laws, together with the Council • Scrutinizing other EU institutions, particularly the Commission, to make sure they are working democratically • Debating and adopting the EU's budget, together with the Council
<i>The European Council</i>	<ul style="list-style-type: none"> • Setting the EU's general political direction and priorities • Dealing with complex or sensitive issues that cannot be resolved at a lower level of intergovernmental cooperation
<i>The Council</i>	<ul style="list-style-type: none"> • Passing EU laws • Coordinating the broad economic policies of EU Member States • Signing agreements between the EU and other countries • Approving the annual EU budget • Developing the EU's foreign and defence policies • Coordinating cooperation between the courts and police forces of Member States
<i>The European Commission</i>	<ul style="list-style-type: none"> • Proposing new laws to Parliament and the Council • Managing the EU's budget and allocating funding • Enforcing EU law (together with the Court of Justice) • Representing the EU internationally, for example, by negotiating agreements between the EU and other countries
<i>The Court of Justice of the European Union</i>	<ul style="list-style-type: none"> • Interpreting EU law to make sure it is applied in the same way in all EU countries • Settling legal disputes between EU governments and EU institutions
<i>The European Central Bank</i>	<ul style="list-style-type: none"> • Keeping prices stable (keeping inflation under control), especially in countries that use the euro • Keeping the financial system stable – by making sure that financial markets and institutions are properly supervised
<i>The Court of Auditors</i>	<ul style="list-style-type: none"> • Auditing EU finances

5 The European Union is composed of 27 Member States: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom

6 H.F.M.W. van Rijswijk & A.M. Keessen, 'Legal Protection of the Right to Water in the European Union', in F. Sultana & A. Loftus (eds.), *The Right to Water: Politics, Governance and Social Struggles*, 2011, pp. 123- 138.

7 Article 2 (7) of the Treaty of Amsterdam Amending the Treaty on European Union, the Treaties Establishing the European Communities and Related Acts, 1997.

8 Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, 2009, Part Six, Institutional and Financial Provisions.

The European Union is based on the rule of law.⁹ There are three very familiar legal instruments at the EU level which were listed in Article 288 of the Consolidated Version of the Treaty on the Functioning of the European Union (ex Article 249 TEC): the regulation, the directive and the decision.

The regulation has general application, is binding in its entirety and is directly applicable in all Member States, which does not need to, in fact is not allowed to, be transposed into national law.

The directive is binding, as to the result to be achieved, upon each Member State to which it is addressed, but leaves it to the national authorities to choose the form and methods for achieving this result. The most important feature of directives is that, to be fully effective in the national legal order, they must be transposed into the national legal order by means of national implementing legislation.¹⁰

The decision is binding in its entirety upon those to whom it is addressed, both Member States and individuals alike.

The relationship between EU law and the national law of the Member States is one of interaction, but not only with a top-down influence. When one looks, for example, at Dutch and European water law, one can see a strong interaction between the two legal systems.¹¹ New European developments are generally in keeping with Dutch water management, even if the mandatory nature of European law does not always marry well with Dutch administrative culture.¹² For example, water in the Netherlands has from time immemorial been managed on the basis of water system elements, which is basically the same underlying principle as the river basin approach to water management.¹³

2.2. Water-related policies in the European Union

The three largest river basins in Europe are: the Danube (817,000 km²), the Vistula (194,000 km²) and the Rhine (185,000 km²), which together drain approximately a quarter (27%) of the EU-27 territory.¹⁴ Initially, the protection of the environment was not an explicit objective of the European Community (as the European Union was then called);¹⁵ it was not until 1972 that the Community became active in environmental protection, and a number of framework directives, especially for water and waste, were decided during the period between 1973-1982.¹⁶ The first environmental directives concerned the prevention of surface water pollution and concerned detergents – which were found in washing products, for example, and caused foam on surface water – and a method for controlling the biodegradability of surfactants.¹⁷ In 2000, with a new approach to water management, the WFD was adopted and it must be placed somewhere near the ‘high-water mark’ of European Union environmental legislation due to its many innovative features and general ambitious objectives.¹⁸

2.3. The Water Framework Directive and the content of Article 9

The WFD was published in 2000 (2000/60/EC) and functions as a major framework for the protection of water policies in Europe, both as regards surface waters (rivers, lakes, transitional waters, coastal waters), and groundwater.¹⁹ Its purpose, according to Article 1, is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater. This directive is the first European directive which explicitly points to the use of economic instruments in the field of water policy.²⁰

9 W.T. Eijssbouts, ‘In Defense of EC Law’, in T.A.J.A. Vandamme & J.-H. Reestman (eds.), *Ambiguity in the Rule of Law*, 2001, pp. 35-50.

10 J.H. Jans et al., *Europeanisation of Public Law*, 2007, p. 11.

11 H.F.M.W. van Rijswijk, ‘Interaction between European and Dutch Water law’, in S. Reinhard & H. Folmer (eds.), *Water policy in the Netherlands, Integrated Management in a Densely Populated Delta, Issues in water resource policy*, 2009, pp. 204-224.

12 H.F.M.W. van Rijswijk & H.J.M. Havekes, *European and Dutch Water Law*, 2012, p. 97.

13 H.F.M.W. van Rijswijk & H.J.M. Havekes, *European and Dutch Water Law*, 2012, p. 97.

14 J. Eldridge & C. Europa, *Life and Europe's rivers: Protecting and improving our water resources*, 2007.

15 H.F.M.W. van Rijswijk & H.J.M. Havekes, *European and Dutch Water Law*, 2012, p. 94.

16 Ch. Hey, ‘EU Environmental Policies: A short history of the policy strategies’, in S. Scheuer (ed.), *EU Environmental policy handbook*, 2005, p. 20.

17 H.F.M.W. van Rijswijk & H.J.M. Havekes, *European and Dutch Water Law*, 2012, p. 95.

18 W. Howarth, *Cost recovery for water services and the polluter pays principle*, 2009, pp. 565-587.

19 Y. Uitenboogaart et al., *Dealing with Complexity and Policy Discretion, A Comparison of the Implementation Process of the European Water Framework Directive in Five Member States*, 2009, p. 11.

20 A. Jolink, *Legal Implications of Introducing Economic Instruments in the Field of European and Dutch Water Management*, 2010, p. 2.

The directive, in itself, does not contain detailed regulations on policy objectives for each water system, nor does it exactly prescribe specific policy measures to be taken.²¹ It gives more freedom to the Member States as to how they will transpose the directive into their national orders by means of national implementation legislation.

Article 9 of the WFD specifically points to the use of economic instruments in order to guarantee the efficient use of water resources:²²

‘Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs with regard to the economic analysis conducted according to (...) and in accordance in particular with the polluter pays principle.’

Several elements can be extracted from this article, they are:

- water services;
- cost recovery;
- the polluter pays principle.

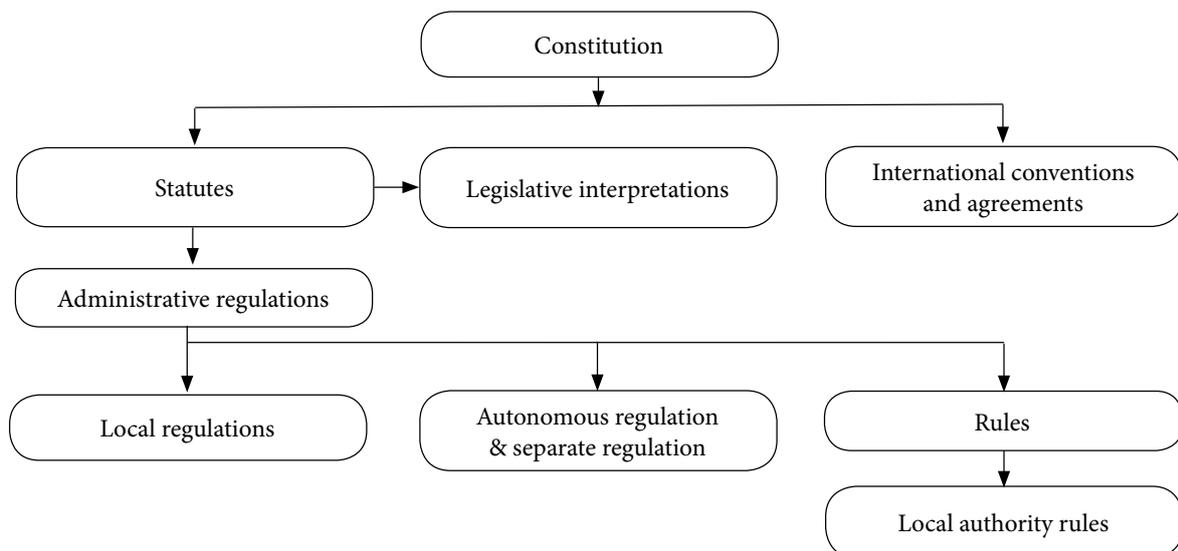
These contents will be discussed below (Sections 3-5).

3. The water management system in the People’s Republic of China

Analyzing how water management is arranged is a key element for exploring water price policies. Before we address this question, the legal hierarchy of the People’s Republic of China (hereinafter PRC) and the legal arrangements for water management will be explained in the first place by providing the reader with some basic information about Chinese law and an overview of the legislative status of water resources in the PRC.

3.1. Legal hierarchy in the People’s Republic of China

Figure 1 Legal hierarchy in the PRC



21 Y. Uitenboogaart et al., *Dealing with Complexity and Policy Discretion, A Comparison of the Implementation Process of the European Water Framework Directive in Five Member States*, 2009, p. 11, although Article 11 WFD contains a list of mandatory measures.

22 A. Jolink, *Legal Implications of Introducing Economic Instruments in the Field of European and Dutch Water Management*, 2010, p. 8.

According to the Legislation Law, there are five ranks of legal documents in the PRC. The Constitution, which has been made by the National People's Congress, is the highest ranking legal document in the PRC, followed by statutes, legislative interpretations and international conventions and agreements. Administrative regulations, which are made by the State Council, rank as third, and they are drafted according to the Constitution and statutes.

There are five autonomous regions in the PRC, which have the right to adopt their own regulations and separate regulations in their administrative fields according to local political, economic and cultural characteristics. The ranking is the same for local regulations which are made by the people's congresses and their standing committees of provinces, the organs directly under the State Council with administrative functions which may formulate the rules within the limits of the competence of their own departments, so that rules, local regulations, autonomous regulations and separate regulations remain at the same level. The last are local authority rules which are adopted by the governments at the provincial level (Figure 1).

3.2. Legal arrangements for water management in the People's Republic of China

Since the Open and Reform Policy was adopted in the PRC in 1978, the state has promulgated a series of laws and regulations to regulate water management. They cover almost every aspect of water management from strategic planning and water quantity management to water quality control.²³ I will only list some statutes and regulations which relate to the water supply and water pricing, see Table 2 below.

Table 2 Laws relating to water management

Hierarchy	Title	Year	Purpose
The Constitution	The Constitution	Adopted in 1982 and amended in 1988, 1993, 1999, and 2004	It defines the basic system and basic tasks of the state in a legal form; it is the fundamental law of the state and has supreme legal authority. It states that the waters are owned by the state, and the state ensures the rational use of natural resources.
Statutes	Prevention and Control of Water Pollution Law	Adopted in 1984 and revised in 1996, 2008	1) To prevent and control water pollution, 2) to protect and improve the environment, 3) to maintain the safety of drinking water, and 4) to promote sustained economic and social development.
	Environmental Protection Law	Adopted in 1989	1) To protect and improve the living and ecological environment; 2) to prevent and control pollution and other public hazards; 3) to safeguard human health; and 4) to facilitate the development of socialist modernization.
	Water Law	Adopted in 1998 and revised in 2002	1) To undertake the rational development, utilization, saving and protection of water resources; 2) to prevent and control water disasters; 3) to conduct the sustainable use of water resources; and 4) to meet the needs of national economic and social development.

23 Peng Shugang, 'China's Legal System for Water Management: Basic Challenges and Policy Recommendations', 2010 *International Journal of Water Resources Development* 26, no. 1, pp. 3-22.

<i>Hierarchy</i>	<i>Title</i>	<i>Year</i>	<i>Purpose</i>
Administrative regulations	Regulations on Urban Water Supply	Adopted in 1994	1) To strengthen the management of the urban water supply; 2) to boost the development of water supply enterprises; 3) to protect water for human consumption, production and construction.
	National Guidelines on Water Tariffs	Adopted in 1998, it is currently being revised	1) To standardize the price of the urban water supply; 2) to protect the legal rights and interests of the supplier and consumer; 3) to boost the development of water supply enterprises; 4) to protect and save water resources.
	Regulations on the Management of Pollutant Discharge Fees and their Collection and Usage	Adopted in 2003	To improve the management of pollutant discharges, fee collection and usage.
	Regulations on the Management of Water Abstraction Permits and Water Resource Fee Collection	Adopted in 2006	1) To enhance the management and protection of water resources; 2) to improve the saving of water resources; and 3) to explore and utilize such resources reasonably.
Rules	National Guidelines on Urban Water Supply Tariffs	Adopted in 1998 and revised in 2004 (is currently being revised)	1) To standardize urban water supply prices and to protect the legal rights and interests of both the water suppliers and water users; 2) to develop urban water supply businesses and to save and protect water resources.
	Rules on the Management of Standards of Pollution Discharges and Fee Collection	Adopted in 2003	To standardize the management of pollution discharges and fee collection.
Local regulations	Local regulations and local authority rules will not be listed here.		

3.3. Institutional arrangements for water management in the People's Republic of China

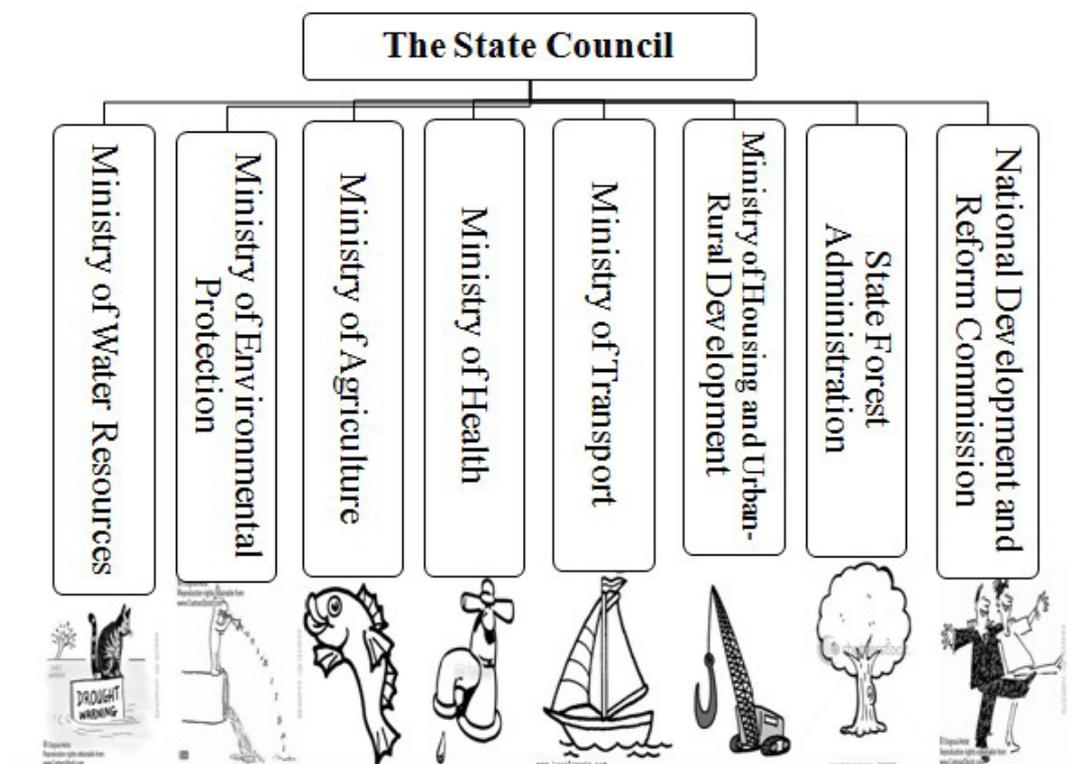
There are about 50,000 rivers with an area larger than 100 km² in the PRC, among which more than 1,500 rivers cover an area larger than 1,000 km². Most rivers are distributed over the eastern and southern part of the PRC. The total basin area of the rivers flowing into the sea accounts for $\frac{2}{3}$ of the total area of Chinese territory, and the remaining $\frac{1}{3}$ belongs to the inland river basins.²⁴ Seven river basins are considered as the major ones in the PRC: the Yangtze, Yellow, Songhua, Pearl (Zhu Jiang), Huai, Liao, and Hai Rivers.

The co-operative management approach has been adopted among different administration bodies in water management in the PRC. Let us take the management of national key rivers and lakes for example (Figure 2). There are more than 40 departments directly governed under the State Council, among which at least eight ones are related to water management. The Ministry of Agriculture is responsible for irrigation, fisheries and environmental water and non-point source pollution control; the Ministry of Health is responsible for the safety of national drinking water, while other departments are responsible for different aspects of water use: the Ministry of Transport is concerned with inland navigation. The Ministry of Housing and Urban-Rural Development is responsible for the construction and manage-

24 Zhang Hai-Lun & Wen Kang, 'Flood Control and Management for large rivers in China', <http://www.unescap.org/enrd/water_mineral/disaster/flood%20china.doc> (last visited 10 March 2012).

ment of water supply projects, drainage and sewage disposal projects. The State Forest Administration protects against soil erosion, while the National Development and Reform Commission cooperates with other departments when comprehensive river basin plans are made.

Figure 2 Water resources management system in the PRC



Among these departments the Ministry of Water Resources and the Ministry of Environmental Protection play the most important roles. The former is responsible for overall water management across the country; it delegates the management to seven River Basin Commissions which are responsible for the daily administration of water management within their own fields. The Ministry of Environmental Protection is responsible for water quality and the prevention and treatment of water pollution throughout the country. Corresponding to the distribution of powers between these two Ministries, the local water resource authorities and environmental protection agencies have the same responsibilities within their own jurisdictions. However, such a management system has many shortcomings, at both the horizontal and the vertical level. It has made the cost of coordination among different authorities extremely taxing, expensive and highly inefficient. It makes coherent policy formulation and implementation more difficult, thus the whole country is subject to unsustainable water use and worsening water pollution.²⁵ We will not discuss this in an in-depth manner due to the fact that this article does not focus on the structure of water management.

3.4. Comments

The PRC and the EU are two different regimes. The former is a sovereign state while the latter is an economic and political union. However, water problems are of equal importance in both regimes. To address these problems, a series of legal documents at several levels (multi-level governance) to regulate water management have been promulgated in both Europe and the PRC since the turn of this century. Both the PRC and the EU are based on a river basin management approach. The WFD, which integrates

25 Peng Shugang, 'China's Legal System for Water Management: Basic Challenges and Policy Recommendations', 2010 *International Journal of Water Resources Development* 26, no. 1, pp. 3-22.

an economic approach into water management, is considered to be the most important directive in European water law so far and is looked upon as being a model outside Europe. The PRC has revised several legal documents relating to water management at the national level in recent years. Whether such revision is a direct effect of the WFD is difficult to say.

There is not one comprehensive legal document for water management in the current PRC. The rules and principles are distributed among different statutes, rules and regulations. Some of the aspects of the national legislation are too general to be implemented in local policies and regulations; so they need to be detailed by local legislatures according to their own situations. This is similar to the WFD which is required to be transposed into the legal order by Member States and where there is room to take regional and local differences into account. Therefore, although there are different hierarchies of legislation in the PRC, they are still comparable to the WFD and it can certainly be inspiring for the PRC.

Following this introductory background, the specific economic tools and principles which are essential for the cost recovery of water services will be discussed below.

4. Water services

4.1. Water services in the Water Framework Directive and the European Union

It is very important to know what water services are before one analyzes how to recover the costs thereof. Article 2 (Paragraph 38) of the WFD defines ‘water services’ as

‘all services, which provide, for households, public institutions or any economic activity:

- (a) Abstraction, impoundment, storage, treatment and distribution of surface water or ground-water.
- (b) Wastewater collection and treatment facilities, which subsequently discharge into surface water.’

To clarify what water services are, it is necessary to be aware of another term – water use, which is also defined in Article 2 (Paragraph 39): “‘Water use’ means water services together with any other activity (...) having a significant impact on the status of water.’

Water services and water uses are sometimes confused in academic fields, especially in non-EU countries. However, water services are different from water uses; according to the Common Implementation Strategy for the Water Framework Directive (2000/60/EC), which was produced by WATECO,²⁶ a water service represents an intermediary between the natural environment and the water use itself, and the main purpose of the water service is to ensure that:

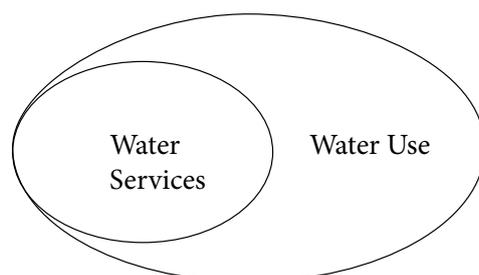
- a) the key characteristics of natural waters are modified (i.e. the service offered is this modification) so as to ensure that it fits within the requirements of well-identified users (e.g. the provision of drinking water); or
- b) the key characteristics of water ‘discharged’ by users are modified (i.e. the service offered is also this modification, e.g. waste water treatment) so that it can go back to the natural environment without damaging it.

Overall, a water service per se does not consume water nor produce pollution, while water use has ‘a significant impact on the status of water’ according to Article 2 of the WFD.²⁷ The extension of water services narrower than water use (Figure 3).

26 Common Implementation Strategy for the Water Framework Directive, (2000/60/EC) No. 1/2000.

27 Common Implementation Strategy for the Water Framework Directive, (2000/60/EC) No. 1/2000.

Figure 3 Relationship between water services and water use in the WFD



According to WATECO, the characteristics of waters that are modified through a water service include:

- its spatial distribution, e.g. a water supply network for ensuring that water is reallocated spatially to every individual user;
- its temporal distribution/flows, e.g. dams;
- its height, e.g. weirs and dams;
- its chemical composition, e.g. the treatment of water and wastewater;
- its temperature, e.g. the temperature impact on water.²⁸

To address the scope of water services clearly, another term, ‘water-related ecosystem services’, needs to be introduced here.

In 2005, a four-year study entitled ‘The Millennium Ecosystem Assessment’ was carried out, in which a definition of ‘ecosystem services’ was addressed: ‘ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling.’²⁹ Since then, the research on how to pay for these services in several fields, like natural protection areas, mining resource areas and watersheds, has sprung up.

Water-related ecosystem services as the basis of the payment in watersheds were defined by the Economic Commission for Europe as:

‘Water-related ecosystem services: means such services as flood prevention, control and mitigation; regulating runoff and water supply; improving the quality of surface waters and groundwaters; withholding sediments, reducing erosion, stabilizing river banks and shorelines and lowering the potential of landslides; improving water infiltration and supporting water storage in the soil; and facilitating groundwater recharge. Water-related ecosystem services also include cultural services, such as recreational, aesthetic and spiritual benefits of forests and wetlands.’³⁰

Water-related ecosystem services can be divided into two categories: water-quantity-related ecosystem services and water-quality-related ecosystem services:

[1] Water-quantity-related ecosystem services, such as flood protection and water regulation (run-off, infiltration, retention and storage), could be provided through forestation, conservation agriculture and flood plain restoration. [2] Water-quality-related services, such as curbing water pollution, could be provided through extensification of (agricultural) land use, integrated pest management; pollution quotas and conversion or restoration of natural land cover.³¹

28 Common Implementation Strategy for the Water Framework Directive, (2000/60/EC) No.1/2000.

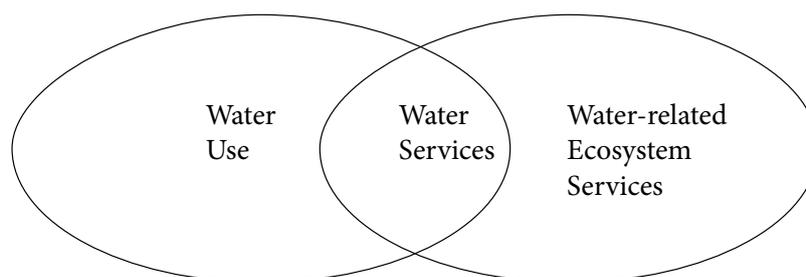
29 *Millennium Ecosystem Assessment*, ‘Ecosystems and Human Well-being: Synthesis’, Island Press, 2005, p. V.

30 Recommendation on Payments for Ecosystem Services in Integrated Water Resources Management, UN Doc. ECE/MP.WAT/22 (2007), p. 2.

31 Recommendation on Payments for Ecosystem Services in Integrated Water Resources Management, UN Doc. ECE/MP.WAT/22 (2007), p. 4.

Compared to the definition of water services in the WFD, the scope of water-related ecosystem services is broader. For example, pollution quotas do improve the water quality, but cannot be considered as WFD water services, both in a narrow or broad interpretation of water services.³² They are not water services which provide for households, public institutions or any economic activity in abstraction, impoundment, storage, treatment and distribution of surface water or groundwater.³³ Water use and water-related ecosystem services are also not the same, it is hard to say that the settlement of emigrants in water transfer projects, which is a kind of water-related ecosystem services, is water use, although it does have an impact on the status of water. Otherwise the explanation of water use will be too broad (Figure 4).

Figure 4 Relationship of water use, water services and water-related ecosystem services



4.2. Water services in the People's Republic of China

There is no legal definition of 'water services' in the PRC. The closest is the description of the 'urban water supply price' which was introduced by the National Guidelines on Urban Water Supply Tariffs in 1998 (and is currently being revised): the price of water supply means the prices for purifying and disinfecting the surface and groundwater to make it reach the standard of drinking water and the price of sewage treatment. Water supply and water sanitation are also mentioned.

However, 'water services' do exist in Chinese academic fields. Since the payment for water-related ecosystem services (PWS) in watersheds has been introduced in recent years (which is called eco-compensation for watersheds in the PRC due to different language usage), many studies have been carried out on how to pay for the 'water services', which have been mainly defined as provisioning, regulating, cultural, and supporting services of the water ecosystem. The debates regarding 'water services' in the PRC often concern the question of 'how much are the water services worth', in which they estimate the economic value based on the above four groups, although there is less concern for what water services themselves are. For example, some scholars in the PRC have estimated the direct value of Chinese terrestrial surface water ecosystem services in 2000 as 4263.91×10⁸ Yuan RMB (57,563 Euro), and indirect values as 5546.92×10⁸ Yuan RMB (74,883 Euro), the total value was 9810.83×10⁸ Yuan RMB (132,446 Euro), and was up to 10.97% of the GDP of the PRC in 2000.³⁴

There is seldom a distinction between 'water services' and 'water-related ecosystem services' in the PRC or in the EU. The two terms are used in a somewhat confused manner. If the definitions of water services in the WFD and water-related ecosystem services in the Economic Commission for Europe documents are taken as references, I would say that 'water services' in the PRC are actually water-related ecosystem services.

32 For more information about a narrow and broad interpretation of water services, see P.E. Lindhout, 'A Wider Notion of the Scope of Water Services in EU Water Law: Boosting payment for water-related ecosystem services to ensure sustainable water management?', 2012 *Utrecht Law Review* 8, no. 3, pp. 86-101.

33 P.E. Lindhout, 'A Wider Notion of the Scope of Water Services in EU Water Law: Boosting payment for water-related ecosystem services to ensure sustainable water management?', 2012 *Utrecht Law Review* 8, no. 3, pp. 86-101.

34 Zhao Tong-qian et al., 'Ecosystem services and their valuation of terrestrial surface water system in China', 2003 *Journal of Natural Resources* 18, no. 4, pp. 443-452.

4.3. Comments

Slogans to cover the costs of water services have emerged during the procedure for reforming water pricing in the PRC. At present, payments for water-related ecosystem services are also coming to fruition. The current studies which concern 'water services', as I mentioned above, mainly focus on the estimation of the economic value of the water-related ecosystem services, which is the basis for calculating the rate of PWS. Although water services and water-related ecosystem services have some overlap, they are still two different instruments; water services (if I take the definition in the WFD as a reference) should be covered by the water price, water resource fees and waste water discharge fees, and they are levied by the government. But water-related ecosystem services, as a market-based instrument, can be traded in the market directly without government intervention if the market is sufficiently effective, for example, water rights transactions between water-related ecosystem service suppliers and water-related ecosystem service beneficiaries.

To clarify what water services are is the first step in analyzing the cost recovery of water services. Here, the water services in the WFD could be a good reference point for Chinese policy makers, and even though the WFD itself has not distinguished the differences between water services and water-related ecosystem services, it does provide room for the Member States to address this aspect.

5. Recovering the costs of water services

5.1. The costs of water services in the Water Framework Directive and in the European Union

The WFD states that 'water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such',³⁵ so, not only the costs of the product but the price of 'heritage' should be reflected in water prices.

To create a more effective way to use water, Article 9 states that 'Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs (...)', but the WFD does not contain any definition of costs, especially environmental and resource costs.³⁶ In the guiding document Common Implementation Strategy, the WATECO group defined environmental costs as 'the costs of damage that water uses impose on the environment and ecosystems and those who use the environment (e.g. a reduction in the ecological quality of aquatic ecosystems or the Stalinization and degradation of productive soils)', and resource costs 'represent the costs of foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater)'.

Besides the environmental costs and resource costs, operation costs, maintenance costs, capital costs, etc., were also listed in the initial draft of the WFD; they were included as financial costs during the communication on water pricing policies between the European Commission and Parliament, while these costs were defined by the WATECO as the costs of providing and administering the services which include all operation and maintenance costs, and capital costs. See Table 3.

Table 3 Costs of water services in WATECO

Costs of water services	Environmental costs	Direct environmental costs
		Indirect environmental costs
	Resource costs	Costs of foregone opportunities
	Financial costs	Operation costs
		Maintenance costs
		Capital costs
		Other costs

35 Recital 1 WFD.

36 <<http://omega.library.uu.nl/cgi-bin/journal/oxfordft/http://jel.oxfordjournals.org/cgi/content/short/19/1/>> (last visited 15 March 2012).

5.2. Recovering the costs of water services in the Europe Union³⁷

One of the most ambitious objectives of the WFD that immediately influences all the productive sectors and all uses is the proposal for the recovery of the full cost of water services.³⁸ Cost recovery is achieved through the prices that the water service consumers have to pay to the provider directly and through any tax, charge or levy that is imposed on the service, and is borne by the consumer directly or indirectly.³⁹

In the first stage of implementation, Member States have to assess the level at which the full cost of water services is recovered in each river basin. In the next stage they are obliged to use appropriate pricing policies towards the full recovery of the cost of water services. The level of recovery of water service costs and the extent to which the polluter pays principle is assessed through the following steps:

- determination of water service providers, users and polluters;
- assessment of the full water cost;
- identification of the cost recovery mechanism and cost allocation to the users;
- estimation of the level of cost recovery.⁴⁰

5.3. Costs of water services in the People's Republic of China

The Central Government began to concern itself with the costs of water services in 2004 when water prices were transferred from the administrative charges system to the national commodity price management system.⁴¹ Also in that year, the State Council released a document (a rule) stating that when determining water prices, five elements should be considered: the water resource price, the cost of water supply by hydraulic engineering, the price of the urban water supply which includes operating costs and rational profits, the wastewater discharge fee and the price of reclaimed wastewater which also includes operation costs and rational profits, but this price should be lower than the price of drinking water.⁴² However, because of the lower legal hierarchy (see Section 3.1), this document was not well implemented by local governments.

Therefore there is no legal definition of the costs of water services in the PRC either. However, in academic fields, five elements are deduced from the above document, which comprise the cycle of costs for water services, from water abstraction, purification, distribution, utilization, wastewater collection, treatment to discharging it into the natural water body.

As water is not only considered as a public good but also as a commodity, scholars prefer to use economic definitions to explain the costs of water services in the PRC. First, opportunity costs; in economics they mean the value of the next best choices that one gives up when making a decision. Accordingly, in the costs for water services, opportunity costs are the costs of foregone opportunities to use the water resources which people give up due to several reasons (such as overuse at the current stage); they are called water resource costs in the field of water management.

Secondly, private costs which mean the costs which a firm expends on the purchasing of equipment and materials or other inputs for purposes such as management and operation; they are called water project costs in water services, which normally comprise the costs of hydrology exploration, the costs of the hydrology monitoring network, the costs for the construction and management of hydraulic engineering schemes, etc.

37 For more information, see P.E. Lindhout, 'A Wider Notion of the Scope of Water Services in EU Water Law: Boosting payment for water-related ecosystem services to ensure sustainable water management?', 2012 *Utrecht Law Review* 8, no. 3, pp. 86-101.

38 D. Assimacopoulos, 'Recovery of full cost and pricing of water in the Water Framework Directive', Re-assessment of the Water Resources and Demand of the Island of Cyprus, 2000.

39 H. Unnerstall, 'The Principle of Full Cost Recovery in the EU-Water Framework Directive – Genesis and Content', 2007 *Environmental Law* 19, no. 1, pp. 29-42.

40 D. Assimacopoulos, 'Recovery of full cost and pricing of water in the Water Framework Directive', Re-assessment of the Water Resources and Demand of the Island of Cyprus, 2000.

41 The commodity price is charged according to the market while administration charges are collected according to the principle of cost compensation and non-profit making.

42 *The Circular on Promoting Water Pricing for Water Conservation and Water Resources Protection*, no. 36 Policy Paper of the General Office of the State Council.

The third are external costs, which mean the negative effects of an economic activity on a third party in economics. In water services, they mainly mean damage from wastewater, and they are called environmental costs. See Table 4.

Table 4 *Costs of water services in the PRC*

	<i>Economics</i>	<i>Water services</i>	<i>Expression</i>
Costs of water services	Opportunity costs	Resource costs	Water resource fee
	Private costs	Water project costs	Hydraulic project fee
			Drinking water fee
	External costs	Environmental costs	Wastewater treatment fee
			Wastewater discharge fee

In order to know how opportunity costs, private costs and external costs components in the total costs of water services, which are key elements in the pricing of water, are covered, we will now introduce the water charging system in the PRC.

5.4. Recovering the costs of water services in the People's Republic of China

Resource costs which reflect the scarcity of water resources in the PRC are expressed by water resource fees; this fee is collected from the unit or individual who receives extra water from rivers, lakes and groundwater directly by a hydrology project. It is fixed by the local governments based on the actual status of their water resources. It does not vary with the market, and when the fee is collected, it will be delivered to the national and local treasuries separately (the ratio is 1:9), then the Financial Department will arrange it according to the approved proposals of other departments. The water resource fee is used in water resource conservation, protection and management, and can also be used in the exploration of water resources.

Both the hydrology project fee and the drinking water fee are expressions of water project costs. Besides the costs they also include taxes and the the rational profits of water supply entities. They are collected alternatively. The nature and utilization of drinking water fees is no different from hydraulic project fees but the operators are different; the operator of the former is the Drinking Water Company while the latter is the hydraulic project itself. This fee is priced by the Government Price Departments and other related departments with the hearing procedure; it is used to manage, repair and update hydraulic projects.

The environmental costs of water services are reflected by wastewater treatment fees and wastewater discharge fees. The former is normally included in citizens' drinking water bill; it is charged by the water suppliers (most of these are drinking water companies) and they act on behalf of drainage and sewage treatment enterprises. This fee is used in the construction and operation of urban centralized sewage treatment facilities; in fact, it is a payment for service suppliers. The latter, the wastewater discharge fee, is a kind of administrative charge, however. The amount of this fee is defined by the environmental protection departments based on the discharge of pollutants. It is included in the local financial budget which is mainly used in pollution source prevention and control. The waste discharge fee could be exempted when the entities have paid for the wastewater treatment fee and discharge effluent to the drainage and sewage treatment enterprises, but not to the natural water body.

5.5. Comments

Currently, the PRC is in a transitional period and legislation has not kept pace with its overheating economy. From the above analysis, one can see that the division of water service costs only exists in academic fields at present. Tariff structures in the PRC are complicated. Different categories of users are charged differently; different regions also have different tariffs due to the different status of water resources. Block tariffs for urban water supplies have been encouraged since 1998 and many pilot cities have adopted such a system to promote water conservation. Although the tariffs are rapidly increasing, the rates are still insufficient to cover the costs. According to the World Bank, in 2004, 60% of water

supply utilities in the PRC reported negative net incomes, indicating that most of the companies were experiencing financial difficulties.⁴³

Why can the costs of water services not be recovered in the PRC? To answer this question, we have to look at the data. The World Bank's research in developing countries shows that 5% of household income is a 'ceiling' for paying for water services which include water supply and wastewater treatment. It is reasonable when it is below 3% according to the United States. However, the rates in the PRC are exceptionally low; in 2009, the rate in Beijing was 0.64%, in Shanghai it was 0.29%, in Nanjing it was 0.44%, in Guangzhou it was 0.31% and in Hong Kong it was 0.3%.⁴⁴ Although the price has increased during the last two years, it is still far from being able to cover the costs.

In the EU, the Member States transpose the WFD according to their own regional and local features and they have different explanations for water services, so it is difficult to conclude whether the costs of water services have been recovered. However, what the PRC can learn from Article 9 of the WFD is to have its own legislation on its classification of the recovery of costs. The reform of the water price can only be effective if an adequate legal system is being developed.

6. The polluter pays principle

6.1. The polluter pays principle in the Water Framework Directive and in the European Union

The polluter pays principle was adopted by the Organization for Economic Co-operation and Development (OECD) in 1972. It was originally intended as a way of encouraging countries not to subsidize the investments necessary for firms to comply with pollution control regulations. However, OECD countries accepted (in a 1991 Recommendation) that not only pollution prevention and control costs, but also pollution damage costs should be borne by the polluter (OECD, 1991).⁴⁵

Article 9 of WFD states 'Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, (...) in accordance in particular with the polluter pays principle'; 'an adequate contribution of the different water uses, disaggregated into at least industry, households and agriculture, to the recovery of the costs of water services, (...) and taking account of the polluter pays principle'. There is some scope for flexibility in the application of this principle. The WATECO guidance in fact clarifies that Article 9 of the WFD does not prevent Member States from deciding on the contributions of water users as long as this is clearly stated in River Basin Management Plans.⁴⁶ Therefore the scope of water users could vary in Member States, so the definition of polluters also varies. However, no matter how different the explanations of the principle are, all of the water users, polluters or stakeholders within a river basin should contribute to the costs of their water services.

There is an ongoing discussion on the correct interpretation of the polluter pays principle. In the recent EU Green Week, Salm-Salm argued that 'the use of water purified by forests is not for free – this should be the starting point for the further development and implementation of the Water Framework Directive',⁴⁷ 'forest provides provisioning, regulating and supporting services for water', 'ecosystem services provided by forests are of commercial use for society, gas and water industries, but they are taken for free and granted', 'society abandoned sustainability, because nobody pays its services for water'.⁴⁸ The

43 <http://www.wds.worldbank.org/external/default/WDSContentServer/WDS/IB/2007/09/25/000310607_20070925111156/Rendered/PDF/409640P0704130Public.pdf> (last visited 20 March 2012).

44 Wanghao, 'Low water price leads to leakage of state-owned assets', <<http://money.163.com/09/11/19/17/50GG801H00253TTO.html>> (last visited in 25 March 2012).

45 T. Jones, 'Recent developments in the pricing of water services in OECD countries', 1998 *Water Policy* 1, no. 6, pp. 637–651.

46 WATECO, 'Common Implementation Strategy for the Water Framework Directive (2000/60/EC): Guidance Document No 1, Economics and the Environment', European Communities (2003), p. 76 (as cited in B. Baker et al., 'Report on Screening of Water Pricing Policies, Cost Recovery Mechanisms and Economic Instruments for Inclusion in Programmes of Measures and in Relation to Article 9 of the Water Framework Directive', 2006, p. 11).

47 F. Salm-Salm, 'Water: the blue gold in our green forests', Green Week 2012, <http://ec.europa.eu/environment/greenweek/sites/default/files/3-3_salmsalm.pdf> (last visited 5 November 2012).

48 F. Salm-Salm, 'How the polluters led the Water Framework Directive ad absurdum', Green Week 2012, <http://ec.europa.eu/environment/greenweek/sites/default/files/3-3_salmsalm.pdf> (last visited 5 November 2012).

point in his arguments is that water-related ecosystem services which forests supply actually belong to the categories of water services in the WFD.

A specific feature of water services is worth repeating here 'water service per se does not consume water' (Section 4.1). Forests do consume water during the growing period although they supply much more water-related ecosystem services. It is not rare that because of improper species of trees growing near a river, the quality and quantity of the water are seriously affected. But still, forestry plays a significant role in the water-related ecosystem market. To recover the costs of these water-related services, the polluter pays principle is by itself perhaps insufficient.

6.2. The polluter pays principle in the People's Republic of China

The Environmental Protection Law of the PRC (a Trial Implementation) in 1979 provided as a principle: 'units that have caused environmental pollution and other public nuisances shall make a plan to repair them according to the principle of who pollutes, who repairs, or to move factories, to switch to other forms of production after approval by the related authorities.' This was the early stage of the polluter pays principle in the PRC, which only reflected terminal control but without compensation being paid to victims who had suffered losses from the damaged environment. Later when the Environmental Protection Law was revised and enacted in 1989, the principle was again not incorporated in the statute. However, it was reflected in some articles, for instance in Article 14, which states that

'units that may cause environmental pollution and other public nuisances shall incorporate the work of environmental protection into their plans and establish a responsibility system for environmental protection, and shall adopt effective measures to prevent and control the pollution and harms caused to the environment by waste gas, wastewater (...) generated in the course of production, construction or other activities,'

and also in Article 41, which states that

'a unit that has caused an environmental pollution hazard shall have the obligation to eliminate it and pay compensation to the units or individuals that suffered direct losses (...).'

In the Rule to Further Strengthen the Work of Environmental Protection 1990, all levels of governments were asked to protect and use the natural resource rationally according to the principle of 'who explores, who protects; who damages, who restores; and who uses, who compensates' as well as the additional principle of 'laying equal stress on exploitation, utilization, protection and multiplication of the natural resources'. In 1996, the Decision of the State Council on Several Issues Concerning Environmental Protection developed the principle once again; it describes the principle as 'polluter pays, user compensates, explorer protects and destroyer restores', and, according to this, 'the relevant departments of the state shall (...), closely attend to formulating and improving economic policies and measures for promoting environmental protection, preventing environmental pollution (...)'. See Table 5.

Table 5 The history of the polluter pays principle in the PRC

Document	Year	Principles
Environmental Protection Law of PRC (a Trial Implementation)	1979	Who pollutes, who repairs
Environmental Protection Law of PRC	1989	No direct description
Rule on Further Strengthening the Work of Environmental Protection	1990	Who explores, who protects; who damages, who restores; and who uses, who compensates
Decision of the State Council on Several Issues Concerning Environmental Protection	1996	Polluter pays, user compensates, explorer protects and destroyer restores

6.3. Comments

At the national level in the EU, different Member States may have different interpretations of the polluter pays principle. It depends on how Member States define their 'water services' and 'water users' / 'water polluters'. However, the WFD, as the framework at the EU level, still provides a good reference for the PRC. As one can see above, in the PRC the polluter pays principle is embedded in different administrative documents, which only have lower legal force; the Environmental Protection Law was almost an empty shell in interpreting this principle, therefore the reform of the polluter pays policy was reported to the Central Government in 2007, although this is not yet complete.

Worth noting is the fact that Article 9 of the WFD and the PWS are different although they are both economic instruments for enhancing the efficient and sustainable use of water resources. The PWS aims to balance the interests among different stakeholders of watersheds. Compared to the polluter pays principle, the principle of the user pays and the principle of the beneficiary pays are used more in the PWS. The problems which Salm-Salm highlighted (Section 6.1) can be properly resolved by the PWS instrument.

However, to address water-related problems, only taking the polluter pays principle into account is not enough, both in the PRC and in EU. The combination of other principles, for example the precautionary and the prevention principles which are stated in the EC Treaty, are equally important.

7. Conclusion

This article has analyzed the differences and similarities in systems for recovering the costs of water services in the EU and the PRC and has tried to provide an answer to the following research question:

What are the shortcomings of the systems for recovering the costs of water services in the PRC and what lessons can the PRC learn from the WFD?

The WFD is the first directive which specifically points to the use of economic instruments in the EU and Article 9 thereof is a leading rule in implementing costs recovery and the polluter pays principle for Member States and it is also a good framework to refer to when the PRC reforms its water price policies and its recovery of the costs of water services. In order to provide a complete picture, this article has introduced the different water management systems in the EU and the PRC from the beginning. The various sections have divided Article 9 into three parts for comparative purposes: water services, cost recovery and the polluter pays principle.

The PRC has no real legislation on water services although a great deal of water services-related research has been carried out. The two different economic instruments of costs recovery for water services and the PWS were not distinguished. Although there is no distinction in the WFD either, it explains what water services are and provides room for Member States to address them further. Due to the huge territory of the PRC, there are different statuses for water resources in different regions. So it is feasible for the PRC to provide a framework to address water services, as the WFD has done, at the national level and to leave them to the local authorities to choose the form and methods for achieving the necessary standards.

There is no substantial difference in water service costs between the WFD and the PRC, but in the PRC the definitions of these costs have only bloomed in academic circles and the legislation is therefore lagging behind. What the PRC can learn from the WFD is to introduce these definitions at the legislative level. For example, introducing the three categories into the National Guidelines on Water Tariffs which is currently being revised.

Although the polluter pays principle in the PRC is distributed among different administrative legal documents, they do not have strong legal force. The Central Government has realized this, so a policy reform was proposed in 2007. Article 9 of the WFD here provides a good reference; it disaggregates water users into three groups: industry, households and agriculture. A clear definition of water users is a precondition for applying this principle. Other principles worth noting are, for example, the prevention

principle, the user pays principle and the beneficiary pays principle which call for particular attention. The PRC is currently drafting the Rule on PWS, so now is a good time to interpret the applicable scope of these principles.