

China's Water Resources Law in Transition

© 2015, L. Dai

Cover image by Tonie Broekhuijsen

Layout by Klaartje Hoeberechts, Utrecht University

No part of this book may be reproduced in any form, by print, photo copy, microfilm or any other means, without written permission from the author.

China's Water Resources Law in Transition

China's waterbeheer in transitie

(met een samenvatting in het Nederlands)

Proefschrift

ter verkrijging van de graad van doctor aan de Universiteit Utrecht op gezag van de rector magnificus, prof.dr. G.J. van der Zwaan, ingevolge het besluit van het college voor promoties in het openbaar te verdedigen op
maandag 6 juli 2015 des middags te 2.30 uur

door

Liping Dai

geboren op 5 februari 1984
Jiangsu, China

Promotor: Prof.dr. H.F.M.W. van Rijswijk

Copromotor: Dr.A.M. Keessen

"We don't govern water. Water governs us."

James G. Workman

ACKNOWLEDGEMENTS

How to start a PhD?

I had no idea when I arrived in the Netherlands. It was the first time that I had been abroad. I went to my supervisor, Marleen van Rijswick, to seek her wisdom. But she told me “go to the party, make yourself comfortable first”. I therefore started my PhD with parties. After almost four years, when I look back today, I appreciate that she guided me in a special way, she not only encouraged my research and allowed me to grow as a research scientist, but also taught me how to enjoy life. Her attitudes towards learning and life in general provided me with a model of active, optimistic, and academic rigour.

I owe Andrea Keessen, my daily supervisor, many thanks. She provided invaluable academic advice and personal encouragement throughout my four-year research at the Utrecht Centre for Water, Oceans and Sustainability Law. She has a “Bible” on research techniques, we spent a great deal of joyous time in exploring it. Her generous support made many of my achievements possible. I greatly cherish the days working together with her.

I also wish to express my special gratitude to Professor Patricia Wouters, who supervised me when I was a visiting researcher in Xiamen University. She taught me the philosophy of “getting things done is better than perfect”, which will benefit me for a lifetime. She, together with Marleen van Rijswick and Andrea Keessen, lifted me up to more than where I can be.

I would also like to thank my PhD evaluation committee members for the time that they have taken to read my thesis: Mr. Ben Schueler, Professor of Administrative Law, Environmental and Planning Law at Utrecht University; Mr. Remco Nehmelman, Professor of Constitutional Law at Utrecht University, Mr. Rob Widdershoven, Professor of European Administrative Law at Utrecht University; Mr. Tianbao Qin, Professor of Environmental Law at Wuhan University (China), Ms. Annelies Freriks, Professor of Human-Animal Relationship at Utrecht University.

Special thanks are also extended to the University of Utrecht, in particular the Utrecht Centre for Water, Oceans and Sustainability Law for providing me with the necessary support to successfully complete my Ph.D. A word of thanks to Titia Kloos, Peter Morris, Klaartje Hoeberechts and Titia Hijmans van den Bergh of the Editing Department for the revision of this book at short notice. My sincere thanks also go to Tonie Broekhuijsen, who contributed the cover photograph, and the Stichting Schilthuisfonds for their support in printing this book.

I am sincerely grateful to my colleagues and friends for the peer support that they provided. I am so lucky and happy to have had them with me during these years. They encouraged me when I was depressed, brought me joy when I felt bored, accompanied

AKNOWLEDGEMENTS

me when I felt lonely. Without their help, I would not have been confident enough to submit the thesis.

Most of all, I owe an enormous debt of gratitude to my family. Words cannot express how grateful I am to my mother, my father, my sister and brother for all of the sacrifices that they have made on my behalf. The support that they gave me was what has sustained me thus far. I would like to express my special appreciation to my beloved boyfriend, Adrian Butnaru, for his support, understanding, and tolerance during the preparation of this thesis.

Preparing this thesis has been a philosophical as well as an academic experience. Conducting a Ph.D. study is indeed a unique life experience. Thanks to all those mentioned above for contributing to the memorable and precious period of my life.

Jiangsu, China, May 2015.

Liping Dai

CONTENTS

Aknowledgements	vii
Chapter 1	1
Introduction	
1. Background	1
1.1 Economic transition and water quality degradation	1
1.2 Transition in water resource management	2
2. Research questions and purposes	4
3. Research methodology	5
3.1 Research approach	5
3.2 A meta-framework of governance	6
3.2.1 Why the meta-framework of governance?	7
3.2.2 Specification of the research framework	8
4. Research methods	10
4.1 Research methods	10
4.2 Why the EU?	10
5. Research outline	12
Chapter 2	13
Identifying and Understanding the Main Challenges for Sustainable Water Resource Management in China	
1. Introduction	13
2. An integrative and multi-disciplinary method to assess water governance in China: the '10 building-block' assessment method	14
2.1 Block 1: Water system knowledge	15
2.2 Block 2: Values, principles and policy discourses	17
2.2.1 Values and principles	17
2.2.2 Policy discourses	19
2.3 Block 3: Stakeholder involvement	20
2.4 Block 4: Trade-offs between social objectives: service-level agreements	22
2.4.1 Water allocation	22
2.5 Block 5 Responsibility, authority and means	24
2.5.1 Authorities and responsibilities	24
2.5.2 Water property and the allocation of water rights	26
2.6 Block 6: Regulations and agreements	27
2.6.1 Water quality objectives	30
2.6.2 Water quality-related standards	31

2.6.3	Water Pollution Prevention and Control Plan	32
2.6.4	Water pollution prevention and control strategies	32
2.7	Block 7: Financing arrangements	34
2.8	Block 8: Engineering and monitoring	36
2.9	Block 9: Enforcement	37
2.10	Block 10: Conflict prevention and resolution	38
3.	Conclusion	38

Chapter 3 41

A New Perspective on Water Governance in China – Captain of the River

1.	The Captain of the River	41
2.	Why “Captain of the River”?	43
2.1	Government Objective Responsibility Systems (GORS) in China	43
2.2	Relationship between economic development and environmental protection	45
2.3	Government Objective Responsibility Systems (GORS) in environmental pollution management	46
2.4	Government Objective Responsibility Systems (GORS) in water pollution control	47
2.5	The Veto System and the Captain of the River Instrument	47
3.	Where does the law stand in this respect?	48
4.	Pros and cons of the “Captain of the River” instrument	50
4.1	Benefits of the “Captain of the River” instrument	50
4.2	Shortcomings of the “Captain of the River” instrument	51
5.	Suggestions & conclusion	53

Chapter 4 57

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

1.	Introduction	57
2.	Water management policies in the European Union and the Water Framework Directive	58
2.1	The relationship between the European Union and the Member States	58
2.2	Water-related policies in the European Union	60
2.3	The Water Framework Directive and the content of Article 9	60
3.	The Water management system in the People's Republic of China	61
3.1	Legal hierarchy in the People's Republic of China	61
3.2	Legal arrangements for water management in the People's Republic of China	62
3.3	Institutional arrangements for water management in the People's Republic of China	64
3.4	Comments	65
4.	Water services	66

CONTENTS

4.1	Water services in the Water Framework Directive and the Europe Union	66
4.2	Water services in the People's Republic of China	68
4.3	Comments	69
5.	Recovering the costs of water services	70
5.1	The costs of water services in the Water Framework Directive and in the European Union	70
5.2	Recovering the costs of water services in the Europe Union	71
5.3	Costs of water services in the People's Republic of China	71
5.4	Recovering the costs of water services in the People's Republic of China	72
5.5.	Comments	73
6.	The polluter pays principle	74
6.1	The polluter pays principle in the Water Framework Directive and in the European Union	74
6.2	The polluter pays principle in the People's Republic of China	75
6.3	Comments	76
7.	Conclusion	77

Chapter 5

79

Exploring China's Approach to Implementing 'Eco-compensation' Schemes – The Lake Tai Watershed as Case Study Considered Through a Legal Lens

1.	Ecosystem services	79
2.	Eco-compensation in China	81
3.	Eco-compensation in the Lake Tai watershed	83
3.1	Eco-compensation between governments	85
3.2	Eco-compensation between governments and farmers	86
3.3	Eco-compensation between governments and industry	88
3.4	Eco-compensation among industries	89
4.	Legal issues arising from eco-compensation schemes in the Lake Tai case study	90
5.	Conclusions	95

Chapter 6

97

Regulating Water Pollution in China and the European Union with a Focus of Agricultural Pollution

1.	Introduction	97
2.	Establish water quality objectives	98
2.1	China's water quality objectives establishment	98
2.2	Water quality objectives of the EU Water Framework Directive	101
3.	Policy instrument for achieving the established water quality objectives	103
3.1	The Government's Objective Responsibility System for water pollution control in China	103

3.2	The Inter-linkages between water regulations and agricultural-related regulations in China from a legal perspective	105
3.3	Implementation strategies in the European Union	107
4.	Discussion	110
4.1	Objectives establishment	110
4.2	Implementation Strategies	111
4.2.1	The Government's Objective Responsibility System in China	111
4.2.2	Integration between the legal and policy framework for water and agriculture	113
4.2.3	Lessons learned from the EU	115
5.	Conclusion	115

Chapter 7 117

Something Old, Something New, Something Borrowed and Something Blue: Tackling Diffuse Water Pollution from Agriculture in China Drawing Inspiration from the European Union

1.	Introduction	117
2.	Diffuse water pollution	118
2.1	Diffuse water pollution in China	119
3.	The Chinese legal framework for water management	121
3.1	General policies for water resource management in China	121
3.2	Policy review of specific pollution sources	122
4.	An overview of the legal framework on diffuse water pollution in the European Union	124
4.1	Diffuse water pollution in the European Union	124
4.2	An overview of the EU legal framework of water management	125
4.3	A case study within the EU legal framework	127
5.	Legal discussion	128
6.	Conclusion	133

Chapter 8 135

Conclusion

1.	Introduction	135
2.	Reflections on and a synthesis of the findings	136
2.1	The polity dimension	136
2.2	The politics dimension	137
2.3	The policy dimension	139
3.	Recommendations and avenues for future research	143

CONTENTS

Appendix 1	Guidelines for water resource allocation	145
Appendix 2	The main water-related functions of the Ministries under the State Council	147
Appendix 3	Procedure for setting major pollutant cap control targets	149
Appendix 4	Development of eco-compensation mechanism in China	151
Appendix 5	“Three-North” Shelterbelt Project	155
Appendix 6	Policy overview of water resources management in China	157
Appendix 7	Policy overview of livestock and poultry breeding	159
Appendix 8	Legal and policy overview of the use of fertilizers and pesticides	161
Appendix 9	Basic and supplementary measures of the WFD	163
	Samenvatting	165
	References	171
	Curriculum vitae	185

CHAPTER 1

Introduction

1. Background

1.1 Economic transition and water quality degradation

Since 1978, China has been on the road towards a transition from a centrally planned economy to a market economy. The achievements are remarkable after almost three decades of efforts. Industrialization in China has been unprecedented – no developing country has grown by more than 10% per year without interruption for two full decades.¹ The urbanization rate had reached 51% by 2011, and by 2030 nearly 60% of the population are expected to be living in urban areas.² The living standards of ordinary citizens have improved significantly, so that millions of Chinese citizens have been lifted out of poverty.

The rapid industrialization has put significant pressure on the environment. Since the beginning of the 1990s, regional competition has become the main driving force for China's economic transition. All of the provinces and municipalities embarked upon open competition in order to develop the local economy.³ Small and medium-sized non-state enterprises, which could not usually afford environmental protection facilities, soon became the backbone of growth and industrialization after a series of supporting policies.⁴ When competition for economic growth began to intensify, local governments pursued GDP even more vigorously than the central government. Local governments invested blindly to increase local economic production, with scant regard for the environmental costs.⁵ Natural resources were used inefficiently, and water quality became severely degraded in enterprise-intensive regions.

The unprecedented increase in urbanization in China affects the environment as well. In 1978 there was no Chinese city with more than 10 million inhabitants and only two

-
- 1 Eichengreen, B. (2013, November 8). Chinese Industrialization and its Discontents. Retrieved March 3, 2015, from <http://www.project-syndicate.org/commentary/barry-eichengreen-on-what-china-can-learn-from-nineteenth-century-britain#lCKBlObPkyXilMt7.99>.
 - 2 West, J., Schandl, H., Heyenga, S., & Chen, S. (2013). Resource Efficiency: Economics and Outlook for China. *UNEP, Bangkok, Thailand*. Retrieved March 3, 2015, from http://www.unep.org/pdf/China_Resource_Efficiency_in_English_2013.pdf.
 - 3 Coase, R., & Wang, N. (2013, January 15). Policy Report: How China Became Capitalist. Retrieved March 3, 2015, from <http://www.cato.org/policy-report/januaryfebruary-2013/how-china-became-capitalist>.
 - 4 Qian, Y., & Wu, J. (2000, May 1). China's Transition to a Market Economy: How Far across the River? Retrieved March 5, 2015, from <http://web.stanford.edu/group/siepr/cgi-bin/siepr/?q=system/files/shared/pubs/papers/pdf/credpr69.pdf>.
 - 5 Wong, J. (2014, October 25). Dethroning China's 'GDP supremacy' good for region. Retrieved March 3, 2015, from <http://www.straitstimes.com/news/opinion/invitation/story/dethroning-chinas-gdp-supremacy-good-region-20141025>.

with 5 to 10 million inhabitants. By 2010, six cities had more than 10 million and 10 had between 5 million and 10 million inhabitants.⁶ This increase in the urban population has resulted in various problems. Water scarcity and water pollution are among the major issues. An empirical study has shown that the large population in urban cities in China has strongly affected water quality, because the wastewater treatment systems were inadequate to accommodate the population size and the population growth.⁷

The growth of urbanization and the increasing population pose great challenges for agriculture. In order to enhance productivity and to produce enough food, massive amounts of chemical fertilizers and pesticides are being used. For example, fertilizer consumption in China grew by almost 21% annually over the last two decades up until 2013,⁸ and the use of pesticides is 2½ times the global average (in 2012).⁹ Intensive livestock breeding and aquaculture are being expanded to meet increasing consumer needs; however, the equipment used in waste disposal or treatment facilities cannot keep pace.

The economic boom has been accompanied by serious environmental degradation, including water quality degradation. In the period between 2001 and 2005, on average about 54% of the seven main rivers in China contained water which was deemed to be unsafe for human consumption.¹⁰ This rate dropped from 54% to 20.8% in 2008,¹¹ and to 9.0% in 2013 (the average for ten of the main rivers).¹² With regard to water scarcity, pollution control remains a significant challenge. According to the World Bank, water pollution in China is partly the result of rapid industrialization and urbanization.¹³ However, agriculture, according to a Chinese National Census, also plays a major role. China's National Census on Pollution Sources (2007) indicated that agriculture had become a major contributor to water pollution and it contributed even more than industry.

1.2 Transition in water resource management

Along with the economic transition, water pollution in China is developing from traditional pollution with conventional pollutants to a compound type of pollution with

-
- 6 Roberts, D. (2014, March 20). China Wants Its People in the Cities. Retrieved March 3, 2015, from <http://www.businessweek.com/articles/2014-03-20/china-wants-its-people-in-the-cities>.
 - 7 Ito, C. (2005, May 13). Urbanization and water pollution in China. Retrieved March 5, 2015, from https://crawford.anu.edu.au/degrees/pogo/discussion_papers/PDP05-13.pdf.
 - 8 FAO. (2013). *Guidelines to control water pollution from agriculture in China Decoupling water pollution from agricultural production*. Rome: E Food and Agriculture Organization of the United Nations (FAO)., from <http://www.fao.org/docrep/019/i3536e/i3536e.pdf>.
 - 9 Nair, C. (2012, May 28). An Asian perspective on the world food crisis and its impact on development. Retrieved March 3, 2015, from <http://www.consumptionomics.com/>.
 - 10 World Bank. 2007. *Cost of pollution in China: economic estimates of physical damages*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2007/02/7503894/cost-pollution-china-economic-estimates-physical-damages>.
 - 11 Surface Water Environment (Dan Shui Huan Jing). (2009, June 9). Retrieved March 3, 2015, from http://jcs.mep.gov.cn/hjzl/zkgb/2008zkgb/200906/t20090609_152552.htm.
 - 12 Surface Water Environment (Dan Shui Huan Jing). (2014, June 5). Retrieved March 3, 2015, from http://jcs.mep.gov.cn/hjzl/zkgb/2013zkgb/201406/t20140605_276490.htm.
 - 13 World Bank. 2007. *Cost of pollution in China: economic estimates of physical damages*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2007/02/7503894/cost-pollution-china-economic-estimates-physical-damages>.

new and old pollutants interacting with each other, and from a pollution-dominant industry to the coexistence of industrial pollution and agricultural pollution.¹⁴ Traditional water management schemes are not able to meet these challenges. Water resource management, in order to adapt to the new situation, is therefore being reformed.

At the beginning of the economic growth, environmental concerns were largely being ignored due to the eagerness for economic gains. However, along with the economic development and population growth, environmental degradation became an increasingly pressing issue, which urged the government to adopt a more holistic approach so that society could develop sustainably. The Central Government has taken numerous steps with regard to environmental protection, including water pollution control. Positive changes have been achieved:

- Environmental protection has become a national priority. Since 2006, the 11th National Five-Year Plan (2006-2010) brought a historical change to environmental protection in China. It raised environmental protection to the level of national priority, which means that, since then, environmental protection has become as important as economic development. The Central Government then set compulsory environmental targets for all local governments and a failure to meet those targets will lead to related consequences.
- The systematization of data collection. The Central Government initiated a two-year-plus programme to investigate pollution sources since 2007. It involved 570,000 people nationwide and the results were published in 2010. The report helped the public, as well as the policy makers, to further understand the real situation from a macro perspective and laid a good foundation for managing different pollution sources.
- The establishment of a water resource management plan. In 2011, the Central Committee of the Communist Party issued a Document which outlines a 10-year water resource management plan and sets out the “Three Red Lines” and specific targets for water quantity usage, water-use efficiency and water quality control with timeframes.
- The revision of water-related laws and regulations. In 2002, the Water Law was revised and new provisions were added to promote Integrated Water Resource Management in China. The Water Pollution Prevention and Control Law was revised in 2008 and agricultural pollution control was added as a new section. The Agricultural Law was revised in 2012 so that it now emphasizes agricultural pollution prevention and control. In 2014 the Environmental Protection Law was revised for the first time since it was enacted in 1989. It increased sanctions against polluters and updated some basic environmental protection rules for the country, including those on environmental standards, planning and monitoring. Numerous laws, regulations and guidelines have been revised so as to adapt to the new situation.

14 Wang, Y. (2009). *China's water issues: transition, governance and innovation* (pp. 117-134). Earthscan Publications, London, UK. Available at http://admin.cita-aragon.es/pub/documentos/documentos_WangYi_286d0ba6.pdf.

- The promotion of incentive instruments. During the past decade, the Central Government, as well as local governments, has developed a range of economic instruments to tackle water-related problems. For example, water price reform and water rights trading. Numerous bottom-up market-based approaches are being tested by local projects. For example, the eco-compensation programme for water quality protection in the Tai Lake region.
- The improvement of environmental governance through continued reforms of the political and bureaucratic systems. China's new government is now poised to tolerate slower economic growth, to shake off the long GDP focus and to put social progress and environmental welfare at the top of the nation's agenda.¹⁵ It signifies that China is undergoing a crucial shift in that the development trend is transforming from an economic-dominated trend to a more sustainable one.
- Promoting the rule of law. The Communist Party of China developed a new blueprint for the rule of law in its Fourth Plenary Session in 2014. It was the first time that a plenary session has taken the rule of law as its central theme, which means that reform has been taking place within the Communist Party system. By April 2014, China had 242 laws in force. In contrast to the previous legislation that centered on fundamental areas, the current 'laws in the making' focus on specific public concerns, such as food safety, education and environmental protection.¹⁶

2. Research questions and purposes

The main research question which will be prominent in this study is the following:

How can China improve its transition towards sustainable water resource management, from a governance perspective?

In order to answer the main research question it is necessary to break it down into several sub-questions:

- RQ 1. What are the main challenges for sustainable water resource management in China?
- RQ 2. What are the Chinese characteristics of water governance related to water quality governance?
- RQ 3. What are the similarities and differences of the cost recovery for water services in China compared to the EU?
- RQ 4. How does China apply incentive approaches in water resource management?
- RQ 5. How are water quality objectives established and implemented in China compared to the EU?

15 He, S. (2013, November 11). China: Goodbye, GDP. Retrieved March 5, 2015, from <http://english.people.com.cn/business/8452673.html>.

16 China Today. (2014, December 30). Transformations of China's Legal System. Retrieved March 3, 2015, from http://www.chinatoday.com.cn/english/society/2014-12/30/content_661622_2.htm.

- RQ 6. How does China respond to the challenge of diffuse water pollution from agriculture compared to the EU?
- RQ 7. To what extent can China draw inspiration from the EU considering that they are governed by two very different legal regimes?

The purposes of this study are to provide policy makers and scholars with a clear background for understanding the regulatory instruments with regard to water resource management in China and to contribute towards improving Chinese policy and legal framework for water resource management.

3. Research methodology

3.1 Research approach

Water crisis is often a crisis of governance.¹⁷ Due to the complex nature of water systems (multilevel, multi-scale and multi-actor), a comprehensive water governance approach is needed in which different values, interests and uses of water are interconnected so that water policy and measurements are developed and implemented with the support of different stakeholder groups.¹⁸ This book applies a three-step diagnostic method to approach water governance issues in China. The method, developed by Van Rijswick et al., includes ten building blocks generated from a multidisciplinary perspective, respectively water system analysis, economics, law and public administration.

The ‘ten building-block’ assessment method assumes that water governance is sound when three main dimensions and the corresponding ten building blocks are dealt with (Figure 1). Sound water management requires knowledge of the water system in time and space and about values, principles and policy discourses. This knowledge is required for the organizational process to come to an agreed service level. The organizational process requires sufficient stakeholder involvement, insights into the trade-offs between social objectives, the attribution of responsibilities, authorization and the associated means as well as regulations and agreements. Finally, the agreed service level has to be implemented, which requires the engineering of infrastructure, monitoring, enforcement and conflict prevention and resolution.¹⁹

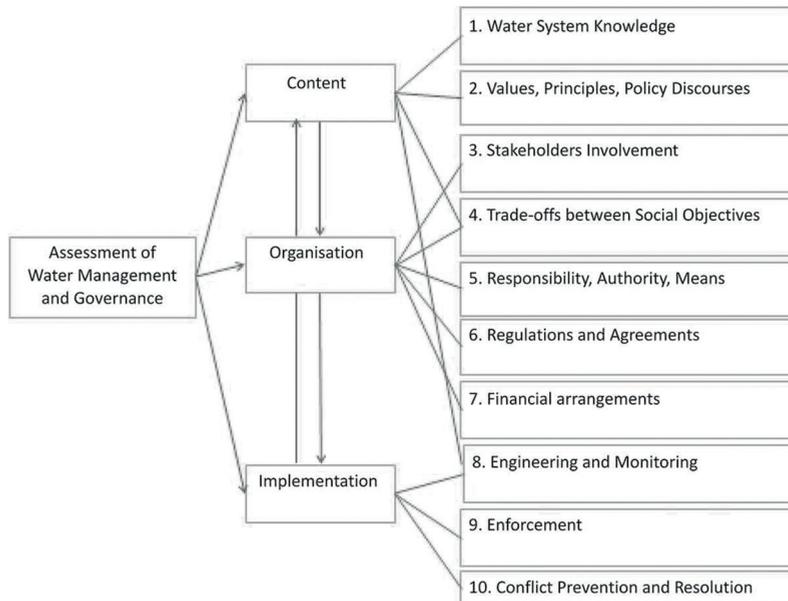
Instead of thoroughly exploring each block, this book firstly analyzes all ten blocks in Chapter 2, with the aim of identifying and understanding the main challenges in Chinese water resource management and to provide readers with a comprehensive view of the current status and challenges of water governance in China. Due to the expertise of the author there is a certain cross-disciplinary barrier. Therefore Chapter 2 does not pay equal attention to each block and the analysis of each block is mainly studied from a regulatory perspective.

17 Rogers, P., & Hall, A. W., (2003). *Effective water governance* (Vol. 7). Stockholm: Global Water Partnership.

18 Van Rijswick, M., Edelenbos, J., Hellegers, P., Kok, M., & Kuks, S. (2014). Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water international*, 39(5), 725-742. DOI: 10.1080/02508060.2014.951828.

19 Ibid.

The remainder of the chapters further discusses selected blocks which are most closely related to the research questions. These mainly include the second block (Policy Discourses), the fifth block (Responsibility, Authority and Means), the sixth block (Regulations), and the seventh block (Financial Arrangements). This book categorizes these blocks by a Meta-framework of Governance introduced below.



3.2 A meta-framework of governance

The meta-framework of governance is conceptualized by Lange et al. for promoting sustainable development.²⁰ Based on the existing literature on “governance” and “governance modes”, Lange et al. developed their meta-framework of governance by using a triad of polity, politics and policy.²¹

The *polity dimension* denotes the institutional structure. That is, the institutional architecture in which politics and policy-making take place, as well as the prevalent interaction patterns among participating actors on multiple policy levels. In this book, policy discourses, water resource management authorities and responsibilities are discussed under this dimension.

The *politics dimension* covers the political process, the relevant aspects within which are the specific relationships of the state and non-state actors during the initiation and coordination process of a governance arrangement. This dimension mainly focuses on the block of financial arrangements, and aims to answer the question of how

20 Philipp Lange, Peter P.J. Driessen, Alexandra Sauer, Basil Bornemann & Paul Burger (2013) Governing Towards Sustainability – Conceptualizing Modes of Governance, *Journal of Environmental Policy & Planning*, 15:3, 403-425, DOI: 10.1080/1523908X.2013.769414.

21 Ibid.

China applies market-based or incentive approaches to supplement the traditional command-and-control approach in water resource management in its transition stage.

The *policy dimension* encompasses the content of governance; it refers to policy formulation and implementation to realize specific goals. This book takes water quality protection as an example to discuss China's regulatory framework of water pollution control, which mainly refers to the block of regulations.

However, the three dimensions of governance are not independent from each other, and neither are the ten blocks. A change to one component could affect other components. For example, if the institutional structure changes in the polity dimension, the policy formulation or the implementation of the policy dimension will be affected and changed correspondingly. Similarly, if the block of policy discourse or, more obviously, the "values" are changed, the remaining nine blocks will then be directly affected. Therefore, readers should keep in mind that the relationship between the components of the meta-framework of governance and the ten blocks is dynamic although they are categorized in different groups in this book. See table 1.

Table 1: Research Framework

Themes	Specifications	Blocks	Sub-RQs	Reflections
polity dimension	Structural side: institutional structure at multiple levels	2&5	RQ 1 & 2	Chapter 2 & 3
politics dimension	Process side: interaction among different actors	5&7	RQ 3 & 4	Chapter 4 & 5
policy dimension	Content side: policy formulation and implementation	5&6	RQ 5 & 6	Chapter 2, 6 & 7
Integration	Block 1-10, RQ 1-7, Chapter 8			

3.2.1 Why the meta-framework of governance?

The meta-framework of governance, generated from political science, is deployed by this legal study. This is because China applies a different legal development path compared to many other countries due to the tradition, dating back thousands of years, of a political monopoly over the law.

Politics and the law deeply influence and penetrate each other in China, which has made it impossible for Chinese laws to function in the same way as they do in Western legal systems, through which social negotiation, mediation and distribution are regulated.²² The Communist Party, with its leadership being mentioned five times in the preamble to China's Constitution, is the dominant power in social development. China pursues the goal of a "socialist rule of law with Chinese characteristics".²³ It is characterized by the fact that the law in China adheres to the Communist Party's

22 Gu, S. (2009). *Law and Politics in Modern China: under the Law, the Law, and above the Law*. Cambria Press. Available at https://www.academia.edu/1136586/Law_and_Politics_in_Modern_China.

23 Xinhuanet. (2014, October 28). Xi says China adheres to socialist path in rule of law. Retrieved March 3, 2015, from http://news.xinhuanet.com/english/china/2014-10/28/c_133748934.htm.

leadership. This makes it impossible to separate any discussion of China's legal system from a political analysis. Therefore, this study makes use of the three dimensions of polity, politics and policy as a new perspective to analyze China's water governance. The focus of this research, however, is still on the legal aspects, as one of the aims of this study is to contribute to the construction of a formal legal framework which is a fundamental part of the development of the "rule of law" approach.

3.2.2 *Specification of the research framework*

1) The polity dimension denotes an institutional structure which determines the actors and levels involved in governance processes, as well as the division of power resources.²⁴ In this research it is limited to China's institutional arrangements of water resource management and the governance pattern embedded therein. The key questions underpinning this theme include:

RQ 1. How are the institutional structures of water management arranged in China?

Over the past three decades, China has established an extensive group of institutions to manage water resources. The aim of this research question is to investigate the diversification of responsibilities among different water-related government agencies that influence water resource management from a macro-perspective, which covers both horizontal and vertical levels.

RQ 2. What are the Chinese characteristics of water governance related to water quality governance?

As stated above, China applies a different path of social development compared to other countries. This research question aims to explain this difference which is also reflected in the field of water governance. It explores how China applies political power as an institutional instrument to address its water quality challenge. By answering this question, those readers who are not familiar with China's legal and political system may learn how political power and formal law play their roles in water resource management in China's transition phase.

2) A significant global trend has occurred in water governance in recent decades. It is now shifting from government-dominated to market-based policies. The *politics dimension* in this research is interpreted as collective action through which state and non-state actors interact with each other to co-manage water resources. It is characterized by complex multi-actor interactions across state, market and civil society levels and these occur at multiple levels.²⁵ Two questions are formulated to address this theme:

RQ 3. What are the shortcomings of the cost recovery for water services in China, compared to the EU system of cost recovery?

24 Philipp Lange, Peter P.J. Driessen, Alexandra Sauer, Basil Bornemann & Paul Burger (2013) Governing Towards Sustainability – Conceptualizing Modes of Governance, *Journal of Environmental Policy & Planning*, 15:3, 403-425, DOI: 10.1080/1523908X.2013.769414.

25 Ibid.

Market-based environmental policies are considered to be more cost-effective than conventional policies.²⁶ Being inspired by the EU Water Framework Directive's promotion of the cost recovery of water services, this research question aims to explore China's situation in this regard and to obtain useful lessons that the EU could provide for China.

RQ 4. How does China apply incentive approaches in water resource management?

For almost a decade China has been implementing 'eco-compensation' mechanisms as an incentive approach to address water-related ecosystem issues. Such an approach requires close cooperation between government and private sectors, i.e. farmers and industry. Under this research question, Lake Tai watershed is put under the microscope in order to show how this cooperation works at a regional level.

3) The *policy dimension* encompasses the content of governance. "Policy is the sum of government activities, whether acting directly or through agents, as it has an influence on the life of citizens".²⁷ In this research, "policy" in water governance is specified as a set of political and legal arrangements which aim to control water pollution, especially from agricultural sources in both China and the EU.

RQ 5. How are water quality objectives established and implemented in China compared to the EU?

Both China and the EU have established water quality objectives by means of deadlines and various implementation strategies for achieving them. This research question aims to explore the similarities and differences between the formulation of objectives and the selection of strategies in both regions.

RQ 6. How does China respond to the challenge of diffuse water pollution from agriculture compared to the EU?

Diffuse water pollution from agriculture is increasingly recognized as a main contributor to water pollution in both China and Europe. The challenge for China is to develop an adequate regulatory framework to tackle diffuse pollution. This research question aims to examine how different regions – China and the EU – respond to a similar problem and what China could learn from the experiences of the EU.

This research applies a comparative approach concerning China and the EU in its RQ 3, 5 & 6 (the reasons for this are explained in "Methods"), which generates a following sub-question:

RQ 7. To what extent can China draw inspirations from the EU considering they are governed by two very different legal regimes?

26 Portney, P. R., & Stavins, R. N. (1998). *Market-based Environmental Policies*. Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University. Available at: <http://www.ksg.harvard.edu/fs/rstavins/Papers/Market%20Based%20Environmental%20Policies.pdf>.

27 B. Guy Peters, *American Public Policy: Promise and Performance* (Chappaqua, NY: Chatham House/Seven Rivers, 1999).

Although China and the EU share different political and legal cultures, they are facing similar problems regarding water management. A comparative study is meaningful for China as an old saying indicates that it is significant “to overcome one’s own shortcomings by learning from the strong points of others”.

4. Research methods

4.1 Research methods

This research is analytical, applied and qualitative with a cross-disciplinary approach, which covers both law and public policy. It introduces and analyzes the existing regulatory framework and aims to find a solution to pressing practical problems, e.g., water pollution control and water conflicts between different regions. It investigates the information in a particular field, i.e. the water-related regulatory framework. In this regard, this research is therefore qualitative in nature.

The major methods of this study include desk research, a case study approach, and a comparative approach.

Desk research entails a content analysis of primary sources, e.g. Policy documents, legal regulations, official bulletins and reports, as well as secondary sources, e.g. a broad range of literature and websites. The sources are in both the Chinese and English languages.

A case study in this research means a descriptive and exploratory analysis of a special instrument deployed by a region or a country to manage its water resources.

A comparative approach is mainly applied when comparing different regulatory strategies at the Chinese national level and the EU regional level. The reasons for selecting the EU are explained below.

More details concerning the research methods are addressed in each individual chapter.

4.2 Why the EU?

China and the EU not only face similar water challenges and share similar goals of achieving sustainable and efficient water use, they also experience a similar transition path of water resources governance, and this is the particular reason why the EU has been selected for this research.

The EU has been developing river basin management and legal frameworks for many years. The bulk of the European Community’s water policy legislation was developed in the mid-1970s and the early 1980s, followed by a second wave of Directives in the early 1990s.²⁸ Early EU water legislation was formulated around priority issues and was focused on water quality. For example, in the period from 1991 to 1998 few directives

28 Foster, D., Wood, A., & Griffiths, M. (2010, May). The EC Water Framework Directive and its implications for the Environmental Agency. In *Freshwater Forum* (Vol. 16, No. 1). Available at: <http://aquaticcommons.org/4603/1/DFoster.pdf>.

were issued which addressed urban wastewater, agricultural pollution, and emissions from industrial installations, respectively.²⁹ However, it has been acknowledged that such an approach is “piecemeal and inconsistent, with differing and sometimes conflicting methods, definitions and aims”.³⁰ That unsatisfactory situation has been recognized for some time by both the Commission and the European Parliament. The Water Framework Directive (WFD), proposed in 1997 and enacted in 2000, is a major piece of legislation and is intended to resolve this piecemeal approach.

The WFD is a milestone in the history of water resources management in the EU; it is a crucial step in ensuring an effective structure for the application of the existing directives that address water management in Europe. It is also interpreted as a coherent legislative framework for the protection and improvement of the water environment within the context of achieving sustainable development in the EU.³¹ After more than a decade of its application, the water status in Europe has been improved, although this is still not enough.³² The first WFD cycle has been operating from 2009-2015, and during this cycle it is expected that the number of surface water bodies in a “good” status will increase from 43% to 53%.³³

The WFD was not only a response to the piecemeal approach of water resource management, but also a response to the increasing water pressure from diffuse source pollution in the EU. When dealing with point-source pollution, it is possible to apply the regulatory standards that are defined for the substances that are discharged. Among the EU member states, in many cases national standards do exist and a permit regime has been established.³⁴ However, when the source of the pollution is diffuse, as is the case for many agricultural activities, standards or permits have limited applicability, as this involves fundamental changes in land use activity and management practices. The WFD provides a new opportunity to tackle aspects other than point-source pollution, for example, by integrating the water and agriculture sectors.

The problems China is facing today are similar to the problems the EU faced in the early stages in both water pressure – diffuse pollution and the water resource management approach – and fragmentation. Besides, what makes the EU more relevant to China is that China proposed a similar strategy of integrated river basin management in 2002 when revising its Water Law. These common features make China and the EU very

29 Giupponi, C., Cogan, V., & La Jeunesse, I. (2002). EU water policy: Research developments and new management tools. *Red*. Available at: <http://ageconsearch.umn.edu/bitstream/14463/1/wp02-13.pdf>.

30 Foster, D., Wood, A., & Griffiths, M. (2010, May). The EC Water Framework Directive and its implications for the Environmental Agency. In *Freshwater Forum* (Vol. 16, No. 1). Available at: <http://aquaticcommons.org/4603/1/DFoster.pdf>.

31 Giupponi, C., Cogan, V., & La Jeunesse, I. (2002). EU water policy: Research developments and new management tools. *Red*. Available at: <http://ageconsearch.umn.edu/bitstream/14463/1/wp02-13.pdf>.

32 WFD Implementation Reports. (n.d.). Retrieved March 3, 2015, from http://ec.europa.eu/environment/water/water-framework/impl_reports.htm.

33 An Introduction to the Water Framework Directive (2015, January 2). Retrieved March 3, 2015, from http://www.envirotech-online.com/news/water-wastewater/9/breaking_news/an_introduction_to_the_water_framework_directive/32842/#sthash.g19Wt44P.dpuf.

34 Foster, D., Wood, A., & Griffiths, M. (2010, May). The EC Water Framework Directive and its implications for the Environmental Agency. In *Freshwater Forum* (Vol. 16, No. 1). Available at: <http://aquaticcommons.org/4603/1/DFoster.pdf>.

comparable. As the Portuguese Minister of Agriculture, Sea, the Environment and Spatial Planning stated “In general terms, we all face the same challenges regarding water resources management. Obviously in a different scale and magnitude, with different backgrounds, reference conditions, and culture, that could lead us to different solutions to a similar problem.”³⁵

5. Research outline

Chapter 2 will provide an overview of China’s water challenges and resource management status quo by applying the ten-block approach. In this chapter, the main gaps in the transition stage towards sustainable water resource management in China are identified.

Chapter 3 takes a newly developed instrument, entitled ‘Captain of the River’, as an example to analyze China’s water governance from a political point of view. It examines the relationship between economic development and environmental pollution and analyzes how the Government Objective Responsibility System contributes to water quality management in China’s transition phase.

Chapter 4 applies a comparative approach to scrutinize the cost recovery of water services in both China and the EU. It first introduces the term “water service” in the Chinese context and then breaks down “cost recovery” into three parts for discussion: water services, cost recovery and the role of the polluter pays principle.

Chapter 5 selects one of China’s most developed and polluted regions – Lake Tai in Jiangsu Province – as a case study to examine the implications of the eco-compensation mechanism at the local level in China. It discusses four types of eco-compensation which are being developed and applied across this region: eco-compensation between governments, eco-compensation between governments and farmers, eco-compensation between governments and industry, and eco-compensation among industries.

Chapter 6 provides an insight into water quality management. By applying a comparative approach, it elaborates the similarities and differences between China and the EU in setting water quality objectives and implemented strategies, with a particular focus on the interaction between water policies and agricultural policies.

Chapter 7 discusses how China has responded to its “new” challenge which was revealed in 2007 – agricultural water pollution. It analyzes three different pollution sources, i.e. fertilizers, pesticides and manure and discusses the corresponding regulatory framework from a legal point of view by making a comparison with the EU.

Chapter 8 comes to an overall conclusion based on the previous findings and it provides concrete suggestions to overcome the deficiency in China’s current regulatory framework for water governance.

35 EU China River Basin Management Programme Project Completion Report 2007 – 2012, Project Completion Report MR-019. (2012, August 1). Retrieved March 5, 2015, from http://cewp.org/wp-content/uploads/2014/03/RBMP-Completion-Report-MR-018_EN.pdf

CHAPTER 2

Identifying and Understanding the Main Challenges for Sustainable Water Resource Management in China

This chapter is to be published in the Journal of Water Law: 2015, Liping Dai, "Identifying and understanding the main challenges for sustainable water resource management in China".

A water crisis is often a governance crisis.¹ Due to the complex nature of water systems (multilevel, multi-scale and multi-actor), a comprehensive water governance approach is needed in which different values, interests and uses of water are interconnected so that water policy and measurements are developed and implemented with the support of different stakeholder groups.² This chapter explores China's water resource management by applying a '10 building-block' method (Section 2) and identifies the main gaps that should be addressed in a transition process towards sustainable water resource management (Section 3). It aims to provide readers with a comprehensive view of the current status of water governance in China.

1. Introduction

Water challenges in China are wide-ranging, from the increasing competition for water use to scarcity, pollution and conflicts between different administrative regions. China has 6% of the world's total water resources; however, its large population means that the country has only 25% of the world's average water resources per capita. It has been listed by the United Nations as one of 13 countries that is experiencing serious water scarcity.³ Unfortunately, this limited water resource is compounded by high levels of pollution. Two-thirds of China's surface water and half of the country's groundwater are polluted.⁴ This scarcity and pollution lead to increasing tensions between different stakeholders and administrative regions. To tackle these water challenges, China is taking a series of measures.

- 1 Rogers, P., & Hall, A. W., (2003). *Effective water governance* (Vol. 7). Stockholm: Global Water Partnership.
- 2 Van Rijswijk, M., Edelenbos, J., Hellegers, P., Kok, M., & Kuks, S. (2014). Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water international*, 39(5), 725-742. DOI: 10.1080/02508060.2014.951828.
- 3 A Different Look at Water: Part I Water for Cities and the Water-Energy Nexus (2011). Dow Water & Process Solutions, retrieved from: http://msdssearch.dow.com/PublishedLiteratureDOWCOM/dh_08cd/0901b803808cdb25.pdf?filepath=liquidseps/pdfs/noreg/609-03016.pdf&fromPage=GetDoc.
- 4 China's Environment: 1 In 2 Gallons of Water Polluted, retrieved from: <http://www.buzzfeed.com/thewilsoncenter/chinas-environment-1-in-2-gallons-of-water-pollu-bh9k>.

A water crisis is often a governance crisis.⁵ Due to the complex nature of water systems (multilevel, multi-scale and multi-actor), a comprehensive water governance approach is needed in which different values, interests and uses of water are interconnected so that water policy and measurements are developed and implemented with the support of different stakeholder groups.⁶ Van Rijswick et al. have developed a three-step diagnostic method to approach water issues in a holistic and integral way. The method includes 10 building blocks developed from a multidisciplinary perspective, respectively water system analysis, economics, law and public administration. This chapter explores China's water resource management by applying the '10 building-block' method (Section 2) and identifies the main gaps that should be addressed in a transition process towards sustainable water resource management (Section 3). It aims to provide readers with a comprehensive view of the current status of water governance in China. Due to the expertise of the author there is a certain cross-disciplinary barrier. Therefore this chapter does not pay equal attention to each block and the analysis of each block is mainly studied from a regulatory perspective.

2. An integrative and multi-disciplinary method to assess water governance in China: the '10 building-block' assessment method

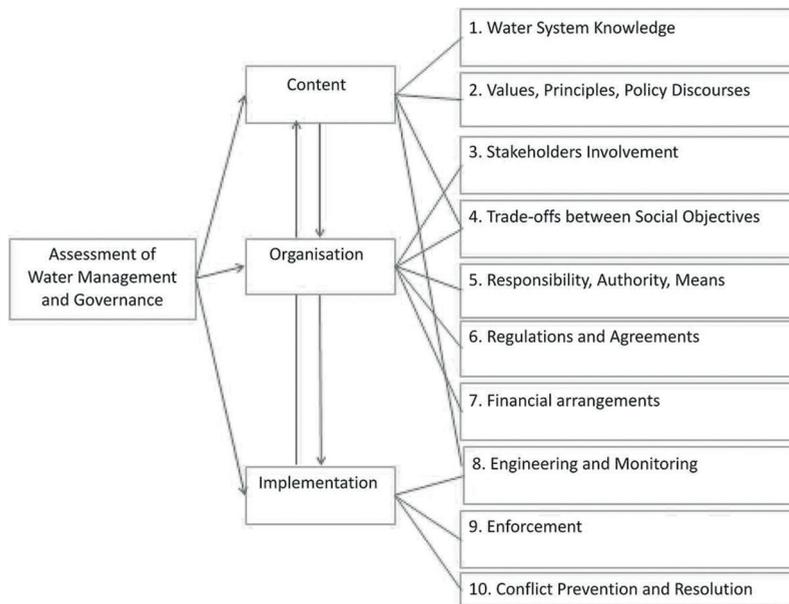
The '10 building-block' assessment method assumes that water governance is sound when three main dimensions and the corresponding 10 building blocks are dealt with (Figure 1). Sound water management requires knowledge of the water system in time and space and about values, principles and policy discourses. This knowledge is required for the organizational process of attaining an agreed service level. The organizational process requires sufficient stakeholder involvement, an insight into the trade-offs between social objectives, the attribution of responsibilities, authorization and the associated means as well as regulations and agreements. Finally, the agreed service level has to be implemented, which requires the engineering of infrastructure, monitoring, enforcement and conflict prevention and resolution.⁷

5 Rogers, P., & Hall, A. W., (2003). *Effective water governance* (Vol. 7). Stockholm: Global Water Partnership.

6 Van Rijswick, M., Edelenbos, J., Hellegers, P., Kok, M., & Kuks, S. (2014). Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water international*, 39(5), 725-742. DOI: 10.1080/02508060.2014.951828.

7 Ibid.

Figure 1: The cyclic aspect of the '10 building-block' method.



Source: Van Rijswijk, M., Edelenbos, J., Hellegers, P., Kok, M., & Kuks, S. (2014). *Ten building blocks for sustainable water governance: an integrated method to assess the governance of water*.

This section analyzes the application of the '10 building-block' assessment method in China's water resource management.

2.1 Block 1: Water system knowledge

There are about 50,000 rivers with an area larger than 100 km² in China, among which more than 1,500 rivers cover an area larger than 1,000 km². Most rivers are located in the eastern and southern part of China. The total basin area of the rivers flowing into the sea accounts for $\frac{2}{3}$ of Chinese territory, while the remaining $\frac{1}{3}$ belongs to the inland river basins.⁸ Seven river basins are considered to be the major basins in China: the Yangtze River Basin, the Yellow River Basin, the Hai River Basin, the Huai River Basin, the Songliao River Basin, the Pearl River Basin, and the Tai Lake Basin. (See Figure 2).

8 Dai, L. (2012). Recovering the Costs of Water Services in the People's Republic of China: Lessons from Article 9 of the European Union Water Framework Directive. *Utrecht Law Review*, 8, 102.

Figure 2: River Basins in China



Source: author's edited version from the Ministry of Water Resources

In terms of the total volume of water resources, China is water-rich. However, a myriad of causes prevent China from enjoying its substantial water resources. These include the massive population of over 1.3 billion, the high variability of seasonal rainfall, and the uneven geographical distribution of water resources.⁹ Water pollution (see Figure 3), water scarcity (see Figure 4), and flood control are seen as the main challenges in China's water resource management.¹⁰ According to statistics by China Water Risk, 57% of shallow groundwater and 50% of deep groundwater in China are Class V.¹¹ Some 20 of the 31 provincial regions (excluding Hong Kong, Macao and Taiwan) have less water than the national average, and the annual renewable water resources per capita of these 20 are less than those of some Middle Eastern countries. The 11 "dry" provinces (Figure 4) account for 51% of the total industrial output in China.¹²

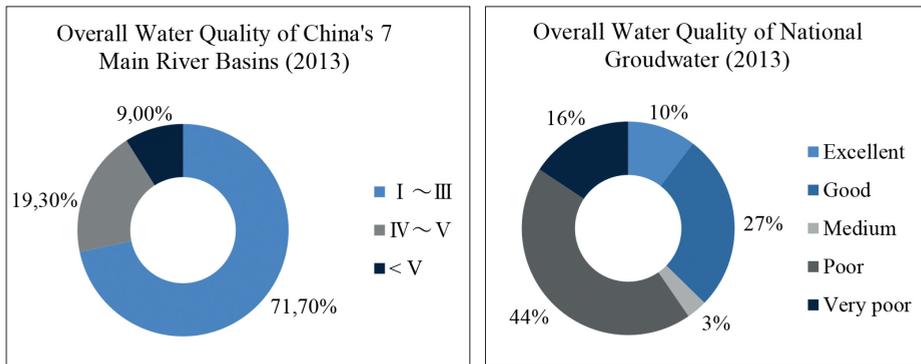
9 Lee, Seungho. "China's water policy challenges." *The University of Nottingham, China Policy Institute Discussion Paper 13* (2006).

10 Ibid. Flood control is not discussed in this chapter.

11 There are five classifications of water quality in China: Class I: water source, national protection areas; Class II: centralized drinking water supply, spawning grounds for rare fish species and shrimps, nursery areas for larva, juvenile and young fish; Class III: grounds and migration paths for common fishes and shrimps, aquaculture areas and swimming areas; Class IV: general industrial water areas, entertainment areas; Class V: farmland areas, general landscape.

12 China Water risk, <http://chinawaterrisk.org/big-picture>.

Figure 3: Overview of China's river basins and their water quality status



Source: Data obtained from the National Environment Bulletin 2013.

Figure 4: Water scarcity in China



Source: China Water Risk (<http://chinawaterrisk.org/big-picture/whos-running-dry/>), data obtained from the National Bureau of Statistics of China, China Statistical Yearbook 2003-2012.

2.2 Block 2: Values, principles and policy discourses

2.2.1 Values and principles

For human beings water was not merely a substance that sustained life. It was above all an elemental ingredient in the way people conceived of the world and a principal

component in the expression of their thoughts and emotions.¹³ Chinese philosophy believes that “the unity of heaven and men” is the basis of relations between man and nature. The human being is a living body of nature and is part of nature. The human being should not wish to conquer, dominate or control nature. The human being must learn to respect and to cherish nature. Relations between man and nature should mutually depend on each other.¹⁴

Although there is not much academic discussion on water values and there is no legal definition or formal recognition of the human right to water in China, most people agree that water resources are precious. In 2014, 99% of the public believe that it is important to take urgent action to address and solve water issues, and 94% feel that they need to take more personal responsibility to help solve water issues in China.¹⁵ Chinese governments have consistently devoted themselves to improving access to water. For example, governments require that water provided by water suppliers should be: (1) a sufficient amount to satisfy personal and domestic uses; (2) of good quality that can prevent water-related diseases; (3) with sufficient accessibility that not only allows people to obtain enough safe water within safe physical reach, but also requires that a water supply should be a universal service with an acceptable price and that it should be supplied on a non-discriminatory basis.¹⁶

Furthermore, an important value in China is the socialist system with a strong role for the Communist Party. Under the guidance of its Constitution, China’s water resource management path is destined to have its own characteristics, as is stated in the Preamble to the Constitution: “under the leadership of the Communist Party of China ... the Chinese people of all nationalities will continue to adhere to ... the socialist road ... steadily improve socialist institutions ... develop socialist democracy, improve the socialist legal system”. China is subject to the leadership of the Communist Party, which has penetrated into almost every nook and cranny of social development.

Certain principles in Chinese environmental and water policies are an important guidance for further policies, but they are often formulated in a rather general way. For example, the Environmental Protection Law states that “activities concerning environmental protection shall adhere to the following principles: according priority to protection, emphasis on prevention, integrated governance, public participation and liability assumption of damages”, which all need to be translated into concrete provisions to be implemented in practice. These principles also provide guidance for the law and policy formulation.

13 Hassan, F. A. (2011). *Water History for Our Times*, France: United Nations Educational, Scientific and Cultural Organization <http://unesdoc.unesco.org/images/0021/002108/210879e.pdf>.

14 Tong Y.(2010). *Healing the Earth: Confucianism and its Environmental Protection Perspective*. Retrieved from: http://www.chinarujiao.net/w_info.asp?PID=6476.

15 *Value of Water* (2014), *Value of Water Index: China*. Retrieved from: http://www.xylem.com/valueofwater/media/China_ValueOfWater_Infographic_8.5x11.pdf.

16 National Development and Reform Committee (NDRC) (2007). *The Outline of the 11th Five-Year Plan for National Economic and Social Development*, 3.

2.2.2 Policy discourses

China is striving to build a “harmonious society”, which aims to change its focus from economic growth to an overall societal balance and harmony. To achieve this strategic vision, the Central Government has declared environmental protection to be one of its priorities (11th and 12th year plans) (Chapter 3).¹⁷ Speeches delivered by President Xi Jinping in early 2014 stressed that China should no longer evaluate the performance of local governments by GDP growth. Instead, it should look at welfare improvement, social development and environmental protection.¹⁸ Premier Li Keqiang has declared ‘war on pollution’ with measures being implemented and monitored across China.¹⁹ The Communist Party for the first time focused on the rule of law in its Fourth Plenary Session in 2014, with the aim to promote the modernization of the country’s governing system and capabilities.²⁰ Numerous environmental laws and regulations have been revised and new approaches have been promoted so as to adapt to the new situation (see the remaining chapters in this book).²¹

China’s structural rebalancing is underway. The role of the government is changing and the role of society is increasing. Governments which address water pollution and scarcity do not rely solely on the traditional command-and-control approach but combine it with other smarter approaches, for example the incentive approach and the bottom-up approach (Chapters 4 & 5). The public participation system in various domains of social development is being promoted by the Central Government and the Communist Party (Section 2.3).

Due to the different political structure, China applies different ways to manage its water resources compared to most of the other countries. The legal system in China is based primarily on the Civil Law model and its primary source is statutes. However, the difference is that, besides formal statutes, the Communist Party is another principal actor in water resources management, as well as in other domains of social development management. China must adhere to the leadership of the Communist Party. The formal law and the Party policy provide synergy to (but also constraints on) each other (Chapter 2). The interaction of Party policy and the formal law is discussed under the sixth block of regulations *and agreements* (Section 2.6).

-
- 17 KPMG, Cutting through complexity (2012). China’s 12th Five-Year Plan (2011-2015)-KPMG Insight Series. Retrieved 24,2,2015, from: <http://www.kpmg.com/cn/en/issuesandinsights/articlespublications/publicationseries/5-years-plan/pages/default.aspx>.
 - 18 Rapoza, K. (2013). China’s Pres Xi: GDP No Longer the Measure of Success. Retrieved 11, 5, 2014, from Forbes: <http://www.forbes.com/sites/kenrapoza/2013/07/01/chinas-pres-xi-gdpno-longer-the-measure-of-success/>.
 - 19 REUTERS (2014). China to ‘declare war’ on pollution, premier says. Retrieved 2,2,2015, from: <http://www.reuters.com/article/2014/03/05/us-china-parliament-pollution-idUSBREA2405W20140305>.
 - 20 International Business Time (2014). As Communist Party Meets For Fourth Plenum, Chinese Media Goes Big On ‘Rule Of Law’. Retrieved 2,2, 2015, from: <http://www.ibtimes.com/communist-party-meets-fourth-plenum-chinese-media-goes-big-rule-law-1708020>.
 - 21 Van Rijswijk, M. & Wouters, P. (2015). “Contemporary challenges for water law – achieving sustainable and adaptive fresh water management across Europe and China”, Journal of Water Law, forthcoming.

2.3 Block 3: Stakeholder involvement

This section explores China's public participation by applying the three pillars of the Aarhus Convention: access to information, participation in decision-making and access to justice.²² Although China is not a party to the Convention, these three pillars are generally recognized as important elements of public participation in China.

In the first pillar of access to information, China issued a General Regulation on the Disclosure of Government Information in 2007. It stipulates that "governments at all levels ... shall establish and improve a government information disclosure system ... and appoint an institution to be responsible for the daily task of information disclosure" (Article 4). Governments disclose information according to the principles of "impartiality, justice and bringing convenience to the public" (Article 5), and by means of "government bulletins, government websites, news releases, newspapers and periodicals, broadcasting, television or any other means which can be easily accessed by the general public" (Article 15). "The government evaluation system shall be evaluated and appraised by a public appraisal system and a responsibility system on a regular basis" (Article 29). A failure to fulfil the obligation to disclose government information will result in a responsibility investigation.²³

A total of 17 categories of environmental information must be disclosed by the Ministry of Environmental Protection on a compulsory basis. These include environmental protection plans; the distribution of credits concerning total discharges of allowed pollutants and their implementation status; the items, bases and standards of pollutant discharge fees as well as the procedures concerned; and the names and lists of enterprises which discharge pollutants in excess of national or regional discharging standards or seriously contribute to environmental pollution.²⁴

The regulation issued by the Ministry of Water Resources on Disclosing Government Administration Affairs lists 11 items that have to be disclosed to the public, including ministerial regulations and guidelines, key national water projects, the development and utilization status of national water resources, ministerial water resource plans, and technical standards for the water industries, etc.²⁵

In terms of public participation in decision-making, the Law of Environmental Impact Assessments (EIA) stipulates that "the state encourages relevant entities, experts and the general public to participate in the appraisal of environmental impacts in appropriate ways" (Article 5). "If a programme may result in unfavorable environmental impacts or directly involve the environmental interests of the general public, the organ that elaborates the special programme shall, prior to submitting the draft programme

22 Aarhus Convention, adopted in 1998 and entered into force in 2001. <http://ec.europa.eu/environment/aarhus/>.

23 Regulation of the People's Republic of China on the Disclosure of Government Information, 2007, issued by the State Council, No. 492.

24 Measures for the Disclosure of Environmental Information (a Trial Implementation Period), 2007, issued by the State Administration of Environmental Protection (now the Ministry of Environmental Protection), No. 35.

25 The Interim Regulation on Disclosing Government Administration Affairs of the Ministry of Water Resources, 2006, issued by the Ministry of Water Resources, No. 205.

for examination and approval, seek opinions from the relevant entities, experts and the general public concerning any environmental impact by holding demonstration meetings or hearings or by any other means, except where it is provided by the state that it shall be kept confidential” (Article 11).

Four years after the EIA took effect, the Ministry of Environmental Protection issued implementation measures which specified the principles that the EIA shall be transparent, equal, wide-ranging and convenient. Guidelines on the disclosure of environmental information (the ways of doing so and the period during which this has to be done) and the forms of such disclosure (consultation, symposia and public hearings) as well as the public participation procedures are also specified.²⁶ The Ministry of Water Resources issued its own ministerial regulations on public participation, for example the Regulation on Public Hearings for Administrative Permits in the Water Sector in 2006.²⁷

In terms of the third pillar – access to justice – the responsible authority must inform the applicant(s) of the means and channels by which to access the information if it belongs to the category of “shall be disclosed”; and if the information cannot be disclosed as prescribed by law, the applicant(s) must be notified of this, and the facts and reasons have to be given (Article 21).²⁸ If one believes that the responsible authority has failed to fulfil its obligation to disclose government information according to the law, one may then inform a superior authority, which must investigate and deal with the matter. If one believes that one’s legal rights or interests have been infringed by an authority when disclosing government information, one may request an administrative reconsideration or bring an administrative lawsuit according to the law (Article 33).²⁹ However, such a lawsuit is difficult in practice, see the Ninth block of enforcement (Section 2.9).

During the past decade, China has developed a skeleton structure for public participation, but it is more at the theoretical level. As society lacks a historical tradition of public participation, there is a lack of experience in organizing and promoting such a programme.³⁰ Furthermore, public participation is more often promoted in the dimension of formal law compared to that of the Communist Party System. Although the Communist Party is developing public participation as well, it is only generally applied. In the core area, i.e. the Government Objective Responsibility System (Section 2.5), public involvement is not considered to be necessary. However, this core area is no less than a fundamental aspect of water governance in China at the current stage (Chapter 3).

26 Implementation Measures for Public Participation in an Environmental Impact Assessment, 2006, issued by the State Environmental Protection Administration (now the Ministry of Environmental Protection), No. 28.

27 Song, X., Mulder, K., Frostell, B., Ravesteijn, W., & Wennersten, R. (2011). Transition in public participation in Chinese water management. *Proceedings of the ICE-Engineering Sustainability*, 164(1), 71-83.

28 Regulation of the People’s Republic of China on the Disclosure of Government Information, 2007, issued by the State Council, No. 492.

29 Ibid.

30 Ibid.

2.4 Block 4: Trade-offs between social objectives: service-level agreements

At an earlier stage of the resource-draining development period in China, local governments often boosted their economic resources by over-exploiting natural resources. Increasing demands for the use of natural resources, including water use, resulted in numerous conflicts among different administrative regions, as well as different stakeholders. At this transition stage, when rebalancing the development structure, the Central Government took trade-offs in economic development into account and paid great attention to environmental protection. The water allocation mechanism is currently being structured.

2.4.1 Water allocation

A useful working definition of water allocation would be that it is a combination of actions which enable water users and water uses to take or to receive water for beneficial purposes according to a recognized system of rights and priorities.³¹ Water allocation is a mechanism for determining who can take water, how much they can take, from which locations, when, and for what purpose.³²

Internationally, water allocation can be targeted in numerous forms, ranging from complete control by the government to a mixture of market and government allocation, and to predominantly market allocation.³³ In China, the original allocation of water resources is dominated by the government: the trans-provincial allocation of water resources is jointly guided by the River Basin Commissions and provincial governments, and the allocation of water resources within one provincial jurisdiction is dominated by the provincial government which consults with relevant local governments. In the field of reallocation, the market has become more active during the last few years, but is still subject to extensive interference by governments.

1) National Water Resources Strategic Plan

The Water Law (2002) requires the State to make a National Water Resources Strategic Plan (NWRSP) for the purpose of investigating national water development and its utilization status in order to provide the country with a foundation for macro water resource allocation, water exploitation and utilization management, as well as water resource protection.

Both a top-down and a bottom-up approach are applied to formulate the NWRSP. At the “bottom” level, plans are developed by river basins and administrative regions. River basin plans include the River Basin Comprehensive Plan and the River Basin Special Plan. Regional Water Plans also consist of a comprehensive plan and a special

31 UN-ESCAP (United Nations, Economic and Social Commission for Asia and the Pacific) (2000), *Principles and Practices of Water Allocation among Water-Use Sectors*, ESCAP Water Resources Series No. 80, Bangkok, Thailand.

32 Speed, R., Li, Y., Le Quesne, T., Pegram, G., & Zhiwei, Z. (2013). *Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning.*

33 Dinar, A., Rosegrant, M. W., & Meinzen-Dick, R. S. (1997). *Water allocation mechanisms: principles and examples* (No. 1779). World Bank Publications.

plan. A comprehensive plan is an overall scheme that covers water development, utilization, conservation, protection, and pollution prevention. A special plan focuses on one theme, such as flood control, irrigation, water supply, fishing, water resource protection and water and soil conservation, etc.

Within a particular basin, the Special Plans must respect the comprehensive plans, and the Regional Plans must respect the River Basin Plan. At the “up” level, the NWRSP considers river basins to be Plan units and the State Council sets out the strategies, objectives, plans, guidelines and procedures. All River Basin Commissions and provinces must develop their own plans within their areas of responsibility. For the Plan for trans-provincial rivers and lakes, the River Basin Commissions are required to cooperate with the competent departments of the provincial governments. Both the River Basin Plan and the Regional Water Plan must be approved by the State Council before they are implemented in practice.

The process of drafting the NWRSP is interactive between the central and local level. Firstly, the Basin Commissions and the provinces submit their Plans to the central level, the State Council then balances and harmonizes the submissions from a macro perspective, and they may be returned to the submitters for revision if necessary. This process can be repetitive and can take a long time. In the case of China’s first NWRSP, it took 8 years from initiation (2002) to accomplishment (2010). The NWRSP basically answers the question of how much water resources are available for allocation.

2) The allocation of water resources

The Water Allocation Plan determines how water should be allocated between different regions, sectors, or users within a basin.³⁴ The process of developing a water allocation plan is fundamentally challenging because of the complexity of the issues involved, the number of interested parties, and the degree of uncertainty involved.³⁵

At the national level, water resource allocation and the total amount of control have been introduced as new concepts and strengthened by the 2002 Water Law. The Ministry of Water Resources issued a Water Quantity Allocation Measure in 2006, which defines water quantity allocation as

*“the allocation of the total usable amount of water resources or the total distributable water quantity to administrative divisions on a level by level basis, so as to determine the shares of consumable water quantity for life and production as well as the shares of water taking and its quantity” (Article 2).*³⁶

The Allocation Measure is applied at two levels: the trans-provincial level and within a provincial region. The river basin is taken as a unit when the allocated water is shared by different provincial regions; the administrative region is taken as a unit when the allocated water is located within a province. All water allocation plans are required

34 R. Speed, Li Y., T. Le Quesne, G. Pegram and Z. Zhiwei (2013) Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning, UNESCO, Paris.

35 Ibid.

36 Interim Measures for Water Quantity Allocation, 2006, Order No.32 of the Ministry of Water Resources. It came into force in 2008.

to combine and harmonize different mixes of management strategies, such as the Five-Year Plan, the Division of Water Function Zones, and the Most Stringent Water Management System, etc. Therefore, as well as the NWRSP, the water allocation plans could also take years, even decades, to be finalized. A procedural basis for water resource allocation provided by the Details of the NWRSP and the key steps is illustrated by Appendix 1. To date, there are only a few Sub-basin Allocation Plans and some Regional Allocation Plans available in China.

2.5 Block 5 Responsibility, authority and means

2.5.1 Authorities and responsibilities

A good water governance arrangement could be imagined as being a strong net which seizes every aspect of water issues. This section explores China's "governance net" on water resources from the horizontal, vertical and interactive points of view.

China's institutional framework for water resource management is often referred to as a 'multi-headed dragon' as a number of Ministries are involved (see Appendix 2). Conflicts between Ministries over policymaking and implementation are often prevalent.³⁷ For example, the two major institutions which manage water are the Ministry of Water Resources and the Ministry of Environmental Protection, which are mainly responsible for water quantity and quality, respectively. The Water Law authorizes the Ministry of Water Resource to oversee "water resource management" but does not define "water resources". It has been inclined to regard water quality protection as also one of its responsibilities, resulting in a contentious political struggle between the Ministry of Environmental Protection and the Ministry of Water Resources.³⁸ The turf conflicts between the two ministries are described as:

"Ministry of Environmental Protection and the ... Ministry of Water Resources argue over the interpretation of 'water resources' which Ministry of Water Resources claims means water quantity and quality, whereas Ministry of Environmental Protection argues that it alone has sole authority for water/environmental quality. This leads to serious institutional problems such as enormous duplication in monitoring and, with no sharing of data, duplication of river management plans. Each of Ministry of Water Resources and Ministry of Environmental Protection has its own system of river coding as a basis for water management. Calls to integrate or harmonize these fall on deaf ears as it is not in the interest of either ministry to do so."³⁹

Fragmented institutional arrangements unavoidably lead to fragmented regulations. Besides the four main statutes – the Water Law, the Soil and Water Conservation Law, the Flood Control Law and the Water Pollution Prevention and Control Law –

37 Lee, Seungho. "China's water policy challenges." *The University of Nottingham, China Policy Institute Discussion Paper 13* (2006). Retrieved from <http://www.nottingham.ac.uk/cpi/documents/discussion-papers/discussion-paper-13-china-water-policy-challenges.pdf>.

38 Yahua, W. (2005). River Governance Structure in China: A Study of Water Quantity/Quality Management Regimes. *Promoting Sustainable River Basin Governance: Crafting Japan-US Water Partnerships in China*, 23-36.

39 Nickum, J. (2010). Water policy reform in China's fragmented hydraulic state: Focus on self-funded/managed irrigation and drainage districts. *Water Alternatives*, 3(3), 537-551.

there are more than 20 national administrative regulations, more than 90 ministerial regulations, and more than 200 provincial regulations as well as numerous guidelines and political declarations. Each sector has its own interests and none of them is capable of developing an overall regulation to take all water-related factors into consideration due to a lack of authorities and effective cooperation.

At the provincial and lower administrative levels, the existing problems within an administrative jurisdiction are similar to the central level because local departments or bureaus are designed to extend the reach of the state into lower levels of society. They take the same sectoral approach to managing water on a daily basis at the local level.

When water is shared by more than one jurisdiction, conflicts concerning water issues often occur. This is partly the result of economic reforms. Since the beginning of the reform, GDP achievement has long been the focus of local governments as those with higher revenue contributions could gain more representation at the central level (Chapter 3). Various localities therefore tend to become inward-looking and regard each other as competitors.⁴⁰ Local governments often exploit their resources by means of their own political power. Environmental problems do not respect political boundaries, however. This inevitably leads to conflicts (see Section 2.10). But in this regard, the Chinese system provides exceedingly few formal mechanisms for inter-jurisdictional cooperation or interest-bargaining between administrative units.⁴¹

Although the 2002 Water Law stipulates that “the state manages water resources by integrating the management of river basins and administrative regions”, and authorizes the River Basin Commissions’ legal status, the River Basin Commissions are still merely extensions of the Ministry of Water Resources. They take a very top-down and narrow approach to managing the river basins.

Great differences between the River Basin Commissions in China and those in some other countries (e.g. the Netherlands) are that the Chinese River Basin Commissions are a) subordinate to their higher authority, they do not have law-making authority within their river basins; b) are not made up of representatives of stakeholders like the Dutch River Basin Commissions [Waterschappen] although they are also called “Commissions”. The horizontal relationship between the Chinese River Basin Commissions and local governments is one of coordination and cooperation. However, this is difficult when there is a lack of common interests. The River Basin Commissions are not known for their ability to override political boundaries. For example, when a River Basin Commission oversees the allocation of water withdrawal quotas among provinces, it has no legal power to stop a province from exceeding its allocation. Furthermore, while monitoring the water quality of the rivers shared by multi-administrative regions, the River Basin Commissions have no authority over its control, which is the responsibility of the environmental protection departments or bureaus of local governments.

40 Cannon, K. A. (2006). Water as a Source of Conflict and Instability in China. *Strategic Analysis*, 30(2), 310-328.

41 Moore, Scott. “Hydropolitics and Inter-Jurisdictional Relationships in China: The Pursuit of Localized Preferences in a Centralized System.” *The China Quarterly* 218 (August 2014): 1-21.

Vertically, Ministries in China cannot issue binding orders to local (provincial) governments due to the fact that they are at the same administrative level/rank. Departments under provincial governments therefore serve two heads. I.e. the corresponding Ministries (a consultative relationship) and the governments they belong to (an administrative hierarchical relationship). There is a great potential for conflicts when the relevant Ministries and governments do not share common interests. Government officials tend to fulfil their governmental objectives preferentially as they are constrained by the governmental personnel system (Chapter 3).

The “net” of China’s water resource management is weak and fragmented, regardless of which aspect – horizontal, vertical or interactive. A plurality of actors is not necessarily problematic, but in the absence of an effective coordinating mechanism it can produce multiple conflicting policies and, therefore, poor water management results.⁴²

Due to the fragmentation of the “governmental net” and the vague distribution of responsibilities, responsibility investigation is unavoidably difficult. The Government Objective Responsibility System has therefore become very popular. Through this system, higher-level governments set targets and assign them to lower levels by entering into performance contracts with the governmental officials and Communist Party leaders, who are personally held responsible for achieving those targets. By applying the Government Objective Responsibility System, administrative efficiency could be greatly improved and the conflicts posted by institutional fragmentation could be mitigated, because the responsible governmental officials and Communist Party leaders have a direct influence on the fragmented departments (Chapter 2 & 6).

2.5.2 *Water property and the allocation of water rights*

In China, all water resources, including surface water and groundwater, are owned by the State, as empowered by the Constitution and the Water Law.⁴³ The State holds water resources in “trust” for the benefit of its people. It also has stewardship responsibility to ensure that water is properly developed, used, managed and protected in the best interests of society.⁴⁴

A water right is legally limited to a right to divert water in China. After the Water Law was revised in 2002, it became acceptable to refer to the right to divert water as a “water right” that implicitly included the right to proper delivery and beneficial use.⁴⁵

A water right is obtained through the granting of a permit. All individuals and enterprises who want to have access to water are required to apply for a water

42 Karen Bakker & Christina Cook (2011) Water Governance in Canada: Innovation and Fragmentation, *International Journal of Water Resources Development*, 27:02, 275-289.

43 Article 9 of the Constitution states that “Mineral resources, waters, forests, and other natural resources are owned by the state”; Article 3 of the Water Law confirms that “water resources are owned by the State; the State Council, on behalf of the State, exercises the right of ownership”.

44 World Bank. (2013). *Design of ET-based Water Rights Administration System For Turpan Prefecture of Xinjiang China*. World Bank Publications.

45 Ibid.

abstraction permit,⁴⁶ and all enterprises and individual businesses which discharge pollutants into water must apply for a pollutant discharge permit.⁴⁷ Both for water abstraction and pollution discharges there is an obligation to pay a water resource fee and a pollution discharge fee, respectively (Chapter 4).

The priority for water use plays a key role in solving water conflicts in water-stressed regions. Most water allocation systems in Western states recognize the domestic use of water as being necessary to sustain life as the highest priority in water use, generally followed by irrigation.⁴⁸ China is no exception in this respect as it also determines that domestic water use by urban and rural residents has the highest priority, but at the national level it leaves agricultural, industrial, ecological and environmental and navigation uses in the same sequence after domestic water use, as all of them “shall be considered and taken care of” (Article 5).⁴⁹ This is because in a country of such an enormous size and complexity, the status of natural resources varies nationwide. Different regions might have different development priorities concerning agriculture or industry, for example. It is not feasible to regulate a unified water use priority sequence at the national level. However, at the provincial or lower level, governments may specify, within the limits of their authority, priority sequences for water use within a river basin or region in the light of conditions which are specific to a particular site (Article 5).⁵⁰

2.6 Block 6: Regulations and agreements

As stated in Section 2.2, in the Chinese legal system which is primarily based on the Civil Law model, the primary source of law is statutes. The National People’s Congress is the highest-level legislative body, which is empowered by the Constitution (Article 58).⁵¹ The National People’s Congress enacts and amends fundamental national statutes, for example the establishment, organization, and responsibilities of the National People’s Congress, the people’s governments, the people’s courts, civil and criminal liabilities, and the government’s prosecutorial functions, etc.⁵² With the exception of these fundamental national statutes, other basic national statutes, like the Environmental Protection Law, the Water Law, the Water Pollution Prevention and Control Law and so

46 There are some exemptions regulated by law, for example, small-scale water drawing for household use and for backyard poultry, the temporary emergency drawing of water to guarantee public safety, or to protect ecology and the environment.

47 Regulation of Pollutant Discharges (Draft for Soliciting Opinions), 2008.

48 Teerink, J.R., & Nakashima, M. (1993). *Water Allocation, Rights, and Pricing; Examples from Japan and the United States* (No. 198); Marleen van Rijswijk, The Allocation and Regulation of Limited Water Use Rights: Lessons from a general public law perspective, *Journal of Water Law*, accepted, published in January or February 2015.

49 Regulation on the Administration of Licences for Drawing Water and the Levying of Water Resource Fees.
50 *Ibid.*

51 Constitution of the People’s Republic of China (2004 Amendment), issued by the National People’s Congress, 1982.

52 Ferris Jr, R.J., & Zhang, H. (2002). Reaching out to the rule of law: China’s continuing efforts to develop an effective environmental law regime. *Wm. & Mary Bill Rts. J.*, 11, 569.

forth, are enacted and amended by the Standing Committee of the National People's Congress, as laid down in the Legislation Law (Article 7).⁵³

The State Council, as the direct executive authority of the National People's Congress, issues decisions in accordance with the Constitution and other laws. For example, in order to further indicate the implementation of the 1988 version of the Water Law, in 2000 the State Council issued Detailed Rules for the Implementation of the Water Pollution Prevention and Control Law.⁵⁴ In the meantime, as the highest administrative organ, the State Council also approves and promulgates national administrative regulations.⁵⁵ For example, the Regulation on the Administration of Licenses for Drawing Water and the Levying of Water Resource Fees is a regulation issued for strengthening water resource management and protection by the State Council.⁵⁶

There are a number of Ministries which are directly governed by the State Council, each of them having the legal right to make "ministerial regulations" within their areas of competence,⁵⁷ and within the scope of implementing national law, administrative regulations, and decisions or orders issued by the State Council (Article 71).⁵⁸ For example, Measures for the Administration of Water Abstraction Licensing is a guideline issued by the Ministry of Water Resources for implementing the regulation on water drawing licenses and the water resource fee addressed above.

At the provincial level, the provincial people's congresses (and their standing committees) may issue local regulations provided they do not contravene the Constitution, the applicable national statutes and administrative and ministerial regulations. The provincial people's governments may also issue local regulations provided that they do not contravene any regulations issued by the provincial people's congresses.⁵⁹ The administrative structures in the 34 provinces (including municipalities and autonomous regions) within the country are similar to the central level as the political structure of China is unitary. The hierarchical legal system of China is illustrated by Figure 5.

53 Environmental Protection Law, issued by the Standing Committee in 1989, revised in 2014; Water Law, issued by the Standing Committee in 1988, revised in 2002, 2009; Water Pollution Prevention and Control Law, issued by the Standing Committee in 1984, revised in 1996, 2008; Legislation Law, issued by the National People's Congress in 2000.

54 Detailed Rules for the Implementation of the Water Pollution Prevention and Control Law. State Council Order No. 284.

55 Ferris Jr, R.J., & Zhang, H. (2002). Reaching out to the rule of law: China's continuing efforts to develop an effective environmental law regime. *Wm. & Mary Bill Rts. J.*, 11, 569.

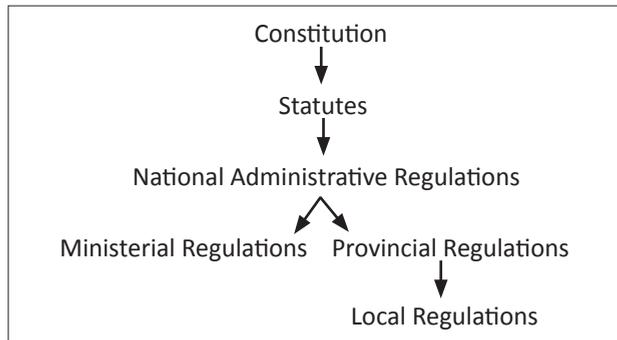
56 Regulation on the Administration of Licences for Drawing Water and the Levying of Water Resource Fees, State Council Order No. 460.

57 Ferris Jr, R.J., & Zhang, H. (2002). Reaching out to the rule of law: China's continuing efforts to develop an effective environmental law regime. *Wm. & Mary Bill Rts. J.*, 11, 569.

58 Legislation Law, issued by the National People's Congress in 2000.

59 Ferris Jr, R.J., & Zhang, H. (2002). Reaching out to the rule of law: China's continuing efforts to develop an effective environmental law regime. *Wm. & Mary Bill Rts. J.*, 11, 569.

Figure 5. Hierarchical legal system of China



Besides the National People’s Congress and the State Council, the Communist Party of China is another principal actor in the field of China’s water resources management, as stated above. China must adhere to the leadership of the Communist Party. The Communist Party has a profound influence on both the National People’s Congress and the State Council. However, the legal status of documents which are drafted by the Communist Party and approved by the National People’s Congress, or are jointly issued by the Communist Party and the State Council, is actually quite vague and is currently being debated in China, as the “Communist Party Leadership” is only emphasized in the preamble to the Constitution and the “legislative power” is neither addressed by the body of the Constitution nor by the Legislative Law.

In the 12th Five-Year Plan (2011-2015) (drafted by the Communist Party and approved by the National People’s Congress), impressive sustainability targets for water pollution management were set out, i.e. a Chemistry Oxygen Demand reduction target of 8% and a growth target of 5% for the surface water quality of several river basins by 2015 (compared to 2010).⁶⁰ These targets are binding and are implemented through administrative authority (Chapter 3). Whether judicial remedies could be sought when failing to achieve these targets is unclear, as the legal status of the Five-Year Plan itself is uncertain. Within China, some scholars are of the opinion that the Five-Year Plan is a legally binding document but is only valid for governments;⁶¹ some argue that it is not a legal document at all, but rather a guideline for regulating social behavior;⁶² while some characterize this category of documents as “soft law”.⁶³ This article does not intend to define the legal status of these documents, but rather to place them together in one basket of policies.

60 Dai, L. (2014), Something Old, Something New, Something Borrowed and Something Blue – Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union, *Utrecht Law Review*, 10 (2), 136-154.

61 Hao, T. (2007). *Do Programs of National Economy and Social Development of Our Country Have Lawful Sanction?*, Study and Exploration (2).

62 Weimin Yang. (2004). The main tasks and direction of regulating political structure reform. *China Economic & Trade Herald* (20).

63 Haocai Luo, & Gongde Song. (2006). Taking soft law seriously – general theory of soft law in public governance and the practice in China, *China Legal Science* (2), 3-24.

The fact remains that this policy basket is very effective and efficient in China, the main reason for this being that China applies its own means of achieving its water management objectives – a Government Objective Responsibility System (Chapters 2 & 6, see Section 2.5). This is more efficient within a short period of time when compared to the application of the formal legal system.

The formal law and Party policies in China can co-exist because 1) China formulates its legal system under the guidance of the Communist Party, 2) China's legislative principle is "general rather than detailed",⁶⁴ which leads to the fact that the implementation of formal laws in China is often difficult, and 3) China's system of environmental governance is both still very much in the making and subject to constant change and transition due to a fluid social environment.⁶⁵ Compared to formulating formal laws, the formulation of policies is more flexible, and may also be cost-effective as the process of policy making is normally not as long and comprehensive as law making.

Below, the regulatory framework for water quality is introduced as an example of this mixed structure.

2.6.1 Water quality objectives

There are two types of water quality objectives: narrative and numerical.⁶⁶ Narrative objectives present general descriptions of water quality that must be attained through pollutant control measures and watershed management.⁶⁷ For example, China has set out specific water quality objectives and the timetables for achieving them (Chapter 6).

Numerical objectives typically describe pollutant concentrations, the physical/chemical conditions of the water itself, and the toxicity of the water for aquatic organisms.⁶⁸ These objectives are designed to represent the maximum amount of pollutants that can remain in the water column without causing any adverse effect on organisms using the aquatic system.⁶⁹ These objectives are normally reflected by "Pollutant Cap Controls".

Both the 2014 Environmental Protection Law and the 2008 Water Pollution Prevention and Control Law promote the development of a "Major Pollutant Cap Control" system. By evaluating the 11th Five-Year Plan's achievements, the 12th Five-Year Plan sets out cap control targets for four major water pollutants (COD, SO₂, NH₃, and NO_x). Based on the emission status of a selected base year (2012) and other essential factors, the State Council determines national cap control targets for the next five years (2011-2015) and allocates these targets downward to local governments, which further distribute

64 Qjin, T. (2014). Improving China's Legislations of Water Resource Protection, Environmental Protection (4). <http://lib.cnki.net/cjfd/HJBU201404009.html>.

65 Mol, A. P., & Carter, N. T. (2006). China's environmental governance in transition. *Environmental Politics*, 15(02), 149-170.

66 Water Quality Objectives. Retrieved 5.6.2014, from: http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/basin_plan/docs/bp_ch3+tables.pdf.

67 Ibid.

68 Ibid.

69 Ibid.

their quotas to lower governments and then to firms/dischargers. For guidelines for developing the system see Appendix 3.

2.6.2 Water quality-related standards

Water quality-related standards provide a foundation for Pollutant Cap Controls. The system of water-related standards in China consists of five types and two levels. The five types include water quality standards, water pollutant discharge standards, water quality criteria, water monitoring and analytical method standards, and standard reference materials for the water environment. The two levels are national standards and local standards. Local governments may develop stricter standards than national standards. Compulsory standards and recommended standards are further divided in terms of the legal status of these standards.

Among the five types, water quality standards and water pollutant discharge standards are core standards for water quality management, the other three are their supporting and implementing technical standards. Water quality standards can be further divided into five sub-standards, see table 1. Among these five sub-standards, the Environmental Quality Standards for Surface Water classify national surface water into five types of Water Environmental Function Zones on the basis of their different environmental functions. Five different quality standards are set for these five different zones, i.e. from Class I (for drinking water sources and national protection zones) to Class V (for agricultural water use and the general landscape).

Based on these water quality standards, emission discharge standards are developed. To date, there are 64 emission discharge standards available on the website of the Ministry of Environmental Protection and their scope is wide-ranging, from emission discharge standards for the iron and steel industry to the phosphate fertilizer industry and the pharmaceutical industry.

Table 1: Water quality standards

Name	Number	When Issued	In Force as of
Environmental Quality Standards for Surface Water	GB 3838-2002	28-4-2002	1-6-2002
Water Quality Standards for Sea Water	GB 3097-1997	3-12-1997	1-7-1998
Water Quality Standards for Groundwater	GB/T 14848-93	30-12-1993	1-10-1994
Water Quality Standards for Irrigation	GB 5084-92	4-1-1992	1-10-1992
Water Quality Standards for Fisheries	GB 11607-89	12-8-1989	1-3-1990

Source: Ministry of Environmental Protection

2.6.3 *Water Pollution Prevention and Control Plan*

Water pollution prevention and control is planned on the basis of river basins and administrative regions. Pollution Control Plans for national major rivers and lakes are dominated by the Ministry of Environmental Protection, jointly with the State Council's Department of Macro-economic Control, the Ministry of Water Resources, and the relevant provincial governments (Article 15).⁷⁰

The National Water Pollution Prevention and Control Plan for Major River Basins (2011-2015) is an existing overall Plan in China. It covers 10 river basins and 23 provinces (including the Autonomous Regions and Municipalities). The Plan outlines different strategies for different river basins or "control units" according to their different water status and economic development levels.⁷¹ For example, for "units" with fairly good water quality, the strategy is to maintain that status by "prevention and conservation";⁷² for basins with fairly poor water quality, the strategy is to improve their status by implementing the "pollutant cap control" mechanism; for "units" with a high pollution risk, the strategy is to combine the prevention and control approach by closely monitoring the water bodies and high-polluting industries along the rivers.

2.6.4 *Water pollution prevention and control strategies*

1) Environmental impact assessment

Making an environmental impact assessment is compulsory when one constructs, renovates or expands water-related projects which directly or indirectly discharge pollutants into water. Non-compliance will result in a responsibility investigation.

The "Environmental Impact Assessments (EIAs)" are "methods and institutions for analyzing, predicting and assessing the impacts of programmes and construction projects that might incur after they are carried out so as to propose countermeasures for preventing or mitigating unfavorable impacts and arranging follow-up monitoring" (Article 2).⁷³ Both specific programmes (e.g. a River Basin Development Plan) and construction projects are required to conduct an EIA. The EIA could be an effective tool in preventing polluting projects. It could also propose precautionary measures or measures to ease any negative impacts. However, the EIA in China does not fully live up to its potential, a survey has shown that only 55.9% of respondents saw notices of EIA reports prior to approval.⁷⁴

70 The Water Pollution Prevention and Control Law, issued in 1984 by the Standing Committee of the National People's Congress, revised in 1996 and 2008.

71 The Plan divides the 10 river basins into 37 "control regions" and 315 "control units" according to their natural characteristics and administrative management demands.

72 Chapter 4 of the Water Pollution Prevention and Control Planning for Major River Basins (2011-2015).

73 Law of Environmental Impact Assessments, 2002, issued by the Standing Committee of the National People's Congress.

74 <http://chinawaterrisk.org/opinions/china-roadblocks-to-effective-eia/#sthash.xdhRZSyq.dpuf>.

2) The “three simultaneities” regime

According to the Environmental Protection Law (Article 41), the facilities for pollution prevention and control must be conducted simultaneously with the main projects with regard to their design, construction and operation. Any non-compliance will also result in a responsibility investigation. It is usually called the “three simultaneities” regime.

As well as the EIA, the “three simultaneities” regime could be another effective tool for avoiding new instances of environmental pollution and deterioration. It is complimentary to the EIA. However, available studies have shown that in many instances no responsibility investigation has taken place when the rule was not adhered to.⁷⁵

3) Water pollutant discharge permits

Subject to the approval of the EIA and the “three simultaneities” regime, dischargers may apply for a water pollutant discharge permit; discharging pollutants without a permit is unlawful.

The “pollutant discharge permit” was initially promoted in the early 1980s in China. After a trial implementation period of almost 30 years, most of the provinces have issued their own regulations thereon (20 out of the 31 provincial regions).⁷⁶ The system does play a certain role in pollution control. However, the general effects are unsatisfactory. There are two factors that could weaken the system: 1) although both the Water Pollution and Prevention Law and the Environmental Protection Law have adopted the system, there are, as yet, no technical guidelines for its implementation; 2) sanctions against those who violate the approved permits do not act as a significant deterrent, as they are normally relatively minor in comparison to the benefits gained by dischargers.

4) Pollutant discharge fees

Discharging pollutants directly into waters is subject to a pollutant discharge fee based on the category and quantity of the discharged pollutants (Article 24). Those who discharge beyond state or local standards or exceed the allowed total discharge volume of major water pollutants have to tackle the pollution within a certain time limit and pay a fine of not less than twice but not more than five times the pollutant discharge fee (Article 74).⁷⁷

This has been implemented since 2003. Before 2003, polluters only needed to pay pollutant discharge fees when their discharges exceeded established standards. Today, according to the new regulation, polluters not only have to pay for excessive discharges but also for discharges below established standards.⁷⁸ The collection of

75 OECD (2005), “Environment and Governance in China”, in *Governance in China*, OECD Publishing. Retrieved from: <http://dx.doi.org/10.1787/9789264008441-19-en>.

76 Ibid.

77 Water Pollution Prevention and Control Law. Issued in 1984 by the Standing Committee of the National People’s Congress, revised in 1996 and 2008.

78 Regulation on Collecting and Utilizing Pollutant Discharge Fees, 2003, issued by the State Council.

pollutant discharge fees is managed by separate channels of revenue and expenditure, and these fees are specifically spent on environmental protection. To date, 91% of the 2,269 cities (and counties) nationwide have levied discharge fees.⁷⁹ In 2013 alone, the total revenue from these fees was 21.6 billion CNY (USD \$3.5 billion), which had increased by 5.2% compared to 2012.⁸⁰

The regulations, plans and standards have together formed the regulatory framework of China's water quality protection and water pollution control. However, this framework only partially covers China's water problems – industrial source water pollution is still a major problem. The EIA, the “three simultaneities”, water pollutant discharge permits and pollution discharge fees are all important strategies to achieve water quality objectives. If all of them are optimally implemented, industrial source pollution could be basically controlled in China. However, besides industrial pollution, what is more pressing is agricultural source pollution, which contributes to more than half of the water pollution in China (Chapters 6 & 7). In this respect, the country still lacks efficient countermeasures.⁸¹

2.7 Block 7: Financing arrangements

Investment in environmental pollution control in China increased from around 0.5% of GDP in 1996 to 1.59% in 2012.^{82, 83} During the 12th Five-year Plan period (2011-2015), environmental protection investment is expected to be more than 5 trillion yuan (US \$817 billion). Investment channels emanate from the government, financial institutions, enterprises and social capital,⁸⁴ but they mainly rely on the government (Chapters 4 & 5). See Table 2.

79 Carbon Trading (2014). The Effectiveness of China's Pollutants Discharge Fee Implementation at Current Stage. Retrieved 5/6/2015, from: <http://www.tanpaifang.com/tanshui/2014/0425/31494.html>.

80 Sina News (2014). 21.6 billion were collected from pollutants discharge. Retrieved 5/6/2014, from: <http://finance.sina.com.cn/china/20140114/172317950420.shtml>.

81 Dai, L. (2014), Something Old, Something New, Something Borrowed and Something Blue – Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union, *Utrecht Law Review*, 10 (2), 136-154.

82 Wang, H., & Chen, M. (1999). *How the Chinese system of charges and subsidies affects pollution control efforts by China's top industrial polluters* (Vol. 2198). World Bank Publications. Retrieved from: <http://web.worldbank.org/archive/website01004/WEB/IMAGES/10150132.PDF>.

83 Statista (2015). *Investment in pollution control as percentage of GDP in China from 2002 to 2012*. Retrieved 2.9.2015, from: <http://www.statista.com/statistics/300438/china-pollution-treatment-investment-as-percentage-of-gdp/>.

84 The Climate Group (2014). China on track to spend US\$17 billion in environmental protection. Retrieved from: <http://www.theclimategroup.org/what-we-do/news-and-blogs/china-announces-us-817-billion-investment-in/>.

Table 2: Paying for water management in China

Sectors	Main institutions/groups involved in financing
Flood and drought control	<ul style="list-style-type: none"> • Mainly by the government (including planning, investment and operations) Flood control law indicates a combination of government funds and “rational payment by beneficiaries”. • Flood control in rivers and lakes and emergency responses funded by the central government. • Flood protection in cities funded by city governments. • Flood protection of economic infrastructure (oilfields, railways, mines, telecommunications, ...) funded by companies. • Drought control and disaster relief by the government at different levels.
Water supply and sanitation in cities	<ul style="list-style-type: none"> • Water supply in urban areas self-financed by water operators (with some government subsidies) with pricing in the form of cost plus and total cost accounting. • Sewage treatment and pollution control mixed, combining “polluter pays” and government subsidies. • Water supply in rural areas jointly financed by farmers and the government (central and local) – principle of “multi-level, multi-channel, diversified and multi-way financing”. Several funds (poverty relief, welfare-to-work, small irrigation and water conservation, special fund for shortage). In the special fund, the central government finances poorer regions (west 60%, central 40%), in richer regions (east) only local governments and farmers.
Irrigation	<ul style="list-style-type: none"> • Large and medium-sized systems largely funded by the state, with some water fees from farmers. • Small systems largely funded by farmers, with some government subsidies Example: water saving initiative: central 33%, local 25%, 42% loans and farmers.
Water and soil conservation	<ul style="list-style-type: none"> • Mainly financed by the state. • Enterprises must adopt water and soil conservation measures, or pay the competent authorities to carry out works.

Source: OECD (2012), *A Framework for Financing Water Resources Management*, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264179820-1-en>

In China, the current water-related investments rely heavily on the government. The market has only recently become an emerging player, e.g., at the 18th Communist Party of China Central Committee in 2013, the market was promoted as having a ‘decisive’ role in resource management, rather than a ‘basic role’ as previously defined.⁸⁵ Although the collection of pollutant discharge fees is increasing, compared to the total expenditure it is still currently negligible. However, a promising signal is that the Central Government has gradually reduced administrative intervention in the market during the past few years. Economic incentives have been considered to offer both flexibility and efficiency in achieving environmental policy goals (Chapters 4 & 5).⁸⁶

85 The 18th Central Committee of the Communist Party of China held its Third Plenary Session (Third Plenum) in Beijing from November 9-12, 2013. Retrieved from: http://www.theclimategroup.org/_assets/files/China-Ecocivilisation.pdf.

86 Qin, T. (2014). Challenges for Sustainable Development and Its Legal Response in China: A Perspective for Social Transformation. *Sustainability*,6(8), 5075-5106.

2.8 Block 8: Engineering and monitoring

During Mao's era (in the 1950s), water management in China was engineering-oriented. Mao's policy to 'conquer and harness nature'⁸⁷ initiated a programme of intensive water infrastructure constructions on different scales in order to meet the increasing demand for water and to prevent flooding and droughts.⁸⁸ China has a far greater number of large dams than any other country.⁸⁹ Almost all of the world's large dams (higher than 15 meters) built since 1950 are located in China⁹⁰ and of the 84,000 reservoirs in use in China until 1999, more than 70% were built between 1957 and 1977.^{91, 92}

China's per capita water resources are among the lowest compared to the global average. Along with urbanization and population growth comes more wastewater in China. A recent government report revealed that about 30% of China's rivers and 60% of its groundwater resources are polluted. Since 2000, the total amount of wastewater discharged has grown by 65%, and is expected to increase further as urbanization continues.⁹³ All of this means that additional water distribution networks, sanitation systems and wastewater treatment facilities need to be built and installed.

The environmental monitoring system in China is three-tiered: the national, provincial and city levels. The Chinese government's policy responses to water quality issues rely largely on strengthening monitoring capabilities.⁹⁴ In 2006 the Ministry of Environmental Protection set up branches in 11 cities to monitor environmental issues and that are independent from local government interference.⁹⁵ The new revised Environmental Law (2015) prescribes important provisions relating to data monitoring, e.g. those who evade monitoring systems or register false monitoring data could be criminally punished. The implementation of these provisions, however, is uncertain at this point in time.

87 Shapiro J (2001) *Mao's War against Nature: Politics and the Environment in Revolutionary China*. Cambridge University Press, Cambridge.

88 Song, X., Mulder, K., Frostell, B., Ravesteijn, W., & Wennersten, R. (2011). Transition in public participation in Chinese water management. *Proceedings of the ICE-Engineering Sustainability*, 164(1), 71-83.

89 Nickum, J. (2010). Water policy reform in China's fragmented hydraulic state: Focus on self-funded/ managed irrigation and drainage districts. *Water Alternatives*, 3(3), 537-551.

90 Gleick PH (2009) China and water. In *The World's Water 2008-2009: The Biennial Report on Freshwater Resources* (Gleick PH et al. (eds.)). Island Press, Washington, DC, pp. 79-100.

91 Liu BJ and Zhang JH (1999) Reservoir construction and flood prevention in China. *China Water Resources* 7(433): 16-17 (in Chinese).

92 Song, X., Mulder, K., Frostell, B., Ravesteijn, W., & Wennersten, R. (2011). Transition in public participation in Chinese water management. *Proceedings of the ICE-Engineering Sustainability*, 164(1), 71-83.

93 Hafner-Cai, J. (2014). *As China's cities grow, so must water infrastructure*. Retrieved from: <http://www.robecosam.com/en/sustainability-insights/library/foresight/2014/as-chinas-cities-grow-so-must-water-infrastructure.jsp>.

94 Moore, S. (2013). *Issue Brief: Water Resource Issues, Policy and Politics in China*. Retrieved from: <http://www.brookings.edu/research/papers/2013/02/water-politics-china-moore>.

95 Falk, R. L. & Wee, J. (2013). China's New Environmental Protection Law Implications for Overseas Investors, Joint Ventures and Trading Partners. Retrieved from: http://www.mofo.com/~/_media/Files/ClientAlert/2014/09/140930ChinasNewEnvironmentalProtectionLaw.pdf?utm_source=Mondaq&utm_medium=syndication&utm_campaign=View-Original.

2.9 Block 9: Enforcement

In the process of industrialization, China has pursued intensive economic growth. It has relied mainly on administrative and regulatory mechanisms which have strong characteristics of the planned economy. The government is the main executive body in the process of economic development and environmental protection (Section 2.5).⁹⁶ Citizens are used to resolving their conflicts through administrative channels; they can also resort to a higher-level administrative institution to reconsider the decision being challenged (Section 2.3). Judicial channels are less popular because judicial decisions are very often interfered with by local governments as local judiciaries are dependent on local governments for funding.

There are around 30 laws and numerous local regulations related to environmental and nature protection in China, and almost every important area of the environment has been covered by those laws and regulations. However, their enforcement is less than satisfactory. For example, the EIA, the “three simultaneities”, the water pollutant discharge permits and the pollution discharge fees are all promising strategies, but the rules are not adhered to in practice (Section 2.6).

Weak enforcement has resulted in frequent public environmental protests, which have been growing by 29% a year since 1996.⁹⁷ The main reason for this is believed to be that these protests grow out of environmental injustice, which is impossible or difficult to resolve within the existing framework.

The Communist Party has certainly not ignored this; it has taken the unprecedented step of emphasizing and promoting certain approaches based on the “rule of law” (Section 2.2). Accordingly, the Environmental Protection Law was substantially revised in 2014. The new law expands the range of the public interest by providing certain organizations with the right to sue. In addition to the Communist Party’s internal reform and the amendments to the Environmental Protection Law, the judicial system has recently begun to develop a noteworthy environmental arm. The Supreme People’s Court has announced that a special tribunal will be established for dealing with cases related to environmental pollution problems and that it will be promoted nationwide.

All these promising signals indicate that China is devoting itself to enhancing the performance of environmental laws, regulations and the judicial system. The challenges that lie ahead are huge, however, especially with regard to judicial reform. Besides the difficulties in training competent staff and clarifying the scope of jurisdiction for operating a tribunal, the biggest obstacle could be financial and personnel independence, now that both of them fall under the responsibility of local governments.

96 Qin, T. (2014). Challenges for Sustainable Development and Its Legal Response in China: A Perspective for Social Transformation. *Sustainability*, 6(8), 5075-5106.

97 Liu, Q. (2014). *China’s pollution protests could be slowed by stronger rule of law*. Retrieved from: <https://www.chinadialogue.net/article/show/single/en/7483-China-s-pollution-protests-could-be-slowed-by-stronger-rule-of-law>.

2.10 Block 10: Conflict prevention and resolution

The assessment method used in this chapter emphasizes the holistic approach in which all elements of the building blocks are closely related and influence each other. An insufficiently developed element may have its effects on other elements or blocks. This is certainly the case when it comes to conflict prevention. Water management that is based on shared values is assumed to lead to fewer conflicts. The same holds true for effective public participation, accepted and well-motivated trade-offs, clearly divided responsibilities, a sound regulatory system, and sufficient financial, personnel and technical means. A good monitoring system and effective enforcement mechanisms may reduce the risk of potential conflicts between, for example, polluters and the government or citizens or society, and polluters and/or the government. Therefore conclusions from the previous sections are important to be able to address the elements that may contribute to conflict prevention.

To prevent conflicts, the first step is to understand them. Water conflicts in China, as stated above (Section 2.5), are mainly caused by economic competition and the fragmented institutional structure. China generally lacks clear inter-agency lines of communication in this regard. Strategies are often case-specific, for example, through sustained lobbying, multi-party negotiations or central-level interventions.⁹⁸

The new round of ongoing reform is expected to mitigate these conflicts. It intends to bid farewell to applying “only GDP” to evaluate the local governments’ performance; instead, welfare improvement, social development and environmental indicators will be deployed (Section 2.2). Meanwhile, judicial reform could also contribute to conflict settlement. However, considering the complexity of these issues, there is still a long way to go.

3. Conclusion

Water challenges in China are wide-ranging and the already apparent water pressures, e.g. water pollution and water scarcity, are clear enough to call for regulatory and policy actions. Both the government and the public have realized that water problems need to be tackled urgently. In other words, society shares a common value concerning water issues. Based on the Chinese philosophy of the “unity of heaven and men” and the “harmonious society”, the Chinese government is rebalancing its social development by slowing down economic growth and focusing more on environmental protection. During this transition process, the roles of both the government and society are changing. The government is more open and the public is promoted more often than before.

The Chinese policy discourses have their own characteristics because the country applies a socialist system with a strong role for the Communist Party. Therefore, besides the legal system which is somewhat familiar to Western eyes, the Communist Party is another principal actor in Chinese social development, as well as in water

98 Ibid.

resource management. To promote the country's governing system and capabilities, both the Party and the legal system in China are being reformed.

Public participation, although it has recently been strongly promoted, is still difficult to implement in practice due to the lack of any tradition in this respect. In the fundamental areas of water resource management, public participation has not yet been sufficiently developed.

Water allocation mechanisms are still in their infancy due to the large number of interested parties and the degree of uncertainty involved. A primary precondition for a sound water allocation mechanism is considered to be cooperation and collaboration between different stakeholders. However, this is nothing less than a fatal weakness of Chinese water resource management.

The Chinese water resource management structure is fragmented, whether it is from a horizontal, vertical or interactive point of view. This fragmented institutional structure has resulted in fragmented regulations and has also led to water conflicts. The distribution of responsibilities for dealing with those conflicts is vague, which makes responsibility investigation unavoidably difficult. Due to this situation, China applies its political power/-Government Objective Responsibility System to address water issues. This system could contribute to distributing responsibilities more efficiently in a short period of time. But in the long term, depending solely on political power is far from sufficient. The reform of the legal framework must be accelerated.

Regulations in point source pollution control in China are fairly well developed; however, the enforcement of existing regulations is less than satisfactory. The performance of the judicial system is poor due to the fact that the government has been the main executive body in the process of social development during the last three decades, and not the courts. Currently, judicial reform is ongoing, which is expected to result in new inspirations for China's natural resource management.

Along with urbanization and population growth, water pollution and scarcity have become more pressing in China, and more policies and measures are therefore being adopted and there is more investment in infrastructure. For constructing the necessary infrastructure, the main financial support currently comes from the governments, while the market is comparatively less active although innovative approaches are being developed.

Water disputes in China are mainly caused by local competition for economic development and the fragmented institutional arrangements. The new round of ongoing reform to rebalance economic and environmental development and to establish environmental tribunals is expected to mitigate these conflicts to a certain extent. The '10 building block' reflection is illustrated by Table 3.

Table 3: Result of the assessment of water governance in China based on the ‘10 building blocks’ method.

10 building blocks		Findings
1	Water System Knowledge	The existing problems are sufficiently clear to call for regulatory actions.
2	Values, Principles, Policy Discourses	Society shares the same values and principles concerning water issues. Policy discourses consist of a legal and a political path, both them are under reform to promote the country’s governing capacity.
3	Stakeholder Involvement	Public participation is in its infancy and is weak in fundamental areas.
4	Trade-offs between Social Objectives	Water allocation schemes are at an early stage, trade-offs in economic development are being taken into account and lead to a greater focus on environmental protection.
5	Responsibility, Authority and Means	Institutional arrangements are fragmented, the distribution of responsibility is vague. Implementation is more by political power and less by the judicial system.
6	Regulation and Agreements	Water allocation mechanisms are under-developed. The regulatory framework is highly fragmented and leads to ineffective water management. There is a combination of formal rules, political agreements and obligations, and informal agreements. Regulations in point source pollution control are well developed but in non-point source pollution control they are insufficient.
7	Financial Arrangements	Financial investment relies mainly on governments although innovative approaches are being developed.
8	Engineering and Monitoring	Engineering has been the main approach in Chinese water management. Due to urbanization (amongst other things) new investments in infrastructure are needed, especially in the field of wastewater collection and treatment. Policies and measures are being developed for monitoring water pollution.
9	Enforcement	Enforcement is less than satisfactory but is improving; it relies more on political power and less on the judicial system.
10	Conflict Prevention and Resolution	It lacks clear inter-agency lines of communication. Due to hampering elements in previous blocks there is a risk that conflicts may arise. Dealing with these issues may reduce water conflicts. Conflict resolution takes place in several ways: mainly by political arrangements and less by formal court proceedings. There is a development towards environmental tribunals.

China’s water resource management is in a transition period from a conventional mode of “only GDP” development towards a sustainable method which integrates economics, environmental protection and a greater involvement on the part of society. This transition needs changes in the policy and regulatory framework. China is currently “crossing the river by feeling the stones underneath the surface”.

CHAPTER 3

A New Perspective on Water Governance in China – Captain of the River

This chapter is published as: 2015, Liping Dai, “A New Perspective on Water Governance in China – Captain of the River”, *Water International*, 40(1), 87-99. Doi: 10.1080/02508060.2014.986702

Although formal law plays an increasing role in water governance in China, the political arena has a large influence upon it. This article, seeks to provide a new perspective to understand water governance and what role formal laws play during China’s transition phase of China, through the lens of the “Captain of the River” – a newly developed water governance instrument in China.

Key words: water governance, China, politics, objective responsibility

1. The Captain of the River

Wuxi City (in Jiangsu Province) is the founder of the “Captain of the River” instrument. As one of the most developed cities in eastern China, water quality is a pressing issue. In 2007, a devastating blue algae bloom in Lake Tai seriously affected Wuxi City. Two million residents could not access clean tap water for five days, causing frustration among residents.¹ Afterwards, the city government adopted a series of measures to tackle water pollution, and thus the “Captain of the River” instrument came into being.

The Wuxi (Communist) Party Committee and the Wuxi City Government require Party heads and government officials at all administrative levels (city, county and district) to be “Captains” of 64 rivers by signing responsibility contracts. The results from water quality monitoring in these 64 rivers are taken as a reference to assess the Captains’ administrative achievements. The Wuxi Government created a special account to implement the “Captain of the River” instrument – a Guarantee Deposit. For example, in Huishan District (of Wuxi City), the Captain of each river is required to deposit 3,000 RMB (491 USD) into the account at the beginning of each year. The fund is exclusively used for rewarding and penalizing the Captain in question. At the end of the year, the Captain whose river quality is assessed as “improved” is eligible to have their deposit doubled as a reward. Those who have maintained the quality status quo can have their money returned, but for those whose water quality has worsened, their deposit will be confiscated.

1 Tai, C., & Ellis, L. (2008, 10). *Taihu: Green Wash or Green Clean?* A China environmental health project research brief. Retrieved from http://www.circleofblue.org/waternews/wp-content/uploads/2011/03/taihu_oct08.pdf.

This incentive policy of the Grantee Deposit may play a role in motivating Captains to protect their rivers, but this may not be the main factor. The amount of 3,000 RMB, which compares to the annual per capita disposable income (38,999 RMB/ 6,378 USD during of 2013),² is not a great incentive to persuade Captains to go to extraordinary, yet necessary, lengths to control pollution, especially given the pressure of GDP growth targets (discussed in the section of “The relationship between economic development and environmental protection”). Moreover, the deposits typically come from the government to which the Captains belong, rather than being the Captains’ own funds, which can also undermine their motivation.

In spite of this, the “Captain of the River” instrument has achieved great success. The water quality in monitored sectors has improved significantly, 74.7% had reached the established standards in 2008, 50% more when compared to the previous year when the system had not yet been adopted.³ What contributed to this success was actually the Veto System (yipiao foujue), which is a core operating tool in China’s (Communist) Party and governmental responsibility system. Under the Veto System, a failure to attain any of the assigned targets will unilaterally lead to the disqualification of the official.

The Communist Party of China (CPC) Wuxi Committee incorporated environmental protection into its Veto System. It states that:

*“For those who poorly govern environmental protection, those who cannot achieve the established objectives for energy-saving and emission reduction [...]”, the Organizational Department (of the CPC), after an investigation, will “veto the relevant leadership when they participate in a city-level competition for an effective leading group, or veto the relevant responsible officials when they participate in the competition for advanced or excellent individuals, or veto the promotion of those directly responsible officials [...]”.*⁴

Significant career pressure persuades Captains to devote themselves to controlling water pollution. The reported improvement in the short term, as stated above, is tremendous. The “Captain of the River” instrument, therefore, is rapidly expanding. As of September 2008, Wuxi City had promoted the instrument in its 815 rivers.⁵ Up to 2012, the city had 1,284 Captains.⁶ The system has since gone through a series of updates and iterations. For example, the “Joint Captains of the River” instrument,

2 Chen, Y., & Tan, D. (2014, 1 27). *Wuxi City achieved 8,000 billion GDP in 2013*. Retrieved 8 17, 2014, from Jinagsu News Window: <http://js.people.com.cn/html/2014/01/27/285116.html>.

3 Ministry of Environmental Protection. (n.d.). *Wuxi: developing ‘the Captain of the River’ and strengthening river protection*. Retrieved 8 18, 2014, from Ministry of Environmental Protection of People’s Republic of China: http://www.zhb.gov.cn/ztbd/rdzl/hzhzh/gdsj/200905/t20090526_152010.htm.

4 Xinhua News. (2007, 12 7). *Organizational Department of Jiangsu Provincial Party Committee*. Retrieved 11 5, 2014, from Wuxi: Veto on deficient implementation of major decisions and arrangements: <http://www.jszsb.gov.cn/dt2111111132.asp?DocID=2111118486>.

5 Zhang, Y. (n.d.). *Whether contract system can save China’s rivers*. Retrieved 11 5, 2014, from Ministry of Environmental Protection of the People’s Republic of China: http://www.mep.gov.cn/ztbd/rdzl/hzhzh/gfpl/200905/t20090526_152020.htm.

6 Environmental Protection Department. (2012, 8 6). *The Captain of the River of Wuxi ensures Lake Tai’s safety for five consecutive years*. Retrieved 11 5, 2014, from Environmental Protection Department of Jiangsu Province: http://www.jshb.gov.cn/jshbw/xwdt/sxxx/201208/t20120806_210991.html.

where officials of the Party and governments at both the city level and county levels are asked to be “Joint Captains” of selected rivers. In some areas, such “Joint Captains” extend four administrative levels (city, county, town and village). To date, the rivers in Wuxi city have been covered by Captains without difficulty and each part of the river has a specific person in charge.

After seeing the success of the “Captain of the River” instrument in Wuxi City, the provincial government – Jiangsu Government – has begun to promote and improve this system since 2008. The province selected 15 rivers to implement the “Joint Captains of the River” instrument, connecting provincial and city levels. The names of the responsible officials are published by the government. Up to 2014, 727 main rivers in Jiangsu Province have their own Captains.⁷

The “Captain of the River” plays a significant role in the improvement of river water quality of Jiangsu today and many other provinces are following suit. The Ministry of Water Resources encourages the development of this new instrument and plans to promote it nationwide. This is because that the “Captain of the River” happens to become an efficient tool to implement the “Most Stringent Standards” water management mechanism promoted by the Central Government, which assigns tasks to local governments through a Government Objective Responsibility System (GORS).⁸ In other words, the “Captain of the River” renders the GORS more operational.

2. Why “Captain of the River”?

One of the key strengths of Chinese socialism is its capacity for long-term, national-level planning.⁹ China establishes its national development priority in its Five-Year Plans, and normally implements them through a GORS. Through the GORS, the Central Government assigns its overall established targets to provincial governments, who then reassign their quotas to lower levels (municipal and county levels). Party leaders and government officials at all levels are required to sign responsibility contracts and their performance will be assessed by the upper levels, sometimes through the Veto System. The “Captain of the River” instrument is an implementation tool of the GORS.

2.1 Government Objective Responsibility Systems (GORS) in China

China’s civil servant system includes two types of positions, leading cadres and non-leading cadres,¹⁰ each managed differently. Non-leading cadres fall under the personnel departments and are subject to civil service regulations; they are admitted by examination which is open to the public. The leading cadres are appointed and elected by the Organization Department of the CPC Committee, but are also regulated

7 Wang, J. (2014, 3 21). *Jiangsu appointed Captains of its 727 main riviers*. Retrieved 11 5, 2014, from Sinanews: <http://news.sina.com.cn/c/2014-03-21/180629763406.shtml>.

8 Dai, L. (2015). Regulating water pollution in China and the European Union in terms of agricultural pollution. *Journal of Water Law*, forthcoming issue.

9 Hu, A. (2011, 3 28). *Green light for hard targets*. Retrieved 11 5, 2014, from Chinadaily: http://www.chinadaily.com.cn/opinion/2011-03/28/content_12234557.htm.

10 Civil Servant Law. (2006, 1 1). Adopted by the Fifteenth Meeting of the Standing Committee of the Tenth National People’s Congress. Retrieved from http://law.lawtime.cn/d353351358445_1_p3.html.

by the civil service regulations. The CPC Committee exercises authority over the leading cadres' promotion, dismissal and transfer one step down the administrative hierarchy, and the lower level is accountable to the next level up.¹¹

Higher-level governments set targets and assign them to lower levels by signing performance contracts with the leading cadres, which form the GORS. In the contracts leading cadres pledge to achieve, and are personally held responsible for achieving, certain targets laid down by the higher levels.¹² Non-leading cadres may also sign contracts, but these contracts are with their own working units. Incentives play a central role in motivating the cadres to fulfil their targets. Outstanding performances in the annual cadre evaluation are rewarded through promotion (in rank or position), additional wages or bonus payments, or other material benefits, including administrative benefits (e.g., free transport, entertainment, training, and travel), and other allowances for cadres (e.g., subsidized housing, health care, and opportunities for further education).¹³ Conversely, failing to meet some targets will result in censure and the denial of promotion.

The relative importance of different targets is made explicit in the GORS: soft ("guidance") targets, hard targets and "targets with a veto power".^{14, 15} Targets with a veto power are exclusively used for key policies of the central levels and sometimes also used for key policies at local levels.¹⁶ These targets are the most important and a failure to meet them automatically results in censure. Poor performance concerning veto targets cannot be remedied by good performance on other targets.¹⁷ Hard targets are also important mandatory targets. Soft targets are lower priority objectives and are usually applied to those areas which are difficult to measure and quantify as well as to policies that are not deemed important by higher levels, such as cultural development.¹⁸

11 Edin, M. (2003). Remaking the Communist party-state: the cadre responsibility system at the local level in China. *China: An International Journal*, 1-15. DOI: 10.1353/chn.2005.0013.

12 Ibid.

13 Genia, K. (2014, 8 1). Barriers to the Implementation of Environmental Policies at the Local Level in China. *World Bank Policy Research Working Paper*. Retrieved from <http://ssrn.com/abstract=2487614>.

14 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

15 Minzner, C. (2009). Riots and cover-ups: counterproductive control of local agents in China. *Journal of International Law*, 31(1), 53-71. Retrieved from : <http://scholarship.law.upenn.edu/jil/vol31/iss1/2>.

16 Edin, M. (2003). Remaking the Communist party-state: the cadre responsibility system at the local level in China. *China: An International Journal*, 1-15. DOI: 10.1353/chn.2005.0013.

17 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

18 Edin, M. (2003). Remaking the Communist party-state: the cadre responsibility system at the local level in China. *China: An International Journal*, 1-15. DOI: 10.1353/chn.2005.0013.

2.2 Relationship between economic development and environmental protection

In 2014 China became the second largest economy in the world,¹⁹ this success actually largely benefits from the GORS system. Economic goals have long been placed as nationwide hard targets in China. The country has had clear targets to boost the economy since reform and opening-up policies were introduced. The overall economic construction objectives were clearly laid down in the “Three-Step Development Strategy” set out in 1987: Step One--to double the 1980 gross national product (GNP) by the end of the 1980s; Step Two--to quadruple the 1980 GNP by the end of the 20th century; and Step Three--to increase per-capita GNP to the level of medium-developed countries by the mid-21st century.²⁰ These targets have prioritized economic development at all administrative levels throughout the past three decades. GDP achievement have long been the focus of local governments and the performance of a government cadre has been solely based on its economic success.²¹ Cadres are extremely sensitive to their GDP indicator as it largely determines their career path. Research has found that provinces with higher revenue contributions and more rapid economic growth have gained more representation in the central committees compared to other provinces,²² however things have recently begun to change.

Speeches delivered by President, Xi Jinping, earlier this year have stressed that “we should no longer evaluate the performance of leaders simply by GDP growth. Instead, we should look at welfare improvement, social development and environmental indicators to evaluate leaders”, “the CPC should adopt more comprehensive criteria for assessing the performance of its officials”.²³ The Organization Department of the CPC Central Committee also stated that “GDP will no longer be the most important factor when evaluating an official’s performance” China has canceled over 70 counties GDP assessment.²⁴ These are healthy signs that China is switching its focus from “GDP worship” to a more sustainable development mode. To date, more than 70 counties and cities (but only around 3% of the total) have bid farewell to the “only the GDP” era, have cancelled GDP assessment, and have adopted an environmental and livelihood assessment guide instead.²⁵

19 Yueh, L. (2014, 4 30). *Is China about to overtake US as the world’s largest economy?* Retrieved 4 30, 2014, from BBC: <http://www.bbc.com/news/business-27216705>.

20 China.org.cn. (sd). *Three-Step Development Strategy*. Retrieved 11 5, 2014, from About China: <http://english.people.com.cn/92824/92846/93014/6448494.html>.

21 Easterlin, R. (2014, 10 27). What matters more: GDP or happiness? Retrieved 11 5, 2014, from Goodbye GDP: <http://goodbyegdp.org/2014/10/27/what-matters-more-gdp-or-happiness/>.

22 Edin, M. (2003). Remaking the Communist party-state: the cadre responsibility system at the local level in China. *China: An International Journal*, 1-15. DOI: 10.1353/chn.2005.0013.

23 Rapoza, K. (2013, 7 1). *China’s Pres Xi: GDP No Longer The Measure Of Success*. Retrieved 11 5, 2014, from Forbes: <http://www.forbes.com/sites/kenrapoza/2013/07/01/chinas-pres-xi-gdp-no-longer-the-measure-of-success/>.

24 An, B., & Zheng, J. (2013, 12 11). *GDP no longer focus of officials’ evaluations*. Retrieved 11 5, 2014, from Chinadaily: usa.chinadaily.com.cn/epaper/2013-12/11/content_17167398.htm.

25 *China has canceled over 70 counties GDP assessment*. (2014, 8 25). Retrieved 11 5, 2014, from EN News163: <http://www.english163.com/2014/08/25/china-has-canceled-over-70-counties-gdp-assessment-50298.html>.

2.3 Government Objective Responsibility Systems (GORS) in environmental pollution management

Environmental degradation has always been a concern for the central level. For example, as early as 1983 during the Second National Conference on Environmental Protection, the need for a coordinated advancement of both economic development and environmental protection was explicitly emphasized.²⁶ Environmental protection, however, has certainly not been a priority for both the central and local governments. The idea of a “Green GDP” was once explored by the Central Government, but its 2004 Chinese Green National Economic Evaluation Research Report was not released until 2006, and subsequently ran aground.²⁷ Environmental targets have been determined to be soft targets, and have long been devalued on the agendas of local governments. While prioritization was primarily given to economic growth, an insufficient effort and expenditure was devoted to environmental protection and social development.²⁸

A historical change occurred in the 11th Five-Year Plan (2006-2010), which elevated environmental goals to the same level as economic goals, i.e. from soft to hard goals.²⁹ The Plan lists 8 “binding targets” (hard targets) in which the “Major Pollutants Control Rate” was included for the first time.³⁰ Its sub-plan, the 11th National Environment Protection Plan, was also, for the first time, issued as a State Council Document. It emphasized that “the CPC Central Committee and the Central Government take environmental protection to be a national development strategy”. The most prominent environmental targets of this sub-plan were the goals to reduce the major pollutant sulphur dioxide (SO₂) and Chemical Oxygen Demand (COD) pollution by 10 percent, respectively.³¹ It explicitly states that “tasks are assigned according to levels through the GORS, thereby incorporating the environmental indicator into the performance achievement assessment of the Party leaders and the governments’ officials and establishing a reward and sanctioning system.” Later that year the National Environmental Protection Bureau (which subsequently became the Ministry of Environmental Protection in 2008) signed responsibility contracts with 7 major SO₂ and 9 major COD emission provinces, and gradually with other provinces, to specify the provincial emission targets. Since then, environmental protection has been given unprecedented attention in China.

26 CCICED. (2013). *China’s environmental protection and social development*. Retrieved from http://www.cciced.net/encciced/event/AGM_1/2013agm/speeches2011/201311/P020131106443218117388.pdf.

27 *An end to GDP worship*. (2011, 8 17). Retrieved 11 5, 2014, from Chinadialogue: <https://www.chinadialogue.net/blog/4467-An-end-to-GDP-worship/en>.

28 CCICED. (2013). *China’s environmental protection and social development*. Retrieved from http://www.cciced.net/encciced/event/AGM_1/2013agm/speeches2011/201311/P020131106443218117388.pdf.

29 Ibid.

30 Outline of the 11th Five- Year Plan. (2006). Retrieved from: <http://www.szzxx.com/html/llyzc/zc/2010/0927/766.html>.

31 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

2.4 *Government Objective Responsibility Systems (GORS) in water pollution control*

The 12th Five-Year Plan (2011-2015) highlights the need to “construct a resource-conserving and environmentally-friendly society” barriers to the implementation of environmental policies at the local level in China.³² It incorporates “energy saving and emission reduction” as one of its social development goals, and goes a step further towards water quality protection by initiating “the most stringent water management” mechanism. It adds two more major pollutants to its binding goals, and again emphasizes target responsibility assessment.

To apply the “the most stringent water management” mechanism, the CPC Central Committee outlined a 10-year water management plan, specified implementing policies and developed national and provincial water quality objectives. The State Council specified objectives and timeframes and assigned them to each province. The implementation of each of province will be evaluated using a scoring system. At the beginning of 2014, the Ministry of Water Resources, jointly with 10 other Ministries, issued an Implementation Plan Concerning the Most Stringent Water Management Assessment. The process, contents, and scoring methods of the assessment are further specified by the Plan. The GORS for water quality control have so far formed.

2.5 *The Veto System and the Captain of the River Instrument*

Veto targets, as stated above, are the most important targets for governments, meaning that if these targets are not met, all other achievements by a local leader will be rendered null and void.³³ The veto power was originally applied to birth control in Hunan Province in 1984 and was then updated as a national tool to ensure “Social Stability” after 1991. Today, maintaining social stability and meeting birth control targets are almost universally covered by the veto, which may also cover items such as fiscal income, workplace safety, and attracting investment.³⁴ Energy saving and emission reduction fell under the veto power in 2007.³⁵ That is why in the following year the CPC Wuxi Committee clearly declared that it would apply the veto system to assess leadership according to their achievements in energy saving and emission reductions.

Thus the 11th Five-Year Plan incorporated the “Major Pollutants Control Rate” as a binding government target, the 12th Five-Year Plan added “the Most Stringent Standards” to water resource management, and the Central Government declared that it would apply the “veto power” in emission reductions. It is against this background

32 Hu, A. (2011, 3 28). *Green light for hard targets*. Retrieved 11 5, 2014, from Chinadaily: http://www.chinadaily.com.cn/opinion/2011-03/28/content_12234557.htm.

33 Genia, K. (2014, 8 1). Barriers to the Implementation of Environmental Policies at the Local Level in China. *World Bank Policy Research Working Paper*. Retrieved from <http://ssrn.com/abstract=2487614>.

34 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

35 Notice of Energy Saving and Emission Reduction. (2007). Retrieved from http://www.gov.cn/jrzq/2007-06/03/content_634545.htm.

that the Captain of the River instrument rapidly became an adaptive instrument which can concentrate governmental manpower and personnel resources in a short period of time to deal with urgent pressures. It has been successful to an extent and has been approved by Wuxi City. However, it is not without problems in practice, which are discussed below in section of pros and cons of the “Captain of the River” instrument.

3. Where does the law stand in this respect?

Since 1979, the China National People’s Congress (NPC) and its Standing Committee have passed as many as 280 pieces of legislation, of which 29 – almost 10% – relate to environmental issues. However, environmental pollution in China has reached a critical level, thus the implementation of these laws appears to have failed.³⁶

The legislative body of the NPC, China’s parliament, has grown in importance since 1978 when the domestic gates were opened. The NPC is often criticized as being a “rubber stamp” for party decisions.³⁷ Since approximately 75% of NPC deputies are CCP members, by the time a bill is placed before the NPC the major content of the bill has already been decided and members are expected to simply vote it through; bills are never rejected.³⁸

However, through the last decade there have been signs that the NPC is striving to be more independent. Today, it is playing an increasingly important role in China’s governance and tremendous progress has been made by the NPC. For example, it approved the Administrative Procedure Law in 1989, which marked the first time that legal standards were applied requiring every level of government and all government employees to operate in accordance with the law.³⁹ It added “ruling the country in accordance with the law and building a socialist country of law” to the third amendment of the Constitution in 1999. To date, the NPC has passed hundreds of pieces of legislation, covering all aspects of society. As a country with two thousand years of bureaucratic history, the construction of a legal system cannot be easy.

Not only is the NPC striving to create a country governed by the rule of law, but so is the Party. The Party created the ideology of “ruling the country in accordance with the law” for the first time at the 15th Party Congress in 1998 and formally added the phrase “ruling the country according to law” to the Party Constitution at the 16th Party Congress in 2002. It also included the requirement of “exercising power scientifically, democratically and in accordance with the law” in 2003.⁴⁰

36 Wang, J. (2010, 9 23). *China’s green laws are useless*. Retrieved 11 5, 2014, from Chinadialogue: <https://www.chinadialogue.net/article/show/single/en/3831--China-s-green-laws-are-useless->

37 *How China is ruled*. (sd). Retrieved from BBC News: http://news.bbc.co.uk/2/shared/spl/hi/in_depth/china_politics/government/html/7.stm.

38 Truex, R. (2013). The Returns to Office in a “Rubber Stamp” Parliament. *RCCPB Working Paper #33*. Retrieved from http://www.indiana.edu/~rccpb/pdf/Truex_RCCPB_33_June_2013.pdf.

39 *How China is ruled*. (sd). Retrieved from BBC News: http://news.bbc.co.uk/2/shared/spl/hi/in_depth/china_politics/government/html/7.stm.

40 Cai, D., & Wang, C. (2010). *China’s Journey Toward the Rule of Law: Legal Reform, 1978-2008*. Brill.

The fact of the matter is that at China's present stage, neither the political nor the legal developments are a linear impetus to develop a law-ruled country. They are deeply intertwined and develop following their own dynamics; they cooperate with, yet constrain each other.

This cooperation shows that law has sometimes served as a lagging indicator, memorizing and "legalizing" priorities established by the party state.⁴¹ For example, after the Party incorporated pollution control as a governmental "binding target" in the 11th Five-Year Plan, the Water Pollution and Prevention Law added GORS as a new provision in 2008, and this was also emphasized in the revisions of the Environmental Protection Law in 2014. The laws symbolically confirmed the GORS' legitimacy.

Law and Party policy occasionally constrain each other. In practice, law has played a secondary role in China, being readily breached when it is in conflict with key bureaucratic targets.^{42, 43} In a random check of 126 industrial parks in 11 provinces (autonomous regions) in 2007, 87.3% of these parks were shown to have been approved by governments illegally or *ultra vires*, or by lowering the standards of environmental impact assessment. In more than half of the governmental urban sewage treatment projects corners had been cut or work was simply stopped.⁴⁴ The enthusiastic pursuit of economic growth lead governments to ignore the legal norms of environmental protection on a wide scale, and as one scholar has stated: "a lack of good legislation is not the cause of China's ecological crisis, but rather a failure by government to prioritize the environment and enforce laws effectively".⁴⁵

Law enforcement by the judicial system is weak, as local judiciaries are dependent on provincial and local governments for their funding. By controlling local judicial salaries and court finances, local governments often interfere with judicial decisions in order to protect local industries or litigants, or, in the case of administrative lawsuits, to shield themselves from liability.⁴⁶ For example, in Beijing City, the success rate of plaintiffs in administrative cases was 12.1% in 2013, and the national average success rate was less than 10%.⁴⁷ Some 87% of the public, when they encounter environmental disputes, choose to report the issue to governmental departments rather than bring the case

41 Sunstein, C. R. (1996). On the expressive function of law. *University of Pennsylvania law review*, 2021-2053.

42 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

43 Minzner, C. (2009). Riots and cover-ups: counterproductive control of local agents in China. *Journal of International Law*, 31(1), 53-71. Retrieved from <http://scholarship.law.upenn.edu/jil/vol31/iss1/2>.

44 Geng, H. (2013, 6 13). *Can the Captain of the River save China's environmental crisis?* Retrieved 11 5, 2014, from Huanshan News: <http://www.newshs.com/a/20130613/00203.htm>.

45 Liu, J. (2014, 4 24). *China's new environmental law looks good on paper*. Retrieved 11 5, 2014 from Chinadialogue: <https://www.chinadialogue.net/blog/6937-China-s-new-environmental-law-looks-good-on-paper/en>.

46 Brown, S. (sd). *Judicial Independence in the PRC*. Retrieved 11 5, 2014 from <http://www.cecc.gov/judicial-independence-in-the-prc>.

47 Xinhua News. (2014, 9 21). *Success rate of the plaintiff in administrative cases is less than 10%*. Retrieved 11 5, 2014, from Sina News: <http://news.sina.com.cn/c/2014-09-21/145630891138.shtml>.

before the courts.⁴⁸ For example, the Wuxi Intermediate People’s Court created a special tribunal for environmental protection in 2008; however, up to the end of that year, not a single conflict had been brought before the tribunal.⁴⁹

The fate of the “failure of environmental law” is to a large extent exacerbated by the GORS, as the environmental protection therein has been included as one of the soft guidance targets and it has been given secondary importance to the GDP targets determined by the Party.⁵⁰ Moreover, environmental achievements were not an indicator for assessing officials’ performance until 2006. This largely constrains the motivation of lower governments to conduct environmental protection.

Although the GORS, as well as the “Captain of the River” instrument, has been criticized as a “rule of man”,⁵¹ as being “against the law”,⁵² or as “fixing the symptom instead of the root causes”, it does not seem to be a better way to control rapid environmental degradation and to achieve immediate results against the backdrop of a country undergoing a political and legal transition from an “only GDP” era to a sustainable development era. Since the environmental problem is unique and must be quickly addressed, ‘fixing’ the symptoms can save time for ‘fixing’ the root causes.

4. Pros and cons of the “Captain of the River” instrument

A useful way of thinking about the “Captain of the River” instrument is that it is an adaptive tool to deal with the urgent pressures of water pollution. It has its strength, but it also has its shortcomings.

4.1 Benefits of the “Captain of the River” instrument

The “Captain of the River” instrument largely improves administrative efficiency. Fragmentation has been determined to be the primary weak point in China’s institutional arrangement and legal framework for water resources management. It is often referred to as a multi-headed dragon since so many departments are involved therein.⁵³ The “Captain of the River” instrument, to some extent, solves this problem. It contractually compels the official leaders of the Party and governments as the first responsible actors to take charge of water quality, and directly correlates the consequences with their career possibilities. As the Captains are the immediate leaders

48 Huang, S. (2014, 7 11). *The dilemma of environmental tribunals in China*. Retrieved 11 5, 2014 from Legaldaily: http://www.legaldaily.com.cn/Frontier_of_Law/content/2014-07/11/content_5667242.htm.

49 Ibid.

50 Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.

51 Minzner, C. (2009). Riots and cover-ups: counterproductive control of local agents in China. *Journal of International Law*, 31(1), 53-71. Retrieved from <http://scholarship.law.upenn.edu/jil/vol31/iss1/2>.

52 Minzner, C. (2011). China’s Turn Against Law. *American Journal of Comparative Law*, 2011; *Washington University in St. Louis Legal Studies Research Paper No. 11-03-01*, 937-984. Retrieved from <http://ssrn.com/abstract=1767455>.

53 Dai, L. (2012). Recovering the Costs of Water Services in the People’s Republic of China: Lessons from Article 9 of the European Union Water Framework Directive. *Utrecht Law Review*, 102-118. Retrieved from <https://www.utrechtlawreview.org/index.php/ulr/article/view/208/206>.

of different governmental sectors, and have direct influence on these fragmented departments, under their guidance it is easier to combine sectorial strength concerning pollution control and resource management in a short period of time.

The “Captain of the River” instrument promotes more site-specific policies. Water pollution sources vary on a regional basis, and especially in a country like China, industrial and agricultural pollution, the two main sources of water pollution, are unevenly distributed. National or provincial regulations are not always suitable for local conditions. The Captains, instead, can compensate for this defect. By diagnosing the specific causes of water pollution in their rivers, the Captains “relate the remedy to the specific situation”, so that pollution problems are dealt with in a river-based perspective; the means therefore tends to be more practical.

Although the GORS occasionally constrains the implementation of formal law, it can also promote specific laws when setting hard targets in specific fields. For example, following the assignment of water quality targets by State Council to local governments, the NPC further strengthened the legal framework of environmental protection. Not only can the implementation of existing laws and regulations facilitate the pursuance of governmental goals, but the designation of specific targets can also promote the implementation of formal laws and regulations.

4.2 Shortcomings of the “Captain of the River” instrument

The Veto System is not only applied in the “Captain of the River” instrument, but also in other fields. For example, GDP achievements, birth control, safe production control and food safety, etc. According to a news report, in Jiangxi Province alone there were 62 different items under the veto system applied to its local governments up to 2011.⁵⁴ Local cadres have a wide range of responsibilities, water pollution control (if they happen to be ‘Captains’) being only one of them. Officials can be overburdened with pressure, especially when each of the responsibilities plays a decisive role in their promotion, reward or sanction. This pressure tends to lead to favoritism and manipulation which are unavoidable under certain circumstances especially when competition for promotion is fierce. Many strategies have been adopted by lower governments in order to cope with the overwhelming pressure, for example, selective reports, selective implementation, or the manipulation of data, etc..

The “Captain of the River” instrument has achieved a level of success in the short term however, it might be the consequence of campaign-style enforcement. This enforcement style forces governments to resolve outstanding issues in the short term by concentrating their manpower and material resources. An example of this is the “Hard Strike” anti-crime campaign in 1983, which targeted a particular crime, and ramped up the law enforcement and state propaganda machines to obtain mass arrests, rapid trials, and mass executions.⁵⁵ Another example is an anti- prostitution

54 Pan, J. (2013, 11 7). *Veto should not become a norm of cadre evaluation*. Retrieved 11 5, 2014, from Guanmingdaily: http://epaper.gmw.cn/gmrb/html/2013-11/07/nw.D110000gmr_b_20131107_2-02.htm.

55 Nestor, P. (2007). When the Price Is Too High: Rethinking China’s Deterrence Strategy for Robbery. *Pac. Rim L. & Pol’y J*, 16(27), 525.

campaign in Dongguan City at the beginning of 2014. In one afternoon alone, the city dispatched 6,525 police officers in raids to arrest 67 people and to close 12 entertainment venues.⁵⁶ Both the “Hard Strike” and the “anti-prostitution” campaigns achieved immediate success, but neither of them had a long-term effect.⁵⁷

Although the “Captain of the River” instrument tends to be a long-term strategy, it is not immune to the allure of campaign-style enforcement. Every Captain has a limited tenure and everyone has his own understanding of career achievement. It cannot ensure that every cadre has the same enthusiasm concerning the pursuit of his career, or more directly in this case, concerning water quality protection, especially when the Captain may be close to the age limit for promotion. As one local official once said he was ‘too old for promotion, too young to stop working, but just right for mahjong and drinking’.⁵⁸ It is, therefore, possible to have tight control on water quality in one period or place and to have a loose policy in others due to the individual character and situation of Captains.

Another shortcoming of “the Captain of the River” instrument is that environmental effects tend to appear after a certain period of time, meaning that the effects may only emerge after a number of years and may not become apparent during the 5-year tenure of the leadership at the township level. This time lapse can result in either officials ignoring the high-polluting source with slow consequences, like agricultural pollution, or with the Captains being unfairly assessed, i.e. unjustly rewarded or unjustly sanctioned due to the previous tenure’s efforts or ignorance. In the case of trans-regional rivers, the Captains may be misjudged since the river is shared by different Captains and the monitoring result in fact is a joint effort.

Transparency and public participation are poor in the Veto System of the “Captain of the River”. In the process of assessing the Captains in question, the public at large are generally excluded, since the Veto System is the Communist Party’s internal personnel system. Decisions are made by the Organizational Department and approved by the CPC Committee, independent monitoring is not necessary and the public does not need to be involved therein. Public participation, promoted by the Central Government, is more applicable to non-leading cadres at the level of local governments. However, the opinions of the public are typically regarded as “references” and have little practical effect on a cadre’s career prospects.⁵⁹ Moreover, the “Captain of the River” instrument is result-oriented, it can easily lead to the lack of transparency and public participation and which may further lead to the illegitimate implementation and the ignorance of public rights.

56 Kaiman, J. (2014, 2 11). *Prostitution crackdown in China province after TV investigation*. Retrieved 11 5, 2014, from The Guardian: <http://www.theguardian.com/world/2014/feb/11/china-province-prostitution-crack-down-guangdong-sex-workers>.

57 Nestor, P. (2007). When the Price Is Too High: Rethinking China’s Deterrence Strategy for Robbery. *Pac. Rim L. & Pol’y J*, 16(27), 525.

58 Smith, G. (2013). Measurement, promotions and patterns of behavior in Chinese local government. *The Journal of Peasant Studies*, 40(6), 1027-1050. DOI:10.1080/03066150.2013.866095.

59 O’Brien, K., & Li, L. (1999). Selective policy implementation in rural China. *Comparative Politics*, 167-186. Retrieved from <http://falcon.arts.cornell.edu/am847/pdf/PolicyImplementationRuralChina%5B1%5D.pdf>.

5. Suggestions & conclusion

Although the “Captain of the River” instrument is largely ruled by man and seems to conflict with the country’s objective of building a law-ruled society, it is still an efficient tool to promote environmental protection during this transitional period. While strengthening the legal framework, there is certainly room for and a need to improve this instrument.

One of the legislative tasks declared by the Party in 1978 is that “there must be laws for people to follow”. To date, although there has been major progress in water-related legislation by the NPC, its legal framework appears “fragmented” and “insufficient”. Approaches to tackle water pollution caused by point source (e.g. industry) and nonpoint source (e.g. agriculture) pollution, has not yet been differentiated.⁶⁰ The integration of different water-related legislation needs to be further developed. In other words, there are still insufficient legal norms or obligations for either the Captains or the public to follow. In order to correct this developing an integrated and concrete legal framework through legal reform, as the author has observed in previous studies, should be a priority.

Another task of the legislation initiated by the Party is to ensure that “the existing laws are observed”. In the “GDP” era, the violation of environmental law by the government was not uncommon. Since the Party has now laid down water quality objectives by means of the GORS and has demoted the GDP goals, local governments may therefore be more inclined to respect environmental law as they are subjected to fewer pressures regarding economic development. However, if there is no sound monitoring system, the GORS, as well as the “Captain of the River” instrument, may lend weight to the failure of environmental compliance. As both the GORS and the “Captain of the River” instrument are result-oriented, countermeasures from local governments tend to vary, as discussed above, and, without monitoring, effective and legitimate implementation cannot always be ensured.

“Accepting the public monitor” is a rule which has been adopted by the Party in years, however, it was not well implemented. It is a promising signal that, since the government of Xi Jinping, more attention has been paid to public participation, as Xi has said that “winning or losing public support is an issue that concerns the CPC’s survival or extinction”. Therefore the Political Bureau of the CPC Central Committee has decided to launch a campaign to boost ties between CPC members and the public in the near future.⁶¹ However, Xi’s new policies will be challenged by poor and ineffective levels of coordination between the central government and local leadership and the

60 Dai, L. (2014). Something Old, Something New, Something Borrowed and Something Blue – Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union. *Utrecht Law Review*, 10(2), 136-154. Retrieved from <http://ssrn.com/abstract=2437506>.

61 Xinhuanet. (2013, 6 18). Xi: *Upcoming CPC campaign a “thorough cleanup” of undesirable practices*. Retrieved 11 5, 2014, from Xinhuanet: http://news.xinhuanet.com/english/china/2013-06/18/c_132465115.htm.

inability of the country's top supervisory body to regulate local cadres.⁶² Recently, the Party has taken the unprecedented step of establishing an Online Public Opinion Monitoring Centre to monitor local-level government members on a daily basis (and also to keep a watchful eye on citizens in general) by collecting information from citizens.⁶³ This is a good start for the Party in accepting public monitoring; however, given that only one-twelfth of China's total population use the internet, other channels and more instruments may need to be further developed.

During the past few years, the Central Government has expanded public participation in all processes, from access to information, participation in decision-making, to access to justice. Examples include, from a legal perspective, the publication of the Environmental Impact Assessment Law in 2002, the Implementation Measures of public participation in the Environmental Impact Assessment Process in 2004, the State Council Open Government Information Regulations in 2008, and similar local regulations and administrative measures. A skeleton structure for public participation has already been basically built at the national level; however, there is still a considerable gap between what is proposed by the Central Government and what is actually implemented and enforced at the local level. This is because, historically, China's governance is subject to a lack of public participation, "a wealth of laws with shallow roots", as one scholar once described it.⁶⁴ A suggestion would be to apply the existing norms more seriously by closed supervision with both a top-down and bottom-up approach, and parallel to this, strengthening general legal awareness and education.

Specific to the "Captain of the River" instrument, concerns arise with regard to the process of how targets are established, how the Captains fulfil their assigned tasks and how they are assessed.

The establishment of water quality targets has been discussed in the author's previous research. When the Central Government designs water quality objectives, ecosystem indicators are not taken into account, and no attention is given to issues of groundwater quality. At the local level, there is no mechanism to ensure that the Captains' tasks are assigned scientifically. With regard to this, more interdisciplinary research is needed, as neither legal nor political reform alone can fully correct this.

To fulfil the assigned tasks, Captains are required to act in accordance with the law. Legitimacy should be fundamental for the system, which, however, has been largely ignored by the evaluators. Public participation can further improve this. For

62 Wang, Y. (2013, 12 18). *Public participation and legal reform key to creating ecological civilisation*. Retrieved 11 5, 2014, from Chinadialogue: <https://www.chinadialogue.net/article/show/single/en/6583-Public-participation-and-legal-reform-key-to-creating-ecological-civilisation>.

63 FlorCruz, M. (2013, 10 3). *China's Government Employs 2 Million 'Public Opinion Analysts'*. Retrieved 11 5, 2014, from International Business Times: <http://www.ibtimes.com/chinas-government-employs-2-million-public-opinion-analysts-1414576>.

64 Wu, J. (2008). Public Participation in the Enforcement of China's Anti-Pollution Laws. *LEAD Journal (Law, Environment and Development Journal)*, 35-48. Retrieved from <http://www.lead-journal.org/content/08035.pdf>.

the time being, Zhejiang Province is trying to establish an online monitoring system to implement its “Captain of the River” instrument, in which the public can upload photographs of polluted water and address complaints about misconduct by the Captains. This bottom-up channel, once initiated, will largely improve governmental transparency and will also assist central authorities to tighten control over lower levels of government.

The Veto System of the “Captain of the River”, as the Party’s personnel management tool, calls for the internal reform of the Party. Although increasing transparency and public participation has been suggested, its implementation requires a change in Party mentality. From a legal perspective, tremendous efforts have been made by the Central Government, as discussed above, and are still made. For instance, at the beginning of this year, the Ministry of Water Resources, jointly with 10 other Ministries, issued an Implementation Plan on the Most Stringent Water Management Assessment, in which the process, contents and scoring methods of how to assess local governments are specified. According to the Plan, the Ministry of Water Resources is to undertake the overall assessment. It is not yet clear how this Plan can be harmonized with the Veto System. Public participation needs to be further developed both within the Party system and the formal law system, as neither of them is able to achieve the state’s final goal – building a country ruled by law – on its own.

In this transition period, the “Captain of the River” instrument is an adaptive tool to curb emerging environmental pressures. It has been developed against the background that the Party runs the state through a political system with a tight top-down responsibility system -- GORS, in which the formal law is less important. Along with both the political and legal reform, the “Captain of the River” instrument faces the challenges, from a legal perspective, that the enforcement of available formal laws has not been effectively ensured and that there is a lack of legal instruments to enable governments to address water pollution, particularly non-point source pollution. With regard to this, the author proposes that while strengthening the enforcement of the existing laws, the legal framework which suits local conditions also be further improved.

CHAPTER 4

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

This chapter is published as: 2012, Liping Dai, "Recovering the Costs of Water Services in the People's Republic of China: Lessons from Article 9 of the European Union Water Framework Directive", *Utrecht Law Review* 8, 102. Link: URN:NBN:NL:UI:10-1-112902

The cost recovery of water services is becoming known as an important element for water management internationally. The Water Framework Directive is a leading document in implementing these economic instruments in the European Union and it is also a good framework to refer to when the People's Republic of China reforms its water price policies and its recovery of the costs of water services. By providing a comparative study of the backgrounds and contents of costs recovery between Article 9 of the Water Framework Directive and the water management-related systems in the People's Republic of China, this article aims to look for some legal solutions in the European framework that can be useful for the water management of the People's Republic of China.

Key words: water services; costs recovery; polluter pays; China; Water Framework Directive

1. Introduction

The costs recovery of water services, as a central target of the Europe Union Water Framework Directive (WFD), are becoming known as an important element for water management internationally. A simple explanation of costs 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 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 (the PRC), which has grown rapidly during the past 30 years, water is increasingly one of the most limiting factors in the social development of the current stage; the issue of water pricing is seen as being of

1 Rachel Cardone, Catarina Fonseca, 'Financing and Cost Recovery', 2003, P15.

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 327/1, 22.12.2000.

3 K. Falkenberg, 'The EU Water Framework Directive-Aspirations and Lessons learned', 2010 *Water Front Magazine* No.2.

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 – to be specific, Article 9 – and the current regime in the PRC. The main research questions – what 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 differences and similarities of recovering the costs of water services systems between 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. The relationship between the EU and its member states in water management and Article 9 of the WFD will be introduced first (Section 2), and then I will describe water management in the PRC (Section 3), and, following the introductory comments, Article 9 will be separated into three parts for discussion purposes: water services (Section 4), cost recovery (Section 5) and the meaning and the role of the polluter pays principle (Section 6). 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*

4 L. Zhong, A.P.J. Mol, 'Water Price Reforms in China: Policy-Making and Implementation', 2009 of *Water Resources Management*, 24(2), pp. 377-396.

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 and A. Loftus. (eds.), *The Right to Water: Politics, Governance and Social Struggles*, Earthscan, 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.

*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.

Institutions	Functions
The European Parliament	<ul style="list-style-type: none"> • Debating and passing European laws, with the Council • Scrutinizing other EU institutions, particularly the Commission, to make sure they are working democratically • Debating and adopting the EU's budget, with the Council
The European Council	<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
The Council	<ul style="list-style-type: none"> • Passing EU laws. • Coordinating the broad economic policies of EU member countries. • Signing agreements between the EU and other countries. • Approving the annual EU budget • Developing the EU's foreign and defense policies. • Coordinating cooperation between courts and police forces of member countries
The European Commission	<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.
The Court of Justice of the European Union	<ul style="list-style-type: none"> • Interpreting EU law to make sure it is applied in the same way in all EU countries • Settles legal disputes between EU governments and EU institutions
The European Central Bank	<ul style="list-style-type: none"> • Keeping prices stable (keep inflation under control), especially in countries that use the euro • Keeping the financial system stable – by making sure financial markets and institutions are properly supervised
The Court of Auditors	<ul style="list-style-type: none"> • Auditing EU finances

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 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

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

9 W.T. Eijsbouts, 'In Defense of EC Law', in: T.A.J.A Vandamme, J.-H. Reestan (eds.), *Ambiguity in the Rule of Law*, The Hogendorp Papers (I), 2001, pp. 35-50.

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 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,

10 J.H. Jans, R. de Lange, S. Prechal & R.J.G.M. Widdershoven, *Europeanisation of Public Law*, 2007, p. 11.

11 H.F.M.W. van Rijswijk, ‘Interaction between European and Dutch Water law’, in S. Reinhard and 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 Ibid.

14 Jon Eldridge & Comisión Europea, *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’, *EU Environmental policy handbook*, 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.

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

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 resources²²:

“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
- Costs 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

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

19 Y. Uitenboogaart, J.J.H. van Kempen, M.A. Wiering & H.F.M.W. van Rijswijk. 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.

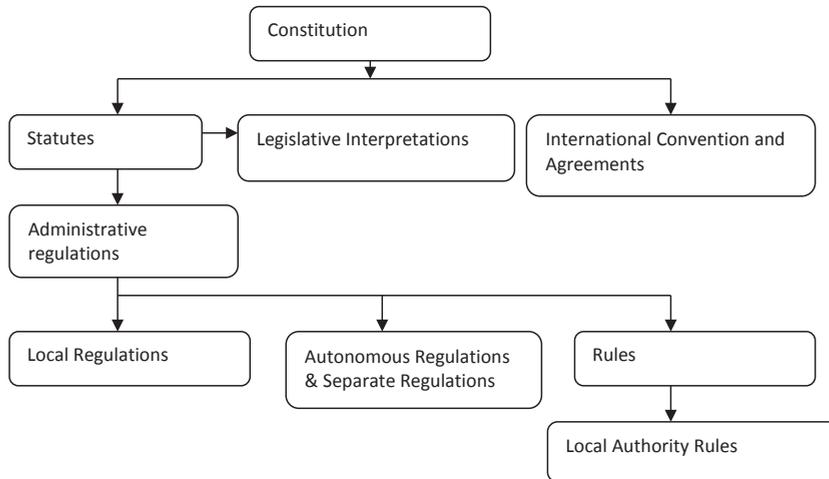
21 Y. Uitenboogaart, J.J.H. van Kempen, M.A. Wiering, H.F.M.W. van Rijswijk. Dealing with Complexity and Policy Discretion, A Comparison of the Implementation Process of the European Water Framework Directive in Five Member States (2009), p. 11, although article 11 WFD contains a list of mandatory measures.

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

ranking legal document in the PRC, followed by statutes, legislative interpretations and international convention 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 provincial level (Figure 1).

Figure 1: Legal Hierarchy in the PRC



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 We only list some statutes and regulations which relate to the water supply and water pricing, see Table 2.

23 Peng Shugang, 'China's Legal System for Water Management: Basic Challenges and Policy Recommendations, International Journal of Water Resources Development', pp. 3-22.

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 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.
Administrative Regulations	Regulations on Urban Water Supply	Adopted in 1994	1) To strengthen the management of 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 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 Pollutants Discharge Fees and their Collection and Usage	Adopted in 2003	To improve the management of pollutants 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.

Hierarchy	Title	Year	Purpose
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 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		

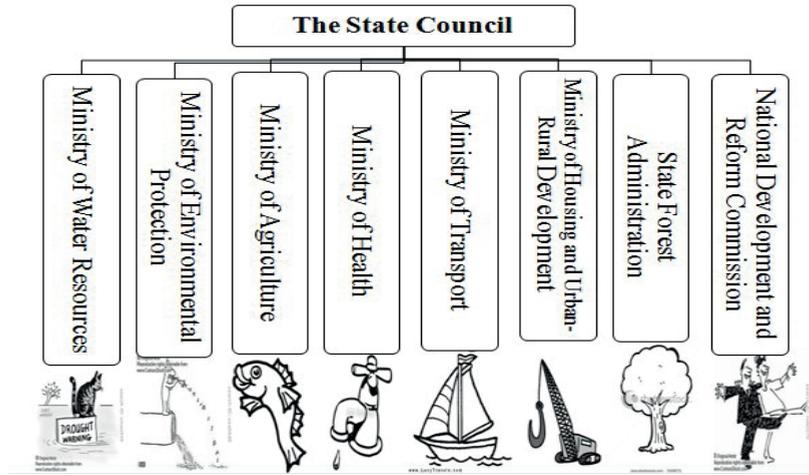
3.3 Institutional arrangements for water management in the People’s Republic of China

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 ⅔ of the total area of Chinese territory, and the remaining ⅓ 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, fishery environmental water and non-point source pollution control, the Ministry of Health manages the national drinking water safety, while other departments are responsible for different aspects of water use: the Ministry of Transport concerns inland navigation. Ministry of Housing and Urban-Rural Development is responsible for construction and management of water supply projects and drainage and sewage disposal projects. State Forest Administration protects soil erosion; while National Development and Reform Commission cooperate with other departments during the comprehensive river basin plans are made.

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).

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 over 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 an economic approach into water management, is considered as being the most important directive in European water law so far and is looked upon as being a

25 Peng Shugang, 'China's Legal System for Water Management: Basic Challenges and Policy Recommendations, *International Journal of Water Resources Development*', pp. 3-22.

model outside Europe. The PRC has revised several legal documents relating to water management in 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 current PRC. The rules and principles are distributed in different statutes, rules and regulations. Some of these national legislations are too general to be implemented in local policies and regulations; so they are needed to be detailed by local legislatures according to their own situations. This is similar to the WFD which is needed 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 legislations in the PRC, they are still comparable to the WFD and they 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 Europe 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 groundwater.

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:

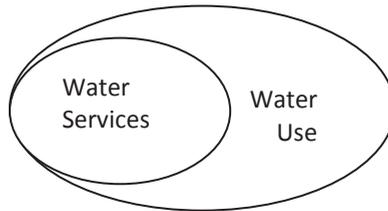
- a) Key characteristics of natural waters are modified (i.e. the service offered is this modification) so as to ensure it fits with the requirements of well-identified users (e.g. the provision of drinking water); or

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

- b) 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 is narrower than water use (Figure 3).

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” need to be introduced here.

In 2005, a four year study “the Millennium Ecosystem Assessment” was carried out, in which a definition of ‘ecosystem service’ 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 Economic Commission for Europe as,³⁰

27 Ibid

28 Ibid.

29 Millennium Ecosystem Assessment, ‘Ecosystems and Human Well-being: Synthesis’, 2005 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.

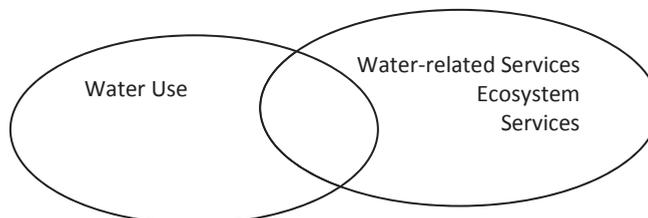
“Water-related ecosystem services: means such services as flood prevention, control and mitigation; regulating runoff and water supply; improving the quality of surface waters and groundwaters; withholding sediments, reducing erosion, stabilizing river banks and shorelines and lowering the potential 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.”

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

- *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.*
- *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*

Compared to the definition of water services in the WFD, the scope of water-related ecosystem services are broader. For example, pollution quotas does improve the water quality, but cannot be considered a WFD-water service, both in a narrow or broad interpretation of water services.³² It is no water service which provides 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 not the same either, it is hardly to say that relocating immigrants in water transfer projects, which is a kind of water-related ecosystem services, is water use, although it does have 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 one is the description of the “urban water supply price” which was introduced by the National

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

32 For more information about narrow and broad interpretations 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? Utrecht Law Review, November 2012.

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? Utrecht Law Review, November 2012.

Guidelines on Urban Water Supply Tariffs in 1998 (and is now being revised): the price of water supply means prices of purifying and disinfecting the surface and groundwater to make it reach the standard of drinking water and the price of sewage treatment. The water supply and water sanitation were mentioned there.

However, “water services” do exist in Chinese academic fields. Since payment for water-related ecosystem services (PWS) in watersheds was introduced in recent years (which is called eco-compensation for watersheds in the PRC due to different language habits), 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 water ecosystem. The debates regarding “water services” in the PRC which 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 RMB (57,563 Euro), and indirect values as 5546.92×10⁸ Yuan RMB (74,883 Euro), the total value was 9810.83×10⁸ 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, neither in EU. The two terms are being used confused. 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 “water services” in the PRC are actually water-related ecosystem services.

4.3 Comments

Slogans to cover the costs of water services have emerged during the procedure for reforming water pricing in the PRC. At the meantime, payments for water-related ecosystem services are blooming too. The current studies which concern “water services”, as I have 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 water price, water resource fees and waste water discharge fees, they are levied by the government. But water-related ecosystem services, as a market-based instrument, they can be traded in the market directly without government intervention if the market is perfect enough, for example, water right transaction between water-related ecosystem services suppliers and water-related ecosystem services 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, even though the WFD itself didn’t distinguish the differences

34 Zhao Tongqian, Ouyang Zhiyun, Wang Xiaoke, Miao Hongwei & Yanchang, *Ecosystem services and their valuation of terrestrial surface water system in China*, 2003 Journal of Natural Resources, p. 4.

between water services and water-related ecosystem services, it provide room for the Member States to address it.

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 “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 Union*³⁷

One of the most ambitious objectives of Directive, that influence immediately all the productive sectors and all the uses, is the proposal for 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 in 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 water services cost. The level of recovery of water services cost and the extent to which polluter pays principle is assessed through the next 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 recovery⁴⁰

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 (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 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 force (see Section 3.1), this document was not implemented very well by local governments.

Therefore there is no legal definition of the costs of water services in the PRC either. However, in the academic fields, five elements are extracted from the above document, which comprise the cycle of costs for water services, from water abstraction,

37 For more information, please find in 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? *Utrecht Law Review*, November 2012.

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*, Cyprus, 2000.

39 Herwig Unnerstall, 'The Principle of Full Cost Recovery in the EU-Water Framework Directive – Genesis and Content', *Environmental Law* (2007) 19(1): 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*, 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.

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, the 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.

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, which are called environmental costs. See Table 4.

Table 4: Costs of Water Services in the PRC

Costs of Water Services	Economics	Water Services	Expression
	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 the 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 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 the citizens' drinking water bill; it is charged by the water suppliers (most of these are drinking water companies) and they are on behalf of the 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 discharged 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, the legislation has not kept pace with its overheating economy. From the above analysis, one can see that the division of water services costs only exist in academic fields now. 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 increase rapidly, the rates are still insufficient to cover the costs. According to the World Bank, in 2004, 60 percent 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%,

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

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 EU, the member states transpose the WFD according to their own regional and local features, they have different explanations of water services, so it is hard to summarize if the costs of water services have been recovered. However, what the PRC can learn from the Article 9 of WFD is to have its own legislation on its classification of costs recovery. The reform of water price can go well only if there is a good legal system taking shape.

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, the definition of polluters varies either. 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 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

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

45 Jones, T. 'Recent developments in the pricing of water services in OECD countries', *Water Policy* (1998),1 (6): 637–51.

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 Dr. Bill Baker, Susanne Leitterstorf, Paul Metcalfe & Anna Navidski, "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, P11).

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 What support the point in his arguments are water-related ecosystem services which the forest supplies are belonged to the categories of water services in the WFD.

A feature of water services bears repeating here “water service per se does not consume water” (Section 4.1). The forests do consume water during the growing procedure although they supply much more water-related ecosystem services. It is not rare that because of the improper species of trees growing near the river, the quality and quantity of the water were affected seriously. But still, the forestry plays a significant role to pay in the water-related ecosystem market. To recover the costs of these water-related services, only polluter pays principle perhaps is not sufficient.

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

The Environmental Protection Law of the PRC (for a Trial Implementation) in 1979 provided for a principle as “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 suffered losses from the damaged environment. Later when the Environmental Protection Law was revised and released 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

47 EU Green Week – Water: the blue gold in our green forests (2012). <http://www.apastyle.org/learn/faqs/web-page-no-author.aspx>. (last visited 19 March 2010).

48 Green Week 2012, How the polluters led the Water Framework Directive ad absurdum. http://ec.europa.eu/environment/greenweek/sites/default/files/3-3_salmsalm.pdf. (last visited 19 March 2010).

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 (for a Trial Implementation)	1979	who pollutes, who repairs
Environmental Protection Law of PRC	1989	no direct description
Rule of 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

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

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

However, to address the water-related problems, only take into account of the polluter pays principle is not enough, neither in the PRC nor in EU. The combination of other principles, for example, the precautionary and the prevention principle which were stated in the EC Treaty are equally important.

7. Conclusion

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

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

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

The PRC has no real legislation of water services although a lot of water services-related research has been done. The two different economic instruments of costs recovery for water services and the PWS were not distinguished. Though 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 of water resources in different regions. So it is feasible for the PRC to provide a framework to address the water services, as the WFD has done, in the national level and leave them to the local authorities to choose the form and methods for achieving it.

There is no substantial difference of water services costs between the WFD and the PRC, but in the PRC the definitions of these costs only bloomed in the academic fields, the legislation lags behind. What the PRC can learn from the WFD is to introduce these definitions into legislative level. For example, introduce the three categories into the National Guidelines on Water Tariffs which is being revising recently.

Although polluter pays principle in the PRC is distributed into different administrative legal documents, they don't have high legal force. The Central Government has realized it, so the policy reform of this principle was proposed in 2007. The Article 9 of the WFD here provides a good reference; it disaggregates water users into three groups: at least industry, households and agriculture. A clear definition of water users is the precondition for applying this principle. And what worth noting are the other principles, like prevention principle, user pays principle and beneficiary pays principle call for particular attention. The PRC is drafting the Rule for PWS in current stage; it is a good time to interpret the applicative scopes of these principles.

CHAPTER 5

Exploring China’s Approach to Implementing ‘Eco-compensation’ Schemes – The Lake Tai Watershed as Case Study Considered Through a Legal Lens

This chapter is published as: 2014, Liping Dai, “Exploring China’s approach to implementing ‘eco-compensation’ schemes: the Lake Tai watershed as case study considered through a legal lens”, *Water International*, 39(5), 755-773. DOI: 10.1080/02508060.2014.950860

For close to a decade China has been implementing ‘eco-compensation’ mechanisms to address water-related ecosystem issues. This paper examines China’s approach to eco-compensation through experience in the Lake Tai watershed. Four typologies of eco-compensation schemes are identified and analyzed, primarily through a legal lens. The author concludes that while progress has been made, there is need for improved legal approaches to this complex topic.

Keywords: PES; Eco-compensation; Lake Tai, China, water law

1. Ecosystem services

Well-functioning ecosystems provide a broad range of services to myriad communities, anthropogenic and others. With growing populations the demands for natural resources are continually increasing, often resulting in dwindling healthy ecosystems. Identifying the significance of ecosystem services and assessing their monetary value are not new nor novel ideas; these can be traced back to an influential article published in *Nature* in 1997.¹ In that seminal study the authors classified ecosystem services into 17 major categories: gas regulation, climate regulation, disturbance regulation, water regulation, water supply, erosion control and sediment retention, soil formation, nutrient cycling, waste treatment, pollination, biological control, refugia, food production, raw materials, genetic resources, recreation and cultural services.²

The notion of ‘ecosystem services’ has been mainstreamed over the past decade, referred to as “environmental services,” “ecological services,” or simply “investing in nature”. In the first wave of research in this field (1990-1996), a survey of the legal literature reveals under 20 important studies that refer to the term “ecosystem services.” However, during the following seven years, from 1997-2003, over ten

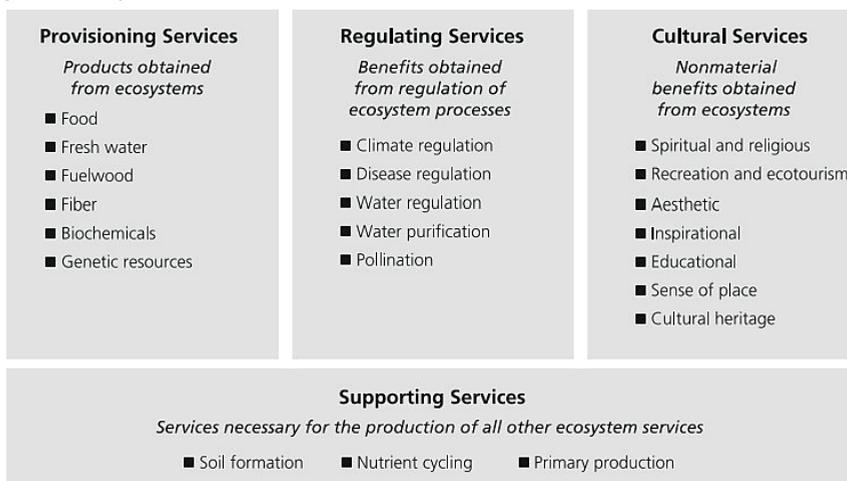
1 Costanza, R., d’Arge, R., Groot, R., Farber, S., Grasso, M., Hannon, B. . . . Belt, M. (1998). The value of the world’s ecosystem services and natural capital. *Nature*, 253-260.

2 Ibid.

times that number of law review articles referred to ecosystem services reflecting the growing legal discourse in this field.³

The most influential categorization of ecosystem services comes from the Millennium Ecosystem Assessment (MA). The MA follows Costanza and his colleagues⁴ in taking both natural and man-made ecosystems as sources of ecosystem services, and follows Daily⁵ in using the term “services” to encompass both the tangible and intangible benefits that humans obtain from ecosystems, which are sometimes separated into “goods” and “services” respectively.⁶ The MA categorizes ecosystem services into four groups based on their functional lines: provisioning services, regulating services, cultural services and supporting services (see Figure 1).

Figure 1: Ecosystem Services.



Source: *Ecosystems and Human Well-being: A Framework for Assessment*, p.57.

Perhaps the most important basis for supporting a policy that would protect otherwise threatened ecosystem services is the growing evidence that society gains more value from such protection than it gives up.⁷ However, valuing ecosystem services is an extraordinarily difficult undertaking, and the economic valuation of ecosystem services at the global level has been a hot topic of debate.⁸ For example, Costanza et al. suggestion in 1997 that a “minimum estimate” of such values was US \$33

3 Ruhl, J., & Salzman, J. (2007). The Law and Policy Beginnings of Ecosystem Services. *Journal of Land Use and Environmental Law*, 22.

4 Costanza, R., d'Arge, R., Groot, R., Farber, S., Grasso, M., Hannon, B. . . . Belt, M. (1998). The value of the world's ecosystem services and natural capital. *Nature*, 253-260.

5 Daily, G. C. (1997). *Nature's Services. Societal Dependence on Natural Ecosystems*. Washington DC: Island Press.

6 Alcamo, J., & Bennett, E. (2003). *Ecosystems and Human Well-being: A Framework for Assessment*. Island Press. Retrieved from <http://www.millenniumassessment.org/en/Framework.html>.

7 Goulder, L., & Kennedy, D. (2011). Interpreting and Estimating the Value of Ecosystem Services. *Natural Capital—Theory and Practice of Mapping Ecosystem Services*, 15-33.

8 Simpson, D. (2011). The “Ecosystem Service Framework”: a critical assessment. *Ecosystem Services Economics Working Paper Series*.

trillion, has given rise to a great deal of criticism, particularly from economists.⁹ A more fundamental criticism of the Costanza et al. is that it confused marginal and total values.¹⁰ Nonetheless, the universal consensus is that ecosystems are tremendously valuable, regardless of whether or not there are challenges in accurately assessing such value. Thus, while we continue to attempt to calculate the actual value, ecosystems should be managed wisely before they are lost. It is within this context that the legal underpinnings of such schemes are so important, as robust implementing vehicles for policies in this field.

What needs to be kept in mind is that ecosystem processes do not yield ecosystem services until they are used by human beings.¹¹ In other words, without human beings, “ecosystem services” would not be enjoyed: the food supplied or the water purification processes provided by the ecosystems are simply ecosystem processes in and of themselves. Thus any law or policy formulated to address ecosystem services should not deal with relations between humans and nature directly, but instead must focus on adjusting relations between humans. For example, compensation for ecosystems cannot be paid to ecosystems directly, but to the person who protects or repairs them. Thus, in this article, although the term “eco-compensation” – compensating the ecosystem – is adopted, it refers, in fact, to compensation schemes among people. Only by adjusting the different interests among different stakeholders of an ecosystem can ecosystem services compensation mechanisms be formulated.

2. Eco-compensation in China

At the international level, incentive-based approaches for conserving ecological services have been devised as vehicles to contribute to achieving environmental sustainability. In this context the notion of ‘payment for ecosystem services’ (PES) has become an important strategy in dealing with various challenges in environmental management.¹² According to the UNECE, PES refers to a contractual transaction between a buyer and a seller for an ecosystem service or for a land use/management practice which is likely to secure that service.¹³

The Chinese term “eco-compensation” (*sheng tai bu chang*) has often been used interchangeably with the international term “PES” – especially in comparative studies

-
- 9 Simpson, D. (2011). The “Ecosystem Service Framework”: a critical assessment. *Ecosystem Services Economics Working Paper Series*. Ayres, R. U. (1997). On the economic valuation of ecosystem services. *Fontainebleau: INSEAD*. Toman, M. (1998). Why not to calculate the value of the world’s ecosystem services and natural capital. *Ecological Economics* 78, 426-441.
 - 10 Simpson, D. (2011). The “Ecosystem Service Framework”: a critical assessment. *Ecosystem Services Economics Working Paper Series*.
 - 11 Ruhl, J., Kraft, S., & Lant, C. (2007). *The Law and Policy of Ecosystem Services*. Washington DC: Island Press.
 - 12 United Nations Economic Commission for Europe (UNECE). (2007). *Recommendations on payments for ecosystem services in integrated water resources management*. New York and Geneva: United Nations Publications.
 - 13 Ibid.

in this field examining China and global approaches.¹⁴ However, although the two schemes share some similarities, they are quite different. The Chinese notion of eco-compensation is broader, encompassing both PES-like policies and also a wide range of other policies and programme types.¹⁵ The Chinese approach is elaborated further below.

PES schemes generally refer to voluntary transactions between service providers and service buyers. When successful, PES creates economic incentives for landholders to conserve or even improve the function of their lands for services as varied as watershed protection, carbon sequestration, and biodiversity conservation.¹⁶

Eco-compensation schemes generally create not only incentives, but also disincentives. Incentives refer to a reward or compensation for a right that is foregone in order to maintain a certain ecosystem service. Disincentives refer to charges for the loss of or damage to ecosystems and natural resources.¹⁷

Therefore, eco-compensation in China is defined in both narrow and broad terms. The narrow definition, which is comparable to PES, refers to rewards for protecting the environment and natural resources; the broad definition covers not only rewards, but also environmental pollution charges,¹⁸ for example, a pollution discharge fee. As there are already a series of laws and regulations that deal with pollution charges in China, this article focuses more specifically on the narrow definition of eco-compensation, as it is a relatively new and innovative development being implemented in China.

In order to develop internal ecosystem services markets, China's central and local governments have rapidly expanded their environmental protection policies, especially during the past few years, largely under the heading of "eco-compensation" (see Appendix 4). The first official document to stimulate an eco-compensation mechanism was a 'Decision regarding Strengthening Environmental Protection' issued by the State Council in 2005, which states that the government "... should improve eco-compensation policy, and develop an eco-compensation mechanism as soon as possible ... pilot projects can be launched at both local and national level". Following this, many provinces enacted their own regulations and eco-compensation projects.

14 Zhang, Q., Bennett, M., Kannan, K., & Jin, L. (2010). *Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China*. Philippines: Asian Development Bank. Retrieved from <http://www.adb.org/publications/payments-ecological-services-and-eco-compensation-practices-and-innovations-peoples-rep>.

15 Bennett, M. T. (2009). *Markets for Ecosystem Services in China: An Exploration of China's "eco-compensation" and Other Market-based Environmental Policies: a Report from Phase I Work on an Inventory of Initiatives for Payments and Markets for Ecosystem Services in China*. Forest Trends. Retrieved from http://www.forest-trends.org/documents/files/doc_2317.pdf.

16 Zhang, Q., Bennett, M., Kannan, K., & Jin, L. (2010). *Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China*. Philippines: Asian Development Bank. Retrieved from <http://www.adb.org/publications/payments-ecological-services-and-eco-compensation-practices-and-innovations-peoples-rep>.

17 Zhang, Q., Lin, T., Bennett, M., & Jin, L. (2010). *An eco-compensation policy framework for the People's Republic of China: challenges and opportunities*. Mandaluyong City: Philippines: Asian Development Bank.

18 Li, W., & Liu, M. (2010). Reflections on the Development of Eco-compensation Mechanisms in the People's Republic of China. *Payments for Ecological Services and Eco-Compensation*, (p. 58).

The “win-win development” principle was later laid down as one of the cornerstones of the eco-compensation mechanism by the Ministry of Environmental Protection (MEP), which recommended carrying out pilot projects in four fields:

- eco-compensation for nature reserves,
- eco-compensation for eco-function areas,
- eco-compensation for the development of mineral resources, and
- eco-compensation for watersheds.

The number of eco-compensation projects in watersheds alone has increased significantly in only a decade – from 8 in 1999 to more than 47 in 2008, with an estimated transacted value of roughly US \$7.8 billion, covering some 290 million ha.¹⁹

For the purposes of this study the Lake Tai watershed in Jiangsu Province has been selected as a case study. Through a legal analysis of the eco-compensation mechanism in this watershed, this article aims to provide an overview of how this scheme has been applied in China. The Lake Tai case study is particularly well suited to this examination – it is one of the eco-compensation pilot schemes in China, one of the most developed and polluted regions, and one of the watersheds where a number and variety of eco-compensation schemes are being applied.

Although eco-compensation schemes are diverse in different watersheds, there are still some common rules that can be distilled from state practice. The Lake Tai example provides ample opportunity for harvesting valuable lessons for national water management regimes in the provision of water-related ecosystem services.

3. Eco-compensation in the Lake Tai watershed

Lake Tai is the third largest freshwater lake in China. The watershed occupies an area of some 36,500 square kilometres and extends across multiple jurisdictions: Jiangsu Province (52.6%. See Figure 2), Zhejiang Province (32.8%), Shanghai Municipality (14%) and Anhui Province (0.6%).²⁰ As one of the most developed regions in China, with only 0.4% of the land territory but 4.4% of the population, the Lake Tai watershed produced 10.3% of GDP; per capita GDP in this region was 2.4 times more than the national average in 2012.²¹ The lake connects seven large cities across East China, including Shanghai and Hangzhou, which have a population of 23.8 million and 8.8 million, respectively.

19 Stanton, T., Echavarria, M., Hamilton, K., & Ott, C. (2010). *State of Watershed Payments: An Emerging Marketplace*. Ecosystem Marketplace. Retrieved from http://www.foresttrends.org/documents/files/doc_2438.pdf; Zhang, Q., & Radstake, F. (2010). Payments for Ecological Services: Future Prospects for the Asian Development Bank Operations in the People's Republic of China. *Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China* (pp. 118-129). Mandaluyong City: Philippines: Asian Development Bank.

20 Monitor Center. (2013, 6 21). *Introduction of Tai Lake (in Chinese)*. Retrieved from Monitor Center of Hydrological and Water Resources: <http://www.thwb.gov.cn/aboutth/intro.asp>.

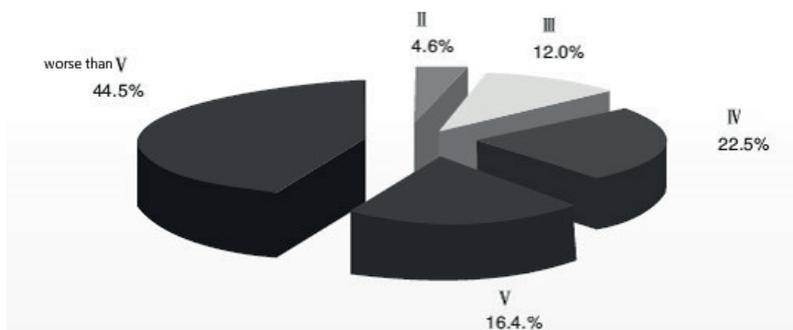
21 (2012). *Taihu Basin and Southeast Rivers Water Resources Bulletin 2011*. Shanghai: Bureau of Taihu Lake Basin Ministry of Water Resources. Retrieved from <http://218.1.102.107:9001/tba/content/TBA/lygb/szygb/0000000000003585.html>.

Figure 2: Lake Tai and Jiangsu Province



Serious water pollution has been caused by unprecedented economic growth and rapid urbanization in the Lake Tai watershed region (see Figure 3). The entire lake has suffered from eutrophication since 1993, the most serious crisis coming in 2007 when dozens of centimeters-thick algal blooms covered the entire lake and tap water turned yellow and was foul-smelling.²² Transboundary water pollution problems (“transboundary” in this article refers to as water bodies which cross two or more administrative regions) are persistent issues in this watershed as it extends across three provinces and one municipality.

Figure 3: Water quality of Lake Tai in 2011



Source: The chart is retrieved from: <http://218.1.102.107:9001//tba/content/TBA/lygb/szygb/0000000000003585.html>

Note: There are five classifications of water quality in China: Class I: water source, national protection areas; Class II: centralized drinking water supply spawn grounds for rare fishes and shrimps, nursery areas for larvae, juvenile and young fishes; Class III: grounds and migration paths for common fishes and shrimps, aquaculture areas and swimming areas; Class IV: general industrial water areas, entertainment areas; Class V: farmland areas, general landscape.

22 Liang, G., & He, H. (2012, 2 14). *Long Struggle for a Cleaner Lake Tai*. Retrieved from Chinadialogue: <http://www.chinadialogue.net/article/show/single/en/4767-Long-struggle-for-a-cleaner-Lake-Tai->

In 2008 alone, China's Central Government allocated more than 111 billion RMB (US \$ 17.9 billion) to improve national lake water quality from Class V to Class IV, with an overall goal to achieve Class III status by 2020.²³ The government of Jiangsu province – which is covered by more than half of Tai's total watershed (52.6%) – has worked to improve its legal framework in order to improve water quality in the lake. Over the past decade eco-compensation schemes have been significantly developed across this region.

Four types of eco-compensation have been developed and applied in the Lake Tai watershed: eco-compensation between governments, eco-compensation between governments and farmers, eco-compensation between governments and industry,²⁴ and eco-compensation among industries. These are explored in more detail below.

3.1 *Eco-compensation between governments*

Bi-directional inter-governmental eco-compensation between upstream areas and downstream areas within one watershed is a newly developed mode of eco-compensation, aimed primarily at addressing transboundary water pollution problems. It can motivate both the upstream and downstream jurisdictions to act jointly in protecting their shared water resources.

Jiangsu province selected four cities – Nanjing, Changzhou, Wuxi and Zhenjiang – as pilot schemes for applying governmental eco-compensation instruments, beginning in 2007. Seven monitoring areas were selected in the four cities, where water quality standards were set by the provincial government. Using these standards as baselines, the provincial government combines the environmental protection responsibility of city governments with financial incentives. For example, in the Xu River in Changzhou City (one of the sub-watersheds of Lake Tai), a monitoring site was established by the provincial Administrative Department of Environmental Protection. The Department records the water quality on a weekly basis and calculates the monthly average. If the result exceeds the baseline, meaning the water quality is below the standard set, the upstream city (Nanjing) has to compensate the loss suffered by the downstream city (Changzhou) in accordance with Jiangsu provincial regulation. The rationale for this approach is that the extra pollution caused by Nanjing City results in extra expenditure on pollution control for Changzhou City. Up to 2008, Nanjing City had compensated Changzhou City by ¥18,000 (US \$29,032), and Changzhou City had compensated its downstream city Wuxi City by ¥180,000 (US \$29,032) due to the recorded water quality results in the monitoring areas below the standard set.²⁵

In order to enhance the motivation for water quality protection, the compensation level is set at twice the pollution control cost. The compensation is incorporated into

23 Ibid.

24 Luo, X., Qu, F., Feng, S., Shi, X., & Jiang, H. (2011). Ecological Compensation Mechanism in Taihu Lake Basin: Based on Theory and Experience of Watershed Ecological Compensation in and out of China (in Chinese).

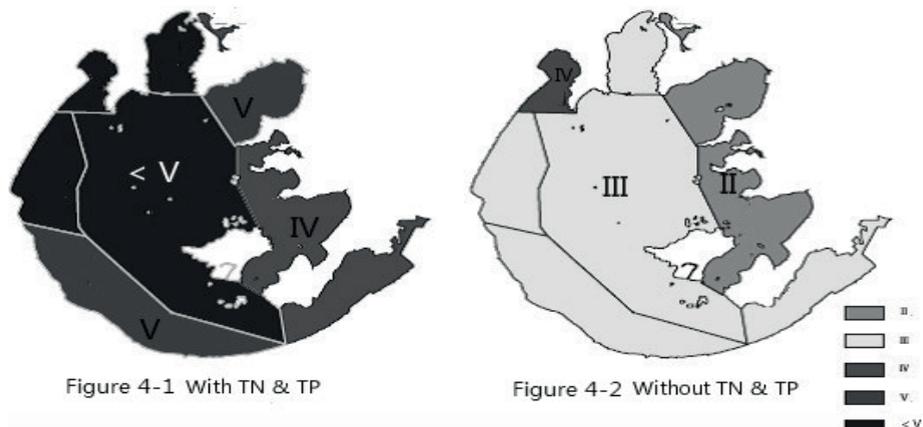
25 International Consumer Rights Forum. (2012, 11 02). *Eco-compensation enters a substantive phase*. Retrieved from International Consumer Rights Forum: <http://www.fj42.com/54067.html>.

special environmental protection funds or pollution prevention and control funds for water pollution control and ecosystem restoration.²⁶ In another case, if the recorded results in the monitoring areas between the upstream city and the downstream city are above the designated baselines, the downstream city has compensate the upstream city, which stated by the State Council, "...if the upstream cities achieve the water quality targets in the monitoring areas of administrative boundaries, the downstream regions should compensate the upstream regions".²⁷ However, the legal nature of such compensation gives rise to further discussion (see Section 4).

3.2 Eco-compensation between governments and farmers

Diffuse water pollution is a main contributor to water pollution in the Lake Tai watershed (Figure 4). If the Total Nitrogen (TN) and the Total Phosphorus (TP) – two main pollutants in diffuse agricultural pollution – had not been included in the evaluation of the water quality, most of the surface water in Lake Tai would have reached Class III (Figure 4-2). However, when the TN and TP are taken into account, the water quality drops to a level worse than Class V (Figure 4-1), especially in Jiangsu Province.

Figure 4. Diffuse water pollution of Lake Tai in 2011



Source: the author edits the map retrieved from <http://218.1.102.107:9001//tba/content/TBA/lygb/szygb/000000000003585.html>.

In 2011, the State Council introduced a special regulation aimed at tackling diffuse water pollution in Lake Tai,²⁸ which required local governments to take measures such as

- "constructing an ecological protection forest within a 500-metre area around the shoreline of the lake,

26 (2007). *The Compensation Method of Regional Environmental Resources of Jiangsu Province (Trial Implementation)*. Governmental Office of Jiangsu Province.

27 (2011). *Regulation on the Administration of the Tai Lake Basin*. State Council.

28 (2011). *Regulation on the Administration of the Tai Lake Basin*. State Council.

- a 1,500-metre area around the drinking water source protection zones, and
- within a 200-metre area along both of the river banks of the shore of the lake”.

Local county governments

- “should provide subsidies and support to farmers who have to change their jobs due to the ban on aquaculture and livestock breeding, and the projects of returning the cultivated land or fishery to the lake”;
- “should guarantee basic life for those farmers by skill training or incorporating them into the social security system”;
- “should provide subsidies for farmers whose income has decreased or whose expenditure has increased due to the projects to reduce pesticide and fertilizer use”.

In fact, Jiangsu province had already formulated its own regulation in 2007 to address pollution problems caused by algal blooms.²⁹ It requires the cities within its jurisdiction “to return the cultivated land to the lake, to plant forests and to remove livestock breeding and traditional planting within 5-kilometres around the first-grade protection zones of Lake Tai”. This proved to be a difficult exercise in practice. For example, the East Lake Tai in Suzhou City, an 180,000 Mu (12,000 Ha.) bay on Lake Tai, was occupied by enclosed fish farms with 165,700 Mu (11,048 Ha.),³⁰ which accounted for more than 90% of the surface water of the East Lake Tai, and more than 80% of the total enclosed fish farm area in the Lake Tai. The intensive enclosed fish farms were one of the main causes of the algal blooms due mainly to the excessive use of fish feed. In order to achieve its water quality target for 2012 (from Class V to Class IV), the government of Suzhou City reorganized its intensive enclosed aquaculture. The City’s governmental policy requires the decrease of enclosed aquaculture from 300,000 Mu (20,000 Ha.) of water areas to 45,000 Mu (3,000 Ha.),³¹ which resulted in significantly improved water quality.

However, problems arose since the rural fish farmers were seriously affected as a consequence of this massive reorganization. For example, in the Wuzhong District of Suzhou City, 426 fish farming families (252 professional and 174 non-professional) were directly affected when 22,521 Mu (1,501 Ha.) water areas were reclassified. The government provided 793.3 million RMB (US \$ 128 million) in total as compensation subsidies for those farmers who had suffered financial losses,³² and some of them were compensated by resettling fish farms in other locations. However, the compensation system did not run smoothly, as the actual situation was very complicated, with some unsatisfactory outcomes, discussed in more detail below (see Section 4).

29 (2007). *Opinions on Energy Conservation and Emission Reduction in Jiangsu Province*. Jiangsu Provincial Government.

30 Han, L. (2010). *Study of Ecological Compensation of the Fence Removal in Taihu Lake*. Retrieved from <http://www.globethesis.com/?t=2121360305484392>.

31 (2008). *Suggestions on Implementation of Reorganizing Intensive Enclosed Aquaculture*. Government of Suzhou City.

32 Fisheries Supervision and Management Station. (2008, 3 28). *Ocean and Fisheries in Jiangsu Province*. Retrieved from Re-organizaion of Fishery Farms ended successfully in Wuzhong District (in Chinese): http://www.jsf.gov.cn/art/2008/3/28/art_58_19385.html.

3.3 *Eco-compensation between governments and industry*

According to the Water Environment Comprehensive Management Plan for the Lake Tai Basin, there are some 2.10 million industries in the Comprehensive Treatment Region of the lake. Of this total, around 1.04 million are in Jiangsu Province and 1.06 million in Zhejiang Province; 0.56 million of these industries belong to the Six Major Pollution Industries (Textile Industry, Manufacture of Paper and Paper Products, Petroleum Processing Industry, Coking and Nuclear Fuel Processing; Manufacture of Raw Chemical Materials and Chemical Products; Manufacture of Medicines and the Manufacture of Chemical Fibres), which also contribute significantly to the economic development in the Lake Tai region.

To control the water pollution caused by its intensive polluting industries, Jiangsu Provincial government has implemented an approach that evaluates the receiving capacity of the surface water in water environmental function zones, applies a scheme of pollutants loading cap control, and a scheme of the discharge credits paid-use (is only limited to Chemical Oxygen Demand (COD) discharge so far). The Price Bureau of Jiangsu Province set different charging standards for emission credits for different industries. Under the pollutants loading cap control system, the amount of the pollution discharge credits is limited, which means that once the government has allocated all of the credits, new applicants cannot purchase any from the government, but can only, either buy surplus credits from other dischargers via an emissions trading platform (Section 3.4), or, improve their own pollution prevention facilities to save credits themselves. It is a so-called "bubble policy", where polluters are free, within an imaginary bubble, to offset excess emissions from one source by a reduction made in another source, as long as the overall quantity is not exceeded.³³ In the Lake Tai watershed 1,357 dischargers (annual emission > COD 100 tons) have been selected in the programme of discharge credits paid-use until 2010. The purchase amounts of COD achieved 49,700 tons per year during 2009-2010, and the collected payments from discharge permits reached 175 million RMB (US \$ 28.2 million).³⁴ The revenue, which is managed as governmental non-tax revenue, allocates 10% to a provincial special fund for environmental protection, and 90% as local.³⁵ This special fund is used exclusively for environmental governance, the establishment of environmental monitoring and the construction and maintenance of the emission credits trading platform in the Lake Tai watershed within Jiangsu jurisdiction.

33 Kraemer, R., Kampa, E., & Interwies, E. (2004). The role of tradable permits in water pollution control. *Inter-American Development Bank*, 11. Retrieved from <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1481959>.

34 Li, L., Fan, S., Yan, Y., & Gao, J. (2010, 10 25). *The Official Opening of Emission Trading Market in Tai Like Basin (Chinese)*. Retrieved from Environment-China: http://www.cenews.com.cn/xwzx/cysc/cyqs/201010/t20101024_677617.html.

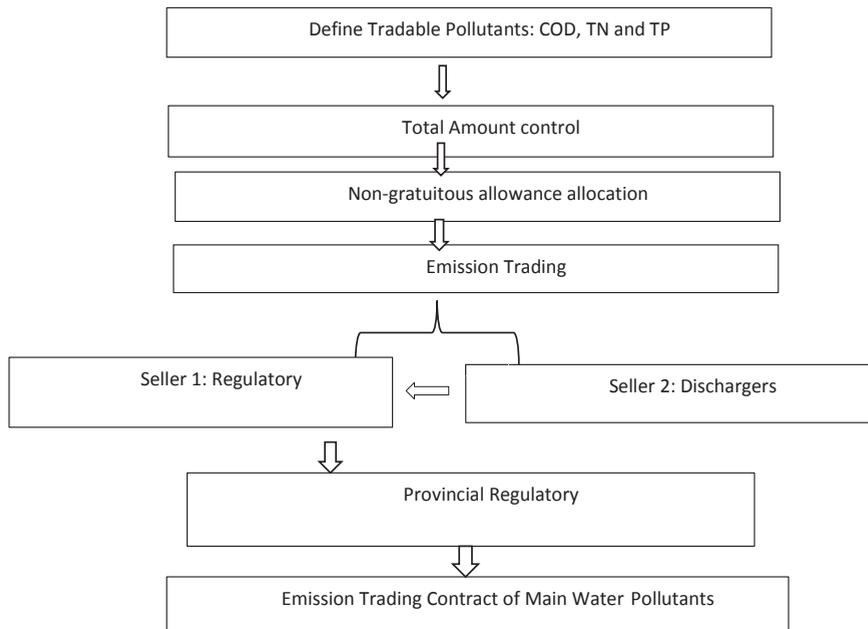
35 Price Bureau, F. D. (2008). *Administration of Charges for Main Pollutants Discharge Credits in the Tai Lake Watershed of Jiangsu Province (Trial Implementation)*.

3.4 Eco-compensation among industries

On the basis of scheme of the discharge credits paid-use, the emissions trading system has been initiated in a few pilot cities in the Lake Tai watershed since 2008, but limited to COD emissions too. The governments of local cities set maximum limits on the total allowable emissions of COD, and then allocate these to the governments at county levels, which allocate their credits to selected industrial dischargers for a specified period of time. After receiving a written notice from the local Environmental Protection Bureau, the selected industrial dischargers can buy discharge credits from governments which are embodied in discharge permits. With these permits, comes the right to use the environmental capacity resources and to buy or sell their discharge credits.

Emissions trading occurs only in one “bubble” – in which the total maximum amount of pollutants is determined, which means that purchasing from out of the region is not allowed for the city or county whose total discharge pollutants have already exceeded the control targets, or where the receiving water body has failed to reach the required water quality standards. Trading can be initiated between the dischargers and the Regulatory Authority of Emissions Trading or among the dischargers themselves on a specified trading platform monitored by the Provincial Regulatory Authority. See Chart 2.

Chart 2 Process of Emission Trading in the Lake Tai Watershed



Source: *Interim Measures of Emission Trading of Main pollutants in Tai Lake Basin of Jiangsu Province*

Jiangyin City is one of the pilot cities for emissions trading in the Lake Tai watershed. In 2010, 158 dischargers (annual COD emission > 100 tons) discharged 6,930.7 tons COD, and paid 18.7 million RMB (US \$ 3 million) for discharge permits. Among these 158

industrial dischargers, 68 received extra discharge credits by emission trading with a total turnover achieved of 6.7 million RMB (US \$ 1.2 million). As well as the collection from discharge credits paid-use, the revenue from the trading is used exclusively for environmental protection measures, the establishment of environmental monitoring facilities and the maintenance of the emission credit trading platform.

4. Legal issues arising from eco-compensation schemes in the Lake Tai case study

This section considers each of the 4 typologies of eco-compensation implemented in the Lake Tai case study.

In the first type of scheme (government to government) the upstream jurisdiction is required by law to compensate the losses of the downstream jurisdiction when the monitoring data shows that the water quality is below the legally defined standards in the monitoring areas. But is this a true 'eco-compensation' scheme – in fact, from a legal perspective, this compensation is more akin to payments for illegal water pollution, a legal liability approach, not as compensation *per se* for ecosystem services.

The national Environmental Protection Law states that

“Enterprises and institutions discharging pollutants in excess of the predetermined national or local discharge standards shall pay a fee for excessive discharge according to the state provisions and shall assume responsibility for eliminating and controlling the pollution”.

Therefore, the “designated discharge standards” are actually compulsory standards regulated by the law; polluters that discharge pollutants exceeding the standards should bear legal liability.³⁶ Given this reading, the compensation paid by the upstream city to the downstream city is not really eco-compensation. It neither provides rewards for protecting the environment and natural resources, nor does it introduce pollution charges, i.e. water use fee or waste water discharge fee and thus cannot be considered to qualify as a true 'eco-compensation' mechanism.

Under this same line of reasoning, asking the downstream city to compensate the upstream city when the water quality does not exceed the standards also lacks legal support as a true eco-compensation mechanism, because again the standards imposed are compulsory regulations – nobody should be compensated for merely abiding by the law.

One approach to transforming this approach into a true eco-compensation scheme would be to establish a “negotiable water quality”³⁷ instead of referring simply to the compulsory regulatory standards. By agreeing on a certain water quality (must be better than the compulsory quality) in monitored areas, the upstream and downstream cities may voluntarily agree to an eco-compensation contract: if the recorded results in the

36 Du, Q., & Chen, Z. (2013). On Common but Differentiated Responsibilities of Eco-compensation in River Basin-based on legal analysis of water quality objectives (Chinese). *Journal of Hubei University*.

37 Ibid.

monitoring areas are above the contractual water quality, the party who puts efforts into making this should be compensated by the other one. Through such means, supplementing and building upon the existing regulatory requirements, a more holistic and functional eco-compensatory scheme can be formulated and implemented.

For this type of voluntary eco-compensation to work in practice, however, more scientific and legal research is needed in order to address a broad range of complex issues, such as monetizing the target ecosystem services, governance mechanisms for stakeholder involvement, adequate legal frameworks, as just some of the most pertinent examples.

In the case study examining the farmer compensation schemes, the governments compensate the farmers for changing their water-use practices, which is aimed at improved water quality. The eco-compensation relationship seems to be comparatively clear – the ecosystem service buyers are the Jiangsu provincial government, the Suzhou City government and the related district/county governments, and the ecosystem service providers are the fish farmers. The compensation payments include compensation through direct cash payments and fish farm resettlement.

However, these schemes have proved to be problematic in practice, with apparent divergent approaches for professional and non-professional farmers. While the former category is permitted to select their type of compensation – either cash compensation or resettlement, non-local fish farmers and non-professional fish farmers have only one choice – direct cash payments. Thus, this category of farmers is required to give up their primary livelihoods. This unequal treatment led to protests by some non-local farmers, who challenged this discriminatory approach by the governments. Another shortcoming of this scheme is the fact that the City Government dominated the entire compensation process, with a marked absence of market party participation, with no third party evaluations and assessments. This resulted in some poor decision making – i.e. many of the newly resettled areas were not suitable for aquaculture.³⁸ This situation meant that farmers had limited options because signing the contract was a precondition for the new farm resettlement, with the new aquaculture zones already planned by government, making the cost of reorganization too high in many respects. Given this reality, the compensation for resettlement made no sense at all for those farmers whose newly allocated farms produced substantially lower yields; it was made even worse in light of the fact that they had given up the option of cash compensation. This has given rise to new social conflicts, although water pollution has been improved to a certain extent.

Another issue relates to the compensation criteria that is used. For example, in the forest rehabilitation project in Lake Tai region, 68.18% of the farmers interviewed were not satisfied with the government compensation, because the farmland was productive as the irrigation was sufficient and the soil was fertile. Before rehabilitation farmers could get ¥13,890/hm² (US \$2240/hm²) income per year by growing ordinary vegetables, but after rehabilitation they could only get ¥6,000-9,000/hm² (US \$968-

38 Han, L. (2010). *Study of Ecological Compensation of the Fence Removal in Taihu Lake*. Retrieved from <http://www.globethesis.com/?t=2121360305484392>.

1452/hm²) from the government as compensation.³⁹ This is not a minor loss for a farmer whose per capita disposable income is ¥38,459 (US \$6,203) in 2012.⁴⁰ If rational decision-makers are assumed to be participants, they would be unlikely to accept a payment unless it exceeds the sum of the opportunity costs they face.⁴¹ In light of all of this, it seems that the 'win-win' objective set forth in the regulations has not been achieved.

In the third and fourth typologies, the eco-compensation between the government and industry and among the industries, these have succeeded in making considerable contributions to various environmental protection funds. The scheme of discharge paid use works appears to work quite efficiently. Nonetheless, it must be noted that this system is actually different from the scheme of national pollution discharge fees. Under the scheme of discharge paid use, governments set pollutants loading cap for a "bubble" and allocate discharge credits. Dischargers buy credits guided by the principle of the "user pays", it reflects the dischargers' right to use natural resources. Under the latter scheme of national pollution discharge fees, dischargers pay fees whether they discharge pollutants into the water in excess of discharge standards or not. The difference from the former scheme is that instead of governments setting pollutants loading cap and allocating discharge credits, dischargers in the latter scheme report to and register with the local governments about the variety, quantity and density of discharged pollutants and wait for the governments' approval. Dischargers pay fees based on the principle of the "polluter pays"; it reflects the dischargers' liability for using the natural resources.

Under the former scheme of discharge paid use, dischargers are more motivated than under the scheme of national pollution discharge fees, as once they save discharge credits, they can keep them for the following year or sell them on the market. Dischargers themselves are the main pollution control bodies; governments only design and control the "bubble". Under the scheme of national pollution discharge fees, dischargers normally do not have enough motivation to reduce emissions if their discharges do not exceed the discharge standards approved by the governments. Governments are the main pollution control bodies. It is less cost-efficient than under the former scheme.

Although dischargers who have legally purchased the emission credits still have to undertake the legal responsibility of pollution control, but the two different charges should not be repetitively collected, i.e. who buys the discharge credits should not pay pollution discharge fees. However, in practice there are no published legal guidelines to address this problem, leaving it unclear how the governments have managed this in practice.

39 Luo, X., Qu, F., Feng, S., Shi, X., & Jiang, H. (2011). Ecological Compensation Mechanism in Taihu Lake Basin: Based on Theory and Experience of Watershed Ecological Compensation in and out of China (in Chinese). *Journal of Nanjing Agricultural University (Social Sciences Edition)*, 82-89.

40 National Bureau of Statistics. (2014, 7 1). *National Data*. Retrieved from <http://data.stats.gov.cn/search/keywordlist2?keyword=gdp>.

41 Wunder, S., Engel, S., & Pagiola, S. (2008). Taking Stock: A comparative analysis of Payments for Environmental Services Programs in Developed and Developing Countries. *Ecological Economics* 65, 834-852, at 846. DOI:10.1016/j.ecolecon.2008.03.010.

In the scheme of discharge paid use, the governments play the role of ecosystem service providers for the purpose of maintaining a healthy water ecosystem and ensuring that the ecosystem can provide continuous eco-services, they set the pollutants loading cap for a “bubble”, monetize the pollutants and allocate the discharge credits. The selected dischargers are service buyers. In the COD emission trading system, those selected dischargers become service providers, who save discharge credits and provide certain ecosystem services by improving their pollution prevention facilities or inputting some other efforts, those who buy credits from other dischargers are service buyers.

As new and experimental instruments, both the scheme of discharge paid use and emissions trading have some shortcomings. For example, it is uncertain how the provincial governments adjust their pollutant discharge targets and how they allocate or set prices for the emissions in the next five years, while the Central Government adjusts national pollutant targets every five years. This lack of transparency leads to considerable uncertainties for the key actors in these schemes; as a result industrial dischargers face considerable risks in making decisions such as whether or not to buy the discharge credits, or how many to buy. In addition, the current emissions trading in the Lake Tai watershed within Jiangsu province is limited to COD emissions only; while the prices for TN and TP emissions trading were announced in 2011, there is not yet a specific legal regulation covering these. Furthermore, it is also very difficult to evaluate the environmental benefits from the emissions trading alone as it is generally applied together with many other policy instruments. According to research, tradable discharge permits are actually among the most challenging regulatory policies in terms of both their design and implementation.⁴²

In summary, the case study undertaken here reveals that four types of eco-compensation mechanisms have been deployed across the Lake Tai region (see Table 1). The common feature in each case is the dominant role played by governments (especially in the first three types). The main financial source for compensation is governmental payment. For example, at the time of the algal bloom in 2007, Jiangsu was spending two billion RMB (US \$ 322 million) per year to address Lake Tai’s pollution problems.⁴³ Since 2008, Jiangsu Provincial Government has contributed 0.2 billion RMB (US \$ 32 million) per year to a special fund to control water pollution in Lake Tai, with local governments asked to contribute 10%-20%.⁴⁴ Governments are the main actors in formulating and implementing eco-compensation schemes. Although commercial actors also contribute to the fund (for example, the revenue of COD trading) this amount is insignificant when compared with the level of governmental payments. The single financial source from government might weaken the expectations of the eco-compensation projects. An example is the “Three-North” Shelterbelt Project. See Appendix 5.

42 Kraemer, R., Kampa, E., & Interwies, E. (2004). The role of tradable permits in water pollution control. *Inter-American Development Bank*, 11. Retrieved from <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1481959>.

43 Liang, G., & He, H. (2012, 2 14). *Long Struggle for a Cleaner Lake Tai*. Retrieved from Chinadialogue: <http://www.chinadialogue.net/article/show/single/en/4767-Long-struggle-for-a-cleaner-Lake-Tai->

44 He, G. (2014, 7 11). *A Dilemma of water pollution control in Lake Tai*. Retrieved from Time-weekly: <http://time-weekly.com/story/2014-01-16/132082.html>.

Table 1: Types of Eco-compensation mechanisms in the Lake Tai region within Jiangsu province

Types	Water Problems	Water-related Eco-services	Providers	Buyers	Payment	Laws/Regulations
ECM between governments	Pollution, disputes	Provision of higher water quality than compulsory standards	Upstream city/ downstream city	Downstream city/ upstream city	Cash, others	None
ECM between governments and farmers	Pollution	Improved water quality	Farmers	Governments	Cash, Farm resettlement	Opinions of Energy Conservation and Emission Reduction in Jiangsu Province, NO.63 [2007]; Regulation on the Administration of the Lake Tai Basin, State Council, No. 604 [2011]
ECM between governments and industry	pollution	Pollution control in certain cap	Governments	Industries	Cash	Implementing Measures for Main Pollutants Discharge and Emission Trading in Pilots of Lake Tai Watershed in Jiangsu Province, No. 8 [2008]; Administration for Charges of Credits of Main Pollutants Discharge in the Lake Tai Watershed of Jiangsu Province (Trial Implementation), [2008]; Regulation of Jiangsu Province on Prevention and Control of Water Pollution in the Lake Tai region, No.113 [2012]
ECM among industries	Pollution	Improved water quality	Industries	Industries	Cash	Implementing Measures for Main Pollutants Discharge and Emission Trading in Pilots of the Lake Tai Watershed region in Jiangsu Province, No. 8 [2008]; Interim Measures for Main Pollutants Emission Trading in the Lake Tai Watershed of Jiangsu Province, No. 4 [2010]

5. Conclusions

Well-functioning ecosystems provide human beings with a broad range of important services, many fundamental to sustainable development. Effective eco-compensation schemes can contribute to the preservation of ecosystem services and lead to more sustainable development both within and outside China, the subject of this study.

Through examining the four types of eco-compensation schemes applied across the Lake Tai watershed, a number of observations can be made.

Eco-compensation schemes in Lake Tai watersheds are dominated primarily by governments through primarily governmental-sourced financial transfers. Although market-based eco-compensation, for example the emissions trading of COD, has been experimented with, it is still at a very early stage and needs to be further developed. The single source of governmental financial transfers might lead to a risk of a fund shortage in the future. A shortfall could, in turn, weaken the sustainability of the mechanism itself revealing a critical overall risk.

Constructing effective eco-compensation mechanisms in watersheds is a long-term project requiring multi-disciplinary expertise. As has been discussed here, designing a robust legal framework capable of anchoring true eco-compensation schemes (as opposed to pollution liability regimes) requires careful consideration of a range of issues, focusing only on the mechanism itself is far from sufficient. Attention must also be paid to the preconditions in each case, such as: water management system details; the public's willingness to participate; and, the collaboration between or among provinces and regions and such other conditionalities that might support or impede the mechanism. Even across the legal domain, eco-compensation schemes cross a complex matrix of legal regimes – a multi-dimensional construct of rules, laws and regulations, including (but not limited to!) administrative, corporate, contractual, public, private, regulatory and trade matters.⁴⁵

Despite these challenges, the eco-compensation schemes being implemented in China provide a meaningful platform for addressing the complex issues related to eco-system services. More legal research is required to address the gaps identified in current domestic practice.

45 Wouters, P. (2007). A New Generation of Local Water Leaders. *Colo. J. Int'l Env'tl. L. & Pol'y* 513, Vol. 18:3, 513-522.

CHAPTER 6

Regulating Water Pollution in China and the European Union with a Focus of Agricultural Pollution

This chapter is published as: 2015, Liping Dai, "Regulating water pollution in China and the European Union in terms of agricultural pollution", *Journal of Water Law*, forthcoming.

Regulatory instruments, are the most commonly used policy instruments in both China and the EU. This article explores how China and the EU establish their water quality objectives by regulation and how they design implementation strategies, with a particular focus of agricultural water pollution control. It aims to discuss the similarities and differences between China and the EU, and to observe what experiences the EU can provide for China.

Key words: regulation, water pollution, China, the EU, agricultural pollution

1. Introduction

Curbing water pollution is still a policy challenge, especially pollution from agricultural sources, as finding the polluters i.e. those liable for pollution, is a more complex issue than when the pollution emanates from industrial sources. Dealing with water pollution involves team work. Each type of policy instruments, for example, regulatory instruments, economic instruments or communicative instruments,¹ play certain role in water pollution control.

This article explores how China and the Europe Union (EU) establish their water quality objectives by regulation and how they design implementation strategies, agricultural water pollution control is the particular focus".² The main purposes of this research are 1) to provide policy makers and scholars with a clear background for understanding the regulatory instruments in terms of water quality objectives management in both China and the EU, and the challenges facing China today; 2) to contribute towards improving Chinese policy and legal framework for water pollution control, especially concerning agricultural pollution.

By adopting a comparative approach, this article first explores how China and the EU each establish their water quality objectives (Section 2). In this section, the *policy*

1 Mees, H.L.P., J. Dijk, D. van Soest, P.P.J. Driessen, M.H.F.M.W. van Rijswijk, and H. Runhaar 'A method for the Deliberate and Deliberative Selection of Policy Instrument mixes for Climate Change Adaptation' (2014) *19(2) Ecology and Society* 58. <http://dx.doi.org/10.5751/ES-06639-190258>.

2 The regulatory instruments here need to be distinguished from the EU's "Regulation", which is a legislative act defined as a rule that is binding in its entirety and is directly applicable and obligatory for all Member States.

framework of water pollution management in China is given particular attention due to its special domestic situation that formal law is less effective.³ Section 3 discusses how China and the EU design implementation strategies for achieving their established objectives, agricultural water pollution control is analyzed here. The similarities and differences between the two regions, as well as the lessons learned by analyzing the China's strategies and the experience provided by the EU, are discussed in Section 4. A conclusion is drawn in the last section.

Information from official documents, literature and websites are the main sources. This article does not attempt to analyze a full inventory of every regulatory measure applied in both regions. This is because some of them, for example sanctions on or liability for environmental damage, are more commonly discussed under administrative enforcement and civil or criminal liability, which are not the focus of this article.

2. Establish water quality objectives

2.1 China's water quality objectives establishment

The No. 1 Document for 2011 (hereafter the "2011 No. 1 Document") is China's "Water Framework Directive", which was announced in December 2010 and implemented as the first policy document in 2011.⁴ It aims at maintaining and improving the water environment, and achieving the sustainable use of water resources. The 2011 No. 1 Document, which outlines a 10-year water management plan and which traverses two national five-year plans, is new in China's water management history.⁵

The 2011 No. 1 Document does not directly prescribe water quality objectives; it rather sets out a "Most Stringent Standards" system, which is usually called the "Three Red Lines" (the red lines of water quantity usage, efficiency and quality, respectively). The first line is to define a control limit for water resource exploitation and utilization, the second is to establish a control limit for water-use efficiency, and the third is to establish a pollutant-carrying limit for water function zones, which is the most important element relating to water quality. The 2011 No. 1 Document focuses more on "what to do" in terms of achieving the Most Stringent Standards, and leaves concrete methods and technologies of "how to do" to its subordinating implementing regulations.

The National Water Function Zoning of Important Rivers and Lakes (2011-2030) (hereafter referred to as the "Zoning Policy") is a supporting policy which helps to

3 For the discussion of the relation of policy and formal law in water governance, please further see Liping Dai, 'A new Perspective of Water Governance in China – Captain of the River', a forthcoming article.

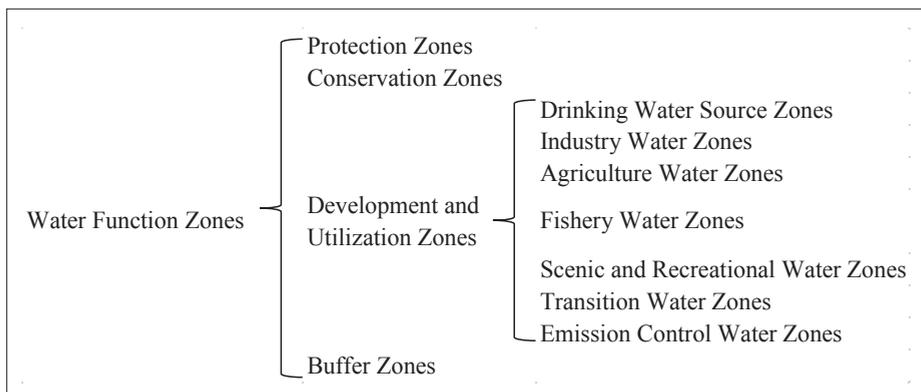
4 The No. 1 Document is the first document issued by the Central Committee of the Communist Party each year. It sets national policy priorities for the forthcoming year. Whether the No.1 Document is in fact law is very much debated; some scholars consider it to be soft law. For more discussion of No.1 Document please see the forthcoming article of Liping Dai, Water Resources Management in China – a legal approach and overview.

5 Griffiths, M. 'Comparison of EU-WFD and China's No.1 Policy (in Chinese)' (2012) 12(6) *Water Resource Development Research* 82-85.

implement the 2011 No. 1 Document, more specifically to implement the “Most Stringent Standards” system.⁶ The Zoning Policy provides a foundation by which to determine water quality objectives.

Water Function Zones are divided into a “two-level” system by the Zoning Policy: the first level includes Protection Zones, Conservation Zones, Development and Utilization Zones and Buffer Zones; the second level refines the Development and Utilization Zones into seven categories, i.e. Drinking Water Source Zones, Industry Water Zones, Agriculture Water Zones, Fishery Water Zones, Scenic and Recreational Water Zones, Transition Water Zones and Emission Control Water Zones (see Figure 1).

Figure 1: Categories of Water Function Zones



The Zoning policy requires Classified Management for different Water Function Zones; it does not itself establish water quality objectives. In order to determine the objectives, it is necessary to combine the Zoning Policy with the Environmental Quality Standards for Surface Water (GB3838, EQSSW), the Water Quality Standards for Irrigation (GB5084), and Water Quality Standards for Fishing (GB11607). The EQSSW sets different quality standards for different Water Environmental Function Zones – from Class I (for drinking water sources and national protection zones) to Class V (for agricultural water use and general landscape), i.e., five classes in total.

By referring to the EQSSW, the Zoning Policy identifies 3,631 Function Zones nationwide with the water quality objective of Class III or above, and 862 Function Zones of Class IV or below. The year 2030 has been specified by the Zoning Policy as the time by which to achieve those water quality objectives. When the State Council approved the Zoning Policy, it regulated more detailed timetables – to achieve 80% of the established objectives by 2020, and basically to achieve them all by 2030.

⁶ The Zoning Policy was drafted by the Ministry of Water Resources (the Development and Reform Committee) and the Ministry of Environmental Protection, and was approved by the State Council in No. 167 [2011], in which 1027 rivers were covered, each watershed area being more than 1000 km². In total these rivers account for ⅓ of all national rivers (exceeding 1000 km²).

The *Opinion of the State Council on Implementing the Most Stringent Water Resources Management System* (hereinafter referred to as the “Opinion”), as one of the implementing guidance documents for implementing the “Most Stringent Standards” system of the 2011 No. 1 Document, addressed three more specific objectives by referencing the Zoning Policy.⁷ The three objectives are:

- 1) To achieve higher than 60% of the established water quality objectives in the Water Function Zones within important national rivers and lakes by 2015 (for example, according to the Zoning Policy and the EQSSW, 60% of the 3,631 Function Zones within important national rivers and lakes shall achieve the water quality objective of Class III or above);
- 2) To achieve higher than 80% of the established water quality objectives in the Water Function Zones within important national rivers and lakes, and 100% in urban drinking supply regions by 2020.⁸ This partly echoes the State Council when it approved the Zoning Policy; and
- 3) By 2030 the total quantity of main pollutants in the Water Function Zones should be controlled within the pollutant-carrying capacity (the 3rd Red Line), and the compliance rate of the achievement of the water quality objectives should be raised to higher than 95%.

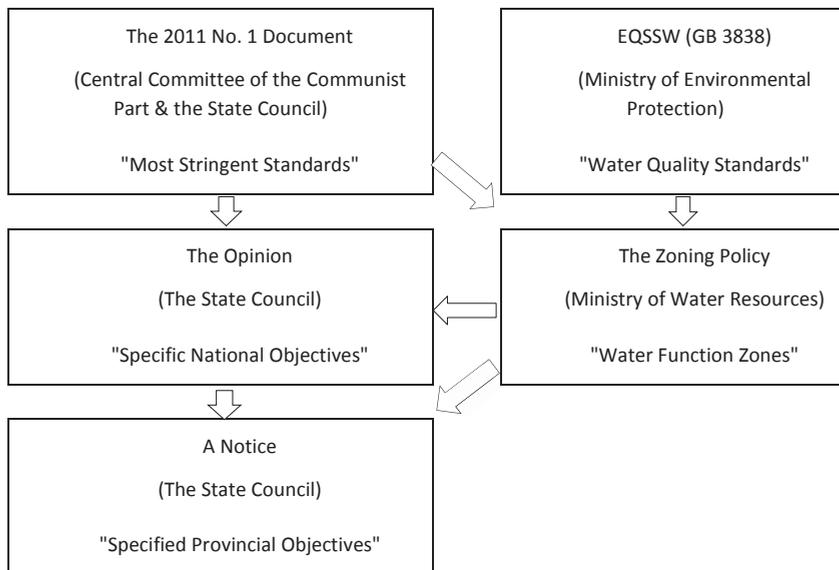
Based on the 2011 No. 1 Document and the Zoning Policy, the Ministry of Water Resources distributes the established objectives above to the River Basin Management Authorities and provincial administrative authorities. Besides water quality objectives, water quantity usage objectives, efficiency objectives are also distributed, which correspond to the Three Red Lines. The timetables are determined by the State Council: 2015, 2020, and 2030.⁹ The water quality objectives are not unified in provinces in the first two timetables considering different provinces and regions might have different water conditions and status. For example Beijing is required to attain the compliance rate of 50% and 77% by the year 2015 and 2020, respectively, while in Shanghai these percentages are 53% and 78%. By averaging the compliance rates of all the provinces (including the Autonomous Regions and Municipalities), the national average compliance rates are required to reach 60% by 2015 and 80% by 2020. The objective of 2030 is unified for the whole country: to achieve 95% of the established quality objectives of Water Function Zones within important rivers and lakes. The interrelationship between different policies in terms of their objective establishment can be expressed by Figure 2.

7 State Council No.3 ‘The Opinion of the State Council on Implementing the Most Stringent Water Resources Management System (in Chinese)’, available at: http://www.gov.cn/zwgk/2012-02/16/content_2067664.htm.

8 Urban drinking supply regions belong to the Drinking Water Source Zones of the 2nd level of the Zoning, water quality is established as being Class II~III.

9 State Council No.2 ‘Notice of the General Office of the State Council on Issuing Measures for Assessing the Implementation of the Strictest Management System for Water Resources (in Chinese)’ (2013), available at http://www.mwr.gov.cn/zwzc/zcfg/xzfgfhgwxj/201301/t20130107_336155.html.

Figure 2: The interrelationship between different policies in terms of the establishment of the water quality objective in China.



⇒: the former is the policy basis of the latter

2.2 Water quality objectives of the EU Water Framework Directive

The EU Water Framework Directive (WFD) establishes a legal framework to protect and restore water across Europe.

It commits the Member States (MS) to prevent their waters from deterioration and to achieve a common water quality objective by a set deadline – at least a ‘good water status’ for both surface water and groundwater before 2015.^{10,11} “Good water status”, as a desired water quality objective, refers to both the chemical and ecological status of water bodies as being “good”.

In the context of the WFD, the water environment includes surface water and groundwater. For the purposes of management, these waters are firstly divided based on a river basin approach and are furthermore divided into units called water bodies, which include natural water bodies, artificial water bodies and heavily modified water bodies. They provide benchmarks to determine the water quality objectives, for example, instead of a good ecological status, the artificial and modified water

10 Article 4 WFD consists of several objectives, which differ in their formulation and in the presence or absence of deadlines and exemptions; more information can be found at Section 4.1 of van Kempen, J.J.H. ‘Countering the Obscurity of Obligations in European Environmental Law: An Analysis of Article 4 of the European Water Framework Directive’ (2012) 24 (3) *Journal of Environmental law* 499-533.

11 The criterion of good ecological status is defined in Annex V of the WFD, measured on the scale of high, good, moderate, poor and bad. Good chemical status is defined in terms of compliance with all the quality standards established for chemical substances at the European level, measured as good or failing.

bodies must meet 'good ecological potential'. Besides this, the WFD also regulates some exemptions to the obligation to attain a good status for all water bodies by 2015, which are considered to be part of the environmental objectives.

In practice, designing water bodies (in natural, heavily modified and artificial water bodies) is the first important step for MS to establish their environmental quality standards and setting their water quality objectives. MS are required to assess both the ecological status or ecological potential, and the chemical status by the WFD when they design the surface water bodies. The quality elements for this assessment are explicitly defined in the annex to the WFD (Annex V). They are subdivided into 3 groups of 'elements': (1) biological elements, (2) hydromorphological elements supporting the biological elements; and (3) chemical and physico-chemical elements supporting the biological elements.¹² These normative elements provide the basis for classifying water bodies, which in turn provide the basis for setting water quality objectives.

Uitenboogaart et al. have conducted detailed comparative research in five different MS (the Netherlands, Denmark, France, England and Wales, and Germany) to see how the general environmental objectives of the WFD were transposed and how the MS established those objectives as standards and norms. They compared the objective-setting process of water quality at the river-basin level according to a number of topics, for example, the designation of water bodies and the objective-setting process in steps.¹³ They found that the good ecological status for natural water bodies and the good ecological potential for artificial water bodies and heavily modified water bodies are laid down in different ways, and there are also possible different methods to be applied in defining good ecological potential.¹⁴ Keessen et al. later compared 11 MS, in particular concerning how they legally formulate their water quality norms and standards. Both studies found that the MS designed their water bodies on the basis of different criteria and that they did not qualify the types of obligations in the same way.¹⁵

In terms of the types of obligations, Van Kempen has a very interesting opinion. According to him, it is important to distinguish between obligations of best efforts and obligations of result.¹⁶ An obligation of best efforts is an obligation to endeavour or to do one's best to attain a result; an obligation of result is an obligation to succeed in attaining a result.¹⁷ If the result is not attained, in the latter case the MS can only justify their failure by invoking one or more of the available mechanisms. With regard to the EU water quality objectives – "good water status", Van Kempen has specified by means

12 Water Framework Directive Common Implementation Strategy Working Group 2A 'Overall Approach to the Classification of Ecological Status and Ecological Potential' (2003): 28.

13 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*, The Hague: Sdu Uitgevers, 2009.

14 Ibid.

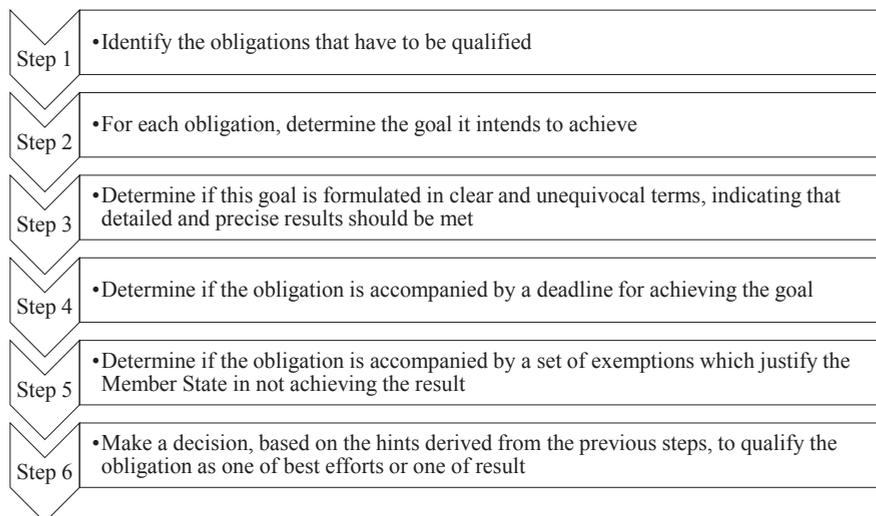
15 A.M. Keessen et al. 'European River Basin Districts: Are They Swimming in the Same Implementation Pool?' (2010) 22(2), *Journal of environmental law*, 197-221.

16 Supra 11.

17 Ibid.

of a set of methods that the obligations to achieve both good surface water chemical status and ecological status are obligations of result (See Figure 3).

Figure 3: 6-step method to assess the quality of obligations



3. Policy instrument for achieving the established water quality objectives

3.1 *The Government's Objective Responsibility System for water pollution control in China*

China applies a Government Objective Responsibility System (GORS) as its main strategy to achieve the environmental objectives. Governments at all levels are the first responsible actors, they must consider emission reductions of main pollutants as an important task. The State Council specifies the total emission of certain pollutants for all administrative regions, who further break down their amount into layers.¹⁸ For example, in terms of the emission reduction objective of the Chemical Oxygen Demand (COD), which is a main pollutant of water pollution, the assigned quota for Beijing is 183,000 tons until 2015, 98,000 tons of which are given to industrial and domestic discharges, the remainder is for other pollution sources. After receiving the assigned quotas, the Beijing Government further assigns them to its district governments.

The Opinion, which specifies water quality objectives by different timetables (Section 2.1), outlines both “what to do” and “how to do” measures in order to achieve the objectives (see Figure 4).

¹⁸ State Council, No. 26 ‘The Comprehensive Working Plan for Energy Conservation and Emission Reductions in the 12th Five-Year Plan Period (in Chinese)’ (2011), available at http://www.gov.cn/zwgk/2011-09/07/content_1941731.htm.

What to do:

- strengthening the monitoring and management of Water Function Zones,
- intensifying the protection for drinking water sources, and
- promoting the protection and restoration of water ecological systems.

How to do:

- establish the accountability and performance assessment system regarding the management of water resources,
- reinforce the system for monitoring water resources,
- improve the water resources management system,
- refine input mechanisms for water resources management, and
- enhance policies, regulations and public supervision mechanisms.

For establishing the accountability and performance assessment system, in another word, for strengthening the GORS, the State Council established a scoring system to assess the local governments' performance, i.e. by scoring excellent (90 points or more out of 100 points), good (more than 80 and less than 90 points), qualified (more than 60 and less than 80 points), or unqualified (less than 60 points).¹⁹

Normally the leading officials of the Communist Party and local governments are the direct responsible persons. They sign performance contracts with the upper level governments who assign the tasks. Their performance is evaluated by the performance assessment system. The assessment results are taken as important indicators to reward or sanction the direct responsible persons.

The State Council assesses the local governments every five-year period. For those which are assessed as excellent governments, the State Council will circulate a notice of commendation and give prior consideration to the application of their future water-related projects. The direct responsible officials will also be granted a corresponding recommendation and be rewarded. For those who do not qualify, first the State Council will ask them to make improvements within a certain time limit. If this rectification results in failure, the responsible officials will be held accountable. By this way, China places its local governments at the forefront of environmental pollution control.

19 State Council No. 2 'Assessment Methods for the Most Stringent Water Management System (in Chinese)' (2013), available at http://www.gov.cn/zwggk/2013-01/06/content_2305762.htm.

Figure 4: The implemented strategies and the methods for water quality objectives in China

The Opinion (The State Council)	Objectives	Achieving 60% in 2015 Achieving 80% in 2020 Achieving more than 95% in 2030		
	What to do	<ul style="list-style-type: none"> • Monitoring Water Function Zones • Protecting drinking water sources • Protecting ecological systems 	Establishing an accountability and performance system: <ul style="list-style-type: none"> • Reinforcing monitoring • Improving the water management system • Refining input mechanisms • Enhancing supervision 	How to do
The Methods (The State Council)		Establishing an accountability and performance system	A scoring system	

3.2 The Inter-linkages between water regulations and agricultural-related regulations in China from a legal perspective

Although the National Census on Pollution Sources discovered that agriculture was the main contributor to environmental pollution, as well as water pollution,²⁰ a cohesive legal framework which integrates water and agriculture is not yet well formulated.

The legal system in China resembles a pyramid structure. Under the guidance of the Constitution and the Environment Protection Law, individual environmental laws are enacted. For example, the Water Law, the Agriculture Law, the Water Pollution and Prevention Law, etc. Based on their different functions, the existing laws can be further divided into three groups: 1) Pollution prevention and control laws, for example the Water Pollution Prevention and Control Law, the Air Pollution Prevention and Control Law, and the Solid Waste Pollution Prevention Law. 2) Resource conservation and utilization laws, like the Water Law, the Agriculture Law and the Grassland Law. 3) Environmental management laws, for example the Environmental Impact Assessment Law.²¹

The first group of pollution prevention and control laws plays a leading role in agricultural water pollution control. Among which, the new revised Water Pollution Prevention and Control Law (2008) added agricultural pollution control as a new provision, requiring that

20 The 1st National Census on Pollution Sources was jointly released by the Ministry of Environmental Protection, the Ministry of Statistics and the Ministry of Agriculture on 6 February 2010. For further information on water pollution from agriculture see Liping Dai 'Something Old, Something New, Something Borrowed and Something Blue-Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union' (2014) 10(2) *Utrecht Law Review*, 136-154.

21 Qi, Y., & Zhou, X. 'Water Pollution Control in China: Review of Laws, Regulations and Policies and their Implementation' IGES(Hayama) 2009, available at <http://pub.iges.or.jp/modules/envirolib/view.php?docid=2775>.

“the use and application of pesticides and fertilizers shall be reasonable and related standards shall be applied, and animal waste shall be treated to render it harmless” (Articles 47 to 50).²²

Although individual agricultural laws do not directly address water pollution, they do help to improve water quality indirectly (see Figure 5). For example, the Regulation on the Protection of Basic Farmland states that

“the state advocates and encourages agricultural producers in the application of organic fertilizers, the rational application of chemical fertilizers and agricultural chemicals in the basic farmland under their management” (Article 19).²³

Facing the challenge of increasing agricultural pollution, China has made great efforts to revise many agriculturally-related laws during past years. For example, the Cleaner Production Promotion Law, revised in 2012, requires that

“the use of chemical fertilizers, pesticides, and feed additive compounds shall be in accordance with scientific principles ... The use of toxic or hazardous wastes as fertilizers or as landfill to build up fields is prohibited” (Article 22).²⁴

The Law on the Prevention and Control of Environmental Pollution by Solid Wastes requests that

“those who adopt agricultural films for agricultural use shall take certain measures such as recycling to prevent or reduce environmental pollution caused by the films” (Article 19), *“those who engage in livestock and poultry breeding shall collect, store, transport and dispose of the livestock and poultry manure in accordance with the state regulation and prevent environmental pollution”* (Article 20), and *“the specific measures for preventing and controlling rural consumer wastes shall be prescribed by local regulations”* (Article 49).²⁵

The Regulation on the Prevention and Control of Pollution from Large-scale Breeding of Livestock and Poultry requires that

“the prevention and control of pollution from livestock and poultry breeding shall give overall consideration to the need to protect the environment and to promote the development of the livestock husbandry” (Article 3), and *“the construction of livestock and poultry farms and breeding establishments within Drinking Water Source Protection Zones is prohibited”* (Article 11).²⁶

22 The Water Pollution Prevention and Control Law was adopted by the National People’s Congress in 1984, and was subsequently revised in 1996 and 2008.

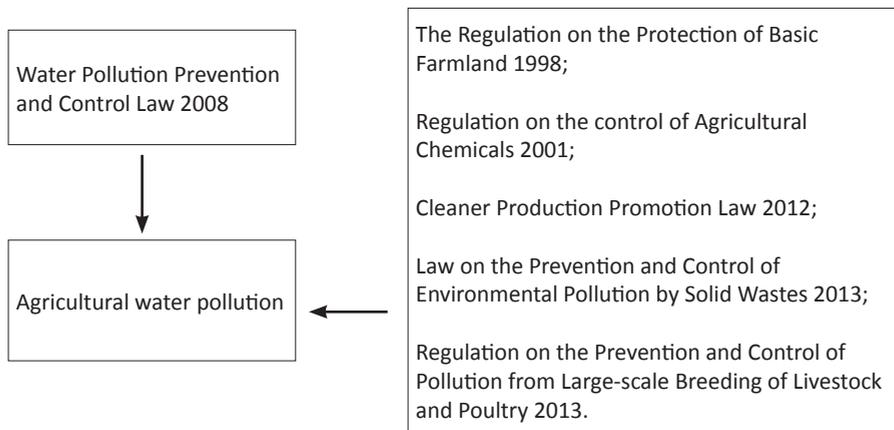
23 State Council No. 257 ‘The Regulation on the Protection of Basic Farmland (in Chinese)’ (1998), available at http://www.mlr.gov.cn/zwgk/flfg/tdglflfg/200406/t20040625_570370.htm.

24 Cleaner Production Promotion Law, issued by the Standing Committee of the National People’s Congress, No. 54 [2003], revised in 2012.

25 Law on the Prevention and Control of Environmental Pollution by Solid Wastes, issued by the Standing Committee of the Eighth National People’s Congress, No. 58 [1995], revised in 2004 and 2013.

26 Regulation on the Prevention and Control of Pollution from Large-scale Breeding of Livestock and Poultry, issued by the State Council, No. 643 [2013].

Figure 5: The interaction between water and agriculture with regard to pollution control within the legal framework in China



3.3 Implementation strategies in the European Union

For achieving the established water objectives in the WFD – the ‘good status’ of all Community waters by 2015, the full implementation of existing obligations which relate to water quality in the EU is required.

The WFD requires MS to establish river basin districts (RBD) as the main units for their river basin management (Article 3). For each RBD or the portion for which they are responsible, MS are required to establish a Programme of Measures (Article 11) and River Basin Management Plans (RBMP) (Article 13).

The Programme of Measures and RBMP are two fundamental compulsory instruments required by the WFD. An RBMP is partly formed by a summary of the Programme of Measures. The Programme of Measures must include ‘basic’ measures and, where necessary, ‘supplementary’ measures (Article 11). Basic measures are the minimum requirements to be complied with and they are based on existing EU legislation. For example, the WFD itself contains no specific provisions concerning pollution by manure and fertilizers. Hence, in order to deal with this pollution the WFD refers to the Nitrates Directive.²⁷ Only when the basic measures alone are not able to achieve the necessary objectives are supplementary measures adopted. They aim at either reinforcing the provisions of the directive or setting up new ones.²⁸ A non-exclusive list of supplementary measures is provided in part B of Annex VI to the WFD.

27 Basic measures are included in Article 10 and part A of Annex VI to the WFD.

28 R. Müssner, et al. ‘WFD and Agriculture Linkages at the EU Level. Final report about Cross Compliance and the WFD’ (2006), available at: http://www.ecologic.eu/download/projekte/1950-1999/1966/1966_deliverable_12.pdf.

Tackling pressure from agriculture is one of the main challenges in achieving the WFD's objectives, as 40% of rivers and coastal waters in the EU are affected by agriculture.²⁹ Water and agriculture management interact with each other in many ways. The development of agriculture is mainly influenced by the Common Agricultural Policy (CAP), which contains a number of instruments related to water resource management.

The CAP was established in 1957 as a common policy by the European Economic Community; its original objectives were to provide affordable food for EU citizens and a fair standard of living for farmers.³⁰ Since its establishment five decades have now passed and the new CAP 2014-2020 has been updated so as to have three current objectives: viable food production, the sustainable management of natural resources and climate action and a balanced territorial development.³¹

Cross-compliance is one of the instruments of the CAP. It links direct payments to compliance by farmers with basic standards concerning the environment, food safety, animal and plant health and animal welfare, as well as the requirement of maintaining land in a good agricultural and environmental condition (Council Regulation 73/2009 and Commission Regulation 1122/2009)³². Cross-compliance represents the "baseline" or "reference level" for agri-environment measures;³³ the main function thereof is to reinforce compliance with the EU's existing regulations. Two elements are included in the Cross-compliance. One is the Statutory Management Requirements, which refer to 18 legislative standards related to

- a) public, animal and plant health,
- b) the environment and
- c) animal welfare.³⁴

The other is the Good Agricultural and Environmental Condition. It requires MS to maintain all agricultural land in a good agricultural and environmental condition according to a range of standards.³⁵

Although the WFD is not one of the Statutory Management Requirements in the CAP, the implementation of the Statutory Management Requirements does help to achieve the water quality objectives of the WFD, either directly or indirectly. With regard to water management, the related directives covered by the Statutory Management Requirements are the Groundwater Directive (2006/118/EC), the Nitrates

29 European Environment Agency Report *'European Waters--Assessment of Status and Pressures'* Luxembourg: Office for Official Publications of the European Union, 2012.

30 European Union *'The Common Agricultural Policy A Story to be Continued'* Luxembourg: Publications Office of the European Union, 2012.

31 European Commission 'Agricultural Policy Perspectives Brief Overview of CAP Reform 2014-2020', available at http://ec.europa.eu/agriculture/policy-perspectives/policy-briefs/05_en.pdf.

32 European Commission *'Agriculture and Environment'*, available at http://ec.europa.eu/agriculture/envir/cross-compliance/index_en.htm.

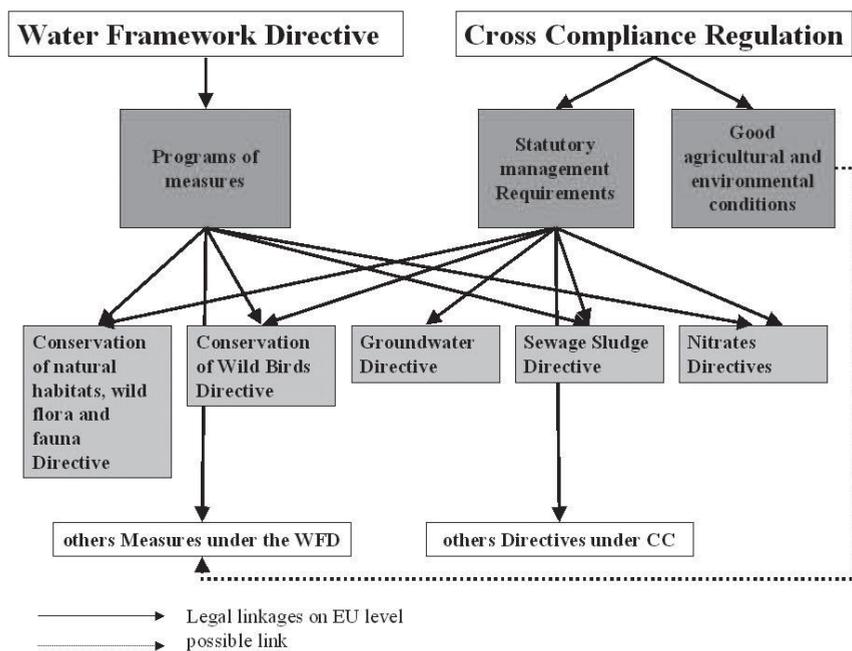
33 Supra 32.

34 Article 5 of Council Regulation 73/2009. The 18 legislative standards are listed in Annex II. For a full understanding of EU water law including other water directives please see H. van Rijswijk and H. Havekes *'European and Dutch Water Law'*, Europa Law Publishing Groningen, 2012.

35 Article 6 of Council Regulation 73/2009. The standards are listed in the third column of Annex III.

Directive (91/676/EEC), the Sewage Sludge Directive (86/278/EEC), the Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna, and the Birds Directive (79/409/EEC as amended by Directive 97/49/EC), see Figure 4.³⁶ All of them are listed among the basic measures by the Annex to the WFD except for the Groundwater Directive, which is a daughter directive of the WFD. The Good Agricultural and Environmental Condition also help to achieve the WFD's objectives. The most common measures adopted by the MS are the establishment of green cover, restrictions on the burning of vegetation, controlling the encroachment of unwanted vegetation and restrictions concerning the use of machinery on waterlogged land.³⁷

Figure 6: Inter-linkages between the Cross-compliance Framework and the Water Framework Directive



Source: R. Müssner, et al. 'WFD and Agriculture Linkages at the EU Level. Final Report about Cross Compliance and the WFD' (2006), available at: http://www.ecologic.eu/download/projekte/1950-1999/1966/1966_deliverable_12.pdf.

The Nitrates Directive (91/976/EEC) attracts special attention because it is a Directive that specifically seeks to reduce water pollution caused by nitrates from agricultural sources. It intends both to safeguard drinking water supplies and to prevent wider ecological damage arising from the eutrophication of freshwater and marine waters

36 Dworak, T., Berglund, M., Thaler, T., Fabik, E., L., Amand, B. 'Assessment of Agriculture Measures included in the Draft River Basin Management Plans – Summary Report' Berlin/Vienna: Ecologic Institute, 2010.

37 Supra 29.

generally by the application of vulnerable zones.³⁸ Compliance with the Nitrates Directive is a key condition for meeting the WFD's objectives.

4. Discussion

4.1 Objectives establishment

In terms of the establishment of water quality objectives, China's 2011 No. 1 Document shares many similarities with the EU WFD; however, as the developmental levels and culture are different in these two regions, the water management policies are also implemented in different ways.

Both China's 2011 No. 1 Document and the EU WFD outline long-term plans for water management: a 10-year plan in China and a 6-year planning cycle in the EU. Both of them set out their desired water quality objectives and timetables. The WFD requires MS to achieve at least 'good water status' for both their surface water and groundwater before 2015, while China schedules 2015, 2020 and 2030 as its deadlines by referring to different policy documents.

But unlike the EU WFD, which establishes some general water quality objectives and leaves some of the environmental quality standards to be set at the MS level, China does not lay down any objective in the 2011 No. 1 Document; it leaves them to its subordinating implementing regulations: the Opinion, the Zoning, and the Notice. By dividing its water bodies into different Water Function Zones, China establishes different targeted objectives for those Zones, and sets out different compliance rates for the targeted objectives by different policy documents. The short-term objectives (2015 and 2020) for each province might be different, but the compliance rate of more than 95% is uniform by 2030. This end result is much like the EU WFD. What a difference is that the EU laid down possibilities for extension of the deadline twice but there is no clear corresponding statement in China.

Both the division of Water Function Zones in China and the designation of water bodies in the EU are benchmarks for setting water quality objectives. But the objective-setting processes in different provinces of China are not so diverse as they are in different MS of the EU. Because unlike the EU, China is a centralized country, the provinces under its Central Government almost apply more or less the same political structure and therefore water management arrangements are basically the same.

In China, the EQSSW specify the scope of surface water as rivers, lakes, canals, irrigation channels and reservoirs (Article 1.2), this is not as detailed as in the EU WFD, which further distinguishes water bodies between natural water bodies, heavily modified water bodies and artificial water bodies (Article 4(3)). With such a division, the constraints imposed by the activities of human beings are taken into account and the economic activities can be somehow reconciled with the environmental objectives.

38 Volkery, A., Geeraerts, K., Farmer, A., Chalsège, L., Vandresse, B., Gaspar, L.D.S., & Ursachi, D.L. 'European Commission—General Directorate Environment Support to Fitness Check Water Policy' Belgium: Deloitte Consulting Institute for European Environmental Policy, 2011.

Instead of achieving the “good ecological status”, the WFD provides that for the altered water bodies of heavily modified water bodies and artificial water bodies an alternative objective of “good ecological potential” can be achieved. Ecological indicators are taken into account when designing water bodies in the EU. In contrast, by referring to the EQSSW, China’s Zoning Policy divides Water Function Zones according to 24 Chemical indicators, and excludes an ecological indicator. The EU WFD sets basic requirements for assessing both ecological status and ecological potential. Although assessing ecological status for water bodies is still a big challenge for the EU and its MS, it does not deter from the fact that China can receive inspiration from this: to include the health of the aquatic ecosystem in water resource management.

The EU WFD requires MS to achieve the “good status” of both surface water and groundwater. China focuses more on surface water and less on groundwater policy which is not yet well developed. This does not mean that the pollution of groundwater in China is not a problem. For example, on the North China Plain more than 70% of the overall groundwater quality is classified as Grade IV+ in 2013, in other words unfit to be touched by humans.³⁹ However, to date there has been no census on the status of groundwater and eventual protection nationwide. A general understanding of the country’s groundwater pollution situation is expected in 2015, according to an official document.⁴⁰

There is barely any discussion on the quality of the obligations for objectives achievement in China. According to Van Kempen’s 6-step method, the obligation of achieving different compliance rates should be qualified as obligations of result because the objectives for each province are detailed and the deadlines are clearly specified by the official national Notice. Both of them hint at obligations of result. However, to date there is not a regulation to state the remedial measures for any non-achievement.

4.2 Implementation Strategies

China and the EU are applying very different strategies to achieve their established objectives. China adopts a GORS and the EU establishes a very interactive legal system.

4.2.1 The Government’s Objective Responsibility System in China

GORS greatly contribute to the objectives’ achievement in China. For example, in Wuxi City of Jiangsu Province the water quality in monitoring sectors is reported to have improved significantly by applying the GORS, 74.7% of the sectors reached the established standards in 2008, which was 50% more compared to one year earlier when the system had not yet been adopted.⁴¹

39 China Water Risk, available at <http://chinawaterrisk.org/notices/north-china-plain-groundwater-70-unfit-for-human-touch/>

40 The National Planning for Prevention and Control of Groundwater Pollution was jointly released by the Ministries of Environmental Protection, Land and Resources, and Water Resources and was approved by the State Council, No. 119 [2011].

41 Liping Dai ‘A New Perspective of Water Governance in China – Captain of the River’, a forthcoming article.

However, the GORS has its limitations. As the author discussed in her previous research that due to the GORS is an internal personnel system, public participation is not necessary.⁴² Lack of public monitoring unavoidably render the responsible governments seek countermeasures as the evaluation result of the GORS is extremely important for a government and the direct responsible persons, i.e. it largely determines the governments' financial fate (.e.g., good result may help them to get support funding from the upper level) and the responsible persons' career paths (e.g. promotion or dismissal). For example, according to one empirical study, many strategies have been developed by lower governments in order to cope with the GORS, such as

- 1) Roundabout strategies, for instance selective reports, selective implementation, manipulating the data or sharing experiences among different local governments.
- 2) Soft resistance. In reporting to higher-level governments the local governments usually exaggerate the difficulties involved in attaining the objectives or completing the assigned tasks.⁴³

These various coping strategies easily lead to an illusory achievement, which makes that "the data becomes better and better, while the practical situation becomes worse and worse".⁴⁴

Theoretically, the citizens can initiate public-interest litigation when governments fail or choose not to enforce the law. However, in practice, succeeding in defending this are few and far between, as the local judiciaries are dependent on local governments for funding, judicial decisions are very often interfered by local governments. From 2002 to 2011, according to a research, the environment related litigations only account 0.2% of the total cases in first instance,⁴⁵ and from 2000 to 2013, less than 60 environmental public-interest litigations were taken place.⁴⁶

Different from the GORS in China, the implementation of European Directives is ensured by the European Court of Justice (ECJ) at the EU level and by the national courts concerning the MS. With regard to the implementation of the WFD, the ECJ has issued a considerable number of judgments against the MS.

For example, the ECJ has condemned Spain for having failed to designate a competent authority (C-516/07), and has condemned Greece (C-264/07) and Italy (C-85/07) for their failure to undertake the necessary analyses for some or all of their river basins.⁴⁷ There were 353 environmental infringements taken to the court in 2013 alone, among which, 80 (23%) were water cases, see Figure 7.

42 Ibid.

43 He, S. 'The Objective Responsibility System: Operation and Characters (in Chinese)' (2010) Vol. 27 No. 4 *China Agricultural University Journal of Social Sciences Edition*, 173-182.

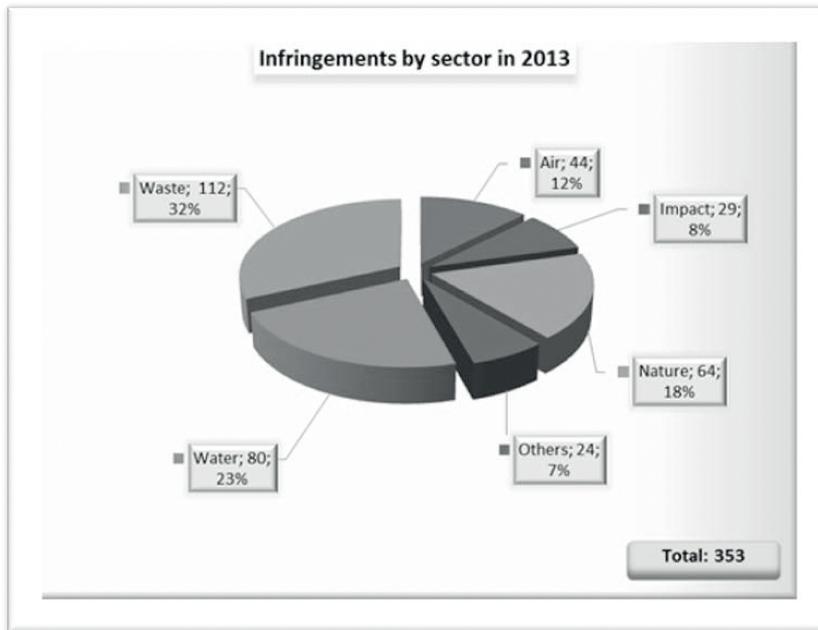
44 Ibid.

45 Chun Yuan, 'Analysis of National Environmental Litigations from 2002 to 2011 (in Chinese)', available at http://www.legaldaily.com.cn/zbkz/content/2012-12/19/content_4069404.htm?node=25497.

46 China News 'Judges have no environmental case to hear while environmental conflicts occur frequently (in Chinese)' available at <http://www.chinanews.com/gn/2014/10-08/6652268.shtml>.

47 Supra 39.

Figure 7: Infringements by environmental sector at the EU level



Source: European Commission, 'Legal Enforcement', available at <http://ec.europa.eu/environment/legal/law/statistics.htm>

4.2.2 Integration between the legal and policy framework for water and agriculture

The EU aims to adopt a coordinated legal framework in terms of controlling agricultural water pollution. Article 11 of The Treaty on the Functioning of the European Union states that Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities. The WFD was actually introduced partly for this aim. The main achievements of this coordination are: greater transparency in policy implementation, better communication and the use of joint resources by the administration bodies concerned (within and across member states and regions).⁴⁸

The WFD's scope of integration with other environmental Directives is fairly advanced. The integration of water concerns into other policy areas is approached through various channels.⁴⁹ For example, in order to control agricultural pollution, the WFD refers to the Nitrates Directive, which requires the MS to designate Vulnerable Zones within a limited period of time and it is compulsory. It can be considered as an obligation of result.

48 Ibid.

49 Ibid.

Although agricultural pollution is regulated by some individual laws in China, the coordination among them is generally weak. For example, the Water Pollution Prevention and Control Law states that

“the use of pesticides must comply with the state provisions and norms on the safe use of pesticides” (Article 47).

For the referred norms and provisions, one could trace back to the Standards for the Safe Application of Pesticides in 1990.⁵⁰ However, it should be noted that it is only a guidance document which cannot be enforced, let alone it is out of date.

Another two examples are while the Water Pollution Prevention and Control Law regulates that

“The competent department of agriculture and other related departments under the local people’s government at or above the county level shall take steps to guide agricultural producers to use fertilizers and pesticides in a scientific and reasonable way and control the overuse of fertilizers and pesticides so as to prevent water pollution” (Article 48).

and the Regulations on Pesticide Administration states:

*“The competent administrative departments of agriculture of the people’s governments at or above the county level shall enhance guidance in the safe and rational use of pesticides” (Article 24).*⁵¹

The safeguarding measures to guarantee that the competent administrative departments exercise their legal responsibilities under either the Water Pollution Prevention or Control Law or the Regulations on Pesticides Administration cannot be traced anywhere. National guidance on how the competent governments can execute their responsibilities is also lacking. Although agricultural pollution was added as a new section to the Water Pollution Prevention and Control Law in 2008; the Detailed Rules for the Implementation of the Water Pollution Prevention and Control Law, which were adopted in 2001, stays the same.

In the EU, pollution which affects water status is not only regulated by water legislation. Many activities having an impact on the status of water are also regulated in other policy fields.⁵² For example, the CAP sets out the Cross-compliance scheme. Under the scheme, it is compulsory to comply with the basic standards concerning the environment. Farmers will be sanctioned in case of non-compliance by means of a partial or complete reduction of direct support.⁵³ However, this seems less effective in China, as comparing with 30% or more of a farmer’s average income in the EU, the support subsidy for a farmer is only 4% in China.⁵⁴

50 Standards for the Safe Application of Pesticides (GB 4285-89), approved by the National Environmental Protection Bureau (now the Ministry of Environmental Protection) in 1989.

51 Regulations on Pesticide Administration, issued by the State Council, No. 326 [1997], revised in 2001.

52 Supra 14.

53 Supra 29.

54 Hongbin Liu, ‘Inspirations of Diffuse Pollution Control in the European Union’, available at <http://file.euchinapdsf.org/>.

4.2.3 *Lessons learned from the EU*

When China designs its water quality objectives, the ecosystem indicator is not taken into account. Although the Ministry of Environmental Protection proposed to assess the ecological security of important national lakes and reservoirs in early 2008, there is not yet an official guideline available to date. In this respect, a suggestion would be to first apply the experience provided by the EU into pilot schemes, take ecosystem factor in consideration, develop it in line with local conditions and then generalize it nationwide.

China focuses more on surface water management and less on groundwater when developing its water quality objectives. Unlike the EU, it does not integrate the management of surface water resources and ground water resources. This is because its fragmented institutional arrangements, i.e. surface water resources and groundwater resources are charged by different sectors.⁵⁵ To improve this, it calls for institution reform. But before the reform is taken, a useful suggestion would be that to establish a high-level co-ordination commission to facilitate the cooperation among key water management sectors.

The overemphasis of the GORS in China leads to that the legitimate implementation of existing law cannot be ensured, as the GORS mostly rely on the results which lower governments reported (although there are some internal investigation at upper level). With regard to this, public participation is suggested, as a bottom-up channel can effectively improve the governmental transparency. Ensuring implementation by the judicial system, which the EU provides, calls for judicial independence in China.

The coordination among different water and agriculture related regulations in China, as discussed above, is not well developed. For example, by addressing water pollution from agricultural sources in many regulations, specific responsibility or concrete guidance cannot be clearly ascertained at the end of the day. With this regard, the Programme of Measures of the EU WFD provides a valuable lesson. A fitness check of the existing legal framework is strongly suggested.

5. Conclusion

Both China and the EU have established their water quality objectives and different timetables to that end. China has laid them down in the 2011 No. 1 Document and its subordinating implementing regulations, while the EU regulates them in its WFD its daughter directives and other environmental directives.

The division of the Water Function Zones in China and the designation of water bodies in the EU, as benchmarks for the establishment of water quality objectives, are based on different indicators. China does not include the ecological indicator, while the EU also takes the health of aquatic ecosystems into account.

55 Liping Dai, 'Water Resources Management in China – a legal approach and overview', a forthcoming article.

China has adopted a GORS to achieve its desired objectives while the EU bases its compliance system on a very interactive legal system. China could further improve its policy and legal framework by paying more attention to develop more scientific water quality objectives, i.e. taking the health of aquatic ecosystems in consideration, integrating water management of surface water resources and groundwater resources, improving its GORS by public participation, and carrying out a fitness check for the existing legal framework.

CHAPTER 7

Something Old, Something New, Something Borrowed and Something Blue: Tackling Diffuse Water Pollution from Agriculture in China Drawing Inspiration from the European Union

This chapter is published as: 2014, Liping Dai, “Something Old, Something New, Something Borrowed and Something Blue-Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union”, *Utrecht Law Review*, 10(2), 136-154. Link: URN:NBN:NL:UI:10-1-115816.

Diffuse water pollution caused by agriculture is increasingly recognized as a major contributor to water pollution both in China and in Europe. A great deal of effort has been spent on mechanisms to address such pollution, especially through legislation and policy. The legal challenge for China is to develop an adequate legal framework to tackle diffuse pollution. By providing an overview of the current policy design regarding diffuse water pollution management in both China and the European Union, this article discusses the extent to which the EU legal framework could provide inspiration for China.

Key words: diffuse water pollution; agriculture; legal framework; China; European Union

1. Introduction

More than 10,000 dead pigs were pulled out of the Huangpu River in Shanghai in March 2013. Some weeks later the residents of Shanghai still did not dare to drink tap water because the Huangpu River is one of the city’s four drinking water sources. According to news reports, those dead pigs had been thrown in the river by farmers in the upstream province of Zhejiang and then floated down to Shanghai. This international scandal finally put the spotlight on China’s poorly regulated water management related to agricultural activities.

Diffuse water pollution from agriculture is increasingly recognized as a main contributor to water pollution both in China and Europe. A great deal of effort has been spent on mechanisms to address such pollution, especially through legislation and policy. The legal challenge for China is to develop an adequate legal framework to tackle diffuse pollution. This article provides 1) an overview of the current policy design regarding diffuse water pollution management in China and of its shortcomings; and 2) an overview of the legal framework for diffuse water pollution control in China and the European Union (EU). The aims of this article are 1) to provide policy makers and scholars a clear background to understand the Chinese legal approach to managing water pollution problems, and 2) to discuss to what extent the EU legal framework could provide inspiration for China.

This study has a comparative approach. I take the EU as a comparative case because it is much closer to China's situation as regards the level of agricultural intensification and fertilizer application rates than the USA or Australia.¹

In this article, I will first give an overview of *old problems* in Section 2: the status of diffuse water pollution from agriculture in China. Section 3 introduces the Chinese legal framework of water management as well as the law and policies which apply to diffuse water pollution, with the aim to present a complete overview of the Chinese water management system. Section 4 gives an overview of the EU legal framework which is relevant to diffuse water pollution. *Something new* will be included in this section: a case study in the Netherlands to give an indication of incentive instruments within the EU. The findings from the comparisons between China and the EU as well as *what can be borrowed* to benefit China are discussed in Section 5. A conclusion is presented in the last section, Section 6.

2. Diffuse water pollution

Water pollution in EU water law is defined as the discharge by man, directly or indirectly, of substances or energy into the aquatic environment, the results of which are such that they cause hazards to human health, harm to living resources and to aquatic ecosystems, damage to amenities or interference with other legitimate uses of water.² 'Discharge,' here, does not only include the pollution from multiple and diffuse sources, but also refers to any act attributable to a person by which one of the dangerous substances is directly or indirectly introduced into the waters.^{3,4}

Coming from widespread activities without one concrete source, diffuse pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification.⁵ A useful thing to keep in mind about diffuse pollution is that it is often individually minor but collectively a significant source of pollution in a catchment.⁶ Diffuse pollution cannot be the subject of prior authorization⁷

-
- 1 *PhD candidate at the Utrecht Centre for Water, Oceans and Sustainability Law, Faculty of Law, Economics and Governance of Utrecht University, the Netherlands, email: l.dai@uu.nl. Thanks are owed to Prof. H.F.M.W. van Rijswijk and Dr. Andrea Keessen; without them, this article could not have been completed. China Council for International Cooperation on Environment and Development (CCICED), *Working Reports on the Task Force on Non-point Pollution from Crop Production*, CCICED Press, 2004, p. 18.
 - 2 Directive 2006/11/EC of the European Parliament and of the Council of 15 February 2006 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, OJ L 64, 4.3.2006, p. 52.
 - 3 Dangerous substances listed in List I or List II of the Annex to Directive 2006/11/EC.
 - 4 Case C-231/97, *A.M.L. van Rooij v Dagelijks bestuur van het waterschap de Dommel*, Judgment of the Court (Sixth Chamber) of 29 September 1999, [1999] ECR I-06355; Case C-232/97, *L. Nederhoff & Zn. v Dijkgraaf en hoogheemraden van het Hoogheemraadschap Rijnland*, Judgment of the Court (Sixth Chamber) of 29 September 1999, ECR I-06385.
 - 5 *United States Environmental Protection Agency (USEPA), 'What is nonpoint source pollution?'*, available at: <http://water.epa.gov/polwaste/nps/whatis.cfm> (last visited 17 February 2014).
 - 6 *Ibid.*
 - 7 *L. Nederhoff & Zn. v Dijkgraaf en hoogheemraden van het Hoogheemraadschap Rijnland*, supra note 4.

because its pollutant emissions and discharges cannot easily be measured in terms of effluent limitations and it is often unclear who the polluter is.⁸

Three important pollutants associated with diffuse pollution are nitrogen, phosphorus and pesticides, which are mostly from agriculture. Modern-day agricultural practices are associated with high levels of fertilizers, pesticides and manure,⁹ which leads to surplus nutrients (e.g. nitrogen and phosphorus) and results in diffuse pollution in both surface and groundwater through various diffuse processes.

2.1 Diffuse water pollution in China

The annual chemical nitrogen loss through leaching and runoff from farmland is about 1.73 million tons in China; the annual nitrogen input from agriculture into the Yangtze River and the Yellow River is 92% and 88%, respectively.¹⁰ As some 90% of animal farms are equipped with inadequate waste disposal or treatment facilities or even with no facilities whatsoever,¹¹ farmland pollution in China is also taken as a diffuse source in this article. This is because if there is no sufficient disposal facility or standardized management, the pollution sources will be very difficult to trace in practice.

The Gross Domestic Product (GDP) of China was the second largest in the world in 2010.¹² However, the environmental pressure is also bigger than in many other countries. China has the same amount of water as Britain; but its population is 20 times larger.¹³ Cultivated lands in China cover about 1,825.74 million acres (738.85 million hectares), only 12.68% of the total territory. The per capita arable land area is only 1.38 acres (0.56 hectares), less than 40% of the world's average level. Moreover, China's cultivated land is distributed mainly in hilly, mountainous and plateau areas, only 30.73% is in plains and basins.¹⁴ To feed more people with less land, agriculture in China has been greatly intensified since the 1980s. Fertilizers and pesticides have played an important role in boosting crop yields, and livestock and poultry farms are being expanded to meet the increasing consumer demands. Meanwhile, serious environmental pollution has been caused by the overuse and misuse of fertilizers, pesticides and increasing animal waste. Over half of all rivers and about two-thirds of lakes in seven river systems and 28 major lakes in China were assessed to have poor water quality (Grade IV and above)¹⁵ in the

8 R.C. Ferrier et al., 'Diffuse Pollution – What is the Nature of the Problem?' 2005 *Water and Environment Journal* 19, no. 4, pp. 361-366, at p. 362.

9 European Environmental Agency (EEA), 'Diffuse sources', 2008, available at: <http://www.eea.europa.eu/themes/water/water-pollution/diffuse-sources> (last visited 17 February 2014).

10 CCICED, *supra* note 1, p. 2.

11 *Ibid.*

12 The World Bank, 'China Overview', available at: <http://www.worldbank.org/en/country/china/overview>.

13 D. Stanway, 'After China's multibillion-dollar cleanup, water still unfit to drink', 2013, available at: <http://www.reuters.com/article/2013/02/20/us-china-pollution-water-idUSBRE91J19N20130220> (last visited 17 February 2014).

14 H. Xue, 'Research on Evaluation of Intensive Use of Agricultural Land under the New Countryside Construction', 2009 *International Journal of Business and Management* 4, no. 4, pp. 176-182, at p. 176.

15 There are five classifications of water quality in China: Class I: water source, national protection areas; Class II: centralized drinking water supply, spawn grounds for rare fishes and shrimps, nursery areas for larva, juvenile and young fish; Class III: grounds and migration paths for common fishes and shrimps, aquaculture areas and swimming areas; Class IV: general industrial water areas, entertainment areas; Class V: farmland areas, general landscape.

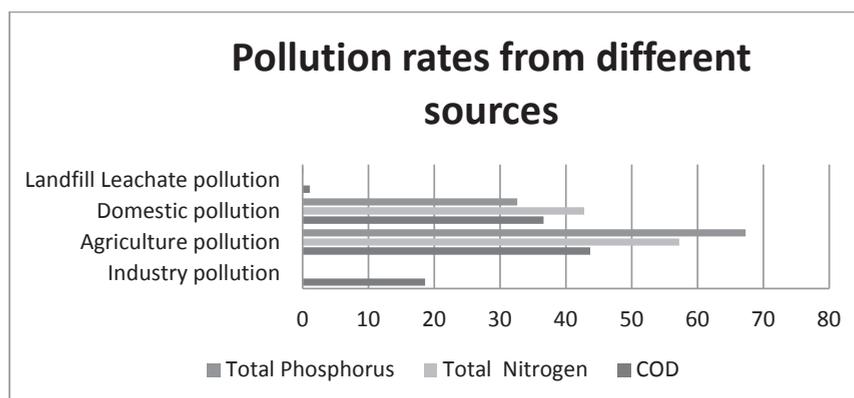
2000-2008 period.¹⁶ According to the government report, the status of surface water was that of moderate pollution in 2010:¹⁷ 51.9% of surface water was in Class I-III, and 20.8% below V.¹⁸ The Ministry of Environmental Protection stated that 43% of the locations monitored in 2011 contained water that was not even fit for human contact.¹⁹

After two years of monitoring pollution sources and collecting data, China released its First National Census on Pollution Sources in 2010. The revelation came as a shock to many, who had previously believed that China's water problems, while severe, had slowly been improving over the years.²⁰

The Census examined data for the year 2007. Nearly 6 million pollution sources were covered in the Census: industrial pollution, agricultural pollution, domestic pollution and intensive pollution treatment facilities.

The outcomes of the Census revealed some problems that were previously known, like striking structural industrial pollution, pollution concentrated in several sectors and greater pollution in developed regions.²¹ However, there were also some new problems that were identified by the Census: agriculture was actually the main contributor to environmental pollution. It contributed 43.7% to chemical oxygen demand (COD) pollution, 67.3% to total phosphorus pollution and 57.2% to total nitrogen pollution (See Figure 1).

Figure 1 Pollution rates from different sources.



16 B. Sun et al., 'Agricultural non-point source pollution in China: causes and mitigation measures', 2012 *Ambio* 41, no. 4, pp. 370-379, at p. 371.

17 The biological index is used to assess the quality of water sources: clean water: 0~8, low pollution 8~20, moderate pollution: 20~60, and high pollution: 60~100.

18 Ministry of Environmental Protection, '2010 National Environmental Quality Report by the Ministry of Environmental Protection', 2011, available (in Chinese) at: http://www.gov.cn/gzdt/2011-01/15/content_1785113.htm (last visited 20 February 2014).

19 Stanway, *supra* note 13.

20 Y. Wu, 'Fighting Water Pollution with Data', 2010, available at: <http://chinawaterrisk.org/opinions/fighting-water-pollution-with-data/> (last visited 20 February 2014).

21 China.org.cn, '1st National Census on Pollution Sources Completed', 2010, available at: http://www.china.org.cn/china/2010-02/09/content_19394384.htm (last visited 20 February 2014).

3. The Chinese legal framework for water management

3.1 General policies for water resource management in China

During the past few years, China has adopted a large number of environmental and water policy documents to reduce the environmental impact of its incredible economic growth. See Appendix 6.

The 12th Five-Year Plan (12 FYP), covering 2011-2015, places heavy emphasis on the environment and energy (with 8 guidelines, one third of the total of 24 guidelines).²²

²³ For the sake of national environmental protection, it sets impressive sustainability targets for water pollution management. For example, it sets a COD reduction target of 8% and a growth target of 5% for the surface water which has been qualified as Class III and above in seven river basins by 2015 (compared to 2010). The 12 FYP governs policy documents at all levels for the next five years and its objectives are to be achieved by complying with detailed implementing actions, laws and policies.

A subordinated plan of the 12 FYP, the 'General Planning for the Development of Environmental Protection Legislation and Environmental Economic Policies', lists key fields and main targets especially for environmental protection, and includes improving environmental legal systems and establishing eco-compensation mechanisms.

The 'No. 1 Document of 2011' (called No. 1 because it was announced as the first policy document in the year 2011) highlights sustainable use of water resources over the next ten years. It places water conservancy projects high on a primary list of national infrastructure developments, and sets 'The Most Stringent Standards' which is usually called 'Three Red Lines', i.e. the first line is to define a control limit of water resource exploitation and utilization, the second is to establish a control limit of water-use efficiency, and the third is to establish a pollutant-carrying limit of water function zones, which is the most important element related to water quality.

To guide the implementation of the 'Three Red Lines', an *Opinion of the State Council on Implementing the Most Stringent Water Resources Management System* (hereafter referred to as 'Opinion') was released by the State Council at the beginning of 2012. It sets out a number of requirements called the 'Four Indicators': total quantity control of water consumption; efficiency control of water use; pollutant-receiving capacity control of water quality in water function zones; and a performance assessment system for water resources management.

The first three indicators were designed based on the process of water use: abstraction, utilization and drainage, which also correspond to the 'Three Red Lines'. The fourth indicator states that water resources management will be incorporated into the system for assessing local economic and social development levels. This Opinion is

22 North Head, *Report On the 12th Five-Year Plan An in-depth overview and analysis of China's policy blueprint for years 2011-2015*, Beijing North Head, 2011, p. 8.

23 The national 'Five-Year Plan' is a developmental blueprint to guide policies and sets targets for the next five years in China.

a fundamental document guiding water-related issues in China at present and in the foreseeable future.

The 'Assessment Methods for the Most Stringent Water Management System' is a specific method to implement the 'Three Red Lines'. It sets out the main objectives for each province, and will evaluate their implementation in a scoring system (with a maximum of 100 points): excellent (90 points or more), good (more than 80 and less than 90 points), sufficient (more than 60 and less than 80 points), and insufficient (less than 60 points). These scores will be used as an important indicator to assess government officials' achievement.

The 'National Plan on Groundwater Pollution Control' is the first-ever national plan on groundwater pollution control in China.²⁴ According to the Plan, China will create a general understanding of the country's groundwater pollution situation, bring the sources of groundwater pollution under preliminary control by 2015, and fully monitor typical sources of groundwater pollution and ensure the safety of essential underground drinking water sources by 2020.²⁵

The 'Water Pollution Prevention Plan in Key Basins (2011-2015)', which was released jointly by a number of institutions of the State Council, aims to enhance watershed protection and to improve the overall water quality in key river basins from moderately polluted to slightly polluted by 2015. It includes a total of 22 indicators to evaluate water quality.²⁶

The 'Water Development Plan (2011-2015)', another specific national plan that is part of 12 FYP, is an important basis for water resources management reform and development. It aims to improve the water quality of major rivers and lakes, improve 60% of it to Grade I-III, increase the rate of urban waste-water treatment to 85%, and raise the waste-water renewal rate of water-needy cities to above 20%.²⁷

3.2 Policy review of specific pollution sources

Based on the 12 FYP, the Ministry of Environmental Protection (MEP) and the Ministry of Agriculture (MA) jointly released a document entitled *12 FYP on the Prevention and Control of Livestock and Poultry Breeding* to guide local governments on the work of regional livestock and poultry breeding. The document focuses on three categories: large-scale farms (slaughtered fattened hogs 500 heads), professional farms (50 heads slaughtered fattened hogs 500 heads) and backyard poultry and livestock breeding. Based on the amount of main pollutants discharge, environmental bearing capacity and confirmed key river basins, the document sets out key prevention and control regions for livestock and poultry breeding, which are distributed in 16 provinces (out of 34). After calculating the total national discharge amounts of COD, ammonia

24 China Water Risk, '2011-2013 Water Policies Review', 8 March 2013, available at: <http://chinawaterrisk.org/resources/analysis-reviews/2011-2013-water-policies-review/> (last visited 20 February 2014).

25 X. Mu, 'China introduces first national plan on groundwater pollution control', 2011, available at: http://news.xinhuanet.com/english2010/china/2011-10/29/c_122211369.htm (last visited 20 February 2014).

26 China Water Risk, supra note 24.

27 Ibid.

and nitrogen, the Central Government distributed them to each province with certain discharge amounts as referenced targets for the year 2015. This distribution was based on three elements: regional economic development, pollution emission intensity and emission reduction potential. This is similar to the allocation criteria of some developed countries.²⁸

The ‘Discharge Standards of Pollutants for Livestock and Poultry Breeding’ (2001), released by the EPA and General Administration of Quality Supervision (GAQ), sets out a maximum daily discharge concentration on average for water pollutants and odour, and the total allowed water discharge. However, it applies only to large-scale intensive livestock breeding (pigs in stock per farm above 3,000 heads). Backyard poultry and livestock breeding (small numbers of domestic animals such as pigs, goats, or chicken surrounding the house, often mixed together) is beyond legal control even though it still makes up a high proportion in China, see Section 4.

The ‘Exposure Draft on the Prevention and Pollution Control of Livestock and Poultry Breeding’ (2012), is the first regulation specifically designed for dealing with livestock and poultry breeding pollution. It promotes a new system which differs from traditional industrial pollution control – using rewards to promote treatment and replace subsidies – to prevent and control pollution from livestock and poultry breeding. However, this regulation is only applied in large-scale farms too. For more policies on livestock and poultry breeding, see Appendix 7.

The large market demand is one of the driving forces for the high-speed development of livestock and poultry farms in China, another one is the support policies. For example, in order to promote large-scale intensive livestock farms, a Notice²⁹ states that ‘any prohibition or restriction of scaled intensive livestock breeding is not allowed on the ground of new rural construction or environmental renovation’; ‘local competent authorities shall give scaled intensive livestock breeding support policies by distinguishing among differing cases’.

The intensive use of fertilizers and pesticides was also promoted by the governments at the earlier stage. To increase yields, agricultural outreach officers under local governments persuaded farmers to use more chemical fertilizers and pesticides since 1980. Officers were rewarded for such promotion.³⁰ Another dominant strategy that China has used for many years to boost grain production is to keep chemical fertilizer prices low. Subsidies are provided to fertilizer manufacturers in various ways,

28 For further information, see H.F.M.W. van Rijswijk, ‘Moving water and the Law, On the Distribution of Water Rights and Water Duties within River Basins in European and Dutch water law’, inaugural address Utrecht University, Europa Law Publishing, Groningen, 2008; H.F.M.W. van Rijswijk, *The allocation and regulation of limited water use rights in international, European and Dutch Water Law*, in print; J.J.H. van Kempen, *Europees waterbeheer: eerlijk zullen we alles delen?*, 2012.

29 Ministry of Land and Resources, ‘Notice of Facilitating Land Use to Intensive Livestock Breeding’, 2007, No. 220.

30 Y. Yang, ‘A China Environmental Health Project Sheet: Pesticides and Environmental Health Trends in China’, 2007, available at: http://www.wilsoncenter.org/sites/default/files/pesticides_feb28.pdf (last visited 21 February 2014).

particularly through low energy prices. The total subsidies have amounted to more than ¥6,300 million (€779 million) every year since 2003.³¹

More than 30 kinds of highly toxic pesticides have been banned by different regulations since the 1980s in China. However, small-scale surveys have shown that a number of banned pesticides are still in use.³² The laws and policies which apply to the use of fertilizers and pesticides are normally too vague to be applied in practice (see Appendix 8). For example, according to the Agricultural Law, Water Law and Water and Soil Conservation Law, governments above county level are responsible for guiding the use of fertilizers and pesticides and supervising the pollution. However, the practical problem is that most extension staff at county level who provides advice and assistance to farmers is not sufficiently educated. According to one survey, only 10% of extension staff had university-level education, and more than 46% had no special training at all.³³ Moreover, there are no sufficient staffs or financial support for this implementation at county level.

4. An overview of the legal framework on diffuse water pollution in the European Union

4.1 *Diffuse water pollution in the European Union*

Europe's waters are affected by several pressures, including water pollution, water scarcity and floods.³⁴ Recent figures show that 20% of (Europe's) surface water is at serious risk of pollution.³⁵ The pressures reported to affect most surface water bodies are pollution from diffuse sources, in particular from agriculture, which is a significant pressure in more than 40% of Europe's water bodies in rivers and coastal waters, and in one third of the water bodies in lakes and transitional waters.³⁶ A large proportion of water bodies, particularly in the regions with intensive agriculture and high population density have poor ecological status and are affected by pollution pressures.³⁷

A high input of fertilizers and pesticides in intensive agriculture results in significant loads of pollutants entering the aquatic environment through diffuse pollution. Widespread problems of nutrient enrichment have had detrimental effects on aquatic ecosystems and have resulted in the loss of aquatic flora and fauna, and this is a cause of concern for public health.³⁸

31 Sun et al., *supra* note 16, p. 376.

32 CCICED, *supra* note 1, p. 4.

33 CCICED, *supra* note 1, p. 14.

34 European Environmental Agency (EEA), 'European waters – assessment of status and pressures', Office for Official Publications of the European Union, 2012, p. 8.

35 European Commission, 'Water Framework Directive Factsheet', 2010, available at: <http://ec.europa.eu/environment/pubs/pdf/factsheets/water-framework-directive.pdf> (last visited 21 February 2014).

36 EEA, *supra* note 34.

37 *Ibid.*

38 *Ibid.*

4.2 An overview of the EU legal framework of water management

According to the 2012 Blueprint, Europeans can safely drink tap water and swim in thousands of coastal areas, rivers and lakes across the EU.³⁹ This status is the result of many efforts, such as scientific research, advanced technology and efficient communication etc., and EU water policy has also successfully contributed to water protection. An adequate legal framework in place is the precondition to manage water resources sustainably. In the EU, various directives apply at the national, regional and river basin level and they aim to protect the quality of water from pollution by certain substances.⁴⁰

The Water Framework Directive (WFD)⁴¹ entered into force in 2000 and aims to create an integrated and coherent water policy within the EU by applying an integrated approach to manage water quality and quantity across entire catchments. It involves land use and management that affect both water quality and quantity and requires coordination with spatial planning by the Member States and integration into funding priorities.⁴² Member States are required to prepare River Basin Management Plans (RBMP), of which the Programme of Measures (PoM) is a central tool.⁴³ As agriculture is identified as a major source of pollution, these programmes have to address agricultural pressures to ensure the full implementation of the WFD and the concretization of the WFD objectives⁴⁴: achieving a ‘good status’ of all community waters by 2015.

The PoM of the WFD includes both ‘basic measures’ and ‘supplementary measures’ (see appendix 9). Basic measures are the minimum requirements to be complied with⁴⁵ and they are based on existing EU legislation. For instance, the WFD itself contains no specific provisions concerning pollution by fertilizers⁴⁶ or pesticides, so to achieve its goals, the requirements of the Nitrates Directive⁴⁷ and the Plant Protection Products Directive⁴⁸ must be applied and enforced. Supplementary measures are the measures designed and implemented in addition to the basic measures, with the

39 European Commission, ‘A Blueprint to Safeguard Europe’s Water Resources’, COM (2012) 673 final, p. 9.

40 H.F.M.W. van Rijswijk, ‘The Relationship between the Water Framework Directive and other Environmental Directives, with Particular Regard to Agriculture – A Dutch Point of View’, 2006 *Water Law* 17, pp. 193-203, at p. 197; H.F.M.W. van Rijswijk & H.J.M. Havekes, *European and Dutch Water Law*, 2012, pp. 341-349.

41 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.

42 European Commission, *supra* note 39, p. 3.

43 European Commission, ‘Guidance for administrations on making WFD agricultural measures clear and transparent at farm level’, 26 May 2011, available at: http://ec.europa.eu/environment/water/quantity/pdf/guidance_en.pdf (last visited 21 February 2014).

44 T. Dworak et al., *Assessment of agriculture measures included in the draft River Basin Management Plans – Summary Report*, 2010, p. 2.

45 Article 11(3) of the WFD.

46 Van Rijswijk 2006, *supra* note 40.

47 Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, OJ L 375, 31/12.1991, p. 1.

48 Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market, OJ L 230, 19.8.1991, p. 1.

aim of achieving the objectives⁴⁹, e.g. economic or fiscal instruments and negotiated environmental agreements.

The Nitrates Directive is clearly directed towards nitrogen pollution in the EU. Its very purpose is to counter water pollution resulting from the spreading or discharge of livestock effluent and from the excessive use of fertilizers.^{50,51} It contributes significantly to the implementation of the WFD. The Nitrates Directive requires Member States to establish code(s) of good agricultural practice (e.g. determining periods when fertilizing land is inappropriate) and allows them to impose more stringent restrictions on the use of fertilizers.⁵²

The Plant Protection Products Directive, which focuses on the application of a separate product and the ensuing exposure and risk, was replaced by a Regulation on the placing of plant protection products on the market in 2009.⁵³ The new Regulation aims to achieve a uniform and a high level of protection for both human and animal health and the environment, and it requires Member States to comply with the objectives of the WFD when they review approval and authorization of the Plant Protection Products Directive.

A new Directive on the sustainable use of pesticides⁵⁴ requires national action plans for reducing risks and dependence on pesticides, training programmes, specific practices, and specific measures for the protection of the aquatic environment.⁵⁵ These measures, including the establishment of buffer and safeguard zones or planting hedges along surface waters, giving preference to pesticides that are not classified as dangerous, applying the most efficient application techniques and using mitigation measures, need to be compatible with the relevant provisions of the WFD and other existing directives.

The Common Agricultural Policy (CAP) provides a framework for agricultural policy and rural development for all EU Member States. In general, the CAP is based on two principles (the so-called 'pillars') of agricultural expenditure, namely the market and income support (pillar 1), and the sustainable development of rural areas (pillar 2).⁵⁶

49 Article 11(4) of the WFD.

50 Van Rijswijk 2006; supra note 40, p. 199.

51 Case C-416/02, *Commission v Spain*, Judgment of the Court (Third Chamber) of 8 September 2005, [2005] ECR I- 7566.

52 H.F.M. W. van Rijswijk (2006), no. 40 above, at p. 201.

53 Regulation (EC) No. 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, OJ L 309, 24.11.2009, p. 1.

54 Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides, OJ L 309, 24.11.2009, p. 71.

55 H.F.M. W. van Rijswijk & E.M. Vogelesang-Stoute, 'The Water Framework Directive and pesticides legislation: the influence of environmental quality standards and the river basin approach taken in the Water Framework Directive on the authorization of plant protection products', 2008 *European Energy and Environmental Law Review*, pp. 78-89, at p. 82.

56 N. Herbke et al., 'WFD and Agriculture – Linkages at the EU Level. Analysis of the Policy and Legal Linkages between CAP and WFD', 2006, available at: http://www.ecologic.eu/download/projekte/1950-1999/1966/1966_deliverable_2-1.pdf (last visited 21 February 2014).

Sustainable rural development and cross-compliance are two important instruments of the CAP. Sustainable rural development measures provide a broad set of opportunities to organize a link between water management (of the WFD) and rural development.⁵⁷ It potentially supports WFD implementation: it provides many opportunities for payments linked to the WFD, and it allows farmers to be compensated for income losses caused by the implementation of the WFD. The cross-compliance instrument establishes a link between the implementation of existing EU legislation (e.g. the Nitrate Directive, the Habitats Directive) and it also benefits WFD objectives.⁵⁸ although complying with animal health requirements does not have direct effects on WFD implementation, it does have indirect positive effects on water quality due to strong animal health standard controls. Both sustainable rural development and cross-compliance provide a direct or indirect contribution to the supplementary measures of the PoM under the WFD.

4.3 A case study within the EU legal framework

Incentive approaches have frequently been adopted in the EU since the introduction of the first EU Rural Development Regulation. Here I take one of the Member States – the Netherlands – as a case study to show how it has adopted the approach of buffer zones to address agricultural diffuse water pollution within the EU’s harmonious legal system.

In the Netherlands, the agricultural sector has been stimulated from the 1950s onwards to intensify production in order to make the EU self-sufficient.⁵⁹ Due to the relatively large scale of horticulture and intensive livestock farming, the environmental impact of the agricultural sector in the Netherlands is greater than in most other (EU) countries.⁶⁰ For example, the use of chemical crop protection agents is roughly 2.5 times greater than the average in the EU-15 and discharges of nitrogen are approximately four times higher.⁶¹

The Dutch agriculture sector has been forced to take measures to deal with this problem under the WFD and the Nitrates Directive. The Nitrates Directive, as discussed above, has the aim of reducing water pollution caused or induced by nitrates from agricultural sources and in order to further prevent such pollution. It gives Member States the choice to apply nitrate action programmes either in designated areas or on their whole territory.⁶² The Netherlands has adopted the latter method. This means, according to

57 Ibid.

58 Ibid.

59 The EU-15 comprised the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom. A. Jolink, *Legal Implications of Introducing Economic Instruments in the Field of European and Dutch Water Law*, 2009, p. 18.

60 The Dutch Rural Development Programme 2007-2013, 2006, at p. 18, available at: <http://www.regiebureau-pop.eu/nl/english/> (last visited 21 February 2014).

61 Ibid.

62 A.M. Keessen et al., ‘The Need for Flexibility and Differentiation in the Protection of Vulnerable Areas in EU Environmental Law: The Implementation of the Nitrates Directive in the Netherlands’, 2011 *Journal for European Environmental & Planning Law* 8, no. 2, pp. 141-164, at p. 144.

Article 4 of the Nitrates Directive, that the Netherlands is obliged to formulate codes of good agriculture practice for the whole territory. The codes of good agriculture cover activities such as application periods, fertilizer use near water sources and on slopes, manure storage methods, spreading methods and crop rotation and other land management measures.⁶³

A 'buffer zone', a construction that is similar to the fertilizer-free zone under the codes of good agriculture, is an efficient policy instrument to address nitrate water pollution in the Netherlands. A buffer zone is a strip of land alongside water courses with restrictions regarding the application of nutrients and pesticides and mowing times.⁶⁴ The creation and management of buffer zones can contribute to the abatement of various water management problems at the same time.

Buffer zones with a specified width are obligatory under the Nitrates Directive and the Pesticides Directive in the EU. As the Netherlands uses nitrate action programmes for the whole of its territory, buffer zones are therefore obligatory in the whole of the Netherlands. However, these buffer zones can be extended under the EU Rural Development Programmes. The extended part is called a 'voluntary buffer zone,' which is additional to the mandatory buffer zones. A certain width of voluntary buffer zones provides additional ecosystem services: for example, they might filter more nitrates to benefit the water alongside and serve as water storage and they can be used to improve the ecological status of waters and serve nature conservation goals. However, if they do not receive anything in return, farmers will not use more land than is necessary for this purpose, because it will only entail higher costs for them, decreasing the amount of land available for production.⁶⁵ Therefore, in exchange for the additional services and maintenance of good water quality, the Dutch Water Boards pay certain compensation to farmers who voluntarily use more land as buffer zones and offer ecosystem services which exceed what is obligatory under EU law.⁶⁶ This idea of using financial compensation in exchange for ecosystem services is supported by the Rural Development Regulation under the EU.

Although more research is still needed, e.g. to increase understanding about buffer zone functions and requirements, the buffer zone approach, combined with other policy instruments, has now been implemented successfully to reduce nitrate water pollution in the Netherlands.

5. Legal discussion

The review of general policies in China (Section 3.1) shows that China has paid increased attention to water protection. A series of regulations and standards have been gradually improved or established. However, why is the water still so seriously

63 Jolink, *supra* note 59, p. 20.

64 T. Dworak et al., *International review on payment schemes for wet buffer strips and other types of wet zones along privately owned land*, 2009, p. 13.

65 Jolink, *supra* note 59, p. 18.

66 Jolink, *supra* note 59, p. 26.

polluted when there are so many laws? Well, 'the existing laws do have some effect', as one expert said, 'without these laws, the environment would be in worse shape'.⁶⁷

The 12 FYP marks a shift from the country's previous emphasis on economic development to a balanced and more sustainable development. Such a blueprint significantly contributes to water resource protection. However, actually putting it into practice is also a big challenge.

China has adopted a co-operative management approach to manage its water resources. Under the State Council there are at least 8 ministries (committees) which are directly related to water management.⁶⁸ Each of the policies addressed above was well designed, but overall it is difficult to say whether the regulations are working well together. Each institution has its own interests and does not pay much attention to the others when drafting a regulation, even though every draft needs final approval from the State Council. This makes coherent policy formulation more difficult, and easily leads to inefficient implementation and unsustainable water use. The Government is gradually improving this shortcoming, but to break down bureaucratic barriers, e.g. harmonizing the different interests of the different institutions, there is still a long way to go. In addition, enforcement is another continuous problem, particularly a lack of proportionate action against transgressions. For example, average environmental fines in 2006 were only ¥10,000 (€1,250),⁶⁹ which is too low to stimulate compliance.

In addition to the water resource management approach, there are two other important elements in the water pollution control system: one is water pollution control policies, and the other is pollution abatement measures.⁷⁰

Chinese water pollution control policies and regulations focus on the industrial sector rather than on agriculture. There are few policies specifically designed for agricultural pollution (see Table 1). No matter from which perspective – mandatory policies, economic policies or policies of public participation – agricultural pollution control is seldom mentioned. In practice, the policies to control water pollution from agriculture are merely an extension of the policies to control industrial pollution.

67 'Time to Enforce China's Environmental Law', Interview with Wang Canfa, 8 March 2013, available at: <http://chinawaterrisk.org/interviews/time-to-enforce-china-environmental-law/> (last visited 21 February 2014).

68 L. Dai, 'Recovering the Costs of Water Services in the People's Republic of China: Lessons from Article 9 of the European Union Water Framework Directive', 2012 *Utrecht Law Review* 8, No. 3, pp. 102-118, at p. 103, available at: <http://www.utrechtlawreview.org/index.php/ulr/article/view/208/0> (last visited 21 February 2014).

69 B. Van Rooij, 'The People's Regulation Citizens and Implementation of Law in China', Amsterdam Law School Legal Studies Research Paper No. 2011-22, p. 9.

70 Ministry of Environmental Protection (MEP) & Asian Development Bank (ADB), 'Market-based instruments for water pollution control in China', 2010, available at: <http://www.adb.org/sites/default/files/publication/30263/instruments-water-pollution-control-prc.pdf>.

Something Old, Something New, Something Borrowed and Something Blue:
Tackling Diffuse Water Pollution from Agriculture in China

Table 1 Classification of China's water pollution control policies

Approaches	Industrial sources of pollution	Agricultural sources of pollution	Urban residential and tertiary industry pollution sources
Coercive (mandatory) rules	Basin water pollution control planning; Environmental impact assessment and the 'three simultaneousness'*; Total pollutant discharge control; Discharge permits; Plant closure and suspension of production; Centralized sewage treatment	Basin water pollution control planning	Basin water pollution control planning; Environmental impact assessment and the 'three simultaneousnesses'; Discharge permits; Centralized sewage treatment
Economic rules	Pollution levies; Waste-water treatment tariffs; Ecological compensation pilot programmes; Emission trading pilot programmes	–	Pollution levies; Waste-water treatment tariffs
Public participation rules	Public reporting and grievance hotlines	–	Public reporting and grievance hotlines

* The "three simultaneousness": the design, construction, and operation of pollution control facilities are required to construct simultaneously with the main project.

Source: Revised on MEP & ABD, *supra* note 70.

This table clearly shows that there is insufficient attention for agricultural pollution compared to industrial pollution. This constitutes a high risk for water management because today agriculture is actually the biggest contributor to water pollution in China. If the Government continues to fail to improve this, the established 'Three Red Lines' (Section 3.1) will never be complied with.

Another problem is the control measures selection. China has adopted a similar approach to point-source pollution control when dealing with diffuse pollution. It relies on administrative enforcement rather than combining it with other instruments – e.g. the incentive approach, public participation or rural education – as is done in the EU. To address the pollution from rural domestic refuse, the main instrument in China currently is still administrative punishment, which is a typical point-source pollution control approach. For this kind of control measure to be effective, it needs a large number of competent authorities, staff, equipment and funds. This is very difficult under the current financial conditions and the institutional structure, as the staff and financial support at the local level are far from sufficient. Although clear targets have been established by 12 FYP and its subordinated plans, it still needs time to develop efficient approaches to reach these goals. Appropriate legal instruments will be the key to diffuse water pollution control.

There is an old Chinese saying: *Know what to expect before you go (zhi ji zhi bi, bai zhan bu dai)*. It means that only when you know the enemy well, can you win the

battle. As regards the battle against diffuse water pollution, only when one clearly knows the problems, can one take a further step.

The current problem of the legal systems for dealing with animal waste pollution in China is that the systems do not match the practical situation very well. For example, there are few regulations on backyard breeding, which still accounts for a large part of national livestock breeding. According to the China Agriculture Year Book, the ratios of slaughtered fattened pigs in backyard poultry and livestock breeding and large-scale intensive breeding were 76.8% and 23.2% in 1998; and 44% and 56% in 2008, respectively.⁷¹ Although there has been a drop in backyard poultry and livestock breeding, it is still a large proportion of the total pollution. However, there is no sufficient legislation to address this problem. Compared to the intensive large-scale farms, backyard poultry and livestock farmers normally have more difficulty in accessing markets and meeting market standards, so they tend to squeeze breeding costs and seldom consider environmental impacts. Based on different traditions, knowledge, wealth and geography, the ways of feeding and faecal treatment are also diverse. These diversities entail high risks of the spreading of diseases and multiple pollution. Therefore some local governments have tried to ban this breeding mode by introducing specific policies. However, this is very difficult in practice as it is a traditional custom: many young, especially male, rural residents in China are flooding into big cities as migrant workers, leaving the elderly, women and children to tend their households and farms alone.⁷² Backyard poultry and livestock breeding is not only a way of self-sufficiency for these families, but also a source of income. In addition, the products from backyard poultry and livestock breeding are actually very popular in markets as customers believe that less chemical feeding has been used compared to large-scale farms. Therefore, prohibition has been ineffective.

Compared to farmers who own large-scale farms in some European countries, farmers in China only have small pieces of land. This makes China's government supervision over the use of fertilizers and pesticides more difficult and expensive. The traditional end-of-pipe control cannot work well as there is insufficient monitoring staff, equipment and funding. Currently the misuse and overuse of fertilizers and pesticides are still the main causes of agricultural pollution. This is because previously, Chinese local governments persuaded farmers to promote the use of chemical fertilizers and pesticides to increase yields. Most farmers today are still of the opinion that 'the more fertilizers and pesticides, the greater the yields'. It is very difficult to change such established behaviour without long-term government encouragement and education.

Subsidies for fertilizer production are indirect causes of diffuse water pollution. To a large extent, subsidies have disrupted the market, which cannot perform its functions based on market rules, resulting in market failure. In the case of chemical fertilizers, this failure will result in a large demand for and the overuse of these fertilizers, which, in

71 Y. Qiao & X. Ji, 'Economic Analysis of Pig-breeding by Scaled Farms and Backyard Poultry in China', 2012 *Market Perspective* 48, no. 8, pp. 14-19, at p. 14.

72 M. Schneider, 'Feeding China's Pigs: Implications for the Environment, China's Smallholder Farmers and Food Security', 2011, available at: <http://www.iatp.org/documents/feeding-china%E2%80%99s-pigs-implications-for-the-environment-china%E2%80%99s-smallholder-farmers-and-food>.

turn, will result in heavy nitrogen loss and eventually in environmental pollution when the overused fertilizers cannot be completely absorbed by crops. China still has a high input of fertilizers and pesticides because it needs to feed its increasing population, which seems impossible to achieve without using them. However, this overuse has already caused serious side effects: not only has it led to excessive nitrogen in water, but it has also increased food safety risks for the general public.

In the EU, an interactive legal system is applied to address water problems. In contrast to China's legal system in terms of diffuse water pollution prevention and control, in the EU's legal system one of the main features is coordination across sectors (e.g. the water sector and the agricultural sector).

The WFD serves as an umbrella directive for water management and refers to many other specific directives and regulations, e.g. the Nitrates Directive and the Directive on Pesticides. The main achievements of this coordination are the following: greater transparency in policy implementation, better communication and use of joint resources by the administration bodies concerned (within and across Member States and regions), as well as stronger incentives to avoid transboundary conflicts.⁷³ This integrated system has been successful in improving the EU's water protection, even though full compliance has not yet been reached.⁷⁴

The successful application of buffer zones in the Netherlands was described in Section 4.3. However, this does not mean that buffer zones can definitely be adopted in China, since the two countries have very different water management systems. The lesson that China can draw is a new perspective to tackle the old problems, as applied by the EU as well as the Netherlands.

Of course the EU's legal framework also entails some concerns. The WFD's policy objectives, for example, are sometimes perceived as overambitious. At this stage it is difficult to estimate the reality of such concerns – certainly the objectives are ambitious, but the implementation timetable from 2000 has been, and will be, longer than any other EU environmental legislation, so it will take some years before an ex-post evaluation of the level of ambition can be made.⁷⁵

'The moving of a rule or a system of law from one country to another has now been shown to be the most fertile source of legal development since most changes in most systems are the result of borrowing.'⁷⁶ Yet legal borrowing needs a very careful approach. An expert once said 'China has borrowed heavily from a number of international sources and experts in drafting its laws, but the end product is, in almost every case, uniquely Chinese.'⁷⁷ In the current period of social transition, China

73 A. Volkery et al., 'European Commission – General Directorate Environment Support to Fitness Check Water Policy', 2011, p. 14.

74 European Commission, *supra* note 39, p. 9.

75 Volkery et al. *Supra* note 73, p. 8.

76 U. Mattei, 'Efficiency in legal transplants: An essay in comparative law and economics', 1994 *International Review of Law and Economics* 14, no. 1, pp. 3-19.

77 C. McElwee, 'Shaping China's green laws', 2011, available at: <http://www.chinadialogue.net/article/show/single/en/4425-Shaping-China-s-green-laws> (last visited 21 February 2014).

is now facing many newly emerging situations, some of which have occurred in other regions too, e.g. in the EU, and some of which are somehow 'uniquely Chinese', like the pollution from backyard poultry and livestock breeding. Both the native and the more universal problems need to be taken into account in legal reform efforts.

6. Conclusion

Diffuse water pollution from agriculture is a major contributor to water pollution in both China and the EU.

The direct causes of diffuse water pollution in China are animal waste from livestock and poultry farms, and the overuse and misuse of chemical fertilizers and pesticides. Pollution from livestock and poultry manure was underestimated until the National Census revealed that they actually amounted to 45% of total national COD emissions and 96% of COD in agriculture diffuse pollution. Fertilizer overuse has turned out to be a serious problem in China since the 1980s, the average levels of nitrogen fertilizer have exceeded the internationally accepted limit (225kg per hectare) in more than half of the regions. China has only 7% of the world's arable land, but it is the largest consumer of pesticides. The annual usage remains at 1.3 million tons, which is 2.5 times higher than the global average. The misuse of fertilizers and pesticides has caused serious water pollution even if they were not used near water, since rainfall could eventually wash them into waters.

In the past few years, the Chinese Government has paid increasing attention to water management. The 12 FYP is the backbone of the new approach, to guide water resource management in China in the coming years. Compared to the 11 FYP, it has added two new pollutants (ammoniacal nitrogen and nitrogen oxides) to the 'Total Amount Control System' and has added agricultural source pollution and traffic source pollution to its management scope. To achieve the goals of 12 FYP, the Central Government evaluates (once every five years) the performance of local governments based on their implementation of the 'Most Stringent Water Management System'. Under this pressure, local governments have set up their own 12 FYPs and will make efforts to reach the targets. However, in these Plans, the pressure of diffuse pollution from agriculture has not been addressed sufficiently; governments have not shifted their focus from point-source pollution control to diffuse source pollution control. Until now, in most regions of China, the approach to tackling diffuse water pollution is still the extension of 'command-control' approach, which works efficiently in industrial pollution control but is not an adequate approach when dealing with diffuse pollution. Furthermore, the current legal framework does not match the practical situation. For example, for animal waste pollution control, there are no tailored measures to address backyard poultry and livestock production, which still greatly contributes to diffuse pollution.

The review of the legal framework in the EU has shown that the EU has adopted an interactive legal system to address its diffuse water pollution problems. Harmonization of various directives and regulations is the main feature of the EU legal system. Applying incentive instruments to deal with diffuse water pollution is not new in the EU, and

this article has described the buffer zone instrument as used in the Netherlands to show how a Member State tackles nitrates water pollution within the EU's harmonious legal framework.

An efficient and effective legal framework plays an essential role in dealing with diffuse water pollution problems. Collaboration, especially between the water management sector and the agricultural sector, is essential to tackle diffuse water pollution. The EU legal framework provides valuable lessons for China, which has less experience in this regard. China has the option to apply similar solutions to tackle its diffuse water pollution as the Netherlands and some pilot projects have already been started in a number of rural regions.

However, further research is required to build an efficient legal framework or apply incentive instruments in China, as there are many differences between the two legal systems and water management systems, and also the instruments *per se* need more exploration. This article has provided an overview of the EU legal framework and a new perspective of the incentive instrument as a reference, and has hopefully provided valuable information for policy makers and suggested workable solutions for dealing with the continuous diffuse water pollution in China.

Following this comparison, the following can be concluded regarding the existing deficiency of China's legal framework:

- 1) In general, the pressure of diffuse pollution has received insufficient attention, both in the field of water management and in the agricultural field. This certainly affects the selection of legal instruments, and
- 2) the current approach to tackle diffuse water pollution is still the extended performance of point-source control.

This makes it necessary for the Government to invest more in resources: staff, equipment and funds to combat China's diffuse water pollution directly.

- 3) Other elements in the failure to combat diffuse water pollution are the flawed design of livestock and poultry breeding policies, and the numerous subsidies for fertilizers and pesticides, which affect the water environment indirectly.

The lessons that China can learn from the EU are not to simply copy the instruments, but to adopt an integrated approach to deal with the problem. China has made a good start by carrying out a National Census to reveal the problem and producing a 12FYP to express its determination. However, there is still a long way to go. In the future process of legal formulation and perfection, many lessons provided by the EU can be taken as reference or inspiration, e.g. the integration and harmonization of water and agriculture policies, the good agriculture practices, the best technology for pesticides production, and the rural development incentive programmes.

CHAPTER 8

Conclusion

1. Introduction

This study set out to explore the transition in China's water resource management during the past three decades. The reasons and motivations for this are to comprehend the challenges of water governance in China and to provide inspirations and suggestions for Chinese policy makers to further improve the domestic water governance system.

The preceding chapters offered a reflective analysis from different perspectives according to a ten-block-method and a meta-framework – polity, politics and policy, i.e. institutional structure, interaction between state and non-state actors, and the regulatory framework. By analyzing a series of measures which China has adopted in recent years, this study sought to answer the following questions:

How can China improve its transition towards sustainable water resource management, from a governance perspective?

Sub-questions:

- RQ 1. What are the main challenges for sustainable water resource management in China?
- RQ 2. What are the Chinese characteristics of water governance related to water quality governance?
- RQ 3. What are the shortcomings of the cost recovery for water services in China compared to the EU system of cost recovery?
- RQ 4. How does China apply an incentive approach in water resource management?
- RQ 5. How are water quality objectives established and implemented in China compared to in the EU?
- RQ 6. How does China respond to the challenge of diffuse water pollution from agriculture compared to the EU?
- RQ 7. To what extent can China draw inspiration from the EU considering they are governed by two very different legal regimes?

2. Reflections on and a synthesis of the findings

2.1 *The polity dimension*

The polity dimension in this research is limited to China's institutional structure of water resource management and the governance pattern embedded therein.

The first research question is how institutional structures of water management are arranged in China?

This research question is addressed in Chapter 2 from the perspective of institutional arrangements and public participation. The Chapter firstly introduces the institutional structure of water resource management and then analyzes the diversification of responsibilities among different water-related government agencies at both horizontal and vertical levels.

It finds that at the horizontal level the institutional structure is fragmented and nine sectors are involved therein at both the national and local level. Conflicts among different sectors over policy-making and implementation are often prevalent. At the vertical level, the Central Government governs the lower governments through a political personnel system (which is further elaborated in Chapter 3). The River Basin Commissions, which were supposed to be joint organizations to integrate water resource management between the central and local level and among different jurisdictions, suffer from a lack of authority to mediate or compel local governments to implement their suggestions when conflicts arise. The literature suggests that public participation may reduce this problem. However public participation seems to be poor in China. Although the Central Government has developed a series of regulations to promote public participation during the past decade, it is still in its infancy.

The second question is what the Chinese characteristics of water governance are related to water quality governance?

Chapter 3 provides a new perspective on water governance from a vertical point of view. It analyzes a recently developed water quality management policy instrument – 'Captains of the River' – to show how China applies its political cadre evaluation system as an institutional tool to address water quality challenges and to fulfil the tasks assigned by upper governments through the Government Objective Responsibility System (Chapters 3 & 6).

The political cadre evaluation system is considered to be a tight top-down approach, which requires leading cadres to enter into performance contracts and in which they are personally held responsible for achieving assigned targets. It ensures implementation through incentives and disincentives. During the early stages of economic transition, China's government achieved great success by deploying the political cadre evaluation system to boost the GDP. From the moment that water quality was enhanced as a national binding target, the political cadre evaluation system ('Captains of the River') rapidly proved to be an adaptive and effective instrument to fulfil the goal of water quality management. It is indeed a problem-solving instrument and has gained a

considerable level of success in a short period of time. Through applying the Captains of the River instrument, administrative efficiency has been greatly improved in the short term, and the pressure caused by fragmented institutions has been temporarily mitigated. It is important in this transition period while the legal arena is still weak in China.

However, the cadre evaluation approach also has its shortcomings, i.e. unexpected countermeasures, campaign-style enforcement and it is difficult to measure individual efforts. More fundamentally, the nature of the political cadre evaluation system is “ruled by man” and it therefore conflicts with the country’s essential pursuit of developing a country which is subject to the rule of law. Furthermore, as it is a political personnel system within the Party, public involvement therein is not considered to be necessary. This jeopardizes the promotion of public participation by law and may lead to illegitimate implementation such as ignoring public rights (Chapter 2). The development of public participation, therefore, cannot simply rely on legal improvements but also calls for political reform.

2.2 The politics dimension

The politics dimension in this research is interpreted as collective action through which state and non-state actors interact with each other to co-manage water resources. Water pricing reform is seen as one of the central tenets in water resource management of China’s transition period. Therefore, I took a closer look at this aspect and analyzed the instruments to recover the costs of water services (Chapter 4) and eco-compensation for water-related services (Chapter 5). It applies a comparative approach. The EU WFD requires Member States to fully recover the costs of water services, however, to what extent this happens is unclear and the implementation in MS varies considerably. Although there are discussions among academia in China in this regard, an adequate policy response is still lacking. Eco-compensation is a pilot scheme which is being applied in China. The main finding in this respect is that the government plays a dominate role active market actors are lacking, which may lead to a risk of a fund shortage in the future.

The third question explores what are the similarities and differences of the cost recovery for water services in China compared to the EU?

Chapter 4 first clarifies the relations and differences between water use and water services, then distinguishes the differences between water-related ecosystem services (discussed in Chapter 5) and water services in the EU context, which are often confused by non-EU countries.

When it comes to water services, the WFD doesn’t defines “water services” in Article 9, and a recent case of European Commission vs Germany shows different interpretations with regard to its concept. While the Commission sees water services as a wide notion Germany holds a very narrow interpretation. The ECJ however does not provide for an interpretation of the concept of water service in the end and leaves MS with a large

margin of discretion in this respect.¹ Member States have found implementation of the WFD challenging. Incomplete implementation across the EU as a whole brings the risk that a proper assessment of the effectiveness of the WFD may be hampered and it will be difficult for the European Commission to prove that Member States have not yet implemented the Directive properly, and this in turn impedes any process of identifying changes that may need to be made.²

The EU divides the costs of water services, according to a guiding Common Implementation Strategy by the WFD, into environmental costs, resource costs and financial costs. Although there is no such legal division in China, the divisions in academic discussions are not much different from those of the EU, i.e. environmental costs, resource costs and water project costs. All of these costs are reflected by different water-related fees and levies in China. However, because these fees or levies are too low, the full costs of water services are not recovered in a way which would contribute to the sustainability of water resource management.

The EU WFD lays down the polluter pays principle as a compulsory principle to implement the cost recovery of water services in the Member States. However, as polluters are defined differently in the Member States, it is difficult to draw an overall conclusion as to whether or not the principle has been fully applied. In China, the polluter pays principle is embedded in different regulations but is not fully operationalized and appear symbolic. It can hardly be applied and enforced.

From a legal point of view, the main shortcoming of China's cost recovery system is that it lacks operationalization, from definitions and implementation guidelines. In this regard, China may draw lessons from the existing discussions in the domestic academic area and learn from the EU's experience in how to structure and set guidelines and principles. Another shortcoming which contributes to the failure of the cost recovery system in China is its low water price. However, given the magnitude of the water scarcity and the uneven water distribution in China, it is still a big challenge to implement water price reform, which calls for more scientific research.

The fourth research questions deals with how China applies incentive approaches in water resource management?

For almost a decade China has been promoting and implementing the eco-compensation mechanism as an incentive approach to address water-related ecosystem issues. Chapter 5 has selected one of China's most developed and polluted regions – Lake Tai in Jiangsu Province – as a case study to examine the implications of the eco-compensation mechanism at the local level. It finds that four types of eco-compensation are being developed and applied across this region, which are eco-compensation between governments, eco-compensation between governments

-
- 1 C-525/12 European Commission v Federal Republic of Germany ECLI: EU: C: 2014:2202. Lindhout, P.E., 2015, Cost recovery as a policy instrument to achieve sustainable and equitable water use in Europe and the Netherlands, PhD thesis, Utrecht University.
 - 2 UK House of Lords European Union Committee 33rd Report 2010–12, 'An Indispensable Resource: EU Freshwater Policy' para 15 <http://www.publications.parliament.uk/pa/ld201012/ldselect/ldcom/296/29605.htm>..

and farmers, eco-compensation between governments and industry, and eco-compensation among industries.

The eco-compensation scheme in the Lake Tai region is comparable with the Dutch Buffer Zones (Chapter 7). Both of them create incentives to tackle water-related problems. While the Dutch Buffer Zones focus more on water pollution associated with agricultural practices, China's eco-compensation has a broader scope and covers not only agricultural water pollution but also water pollution conflicts between different regions and water rights trading. While the Dutch Buffer Zones are compulsory under the EU Nitrates Directive and are applied nationwide in the Netherlands, the eco-compensation scheme is a pilot instrument, and relies more on local innovation. Both the eco-compensation scheme and the Dutch Buffer Zones provide meaningful platforms for addressing complex issues related to water ecosystem services. However, the challenges which both the Dutch Buffer Zones and the eco-compensation scheme in China are facing is that they lack active market participants and none of the two reflects the real environmental benefits, which are, however, difficult to measure and to evaluate in monetary terms.

By examining the four types of Chinese eco-compensation schemes, Chapter 6 finds that the common feature in each type is that the government plays a dominate role, the main financial source for compensation is government payments. Governments are the main actors in formulating and implementing the scheme, including water rights trading. Although market-based eco-compensation has been examined within this region, it is still at a very early stage. Challenges facing this scheme include a general lack of clear legal support and uncertain policy risks. The consequence of the single source of compensation being government financial transfers is that it might lead to a risk of a fund shortage, which has happened with other similar projects. This shortfall could, in turn, jeopardize the sustainability of the scheme. In order to design a capable legal framework for anchoring effective eco-compensation schemes a careful consideration of a range of issues is required, e.g. collaboration between the central and local levels, and the public willingness to participate. Merely focusing on the scheme itself is certainly not sufficient.

2.3 The policy dimension

The policy dimension encompasses the content of governance. In this research, it is specified as a set of political and legal arrangements which aim to control water pollution, in particular the setting of objectives and curbing pollution from agricultural sources.

The fifth research question deals with this dimension by analyzing how water quality objectives established by regulation and how they are implemented in China and compares this with the EU approach.

Chapter 2 provided an introduction into how China manages its water quality through setting water quality objectives, pollutant cap controls, water quality standards and

water pollution prevention and control strategies. All of them have greatly contributed to China's protection of water quality.

Chapter 7 further elaborates the establishment of China's water quality objective and its implementation. It applies a comparative approach to examine the similarities and differences between China and the EU in this regard. Three findings are observed. The first is that both China and the EU have set water quality objectives with deadlines by means of regulations. Although the ways of expressing these objectives are different, i.e. China presents its objectives by means of a series of regulations and the EU by means of the WFD, the outcome is the same: both regions have set clear water quality objectives within different timetables.

However, differences exist in the process of formulating the objectives, which is the second finding. When designating water quality objectives, China does not take ecological indicators into account, i.e. specific aspects of the biological quality elements, but only chemical indicators. Focusing only on chemical indicators might jeopardize the integrated approach which its Water Law proposed in 2002, as the safety of an individual chemical load cannot ensure the health of the aquatic environment from an overall perspective. Although the total pollution cap control--the carrying capacity management--may reduce this risk, the implementation systems--due to their complexity--do not yet exist. The assessment of ecological indicators, however, is a big challenge in the EU too. Though simple in principle, the process is difficult to implement. It requires meticulous monitoring and data management. The EU has developed a number of technical guidance aspects, but the result is still uncertain in practice. For example, 15% of surface water bodies in the EU had an unknown ecological status during the first round of assessments.³ Besides the ecological indicators, another important difference is that groundwater has not been greatly considered when formulating water quality objectives in China. This is partly because the status of groundwater nationwide is not yet clear, and the underlying reason for this could be due to the fragmented institutional arrangement, i.e. surface water and groundwater are managed by different sectors.

The third finding is that the implemented strategies for achieving the established objectives are vastly different when comparing China and the EU. China applies a Government Objective Responsibility System while the EU bases its compliance system on an interactive legal framework. By applying a Government Objective Responsibility System, China's higher level governments assign water quality objectives to lower levels by entering into performance contracts; enforcement therefore relies more on political power through its government personnel system (Chapter 3). Excessive reliance on politics could weaken the development of the formal law. This Chapter takes agricultural water pollution control as an example to examine this issue. It analyzes the interaction between water and agriculture within the framework of the formal law, and finds that a cohesive legal framework which integrates water and

3 Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans (2012, November 14). Retrieved March 3, 2015, from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0670&from=EN>.

agriculture is, as yet, not well formulated in China, while the judicial system is also weak because implementation is mainly based on political channels.

The sixth research question is about the challenge of diffuse water pollution from agriculture and how China and the EU respond to that challenge.

Curbing agricultural pollution is an important policy goal, because the first National Census revealed that agriculture is the main contributor to environmental pollution in China. Chapter 5 takes the EU as a reference point to investigate how China responds to this “new” challenge. A comparative approach is applied therein.

The main pollution sources of China’s agricultural water pollution are animal waste from livestock and poultry farms, and the overuse and misuse of chemical fertilizers and pesticides. This Chapter respectively examines the policies and regulations applied to these individual pollution sources. It finds that the Chinese Government has paid increasing attention to improving water-related agricultural regulations during the past few years, which has certainly contributed to the protection of water quality. However, these regulations are plagued by certain deficiencies. For instance, the available poultry-related regulations cannot provide sufficient guidance for controlling backyard poultry pollution. Moreover, chemical fertilizers and pesticides tend to be heavily subsidized, and the approach to agricultural water pollution control is not much different from the approach to industrial pollution control. Furthermore, this fragmented institutional arrangement leads to difficulties in the implementation of existing regulations.

This Chapter finds that China pays more attention to the achievement of overall water quality targets and less to controlling specific water pollution sources at a national level. From a legal-technical point of view, the regulations are often too abstract to be implemented in practice. Local governments may be expected to further develop the central guidance into their own local tailor-made regulations. However, under pressure from the Government Objective Responsibility System and the political cadre evaluation system (Chapters 3 & 6), local governments tend to lack patience, especially when environmental effects normally appear after a certain time lag, e.g. pollution associated with agricultural practices normally appears much later than when the practices are actually being carried out. This may therefore lead to the result that high-polluting sources with staggered consequences (i.e. agricultural pollution) are deliberately ignored and the construction of formal law with slow but positive consequences is undermined.

As well as in China, agriculture has been identified as a major pollution source for EU waters. The EU WFD, which provides water quality objectives (Chapter 6), aims to create an integrated and coherent water policy within the EU. The Nitrates Directive, which is clearly directed towards nitrogen pollution, contributes significantly to the implementation of the WFD. The Common Agricultural Policy also potentially contributes to the implementation of the WFD. Its cross-compliance instrument establishes links between the implementation of existing EU legislation which also greatly benefits the achievement of the WFD’s objectives. The introduction of the EU legal framework shows that the harmonization of various water and agricultural

directives is its main feature. Collaboration between the water and agricultural sectors is a fundamental factor in sustainably managing water resources in the EU.

The Seventh research question is to what extent China can draw inspiration from the EU considering that they are governed by two very different legal regimes?

China and the EU are facing similar water challenges which make them in a way comparable. Comparative research may provide inspiration since the transplantation of a system of law from one country to another has been shown to be the most fertile source of legal development. However, borrowing legal concepts needs a very careful approach, because there is no “one-fit-all” approach to water resource management. When it comes to water governance, China is applying a very different approach from that of the EU. While constructing its legal system of water resource management; China may learn from the EU with regard to

- Crystallizing water-related legal provisions and implementation guidelines. China’s legislative principles are “general rather than detailed” and depend more on political policies due to the fact that society is rapidly changing while policies are comparatively more efficient and flexible (Chapter 2). Dealing with a dispute therefore often relies on *ad hoc* administrative decisions and less on legal channels. This leads to the law being, to some extent, symbolic. “There must be laws for people to follow”, as the Party declared (Chapter 3). When China devotes itself to developing a formal legal framework, the EU may indeed prove to be an inspiration in this regard. What China urgently needs and can learn from the EU is to develop more pragmatic provisions, The WFD’s Programme of Measures, which clearly provides what basic and supplementary measures are, may serve as a good example.
- Integrating the existing water-related legal framework. By examining the interaction between water regulations and agricultural regulations, this research finds that the biggest difference between China’s legal system and that of the EU is that the former is fragmented while the latter is famous for its integration and harmonization. The Chinese government has paid more attention to agricultural pollution control since its National Census revealed that agriculture is the biggest contributor to environmental pollution, and many laws have therefore been revised as a result of this (Chapter 7). However, the existing regulations, as stated above, are less interactive and insufficient to prevent and control agricultural water pollution. The EU has rich experiences in this respect after a few decades of practice, China may draw lessons from, for example, how to designate an effective integrated framework from a holistic view, and how to apply best practices in agriculture which could contribute to water quality protection, etc.
- Applying a more comprehensive approach to integrate ecological indicators and groundwater into the establishment of water quality objectives. The Chinese Central Government has proposed reforms in this respect and there are relevant guidelines available in the EU, for example, the guidelines with regard to the assessment of ecological indicators and the integration of surface water and groundwater. However, it should be noted that although China may draw some valuable lessons from the EU, real reform in China requires domestic change. For

example, the lack of groundwater involvement in the formulation of water quality objectives is greatly exasperated by the fragmented institutional arrangements, which cannot be replaced by any advanced technical innovation of legal framework.

3. Recommendations and avenues for future research

The institutional arrangements for water resource management are considered to be excessively fragmented in this study and they have become a major obstacle for the reform of future water resource management. In order to achieve sustainable water resource management, as well as the integrated management of river basins and administrative regions as promoted by its Water Law, China needs institutional reforms. Coordinated action amongst different water-related sectors is urgently required. It is therefore highly recommended to construct a high-level co-ordination commission which can be consulted for the purpose of decision-making by the central government. Such a commission could harmonize the sectorial policies and help to reduce overlaps and anomalies among different sectors. The Climate Change Commission, for example, which was established above the ministries, has been working efficiently up until now. It delivers inspiring domestic lessons for water resource management. The Integrated River Basin Management of the EU WFD may certainly provide another good example in this regard. However, in order to put all this into practice, China first needs to reform its River Basin Commissions by providing them with more independent and comprehensive tasks and functions which are currently considered to be beyond their limits.

China may learn from the EU when it comes to improving its individual laws and integrating water-related regulations. With regard to current practice, China may consider a fitness check for its existing legal framework in order to discover gaps and overlaps. And in the meantime it should shift its focus from only controlling industrial source pollution to jointly tackling both industrial and agricultural pollution considering that agricultural pollution is currently a more serious issue.

The bottom-up channel demonstrated by the Lake Tai case shows that incentive approaches contribute, to a large extent, to local water resource management. However, as stated above, incentive approaches face the challenge of financial shortages while private actors are not sufficiently active. The central government has been devoting itself to promoting the domestic ecosystem services markets for the last ten years or so, but in order to develop effective market-based approaches not only encouragement and promotion are needed, but a robust and stable regulatory regime for securing the rights of private actors is equally necessary. Considering that the approaches are highly complex and traverse across a complex matrix of legal and economic regimes, multidisciplinary research for enhancing market actor involvement is highly recommended.

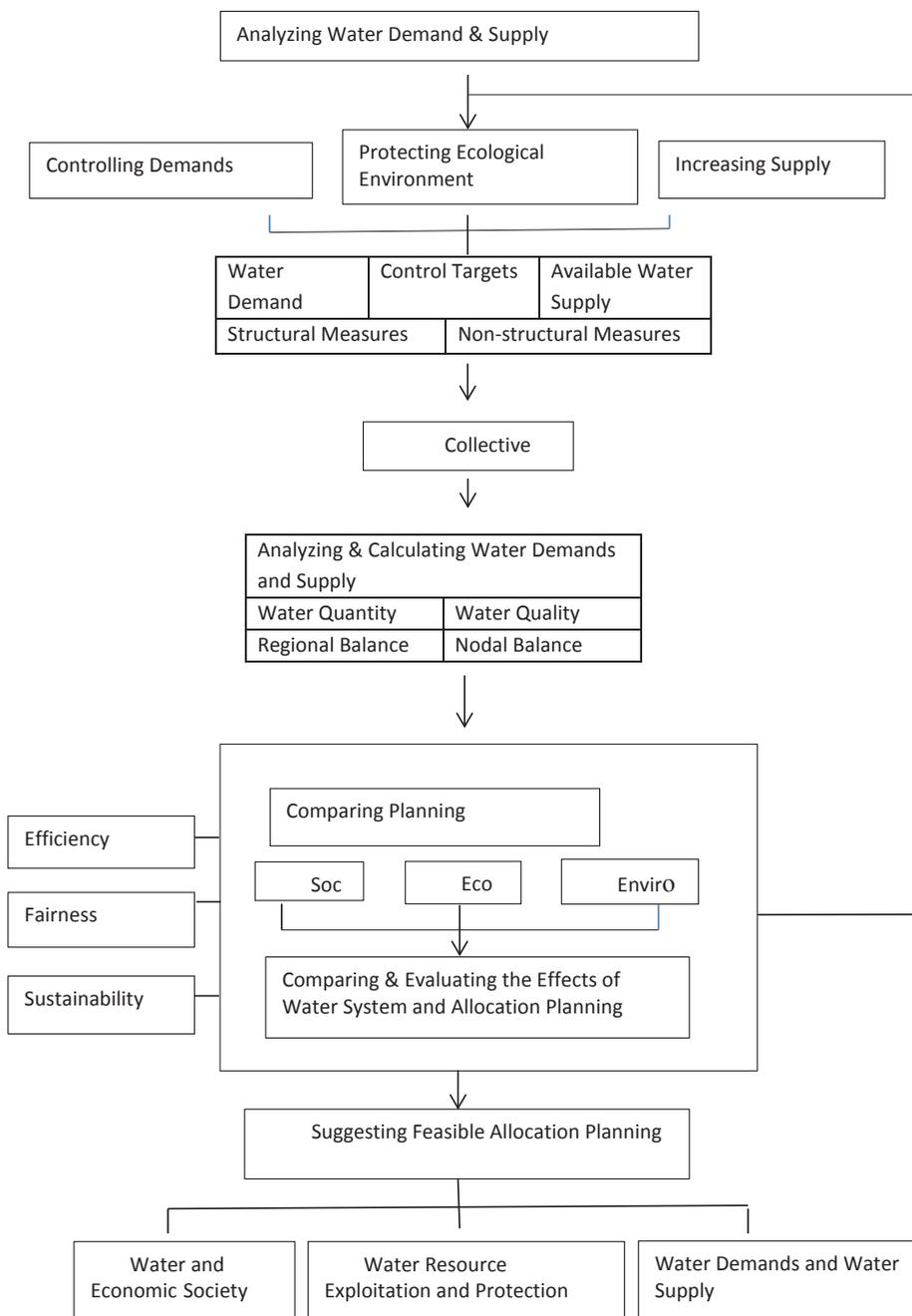
The construction and reform of a legal regime cannot be separated from political reform in China, especially considering that water resource management relies heavily on political power. As the example of public participation shows, from a legal perspective the Central Government has expanded the entire scheme, from

access to information, to participation in decision-making, and to access to justice. However, while public participation is excluded from the political personnel system, its implementation in practice will be seriously affected. The political personnel system is the only fundamental domain of water governance at present. Therefore, a real reform of public participation, as well as water resource management, calls for a mentality change within the Party, which needs to take the rule of law as its central theme, as was stated in the 4th plenary session of the Party's Congress.

Compared to the EU, China's judicial system is less effective, especially when it comes to environmental infringements. Because, historically, environmental protection was not the priority of local governments, as Chapter 3 has stated, local governments often interfere with judicial decisions in order to protect local industries or litigants as they have to achieve the assigned GDP targets, on the one hand, and, on the other, they control the salaries of the local judiciary. A reform of the judicial system has been suggested by scholars in various studies. A promising signal was that earlier this year China's Supreme People's Court announced that it would establish a special tribunal for dealing with major cases related to pollution problems, and it promoted such green tribunals nationwide. However, the challenges facing this task are huge, while the reform of financial independence from the government, the plaintiff's standing, the scope of this tribunal's jurisdiction, and the professional knowledge and competence of judges are all fundamental elements for the tribunal to operate successfully. It would be interesting to further study this field in the future. As the old Chinese saying states: "the law cannot on its own". Drafting a law, issuing a policy or establishing an organization does not guarantee that the law will be effective in practice; law must be applied and enforced.

APPENDIX 1

Guidelines for water resource allocation



Source: translated by the author from the Details of the NWRSP.

APPENDIX 2

The main water-related functions of the Ministries under the State Council

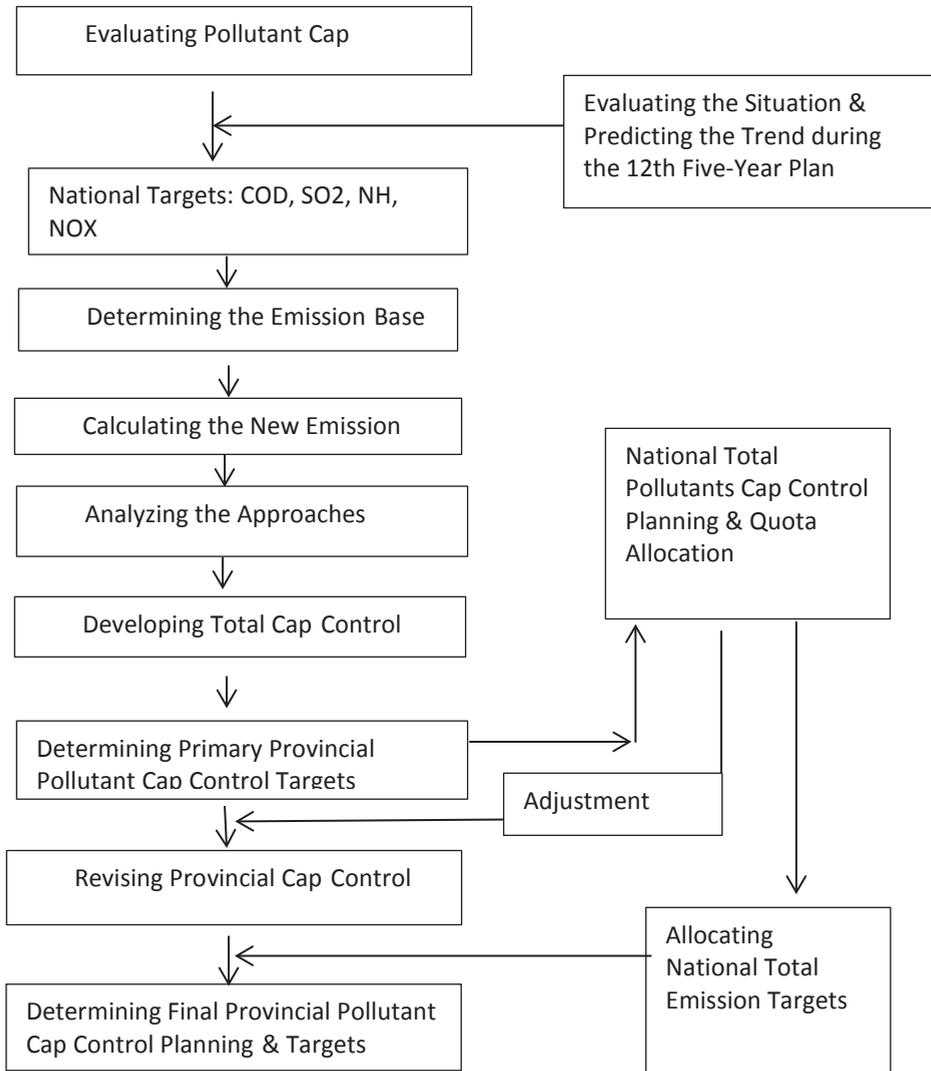
Authorities	Main water-related functions
MWR	<ul style="list-style-type: none"> • Formulating water resource management guidelines, development strategies, and medium and long-term plans. • Managing aerial water, surface water and groundwater; formulating a long-term water supply and demand plan, and a water quantity allocation plan; implementing the water discharge permits system and water abstraction fees. • Formulating water-saving guidelines and a water-saving plan. • Monitoring the water quality and quantity of rivers and lakes, assessing water assimilation capacity and proposing pollutant loading targets for pollutant cap controls. • Mediating and arbitrating inter-sector or inter-provincial water disputes. • Formulating and supervising large and medium-scale water-related infrastructure and engineering projects. • Managing water conservation facilities; directing water conservation and the development of major rivers and lakes. • Guiding water resource management in rural areas. • Organizing and supervising national water and soil protection.*
MEP	<ul style="list-style-type: none"> • Formulating basic environmental protection regulations; establishing environmental function zones, environmental protection standards, criteria and technical guidelines; formulating and supervising environmental protection plans in key watersheds. • Arbitrating and resolving environmental pollution disputes between different administrative regions; coordinating pollution prevention in national key watersheds. • Implementing national emission reduction objectives. Formulating and supervising pollutant cap controls and the discharge permit system; providing a list of pollutants for the pollutant cap control system; implementing the environmental objectives accountability system. • Reviewing EIA reports on water engineering projects. • Monitoring water quality and pollution status.
MA	<ul style="list-style-type: none"> • Conserving fishing waters, fish, wildlife, plants, and the aquatic environment and habitats. • Controlling non-point source pollution.
MLR	<ul style="list-style-type: none"> • Exploring and assessing hydro-geological conditions. • Monitoring and preventing the over-exploitation of groundwater.
MT	<ul style="list-style-type: none"> • Formulating standards for water transportation. • Treating water pollution from ships and ship-related water-based facilities.
MHURD	<ul style="list-style-type: none"> • Overseeing urban water supplies and water-saving management. • Directing the construction of waste-water treatment facilities and pipe networks.
SFB	<ul style="list-style-type: none"> • Exploring, monitoring and assessing the status of watersheds. • Overseeing afforestation and preventing soil erosion. • Directing and monitoring the management of national wetlands.
MH	<ul style="list-style-type: none"> • Formulating drinking water standards.
NDRC	<ul style="list-style-type: none"> • Participating in the development of water resources and ecological construction plans. • Balancing and harmonizing water-related policies among different sectors.

*http://webcache.googleusercontent.com/search?q=cache:http://www.gov.cn/zhengce/content/2010-11/18/content_7758.htm.

Notes: MWR, Ministry of Water Resources; MEP, Ministry of Environmental Protection; MA, Ministry of Agriculture; MLR, Ministry of Land and Resources; MT, Ministry of Transport; MHURD, Ministry of Housing and Urban-Rural Development; SFB, State Forestry Bureau; MH, Ministry of Health; NDRC, National Development and Reform Commission.

APPENDIX 3

Procedure for setting major pollutant cap control targets



Source: translated by the author from the Guidelines for Developing the 12th Five-Year Plan for Major Pollutant Cap Controls.

APPENDIX 4

Development of eco-compensation mechanism in China

Political Speeches			
Year	Date	Congresses	Recommendations
2005	8th December	The 5th Session of the Sixteenth Central Committee of the CPC	Recommends that eco-compensation mechanisms should be established soon, based on the principle of developer protects, and beneficiary compensates
2006	5th March	Central Government 2006 Work Report	Comprehensively mobilizes all means available, and in particular economic instruments, such as pricing and taxation, to promote the rational and sparing use of natural resources and to develop an eco-compensation mechanism as soon as possible
2007	5th March	Central Government 2007 Work Report	Calls for a reform of important natural resources prices and pollutant charges and an acceleration in the development of the eco-compensation mechanism
	15th December	The 17th National Congress of the CPC	Establishes and improves the resource use paid system and eco-compensation mechanisms
2008	5th March	Central Government 2008 Work Report	Reforms the natural resources tax and fees system, and improves the system of paid natural resource use and of eco-compensation mechanisms
2009	5th March	Central Government 2009 Work Report	Accelerates the establishment of sound eco-compensation mechanisms, and reforms and improves the natural resource tax system
2010	5th March	Central Government 2010 Work Report	Accelerates important watersheds management
2011	5th March	Central Government 2011 Work Report	Improves water conservation facilities; makes progress in better controlling important tributaries of large rivers as well as lakes and small and medium-sized rivers
2012	5th March	Central Government 2012 Work Report	Establishes a sound system of compensation for ecological damage, strengthens ecological protection and restoration and strictly protects river sources, wetlands, lakes, and other priority functional ecological zones

APPENDIX 4

Policies			
Year	Date	Documents	
2005	3rd December	State Council Decision Regarding Implementing the Scientific Development View to Strengthen Environmental Protection. National Issue [2005] No. 39	Calls for the improvement of eco-compensation policies and the establishment of an eco-compensation mechanism; recommends the consideration of eco-compensation factors in central and provincial fiscal transfer payment systems
2006	14th March	Outline of the 11th Five-Year Plan	Calls for policy makers to innovate in environmental policy, establishment of eco-compensation mechanisms (especially intraregional and watershed-related eco-compensation mechanisms) based on the principle of “who develops protects, who benefits subsidizes”
	19th March	State Council 2006 Work Outline. National Issue [2006] No. 12	Develops eco-compensation mechanisms, and gradually resolves and improves the evolving mechanisms for pricing natural resources and primary commodities
2007	24th August	Guiding Opinions on the Development of Eco-compensation Pilot Work. MEP Issue [2007] No. 130	Basic principles of eco-compensation: those who develop and exploit resources should also protect the environment; those who benefit from it should subsidize it; and who pollutes should pay; recommends carrying out eco-compensation pilot projects preferentially within four areas: natural protection areas, key ecological areas, mining resource areas and watersheds.
	22nd November	The National 11th Five-Year Plan for Environmental Protection (2006-2010). National Issue [2007] No.37	Proposes a target responsibility system for watershed pollution control and a water quality examination system for trans-province boundary waters, and speeds up the establishment of eco-compensation mechanisms
2008	29th March	State Council 2008 Work Outline. National Issue [2008] No.15	Improves the paid natural resource use system and eco-compensation mechanism
	22nd July	Views Regarding Work on Deepening Economic Structural Reforms for 2008. General Office of the State Council Issue [2008] No. 103	Reforms the system for distributing the benefits of natural resources; establishes a system for natural resource compensation for underdeveloped areas; and promotes the establishment of pilot projects for inter-provincial watershed eco-compensation

APPENDIX 4

2011	16th March	Outline of the 12th Five-Year Plan	Improves the system of equalization transfer for key ecological function areas; sets up a special fund for national eco-compensation; promotes a reverse system for the sustainable development of resource-oriented enterprises; encourages, guides and explores an eco-compensation mechanism whereby downstream areas compensate upstream areas, development areas compensate protection areas and ecological beneficiary areas compensate ecological protection areas; explores a market-based eco-compensation mechanism; and speeds up the formulation and implementation of an Eco-compensation Regulation
2011 2012	15th December	The National 12th Five-Year Plan for Environmental Protection (2011-2015). National Issue [2011] No.42	Accelerates the research on, the formulation and implementation of the Eco-compensation Regulation; establishes an eco-compensation mechanism for watersheds and important ecological function zones
	12th January	Opinions of the State Council on Applying the Strictest Water Resources Control System. National Issue [2012] No.3	Conserves and restores the ecological system; conducts health assessment for national key rivers and lakes; establishes and improves eco-compensation mechanisms for water ecology
Laws & Regulations			
Year	Authorities	Name	
Adopted in 1984, revised in 2008	Standing Committee of the National People's Congress	Water Pollution Prevention and Control Law	Article 7: the state sets up an eco-compensation mechanism, with a public financial transfer, to protect the drinking water source areas and headwaters of rivers, lakes, and reservoirs.
Adopted in 1991, revised in 2010	Standing Committee of the National People's Congress	Water and Soil Conservation Law	Article 31: the state strengthens the prevention and treatment of soil erosion in river source areas, drinking water source protection zones and headwaters; raises funds through different channels; eco-benefits compensation for water and soil conservation into state eco-compensation mechanism
Drafting		Eco-compensation Regulation	

APPENDIX 5

“Three-North” Shelterbelt Project

The “Three-North” Shelterbelt Project is the biggest eco-compensation/PES project in the world, with a total plan area of 6,103 billion mu (406.9 million ha.), some 42% of China’s total land area (Bennett, 2009). The project runs from 1978 to 2050 and aims to control desertification in northern China. The funds for compensating farmers who return farmland to forest rely mainly on state financial transfers. During the past 30 years the “Three-North” project has demonstrated certain ecosystem benefits, like farmland protection, soil and water conservation, wind reduction and sand dune fixation. However, the project is now in a difficult stage as the compensation fund is not sufficient. Since the implementation of the project in 1978, the state has not increased the compensation rate while overall living expenses are continually increasing. The cost of afforestation is ¥250-310 (US \$30-38)/mu (0.07 ha), but the subsidy from the state is only 2%-4% of the actual cost. For example, in the Inner-Mongolia Autonomous Region, during the past few decades the Region has invested at least ¥2,250/ha (US \$363/ha.) to control the soil desertification of around 2,298 ha.; by comparison, the state has only invested less than ¥150/ha (US \$24/ha.), 15 times less than the actual cost. In this case, it is very difficult or unfeasible to ask for more local government investment as those provinces/autonomous regions are comparatively underdeveloped.

In the field of eco-compensation for watersheds, the same problem exists, as many water function zones and water sources are located in the west of China. Many of them are relatively underdeveloped, therefore relying on large-scale local government investments is almost impractical. It is essential to promote further research on other types of eco-compensation, for example market-based compensation, as governmental compensation alone is never enough in the long run.

APPENDIX 6

Policy overview of water resources management in China

Name	Date & Institution	Highlights
Notice of the State Council on Issuing the '12 FYP' for National Environmental Protection	No. 42 [2011], the State Council	<p>Setting reduction targets for main pollutants by 2015:</p> <ul style="list-style-type: none"> • Implementing a target responsibility system for environmental protection. • Strengthening the construction of legal systems. • Improving environmental economic policies.
General Planning for the Development of Environmental Protection Legislation and Environmental Economic Policies in China for the 12 FYP Period	No. 129 [2011], MEP	<p>Key fields and major tasks (2011-2015):</p> <ul style="list-style-type: none"> • Improving the system of laws on environmental protection. • Promoting the legalization of environmental economic policies. • Establishing the system of the paid use and trading of emission rights. • Establishing ecological compensation mechanisms. • Improving policies for public finance support for environmental protection.
2011 No. 1 Document (Decision of the CPC Central Committee* and the State Council on Accelerating Water Resources Reform and Development)	No. 1 [2011] of the CPC Central Committee	Applying the most stringent water management system.
Opinions of the State Council on Applying the Strictest Water Resources Control System	No. 3 [2012] of the State Council	<p>Three red lines: A red line of water resource development and use; a red line of water use efficiency; and a red line of the total amount of pollutant emissions into rivers and lakes.</p> <p>Four indicators: Total quantity control of water consumption, efficiency control of water use, pollutant-receiving capacity control of water quality in water function zones, and a performance assessment system for water resources management.</p>
National Plan on Groundwater Pollution Control	No. 128 [2011] of the Ministry of Environmental Protection	A total of 34.66 billion RMB (US \$ 5.48 billion) will be invested in six categories of projects between 2011 and 2020: survey, prevention, remediation of groundwater pollution, control of pollution in underground drinking-water sources, agriculture-related groundwater pollution control, and underground water environment monitoring.

Name	Date & Institution	Highlights
Water Pollution Prevention Plan in Key Basins, 2011-2015	May 2012, Ministry of Environmental Protection, National Development and Reform Commission, Ministry of Finance and Ministry of Water Resources	<p>Six major tasks:</p> <ul style="list-style-type: none"> • to strengthen the protection of drinking water, • to improve industrial pollution controls, • to enhance urban sewage treatment systems, • to actively promote comprehensive environmental and ecological construction, • to enforce coastal water pollution prevention and control, and • to enhance the watershed level of risk prevention.
Water Development Plan, 2011-2015	No. 618 [2012], National Development and Reform Commission, Ministry of Water Resources, and Ministry of Housing and Urban-Rural Construction	<p>Main targets:</p> <p>Flood control, the saving and protection of water sources, water and soil conservation, ecological rehabilitation, developing a basic system of water projects and water rights.</p>
Assessment Methods for the Most Stringent Water Management System	No. 2 [2013] of the General Office of the State Council	Sets out water usage criteria, efficiency ratios for industry and agriculture and water quality measurements for each province which filter into the national water caps and targets.
Guidance on the Development of Environmental Protection Services	No. 8 [2013] of the Ministry of Environmental Protection	Formation of 50 environmental protection service companies with revenues in excess of RMB1billion (US \$0.16 billion).
12FYP** on the Prevention and Control of the Environmental Risks of Chemicals	No. 20 [2013] of the Ministry of Environmental Protection	This plan aims to control the use and discharge of 58 harmful chemicals according to categories and their levels of potential harm to the environment.
Circular on Issues Concerning Collection Standards for the Water Resource Fee	No. 29 [2013], National Development and Reform Commission, Ministry of Finance and Ministry of Water Resources	Formulating principles, standards and goals of the water resources tariff formulation system.

APPENDIX 7

Policy overview of livestock and poultry breeding

Name	Date & Institution	Highlights
12 FYP on Prevention and Control of Livestock and Poultry Breeding	Nov. 2012, MEP & MA	Aims of 2011-2015: <ul style="list-style-type: none"> • Establishing 'forbidden zones'. • Decreasing the discharge of COD, ammonia and nitrogen by 8% and 10% respectively compared to the year 2010. • Increasing waste treatment facilities for large-scale breeding farms to more than 50% and reducing 1.4 million tons of COD and 100,000 tons of ammonia and nitrogen every year.
12 FYP on National Rural Economic Development	June 2012, NDRC	Promoting biomass projects in rural areas
12 FYP on Animal Husbandry Development	No. 8 [2011], MA	<ul style="list-style-type: none"> • Promoting the ecological management mode (combining planting and breeding) according to local conditions. • Ensuring the recycling of wastes.
Discharge Standards of Pollutants for Livestock and Poultry Breeding	Dec. 2001, EPA & GAQ	<ul style="list-style-type: none"> • Applying to large-scale intensive livestock breeding. • Providing environmental standards for waste water, odour discharge and residue disposal. • Setting out a maximum daily discharge concentration on average for water pollutants and odour, and the total allowed water discharge.
Technical Standards for Preventing Pollution in Livestock and Poultry Breeding	Dec. 2001, EPA	Stimulating basic technical requirements for the siting and layout of livestock and poultry farms, the process of clearing and stockpiling dung, sewage treatment, the treatment and use of solid manure, feedstuff and breeding management, the treatment and disposal of dead livestock and poultry caused by diseases, and pollutant monitoring.
Exposure Draft on the Prevention and Pollution Control of Livestock and Poultry Breeding	July 2012, LAO of the State Council	Incentive measures: <ul style="list-style-type: none"> • Financial support for pollution treatment facilities. • Reward for voluntary emission reductions.

Notes: EPA, Environmental Protection Agency which was upgraded to the Ministry of Environmental Protection (MEP) in 2008; MA, Ministry of Agriculture; NDRC, National Development and Reform Commission; GAQ, General Administration of Quality Supervision, Inspection and Quarantine; LAO, Legislative Affairs Office.

APPENDIX 8

Legal and policy overview of the use of fertilizers and pesticides

Legislation & Regulations	Year	Production Management	Competent Authorities	Usage	Competent Authorities	Diffuse Water Pollution Control	Competent Authorities	Economic Instruments
Cleaner Production Promotion Law	2002, 2012	Adopting toxin-free, non-hazardous or low-toxin and low-harm raw materials to replace toxic and hazardous raw materials	Ministry of Industry and Information Technology	Agricultural producers should use chemical fertilizers, pesticides, agricultural films and feed additives wisely based on scientific recommendations				
Agricultural Law	1993, 2009, 2012			Farmers and agricultural producers should maintain cultivated land, use fertilizers, pesticides, and agricultural films rationally.	Administrative departments of agriculture in People's Governments above county level monitor cultivated land quality regularly.	Preventing and controlling waste water, gas and solid waste pollution and agro-ecological pollution.	Governments above county level	Farmers who convert cultivated land back to nature are eligible for subsidies from governments. The State encourages farmers and raises agricultural funds in various forms on a voluntary basis.
The Prevention and Control Law for Water Pollution	1984, 1996, 2008	National standards for water environment quality; National standards for the discharge of water pollutants.	Ministry of Environmental Protection	Providing guidance to agricultural producers as to how to apply fertilizers and pesticides wisely.	Administrative departments of agriculture in People's Governments above county level.	A whole section (Section 4) to address the prevention and control of agricultural and rural water pollution.		The State will adopt eco-compensation mechanisms for water environments located in certain areas.

Legislation & Regulations	Year	Production Management	Competent Authorities	Usage	Competent Authorities	Diffuse Water Pollution Control	Competent Authorities	Economic Instruments
Cleaner Production Promotion Law	2002, 2012	Adopting toxin-free, non-hazardous or low-toxin and low-harm raw materials to replace toxic and hazardous raw materials	Ministry of Industry and Information Technology	Agricultural producers should use chemical fertilizers, pesticides, agricultural films and feed additives wisely based on scientific recommendations				
Agricultural Law	1993, 2009, 2012			Farmers and agricultural producers should maintain cultivated land, use fertilizers, pesticides, and agricultural films rationally.	Administrative departments of agriculture in People's Governments above county level monitor cultivated land quality regularly.	Preventing and controlling waste water, gas and solid waste pollution and agro-ecological pollution.	Governments above county level	Farmers who convert cultivated land back to nature are eligible for subsidies from governments. The State encourages farmers and raises agricultural funds in various forms on a voluntary basis.
The Prevention and Control Law for Water Pollution	1984, 1996, 2008	National standards for water environment quality; National standards for the discharge of water pollutants.	Ministry of Environmental Protection	Providing guidance to agricultural producers as to how to apply fertilizers and pesticides wisely.	Administrative departments of agriculture in People's Governments above county level.	A whole section (Section 4) to address the prevention and control of agricultural and rural water pollution.		The State will adopt eco-compensation mechanisms for water environments located in certain areas.

APPENDIX 9

Basic and supplementary measures of the WFD

WFD Directive 2000/60/EC			Protecting and enhancing the status of all EU waters	RBMP PoM
PoM	Basic Measures	Nitrates Directive Directive 91/676/EEC	Reducing water pollution caused by nitrates from agricultural sources.	Codes of good agricultural practice.
		Regulation on the placing of plant protection products on the market Regulation (EC) No. 1107/2009	Ensuring a high level of protection for both human and animal health and the environment.	Precautionary principle.
		Directive on the sustainable use of pesticides Directive 2009/128/EC	Achieving a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment.	Integrated pest management; specific measures.
		CAP	Providing market stabilization, a fair standard of living for farmers and increased productivity in agriculture ensured by common market organizations.	Rural development.
	Supplementary measures	CAP	Providing market stabilization, a fair standard of living for farmers and increased productivity in agriculture ensured by common market organizations.	Cross- compliance.

SAMENVATTING

China's waterbeheer in transitie

1. Achtergrond

China bevindt zich sinds 1978 in een overgangsfase van een centrale planeconomie naar een markteconomie. De snelle industrialisatie en verstedelijking hebben grote druk gelegd op het milieu. Sinds het begin van de jaren negentig is regionale concurrentie de drijvende motor achter de economische veranderingen in China. Lokale overheden hebben blind geïnvesteerd om de lokale economische productie op te voeren, waarbij er erg weinig aandacht was voor de hiermee gepaard gaande milieukosten.¹ De bevolkingsgroei in de steden heeft tot verschillende problemen geleid en bijvoorbeeld grote invloed gehad op de waterkwaliteit, omdat afvalwaterbehandelingssystemen ontoereikend waren voor de grootte en toename van de bevolking.² De groeiende verstedelijking en bevolkingstoename leidden ook tot grote uitdagingen voor de landbouw. Om de productiviteit te verhogen en voldoende voedsel te kunnen produceren worden enorme hoeveelheden kunstmest en pesticiden gebruikt. De landbouw veroorzaakt daarmee ernstige watervervuiling en speelt daarin nu zelfs een grotere rol dan de industrie.

Samen met de economische transitie vindt er in China ook een andere verandering plaats: van traditionele watervervuiling met conventionele verontreinigende stoffen naar een samengestelde vorm van vervuiling met oude en nieuwe verontreinigende stoffen die op elkaar reageren, en van een situatie waarin de industrie de grootste vervuiler is naar het naast elkaar bestaan van vervuiling door de industrie en door de landbouw.³ Het traditionele waterbeheer heeft vooralsnog geen antwoord op deze nieuwe problemen. Het waterbeheer wordt daarom op dit moment hervormd, om het aan te passen aan de nieuwe situatie. De Centrale Overheid heeft een groot aantal stappen genomen met betrekking tot milieubescherming, ook op het gebied van beheersing van waterverontreiniging. Veel watergerelateerde wet- en regelgeving is bijvoorbeeld sinds 2002 aangepast, milieubescherming heeft sinds 2006 als nationale prioriteit meer gewicht gekregen, data-verzameling met betrekking tot oorzaken van waterverontreiniging is sinds 2007 gesystematiseerd, sinds 2011 bestaat er een

-
- 1 Wong, J. (2014, October 25). Dethroning China's 'GDP supremacy' good for region: <http://www.straitstimes.com/news/opinion/invitation/story/dethroning-chinas-gdp-supremacy-good-region-20141025>; geraadpleegd 3 maart 2015.
 - 2 Ito, C. (2005, May 13). Urbanization and water pollution in China: https://crawford.anu.edu.au/degrees/pogo/discussion_papers/PDP05-13.pdf, geraadpleegd 5 maart 2015.
 - 3 Wang, Y. (2009). *China's water issues: transition, governance and innovation* (pp. 117-134). Earthscan Publications, London, UK: http://admin.cita-aragon.es/pub/documentos/documentos_WangYi_286d0ba6.pdf.

waterbeheerplan, en in 2014 heeft de Communistische Partij een nieuwe blauwdruk gepresenteerd voor de rechtsstaat.

2. Onderzoeksvragen en doelstellingen

De belangrijkste onderzoeksvraag in dit onderzoek is: "Hoe kan China de overgang naar duurzaam waterbeheer verbeteren, vanuit het perspectief van overheidsbestuur?"

Dit onderzoek heeft tot doel om voor beleidsmakers en academici duidelijke achtergrondinformatie te verschaffen die bijdraagt aan een goed begrip van de regulerende instrumenten voor waterbeheer in China, en bij te dragen aan verbetering van het Chinese beleid en het juridische kader voor het waterbeheer.

3. Onderzoeksmethodologie

In dit boek worden kwesties rondom waterbestuur in China beschreven met een diagnostische methode om het huidige waterbeheer te begrijpen en te verklaren en vanuit een metakader op het gebied van bestuur. De multidisciplinaire diagnostische methode bestaat uit tien elementen (bouwstenen) waaraan goed waterbeheer zou dienen te voldoen, waarbij aandacht wordt geschonken aan inhoudelijke aspecten, de organisatie en de implementatie van het waterbeleid. De betrokken disciplines betreffen watersysteemanalyse, economie, recht en openbaar bestuur. Het metabestuurskader gaat uit van drie aspecten: *polity*, *politics* en *policy* (bestuursvorm, politiek en beleid), die de institutionele structuur, het politieke proces en de inhoud van het beleid omvatten. In dit onderzoek is gekozen voor de EU als inspiratiebron voor China, omdat China en de EU niet alleen met vergelijkbare uitdagingen te maken hebben en vergelijkbare doelstellingen hebben wat betreft duurzaam en efficiënt waterbeheer, maar ook een vergelijkbare transitie doormaken wat betreft waterbeheer. De onderzoeksmethoden zijn analyse van literatuur, beleidsdocumenten, wet- en regelgeving en jurisprudentie, casestudy-onderzoek en rechtsvergelijkend onderzoek.

4. Overzicht van het onderzoek

Hoofdstuk 2 biedt een overzicht van de status quo binnen het waterbeheer en de daaruit voortvloeiende opgaven waar China voor staat op het gebied van waterbeheer. Deze analyse is uitgevoerd met de diagnostische methode met de tien bouwstenen voor goed waterbeheer. In dit hoofdstuk wordt duidelijk wat in China de belangrijkste lacunes en opgaven zijn in de transitie naar duurzaam waterbeheer.

Hoofdstuk 3 draait om een nieuw ontwikkeld instrument, genaamd *Captain of the River*, als voorbeeld in de analyse van de transitie van China's waterbestuur vanuit politiek opzicht. Het bekijkt het verband tussen economische ontwikkeling en milieuvervuiling en analyseert hoe het *Government Objective Responsibility System* bijdraagt aan waterkwaliteitsbeheer in China's overgangsfase.

In Hoofdstuk 4 wordt een vergelijkende benadering gevolgd voor een nauwkeurige analyse van de terugwinning van kosten van waterdiensten, zowel in China als in de

EU. Hier wordt eerst de term ‘waterdienst’ geïntroduceerd binnen de Chinese context en daarna wordt in drie delen ingegaan op het begrip ‘terugwinning van de kosten’: waterdiensten, terugwinning van kosten en de rol van het principe ‘de vervuiler betaalt’.

Hoofdstuk 5 neemt een van China’s meest ontwikkelde en vervuilde regio’s onder de loep – het Tai-meer in de Provincie Jiangsu – en behandelt de werking van het ecocompensatiemechanisme op lokaal niveau in China. Het bespreekt vier typen ecocompensatie die in deze regio worden ontwikkeld en toegepast: ecocompensatie tussen overheden onderling, ecocompensatie tussen overheden en boeren, ecocompensatie tussen overheden en de industrie, en ecocompensatie binnen de industrie.

Hoofdstuk 6 biedt inzicht in het waterkwaliteitsbeheer. In een vergelijking worden de overeenkomsten en verschillen tussen China en de EU uitgewerkt wat betreft het stellen van doelen voor waterkwaliteit en de geïmplementeerde beleidsstrategieën, met specifieke nadruk op de wisselwerking tussen waterbeleid en landbouwbeleid.

Hoofdstuk 7 behandelt hoe China heeft gereageerd op de ‘nieuwe’ uitdaging die in 2007 naar voren kwam: de waterverontreiniging door de landbouw. Hier wordt een analyse gemaakt van drie verschillende bronnen van vervuiling – kunstmest, pesticiden en natuurlijke mest (gier) – en gekeken naar het bijbehorende regelgevende kader vanuit juridisch perspectief door een vergelijking te trekken met de EU.

Hoofdstuk 8 presenteert een algemene conclusie op basis van de bevindingen in de eerdere hoofdstukken en doet concrete suggesties ter oplossing van de tekortkomingen in China’s huidige regelgevende kader voor waterbestuur.

5. Conclusie

Gezien vanuit de bestuursvorm (*polity*), resulteert dit onderzoek in de conclusie dat op horizontaal niveau de institutionele structuur gefragmenteerd is en er op nationaal en lokaal niveau sprake is van negen verschillende sectoren die relevant zijn voor het waterbeheer. Conflicten tussen de verschillende sectoren over beleidsvorming en uitvoering voeren vaak de boventoon. Op verticaal niveau bestuurt de centrale overheid de lagere overheden via een politiek personeelssysteem (dat in Hoofdstuk 3 is uitgewerkt). De stroomgebiedscommissies, die geacht werden samen te werken om het waterbeheer te integreren op centraal en lokaal niveau en tussen verschillende rechtsgebieden, hebben onvoldoende autoriteit om te kunnen bemiddelen, of om lokale overheden te kunnen dwingen hun suggesties uit te voeren als er zich conflicten voordoen.

Het politieke kaderevaluatiesysteem wordt beschouwd als een strikte top-down aanpak die via aanmoediging en ontmoediging moet zorgen voor uitvoering. Al snel nadat waterkwaliteit werd ‘gepromoveerd’ tot bindende nationale doelstelling bleek het politieke kaderevaluatiesysteem een snel aanpasbaar en effectief instrument voor het bereiken van de doelstellingen op het gebied van het waterkwaliteitsbeheer. Het blijkt een goed probleemoplossend instrument en heeft in korte tijd voor aardige

successen gezorgd. De kaderevaluatieaanpak heeft echter ook zijn tekortkomingen: het politieke kaderevaluatiesysteem wordt door zijn aard "door de mens geregeerd" en dat botst met het idee dat China expliciet streeft naar ontwikkeling van een echte rechtsstaat. Het is een politiek personeelssysteem binnen de Communistische Partij, waarbij openbare betrokkenheid of participatie onnodig wordt geacht. Dit brengt het stimuleren van publieke betrokkenheid via wetgeving in gevaar en kan leiden tot onrechtmatige uitvoeringsactiviteiten.

Gezien vanuit de politiek (*politics*), wat in dit onderzoek wordt opgevat als collectieve actie waarmee overheden en niet-overheden met elkaar in wisselwerking staan in hun gezamenlijke beheer van waterbronnen, concludeert dit onderzoek dat de belangrijkste tekortkoming in China's systeem van terugwinning van kosten is dat er geen operationalisatie plaatsvindt, en dat de kosten niet volledig worden teruggewonnen op een manier die zou bijdragen aan duurzaam waterbeheer. Wat betreft dit onderwerp kan China leren van de huidige discussies in de nationale academische wereld en van de ervaring in de EU met het structureren en opstellen van richtlijnen en principes.

In dit onderzoek zijn vier verschillende Chinese ecocompensatiesystemen bekeken, en de conclusie is dat de gemene deler daarin is dat de overheid een dominante rol speelt, omdat overheidsgeld de belangrijkste bron van financiële compensatie is. Overheden zijn de voornaamste actoren in het formuleren en uitvoeren van de regelingen, waaronder ook handel in waterrechten. De uitdagingen met betrekking tot deze regeling zijn een algemeen gebrek aan heldere juridische ondersteuning en onzekere beleidsrisico's. Het gegeven dat financiële steun van de overheid de enige financieringsbron van compensatie is, bergt het risico in zich dat het kan leiden tot een gebrek aan fondsen, iets wat bij andere projecten ook al is gebeurd. Een dergelijke tegenvaller zou vervolgens de houdbaarheid van de hele regeling in gevaar kunnen brengen. Om een adequaat juridisch kader op te stellen voor het verankeren van effectieve ecocompensatieregelingen dient een groot aantal kwesties zorgvuldig te worden overwogen zoals de samenwerking tussen centrale en lokale niveaus, en is de bereidheid van het algemene publiek om mee te werken noodzakelijk. Het is zeker niet voldoende om puur te focussen op de regeling zelf.

Het beleidsgebied (*policy*) omvat de inhoudelijke beleidsaspecten. Dit onderzoek voert een vergelijking uit van de overeenkomsten en verschillen tussen China en de EU op het gebied van het vaststellen van doelen voor de waterkwaliteit. De conclusie hier is dat zowel China als de EU voor de waterkwaliteit doelstellingen hebben vastgesteld middels verordeningen die ook deadlines bevatten. Bij het vaststellen van doelstellingen voor de waterkwaliteit heeft China alleen met chemische indicatoren rekening gehouden en niet met ecologische indicatoren. Er bestaan enorme verschillen tussen China en de EU als het gaat om de uitvoeringsstrategieën voor het bereiken van de doelstellingen. China gebruikt een *Government Objective Responsibility System*, terwijl de EU haar normen baseert op een interactief juridisch kader.

In de vergelijking van beheersing van de waterverontreiniging door de landbouw in China en de EU concludeert dit onderzoek dat in het juridische kader van de EU de

SAMENVATTING

poging om verschillende richtlijnen voor water en landbouw op elkaar af te stemmen het belangrijkste aspect vormt. Daarentegen besteedt China meer aandacht aan het bereiken van algemene doelstellingen voor waterkwaliteit en minder aan beheersing van specifieke bronnen van waterverontreiniging op nationaal niveau. Vanuit technisch-juridisch oogpunt is de Chinese wetgeving vaak te abstract en gefragmenteerd om uitvoering in de praktijk te faciliteren.

REFERENCES

- A. Jolink, 'Legal Implications of Introducing Economic Instruments in the Field of European and Dutch Water Management', 2010, p. 2.
- A. Volkery et al., 'European Commission – General Directorate Environment Support to Fitness Check Water Policy', 2011, p. 14.
- A.M. Keessen et al. 'European River Basin Districts: Are They Swimming in the Same Implementation Pool?' (2010) 22(2), *Journal of environmental law*, 197-221.
- A.M. Keessen et al., 'The Need for Flexibility and Differentiation in the Protection of Vulnerable Areas in EU Environmental Law: The Implementation of the Nitrates Directive in the Netherlands', 2011 *Journal for European Environmental & Planning Law* 8, no. 2, pp. 141-164, at p. 144.
- Aarhus Convention, adopted in 1998 and entered into force in 2001.
<http://ec.europa.eu/environment/aarhus/>.
- Alcamo, J., & Bennett, E. (2003). *Ecosystems and Human Well-being: A Framework for Assessment*. Island Press. Retrieved from <http://www.millenniumassessment.org/en/Framework.html>.
- An end to GDP worship*. (2011, 8 17). 11 5, 2014, retrieved from Chinadialogue: <https://www.chinadialogue.net/blog/4467-An-end-to-GDP-worship/en>.
- An, B., & Zheng, J. (2013, 12 11). *GDP no longer focus of officials' evaluations*. Retrieved 11 5, 2014, retrieved from Chinadaily: usa.chinadaily.com.cn/epaper/2013-12/11/content_17167398.htm.
- B. Guy Peters, *American Public Policy: Promise and Performance* (Chappaqua, NY: Chatham House/Seven Rivers, 1999).
- B. Sun et al., 'Agricultural non-point source pollution in China: causes and mitigation measures', 2012 *Ambio* 41, no. 4, pp. 370-379, at p. 371.
- B. Van Rooij, 'The People's Regulation Citizens and Implementation of Law in China', Amsterdam Law School Legal Studies Research Paper No. 2011-22, p. 9.
- Bennett, M. T. (2009). *Markets for Ecosystem Services in China: An Exploration of China's "eco-compensation" and Other Market-based Environmental Policies: a Report from Phase I Work on an Inventory of Initiatives for Payments and Markets for Ecosystem Services in China*. Forest Trends.
- Brown, S. (sd). *Judicial Independence in the PRC*. 11 5, 2014, retrieved from <http://www.cecc.gov/judicial-independence-in-the-prc>.
- C. McElwee, 'Shaping China's green laws', 2011, available at: <http://www.chinadialogue.net/article/show/single/en/4425-Shaping-China-s-green-laws>, last visited 21 February 2014.
- Cai, D., & Wang, C. (2010). *China's Journey Toward the Rule of Law: Legal Reform, 1978-2008*. Brill.
- Cannon, K. A. (2006). Water as a Source of Conflict and Instability in China. *Strategic Analysis*, 30(2), 310-328.
- Carbon Trading (2014). The Effectiveness of China's Pollutants Discharge Fee Implementation at Current Stage. Visited 5/6/2015, retrieved from: <http://www.tanpaifang.com/tanshui/2014/0425/31494.html>.

REFERENCES

- CCICED. (2013). *China's environmental protection and social development*.
retrieved from http://www.cciced.net/enciced/event/AGM_1/2013agm/speeches2011/201311/P020131106443218117388.pdf.
- Ch. Hey, 'EU Environmental Policies: A short history of the policy strategies', EU Environmental policy handbook, p. 20.
- Chen, Y., & Tan, D. (2014, 1 27). *Wuxi City achieved 8, 000 billion GDP in 2013*. Retrieved 8 17, 2014, from Jinagsu News Window: <http://js.people.com.cn/html/2014/01/27/285116.html>.
- China Council for International Cooperation on Environment and Development (CCICED), *Working Reports on the Task Force on Non-point Pollution from Crop Production*, CCICED Press, 2004, p. 18.
- China News 'Judges have no environmental case to hear while environmental conflicts occur frequently (in Chinese)' available at <http://www.chinanews.com/gn/2014/10-08/6652268.shtml>.
- China Today. (2014, December 30). Transformations of China's Legal System. Retrieved March 3, 2015, from http://www.chinatoday.com.cn/english/society/2014-12/30/content_661622_2.htm.
- China Water Risk, '2011-2013 Water Policies Review', 8 March 2013, available at: <http://chinawaterrisk.org/resources/analysis-reviews/2011-2013-water-policies-review/> (last visited 20 February 2014).
- China.org.cn. (sd). *Three-Step Development Strategy*. Visited 11 5, 2014, retrieved from: <http://english.people.com.cn/92824/92846/93014/6448494.html>.
- China.org.cn, '1st National Census on Pollution Sources Completed', 2010, available at: http://www.china.org.cn/china/2010-02/09/content_19394384.htm (last visited 20 February 2014).
- China's Environment: 1 In 2 Gallons of Water Polluted, retrieved from: <http://www.buzzfeed.com/thewilsoncenter/chinas-environment-1-in-2-gallons-of-water-pollu-bh9k>.
- Chun Yuan, 'Analysis of National Environmental Litigations from 2002 to 2011 (in Chinese)', available at http://www.legaldaily.com.cn/zbkz/content/2012-12/19/content_4069404.htm?node=25497.
- Coase, R., & Wang, N. (2013, January 15). Policy Report: How China Became Capitalist. Retrieved March 3, 2015, from <http://www.cato.org/policy-report/januaryfebruary-2013/how-china-became-capitalist>.
- Costanza, R., d'Arge, R., Groot, R., Farber, S., Grasso, M., Hannon, B. . . . Belt, M. (1998). The value of the world's ecosystem services and natural capital. *NATURE*, 253-260.
- 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, Cyprus, 2000.
- D. Stanway, 'After China's multibillion-dollar cleanup, water still unfit to drink', 2013, available at: <http://www.reuters.com/article/2013/02/20/us-china-pollution-water-idUSBRE91J19N20130220> (last visited 17 February 2014).
- Dai L. 'A New Perspective of Water Governance in China – Captain of the River', *Water International*, 40(1), 87-99.

REFERENCES

- Dai, L. (2012). Recovering the Costs of Water Services in the People's Republic of China: Lessons from Article 9 of the European Union Water Framework Directive. *Utrecht Law Review*, 102-118. Retrieved from <https://www.utrechtlawreview.org/index.php/ulr/article/view/208/206>.
- Dai, L. (2014). Something Old, Something New, Something Borrowed and Something Blue – Tackling Diffuse Water Pollution from Agriculture in China: Drawing Inspiration from the European Union, *Utrecht Law Review*, 10 (2), 136-154.
- Dai, L. (2015). Regulating water pollution in China and the European Union in terms of agricultural pollution. *Journal of Water Law*, forthcoming issue.
- Daily, G. C. (1997). *Nature's Services. Societal Dependence on Natural Ecosystems*. Washington DC: Island Press.
- Dinar, A., Rosegrant, M. W., & Meinzen-Dick, R. S. (1997). *Water allocation mechanisms: principles and examples* (No. 1779). World Bank Publications.
- Du, Q., & Chen, Z. (2013). On Common but Differentiated Responsibilities of Eco-compensation in River Basin-based on legal analysis of water quality objectives (Chinese). *Journal of Hubei University*.
- Dworak, T., Berglund, M., Thaler, T., Fabik, E., L., Amand, B. 'Assessment of Agriculture Measures included in the Draft River Basin Management Plans – Summary Report' Berlin/Vienna: Ecologic Institute, 2010.
- Easterlin, R. (2014, 10 27). What matters more: GDP or happiness? Visited 11 5, 2014, Goodbye GDP: <http://goodbyegdp.org/2014/10/27/what-matters-more-gdp-or-happiness/>.
- Edin, M. (2003). Remaking the Communist party-state: the cadre responsibility system at the local level in China. *China: An International Journal*, 1-15. DOI: 10.1353/chn.2005.0013.
- Eichengreen, B. (2013, November 8). Chinese Industrialization and its Discontents. Retrieved March 3, 2015, from <http://www.project-syndicate.org/commentary/barry-eichengreen-on-what-china-can-learn-from-nineteenth-century-britain#lCKBlObPkyXiIMt7.99>.
- Environmental Protection Law, issued by the Standing Committee in 1989, revised in 2014; Water Law, issued by the Standing Committee in 1988, revised in 2002, 2009; Water Pollution Prevention and Control Law, issued by the Standing Committee in 1984, revised in 1996, 2008; Legislation Law, issued by the National People's Congress in 2000.
- EU China River Basin Management Programme Project Completion Report 2007 – 2012, Project Completion Report MR-019. (2012, August 1). Retrieved March 5, 2015, from http://cewp.org/wp-content/uploads/2014/03/RBMP-Completion-Report-MR-018_EN.pdf.
- EU Green Week – Water: the blue gold in our green forests (2012). <http://www.apastyle.org/learn/faqs/web-page-no-author.aspx>. (Last visited 19 March 2010).
- European Commission 'Agriculture and Environment', available at http://ec.europa.eu/agriculture/envir/cross-compliance/index_en.htm.
- European Commission 'Agricultural Policy Perspectives Brief Overview of CAP Reform 2014-2020', available at http://ec.europa.eu/agriculture/policy-perspectives/policy-briefs/05_en.pdf.

REFERENCES

- European Commission, 'A Blueprint to Safeguard Europe's Water Resources', COM (2012) 673 final, p. 9.
- European Commission, 'Guidance for administrations on making WFD agricultural measures clear and transparent at farm level', 26 May 2011, available at: http://ec.europa.eu/environment/water/quantity/pdf/guidance_en.pdf (last visited 21 February 2014).
- European Commission, 'Water Framework Directive Factsheet', 2010, available at: <http://ec.europa.eu/environment/pubs/pdf/factsheets/water-framework-directive.pdf> (last visited 21 February 2014).
- European Environment Agency Report 'European Waters--Assessment of Status and Pressures' Luxembourg: Office for Official Publications of the European Union, 2012.
- European Environmental Agency (EEA), 'Diffuse sources', 2008, available at: <http://www.eea.europa.eu/themes/water/water-pollution/diffuse-sources> (last visited 17 February 2014).
- European Environmental Agency (EEA), 'European waters – assessment of status and pressures', Office for Official Publications of the European Union, 2012, p. 8.
- European Union 'The Common Agricultural Policy A Story to be Continued' Luxembourg: Publications Office of the European Union, 2012.
- Falk, R. L. & Wee, J. (2013). China's New Environmental Protection Law Implications for Overseas Investors, Joint Ventures and Trading Partners. Retrieved from: http://www.mofo.com/~media/Files/ClientAlert/2014/09/140930ChinasNewEnvironmentalProtectionLaw.pdf?utm_source=Mondaq&utm_medium=syndication&utm_campaign=View-Original.
- FAO. (2013). *Guidelines to control water pollution from agriculture in China Decoupling water pollution from agricultural production*. Rome: E Food and Agriculture Organization of the United Nations (FAO), from <http://www.fao.org/docrep/019/i3536e/i3536e.pdf>.
- Ferris Jr, R.J., & Zhang, H. (2002). Reaching out to the rule of law: China's continuing efforts to develop an effective environmental law regime. *Wm. & Mary Bill Rts. J.*, 11, 569.
- Fisheries Supervision and Management Station. (2008, 3 28). *Ocean and Fisheries in Jiangsu Province*. Retrieved from Re-organizaion of Fishery Farms ended successfully in Wuzhong District (in Chinese): http://www.jsf.gov.cn/art/2008/3/28/art_58_19385.html.
- FlorCruz, M. (2013, 10 3). *China's Government Employs 2 Million 'Public Opinion Analysts'*. Retrieved 11 5, 2014, from International Business Times: <http://www.ibtimes.com/chinas-government-employs-2-million-public-opinion-analysts-1414576>.
- Foster, D., Wood, A., & Griffiths, M. (2010, May). The EC Water Framework Directive and its implications for the Environmental Agency. In *Freshwater Forum* (Vol. 16, No. 1). Available at: <http://aquaticcommons.org/4603/1/DFoster.pdf>.
- Geng, H. (2013, 6 13). *Can the Captain of the River save China's environmental crisis?* Retrieved 11 5, 2014, from Huanshan News: <http://www.newshs.com/a/20130613/00203.htm>.

REFERENCES

- Genia, K. (2014, 8 1). Barriers to the Implementation of Environmental Policies at the Local Level in China. *World Bank Policy Research Working Paper*. Retrieved from <http://ssrn.com/abstract=2487614>.
- Giupponi, C., Cogan, V., & La Jeunesse, I. (2002). EU water policy: Research developments and new management tools. *Red*. Available at: <http://ageconsearch.umn.edu/bitstream/14463/1/wp02-13.pdf>.
- Gleick PH (2009) China and water. In *The World's Water 2008–2009: The Biennial Report on Freshwater Resources* (Gleick PH et al. (eds.)). Island Press, Washington, DC, pp. 79–100.
- Goulder, L., & Kennedy, D. (2011). Interpreting and Estimating the Value of Ecosystem Services. *Natural Capital–Theory and Practice of Mapping Ecosystem Services*, 15-33.
- Green Week 2012, How the polluters led the Water Framework Directive ad absurdum. http://ec.europa.eu/environment/greenweek/sites/default/files/3-3_salmsalm.pdf, (last visited 19 March 2010).
- Griffiths, M. 'Comparison of EU-WFD and China's No.1 Policy (in Chinese)' (2012) *12(6) Water*.
- Gu, S. (2009). *Law and Politics in Modern China: under the Law, the Law, and above the Law*. Cambria Press. Available at https://www.academia.edu/1136586/Law_and_Politics_in_Modern_China.
- H. Xue, 'Research on Evaluation of Intensive Use of Agricultural Land under the New Countryside Construction', 2009 *International Journal of Business and Management* 4, no. 4, pp. 176-182, at p. 176.
- Hafner-Cai, J. (2014). As China's cities grow, so must water infrastructure.
- Han, L. (2010). *Study of Ecological Compensation of the Fence Removal in Taihu Lake*. Retrieved from <http://www.globethesis.com/?t=2121360305484392>.
- Hao, T. (2007). Do Programs of National Economy and Social Development of Our Country Have Lawful Sanction? *Study and Exploration* (2).
- Haocai Luo, & Gongde Song. (2006). Taking soft law seriously – general theory of soft law in public governance and the practice in China, *China Legal Science* (2), 3-24.
- Hassan, F. A. (2011). Water History for Our Times, France: United Nations Educational, Scientific and Cultural Organization <http://unesdoc.unesco.org/images/0021/002108/210879e.pdf>.
- He, G. (2014, 7 11). *A Dilemma of water pollution control in Lake Tai*. Retrieved from Time-weekly: <http://time-weekly.com/story/2014-01-16/132082.html>.
- He, S. (2013, November 11). China: Goodbye, GDP. Retrieved March 5, 2015, from <http://english.people.com.cn/business/8452673.html>.
- He, S. 'The Objective Responsibility System: Operation and Characters (in Chinese)' (2010) *Vol.27 No.4 China Agricultural University Journal of Social Sciences Edition*, 173-182.
- Herwig Unnerstall, 'The Principle of Full Cost Recovery in the EU-Water Framework Directive – Genesis and Content', *Environmental Law* (2007) 19(1): 29-42.
- Hu, A. (2011, 3 28). *Green light for hard targets*. Retrieved 11 5, 2014, from Chinadaily: http://www.chinadaily.com.cn/opinion/2011-03/28/content_12234557.htm.

REFERENCES

- Huang, S. (2014, 7 11). *The dilemma of environmental tribunals in China*. Visited 11 5, 2014, retrieved from Legaldaily: http://www.legaldaily.com.cn/Frontier_of_law/content/2014-07/11/content_5667242.htm.
- International Consumer Rights Forum. (2012, 11 02). *Eco-compensation enters a substantive phase*. Retrieved from International Consumer Rights Forum: <http://www.fj42.com/54067.html>.
- International Business Time (2014). As Communist Party Meets For Fourth Plenum, Chinese Media Goes Big On 'Rule Of Law'. Retrieved 2, 2, 2015, from: <http://www.ibtimes.com/communist-party-meets-fourth-plenum-chinese-media-goes-big-rule-law-1708020>.
- Ito, C. (2005, May 13). Urbanization and water pollution in China. Retrieved March 5, 2015, from https://crawford.anu.edu.au/degrees/pogo/discussion_papers/PDP05-13.pdf.
- J.H. Jans, R. de Lange, S. Prechal & R.J.G.M. Widdershoven, *Europeanisation of Public Law*, 2007, p. 11.
- Jon Eldridge & Comisión Europea, *Life and Europe's rivers: Protecting and improving our water resources*, 2007.
- Jones, T. 'Recent developments in the pricing of water services in OECD countries', *Water Policy* (1998), 1 (6): 637–51.
- K. Falkenberg, 'The EU Water Framework Directive-Aspirations and Lessons learned', 2010 *Water Front Magazine* No.2.
- Kaiman, J. (2014, 2 11). *Prostitution crackdown in China province after TV investigation*. Retrieved 11 5, 2014, from The Guardian: <http://www.theguardian.com/world/2014/feb/11/china-province-prostitution-crack-down-guangdong-sex-workers>.
- Karen Bakker & Christina Cook (2011) *Water Governance in Canada: Innovation and Fragmentation*, *International Journal of Water Resources Development*, 27:02, 275-289.
- KPMG, *cutting through complexity* (2012). *China's 12th Five-Year Plan (2011-2015)* KPMG Insight Series. Retrieved 24, 2, 2015, from: <http://www.kpmg.com/cn/en/issuesandinsights/articlespublications/publicationseries/5-years-plan/pages/default.aspx>.
- Kraemer, R., Kampa, E., & Interwies, E. (2004). The role of tradable permits in water pollution control. *Inter-American Development Bank*, 11. Retrieved from <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1481959>.
- L. Zhong, A.P. J. Mol, 'Water Price Reforms in China: Policy-Making and Implementation', 2009 *Journal of Water Resources Management*, 24(2), 377-396.
- Lee, Seungho. "China's water policy challenges." *The University of Nottingham, China Policy Institute Discussion Paper* 13 (2006).
- Li, L., Fan, S., Yan, Y., & Gao, J. (2010, 10 25). *The Official Opening of Emission Trading Market in Tai Like Basin (Chinese)*. Retrieved from Environment-China: http://www.cenews.com.cn/xwzx/cyyc/cyqs/201010/t20101024_677617.html.
- Li, W., & Liu, M. (2010). Reflections on the Development of Eco-compensation Mechanisms in the People's Republic of China. *Payments for Ecological Services and Eco-Compensation*, (p. 58).

REFERENCES

- Liang, G., & He, H. (2012, 2 14). *Long Struggle for a Cleaner Lake Tai*. Retrieved from Chinadialogue: <http://www.chinadialogue.net/article/show/single/en/4767-Long-struggle-for-a-cleaner-Lake-Tai>.
- Liu BJ and Zhang JH (1999) Reservoir construction and flood prevention in China. *China Water Resources* 7(433): 16–17 (in Chinese).
- Liu, J. (2014, 4 24). *China's new environmental law looks good on paper*. Visited 11 5, 2014, retrieved from Chinadialogue: <https://www.chinadialogue.net/blog/6937-China-s-new-environmental-law-looks-good-on-paper/en>.
- Liu, Q. (2014). China's pollution protests could be slowed by stronger rule of law. Retrieved from: <https://www.chinadialogue.net/article/show/single/en/7483-China-s-pollution-protests-could-be-slowed-by-stronger-rule-of-law>.
- Luo, X., Qu, F., Feng, S., Shi, X., & Jiang, H. (2011). Ecological Compensation Mechanism in Taihu Lake Basin: Based on Theory and Experience of Watershed Ecological Compensation in and out of China (in Chinese).
- M. Schneider, 'Feeding China's Pigs: Implications for the Environment, China's Smallholder Farmers and Food Security', 2011, available at: <http://www.iatp.org/documents/feeding-china%E2%80%99s-pigs-implications-for-the-environment-china%E2%80%99s-smallholder-farmers-and-food>.
- Mees, H.L.P. , J. Dijk, D. van Soest, P.P.J. Driessen, M.H.F.M.W. van Rijswijk, and H. Runhaar 'A method for the Deliberate and Deliberative Selection of Policy Instrument mixes for Climate Change Adaptation' (2014) *19(2) Ecology and Society* 58. <http://dx.doi.org/10.5751/ES-06639-190258>.
- Millennium Ecosystem Assessment, 'Ecosystems and Human Well-being: Synthesis', 2005 Island Press, 2005, p. V.
- Ministry of Environmental Protection (MEP) & Asian Development Bank (ABD), 'Market-based instruments for water pollution control in China', 2010.
- Minzner, C. (2009). Riots and cover-ups: counterproductive control of local agents in China. *Journal of International Law*, 31(1), 53-71. Retrieved from: <http://scholarship.law.upenn.edu/jil/vol31/iss1/2>.
- Minzner, C. (2011). China's Turn Against Law. *American Journal of Comparative Law*, 2011; *Washington University in St. Louis Legal Studies Research Paper No. 11-03-01*, 937-984. Retrieved from <http://ssrn.com/abstract=1767455>.
- Mol, A. P. , & Carter, N. T. (2006). China's environmental governance in transition. *Environnemental Politics*, 15(02), 149-170.
- Monitor Center. (2013, 6 21). *Introduction of Tai Lake (in Chinese)*. Retrieved from Monitor Center of Hydrological and Water Resources: <http://www.thwb.gov.cn/aboutth/intro.asp>.
- Moore, S. (2013). Issue Brief: Water Resource Issues, Policy and Politics in China. Retrieved from: <http://www.brookings.edu/research/papers/2013/02/water-politics-china-moore>.
- Moore, Scott. "Hydropolitics and Inter-Jurisdictional Relationships in China: The Pursuit of Localized Preferences in a Centralized System." *The China Quarterly* 218 (August 2014): 1-21.

REFERENCES

- N. Herbke et al., 'WFD and Agriculture – Linkages at the EU Level. Analysis of the Policy and Legal Linkages between CAP and WFD', 2006, available at: http://www.ecologic.eu/download/projekte/1950-1999/1966/1966_deliverable_2-1.pdf (last visited 21 February 2014).
- Nair, C. (2012, May 28). An Asian perspective on the world food crisis and its impact on development. Retrieved March 3, 2015, from <http://www.consumptionomics.com/>.
- National Bureau of Statistics. (2014, 7 1). *National Data*. Retrieved from <http://data.stats.gov.cn/search/keywordlist?keyword=gdp>.
- Nestor, P. (2007). When the Price Is Too High: Rethinking China's Deterrence Strategy for Robbery. *Pac. Rim L. & Pol'y J*, 16(27), 525.
- Nickum, J. (2010). Water policy reform in China's fragmented hydraulic state: Focus on self-funded/managed irrigation and drainage districts. *Water Alternatives*, 3(3), 537-551.
- North Head, *Report On the 12th Five-Year Plan An in-depth overview and analysis of China's policy blueprint for years 2011-2015*, Beijing North Head, 2011, p. 8.
- O'Brien, K., & Li, L. (1999). Selective policy implementation in rural China. *Comparative Politics*, 167-186. Available at <http://falcon.arts.cornell.edu/am847/pdf/PolicyImplementationRuralChina%5B1%5D.pdf>.
- OECD (2005), "Environment and Governance in China", in *Governance in China*, OECD Publishing. Retrieved from: <http://dx.doi.org/10.1787/9789264008441-19-en>
- 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? *Utrecht Law Review*, November 2012..
- Pan, J. (2013, 11 7). *Veto should not become a norm of cadre evaluation*. Retrieved 11 5, 2014, from *Guanmingdaily*: http://epaper.gmw.cn/gmrb/html/2013-11/07/nw.D110000gmrb_20131107_2-02.htm.
- Peng Shugang, 'China's Legal System for Water Management: Basic Challenges and Policy Recommendations', *International Journal of Water Resources Development*, pp. 3-22.
- Philipp Lange, Peter P. J. Driessen, Alexandra Sauer, Basil Bornemann & Paul Burger (2013) *Governing Towards Sustainability – Conceptualizing Modes of Governance*, *Journal of Environmental Policy & Planning*, 15:3, 403-425, DOI: 10.1080/1523908X.2013.769414.
- Portney, P. R., & Stavins, R. N. (1998). *Market-based Environmental Policies*. Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University. Available at: <http://www.ksg.harvard.edu/fs/rstavins/Papers/Market%20Based%20Environmental%20Policies.pdf>.
- Price Bureau, F. D. (2008). *Administration of Charges for Main Pollutants Discharge Credits in the Tai Lake Watershed of Jiangsu Province (Trial Implementation)*.
- Qi, Y., & Zhou, X. 'Water Pollution Control in China: Review of Laws, Regulations and Policies and their Implementation' IGES(Hayama) 2009, available at <http://pub.iges.or.jp/modules/envirolib/view.php?docid=2775>.
- Qian, Y., & Wu, J. (2000, May 1). China's Transition to a Market Economy: How Far across the River? Retrieved March 5, 2015, from <http://web.stanford.edu/group/siepr/cgi-bin/siepr/?q=system/files/shared/pubs/papers/pdf/credpr69.pdf>.

REFERENCES

- Qin, T. (2014). Challenges for Sustainable Development and Its Legal Response in China: A Perspective for Social Transformation. *Sustainability*, 6(8), 5075-5106.
- Qin, T. (2014). Improving China's Legislations of Water Resource Protection, Environmental Protection (4). <http://lib.cnki.net/cjfd/HJBU201404009.html>.
- R. Müssner, et al. 'WFD and Agriculture Linkages at the EU Level. Final report about Cross Compliance and the WFD' (2006), available at: http://www.ecologic.eu/download/projekte/1950-1999/1966/1966_deliverable_12.pdf.
- R. Speed, Li Y., T. Le Quesne, G. Pegram and Z. Zhiwei (2013) Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning, UNESCO, Paris.
- R.C. Ferrier et al., 'Diffuse Pollution – What is the Nature of the Problem?' 2005 *Water and Environment Journal* 19, no. 4, pp. 361-366, at p. 362.
- Rachel Cardone, Catarina Fonseca, 'Financing and Cost Recovery', 2003, P15.
- Rapoza, K. (2013). China's Pres Xi: GDP No Longer the Measure of Success. Retrieved 11, 5, 2014, from Forbes: <http://www.forbes.com/sites/kenrapoza/2013/07/01/chinas-pres-xi-gdpno-longer-the-measure-of-success/>.
- Report from the Commission to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans (2012, November 14). Retrieved March 3, 2015, from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0670&from=EN>.
- REUTERS (2014). China to 'declare war' on pollution, premier says. Retrieved 2, 2, 2015, from: <http://www.reuters.com/article/2014/03/05/us-china-parliament-pollution-idUSBREA2405W20140305>.
- Roberts, D. (2014, March 20). China Wants Its People in the Cities. Retrieved March 3, 2015, from <http://www.businessweek.com/articles/2014-03-20/china-wants-its-people-in-the-cities>.
- Rogers, P. , & Hall, A. W., (2003). *Effective water governance* (Vol. 7). Stockholm: Global Water Partnership.
- Ruhl, J., & Salzman, J. (2007). The Law and Policy Beginnings of Ecosystem Services. *Journal of Land Use and Environmental Law*, 22.
- Shapiro J (2001) Mao's War against Nature: Politics and the Environment in Revolutionary China. Cambridge University Press, Cambridge.
- Simpson, D. (2011). The "Ecosystem Service Framework": a critical assessment. *Ecosystem Services Economics Working Paper Series*.
- Sina News (2014). 21.6 billion were collected from pollutants discharge. Retrieved 5/6/2014, from: <http://finance.sina.com.cn/china/20140114/172317950420.shtml>.
- Smith, G. (2013). Measurement, promotions and patterns of behavior in Chinese local government. *The Journal of Peasant Studies*, 40(6), 1027-1050. DOI:10.1080/03066150.2013.866095.
- Song, X., Mulder, K., Frostell, B., Ravesteijn, W., & Wennersten, R. (2011). Transition in public participation in Chinese water management. *Proceedings of the ICE-Engineering Sustainability*, 164(1), 71-83.
- Speed, R., Li, Y., Le Quesne, T., Pegram, G., & Zhiwei, Z. (2013). Basin Water Allocation Planning. Principles, procedures and approaches for basin allocation planning.

REFERENCES

- Stanton, T., Echavarria, M., Hamilton, K., & Ott, C. (2010). *State of Watershed Payments: An Emerging Marketplace*. Ecosystem Marketplace. Retrieved from http://www.foresttrends.org/documents/files/doc_2438.pdf.
- Statista (2015). Investment in pollution control as percentage of GDP in China from 2002 to 2012. Retrieved 2.9.2015, from: <http://www.statista.com/statistics/300438/china-pollution-treatment-investment-as-percentage-of-gdp/>.
- Sunstein, C. R. (1996). On the expressive function of law. *University of Pennsylvania law review*, 2021-2053.
- T. Dworak et al., *International review on payment schemes for wet buffer strips and other types of wet zones along privately owned land*, 2009, p. 13.
- Tai, C., & Ellis, L. (2008, 10). *Taihu: Green Wash or Green Clean?* A China Environmental Health Project Research Brief. http://www.circleofblue.org/waternews/wp-content/uploads/2011/03/taihu_oct08.pdf.
- Taihu Basin and Southeast Rivers Water Resources Bulletin 2011*. Shanghai: Bureau of Taihu Lake Basin Ministry of Water Resources. Retrieved from <http://218.1.102.107:9001/tba/content/TBA/lygb/szygb/0000000000003585.html>.
- Teerink, J.R., & Nakashima, M. (1993). *Water Allocation, Rights, and Pricing; Examples from Japan and the United States* (No. 198).
- The Climate Group (2014). China on track to spend US\$17 billion in environmental protection. Retrieved from: <http://www.theclimategroup.org/what-we-do/news-and-blogs/china-announces-us-817-billion-investment-in/>.
- The Dutch Rural Development Programme 2007-2013, 2006, at p. 18, available at: <http://www.regiebureau-pop.eu/nl/english/> (last visited 21 February 2014).
- Time to Enforce China's Environmental Law, Interview with Wang Canfa, 8 March 2013, available at: <http://chinawaterrisk.org/interviews/time-to-enforce-china-environmental-law/> (last visited 21 February 2014).
- Tong Y. (2010). Healing the Earth: Confucianism and its Environmental Protection Perspective. Retrieved from: http://www.chinarujiao.net/w_info.asp?PID=6476.
- Truex, R. (2013). The Returns to Office in a "Rubber Stamp" Parliament. *RCCPB Working Paper #33*. Retrieved from http://www.indiana.edu/~rccpb/pdf/Truex_RCCPB_33_June_2013.pdf.
- U. Mattei, 'Efficiency in legal transplants: An essay in comparative law and economics', 1994 *International Review of Law and Economics* 14, no. 1, pp. 3-19.
- United Nations Economic Commission for Europe (UNECE). (2007). *Recommendations on payments for ecosystem services in integrated water resources management*. New York and Geneva: United Nations Publications.
- United States Environmental Protection Agency (USEPA), 'What is nonpoint source pollution?' available at: <http://water.epa.gov/polwaste/nps/whatis.cfm> (last visited 17 February 2014).
- Value of Water (2014), Value of Water Index: China. Retrieved from: http://www.xylem.com/valueofwater/media/China_ValueOfWater_Infographic_8.5x11.pdf.
- Van Rijswijk, M. & Wouters, P. (2015). "Contemporary challenges for water law – achieving sustainable and adaptive fresh water management across Europe and China", *Journal of Water Law*, forthcoming.

REFERENCES

- Van Rijswijk, M., Edelenbos, J., Hellegers, P., Kok, M., & Kuks, S. (2014). Ten building blocks for sustainable water governance: an integrated method to assess the governance of water. *Water international*, 39(5), 725-742. DOI: 10.1080/02508060.2014.951828.
- Van Rijswijk, M. & Vogelesang-Stoute E.M., 'The Water Framework Directive and pesticides legislation: the influence of environmental quality standards and the river basin approach taken in the Water Framework Directive on the authorization of plant protection products', 2008 *European Energy and Environmental Law Review*, pp. 78-89, at p. 82.
- Van Rijswijk, M., & Keessen, A.M. Legal Protection of the Right to Water in the European Union, in: F. Sultana and A. Loftus. (eds.), *The Right to Water: Politics, Governance and Social Struggles*, Earthscan, 2011, p. 123-138.
- Van Rijswijk, M. 'Interaction between European and Dutch Water law', in S. Reinhard and H. Folmer (eds.), *Water policy in the Netherlands, Integrated Management in a Densely Populated Delta*, Issues in water resource policy, 2009, pp. 204-224.
- Van Rijswijk, M. 'Moving water and the Law, On the Distribution of Water Rights and Water Duties within River Basins in European and Dutch water law', inaugural address Utrecht University, Europa Law Publishing, Groningen, 2008.
- Van Rijswijk, M. 'The Relationship between the Water Framework Directive and other Environmental Directives, with Particular Regard to Agriculture – A Dutch Point of View', 2006, *Water Law* 17, pp. 193-203.
- Van Rijswijk, M. *The allocation and regulation of limited water use rights in international, European and Dutch Water Law*, 2012.
- Van Rijswijk, M., The Allocation and Regulation of Limited Water Use Rights: Lessons from a general public law perspective, *Journal of Water Law*, accepted, published in January or February 2015.
- Volkery, A., Geeraerts, K., Farmer, A., Chalsège, L., Vandresse, B., Gaspar, L.D.S., & Ursachi, D.L. 'European Commission-General Directorate Environment Support to Fitness Check Water Policy' Belgium: Deloitte Consulting Institute for European Environmental Policy, 2011.
- W. Howarth, Cost recovery for water services and the polluter pays principle, 2009, pp. 565-587.
- W.T. Eijsbouts, 'In Defense of EC Law', in: T.A.J.A Vandamme, J.-H. Reestan (eds), *Ambiguity in the Rule of Law*, The Hogendorp Papers (I), 2001, pp. 35-50.
- Wang, A. (2013). The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China. *Harvard Environmental Law Review*, 37, 366-440. Retrieved from <http://www3.law.harvard.edu/journals/elr/files/2013/09/Wang-9-2.pdf>.
- Wang, H. 'Low water price leads to leakage of state-owned assets', <http://money.163.com/09/1119/17/50GG801H00253TTO.html> (last visited in 25 March 2012).
- Wang, H., & Chen, M. (1999). *How the Chinese system of charges and subsidies affects pollution control efforts by China's top industrial polluters* (Vol. 2198). World Bank Publications. Retrieved from: <http://web.worldbank.org/archive/website01004/WEB/IMAGES/10150132.PDF>.
- Wang, J. (2010, 9 23). *China's green laws are useless*. Retrieved 11 5, 2014, from Chinadialogue: <https://www.chinadialogue.net/article/show/single/en/3831--China-s-green-laws-are-useless>.

REFERENCES

- Wang, Y. (2009). *China's water issues: transition, governance and innovation* (pp. 117-134). Earthscan Publications, London, UK. Available at http://admin.cita-aragon.es/pub/documentos/documentos_WangYi_286d0ba6.pdf.
- Wang, Y. (2013, 12 18). *Public participation and legal reform key to creating ecological civilisation*. Retrieved 11 5, 2014, from Chinadialogue: <https://www.chinadialogue.net/article/show/single/en/6583-Public-participation-and-legal-reform-key-to-creating-ecological-civilisation>.
- 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.
- West, J., Schandl, H., Heyenga, S., & Chen, S. (2013). Resource Efficiency: Economics and Outlook for China. *UNEP, Bangkok, Thailand*. Retrieved March 3, 2015, from http://www.unep.org/pdf/China_Resource_Efficiency_in_English_2013.pdf.
- Wong, J. (2014, October 25). Dethroning China's 'GDP supremacy' good for region. Retrieved March 3, 2015, from <http://www.straitstimes.com/news/opinion/invitation/story/dethroning-chinas-gdp-supremacy-good-region-20141025>.
- World Bank. (2013). *Design of ET-based Water Rights Administration System for Turpan Prefecture of Xinjiang China*. World Bank Publications.
- World Bank. 2007. *Cost of pollution in China: economic estimates of physical damages*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2007/02/7503894/cost-pollution-china-economic-estimates-physical-damages>.
- Wouters, P. (2007). A New Generation of Local Water Leaders. *Colo. J. Int'l Envtl. L. & Pol'y* 513, Vol. 18:3, 513-522.
- Wu, J. (2008). Public Participation in the Enforcement of China's Anti-Pollution Laws. *LEAD Journal (Law, Environment and Development Journal)*, 35-48. Retrieved from <http://www.lead-journal.org/content/08035.pdf>.
- Wunder, S., Engel, S., & Pagiola, S. (2008). Taking Stock: A comparative analysis of Payments for Environmental Services Programs in Developed and Developing Countries. *Ecological Economics* 65, 834-852, at 846. DOI:10.1016/j.ecolecon.2008.03.010.
- X. Mu, 'China introduces first national plan on groundwater pollution control', 2011, available at: http://news.xinhuanet.com/english2010/china/2011-10/29/c_122211369.htm (last visited 20 February 2014).
- Xinhua News. (2007, 12 7). *Organizational Department of Jiangsu Provincial Party Committee*. Retrieved 11 5, 2014, from Wuxi: Veto on deficient implementation of major decisions and arrangements: <http://www.jszb.gov.cn/dt2111111132.asp?DocID=2111118486>.
- Xinhua News. (2014, 9 21). *Success rate of the plaintiff in administrative cases is less than 10%*. Retrieved 11 5, 2014, from Sina News: <http://news.sina.com.cn/c/2014-09-21/145630891138.shtml>.
- Xinhuanet. (2013, 6 18). *Xi: Upcoming CPC campaign a "thorough cleanup" of undesirable practices*. Retrieved 11 5, 2014, from Xinhuanet: http://news.xinhuanet.com/english/china/2013-06/18/c_132465115.htm.
- Xinhuanet. (2014, 10 28). *Xi says China adheres to socialist path in rule of law*. Retrieved March 3, 2015, from http://news.xinhuanet.com/english/china/2014-10/28/c_133748934.htm.

REFERENCES

- Y. Qiao & X. Ji, 'Economic Analysis of Pig-breeding by Scaled Farms and Backyard Poultry in China', 2012, *Market Perspective* 48, no. 8, pp. 14-19, at p. 14.
- 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*', The Hague: Sdu Uitgevers, 2009.
- Y. Wu, 'Fighting Water Pollution with Data', 2010, available at: <http://chinawaterrisk.org/opinions/fighting-water-pollution-with-data/> (last visited 20 February 2014).
- Y. Yang, 'A China Environmental Health Project Sheet: Pesticides and Environmental Health Trends in China', 2007, available at: http://www.wilsoncenter.org/sites/default/files/pesticides_feb28.pdf (last visited 21 February 2014).
- Yahua, W. (2005). River Governance Structure in China: A Study of Water Quantity/Quality Management Regimes. *Promoting Sustainable River Basin Governance: Crafting Japan-US Water Partnerships in China*, 23-36.
- Yang, W. (2004). The main tasks and direction of regulating political structure reform. *China Economic & Trade Herald* (20).
- Yueh, L. (2014, 4 30). *Is China about to overtake US as the world's largest economy?* Visited 4 30, 2014, retrieved from BBC: <http://www.bbc.com/news/business-27216705>.
- Zhang, Q., Lin, T., Bennett, M., & Jin, L. (2010). *An eco-compensation policy framework for the People's Republic of China: challenges and opportunities*. Mandaluyong City: Philippines: Asian Development Bank.
- Zhang, Q., & Radstake, F. (2010). Payments for Ecological Services: Future Prospects for the Asian Development Bank Operations in the People's Republic of China. *Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China* (pp. 118-129). Mandaluyong City: Philippines: Asian Development Bank.
- 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).
- Zhang, Q., Bennett, M., Kannan, K., & Jin, L. (2010). *Payments for ecological services and eco-compensation: Practices and innovations in the People's Republic of China*. Philippines: Asian Development Bank. Retrieved from <http://www.adb.org/publications/payments-ecological-services-and-eco-compensation-practices-and-innovations-peoples-rep>.
- Zhang, Y. (n.d.). *Whether contract system can save China's rivers*. Retrieved 11 5, 2014, from Ministry of Environmental Protection of the People's Republic of China: http://www.mep.gov.cn/ztbd/rdzl/hzhzh/gfpl/200905/t20090526_152020.htm.
- Zhao Tongqian, Ouyang Zhiyun, Wang Xiaoke, Miao Hongwei & Yanchang, 'Ecosystem services and their valuation of terrestrial surface water system in China', 2003 *Journal of Natural Resources*, p. 4.

CURRICULUM VITAE



Liping Dai completed a Master's degree in environmental law at the China University of Mining and Technology in 2011 and won 2nd prize in the thesis contest of this university. In September 2011, she started as a PhD candidate at the Utrecht Centre for Water, Oceans and Sustainability Law of Utrecht University on a PhD Scholarship from the China Scholarship Council. Her research focuses on the transition in China's water resource governance by a comparison with the EU. In her PhD research she applies a meta-framework of polity, politics and policy to analyze water resource governance, which consists of the institutional structure of water resource management, the co-management of water resources between state and non-state actors and the water-related policy formulation and implementation. She participated in the Lus Commune Research School, the Netherlands, the 2013 7th Annual Postgraduate workshop, University College Dublin, Ireland, and in the 2015 PhD Research on Sustainable Development winter school, University of Basel, Switzerland.

