Valorization

Water is the core of life, and it is one of the most widespread elements on our planet. Historically, water gestates and nourishes human civilisations. Humans used to take water for granted; however, today, water scarcity affects every continent, and water has become one of the most precious resources on earth. Currently, approximately 700 million people in 43 countries suffer from water scarcity. Unfortunately, the number is still growing. Under the existing climate change scenario, almost half of the world’s population will be living in an area of high water stress by 2030.

In many places, especially in the developing world, water scarcity is threatening social and economic development; in some extreme cases, the scarcity is seriously affecting peoples’ health and lives. In those places, rapid urbanisation, population expansion and environmental deterioration further aggravate the problem in their urban areas. The need of water for economic development and the necessity of environmental protection pose a severe challenge to the governments. Hence, satisfying the water demands of different users with high quality services while maintaining sustainable development and utilisation of water resources is the core target of urban water management in the developing world.

How to achieve this target is the concern of water authorities and policy-makers in many developing countries. In this thesis, through a comprehensive analysis of urban water management reform in China, we try to shed new light on the problem. We address two important questions of urban water management: 1) What is the trajectory of urban water consumption and what are the determinants of its formation?; and 2) what are the determinants of successful urban water management reform in developing countries and the roles of governments, businesses and individuals?

To answer the first question, we investigate the urban water consumption patterns of 27 countries during 1960-2010. We find that per capita urban water consumption has an N-shaped relationship with GDP per capita, which we name as the Cubic Water Kuznets Curve (CWKC) and identify three stages of this relationship. During the first stage, per capita urban water consumption increases with economic development and reaches a peak consumption volume. During the second stage, water consumption per capita decreases despite continuously increasing GDP per capita. During the third stage, as economic development reaches a very high level, water consumption per capita stabilizes or begins to increase slightly.
This finding shows that the turning point and the determinants of the CWKC become important to the developing countries. It demonstrates that the long-term water policies that are properly designed and rigorously implemented can mitigate the stress of water demand in urban areas. These developing countries can then reach an earlier inflection point in the CWKC, thus improving the balance between economic development and environment preservation.

In the remaining part of the thesis, based on the triangular interrelated relationship framework among the government, businesses and individuals, we conduct a comprehensive study of urban water management reform in China with a focus of policy analysis, in which we attempt to answer our second research question.

The policy analysis in Chapter 3 is the first comprehensive research on the neo-liberalist policy adoption in the largest developing economy—China since the reform in 1979. Although neo-liberalist reform of water sector was adopted by many countries, both in the North and the South, developing countries encountered many troubles and failures during reform when they simply adopted the reform of the North. It is arguable that the different development stages and endowment conditions in developing countries require modification of the North’s neo-liberalist strategies on urban water management reform. Our study demonstrates the success of the urban water management reform in China and provides in-depth analysis on the reform. It is thus not only useful for the Chinese water authorities and policy-makers but also valuable to the water authorities and policy-makers in other developing countries.

Although water privatization is already adopted in many countries since 1990s, the debate on water privatization is still fierce. The advocators believe that water privatization can address the problems of inefficiency, lack of financial resources and the corruption in the publicly owned water sector, whereas the opponents argue that the profit-seeking character of private sector will lead to unaffordable water price and destroy the public good character of water. By the end of 1990s, the dramatic withdrawal of multinational water corporations from the South and a number of conflicts taking place in these countries seem to suggest water privatization doesn’t work in the South. However, on the other hand, we have witnessed the active participation of multinational water corporations in China and the fast growth of Chinese water sector. Our firm level empirical analysis of Chinese water sector in the Chapter 4 based on Stochastic Frontier Analysis and Parametric Generalized Malmquist productivity index demonstrate the success of the privatization reform in the country.

The ownership of water sector varies in different countries. In some countries, such as the UK and France, water sector is completely owned by the private firms. While in some other countries, such as The Netherlands and Norway, water sector remains in the public hands. Water sectors in many other countries have mixed ownership. Each model has successful examples and failure cases. Therefore, it is irrelevant to discuss whether the water privatization is effective or not without considering the economic conditions, the government capacity and the natural
endowments of a country. Our study shows that privatization could contribute to the productivity growth of water sector in the developing world, under strong policy intervention and government supervision. Our empirical research in Chapter 4 is the first study examining the productivity change of the Chinese water sector based on firm-level data and contributes to the empirical literature on productivity in the water sector.

Water conservation is promoted through public participation policies in China. The synthesis of individual behaviour determines the outcome of an entire society. Individuals’ behaviour is affected by fiscal incentives and social obligations; in the long-term, their behaviour is largely determined by their intrinsic motivations. Therefore, by examining individuals’ environmental concern and water consumption behaviour evolution and related impact factors, our study in Chapter 5 provides a much needed evaluation of public participation policy in the past and offers recommendation to future improvement. Based on the four waves of the World Value Survey (WVS) data, we in Chapter 5 show that the public participation policies stimulate individuals’ environmental concern and water conservation behaviour in China. Contrary to previous studies that focused on the individual level only, we adopt multilevel regression models to investigate the determinants of environmental concern at both the individual and provincial level, providing more robust evidences.

In summary, in this dissertation, we conduct an in-depth analysis on the pattern of urban water consumption and provide a comprehensive investigation of the urban water management reforms in China. The academic community, water authorities and policy-makers in developing countries are the audience of our research. The Chinese water authorities can learn from our research and address the problems in the future policy design and implementations. The water authorities and policy-makers in other developing countries can learn from the Chinese experience and better adjust their water management strategies based on their local circumstances.

In addition, our study in Chapter 4 provides a useful tool for water policy-makers and water authorities to evaluate and regulate the sector. Water policy-makers can use our method to gain insights into the efficiency of water firms during policy implementations. In fact, the Chinese government and water authorities have launched a pilot project to construct a benchmarking system in the water sector in China. Our research and methodology can serve as a valuable example for such a system.

Our finding in Chapter 5 is very valuable to policy-makers, especially to those in developing countries. By recognising the existence of an N-shaped relationship between environmental concern and per capita GDP, policy-makers can focus on the second stage of the environmental concern curve, namely, the period when the environmental concern decreases with income. Specific policies and more effort should be used to shorten that period as much as possible. The Multilevel Analysis used in this Chapter can also be used by the policy-makers to monitor and analyze
the change of citizens’ environmental concern over time, which can provide further guidance to policy design and implementations.