

# **The dynamics of water policy change in South Korea**

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## **Abstract**

This paper explores the dynamic evolution of water quality policy in a hierarchical country like South Korea since the 1980s. The stage-based institutional analysis explains the South Korean water policy process as a set of incremental change stages. Additionally, the normative approach is used to complement the rational institutionalism as it is less capable of addressing the motivation and initiation of change. Based on the lenses of shift in governance as water reform ideas to Korean case, strong national government initiatives on water quality face the intrinsic problems of a centrally driven process of water reform. Adopting new policy tools and ideas without building up formal and informal institutions of collaborative governance has led to the limited and selective operation of innovation for better water management.

Key words: water policy change, institutional approach, governance change, collaborative governance

## 1. Introduction

Over the last decade we have observed significant developments in environmental policy in Korea, particularly in terms of innovation, which many scholars believe was mainly triggered by a chain of water pollution accidents in the late 1980s and the early 1990s (See Koh 1995). However, more elaboration is needed to analyse the significant policy changes, in particular, since the mid-1990s. Scholars have become aware of dynamic interdependence between formal and informal institutions in the water policy change of South Korea. For example, the roles of policy networks by Park (YS 2002), water management paradigm by Park (SJ 2004) are the key features of Korean water policy change. In particular, Park (SJ 2004) argues that there has been shifted towards IWRM based on the comparative analysis of water policy in the US and South Korea, despite contextual challenges and consequential limits. Jeong and Koh (2002) researched the first voluntary regulation agreement between government and a community group. However, the study of macro policy change with in the recent development of innovative institutions is underexplored, and this is where this research comes in.

Change itself is not surprising in water management, but the mechanisms of change matter. There have been many calls for the radical reform of water management in policy tools as well as the way of management in a number of countries since current arrangements are failing to provide essential water services, including water pollution control (Rees 1998; Sepala 2002). Contradictorily, there is little empirical evidence suggesting that such radical reforms actually take place.

In this paper, we argue that policy change process is the result of interaction among policy entrepreneurs and normative rules such as governance

style based on the given but evolving institutional settings. Analysts who have adopted an institutional approach suggest that the policy system (processes, organisations, laws etc) is rarely designed from one perspective but is subject to path dependent change and grounded in socio-political, cultural contexts which are themselves subject to only gradual shifts. The stage based notions of Saleth and Dinar (2004) provides an excellent explanatory framework for incremental change itself in water institutions based on rational choice approach. Nevertheless, the rational choice cannot explain why the norms of policy reform have been adopted in certain countries when not in others (Mollinga 2001).

Accordingly, the normative approach is adopted as a complementary framework in the analysis. In particular, the shift in water governance change among water reform ideas is used to examine the incremental water quality policy changes in South Korea. This paper raises the following questions on water policy reform and changes: To what extent have reactive reform measures in water quality policy evolved in South Korea? Which type(s) of governance dominate during gradual innovation and why? What have the relationship between policy change and shift in governance style brought?

The next section discusses how new institutionalism provides the necessary theoretical and methodological tools for the analysis of policy changes. The main part of the paper consists of an exploration of public documents for a case analysis. This section, after a brief description of the water resource and pollution situation in South Korea, will consider three phases of water quality policy evolution. These findings form the basis of the argument presented in the conclusion that a modified stage-based insti-

tutional approach may present a convincing explanation of water quality policy change.

## **2. Theoretical background: water policy change and stability**

### **2.1 Institutional stability of policy changes**

The significance of water institutions for policy reform has gained more attention as Williams (1994: 3) indicates “policy prescriptions, which have moved from 'getting the prices right' to 'getting the property rights right', now centre on 'getting institutions right’”. This paper depends on the institutional decomposition and analysis (IDA) framework developed by Saleth and Dinar (2004), which is used to recognise changes in the institutional structure of water policy, the legal system as well as the institutional environment as exogenous influences, and to examine their relationships in the water policy evolution process. They argue that it is natural and economically sensible for institutional change to occur in a gradual way in reality as this minimises the transaction costs of reform.

Despite the excellent explanatory power of the IDA framework, it depends on the rational choice analysis, which is not sufficient to understand less rational, but politically motivated and/or normative reform processes (See Mollinga 2001), which are quite common features of water resource management. We argue that the demand for changing the way of managing water resource, works as driving force for water reform. In the next section, the current water reform ideas and their relationship with institutional change will be addressed.

## 2.2 Change or adding-in of water reform ideas

The last two decades have brought substantial shifts in the role of the state and emerging notions about informal institutions as well as formal state organisations (Carney and Farrington 1998; Pierre 2000). Water resource management is not an exception to this trend. It is a classical case of government failure that segmented governmental agencies are ineffective in handling the complex nature of water management (Koh 2002). Yet, attempts to ‘marketise’ water resources due to the government failure in water management have been evaluated and generally shown to have not been as successful as liberal economists’ originally thought. Hence, the management problem has been regarded as “the challenges of implementation and the problems of governmental steering in complicated systems of interdependence” (Bressers et al. 1994: 4-5).

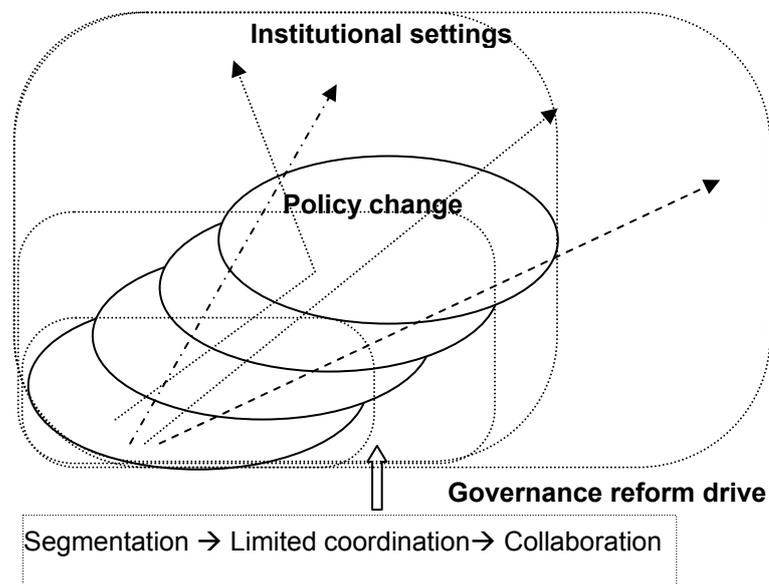
In order to response this intricate nature of water reform, various international conferences and practical experience brought major streams of innovation ideas: treating water as economic goods (Winpenny 1994) e.g. water pricing reform, integrated water resource management (IWRM) (Jønch-Clausen 2004), decentralization (Mody 2004) and collaborative water governance<sup>1</sup> (Heikkil and Gerlak 2005) from stakeholder participation to notions of partnerships (Sabatier et al 2005). Apart from rationalising water investment system such as pricing reform, the way of managing water resource is recommended to progress from segmented management

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<sup>1</sup> The recent reform idea, collaborative water governance, or co-management, refers to ‘a group of diverse stakeholders, including resource users and government agencies, working together to resolve shared dilemmas’ (Heikkil and Gerlak 2005: 583).

towards more integrated and participatory governance, collaborative water governance. With the complex nature of recent water reform, this paper proposes that the notion of water governance has motivated a practice of continuous innovation.

However, this notion of reform itself is normative ideas in nature; thus, it is hard to generalised particular prescriptive approach would work in specific contexts. Therefore, it is more plausible that to combine the notions of governance reform ideas with Saleth and Dinar’s IDA framework in order to understand policy change process as the interaction among policy entrepreneurs and normative rules such as water reform ideas within institutional settings (See Figure 1). In the next section, after brief description on general water management in South Korea, the water quality policy change will be analysed based on the combined analytical framework.



**Fig. 1. Institutional change in water management**

### **3. Analysis**

#### **3.1 Water management in South Korea**

##### ***Water conditions and supply for economic growth***

South Korea is located in the south of the Korean peninsula (total area is 99,912.95 km<sup>2</sup>) and about seventy per cent of the country is mountainous. Korea is in the moderately humid zone on medium latitude, the yearly distribution of precipitation is concentrated in the summer. During the rainy season from June to September, 66 percent of the annual average precipitation of 1,274 millimetres falls, often causing the flooding problems through the highly populated valleys<sup>2</sup>. The total basin area of the ten largest rivers in Korea is 74, 963 square kilometres, constituting 75 percent of the national total. The longest river, the Nakdong River basin, accommodates a population of about 12 million, while the largest river basin, the Han River basin, has about 17 million inhabitants. Major population concentrations and industrial facilities are located near the downstream areas of the major rivers and the great priority for water supply is given to domestic and industrial uses (Shim and Lee 1996).

Both major policy instruments in the 1970s (the Integrated River Basin Development Plan for four major rivers and Comprehensive Development plan for the Han River) were dedicated to enabling economic growth. As one of the main roles of government is to supply water, the total capacity

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<sup>2</sup> South Korea's population density is 481/km<sup>2</sup>, one of highest in the world. About 89% of the population lives in the urban area(2003).

for public water provision in Korea has been improved, as judged by indicators, such as the population with access to piped water supply, which shows an increase from 79.0 % (1991) to 89.4% (2003) (OECD 2006). In order to overcome the physical limitations of water supply conditions mentioned above, and, to support the rapid economic growth since the 1970s<sup>3</sup>, numerous artificial dams and reservoirs have been built and have become the main water supply source. Of the overall installed water supply capacity of Korea (33.5 billion tons in 2004), river flow accounts for 42.7% (14.3 billion tons), lake and reservoir supplies 46.0% (15.4 billion tons) and ground water 11.3% (3.8 billion tons) (PCSD 2005). In terms of water usage, agriculture (61%) is the heaviest user, and the amount of industrial water use (12%) is least (*Op cit.*).

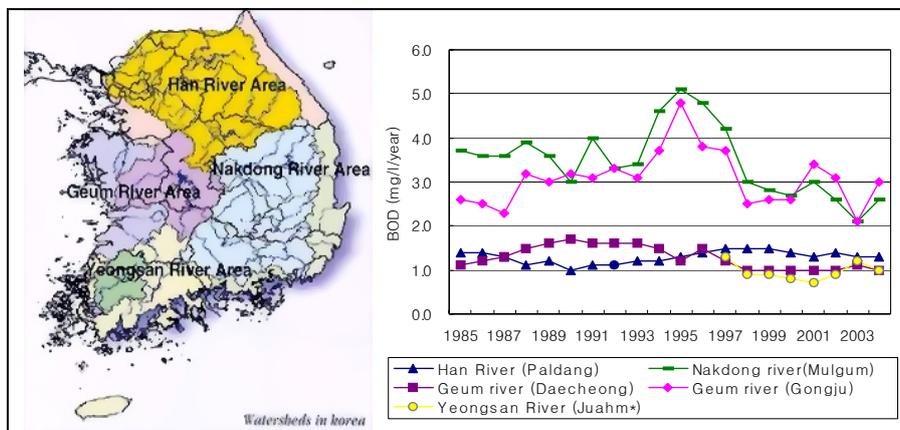
#### ***Water pollution: Problem malignancy***

The country remains dependent on its rivers as the primary source of drinking water and other usages; there is 90% dependency on the rivers (incl. dams (Han 2000). This represents a serious challenge to conventional water resource management given the degradation of water quality. For example, Biological Oxygen Demand (BOD hereafter) concentration downstream in the Nakdong River at Mulgum, which supplies water to more than 4 million people, went up to 5 mg/l/year (Figure 2). In addition, eutrophication has been identified as a chronic water quality issue in the artificial lakes situated in some river basins, such at Paldang on the Han River, Daechong on the Geum River, Juahm on the Youngsan River and Mulgum on the Nakdong River where the lower reach is blocked by a dyke

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<sup>3</sup> Dramatic changes in river environments, such as increasing channelisation of riparian areas (4,600km in 1967, 6,412km in 1981 and 17,186km in 1982) and the building 14 multi-purpose dams with 12 reservoir dams, have taken place over the last three decades (Lee, M.H. 2003).

(OPM, 2002). Furthermore, non-point source pollution has become the latest agenda for water quality management since the late 1990s. Though vast investment in waste water treatment facilities has been conducted in the four major river basins, it appears that conventional water quality policy cannot deal with non-point source pollution, for which the portion of the pollution load is forecast to increase from 28% in 1998 to 43% in 2020 (PCSD 2005).



**Fig. 2. Changes in the BOD concentrations in the four major rivers (1985-2004)** Source: Adapted from the Korean National Statistical Office, Korean Statistical Information System ([kosis.nso.go.kr](http://kosis.nso.go.kr)), the Ministry of Environment ([www.me.go.kr](http://www.me.go.kr))

### **Water management agencies**

Water resource management and economic-social development in South Korea remain in the hands of public bodies in a largely fragmented and segmented way, with water quality and quantity under different agencies (See Table 1). Such segmentation has been the case since the 1950s, when the Republic of Korea was founded. Land use and river management managed by MoCT often contradict the water quality management of MoE,

which has been heavily criticised by environmental NGOs (PCSD 2005). The details of management structure and challenges along with the evolution of water quality policy will be analysed in the next section.

**Table 1.** Fragmented roles of division in Korean governmental agencies\*

	Policy /plan	Main management targets
MoE	Water quality conservation Plan Green Vision	Drinking water and sources
MoCT	National Water Resource Plan	Rivers & Flood control Public surface water and reservoir Ground water (quantity)
MoAF	Agricultural and fishery water usage	
MoCIE	Rural development plan	
MoGAHA	Protection from natural disaster	Spa

\* see Reference II: Abbreviations.

Source: Kim (S.H 2002), Watershed management in Korea, World Watershed Forum

### 3.2 Three stages of water quality policy change

Before the evolution of water quality policy is analysed, the socio-political change in South Korea for the last two decades needs to be explained. In brief, the political landscape of South Korea can be characterised by three central aspects: Political democratisation in the late 1980s, the growth of civil society led by nationwide NGOs since the 1980s (see Armstrong 2002) and the adaptation of the local autonomy system in 1995

(Choi and Park 2001), which has given a slight push towards the decentralisation of a traditional, centralised nation-state. In addition, the economic crisis of 1997-98 brought new liberal ideas to public service and government structures.

***Command-and-control regulation of water quality control measures (1989 ~1994)***

After the shocking water pollution in the drinking water and the Nakdong River as a main water source in 1988 and 1989, the first ever nationwide policy measure for water quality protection, the Comprehensive Measure for Clean Water Provision, was announced in September 1989. The Environmental Agency, which set up the comprehensive plan, was upgraded to the Ministry of Environment (MoE) in 1990, a change which heralded the stricter regulation of water pollution and increased investment in treatment facilities. MoE expanded its capacity with increased financial support and transferred functions from MoCT and the Ministry of Health in 1994, although subsequently monitoring and local water service provision were handed down to local authorities<sup>4</sup>. An example of this was, when the Prime Minister Han Duck-soo announced the creation of the apex cross-ministry committee, the Water Policy Coordination Committee (WPCC hereafter), under his Office in order to stem the soaring public distrust of government because of the continuous water pollution accidents.

Accordingly, this stage of water quality policy in Korea can be called ‘the era of water pollution accidents and reactive policy’. Koh (1995) finds

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<sup>4</sup> The transfer of all enforcement duties in water quality management to local authorities was realised in 2002. However, Koh (2002) and OECD (2006: 17) point out that local capacity in water management needs to be improved with the support of central government.

that the key reason for water policy change in the late 1980s up to the early 1990s was a series of water pollution accidents rather than governmental initiatives. She criticises the package of water quality control plans at that time as myopic, prescriptive and based on the lack of transformative perspectives in central government agencies such as MoE. Given that MoE was a young and relatively small agency, it was not strong enough to negotiate and compete against the traditionally strong initiatives of resource development launched by MoCT. For example, while MoE set up the water quality standard, stricter discharge standards and expanded land use regulation in the water source protection areas, MoCT applied the deregulation of zoning policy in 1993, which contradicted the precautionary regulation on pollution control in the water source areas.

Despite the limited capacity of water quality management and conventional segmentation problem, Korean water quality policy became dramatically progressive during the 1990s, as did the compressed and rapid economic growth of the nation over the last three decades. Central government agency-dominated, end-of-pipe regulation and limited devolution to local authorities adopted the basin-specific policy in the mid 1990s in order to deal with chronic water pollution in the major water sources, the four large river basins.

#### ***The place-based management in four major river basins (1995~2005)***

The 2<sup>nd</sup> stage of water quality policy in Korea started in 1995, when the President announced the long-term environmental goals and strategic plan, Green Vision 21. Organised by the apex state body, the Comprehensive Measure for Water Management (CMWM hereafter), announced in 1995 and legalised in 1998, adopted a more participatory and river basin-based decision making with increased financial support. The measure involves

precautionary policy tools such as riparian buffer zones, purchasing protected land, a total load management scheme of introducing a local pollution allowance balancing the development impact and increased investment in water treatment and pipe management (See Table 2).

**Table 2. Key features of CMWM (1996~2005)**

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- Reshaping of Watershed Management Organization, River basin-oriented institutions
  - Total Pollution Load Management System: voluntary in the Han River, compulsory in the three other major rivers
  - Water Use Charges paid by consumers of water provision in the downstream areas, Watershed Management Funds
  - Designation of Riparian Buffer Zones
  - Purchase of land near drinking water source
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However, the measure was criticised by experts and environmental NGOs since the main policy tools centred on water quality issues and compensation for the regulation in the upstream regions, which was less than the demands for more radical measures, e.g. introducing integrated management to address segmentation of water organisations (See Lee et. al. 2005). MoE made claims for the policy characterising it as a “newly adopted integrated river basin management” based on the public consultation process before the legislative process such as more than 420 open forums and public hearings from 1998 to 2002. However, this participatory policy making process did not lead to the innovative institutional change

needed and the only change of water institutional arrangements was the newly organised river basin management committees. Moreover, the fragmentation of river management among national agencies and local authorities persists and the coordination within each committee, which on average only meets once a year remains rhetorical. Despite the radical application of public participation in the policy making process, governance structure did not forward more collaborative governance and remains at the limited coordination level.

Notably, the beginning of the new century has seen mixed outcomes of the water policy reform package that has been introduced since the mid 1990s: strong legislation in all four major river basins had completed by 2002 coexists with the continuation of chronic water quality degradation problems. For example, the first special measure in the Han River basin was to raise water quality to the first degree of water source standard. However, the persistent degradation of water quality has meant the Han river has remained in the 2<sup>nd</sup> degree (Lee et al. 2005). In the mean time, MoE, by creating the Watershed Policy Division<sup>5</sup> in 2003, paved the way to reinforce the top-down watershed-based management of CMWM. Even though this division published the idea of watershed community and has financially supported the voluntary groups at the community and sub-basin levels, it is considered as more centralised governance because the official institutional arrangements have been stable in the form of rhetorical basin committee within fragmented water management.

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<sup>5</sup> The watershed policy division started to gather scattered functions of basin management under the priority of drinking water provision, inside MoE, then, it drafted the recent long-term plan for Water Environment Management in 2006.

Consequently, a new way of public involvement has turned out to be marginalised because co-operative water management cannot be planted into the hierarchical and largely symbolic operation of newly established river basin committees. While these state-led prescriptions muddled through opposition from residential groups and interstate partners, new forms of cooperative initiatives, government-nongovernmental organisation partnerships became noticeable over the urban, sub-basin levels in the late 1990s, as they had done in Europe and the US since the 1980s. For example, the Daepo Stream case is regarded as proof of participatory governance in South Korea. It is the first symbolic case of voluntary agreement over water conservation by community group (Jeong and Koh 2002; Park SJ 2005). Arguably, this voluntary regulation experience remains an isolated success as the second negotiation attempt by MoE over stricter regulation in the Paldang Lake has been on-going for more than 5 years thus far. Not surprisingly, the contrasting outcomes of recent community participation shows that often, the reality is quite different from what it is branded by the government agency in charge, as Freeman (1997) points out. Therefore, as yet collaborative governance can not really be said to have started in South Korea as it has been claimed, moreover, the delay of innovative governance is related to the path dependence from the process of centralised water policy reform. The new style of collaborative governance hasn't been rooted in South Korea yet: water quantity and quality are managed separately at the national level, while voluntary water partnerships remain islands of new experiments.

2004 and 2005 saw the interesting end of the 2<sup>nd</sup> stage in the Korean water quality policy process. In 2004, the new president, Mr. Roh chose sustainable water management as one of the 100 current national agendas to address during his office. Re-structuring water management at the highest

level of government was the outcome of constant debate among government agencies, water experts and NGOs, led by PCSD since its creation in 2001<sup>6</sup>. The powerful PCSD managed to build up consensus of stakeholder groups and put forward the agreed outcome through discussions with co-ordination committees under the PMO during a period of nearly two years research. Another impressive experiment in 2004~2005 was the National Water Resource Plan Update, which organised experts and various groups of stakeholders at the national, local and community levels. The radical reform was recommended by PCSD and conducted by MoCT, which is in contrast to the less transformative and centralised CMWM. It was a radical social learning process for MoCT to become adaptive in order to address uncertainty of water demand and supply forecast through more open consultation and co-management process after the cancellation of the Youngwol Dam project due to strong environmental concern.

In 2005, PCSD recommended that the President set up the integrated water management plan and its respective legislation, the Water Act, to solve the segmented water management structure among government agencies, in particular, MoE and MoCT. Three scenarios were prepared because it was too controversial and uncertain to select one idea<sup>7</sup>: a water coordination committee under PMO - similar to WPCC-, the amalgamation of MoE and the water-related organisations in MoCT and the Water Management Committee, a powerful apex committee with planning function under PMO (PCSD 2005). In the meantime, WPCC was closed down in 2005 during the rationalisation of cross-government committees. Al-

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<sup>6</sup> Major works by PCSD involve an 'Improvement plan of a long-term water resource plan (March 2001)' and 'Public hearing to improve a sustainable water management system (April 2003)'.

<sup>7</sup> One of the authors was a member of the expert group to conduct the research.

though this apex committee had been the face of place-based measures in the four river basins since 1995, water experts and the media had constantly been suspicious of WPCC and the sub-working group had not been capable of co-ordinating the conflicting interests of governmental agencies, in particular, since WPCC failed to solve the conflicts between the development and conservation of the Saemangeum sea marsh in 2001 (Hankook Ilbo, 20/10/2005). Finally, the President and cabinet members decided to set up the Water Management Committee and to enact the Water Act with a co-operative draft proposal of MoE and MoCT in October 2005. The most recent stage of water quality policy has moved on to stage 3 after the President's active intervention in 2005.

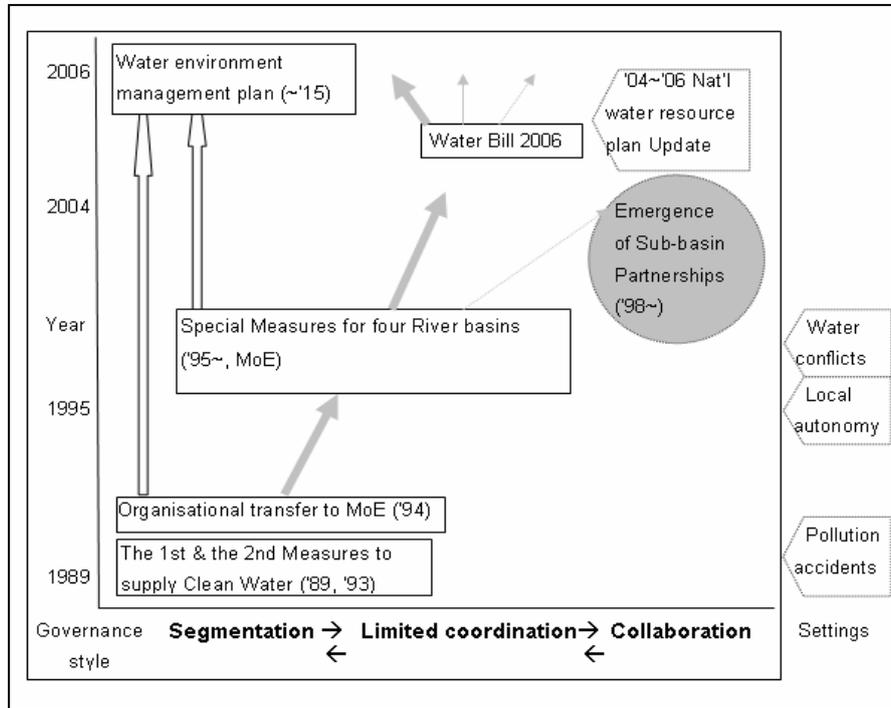
***Water Bill Legislation and Eco-conservation (2006 ~): progress or regression?***

The most recent stage of Korean water quality policy has just started and is clearly on on-going process. The reason the authors regard 2006 as a watershed year, which could usher in a new era for water quality policy, is based on two rather contrasting institutional developments and the end of the 2<sup>nd</sup> stage as Special Measures in the major four rivers finished in 2005.

Firstly, legislation of the Water Act is underway: the MoE and MoCT submitted the Bill to the Ministry of Government Legislation (MoLEG) in 2006. The Water Bill is at the stage of 'Public notice concerning legislation' after the public consultation process. It is soon to be handed over to the Parliament for actual enactment. The realisation of long-expected integrated water resource management is historical because of the Water Bill itself, as well as the close co-ordination between two rival agencies. As the legislation process hasn't been completed, it is not yet possible to declare the better co-ordination an evolving aspect of Korean water governance. If the Water Act and its legislation process will proceed as planned, central

government has to show a clear but integrated plan to develop multi-level water governance, which is not created and running by different directions of fragmented organisations. However, the further study needs to follow up this on-going evolution of water institutions.

Secondly, MoE set up the new long-term plan on water quality, the Water Environment Management Plan (2006~15). The plan differentiates itself from the previous water quality management plans by including ecological improvement as a goal of the plan and stressing non-point source control, in order to deal with chronic ambient water quality problems in the rivers and the lakes. In addition, the plan includes water demand management, so the Watershed Policy division created in 2003, led the focus of water quality policy in MoE from drinking water and water source by 2005, to the literally comprehensive plan of wise consumption and the conservation of interconnected water systems from nature to end users. In a positive sense, it appears that the plan and the active involvement of watershed division within MoE have finally realised the MoE's own claims of integrated river basin management since 1995. However, the direction toward integrated management within the boundary of MoE is to be limited. In particular, the long-term plan of water quality goals without a clear vision of collaborative management with community and local participants, arguably, puts MoE backwards from the information sharing level of public participation during the 2<sup>nd</sup> stage.



**Fig. 3. Water quality policy & Governance style change in South Korea**

Figure 3 summarises the dynamics and continuity of water quality policy in South Korea. The first generation of water quality policy, i.e. command and control, strong regulation of water treatment and land use co-exists with the second institutional design based on the four large river basins. The focus of water quality policy for drinking water provision remains the strongest rationale for MoE, however, the third generation of policy in MoE and the Water Act legislation shows a more comprehensive improvement in water governance in South Korea. In the meantime, collaborative governance has started to gain its niche outside the boundary of the MoE's operations: temporary participatory planning of National Water Resource Plan Update (2004~5); voluntary emergence of sub-basin water partnerships between local governments and NGOs. As the OECD (2006) recommends more active reform in governance structures by adopting

IWRM principles, and now the strong inertia of state-controlled water management in South Korea that has survived for the last two decades will have to answer the international pressure as well as the bottom-up experience of co-managements in the future.

#### **4. Conclusion**

In the beginning, we argue that the process of policy change is the inter-related movement among policy reform ideas and policy entrepreneurs' involvement within institutional settings. The stage-based institutional analysis explains the South Korean water policy process as a set of incremental change stages. It divides Korean water policy evolution into three periods of institutional change and continuation: command-and-control regulation under the water quality control measures, participatory and place-based management in four major river basins and, finally, integrated ecological water management. Despite its explanatory power, the rational institutionalism is less capable of addressing the rationale for policy change and its bounded rationality. In this sense, the evolution of normative reform ideas, in particular, in governance style, is adopted to re-examine the incremental water policy change.

Based on the lenses of shift in governance style from segmented management to collaborative governance, the national government and its central agencies are believed to be the major players in enabling and accommodating continuous reforms thus far, which includes the new approach of collaborative governance. According to the case analysis in this paper, Korean water quality policy at the national level has been expanded and evolved from sanitation treatment and supply-oriented development by fragmented national agencies to ecological river management planning.

Not only problem malignancy but also calls for governance reform have acted to push the centralised regulation focused policy into more participatory governance. MoE is the main policy entrepreneur in water quality management. Though MoE has played a major role to shift the traditional way of top-down and elite decision making to a more 'plural model of public policy making' (McLaughlin and Osborne 2000: 325), water policy reform led by MoE has been a rather an eclectic combination of contested new and old policy instruments, which have failed to tackle the fundamental problems. Therefore, we found that problematic water governance structure has been survived through three stages of policy reform process.

In conclusion, this study shows strong national government initiatives on water quality face the intrinsic problems of a centrally driven process of water reform in South Korea. Adopting new policy tools and ideas without building up formal and informal institutions of collaborative governance has led to the limited and selective operation of innovation for better water management. Additionally, the recent popularity of hybrid governance organisations such as water partnerships at a local level can even weaken the pre-existing drawbacks of centrally driven water reform.

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## Reference II

### - Abbreviations

MoE	the Ministry of Environment
MoCT	the Ministry of Construction and Transportation

MoAF	the Ministry of Agriculture and Forestry
MoCIE	the Ministry of Commerce, Industry & Energy
MoGAHA	the Ministry of Government Administration & Home Affairs
CMWM	the the Comprehensive Measure for Water Management
PCSD	the Presidential Committee for Sustainable Development
BOD	Biological Oxygen Demand
PMO	the Prime Minister's Office
WPCC	the Water Policy Coordination Committee
WQPA	Water Quality Preservation Act
OECD	Organisation for Economic Co-operation and Development
NGO	Non Governmental Organisation