**IIAS working group - History of Administration**

# Water Management as Collective Action in Time: A Multi-Level and Multi-Dimensional Challenge in a Multidisciplinary Context

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## 1. *Water as a Multi-Level and Multi-Dimensional Challenge of Collective Action*

Water is perhaps the most vital of all natural resources for the sustenance of life on earth. As a *natural resource* we take it for granted since it is available in abundance. 71% of the earth is covered by the sea. Interestingly, in the northern hemisphere 61% of the surface is water, while in the southern hemisphere this is 81%. Of all water on earth, 97.2% is ocean water, 2.15% is stored in glaciers and icecaps, and 0.65% is available in lakes, streams (i.e. visible water), groundwater (i.e., invisible water), and the atmosphere (visible and invisible water). Fresh water thus amounts to less than 3% of all water on earth. The sources of fresh water are detailed in table 1 below. When the ice sheets and glaciers are excluded, it becomes clear that 94% of our fresh water is stored in the form of groundwater (figures and table from: Tarbuck & Lutgens, 1991:76, 95, 296-297).

Table 1 *Sources of Fresh Water*

| | |
|---|---|
| Ice sheets and glaciers | 84.945% |
| Groundwater | 14.158% |
| Lakes and reservoirs | 0.549% |
| Soil moisture | 0.254% |
| Water vapor in the atmosphere | 0.049% |
| River water | 0.004% |

This fresh water is used extensively every day for a large variety of human "needs". The human dependency upon fresh water turns this natural resource into a *commodity* with a price. Introductory economics teaches us that commodification and scarcity are linked, although we cannot be really sure which comes first. It is in that situation that public authorities slowly but surely have come to assume responsibility for the *access to, containment and distribution of water*. From very early on in history governments regulate water and the degree to which varies with physical-geographical circumstances (e.g., aridness, delta, seasonal flooding, precipitation) and with population size and ~ density. Government-controlled water management emerges in more or less sedentary societies with urban centers. Exponential population growth since the 1850s intensifies the pressure upon and thus struggle for drinkable water. Fresh and clean water has by now become a very scarce product indeed, even though our senses register abundance.

For millennia people and their governments are mainly concerned with challenges of distribution of the available water quantity and with the containment of water. Concern for water quality, also a distributional challenge, is of much more recent origin, for it is not until the middle of the 19$^{th}$ century that health care professionals hypothesize a relation between water quality and the frequent outbreak of epidemics in urban areas. Since then, governmental control over water increase as a function of, i.a., population size and concentration. The pressure for good water is especially felt in the down-stream areas that are densely populated (such as, for instance, the western part of the Netherlands). More generally, the availability of good water is also a global concern given growing world population size. Where initially water management is a concern for local communities, it becomes from the late Middle Ages on a concern for local governments, and from the early modern age on also one for national government. Since the Second World War it achieves inter-national, supranational, and international importance.

The structure of this introductory chapter is straightforward. In section two the main objective and research questions will be presented. Section three is used for a brief discussion of collective action literature and literature on water management. In section four I will provide a theoretical framework for this comparative study. Given that the authors will select what it is that they desire to discuss in-depth in their country studies, in the substantive sections five to seven I will only briefly address the research questions in their national, inter-national (i.e., between individual countries), supra-national, and international (i.e., global) contexts.

## 2. *General Objective and Research Questions of this Study*

The objective of this study is to map the institutional development of collective action regarding water management with a focus on 19th-20th centuries. While the technological capabilities required for good water management cannot be ignored, attention for the technical and physical aspects of water management must remain limited in view of the

expertise of this working group. The membership of this working group is multi-disciplinary and includes scholars in the studies of history, law, political science and public administration. What connects this group is its interests in the history of government or administrative history. As a scholarly pursuit, administrative history is multi-disciplinary by nature for it seeks to pull together the knowledge and insights from various disciplines. Characteristic for administrative history is the emphasis on a developmental perspective (Nisbet, 1969) made possible by combining the strengths of different disciplines. The study of history thus provides knowledge of archives and historical events. The study of law provides deep appreciation for the importance of formal rules. The study of sociology sensitizes scholars to the importance of interaction and informal rules. All of the social sciences, and the studies of political science and public administration among them, provide theoretical frameworks with which development over time can be interpreted. The time that the study of history and the social sciences regarded each other with suspicion, while not yet entirely overcome, is superceded by a time in which each seeks to draw strength from the other rather than point out the weaknesses (see for contrasting views on this Thuillier and Raadschelders in Wunder, 1995:25-34, 263-267).

Given that the membership of this working group is international, a comparative perspective is inherent to its work. In this chapter a comparative framework is provided to help the authors of the various country studies in the selection of materials. The comparative framework is not intended as a straightjacket and hopes to leave room for flexibility. At the same time, though, the comparative framework is intended to assure that the country studies rise beyond being mere descriptions.

Each author is free to emphasize country-specific aspects in the institutional development of water management. They are free to organize their chapter in the manner they see fit, although an example outline is provided in section nine below. Chapters can be organized chronologically or thematically, but perhaps a combination of both is desirable. Thus, the various country chapters can be organized around the major theme(s) per period, such as, e.g., attention for health concerns from the 1850s on, attention for running water systems for consumption from the 1880s on, and attention for environmental concerns from the 1970s on. Each of these themes can be analyzed in terms of their influence upon the existing Institutional Arrangements (henceforth: IAs) and thus the degree to which these change as a consequence. People's expectations of water management change over time, and what once was a luxury (e.g., running water) is now taken for granted. It is also possible that authors recognize different IAs within one country given geographic and demographic differences between regions (see section five below).

Given that collective action regarding water management has become a multi-level and multi-dimensional affair that can only be understood in a multi-disciplinary context the main question for this study is:
*How have the institutional arrangements (IAs) for collective action with respect to access to and distribution and containment of water developed in the 19$^{th}$ and 20$^{th}$ centuries to be*

*addressed in terms of:*
*a) relation to society and state: ranging from purely private to purely public IAs;*
*b) catchment area or geographic scope of the IAs: from local to regional, national, inter-national, supranational, and international levels;*
*c) autonomy and embeddedness: from IAs specific to water management to IAs where water management is embedded in a larger whole;*
*d) motives: from traditional use (domestic, agriculture) to economic commodity and environmental concerns;*
*e) dominant actors involved: e.g., water engineers (i.e. technical capacity of government to conduct water management), civil servant generalists and the degree to which private actors are involved*.

There are at least three subsidiary questions that potentially are worth some consideration. First, some countries have a long tradition of collective action in water management. While our focus will be on the 19th and 20th centuries, *we should not disregard the extent to which these origins have helped shape current IAs*.

Second, given our focus on the modern era, in most countries water management had become a public, i.e. governmental, concern by the opening of the 19th century. We might, however, pay some attention to the question *when in each country water management came to be perceived as a public good*.

Finally, the inter-national, supranational and international scope of challenges in water management can no longer be disregarded. National policy- and decision-makers are increasingly involved in inter-national, supranational and international efforts to coordinate water policies. That being so, there is every reason to consider current institutional arrangements of national water management systems as a reflection of past national and subnational experiences. In the pressure for quick, ready-made, and - above all - guaranteed solutions, the (pen)ultimate decision makers may not always or not often have an eye for the path-dependent quality of their reasoning and proposals. A more explicit acknowledgment and assessment of the national heritage may very well contribute to satisfactory results. A developmental perspective on the strengths and weaknesses of the structure and functioning of existing water management IAs provides protection against blind and/or naive policy. In a short-term perspective history may appear efficient, meaning that we respond to current environmental circumstances without regard for past experience. In the long(er) term perspective, however, such blindness for the heritage of institutional arrangements can jeopardize policy success. A third question to consider, perhaps, is *to what extend these national experiences influence policy and decision makers when engaging in inter-national, supranational and/or international policy making?*

## 3. *Literature on Collective Action and on Water Management*

Presently water is everywhere a concern for public sector authorities, perhaps to varying

degrees, but still. *Grosso modo*, since the Second World War water management organizations and policies have been firmly embedded in the governmental organizations and policies at large. It is, however, not that long ago that organizations of water management operated on a semi-autonomous or even self-governance basis. The time that no water management organizations and/or policies existed belongs to a more distant past. In this section I will discuss, first, some theoretical literature regarding collective action, and, second suggest some sources for substantive literature on water management.

**a) *Theories of Collective Action***

Whether through private initiative or through public policy, water management has been for some time an object of **collective action**, defined as *the coordinated effort of a group of people to deal with a concern and/or problem that potentially jeopardizes livelihood in a identifiable community the solution to which is beyond the capacity of the individual members of that community*. The notion of 'coordinated effort' assumes that people are able to overcome 'well-understood self-interest', to use De Tocqueville's phrase (2000:502), and have the common good or general interest at heart. Interestingly, some of the most well-known and persuasive political theories and formal theories in the social sciences are based on the pessimistic expectation that people are not able to overcome their self-interest. Thus, Thomas Hobbes argued that government was a necessity if people wish to avoid anarchy and in *The Federalist* no.51 government was legitimized in the observation that 'men are no angels'. More formal theories appeared since the 1950s (Ostrom, 1990:3) but the three major theories date to the 1960s and 1970s.

Mancur Olson's *The Logic of Collective Action* (1965; see also chapter two in Olson, 1982) challenges the assumption that people with common interests would work together on a voluntary basis when they cannot satisfy their desires on their own. Olson's unit of analysis is individuals of which he believes that they cannot work together if the group composition is heterogeneous, i.e. dealing with diverse demands for collective action (1982:25), and fi the group size is so large that individual input into group action will not result in an identifiable individual gain (1982:31).

Three years after the publication of Olson's book, Gareth Hardin described the tragedy of the commons as one where it is rational for individual herders to maximize their profit and in view of short-term returns as the expense of the long-term effects of the deterioration of the regenerative capacity of the common pool resource. Also, he argued that if people were to work together in managing their commons, they should watch out for free-riders, those who profit from collective efforts but do not contribute their time or money to it.

Hardin's 'tragedy' has been formalized in the prisoner's dilemma game where both players select the same less than optimal strategy because they do not trust the other to select the most optimal strategy. Both Hardin's analysis and the PD-game suggest that individual rational strategies may very well lead to collective irrational outcomes.

Characteristic for the analysis by Olson, Hardin and in the PD-game is that the individual is the unit of analysis. The basic choice that this line of reasoning suggest is one between market (anarchy) or state. Other options are simply considered impossible. This has to with the basis of the analysis by Olson, Hardin and in the PD-game, which is that it departs from a legalist (in the Confucian sense) perspective that assumes that people etc. (Dror, 2001). As a consequence, the potential of free-riding is considered far larger than the potential for voluntarily subjecting individual interest to the common good.

Elinor Ostrom's landmark study (1990) rallies against these limited options and argues that a third way of collective action is possible, namely of self-governance, provided that this group of individuals, having defined a collective action problem, is able to overcome the problems of a) supplying a new set of institutions, b) making credible commitments, and c) mutual monitoring (Ostrom, 1990:42). Another difference between her analysis and that of the others, is that she is focused on small to fairly sizeable groups (between 50 to 15,000 individuals) rather than small groups only.

What connects these four theories is that they all assume substantial scarcity of the common good (as a consequence of which the aspect of competition is overemphasized) and/or the domination of self-interest in determining a course of action. Only Ostrom suggests that cooperation is possible between self-interested individuals (for other examples of this approach see: V. Ostrom et al., 1988; Blomquist, 1992; Bromley, 1992). All theories, however, focus on groups that are small to medium sized but not on entire societies. Furthermore, none of these models consider the possibility that a natural resource may well have multiple purposes because individuals are interested in different uses. With respect to water management we shall see (section four below) that water serves a large variety of purposes and has become a society-wide, and even extra-domestic, concern. Also, the theories discussed above focus on groups in single countries, and cannot simply be applied to efforts of cross-border coordination and cooperation. Finally, the collective action theories that depart from methodological individualism suffer from the risk of, to use Mouzelis' phrase, upward reductionism (1991:137) where sub-system or subordinate units and even individuals are ascribed so much autonomy that the system or superordinate unit becomes understandable only as an aggregate of subsystem and individual actions. Thus, collective action literature is relevant to this working group only up to the point where it is acknowledged that proper understanding of the institutional development of collective action with respect to water management requires that we approach it both from the institutional level of analysis as well as from the level of methodological individualism. The combination of macro- and micro perspectives will be further elaborated in section four.

**b) *Substantive Literature on Water Management***

An important source of information on development of water management policies since the early 19$^{th}$ century can be found in the literature of a variety of disciplines. By way of example:

a) *juridical literature*: e.g., water management law is among the oldest bodies of law in the

Netherlands;
b) *historical literature*: e.g., on development of local government functions;
c) *legal-historical literature*: e.g., within the literature on the history of state and administrative law;
d) *historical-geographical literature*: e.g., on development of interrelation between land and water, and
e) *engineering literature*: e.g., concerning technological design and capacity.

Information on the history and development of water management in a large variety of countries can also be found in the national country studies written under the auspices of the International Commission on Irrigation and Drainage (ICID; created 24 June 1950, headquarters in New Delhi) which is a non-governmental organization. In 1977 the ICID encouraged its national committees to conduct a study on irrigation and water management. These studies are specifically focused on the institutional arrangements for water quantity management (e.g., for the Netherlands: Van de Ven, 1993). Clearly this IIAS working group casts a much wider net, yet must restrict itself to fewer pages. Nevertheless it is worthwhile to explore the information available through the ICID (www.icid.org/nc1).

As far as I can tell, the attention in the study of public administration for water management in general, and certainly for the development of the institutional arrangements of water management systems is marginal if not non-existent. The strength of this working group's study will not be in the detail of specific aspects of water management, but in the sweeping overview of the most important existing institutional arrangements and the identification of the national, inter-national, supra-national, and international policy challenges that lie ahead.

## 4. *Theoretical Framework and Definitions of this Study*

In this section the theoretical framework provided for this study will consist mainly of identifying the theoretical approach and a definition of concepts (subsection a.) and a set of substantive definitions relevant to water management (subsection b.). A formal theory will not be developed.

a) *Theoretical Approach and Definitions of Concepts*
First, **institutional analysis** is defined as the study of the development of institutions and organizations over time. This is a very general and not too useful definition, but there is neither clarity nor agreement about what institutional analysis exactly is. Indeed, a variety of institutional analyses have been distinguished (Peters, 1999). At least there is agreement on the analytical difference between institution (which emphasizes value) and organization (which concerns structure) (Blondel, 1990:8-9; North, 1990:4; Uphoff, 1986:8-9). From the point of view of administrative history Uphoff's definition appears relevant:

> ...institutions, whether organizations or not, are complexes of norms and behaviors

> that persist over time by serving collectively valued purposes ... Some institutions have an organizational form with *roles* and structures, whereas others persist as pervasive influences on behavior. (1986:9; emphasis added)

In their respective definitions of institutions Douglas North and Elinor Ostrom emphasize the importance of *rules*, where institutions are rules of the game in society (North, 1990:3) or a set of rules-in-use "... by a set of individuals to organized repetitive activities that produce outcomes affecting those individuals and potentially affecting others." (Ostrom, 1992:19).

Understanding both roles and rules is characteristic for a dynamic approach to institutions which emphasizes their persistence over time. The fact that roles and rules of particular institutions are embedded in larger societal frameworks is emphasized in the following definition of institutions:

> A 'living' institution, then, is a collection of practices and rules, defining exemplary or appropriate behavior for groups of actors in specific situations. Such practices and rules are embedded in structures of meaning and schemes of interpretation which explain and legitimise practices and rules. (Olsen, 1995:5)

Institutional analysts argue that 'institutions matter' and provide the boundaries, or: define the arena, within which collective action takes shape. As methodological individualists can be criticized for upward reductionism, (historical) institutionalists can be charged with a downward reductionism (Mouzelis, 1991:137) that neglects attention to the potential for relative autonomy of subsystems and even individuals. More recently, Knill referred to this as the deterministic bias in historical institutionalism, which is that institutions are conceived as the only explanatory factor in disregard of the strategic interactions that help in the creation of IAs (Knill, 2001:4). Another analytical weakness of historical institutionalism he pointed out is its deterministic bias, given that most definitions of institutions emphasize their continuity and persistence. Change is limited to minor adaptations, while fundamental reforms are assumed only to occur under the highly exceptional circumstances of major social crisis or revolution (Knill, 2001:5).

Rather than regarding the system-level or the individual level of analysis as competing levels of analysis, Mouzelis argued that macro- and micro-levels of analysis are, and probably ought to be, complementary (1967:119) in such a way that the institutional level (he refers to it as values in the Parsonian sense, 1967:155) does not appear as a *deus ex machina* and the individual level not as the only actor that can act. As the study of groups and organizations cannot be reduced to a study of the psychology of its individual members, a study of organizations cannot be reduced to that of its members (i.e., both human beings as well as individual organizations) (Mouzelis, 1967:172). Knill argued along the same lines when advocating a combination of an institution-based approach (focusing on the role of existing IAs as independent explanatory variables) with an agency-based approach (with a focus on the role of individual human beings, and where institutions

matter as intervening rather than independent variables) (Knill, 2001:21-22).

Combining these two approaches is advantageous for this working group because it combines the developmental perspective, that is inherent to institutional analysis, with the contemporary perspective that constrains (at least partially) individual human beings as policy and decision makers.

Second, whether collective action is analyzed within a legal framework (which emphasizes public actors, i.e. again understood as human beings as well as individual organizations, as legal personalities) or within a social science framework (which explores the importance and limitations to or advantages of interest groups, in the western world it always involves the *determination and distribution of property rights*.

Third, collective action can be analyzed as a *multi-level issue* in at least three different ways. The first way emphasizes the rules and the embedded nature of these. Thus, Kiser & Ostrom (1982) distinguished between three levels of rules or action: those of operational, collective, and constitutional rules. Operational rules determine the day-to-day activities and concern literally who must do what, which sanctions are applicable in case of free-riding, which technology to apply. Operational rules function within the context of collective rules. The latter provide the policy and decision making dimension in that it concerns agreements about who can make decisions and how they have to be implemented. One can think, for example, of voting procedures, election procedures, weight of votes, and so forth. Finally, the collective rules are grounded in constitutional rules which basically provide guidance in the how and when of changes in collective rules. As changes in constitutional rules may trickle down (or up) and thus influence changes in the collective and operational rules, changes in the day-to-day operation of activities may ultimately become expressed in changes at the collective and constitutional rule levels (see also Ostrom, 1990:50-55). Indeed, it is characteristic for much legislation that it codifies a particular social reality that has existed for some time yet lacked formal expression in law(s).

Applying this operationalization of a multi-level activity to the subject of this working group, we need to identify for which policies the water management unit (within general or specific purpose government) is directly responsible for (i.e. executes) and which policies are under the jurisdiction of other public sector units. The actual water management tasks concern the *operational level of water management*. We then can identify the degree to which it is required that water management policy is coordinated with other policy areas (such as, e.g, zoning of industrial, agricultural, and residential areas, environmental policy). This aspect is especially concerned with the *collective level of water management*. Finally, the sources of primary and secondary legislation (e.g., water quality acts since the 1960s/70s) need to be identified that together formulate the objectives of water management and legitimize it. This regards the *constitutional level of water management*.

The second way in which the multi-level nature of collective action can be operationalized is by distinguishing between the production, provision, and governance of common goods. To keep it simple "...*provision* refers to decisions that determine what public goods and services will be made available to a community. *Production* refers to how those goods and services will be made available." (ACIR, 1988:1; emphasis added). It is a provision decision to provide a sewage system to a community (i.e. involving taxes and spending, service standards, monitoring) but who will operate the system (a public utility company, a contractor, a private entrepreneur) is a production decision. The provision and production of collective services are embedded in rules of governance, i.e., the basic structure of citizen choice and representation that determines "...the number and variety of both provision and production units." (ACIR, 1988:2).

The third way in which we can conceive of water management as a multi-level activity is by distinguishing between the specialists within a water management unit (e.g., scientists and water engineers) and the generalists, often position hierarchically above the specialists, within the same unit who are responsible for finance and personnel. This distinction, however, is an internal challenge to any water management organization. Given the embedded nature of contemporary water management policy (policies) the notion of multi-level activity should also include attention for the external competing interests, and thus focuses and degrees of (integration and fragmentation of water management in relation to other policy areas (such as, e.g., agriculture, industry, housing and zoning, environment) cooperation with other interests).

Obviously, most countries will have had centuries of experience with water management. It is generally not, however, until the late 18$^{th}$ century that water management becomes an object of conscious planning and policy making by public actors. Following some brief remarks on the major policy areas of water management, we should focus on the development of the balance between the traditional tasks (water quantity, dike management, and transport management: see below) and the more contemporary task (water quality) and how this affected the structure and functionning of the IAs.

b) *Definitions of Substantive Concepts Regarding Water Management*

In this subsection I will define four basic ways in which water management can be organized, provide definitions of concepts specific to water management, and identify various uses or dimensions of water.

1. *Institutional Arrangements for Water Management*:

The identification of four types of institutional arrangements is based on the assumption that they can range between pure market and pure public IAs (see figure two below). In the situation that the market is the dominant economic model, it is assumed that individual interests and preferences are balanced by an invisible hand. In the extreme of such a situation no institutions exist. Perhaps, we can argue that complete privatization of the provision and production of a public good comes close to this model, but we then must

regard that third element of 'governance' mentioned above. The pure case of 'no institutions' is probably moot. On the other side of the continuum it is government within the state that completely controls water management. In-between we find the so-called self-governing model (of which Ostrom's institutions for common pool resource management are an excellent example) and the semi-autonomous model where water management is conducted by concessionaires.

Figure 2 *A Continuum of Institutional Arrangement*s

| | SOCIETY | | | |
|---|---|---|---|---|
| Dominant economic model | MARKET<br>STATE | ☐ | | |
| Interest formation | purely private interests and preferences | collective interests and preferences | | purely public interests and preferences |
| Nature of collective action | 'invisible hand' | self-governing institutions | semi-autonomous | purely public or under supervision by public authority |
| Examples | England & Wales: drinking water, sewage, waste water privatized | CPR's (Ostrom 1990) | Dutch waterboards in Middle Ages | Belgium, France, Germany, Spain Netherlands, |

As already mentioned above, if water management is a public sector activity (because of municipalization and/or nationalization) we must identify whether it is organized within general purpose governments such as municipalities, regions/departments/states, and national government or specific purpose governments such as waterboards. Especially interesting is it to identify the degree to which overlapping authorities and a clear division of labor exists with regard to water management.

2. *Definitions of Concepts Specifically Relevant to Water Management*

Most countries will have some kind of water management system. Studying these in a comparative framework requires agreement about certain concepts to guarantee a focus on the same issues.

First, we need to define the concept of *water management*. Unto the late 18th, early 19th century this concept only referred to the physical activities involved in access to,

distribution of, and containment of water. It referred to 'the state of water management', such as the size of the flood plains, the strength of dikes, the capacity of windmills, and the duty of citizens to help in overseeing proper water management. Since some 200 years, the concept of water management has come to include the notion of government care for public health and safety. One of the unintended results of this is a slow but inexorable intertwinement of general purpose governments (e.g., municipalities) and specific purpose governments (e.g., waterboards). Hence in our day an age water management refers to the technical capacity and the institutional arrangements that are needed to meet the political goal of providing safety from and usage of water in the widest possible sense.

This definition of modern water management implicitly assumes a description of traditional and more modern water management functions. Hence, second, we need to define which functions traditional water management serves. For the purposes of this paper, I will distinguish between four:

1. *Water quantity management*: concerns the access to and distribution of water through regulation and control of inflow and outflow of *surface water* and of the storage of *groundwater* in the aquifers some meters below the ground level. This is the major function of water management from the Middle Ages on.
2. *Water quality management*: concerns the access to and distribution of fresh water through regulation and control for consumption. This is a function of water management that emerged from the 1850s on at local level and became a national government concern from the 1960s/70s on.
3. *Dike management*: concerns the containment of water through the protection, regulation and supervision of natural structures (e.g., dunes) and artificial physical structures designed to constrain excess water in rivers (from rainfall or meltwater) and to protect coastal areas from storm surges. This is also among the oldest functions of water management.
4. *Transport management*: concerns access to water through the regulation and control of transport functions.

Third, the expansion of water management functions and the increased call for cooperation and coordination with other policy areas has in recent decades been expressed in the concept of *integral water management*. For proper understanding of this concept, a distinction needs to be made between the *internal functions* and the *external functions of water management.* The internal functions of water management have been described above (see a. to d. The external functions of water management concern a consideration of the degree to which policies regarding the internal functions influence policies in areas such as, for instance, physical planning and zoning, nature and environmental policy, sewage management, rural planning, and housing. Integral water management is a concept developed in the study of public administration which refers to a policy based on linking the internal functions to each other as well as to the external functions (through centralization or network structures). Increasingly, planning and implementation of water management policies requires cooperation between and coordination of different public sector organizations.

3. *Water as a Multi-Dimensional Phenomenon*

Above I briefly mentioned that policy and decision making on issues concerning water is influenced by the various interests that people have respectively emphasize. This is a consequence of the fact that water has multiple uses, among which we can distinguish:

- household use: for consumption, sewage, but also recreation;
- production: agriculture, energy (electricity), industrial use (for discharge of waste);
- transport: tolls, traffic rules;
- protection: military/strategic (e.g., the Dutch water defense system), fire services;
- environmental: protection of pristine environments and rescue of endangered environments.

The multi-dimensional aspect is very relevant to this working group's task given that different interests may give rise to different types of IA's (in terms of organizational structure and processes of policy and decision making).

## 5. *Water Management as National Challenge*

The nature of the water management IAs) is determined by the *objective(s)* for it on the one hand and by the *physical-geographical characteristics* of the environment on the other. In Antiquity water was important for agriculture (e.g., ancient Egypt) and for the provision of drinkable water for the population (e.g., Roman aqueducts). From the Middle Ages on it was also a means to generate energy (e.g., Dutch windmills) for the processing of agricultural products (e.g., grinding grain, mustard seeds, oil seeds).

The physical-geographic characteristics determine the nature of collective water management arrangements. We could think here of the availability of *surface and ground water* (in, e.g., arid and 'wet' regions), the presence of *high and low grounds* (e.g., areas below and above sea level), the *seasonal variation* in precipitation and meltwater flows in rivers, lakes, and tidal flows (for sea-bordering countries), the *river basins* (i.e., the drainage area of a river, relevant to occurrence of floods), the *flood plains* (i.e., the area which is designated to be flooded in case of excess water; also known as *spillways*).

I assume that all countries will have challenges with respect to water quality management. Most countries will also have to deal with challenges of water quantity, the lack of it and/or the abundance of it through flooding and/or from melt and/or rainwater. In some countries water policy may be an issue of high political contention as, for instance, in Greece where water is withdrawn from the regions for the Athens population. The availability of fresh water is not a given, especially not in regions with higher grounds (e.g., in the east of the Netherlands) and in territories that depend on desalination (as in, e.g., Malta).

It is expected that no country represented in this working group is without institutional arrangements for water management. The second scenario in figure 2 is particularly interesting because, historically, water management arrangements developed

bottom-up and upon the initiative of immediately interested parties. In her continuing research of *common pool resource management systems* (CPR's) E. Ostrom pointed out that some of these water management systems originated in the collective action between private individuals. Examples she analyzes are the huerta irrigation systems in Spain since 1435, the irrigation communities in the Philippines since 1630 and she mentions also the Dutch waterboards existing since the $10^{th}$/$11^{th}$ centuries (Ostrom, 1990).

As time went by these self-governing or autonomous arrangements became linked to the system of general purpose governments (e.g., municipalities, provinces and regions, and, finally, national governments). Thus, water management systems became semi-autonomous. In the course of the $20^{th}$ century, most water management systems have been embedded in the national political-administrative system at large. The degree of interdependence varies with production (who actually manages water), provision (supply of water), and governance (who regulates):

## 6. *Water-Management as Inter-National and Supra-National Challenge*

The *inter-national level* regards the cooperation and coordination of water management policies between individual and neighboring countries. Four excellent examples of this are:
1. International Rhine Transport Treaty of Mannheim 1868;
2. The Rhine Water Treaty of 1963. Given the industrial pollution by, especially, chemical industries in the Rhine river basin an international Rhine committee was formed in 1950. The 1963 Bern Treaty formalized this effort. It was signed by France, Germany, Luxembourg, the Netherlands and Switzerland. The EU entered the treaty in 1976 (also the year of the Rhine Chemical Directive, 76/464);
3. Efforts to reduce pollution of the North Sea through cooperation between Belgium, Denmark, France, Great Britain and the Netherlands;
4. Cross-border cooperation in *cross-border or inter-national regions* such as those that exist between Germany and the Netherlands and between Belgium and the Netherlands.

Inter-national cooperation and coordination regards also both *direct pollution* by identifiable sources (e.g., pipes through which industrial waste is directly dumped in surface water, also dumping of sewage into surface water of rivers and sea) as well as by *indirect pollution* (also known as diffuse pollution, from agriculture and from the air, such as through industrial and car traffic exhaust).

At the *supra-national level*, within the European Union a variety of directives have been issued that directly (e.g., the Drinking Water Directive) or indirectly (e.g., the Environmental Impact Assessment, Community Eco-Management) influence water management. We could also consider the impact these had on redirecting national water management policies (as in, e.g., Knill, 2001).

Ever since the Club of Rome's report in 1972 there have been calls for cross-boundary cooperation between governments with respect to water management. Good intentions, though, do not necessarily turn into decisions and implemented policies. While within the context of a sovereignty a more or less coherent and consistent water policy can be possible, success or failure of inter- and supranational efforts depend upon the willingness of the participating sovereignties to consider a common good larger than the interest of their own jurisdiction. This is why water is not simply a natural resource but also a commodity subject to pricing, distribution, and restraint (e.g., pollution). It is also why policy and decision makers must not regard water management policy and its organization as a mere technical matter, but also - and preferably first - as a matter of institutional capability. Whatever is brought to the floor of inter- and supranational attention, is advanced by political and administrative representatives who take, and how could they otherwise, their own national experiences as point of departure. Surely this has something to do with familiarity and cultural wiring. There is, however, also a strategic dimension known as the *first mover advantage* (Knill, 2001:165), which is when one country takes the lead in a particular supranational policy and manages to convince others of the merits of their (national) approach. Within the European Union it is well-known that national leadership in advancing supranational solutions to policy problems is characterized by first mover advantage.

## *7. Water-Management as International or Global Challenge*

In terms of *international cooperation and coordination*, the United Nations has called attention to water as public property and to the need for improved control over this most vital resource. It has, indeed, been argued that water, rather than oil or other natural resources, will be the source of the most conflict in the 21st century. As important as the international or global challenge is, the working group cannot disregard it entirely, but as an issue of attention it is farthest removed from its immediate interest in the institutionalization of collective action in various countries.

8. *The Future of the Existing Institutional Arrangements*

By way of conclusion we can consider two major issues in the attempt to show that the developmental perspective is relevant for addressing contemporary challenges of water management.

First, how robust are the existing IAs in the face of physical-geographical changes such as climatic change (which is very difficult to say), inter-national competition for water (e.g. the Rhine Water Treaty, cross-border cooperation) and international efforts to protect the environment (e.g., acid rain)? Robustness can be understood in terms of the strength of the existing IAs in confronting and dealing with challenges of water management. It can, however, also be understood in terms of the rigidity if existing IAs in dealing with such challenges.

Second, to what degree should water management be under government control? Is it possible to consider that governments only exercise oversight or even privatize (aspects of) water management. This normative challenge is especially relevant in the context of increasing cross-border cooperation and coordination of water management policies, since only states can exercise the authority to make binding decisions.

## 9. *Example Outline of National Country Studies and Suggestions for Size and Format*

The authors of the national country studies could provide information about (some of) the issues discussed above and organized according to the following sections:

1. Introductory remarks on current challenges of water management (1 page);
2. Brief overview of origin and development of water management: when did collective action start, when did water management become a public good, etc. (1-2 pages);
3. Development of Organizational Structure of Water Management since the early 19th Century: the internal organizational structure of the water management unit(s) (3-4 pages) (see for possible aspects to be addressed, sections four and five above);
4. Development of Water Management Policy since the early 19th Century; i.e., the internal policy and decision making processes (3-4 pages) (see for possible aspects to be addressed, sections four to six above);
5. Interlocking of Water Management Policy with other Policies: i.e., the link between internal and external functions/policies (3-4 pages) (see for possible aspects to be addressed, section four to six above);
6. Inter- and Supranational Challenges: in terms of inter-national, supranational and international arrangements (3-4 pages) (see for possible aspects to be addressed, sections six and seven above).
7. Concluding Section on Meaning of Historical Perspective for Contemporary Policy- and Decision Making (1-2 pages).

The average paper size should be between 15-25 pages (line spacing 1.25). In the printed format as produced by ets. Bruylant each chapter ranges between 18-22 pages (including summaries in French or English). The total volume should limit to approximately 300 pages in print. The two working languages for this working group are English and French

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