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## WATER RESOURCES MANAGEMENT AT THE RIVER BASIN LEVEL: AN INSTITUTIONAL ANALYSIS

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**SUMMARY** - Water resources management at the river basin scale is, under the perspective of institutional analysis, a decentralization process aiming at maximizing socio-economic benefits related to water resources and minimizing transaction costs, in both the implementation of new institutional arrangements and the adaptation of existent arrangements to changing situations. After describing the two key-principles of decentralization and participation, the current work analyzes a number of important characteristics, factors and variables influencing the successful implementation of river basin management decentralization processes. The intent of this paper is to provide a practical tool for researchers and policy-makers, useful to describe – on a case-by-case basis – the performance of water resources management institutional arrangements at the river basin level.

**Key words:** river basin management, water resources institutional arrangements, decentralization, participation.

### INTRODUCTION

Integrated water resources management at the river basin level is - since the beginning of 90s - one of the key-themes of the world debate on water issues. The paradigm merges the two concepts of integrated management and of river basin management.

The first, defined as integrated water resources management (IWRM), broadly refers to the integration of the natural system and the human system into the management of water resources: the integration is aimed at reconciling the aggregate supply and demand for water through structural and non-structural measures, and to achieve sustainable water management under the economic, the social and the environmental profile.<sup>1</sup>

The second concept refers to the management of water resources at the river basin level, based upon the consideration that the river basin area constitutes a single inter-connected natural system (even if a complex system) hence it needs a corresponding coordination of collective decisions on that scale. For this reason, integrated river basin management is considered a particularly suitable form of implementation of the IWRM paradigm.

The institutional perspective for the analysis of river basin management aims to identify the institutional arrangements associated with concrete sustainable outcomes.

Moreover, the institutional asset and the dynamics of the processes of institutional change reveal the complex relations between managing water and the management of agriculture, socio-economic issues, and the natural environment. Thus, it is essential to consider the sustainable integrated management of water resources on a basin scale as a dynamic phenomenon, consisting of the process of balancing decisions through different needs and objectives, in a specific, uniquely-tailored way in every single scenario.

The implementation of water management at the basin scale means activating a process of coordination/cooperation between institutions and stakeholders. The process aims to introduce or reinforce institutional arrangements for water management at the basin level – not necessarily to create or strengthen an ad hoc institutional subject (such as a river basin organization).

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<sup>1</sup> For the definition of the IWRM concept, see GWP (2000).

The general target of the process is the maximization of socio-economic welfare related to water resources, through coordination of multiple activities and resolution of conflicts arising between different users about the limited resource base. It is then fundamental to identify – case-by-case – the main problems to be properly faced at the basin level, and especially those connected with negative externalities at the basin scale (e.g. water pollution, allocative problems).

Indeed, basin management is the result of interactions between different institutional subjects and different stakeholders in facing a specific set of problems, hence it has to be identified as a highly context-specific process.

For this reason, since it is difficult to formulate a standard setting of institutional arrangements (that is, an institutional model) expected to fit the situation of each basin,<sup>2</sup> the recent literature – mainly based upon a transaction costs approach<sup>3</sup> – aims at establishing a set of factors and variables related to successful outcomes, as result of wide case-study experiences of institutional performance at the river basin level in different countries.<sup>4</sup>

### KEY-PRINCIPLES: DECENTRALIZATION AND PARTICIPATION

Under the perspective of institutional analysis, river basin management is a process of decentralization in decision-making, to be implemented with an adequate involvement of the stakeholders in the decision-making process itself.

Thus, the two fundamental elements are:

- i) The achievement of *decentralization* at the maximum “appropriate” extent<sup>5</sup>
- ii) The activation and strengthening of *participation* among all the different stakeholders, as main component of the same decentralization process

As regards the first element, decentralization means organizing or re-organizing the institutional arrangements towards managing water resources on a basin scale, a process that generally implies a transition of powers and functions, from the central to the local level. But it does not univocally correspond to devolution. It has to be noticed that, in implementing a decentralization process in a specific setting, several functions can be opportunely provided by the central authorities and not devolved to the basin level.<sup>6</sup> On this purpose, the literature refers to the aspects of water management characterized by a “public good” nature (e.g. weather monitoring and forecasting, but even – to some extent – hydrological / environmental research, or flood control).

As regards the second element, participation can take various and different forms: transparency and accountability (participation as openness of decision-making to the public), consultation of stakeholders, negotiation (active involvement of stakeholders in decision-making), full transition in powers and functions from central administrative authorities to stakeholders.<sup>7</sup> An important role is played by the relationships and the different situations among the stakeholders, given that strong asymmetries in resources endowment (e.g. financial or political asymmetry) may be associated with an heterogeneous distribution of incentives to cooperative action.

<sup>2</sup> This topic is analyzed by Alaerts, with regard to river basin organizations. See Alaerts, Le Moigne (forthcoming).

<sup>3</sup> About the transaction costs approach and his relevance for the institutional analysis of water resources management, see Saleth, Dinar (2004).

<sup>4</sup> See the findings of the World Bank-supported study “Integrated River Basin Management and the Principle of Managing Water Resources at the Lowest Appropriate Level – When and Why Does It (Not) Work in Practice?” as reported in Blomquist, Dinar, Kemper (2005), Blomquist, Ballesterro, Bhat, Kemper (2005), Bhat, Ramu, Kemper (2005).

<sup>5</sup> The maximum level of appropriate decentralization is defined as the need for decisions to be taken “at the lowest appropriate level” (ICWE, 1992).

<sup>6</sup> As observed in Mody (2004) “..the case for decentralization as against central control is not unambiguous..” given that the devolution of functions can accompany benefits with counter-effects.

<sup>7</sup> See on this topic Massarutto (2005).

As can be clearly noticed, the two elements of decentralization and participation are deeply inter-related.

The following paragraphs will detail single aspects connected with these two fundamental concepts, in order to provide an analytical framework to describe the institutional performance of water resources management processes at the local/basin scale.

## **ANALYTICAL FRAMEWORK FOR INSTITUTIONAL ARRANGEMENTS**

In order to provide an analytical framework for assessing water management institutional arrangements in a local setting, four main categories of factors and variables will be considered.<sup>8</sup> The framework will be completed with a schematic table and a set of specific questions, intended as a tool for documental research and in-field survey of a case-study.

### **Contextual factors and initial conditions**

The success of a decentralization process is influenced by various pre-existent factors, configuring a smaller or greater aptitude, in each specific context, to improve the management of water resources at the river basin scale.

As regards the early stages of the decentralization process, the first contextual factor to be observed is the level of economic development at both the central<sup>9</sup> and at the local/basin level.

The level of economic development is connected with the potential activation of financial commitment to the decentralization process from the central government and the local stakeholders: sustainable outcomes are linked to the financial viability of the institutional arrangements for water management, and this target will be easier to achieve where economic well-being, at both the central and at the local level, allows the bearing of transition and ongoing costs of the process.

The central financial commitment to the decentralization process is an important starting factor, while it is possible to observe that it is not a necessary factor (in theory, a decentralization process can be initiated even with the sole financial commitment of local stakeholders). The central authority can activate funding for initial implementation, in the forms of financing the devolution and/or financing the maintenance of a set of water management-related functions considered to be better managed centrally rather than locally.

The local financial commitment to the decentralization process is a significant factor, as connected with the financial autonomy at the local level, one of the main components of successful implementation of a decentralization process.

Another initial factor influencing the development and implementation of a decentralization process is the distribution of resources between basin stakeholders. When resources are asymmetrically distributed (in terms of financial power, rights over the water resources, or also political influence over water allocation) it is possible that a cooperative arrangement will be less attractive for the better-situated subjects than a non-cooperative option.<sup>10</sup> This element acts in a complex way, because the most endowed stakeholders may assume, if attracted by the future benefits deriving from the basin management option, a leadership role and strengthen the process itself rather than making it more difficult. This leadership role can take the form of a strong financial commitment for decentralization by the main stakeholders. Thus, if extreme inequality may be detrimental to the decentralization effort, the assumption of a leadership role by the better-situated stakeholders can foster the process itself. The described factor, to be taken into account, behaves in a multi-directional way.

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<sup>8</sup> According to the theoretical framework presented in Blomquist, Dinar, Kemper (2005).

<sup>9</sup> The central level in a decentralization process can correspond, depending on the context, to a nation, a state (in federal countries), a region or a province.

<sup>10</sup> When a cooperative arrangement generates significant gains for the group as a whole but results (or is perceived as) less favourable of a non-cooperative scheme for some actors, a redistribution or compensation in benefits can occur. The problem, with regard to the management of international river basins, has been analyzed in Sadoff, Grey (2002).

Also the social and cultural distinctions at the local/basin level are a significant contextual factor, because they can affect communication between stakeholders, as well as trust and aptitude to cooperation. All other factors being equal, it is expected that the greater and more contentious are these distinctions, the more difficult it will be to develop and maintain institutional arrangements for the management of water resources on a basin scale.

Furthermore, a contextual factor to be considered is the existence of previous experiences of governance at the local level. It is expected that water management decentralization initiatives will be more likely to achieve successful results in settings where there is a local experience in governing and managing other resources and services in a cooperative way. While the main challenge is, in this regard, to strike a balance between the central role and the local role in organizing water management at the "lowest appropriate level", this ability will also depend on the skills previously developed in other areas of social life.

### **Characteristics of the decentralization process**

A decentralization process implies the devolution of authority and responsibility from the centre, and the acceptance of authority and responsibility at the local level. The occurrence of both depends upon the way in which the decentralization takes form, and this form may affect the achievement of successful results.

A first characteristic to be considered is the nature of the decentralization initiative. If, in theory, a decentralization process may start from an exclusive top-down initiative (by the central government) or, at the other extreme, bottom-up initiative (by local stakeholders), it is expected that most of the actual settings lie in-between these two extreme examples. A decentralization initiative will be more likely to achieve successful results where devolution is a mutually desired process, shared by basin stakeholders and central government officials.

Furthermore, one of the main targets of a decentralization process is to obtain a deep involvement of the stakeholders into the making of decisions. For this reason, incorporating existing local institutions and practices is another important characteristic of the decentralization initiative. Where the traditional institutions are involved, they play a participating and legitimating role for basin management towards the stakeholders. Moreover, it is to be expected that the transaction costs (in terms of time and effort) to basin stakeholders will be smaller in existing organizational forms than in an additional set of organizational arrangements. All other things being equal, decentralization initiatives are more likely to succeed where they involve existing governance institutions and practices.

Another significant characteristic of the decentralization initiative is the continuity in central level commitment for the decentralization policy. Usually, a decentralization initiative includes a transition of authority from the central government to the local level.<sup>11</sup> In these situations, an important element is how the decentralization policy can survive any changes of power that may occur at the central level during the process. Thus, all other things being equal, when there is a lack of continuity in the central level commitment to the decentralization policy, it will be harder to achieve a successful implementation of the process.

### **Central government and basin-level relationships and capacities**

Coordination of central and local actions is an essential element of a successful decentralization process. The respective capacities of central government and basin stakeholders, and the relationships between them, are key to achieve this target.

In this direction, a significant factor to be considered is the extent of actual devolution from the central to the local level. Indeed, a central government, while formally pursuing the implementation of

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<sup>11</sup> Other cases, expected to be rare, are when the decentralization doesn't include any kind of transition in powers by the central authority to the local level. In these cases, the mentioned factor is not important.

a decentralization policy, may act substantially only in a symbolic or even in an abandoning way for a real devolution of authority and responsibility at the local/basin level.<sup>12</sup> This behaviour may also undermine stakeholders' commitment to the decentralization process. It is reasonable to observe that the degree of actual devolution in resource management responsibilities to the local level is associated with more or less successful results for the decentralization process.

The achievement of financial autonomy at the local/basin level is another factor to be considered for a successful decentralization process. Financial autonomy will be better achieved when there is a balance between the central and the local authorities in financing the process, and in managing the financial resources. On one side, a form of financial autonomy is needed at the basin level but, on the other, a complete transfer of financial responsibilities from the central to the local level may be dangerous for the process itself. All other things being equal, favourable prospects of success will occur where there is a balance in funding and control between the central government and the basin level.

A third significant characteristic is the basin-level authority to create and modify institutional arrangements. A decentralization process is highly context-specific, and the functions of governing, financing, and monitoring water resources, as well as coordinating the infrastructure construction and maintenance, have to be tailored to the specific settings of the basin area. Moreover, sustainability in efficiently managing these functions in the long run necessitates the power to modify the institutional arrangements in response to changed conditions. These activities will be better performed by the local authorities, for two principal reasons: one is the high requirement of information needed; another is the potential of this form of local autonomy to attract stakeholders and foster their involvement into the process. For these reasons, it is expected that successful and sustainable implementation of a decentralization process could occur where stakeholders are empowered to create and modify the institutional arrangements. Another important element related to what mentioned is the power of local authority to set and modify any form of cross-jurisdictional arrangement useful to efficiently implement the process: the relevance of this factor is high in the case of water management, given that in many cases the administrative boundaries don't match the basin or sub-basin boundaries.

With regard to central/local relationships, the distribution of central-level political influence among local stakeholders is another significant factor of a decentralization process. In a specific context, it is possible that the better-situated stakeholders have a stronger access than others to central government influence: the exercise of this influence, consisting in a block or overturning of disagreed local level decisions, can erode the stakeholders' collective commitment to the decentralization process. All other things being equal, a more successful implementation of decentralized management will occur in settings where there is a relative symmetrical political influence of the stakeholders upon the central government.

Another important factor to be observed is the characteristics of the water rights systems (formal or informal rights, recognized as binding among stakeholders). The water rights can be defined at the local level, but it is more likely that at least in some aspects these rights are defined at the central level (as national, state or provincial rules). The nature of these systems of rights, by which the central and the local level relate, can change the commitment of the local stakeholders to the agreements needed by the collective action.

Furthermore, under a transaction costs profile, the adequate time for implementation and adaptation to new institutional arrangements is a significant aspect of a decentralization process related to central and local institutional capacities. Longevity, as well as adaptability to change – in a trial-and-error learning process – are both important factors for the success of a basin management process, although it is difficult to generally establish after how much time a given arrangement can be considered apt to achieve its expected results or to be substituted by another. If this aspect can be opportunely analyzed only inside a specific case, it can be observed that time is an influencing factor for the successful implementation of a decentralization process.

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<sup>12</sup> This is distinct from the above-mentioned factor of continuity in the central action; in this case the problem lies in the gap between formal pursuance and actual implementation of a decentralization policy by the central authority.

### Internal configuration of basin-level institutional arrangements

The possibility to achieve a successful implementation of decentralized water resources management will depend on the characteristics of the institutional arrangements configured at the basin level.

Among these characteristics, a necessary component is the presence of institutional arrangements for the basin-level governance, by which stakeholders articulate interests, share information, communicate and take collective decisions. Nevertheless, it should remain clear that basin-level governance, or the presence of institutional arrangements to enable stakeholders' actions at multiple levels, doesn't imply the creation or strengthening of an *ad hoc* river basin organization.

Another significant characteristic of institutional arrangements at the local level is the clarity of institutional boundaries and their matching with the basin boundaries,<sup>13</sup> given that decentralized water management at the basin scale is a process of collective decision-making. Unclearly defined or mismatched boundaries create a lack of efficiency and effectiveness of collective decisions (e.g. inadequate information, mismatch between decisions and users involved or excluded). All other things being equal, it is reasonable to expect that successful implementation of decentralized water management will take place where basin-level institutions have clearly defined boundaries and where these boundaries are well-matched to the basin boundaries.

Furthermore, an important characteristic of basin-level arrangements is the recognition of sub-basin communities of interest. With regard to this characteristic, it can be observed that the basin system naturally configures an inter-relation of interests among users or groups, but water users and groups have different interests: interests are likely to be different among users/groups in the various sectors of activity (agriculture, industry, hydropower generation) or among users/groups differently situated in the basin area (downstream/upstream users). Recognition of communities of interest can include only representation (guaranteed participation to decisions) or even assurance that decisions are the results of agreements reached between the different communities of interest. The recognition of sub-basin communities of interest is not a costless practice: transaction costs are expected to increase for the recognition of each sub-basin community, to the extent that – beyond a given threshold – additional recognitions may become counter-productive. Nevertheless these recognitions, supporting trust and reciprocity between stakeholders, are an important factor to the emergence and sustainability of basin-level arrangements.

Among the characteristics of basin-level institutional arrangements, a significant role is represented by the availability of fora where stakeholders can communicate and resolve conflicts.<sup>14</sup> These instruments will function as a means to strengthen both cooperation and participation between the different actors.

Information sharing and communication between stakeholders are important elements of water resources management, because they reduce information asymmetries and differences of interpretation, thus fostering cooperation between stakeholders. For this reason, the presence of regular fora for information sharing and communication is expected to be, all other things being equal, a factor contributing to the successful implementation of decentralized water management at the basin level.

Moreover, the sustainability of decentralized water management depends on the presence of fora for conflict resolution, since disagreements between stakeholders might arise in any conceivable

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<sup>13</sup> Matching the administrative (political) boundaries and the basin (natural) boundaries, is one of the most challenging issues in water resources management. In many cases, a solution has been found in creating river basin organizations. Nevertheless, the necessary sustainability of such institutions in the long period suggests the opportunity to consider into single cases (especially in less developed settings), the relation between the benefits to be obtained from a new *ad hoc* institutional organization, and the costs – included transaction costs – of creating and managing it.

<sup>14</sup> If Alaerts indicates how the forum is one of the most specific features of river basin organizations and, in some cases, the essence of such organizations – in Alaerts, Le Moigne (forthcoming) – occasions for ensuring participation of stakeholders at the basin level can be organized even in absence of an *ad hoc* river basin organization.

water resources management setting. Thus, all other things being equal, decentralized water management is more likely to achieve sustainable results where there are fora for conflict resolution.

**TABLE OF RECAPITULATION: CATEGORIES, FACTORS AND RELATED QUESTIONS**

The following table represents schematically the described categories and factors as a set of elements useful to evaluate the institutional performance of the decentralization process of water resources management at the basin level. Related to the single factors, a number of questions are purposed as a case-study tool for documental research and in-field survey.

Table 1. Main categories, single factors and related questions useful to evaluate the institutional performance of the decentralization process of water resources management at the basin level

<i>Main categories</i>	<i>Single factors</i>	<i>Related questions</i>
Contextual factors and initial conditions	Economic development at the central level	Does the national/state/regional/provincial level of economic development allow a financial commitment to the basin management process from the central authorities?
	Economic development at the basin level	Does the level of economic development at the basin level allow a financial commitment to the basin management process from the basin stakeholders?
	Distribution of resources between local stakeholders	Are there consistent asymmetries in financial (or other kind of) resources endowment among local stakeholders? If yes, are these asymmetries expected to weaken (or eventually to foster) the decentralization commitment?
	Socio-cultural background	Is the basin area shared by different cultural/ethnic/religious groups? If yes, are the relations between these groups expected to allow cooperation or are they expected to raise conflictuality in a local water governance process?
	Previous experiences of local governance	Are there previous successful experiences of institutional arrangements for governance at the local/basin level? If yes, have these experiences developed local capacities expected to be useful for water resources management?
Characteristics of the decentralization process	Top-down / Bottom – up / Mutually desired devolution	Does the decentralization process start from a top-down central government officials initiative or from a bottom-up local stakeholders initiative (or in-between the two cases)? If from a top-down initiative, is this initiative likely to activate an adequate stakeholders involvement at the local level?
	Incorporation or involvement of existing local governance arrangements	Does the decentralization initiative adequately incorporate/involve pre-existing local institutions in the process? If yes, is this involvement expected to enhance participation of local stakeholders into the process?



	Consistent central government policy commitment	Does the decentralization initiative include a transition of authority from the central to the local/basin level? If yes, is (or is expected to be) the decentralization policy commitment at the central level continuous or discontinuous with regard to changes of the political situation ?
Central government and basin-level relationships and capacities	Extent of actual devolution	Is there an adequate degree of actual devolution of responsibilities from the central level to the local/basin level, or is the central government decentralization role only formal?
	Financial resources and autonomy at the basin level	Is there a balance in funding/managing funds between the central and the local/basin level?
	Basin-level authority to create and modify institutional arrangements	Is the local level empowered to create institutional arrangements / to modify them in response to changed conditions (especially in regard to cross-jurisdictional arrangements at the basin or sub-basin level)?
	Distribution of central level political influence among stakeholders	Is there a relative asymmetrical access to central level political influence among basin stakeholders?  If yes, are these asymmetries expected to configure blocks or overturns of local level decisions?
	Characteristics of the water rights system	Are there (formal or informal) local systems of water rights and rules defined at the central level?  If yes, are these rights and rules perceived as certain and clear by local stakeholders (otherwise there can be a lack of stakeholders commitment to the decentralization process)?
	Adequate time for implementation and adaptation	Is there an adequate longevity and/or adaptability to change of the institutional arrangements?
Internal configuration of basin-level institutional arrangements	Presence of basin-level governance institutions	Are there adequate institutional arrangements to enable stakeholders collective decisions for water management at the basin level?
	Clarity of institutional boundaries and match to basin boundaries	Do the water management institutional arrangements act into clearly defined boundaries?  Do these boundaries match the basin boundaries?
	Recognition of sub-basin communities of interest	Is there an adequate recognition of different communities of interest in taking decisions at the local level?
	Availability of fora for information sharing and communication	Are there regular fora for information sharing and communication between stakeholders at the basin level?
	Availability of for a for conflict resolution	Are there regular fora for conflict resolution at the basin level?

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