Comprehensive assessment of water management in agriculture

water for food, water for life issuebrief#12

Developing and managing river basins:

The need for adaptive, multilevel, collaborative institutional arrangements

Pressure on water resources heightens hydrological, social, and ecological interdependencies in river basins (as well as the basins of lakes and aquifers). More interdependency demands more integrated approaches to developing and managing water resources at the basin level. Many countries have implemented or are testing such approaches. Even more are struggling with how to put in place institutional arrangements to support more integrated management.

The Comprehensive Assessment of Water Management in Agriculture (CA) analyzed river basin governance and management in the context of increasing competition for water for agriculture and other uses, pollution of water resources, and degradation of ecosystems. This analysis showed that to cope with the diversity of competing values and political and economic interests in basins and increasing water scarcity, natural hazards, and climate change, we need adaptive, multilevel, collaborative governance arrangements. It also showed that progress in establishing such arrangements has been slow—often with undue emphasis on form over process and a lack of redistribution of decision-making power from centralized "hydro-bureaucracies" to users.

To speed progress, the Technical Committee of the Global Water Partnership (GWP), whose regional and country partnerships are engaged in different aspects of basin management, has undertaken this joint brief with the CA and the International Network of Basin Organizations (INBO).

Box 1: Strengthening institutional arrangements

The appropriate institutional arrangement for a particular basin depends on its scale (transboundary, national, local); the stage of basin development; the main water management challenges to be addressed; and the existing social, economic, political and institutional environment. There are no universally applicable solutions, but it is possible to learn from experiences in other basins.

The CA analysis revealed several key lessons that decision-makers should keep in mind when considering how best to strengthen institutional arrangements for basin governance and management:

- Some important challenges that institutional arrangements should address include **coordinating decision-making between levels, establishing water allocation mechanisms, reducing water pollution, and handling flooding and droughts.**
- Because different basins face different challenges and often involve different institutional environments, **rolling out blanket country-wide reforms without adaptation to local specificities or directly copying institutional models from other countries as blueprints is seldom effective.** What works for one basin, may not work for its neighbor.
- **Establishing institutional arrangements is a "learning by doing" process**—there must be enough flexibility to make adjustments and to adapt to changing conditions.
- **Not all water-related problems can or should be solved at the river basin level.** Some problems are best addressed at the sub-basin or local level. Others have solutions beyond the basin itself and even outside the water sector, for example in national or federal agricultural policies.

What functions need to be carried out at the basin level?

The basic functions that comprise water resources management (see Table 1) can be performed by a variety of actors and at multiple levels. From a hydrological perspective, performing certain functions at the basin level makes good sense: planning water resources development, allocating water between competing uses, preventing flooding, monitoring and enforcing water quality and quantity standards, coordinating water-related decision-making among sectors, collecting data, and mobilizing financing to support basin development and management activities. Social, institutional and political factors need to be considered as well.

For example, in South Africa, where water is defined as an "indivisible national resource" over which it is the government's responsibility to exercise custodianship, local level organizations negotiate specific allocations within a framework established at the national level. Many countries have continued to maintain national or state control of water resources development and allocation, using the basin as a unit of planning, while decentralizing other functions to the basin or sub-basin level. This practice has the advantage of ensuring that water allocations are in line with national development priorities and, in countries where inter-basin transfers are the norm, may be a necessity. However, it has the disadvantage of giving basin stakeholders little or no say in allocation decisions.

While the complexity of integrated management of sizable river basins may invite centralization and technocracy, the need for participation suggests decentralization and more local operations. Countries have found many different ways to strike a balance between these imperatives. Often this balance has shifted over time: generally from more centralized—during the basin development phase when construction of large-scale water infrastructure demanded technical expertise and massive mobilization of public funds—to more decentralized—as the focus shifted towards improving productivity, allocating water among users competing for a limited supply, or addressing pollution and degradation of important ecosystems.

Table 1: Essential water resources development and management functions

Collecting data	Collecting, managing and communicating data regarding water availability, water demand (including environmental requirements), and water quality to support different basin functions
Planning	Formulating medium- to long-term plans for developing and managing water resources in the basin
Allocating water	Defining mechanisms and criteria by which water is apportioned among use sectors, including the environment
Constructing facilities	Designing and constructing hydraulic infrastructure
Maintaining facilities	Maintaining hydraulic infrastructure
Operation and management	Ensuring that dams, navigation and water distribution infrastructure, and wastewater treatment plants are properly operated; that allocated water reaches its point of use; and that surface and ground water are conjunctively managed
Prevention, monitoring and enforcing	Monitoring and control of water pollution, salinity levels, and groundwater extraction—ensuring that they remain within accepted limits; and enforcing relevant laws and regulations to prevent degradation/overexploitation and restore ecosystems
Preparing against water disasters	Protecting from floods and developing emergency works, flood/drought preparedness plans, and coping mechanisms
Resolving conflicts	Providing mechanisms for negotiation and litigation
Protecting and conserving ecosystems	Defining priorities and implementing actions to protect ecosystems, including awareness campaigns
Coordinating	Harmonizing policies and actions undertaken in the basin by state and nonstate actors relevant to land and water management
Mobilizing resources	Ensuring financing for other functions, for example, by collecting water user fees or water taxes

Basin Organizations

Whether the creation of a Basin Organization can improve water management in a basin, and if so what kind of Basin Organization is appropriate, depends on the particular challenges to be addressed—e.g. flooding, infrastructure development, conflict resolution, pollution control, power generation and trade—and the institutional arrangements already in place.

The use of the term River Basin Organization should not be taken to mean that these organizations only deal with rivers; they may also be involved in the management of the lakes, wetlands, aquifers, and land within the hydrological boundaries of a basin. There are many different types of "RBOs" and the acronym "RBO" covers a wide range of institutions. A Basin Organization does not have to be a monolithic organization that brings the majority of basin functions under one roof—in fact such organizations are rare. Basin Organizations can also be more loosely constituted bodies that bring together stakeholders from various agencies and water use sectors.

Basin Organizations can play a role in:

- Instituting integrated (rather than sectoral) planning of water resources development, protection, allocation and ecosystem restoration.
- Decentralizing water management functions from national or state-level to basin level.
- Negotiating the complexities of managing transboundary rivers, lakes and aquifers.
- Overseeing activities that have basin-wide impact—for example, constructing or operating large-scale water infrastructure for multiple uses, coordinating pollution prevention, and organizing flood protection.
- Promoting equitable water utilization and benefit sharing.
- Developing joint projects (e.g. power generation and navigation).
- Controlling externalities—as more and more of a basin's water is committed and interdependencies among basin water users increase, consistent basin-wide monitoring and enforcing become increasingly important.
- Providing a mechanism for stakeholder involvement, effective dialogue and cooperation, and for coordinating between different organizations, levels of decision-making, and sectors.
- Providing a platform for basin data collection and knowledge dissemination.
- Developing funding mechanisms.
- Contributing to a better socio-economic development and integration.

Water management is informed by a whole host of formal and informal institutions; attempting to impose a new more coherent structure—particularly a centralized structure—on this multiplicity can create conflicts with existing line agencies and loss of democratic and accountability mechanisms. It may be better to identify conditions under which existing organizations and institutions can play an effective role in addressing basin challenges, understand what can be done to strengthen them or adjust their mandates, and ensure effective coordination and negotiation mechanisms between them. Responsibilities among various organizations at different levels (national, basin, local) must be defined clearly to avoid overlaps and increase effectiveness.

New "RBOs" or platforms may be considered competitors by existing agencies, and, if they have not been endowed with specific powers, they are likely to remain cosmetic; this has happened with some "RBOs" promoted and funded by development banks or cooperation agencies without much in-country buy-in. For example, the embryonic river basin organizations in Vietnam, to whose design not even provincial water authorities have made a significant contribution, are largely international agency driven bodies established through a centralized state. They have very limited funding and are not endowed with specific powers.

Box 2: Criteria for successfully functioning Basin Organizations:

- A well-defined mandate and the legal, political, and administrative power to carry it out. In particular it needs to be clear at what level decision-making authority is vested and mechanisms for resolving conflicting interests between levels.
- Adequate staffing and capacity building, especially for environmental issues, which are often new and informed by limited data availability.
- Strong, broad-based political and stakeholder support.
- Sustainable funding—BOs need to be financed, whether out of user or polluter fees or through government subsidies.

Coordinating across scales

Often ignored in institutional arrangements is that many other factors and processes originating in wider spheres have critical impacts on water use and management within the basin. River basins are part of a national and transnational economy. Sectoral and market linkages have implications for basin agricultural production and water use. Relative or shifting factors such as prices, subsidies, urbanization, trade agreements, and the evolution of world markets also can have dramatic and often unconsidered impacts on water use. To address these issues requires that water resources planning processes link to national sustainable development strategies and that decision-making processes in non-water sectors consider the implications for water resources.

Other problems demand more local-level solutions—for example soil and water conservation. These are often best managed at the sub-basin or local scale, but because these activities do affect the flow of water, sediment, and nutrients through the basin, there need to be links between local-level decision-making and decision-making at basin scale.

The challenge then is to define institutional arrangements that can coordinate between actors and decision-makers operating at different scales—local, basin, national, transboundary. However, the very diversity of physical and socio-political settings precludes defining universal guidelines for addressing this challenge.

Building on diversity

The trend observed by the CA is that the number of public and private sector actors involved in, or concerned with basin planning and management, is increasing, from environmental agencies and civil society or interest groups to regulatory bodies and service providers for agricultural, municipal, tourism and industrial water users. In general, as living standards improve and urbanization and environmental deterioration increase, more and more diverse stakeholders and world views need to be integrated to achieve equitable basin management and avoid conflicts. How to accomplish this while ensuring that water development and use is consistent with available resources and ecosystem integrity?

In "coordination-based," collaborative approaches to basin governance—common in Australia, the European Union and the Western USA, but also emerging in countries such as Brazil, Morocco, Mexico and South Africa—user and community organizations, government organizations, and stakeholder initiatives develop coordination and negotiation mechanisms at the basin or sub-basin level. This can mean a coordinating organization, for example, Mexico's Basin Councils, or it can be a mix of legislation, stakeholder platforms and institutional linkages.

A coordination-based approach to governance can have several advantages:

- Legitimacy—if it recognizes existing institutions with good stakeholder representation and buy-in.
- Participation—if it gives water users the space, capacity and power to participate in water management decisions that affect them.
- Flexibility—because coordination-based arrangements involve diverse organizations and in general less rigid institutional structures, they are better able to adapt to changing needs and circumstances.

Collaborative, multilevel governance can help to reconcile stakeholder values and objectives by ensuring that information becomes available to all stakeholders and that conflicting actions are flagged in advance and duly debated. However, this requires suitable processes, rules and other institutions. It also works best when there is a culture of democratic debate and not too severe imbalances of power.

When creating new rules, roles, and rights, it is crucial to recognize that stakeholders have different levels of access to resources, knowledge, political representation, and institutions; otherwise the institutional outcome can privilege the elite. Of course, if the goal is equity, just focusing on improving participation and coordination is rarely enough; there is a need to redistribute resources, entitlements and opportunities—tasks that must involve the state.

Box 3: Constraints to collaborative governance

- It may become more difficult to achieve as the size of the basin increases, and decision-making can be cumbersome and coordination costs high.
- Existing organizations must have legitimacy, relevant capacities and adequate resources.
- Political changes in participating jurisdictions can upset agreements.
- Stakeholder participation in basin management is not straightforward, and including the poor and achieving substantive stakeholder representation has proven elusive in practice.
- In countries with strong, centralized government control, collaborative arrangements may not be feasible.

Starting with an institutional inventory

Any effort to change institutional arrangements should begin with identifying the problems to be solved and the roles of the various actors engaged in water management—who does what, where, to what end, and how well. Based on this analysis, gaps can be filled and coordinating mechanisms developed or strengthened.

This process can be initiated from the bottom up (as in the example of some watershed initiatives) or the government water agency can take the lead—working closely with existing water users, NGOs and other government agencies to develop appropriate co-management arrangements. In addition to making sure that all functions are carried out (see Table 1), this means making sure regulation and operational duties are separate, that checks and balances are established, and that roles are clear and are supported by adequate legislation.

A key factor in the success of basin institutional arrangements is the definition of water allocation mechanisms and monitoring systems to ensure water use is consistent with available resources and ecosystem integrity. The CA analysis suggests that allocating water between competing uses and users, including the environment, has often not received enough attention, although it is at the heart of integrated water resources management. Most important is the need to define allocation arrangements to be activated in times of shortage. Allocation and monitoring depend on adequate and reliable data; data collection is thus a critical first step that can help get water users and government and nongovernment organizations working together. In addition to water allocation, handling floods and reducing water pollution are key issues in many countries.

Institutional arrangements for sustainable basin management should involve existing organizations, customary practices, and administrative structures. This will often require reshaping the mandate of traditional water bureaucracies—from unilateral decision-makers to facilitators—and shifting the balance of decision-making power towards users. Such a shift takes high-level political support, capacity-building, and incentives for change on the part of the organizations themselves. It also takes time and often significant resources—basic requirements that efforts at institutional change have often foundered upon. This is challenging for basins contained within one country but becomes truly complex in the case of transboundary rivers and aquifers. For the 263 transboundary rivers and hundreds of aquifers shared by two or more countries, special agreements need to be reached by the riparian countries based on a basin perspective.

Adapting to changing conditions

Institutions and institutional structures emerge out of a specific context. For example, a strong civil engineering body capable of planning, designing and constructing infrastructure to tap available water is appropriate when the objective is developing water resources. The problem is that such organizations—whose capacity and structure are oriented towards basin development—can be slow to adapt as the basin's water resources become increasingly committed. They continue to do what they do best—build infrastructure—with the result that basins become developed to the point where ecosystem integrity is threatened. In such basins, institutional arrangements need to be reoriented towards improving water productivity of existing uses; dealing with stakeholders competing for a limited supply of water, including the environment; and regulating water quality and ecosystem health.

In addition, various other types of changes—social, economic and political—can influence the types of demands on water institutions. Climate change may also present new challenges for basin management, which will require adaptive management approaches.

Comprehensive assessment of water management in agriculture

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The Comprehensive Assessment of Water Management in Agriculture (CA) is a five-year initiative to analyze the benefits, costs, and impacts of the past 50 years of water development and management in agriculture, to identify present and future challenges, and to evaluate possible solutions. The CA's Issue Brief series, published by the International Water Management Institute (IWMI), presents key findings from the main Assessment report *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture* (Earthscan). More on the CA donors, co-sponsors (CBD, CGIAR, FAO, Ramsar), process and publications can be found at: www.iwmi.org/assessment.

The Global Water Partnership (GWP) is a worldwide network to support sustainable management of water resources. This Brief complements the GWP's *Catalyzing Change* publications series. The series, developed by the GWP Technical Committee, assists countries in taking a strategic approach to improving their water-related policies and institutions through the creation of national IWRM and water efficiency plans. More information about the GWP and access to the *Catalyzing Change* handbook and briefs are available at www.gwpforum.org.

The International Network of Basin Organizations (INBO) is a worldwide network to support sustainable water management at basin level. It links Basin Organizations and other government agencies responsible for basin management in order to promote the exchange of experiences and develop suitable tools for better basin management at transboundary, national and local levels. More information about INBO activities and members is available at www.inbo-news.org.

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