



GEF-FAO Groundwater Governance Project A Global Framework for Country Action Digest of Thematic Paper 5:

Groundwater Policy and Governance:

A. Groundwater governance — The overarching framework

Groundwater governance is the process by which groundwater is managed through the application of responsibility, participation, information availability, transparency, custom, and rule of law. It is the art of coordinating administrative actions and decision making between and among different jurisdictional levels—one of which may be global. In practice, groundwater governance is the complex and over-arching framework that determines the management of groundwater resources and the use of the aquifers. The local, regional or national governance framework establishes “who” participates in formulating strategies and is responsible for their execution and “how” the different actors (governmental, public sector, non-governmental, private sector, and civil society) interact. **Water management** is “what” we do. It consists of the activities that enable us to move toward achieving goals and objectives. Examples of activities include pumping wells, substituting surface water for groundwater, aquifer recharge, and irrigation practices or other approaches to more efficient water use. Examples of a goal or objective are sustainable water use and maintaining ecosystem health.

B. Key points for decision makers and the broader public

Governance entails responsible resource use, leading to environmental and economic sustainability; sensitivity and adaptation to geography and environment, customs, cultures, political systems, and prevailing practices. Strong stakeholder participation and social acceptance are keys to acceptability of governance practices. Equitable access to water, fair distribution of costs and benefits, and attention to preferences and to winners and losers are critical concerns.

Approaches include those by the UN Development Program, the Millennium Ecosystem Assessment, and the Global Water Partnership—via integrated water resource management (IWRM). Principles of good groundwater governance fall into four main sets of principles and considerations. (1) *Political and institutional*: Accountability, representation, consistency, scalar match, institutional match, and institutional capacity to adapt to uncertainty and change. Groundwater is mostly a local issue and solutions need to fit institutionally and socioculturally—recognizing that paradigms and social constructs change over time. (2) *Sociocultural*: Perceptions about groundwater, religious and spiritual traditions, social learning, social inclusion, ethics, multi-level/multi-scale/polycentric governance models. (3) *Economic*: Imperfection of price signals, the role of scarcity and groundwater-storage conditions, water-quality impacts, inadequate measurement of groundwater usage rates, the growing role of the private sector and public-private partnerships, and the importance of ability to pay. In addition, water prices may not fully reflect the costs of extraction, and rarely include third-party and environmental impacts of groundwater use. Economists often see market mechanisms as having potential to match demand with supplies. (4) *Ecological*: Physical characteristics of

diffusivity, conduciveness, attenuation rates, and renewability. In addition, groundwater development may rival existing land uses. Groundwater systems can be considered common-property resources, vulnerable to over-exploitation and/or under-management. Aquifers are coming to be valued not only for their provisioning services (for consumption, agriculture, or industry) but for their ecosystem-supporting services.

Additionally, the *spatial and temporal contexts* determine the applicability and potential success of governance and management instruments. Often, state-, market- and collective-action-driven groundwater-governance paradigms have been practiced simultaneously in hybrid or nested form. Improved groundwater governance practices depend on accepting the complexity and diversity of groundwater-resources management modes. The following are important considerations. Legal dimensions are likewise important. Groundwater use is dependent on a host of legal instruments, such as: existing formal and customary rights regimes; legislation that specifies access, allocation, and quality; regulations that control planning and zoning; laws and statutes that protect recharge areas, potable water sources, riparian corridors and habitats, and endangered species; enforcement directives; pricing and use regulations; mandates for public participation and transparency; and international treaties, agreements, and protocols. By shaping public policy, these legal instruments influence the nature and details of governance within a nation's boundaries and beyond. Of course, the physical dimensions must be considered. Water is fluid. Its flow patterns do not follow the political boundaries associated with a given jurisdiction's laws and regulations. Given this fluid nature and fluctuations in its availability, water resources require active management. The governance of groundwater basins can present conditions different from river systems, which are important to the development of governance frameworks.

Improvements to groundwater governance will require new approaches. The classic, technophysical, top-down approach presumes an ability to identify and quantify the nature of interactions and clearly define the boundaries of systems. It also assumes that for social institutions (like rules and rights systems), sufficient organizational capacity exists to permit planned and integrated implementation. The "good governance" framework emphasizes sustainability, market approaches, and decentralization. The paradigms of groundwater governance are assumed to be nested within those that govern water generally, which are part of the larger picture of how we deal with natural resources in general.

C. Case studies

Case studies of domestic and transboundary groundwater management are useful to understanding the advantages and drawbacks of alternative approaches and experiences. The paper includes several case studies. A set of broad barriers to groundwater governance was identified: inertia and resistance to change, rent-seeking behavior, problems of fit, problems of interplay, information deficit, poor framing of groundwater issues, and insufficient public participation. Other limitations include incomplete knowledge about: complex and heterogeneous groundwater resources, socioeconomic and demand information, connections between the water sector and macro-policies (e.g., food and energy security) in a given national context, institutional diversity and management practices, and evolving effects of global connectivity.

D. Significant prospects and recommendations

Technical and scientific approaches have enriched our understanding of and provided ways to harness groundwater systems. But attention to governance has revealed that the chief constraints are social, institutional, and political. Innovations in groundwater governance can induce changes in power relations and incur high transaction costs. They may best be developed incrementally.

Ideally, groundwater management and policymaking should be performed at the level appropriate for the context, which is often local. Decentralized management, with stakeholder participation and coherence across scales is the most promising approach. Groundwater governance also should consider national and international food- and energy-security policies. Optimizing demand can have larger effects than sophisticated water-saving measures. But reduction of demand should be balanced with potential loss of agricultural livelihoods and economies. Broad criteria for effective groundwater governance include: creation of *common property regimes* or “unitization” agreements at the aquifer scale; *mediation and conflict resolution* for international aquifers; *voluntary compliance*; *flexible and adaptive management*; and *policy diversification*.

The paper includes several sets of recommendations. **Government agencies** should shift from ‘supply-development’ to ‘resource-custodian’ and ‘information-provider,’ with agencies fully engaging groundwater users and stakeholders in a participatory-management process. National governments should ensure strong state/provincial level agencies by supporting professional development, establishing management guidelines for shared aquifers, and providing monitoring standards for at-risk basins. Water-management responsibilities might be realigned within ministries of environment and other agencies to maximize influence to negotiate with more powerful entities (e.g., ministries of finance, agriculture, or industry). Policy-making could be separated from the operational management of water services. Institutional processes should be explored to remediate bureaucratic inertia and political reluctance. Links can be made to larger macro-level policy decisions (e.g., on food, energy, and trade). Comprehensive review of policy and legislation might examine existing frameworks and identify appropriate policy and legislative modifications.

Development of national **information and science** programs to gather data in areas where groundwater dependence is high should be encouraged. Opportunities include using remote-sensing images to estimate surface components of groundwater systems such as recharge and discharge to support groundwater-resource managers; collecting relevant socioeconomic information; and overcoming institutional asymmetries so as to facilitate negotiation and conflict resolution. The international community, acting through bilateral and multilateral aid mechanisms, should assist with data-collection and management support. In countries that lack basic hydrological data, a greater investment in data collection and data management will be necessary. Additionally, early warning systems based on indicators to assist with disaster-preparedness are important because institutional capacity is absent in many countries. Finally, global water initiatives such as IHP and GWP need to disseminate these modes of information acquisition and sharing.

Public participation is essential for ensuring that governance practices meet the goals of transparency and accountability. Since groundwater management is largely about influencing user and polluter behavior, enabling and nurturing stakeholder participation is an especially critical groundwater governance instrument. Leadership in groundwater governance is essential for planning and implementation, facilitation of

communication, and support of information exchange. Other suggestions include training NGO staffs and citizen groups on technical groundwater issues and on policymaking techniques, developing and enabling community-management of groundwater resources, and applying modern information technology to better connect stakeholder groups and form communities of practice.

Scale is important in several respects. The impact of existing and proposed macro-policies on water development and use should be continuously analyzed. National governments can promote bottom-up approaches by mobilizing citizens, providing funds and technical services for local initiatives, investing in infrastructure, building capacity and expertise among practitioners, and coordinating initiatives that span multiple levels of government. Greater coherence might be built across scales; to better achieve vertical integration of governance systems across levels, water management should be coherently addressed by local action, national policies, and international agreements. Global policy networks could help achieve smarter horizontal governance approaches. Finally, new bridging organizations might help manoeuvre between scales, and international groundwater initiatives might play an intermediary role and promote the co-production of knowledge.

Economic considerations are key determinants of behavior. Economic incentives can steer individual users' behavior as well as institutional behavior. Careful attention should be given to developing best-practices guidelines for water pricing in order to incorporate the scarcity value of water and for recognizing third-party impacts. In addition, there is the opportunity to improve water allocation can be improved through the deployment of market approaches, so long as they are accompanied by corresponding oversight.

E. Concluding observations

All modes of tapping, distributing, and managing water supplies result from organized human effort. Responsible groundwater use will require practices that are flexible, transparent, responsive, incremental, cost-effective, culturally sensitive, equitable, and politically astute. To the greatest degree possible, groundwater governance should be context-based and adaptive. Long-term sustainability of groundwater management will require each country to govern its water resources within its own financial, technological, and institutional capability, as well as to use strategically available international resources. All this calls for considerable ingenuity at the appropriate governance levels to figure out the most appropriate ways of proceeding in specific contexts.