



# Sustainable Groundwater Management: Concepts and Tools

## Briefing Note 6

### Stakeholder Participation in Groundwater Management mobilizing and sustaining aquifer management organizations

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**Why should stakeholders participate in groundwater management?**

- Groundwater stakeholders are those who have an important interest in the resources of a specified aquifer. This may be because they use groundwater, or because they practice activities that could cause groundwater pollution, or because they are concerned with groundwater resource and environmental management (Table 1). Since surface water should be managed conjunctively with groundwater, and municipal or industrial wastewater may pose a threat to groundwater quality, stakeholders should also (where appropriate) include municipal and industrial representatives.
- Stakeholder participation in groundwater management is essential for the following reasons:
  - management decisions taken unilaterally by the regulatory agency without social consensus are often impossible to implement

**Table 1: Potential range of interests and activities of groundwater stakeholders\***

SECTOR	WATER-USE CLASSES	POLLUTING PROCESSES	OTHER CATEGORIES
<b>Rural</b>	domestic supply livestock rearing subsistence agriculture commercial irrigation	household waste disposal farmyard drainage intensive cropping wastewater irrigation	drilling contractors educational establishments professional associations journalists/mass media
<b>Urban</b>	water utilities private supply	urban wastewater disposal/reuse municipal landfills	
<b>Industry &amp; Mining</b>	self-supplied companies	drainage/wastewater discharge solid waste disposal chemical/oil storage facilities	
<b>Tourism</b>	hotels and campsites	wastewater discharge solid waste disposal	
<b>Environment**</b>	river/wetland ecosystems coastal lagoons		

\* beyond local water resource, land planning and environmental protection agencies

\*\* usually represented by some form of NGO and/or local authority



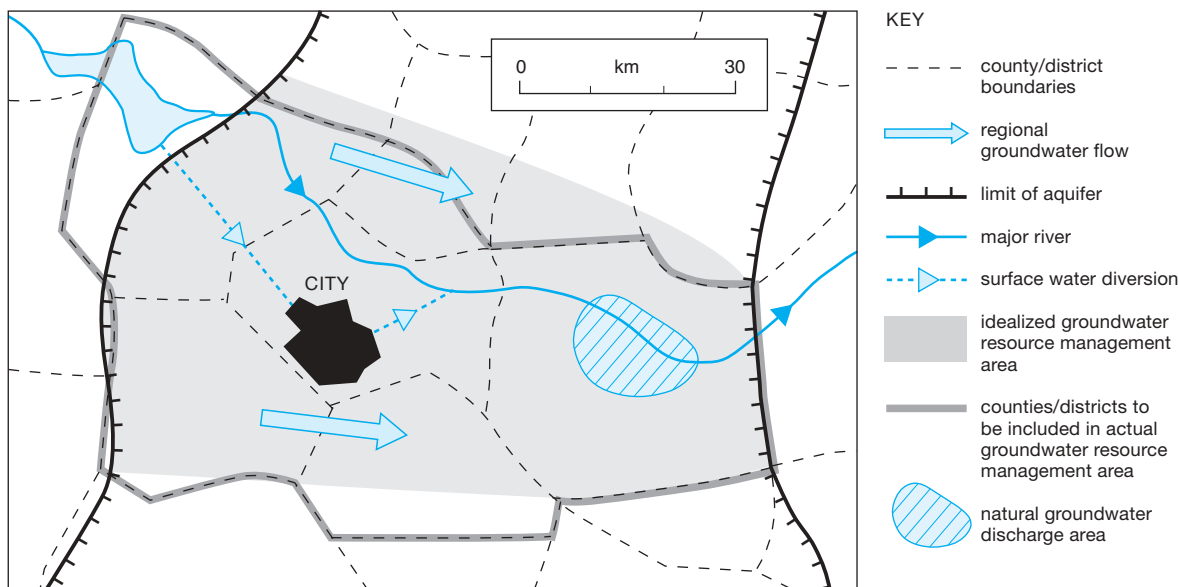
- it enables essential management activities (such as monitoring, inspection and fee collection) to be carried out more effectively and economically through cooperative efforts and shared burdens
  - it facilitates the integration and coordination of decisions relating to groundwater resources, land use and waste management.
- Groundwater management decisions taken with the participation of stakeholders should help to bring:
    - social benefits, because they tend to promote equity among users
    - economic benefits, because they tend to optimize pumping and reduce energy costs
    - technical benefits, because they usually lead to better estimates of water abstraction.
- On the other hand, participatory management of highly-stressed aquifers should help take some otherwise unpopular decisions where—at least in the short run—benefits to a number of stakeholder groups are decreased because they agree to reduce pumping in the longer-term communal interest.

### What are the institutional mechanisms for stakeholder participation in groundwater management?

- Stakeholder and community participation in groundwater management should take place at various territorial levels, ranging from the individual well to the aquifer system, and even to basin or national level. It should be encouraged at all levels where the stakeholders may make an important contribution to groundwater conservation and protection.
- Local entities have been in existence since time immemorial in some countries, distributing groundwater from wells or springs to their members, mostly for irrigation, collecting operational charges and settling water disputes, in accordance with customary rules. Such groups are here called **water-user associations (WUAs)**, although it is recognized that there is much inconsistency in the use of this term between countries. It is important to provide these associations with recognition under the law, and to vest them with juridical personality, so as to facilitate their work and enable them to enter into contractual relations with local water and land regulatory agencies. Where WUAs do not exist, there is a trend towards their establishment, either under water legislation, civil law, or other legislation on community associations (**Briefing Note 4**). In all cases, they need to have juridical personality, and also the authority to elect or appoint a representative for aquifer-level management.
- In the case of groundwater resources, there is definite need of a system for higher-level user and stakeholder participation, called here an **aquifer management organization (AMOR)**. Such organizations must be established more widely as the institutional mechanism for resource management at the aquifer (or sub-aquifer) level, in which all WUAs and other main categories of stakeholder (Table1) should be represented. AMORs should also include representatives of national or local agencies involved in groundwater management and of the corresponding local government authorities. In some circumstances AMORs can (and should) be formed at the initiative of the water administration, when zones with critical groundwater status are declared.
- The delineation of appropriate boundaries for the establishment of the groundwater resource management area for an AMOR is particularly critical (Figure 1). This will not always be straightforward and for large aquifer systems with very low hydraulic gradients, subdivision into groundwater bodies or sub-aquifers will need to be done as logically as possible. When the so-defined



Figure 1: Hydrogeological approach to the delineation of groundwater resource management areas



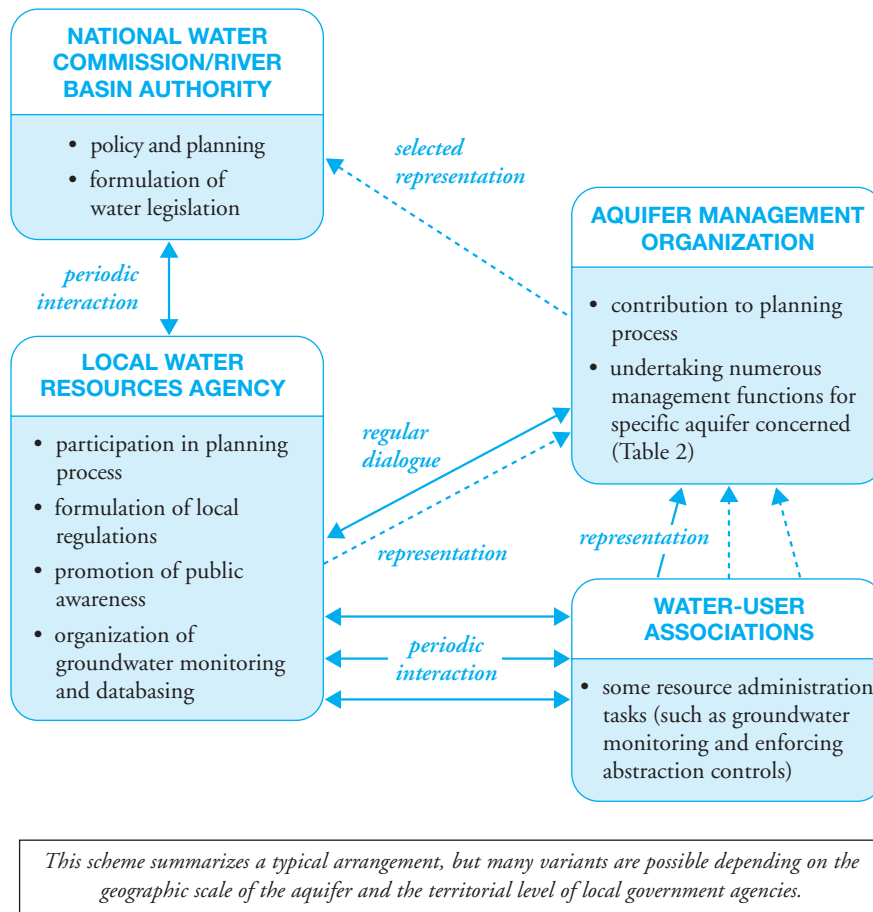
groundwater body is part of a larger aquifer system, it is important to establish institutional mechanisms to integrate groundwater management and stakeholder participation at the system level. An aquifer system may be closely interconnected with a surface water system, and in this case groundwater and surface water management should be integrated; this will call for AMORs to be represented in river basin agencies (Figure 2). Moreover, representatives of the various main categories of groundwater stakeholders may also be called to comment upon high-level policy decisions through a national water commission.

- All stakeholders for a given aquifer management unit need to be identified, and provision made to ensure their equitable representation in the institutional mechanism defined for aquifer management. Difficulties can arise where there are large numbers of individual stakeholders whose interests need to be represented in an AMOR. In this case it is necessary to provide for the formation of federations representative of each stakeholder category, and to vest these federations with the authority to appoint their representatives.
- Stakeholders may be unwilling to participate in the groundwater management process unless this develops within a solid legal and institutional framework providing clarity as to:
  - the rights and duties of representatives
  - procedures to those who are reluctant to cooperate.

A finely-tuned balance of regulations and incentives is required to bring stakeholders into groundwater management. However, regulations should not be imposed from the outside, but negotiated by consensus. Incentives will often be needed to help groundwater users make more efficient use of groundwater and thus to make it easier to achieve agreements to reduce abstraction.



Figure 2: General scheme of institutional interaction in participatory groundwater resource management



### Which groundwater management functions can be performed by stakeholders?

- There are many ways in which stakeholders may participate in the management of groundwater resources and aquifer systems, and a summary of the potential functions that can be performed, and the management levels to which these functions generally correspond, is given in Table 2. Approaches will vary somewhat according to both the specific interests of the stakeholders and the nature of land and water rights in the area concerned.
- In order to ensure stakeholder ownership of decisions, participation should start when resource issues and concerns are first being identified and profiled, and then continue through the management planning, implementation and monitoring stages.
- One of the difficult challenges in participatory groundwater management is to include, and to define a role for, those who have no directly vested interest in resource management, since they are neither well users nor potential polluters, but may still be seriously affected by management decisions—such as employees in agricultural or industrial enterprises and environmental NGOs representing wetland conservation interests.

**Table 2: Summary of functions commonly performed by stakeholders in participatory schemes of groundwater resource administration and management**

FUNCTIONS	LEVEL AT WHICH FUNCTION PERFORMED		
	WUA	AMOR	RBA
hold groundwater rights	● X		
maintain groundwater supply/distribution	●		
collect water-use charges at distribution level	● X		
perform operational groundwater monitoring	● *		
make binding rules on water-use	● X	● X	
undertake policing of groundwater use	● X *	● X *	
participate in setting criteria/targets		● *	
formulate/implement aquifer management plans		● *	
implement groundwater protection measures		● X *	● X *
settle groundwater resource disputes		● X *	● X *
review conjunctive use and water transfer schemes			● *

WUA = Water User Association; AMOR = Aquifer Management Organization; RBA = River Basin (or National) Authority/Committee  
**X** requires juridicial personality to be conferred on corresponding organization and association  
**\*** requires formalization of relationship with a local water resources regulatory agency

### What role should government play in participatory groundwater management?

- Stakeholders have first to be made aware of the importance of participation in groundwater resource management and this is a key government function. It is normally achieved initially through periodic issuing of bulletins on the status of groundwater resources and quality, together with prognostic information on the consequences of not taking some form of management action, using both local communication routes and the mass media to spread the message.
- But this is not generally enough, and education (as distinct from awareness) programs need to be developed and promoted at various levels. Most importantly social scientists should be engaged to map the existing communication network amongst the various ‘message senders’ and ‘message receivers’ involved in the management and use of a specific aquifer.
- When shaping the role for the local government water resources agency in participatory groundwater management it is advisable to adopt the following approaches:
  - **Make complex groundwater situations understandable:** by providing clear information on the groundwater balance of the aquifer concerned and using modern software with user-friendly visual interfaces to share understanding of system behavior under differing management scenarios—stakeholders will usually then be willing to consider management interventions and to accept advice to be sure that their own ideas are technically and economically sound.
  - **Empower stakeholder organizations:** a patronizing (‘officials know best’) attitude should be avoided and it must be recognized that stakeholders must be the main actors in the practical management process with the government role being mainly to assist in identifying strategic issues and implementable solutions.



- **Ensure all stakeholders are properly represented:** this irrespective of their individual weight in land or water rights tenure, or their economic and political influence.
- **Establish a sound groundwater rights system:** so that the interests of stakeholders are reasonably protected with third party and environmental concerns also being taken into account, but flexible enough to make feasible water reallocation to more socially, economically or environmentally beneficial uses (**Briefing Note 5**).
- Additionally, while conflict amongst users is generally best settled by the parties themselves, situations may arise in which the users in conflict prefer to have an external party (such as a government agency) involved in seeking a settlement, so that they do not have to confront each other directly.
- Where excessive groundwater abstraction from an aquifer drives a number of farmers out of agriculture because of increasing costs of access to groundwater supply, wealthier farmers usually consolidate their agricultural production, causing migration of the displaced smaller farmers to urban areas. Public policy must anticipate such phenomena as these in order to make timely interventions.

### Further Reading

Burke J., & Moench M. 2000. *Groundwater and Society: Resources, Tensions and Opportunities, themes in groundwater management for the twenty-first century*: United Nations-Department of Economic and Social Affairs, New York, USA.

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