



# Sustainable Groundwater Management: Concepts and Tools

## Briefing Note 5

### Groundwater Abstraction Rights from theory to practice

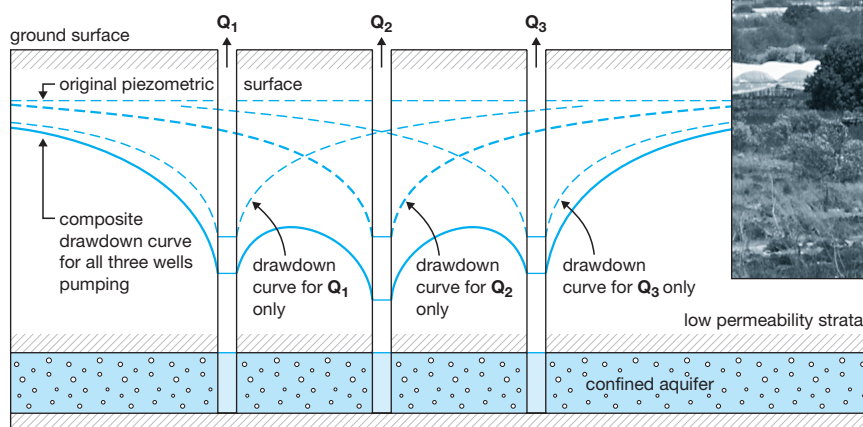
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#### Why is a ‘water rights’ system needed?

- The majority of countries today designate their water resources as being in public ownership, with government having the overall responsibility for resource management. The right to abstract (or divert) and use water (including groundwater) can be granted to individuals, public entities or private corporations, under certain terms or conditions, and such rights are generally issued by the water resources authority or by the law courts directly. A ‘water right’ usually constitutes the right to use (but not ownership of) the water itself. Lawyers call this a ‘usufructuary right’. Grants to abstract and use groundwater are instrumented through permits, licenses, concessions or authorizations, generally called here ‘water rights’.
- A system of groundwater rights (permits to abstract and to use groundwater) is often first introduced as a means to reduce interference, avoid counterproductive conflicts and resolve emerging disputes between neighboring abstractors (Figure 1). However, the development of a stable system of water rights has far wider benefits, since it provides a sound foundation for the development and protection of water

**Figure 1: Incipient interference between neighboring waterwells**





resources and for the conservation of aquatic ecosystems. Also, certain other steps towards more integrated water resources management can only be effectively tackled when groundwater rights have been adequately defined:

- fostering the participation of water users in groundwater management
  - implementing demand management programs to reduce groundwater abstraction
  - systematic collection of abstraction charges to raise revenue for resource management
  - possible subsequent trading of abstraction rights to promote more efficient water use
  - developing conjunctive use of surface water and groundwater resources.
- The existence of a groundwater right cannot guarantee water supply of a given quantity and quality, and thus consideration might be given to prescribing them in terms of a ‘share in aquifer production capacity’ (as opposed to a specified abstraction rate). However, they offer water users greater supply security for investment purposes and a valuable asset as bank collateral to obtain development credits.
  - A water rights system should have the following key attributes:
    - *requirement for effective and beneficial use of water*, such that water resources cannot be obtained for speculation or let run to waste
    - *reasonable security of water-use tenure*, including entitlement to compensation under some (but not all) circumstances when reduced, notwithstanding the requirement for efficient and beneficial use
    - *flexibility to reallocate water* to more beneficial social, economic and ecological uses, through periodic review or other mechanisms, rather than allocation in perpetuity.
 Groundwater rights are thus normally subject to a series of terms and conditions (Table 1).
  - While wastewater discharge permits are outside the scope of this note, it is preferable to issue them concomitantly with water abstraction and use rights, so as to ensure an integrated approach to water resources management.

**Table 1: Terms and conditions usually specified in groundwater abstraction and use rights**

TERM OR CONDITION	COMMENTS
• duration of right	allocation flexibility requires some time limitation (say 5 years)
• point of abstraction and use	these should be specified and may be different
• purpose of use	important to distinguish consumptive and non-consumptive use rights
• rate of abstraction	specify annual maximum together with any short-term limits
• specification of works	details of depth, diameter, completion, sanitary protection, etc.
• environmental requirements	linked specification of location/quality of return flow
• cost of right	fee usually paid for holding and/or using right
• record of transactions	obligation to declare transfer of right (when permitted)
• loss or reduction of right	forfeiture without compensation for non-use or non-compliance
• suspension of right	as a penalty or in emergency without compensation
• review of right	periodic adjustment with compensation according to supply/demand
• renewal of right	facility to apply for continuation before expiration

**How should a groundwater rights system be introduced?**

- Although surface water and groundwater should be managed in an integrated fashion, groundwater has numerous distinguishing features (see **Briefing Note 1**) and special considerations must be taken into account when designing and implementing a groundwater rights administration system (Table 2).

**Table 2: Special considerations related to groundwater rights administration**

CONSIDERATION	COMMENTS
<b>Technical</b>	
<ul style="list-style-type: none"> <li>• groundwater quality concerns</li> </ul>	in terms of possible effect of new abstraction and impact of wastewater discharge have to be considered
<ul style="list-style-type: none"> <li>• level of surface water connection</li> </ul>	varies widely and needs to be considered when evaluating effects on third parties and environment
<ul style="list-style-type: none"> <li>• resource replenishment</li> </ul>	some aquifers have limited present-day recharge and use of ‘fossil groundwater’ requires special criteria
<ul style="list-style-type: none"> <li>• dual purpose of some wells</li> </ul>	investigation boreholes may have to be used as production waterwells since exploratory drilling is too costly
<b>Managerial</b>	
<ul style="list-style-type: none"> <li>• well-drilling trade</li> </ul>	parallel regulation required in view of special skills needed and pollution hazard caused by improperly constructed wells
<ul style="list-style-type: none"> <li>• flexibility in water allocation</li> </ul>	has to be provided for dealing with hydrogeological uncertainty and need to prioritize resource reallocation for potable use
<ul style="list-style-type: none"> <li>• groundwater conservation areas</li> </ul>	may need to be designated to mitigate degradation due to excessive abstraction or pollution threat
<ul style="list-style-type: none"> <li>• transboundary aquifers</li> </ul>	can lead to disagreements between neighboring states/nations over resource behavior and use priorities

- The following considerations are critical:
  - *Be aware of complexities and obstacles in implementation:*
    - many historical, social, ecological, economic and political circumstances influence the exploitation of groundwater resources
    - the complex challenge of monitoring the compliance of groundwater users, paying regard to existing institutional capacity and the essential role that users themselves have to play.
  - *Set up an ‘enabling environment’ for implementation by:*
    - recognizing that water rights administration must be tailored to the specific local circumstances
    - ensuring political support at the highest level, since strong economic interests are usually affected when allocating/reallocating water resources
    - thinking twice before calling for legal amendments, to make sure that any identified shortcomings could not be better overcome without the lengthy process of legal reform
    - starting with definition of water resources policy, which includes the rationale for amended/new water legislation and an outline of how existing water-use rights will be handled



- admitting that perfect is the enemy of good, and that a groundwater rights system does not have to be comprehensive but does have to be workable
  - being convinced that there will always be room for incremental improvement; it is not necessary to await the perfect law and ideal institution before starting action
  - accepting that the task cannot be achieved overnight; international experience has shown the design and implementation of water rights systems always to be a lengthy endeavor
  - involving all actors from the outset to ensure wide ownership of the system introduced, both water-user sectors and government personnel administering the system should participate
  - stressing that regulatory instruments alone are not enough, and that water rights administration requires a finely-tuned balance of regulatory, economic and participatory instruments.
- *Before designing a groundwater rights system ask these key questions:*
    - what really are the problems of the aquifer system under consideration?
    - what could be achieved by introducing groundwater rights?
    - what is realistically feasible and affordable given institutional capacity constraints?

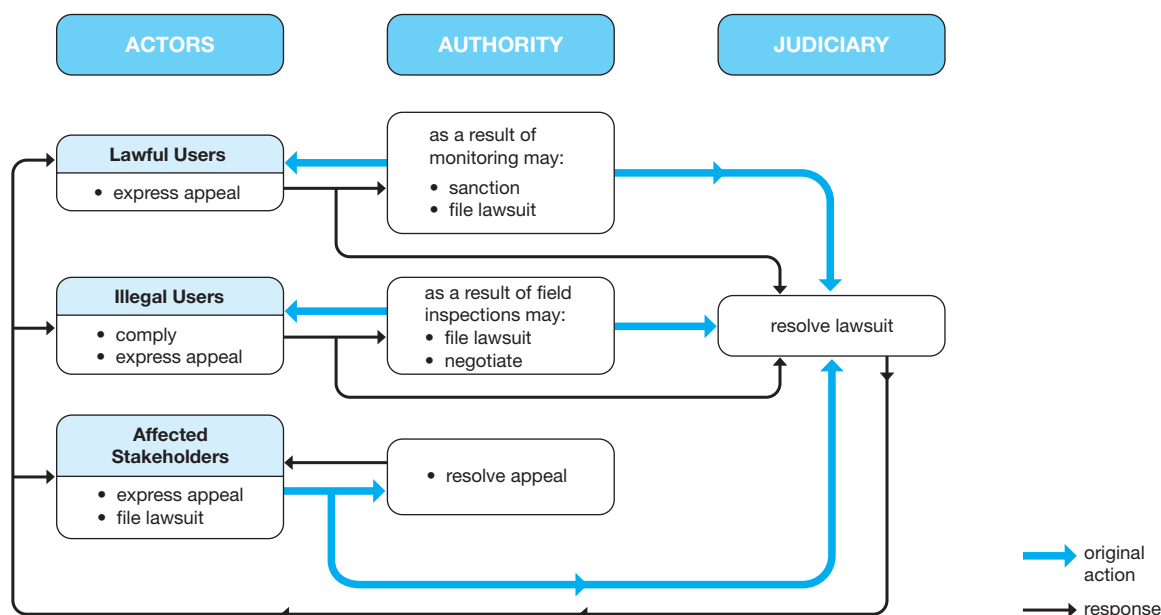
### How should a groundwater rights system be administered?

- In managing a groundwater rights system, the most important actor is the *applicant or holder of a water-use right* (Figure 2). But other users in the same aquifer and its dependent surface water may also be involved. Other *stakeholders* (not only water users but those whose interests might be affected) may also want to express an opinion regarding an application for a new water right, to file a complaint or lawsuit against an existing user, or to appeal against decisions. The *water resource authority* can deny the applicant a new water right, or may grant and register it. Once the application is granted, the applicant becomes a *lawful user* who will often have to pay fees and charges according to the terms and conditions attached to the right. The water resource authority should keep records and monitor compliance through field inspections and other means. On discovery of non-compliance, the authority can impose a warning, or a sanction, or seek prosecution by the *judiciary* if a criminal offence has been committed. In addition, the judiciary may hear appeals from the water-right holder or from affected third parties. In order to ease the burden on the judiciary, appeals may be addressed in the first instance to the highest ranking officer of the water resource authority.
- Management style is as important as management process, because users prefer a water authority to work with (rather than against) them. This can be achieved by ensuring that:
  - conflict resolution mechanisms are well-accepted, economic and rapid
  - sanctions are balanced to discourage non-compliance but not to cripple water users
  - monitoring is realistic and commensurate with institutional capacity
  - record-keeping procedures ensure complete file-copies are available for public scrutiny
  - water authority discretion is limited to discourage corruption but reduce bureaucracy
  - user bribery and administrator corruption is dealt with decisively.
- A number of *implementation tools* are required, which should be kept as simple as possible:
  - *Planning Instruments:* spreadsheets of water users and polluter populations, and aquifer quantity/quality models for prioritization of areas to be controlled
  - *Managerial Guidelines:* procedures for receiving, reviewing and monitoring of applications



- *Information System*: based on adequate software to manage applications, monitor user compliance, carry out operational quality control and deliver easily-understood information to water users
- *Public Education*: for raising political and public awareness in general.

Figure 2: Main interactions on the introduction or consolidation of a groundwater rights system



### How can the transition to a new rights system be managed?

- When water legislation is updated or new laws adopted, difficulties arise because of pressures from existing users and their political associates to concede exceptions. No universal rules are applicable, but the following guidelines should be useful.
  - *Existing uses should be effective and beneficial to qualify for automatic recognition.* If it is not possible to compute an accurate groundwater balance, all users should be given permits of short duration, which can be revised in the light of more reliable information.
  - *Customary rights should be dealt with comprehensively,* either formally recognized or appropriately compensated.
  - *Not only unlawful users are to blame for the unsatisfactory current status of groundwater resources;* past water administrations may also be responsible because of lack of capacity or corrupt tendencies.
  - *No exceptions should be tolerated;* all existing groundwater users, including public water-supply utilities, must be brought into the fold of the law.
  - *Specification of abstraction rate thresholds by water use should be a dynamic process.* Certain minor uses may be exempted from water rights bureaucracy, but simple declaration of existence will prove useful to recognize such lawful users, should more stringent measures be eventually needed.



### How can a sustainable rights system be achieved ?

- The first requirement is that the groundwater rights system is one which government is able to enforce, and with which water users are able to comply. Beyond this:
    - *Anticipation is the name of the game*; developing a water rights administration system should be approached with maximum foresight.
    - *Legislation, regulation and implementation tools should be drafted simultaneously*, with productive feedback between legal drafters and water administrators.
    - *Paper simulation of implementation is valuable*; if the simulation exhibits insufficient governmental or user capacity, then legislation should be redrafted, procedures simplified and capacity-building stressed.
    - *An incremental or pilot approach is wiser*; not all aquifers demand the same level of management control and a stepwise strategy permits learning from experience to improve procedures.
    - *Sustainability will never be achieved without community acceptance*; this must be fostered and understanding enhanced so that users are more willing and able to comply with water legislation.
    - *Keep the system under regular review by asking*:
      - Are groundwater rights really being used as a management tool?
      - Are water resource management objectives clearly understood?
      - Is the groundwater status of the aquifer improving?
- And make all the necessary adjustments required!

### Further Reading

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