

# Groundwater regulation and licensing for transboundary aquifer management

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# Learning Objectives

- Understand the rationale and benefits of groundwater regulation;
- Create awareness about the benefits of a groundwater licensing and allocation system;
- Appreciate how a groundwater licensing and allocation system may be implemented;
- Understand typical institutional arrangements for integrated groundwater management

# Why regulate groundwater

- Regulate groundwater **development**
- Constrain activities that might compromise groundwater **availability** and **quality**
- Address increasing **competition** and conflict between groundwater **users**, and
- Address increasing **threat** of groundwater **pollution**


# Specific legislative provisions in groundwater regulation

- Groundwater Abstraction Permits
- Wastewater Discharge Permits
- Sanctions for Non-Compliance
- Drilling Permits/Controlling Well Construction Activities
- Catchment or Aquifer Level Resource Planning
- Conjunctive Use of Groundwater and Surface Water
- Land Surface Zoning for Groundwater Conservation and Protection
- Facilitating Water-User and Stakeholder Participation
- Provisions for Groundwater Monitoring

In general terms, groundwater regulation must be flexible, enabling and enforceable

# Water... a public ownership

- The responsibility of the government
- A 'water right' = *the right to use (...not ownership of) water*
- Granted under certain terms or conditions → through permits, licenses, concessions or authorizations...



Is there  
permit or  
license system  
to abstract  
GW in your  
basin or  
country?

# Why groundwater licensing?

- Reduce interference between abstractions wells
- Avoid conflicts and disputes over water use
- Foster the participation of water users;
- Improve economic efficiency;
- Implement groundwater demand management
- Collection of abstraction charges
- ...



Does GW  
licensing  
guarantee a  
given water  
quantity/quality?

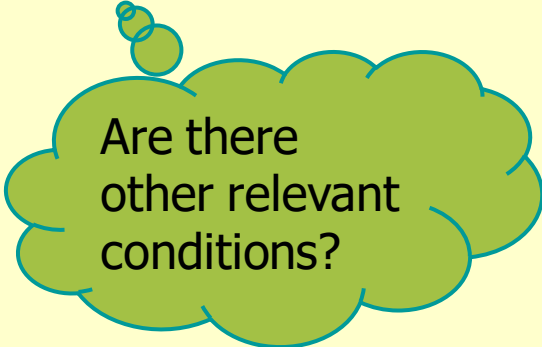
# Requirements for a good groundwater licensing system

- ▶ Comprehensive and unified, covering both GW & SW
- ▶ Sufficient detail to minimize conflict between users
- ▶ Specify conditions under which groundwater is abstracted: time, rate, the volume,... the priority in case of scarcity
- ▶ Appropriate judicial or review mechanism to enable affected users to question and to challenge decisions.



# Examples of permit conditions

TERM OR CONDITION	COMMENTS
● duration of right/permit	This requires flexibility but ranges between 1 to 5 years
● points of abstraction and use	These need to be specified as they may vary
● purpose of use	Important to distinguish consumptive and non-consumptive use
● rate of abstraction	This needs to be specified as it is the basis of compliance monitoring and also charging fees
● specification of works	Details of depth, diameter, completion, sanitary protection, etc need to be stated.
● environmental requirements	These deal with any provisions needed to protect the resource or ensure no adverse environmental impacts are caused by groundwater use under the permit
● Permit Fees	Fee are usually paid for using the water under the permit
● record of transactions	obligation to declare and submit information on groundwater use and any other information collected as part of the permit
● loss or reduction of right	forfeiture without compensation for non-use or non-compliance
● suspension or cancellation of right or permit	Indicates the circumstances under which the permit may be suspended or cancelled. as a penalty or in emergency without compensation
● review of right/permit	States the needed periodic adjustment with compensation according to supply/demand
● renewal of right/permit	States requirements and conditions for renewal of the permit



Are there other relevant conditions?



# Groundwater allocation criteria

► Allocation objectives should be clear and include economic, social and environmental factors

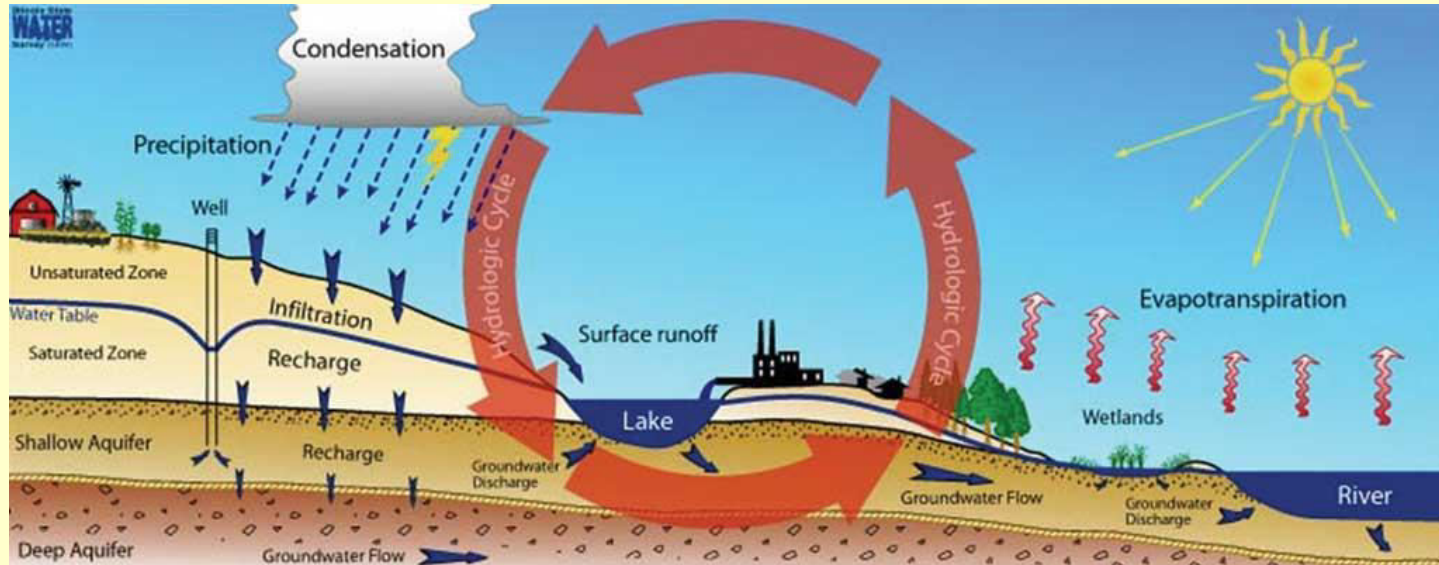
► Criteria

- Flexibility to allow reallocation
- Security of tenure of users
- Predictability of outcomes of allocation process
- Equity
- Political & public acceptability
- Efficacy → changes existing undesirable situation
- Administrative feasibility and sustainability.



Are there other criteria ?

# Administration of a groundwater licensing system



- Interactions between ground and surface water;
- Important issues: level of surface water connection (how much, which bodies, over what period?, is third parties affected?), is baseflow/ecosystem/springs affected?

# Administration of a groundwater licensing system- special considerations (cont.)

- Technical considerations
  - Groundwater quality concerns
  - Resource replenishment
  - Dual purpose of some wells
- Managerial considerations
  - Well drilling trade
  - Flexibility in water allocation
  - Groundwater conservation areas
  - Transboundary aquifers

# Points to be considered

- ▶ Stakeholder participation leads to better compliance;
- ▶ Transparency to allocation process is enhanced by availability of an information system;
- ▶ Monitoring of water use and water resources is key to water allocation enforcement
- ▶ Effects on third parties, watercourse baseflow, environmental ecosystems, and sustainability of springs ;
- ▶ Political and public awareness.



# Implementation tools

- **Planning instruments-** spreadsheets of water users and polluters, aquifer quantity and quality models etc
- **Management guidelines-** procedures for receiving, assessing, and approval of applications
- **Information system-** to manage applications, permits issuance, monitor user compliance, and provide information for use in enforcement
- **Public education-** to raise political and public awareness

# Key priority issues for regulatory and enforcement agencies

- Sufficient staff of adequate capability to enforce regulations and make appropriate assessments
- Laws which are practical and enforceable
- Staff who are knowledgeable about good management practices and have appropriate scientific knowledge
- A sense of ownership on the part of stakeholders
- Adequate financial resources to support staff and operations
- Selecting meaningful indicators for technical, economic and social issues and appropriate benchmarks
- A programme of legal education and awareness building

# Most important actors

- *Holder of a water-use permit, a lawful user who ... has to pay fees and charges .*
- **Other users** in the same aquifer and its dependent surface water.
- Other *stakeholders*, third-party actors.
- The *water resource authority*:
  - can deny or grant water right/permit
  - Should keep records and monitor compliance through field inspections and other means
  - Impose warnings, sanctions or seek prosecution in case of non- compliance
- The **judiciary** may prosecute or hear appeals

# Management style involving working with users

Achieved by ensuring that;

- ▶ Conflict resolution mechanisms are **well-accepted, economic and rapid**
- ▶ Sanctions balanced to **discourage non-compliance** ... not to cripple water users
- ▶ Monitoring **realistic** and commensurate with institutional capacity
- ▶ **Record keeping** procedures ensure complete copies are available
- ▶ **Water authority discretion** limited to reduce bureaucracy
- ▶ **User bribery and administrator corruption** dealt with decisively



## Guidelines in transitional phase

- If no accurate data on GW balance, all users should be given permits of short duration
- Customary rights should be dealt with comprehensively.
- No exceptions should be tolerated.
- Specification of abstraction rate thresholds, a dynamic process.
- Certain minor uses may be exempted from water license bureaucracy.

# The case of non renewable groundwater resources

- Implementation of a licensing system→ high priority.
- Consistent with the hydrogeological reality.
- Permits need to be time-limited, and subject to initial review and modification after a few years.
- Take advantage of results of operational monitoring to take decisions
- **Transboundary aquifers:** need for harmonization of legislation, regulations and licensing system

# Non renewable GW: special consideration needed

- ▶ Impacts of new water allocation on traditional users
- ▶ Ensuring that sufficient water of acceptable quality is left in aquifer
- ▶ Difficulties in estimating impacts on ecosystem
- ▶ Considering the “what happen after” question and identifying and costing probable exit strategy
- ▶ Envisaging re-use of urban, industrial and mining water supplies and carefully controlled agricultural irrigation

# Institutional challenges

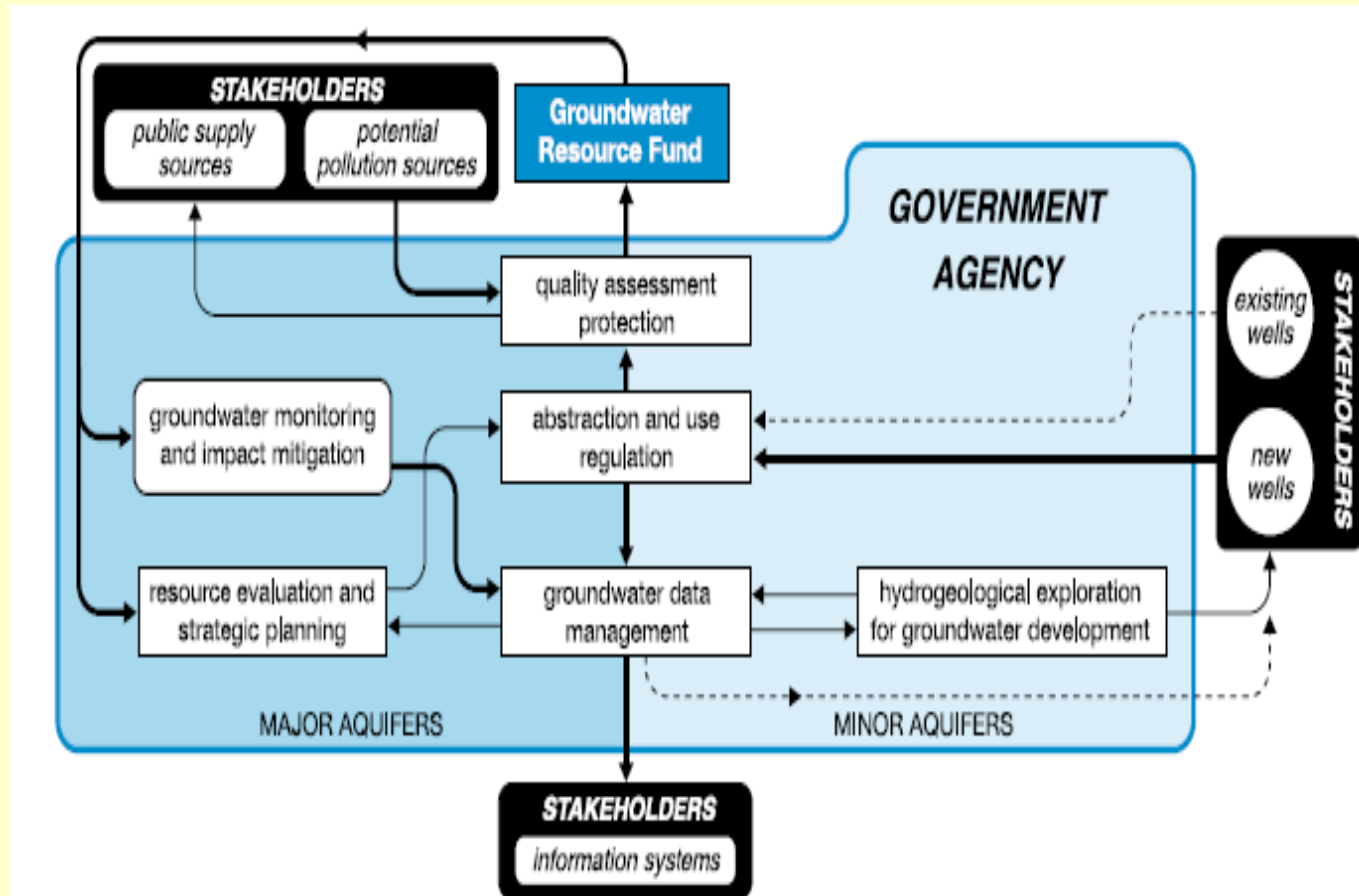
- Inadequate groundwater management boundaries,
- Weak regulatory enforcement,
- Lack of social consensus,
- Poor inter-institutional coordination

# Institutional arrangements for GW management

Groundwater regulation requires:

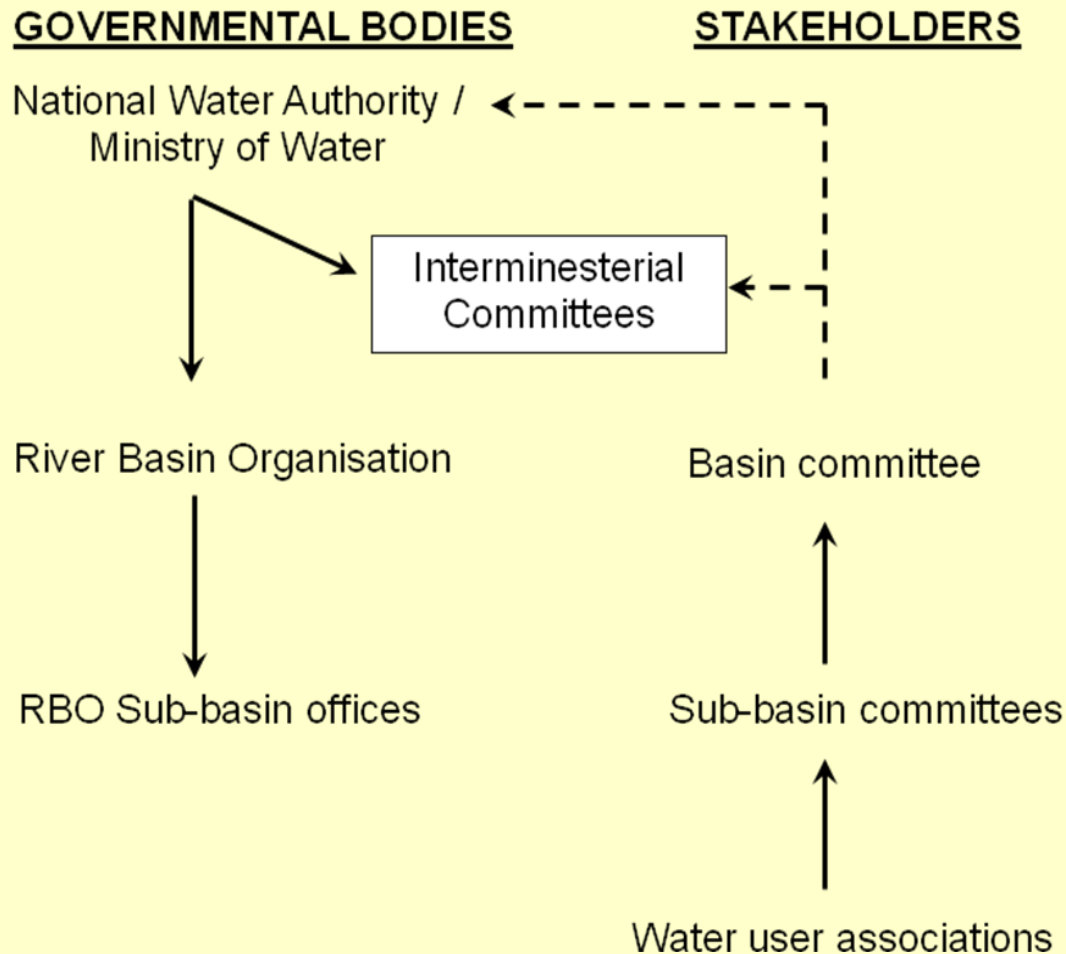
- An administrative set-up and the level of training of water administrators
- A clear understanding of the institutional roles and functions at all relevant levels
- An adequate level of public awareness and acceptance of legal provisions
- Political willingness to promote and attain sustainable groundwater management.

# Institutional arrangements for GW management



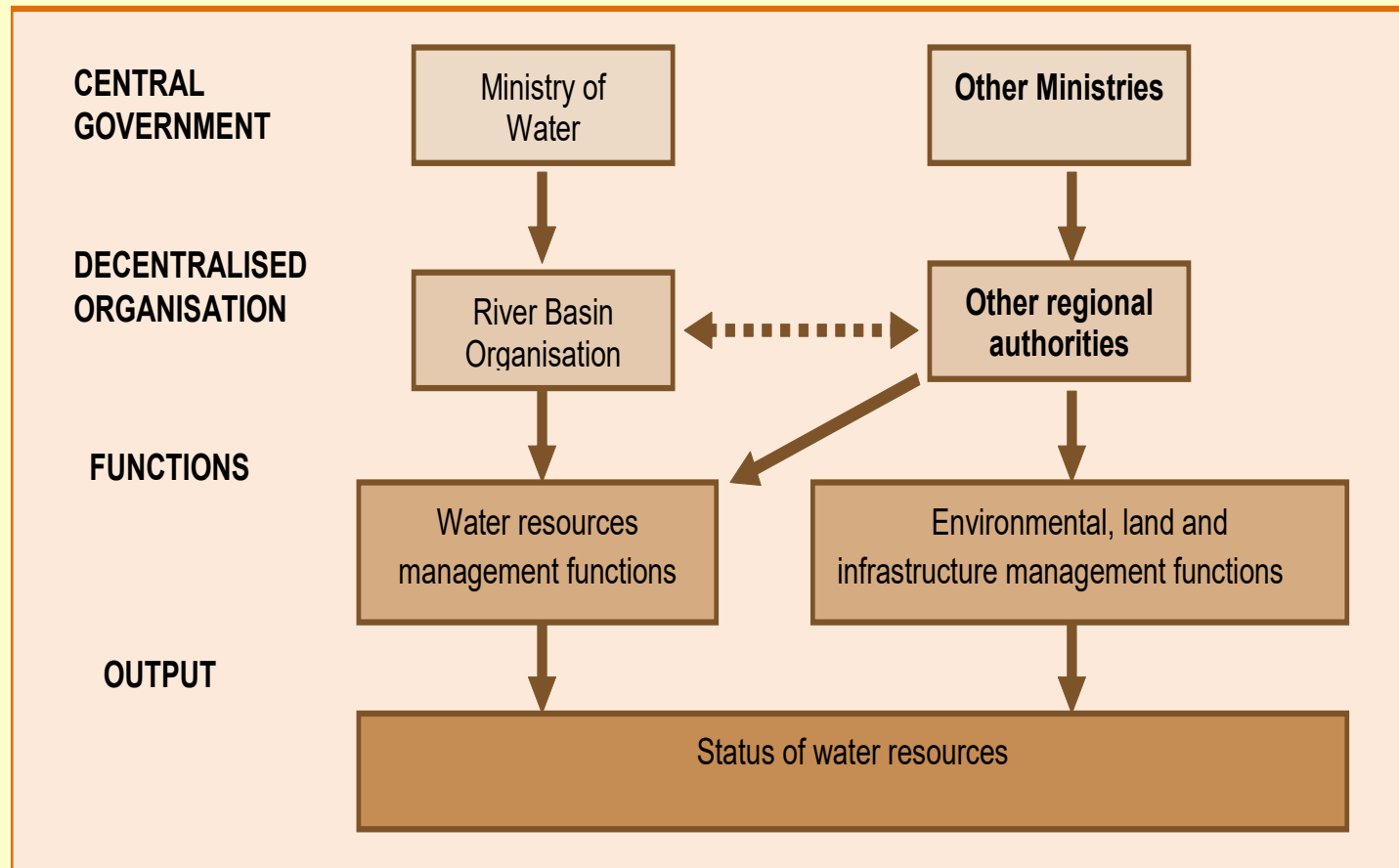
The essential role for government agency in the management process

# Institutional arrangements for GWM



Cap-Net, 2008

# Institutional arrangements for IWRM at River Basin Level



Cap-Net, 2008



# Exercise

## Duration: 30 minutes

### Purpose

- ▶ To share experiences on groundwater regulatory systems and implications for transboundary groundwater management

**Activity:** break into three groups and discuss groundwater regulation and allocation systems in your various countries and mechanisms of enforcement and address the following issues:

- How effective is regulation of groundwater
- Is groundwater regulation part of surface water resources legislation or separate
- How should groundwater regulation be undertaken within a transboundary river basin organisation? Indicate roles of countries and river basin organisations