



Shared global vision for Groundwater Governance 2030

and **A call-for-action**



Revised edition



Groundwater Governance
A Global Framework for Action

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Foreword

With one-third of humanity totally dependent on groundwater for their daily needs and 99% of the Planet Earth's accessible freshwater found in aquifers, there is a need to understand what would deliver sound governance of this natural resource in the face of its over exploitation and degradation over the past half century. Groundwater is also crucial for irrigated agriculture where surface water of suitable quality is not available. However, most - if not all - of our exploited aquifers are not being managed to conserve and protect these vital freshwater resources, according to experts.

Given the current state of aquifers and the degree of human dependency upon groundwater, in 2011 our respective organizations launched the initiative "*Groundwater Governance: A Global Framework for Action*", in collaboration with many regional partners and agencies responsible for managing groundwater use and aquifer protection. In the context of this project, groundwater governance "*comprises the enabling framework and guiding principles for responsible collective action to ensure control, protection and socially-sustainable utilisation of groundwater resources for the benefit of humankind and dependent ecosystems*".

The project has benefited immensely from the contributions of over seven hundred water experts and stakeholder groups throughout the world. It has produced 12 thematic analyses and organized five Regional Consultations resulting in five Regional Diagnostics, and a global expert consultation. It synthesised the findings into a Global Diagnostic and shaped a Shared Global Vision and a Framework of Action, to serve as valuable tools for countries seeking to improve the management of their groundwater resources and aquifers. We believe that these products provide means to face the looming threats to groundwater resources and to close the gap in groundwater and aquifer governance.

The main findings of the project confirm that the world's groundwater resources are falling victim to a lack of effective governance. To a significant extent, the over abstraction of ground water reflects the incentives that users face resulting from both market and policy failures. The available enabling frameworks and guiding principles are in insufficient use and there is a paucity of responsible collective action. This is one of the root causes of groundwater depletion and degradation of aquifers, and urgent call to action is needed if trends in the state of this resource are to be reversed.

The present document provides a synthetic overview of the consultative process and the main achievements. It conveys key messages from the results of the project's analyses, including the finding that governance of the world's groundwater resources is still in infancy. The decision-making processes concerning groundwater use and aquifer management are often poorly informed, leading to patterns of use that cannot be sustained and resulting in entrenched poverty and the loss of environmental and social 'goods' upon which cities and rural communities have come to depend.

Conscious of the need to raise political awareness at global level and to act with urgency to improve groundwater governance, our respective institutions are committed to integrating the recommendations of this project into their work programmes. Our sincere hope is that the initiative will be acted upon by the decision makers who can make a difference in reversing the current trend of groundwater depletion and aquifer pollution and sustaining the goods and services accrued from our valuable groundwater resources.

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A Shared Global Vision for

This is a Vision of a world in 2030 in which countries have taken appropriate and effective action to govern their groundwater in order to reach globally shared goals of social and economic development and avoid irreversible degradation of groundwater resources and their aquifer systems.

There is more freshwater stored underground than anywhere else on the planet. Although not all of this groundwater is readily accessible, groundwater has become a critical element in our lives, settlements, cultures and economies, as a prime source of water and as a factor in environmental health and climate change adaptation.

For all too long now, groundwater has too often been ‘abandoned to chance’ – despite growing resource utilisation and dependence. Therefore, a Shared Global Vision for Groundwater Governance has been prepared through a worldwide process of consultation with groundwater professionals, users and managers. The Vision is an ‘urgent call for systematic action’, recognising that the ‘price of doing nothing’ will be especially high, in terms of lost freshwater reserves at a time when groundwater storage is critical for sustaining water security and adapting to climate variability.



Groundwater Governance 2030

The Vision aims that by 2030

- there are appropriate and implemented legal, regulatory and institutional frameworks for groundwater that establish public guardianship and collective responsibility, permanent engagement of stakeholders and beneficial integration with other sectors, including other uses of the subsurface space and its resources
- all major aquifer systems are properly assessed, with the resulting information and knowledge shared, making use of up-to-date communication techniques
- groundwater management plans are prepared and implemented for the priority aquifers
- groundwater management agencies, locally, nationally and internationally, are adequately resourced and their key tasks of capacity building, resource and quality monitoring, and promotion of demand management, coupled with supply-side measures, are secured
- incentive frameworks and investment programmes foster sustainable, efficient groundwater use and adequate aquifer systems protection.



Groundwater governance – A definition



Effective groundwater governance comprises the promotion of responsible action to ensure the protection and sustainable use of groundwater resources and long term management of aquifer systems.

This action is facilitated by an enabling framework and a set of guiding principles. Groundwater governance has four components:

- An **institutional framework** characterized by leadership, sound organizations and sufficient capacity, permanent stakeholder engagement, and working mechanisms to coordinate between groundwater and other sectors
- an effective and articulate **legal and regulatory framework**
- accurate and widely-shared **knowledge** of the groundwater systems concerned, together with **awareness of the sustainability challenges**
- **policies, plans, finances and incentive structures** aligned with society's goals



Guiding principles

A number of principles guide how governance of groundwater translates into practice.

The **first principle** is that groundwater should not be managed in isolation, but conjunctively as appropriate with other water sources to improve water security and assure ecosystem health. Groundwater can often play the vital role of a strategic reserve to cover variations in surface-water availability, and can be both recharged by and discharged to surface-water bodies

The **second principle** is that groundwater quality and resources should be co-managed, and thus groundwater management needs to be harmonised with land management. Land-use exerts a major influence on how groundwater is recharged, and groundwater recharge zones are thus in urgent need of protection from pollution and degradation

The **third principle** is that effective groundwater governance requires co-governance of all activities in the subsurface space, from waste disposal to tunnelling to hydrofracturing – a point of action not normally discussed in water management policy making.

The **fourth principle** concerns the need for ‘vertical integration’ between national and local level in the elaboration and implementation of groundwater management and protection plans.

The **fifth principle** is coordination with the macro-policies of other sectors – such as agriculture, energy, health, urban and industrial development and the environment. In many cases policy action in these sectors holds the key to groundwater resource sustainability.



Synopsis for action

Why 'groundwater governance' matters now?

Growing dependence

Since earliest history humankind has met much of its needs for good quality water from sources beneath the earth's surface, but for centuries our capability to extract groundwater was tiny by comparison with the available resource. In modern times major advances in water well drilling, pump technology, geological knowledge and energy availability have brought about a 'silent groundwater revolution'. Groundwater withdrawal has more than quadrupled in volume over the last 50 years, a trend that is likely to continue. Today groundwater is estimated globally to provide 36% of potable water, 42% of water for irrigated agriculture and 24% of direct industrial water supply. The importance of groundwater should not be gauged solely on volumes used.

Groundwater brings other major benefits, such as local availability, high reliability during droughts, regulation of ecosystems and microclimates, and delivery of water of superior quality. The intense exploitation of groundwater formed the cornerstone for the 'green revolution' of Asian agriculture, and is providing public water supply for more than 1,000 million urban dwellers worldwide and supports rural livelihoods extensively across the globe. Groundwater is in many areas around the world the only dependable source of fresh water.

Growing pressures

Groundwater development has brought many benefits, but this has come at a significant collateral cost. In many areas resource depletion caused by excessive abstraction is jeopardizing future water security. The over-abstraction diminishes future supplies and in some cases causes irreversible damage through land subsidence, loss of aquatic ecosystems or increased salinization.



Elsewhere – in contrast – very shallow groundwater levels cause soil water-logging and ‘groundwater flooding’ that damage property and/or present health risks.

Another serious challenge is the rapid growth of pollution pressures on groundwater. There is widespread evidence of deteriorating groundwater quality associated with the leaching of agrochemicals, seepage of urban and industrial effluents, and irresponsible disposal of hazardous waste. Such pollution undermines human well-being and limits the options of groundwater use. Once contaminated groundwater quality deterioration is extremely persistent, and often too costly or technically impractical to remediate. There is a growing pressure on the entire ‘subsurface space’. Groundwater withdrawal is part of this pressure and is impacted by the intensive use of the subsurface space for transport and storage, mining and the tapping of new energy sources such as shale gas and coal-bed methane.

Scale and intensity of global groundwater withdrawals

- Global groundwater abstraction has increased more than fourfold in the last 50 years – and is estimated to have reached 1000 km³/a in 2010, or 26% of all freshwater withdrawn for use
- Withdrawal intensity varies widely, with the highest levels occurring over large parts of China, India, Pakistan, Bangladesh, Iran, the US, Mexico and Europe
- Under natural conditions, recharged aquifer systems tend to remain in equilibrium with outflows (seepage or leakage) replaced by recharge. Intensive groundwater abstraction can disrupt this equilibrium, which results in progressive groundwater storage depletion (overdraft).
- The global groundwater abstraction resulting in permanent depletion of aquifers is currently estimated to be almost 200 km³ per annum, nearly one-fifth of all groundwater pumped.

Sources: Konikow (2011): Contribution of global groundwater depletion since 1900 to sea-level rise. *Geoph. Res. Let.*, Vol 38; Margat & Van der Gun (2013): *Groundwater around the World - A Geographic Synopsis*, CRC Press/Balkema.



The initiative to strengthen groundwater governance

Governance – from weakness to strength

The concerns listed above led five international organisations - the Global Environment Facility (GEF), the World Bank, the Food and Agriculture Organization of the United Nations (FAO), the UNESCO-International Hydrological Programme (IHP), and the International Association of Hydrogeologists (IAH) - to launch the Groundwater Governance Project. This global initiative aimed at strengthening groundwater governance commissioned 12 thematic analytical papers by leading experts and convened five regional consultations in different parts of the world, culminating in a final high level expert meeting. The outcomes of all these activities were integrated in a Global Diagnostic that became the basis for the Shared Global Vision for Groundwater Governance 2030 and the Global Framework for Action.

In the course of the process it became evident that in most countries the ability to manage aquifer systems has not kept up with the increased dependence on groundwater resources and with the steadily growing pressures. Groundwater governance almost everywhere is insufficient, with the following key deficiencies identified in the Global Diagnostic:

Groundwater governance – key deficiencies identified in ‘global diagnostic’

- Low political commitment and inadequate leadership from government agencies
- Limited awareness of long-term groundwater risks
- Significant gaps in information about the resource
- Non-performing legal and regulatory systems on groundwater
- Insufficient stakeholder engagement in groundwater management
- Incentive structures not aligned with objectives of sustainable and efficient groundwater use
- Limited integration of science based groundwater understanding in related national policies



There is an urgent need to strengthen groundwater governance – to address the current challenges and future significance of groundwater and to make use of opportunities for protecting and augmenting the groundwater resources. Groundwater governance involves: establishing goals and putting in place policies for efficient and sustainable groundwater development and use; establishing a practical legal and regulatory framework conducive to sustainable and efficient management; establishing or strengthening groundwater management organizations and planning procedures; assigning dedicated personnel and financial resources; ensuring the provision of essential information and knowledge; promoting stakeholder participation; and ensuring a framework of transparency and accountability. Because the use of groundwater is essentially of local value, effective governance arrangements need to extend down to the local level, but should also be linked to aquifer basin-level, national-level and even transboundary level, as appropriate. Good groundwater governance recognizes the inherent value of aquifer systems, and aims at achieving the sustainable provision of freshwater and preventing the degradation of aquifer dependent ecosystems.

The framework for action – urgent action is needed

To achieve the goals of the Shared Vision 2030 a Framework for Action has been prepared. It describes the main steps to be taken, provides guidelines and is an urgent call for action to all who can make a difference: national and local governments, international organizations, private sector, civil society, media, educational institutes and professional organisations – but also well owners, groundwater users and concerned citizens everywhere. What needs to be done in a specific place and on a specific aquifer system is very much driven by the local context: the hydrogeology, the level of development, the specific challenges but also the capacity of political leadership to deliver, the overall governance and macro-economic interests. From the regional consultation process it was clear that more needs to be done to strengthen groundwater governance and that such steps need to be adapted to what is feasible in the specific local and national context.



Creating an adequate basis for governance

Political commitment and leadership are essential, with the ability to deliver on identified priorities. Stakeholder awareness and involvement are also needed to motivate all those involved to align their behaviour with the objectives of good groundwater management. Steps to lay the foundations for strengthening governance can include a groundwater governance diagnostic, data acquisition and management information, awareness raising programmes and institutional mechanisms for effective stakeholder involvement.

Building effective institutions

Institutions, comprising the legal and regulatory framework, organisations (both governmental and non-governmental) and permanent stakeholder engagement mechanisms, are the core of groundwater governance. However, one thing is clear; it is not the formulation of laws and regulations that will make a difference, but their implementation and adoption by all natural resource users and managers.

Preferably groundwater should be under public guardianship, for instance in licensing water well development and controlling localized ‘point’ pollution. Laws and regulations should also require data sharing and facilitate important processes such as balancing competing or conflicting interests among stakeholders, and coordination with urban and rural land uses and with the management of the entire subsurface space.

Lead organisations are required at both central and local government level. The institutional set-up needs to ensure joint management of both quantity and quality aspects of groundwater and should facilitate conjunctive management. The ideal structure would integrate groundwater management vertically between national and local level, and horizontally at each level with other sectors impacting on groundwater. Local level agencies need particular strengthening and motivation for their front-line management tasks.

Effective groundwater management requires partnership between public agencies and private stakeholders. Permanent stakeholder involvement needs to be recognised by law, which may give legal status to formally constituted groundwater associations.



Aquifers that cross the boundaries of countries, or of provinces in federal countries, are a special but a very common occurrence, requiring cooperation among the jurisdictions involved. Best practice starts with professional collaboration, information exchange and development of shared understanding, which can then lead to joint programmes and ultimately to management agreements.

Making essential linkages

Establishing linkages to other water resources and other sectors is a requisite of governance. Connections to the management of other water sources and other sectors need to be systematically made. At present the linkages are often not incorporated in policies and plans. Within the water sector, groundwater needs to be managed ‘conjunctively’ with other sources of water. Groundwater and surface water in particular supplement and feed each other; hence water allocation plans should be made accordingly. Groundwater governance also needs to take account of key linkages with other sectors. Priorities are urban sanitation and waste-water management, land use and land management, energy provision and mining and other sectors that make use of the subsurface space. The key to sustainable groundwater management often lies in the integration in wider policies – from regulating the use of hazardous substances, to infrastructural planning (such as roads and pavements) to trade arrangements.

Redirecting finances

In many countries, incentive policies and public expenditures at present do little to promote sustainable and efficient groundwater management, and often do harm. Public finances related to groundwater need to be reviewed critically, and brought in line with policies for sustainable groundwater development. For example, government subsidies and other incentives that encourage excessive abstraction or pollution of groundwater may need to be withdrawn, without penalizing those who have most to lose. Alternative incentive systems could reward activities that enhance recharge, mitigate pollution and reduce water-use.

Groundwater management infrastructure needs to be adequately financed and it is important to ensure adequate funding for key functions – such as aquifer monitoring, information dissemination, regulatory procedures, developing stakeholder platforms



and promoting user participation. The jobs involved are ‘virtuous’: they safeguard a shared treasure of enormous value to society and economy. Similarly, there needs to be more investment in groundwater management. Portfolios need to be developed for investment in building knowledge, participatory monitoring; landscape improvement, recharge for urban water supply; groundwater substitution; dedicated electricity feeder lines and appropriate use monitoring and operation systems; and protection of recharge zones and, where unavoidable, remediation.

Starting the process of planning and management

A key step in putting groundwater governance provisions to work is the establishment of an aquifer management planning process. These structured programmes of action should be established and owned by local agencies and stakeholders under the guidance of the national groundwater agency. The planning process is evidence-based, transparent and contestable – and the resulting plans create a framework of accountability.

An urgent call-for-action

The current state of, and dependence upon, groundwater resources requires a massive effort to strengthen its governance – locally, nationally and, where appropriate, in transboundary situations. This will require a concerted and coordinated effort from government at different levels, from municipalities and utilities, from the private sector, civil society and international organizations, educational institutes, media and professional associations. Fortunately there are some inspiring examples to follow – major cities that have managed to control excessive extraction, islands that have safeguarded groundwater quality, districts that have put in place full monitoring and metering systems for groundwater.

The Shared Global Vision for Groundwater Governance 2030 and the Global Framework for Action to Achieve the Vision on Groundwater Governance call for strengthening groundwater governance. This call for action urges countries, districts, communities, companies, organisations and individuals to safeguard the groundwater resource that is essential to meet their common future objectives and Sustainable Development Goals. The Framework is designed to set in place the groundwater governance arrangements that will secure this.



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