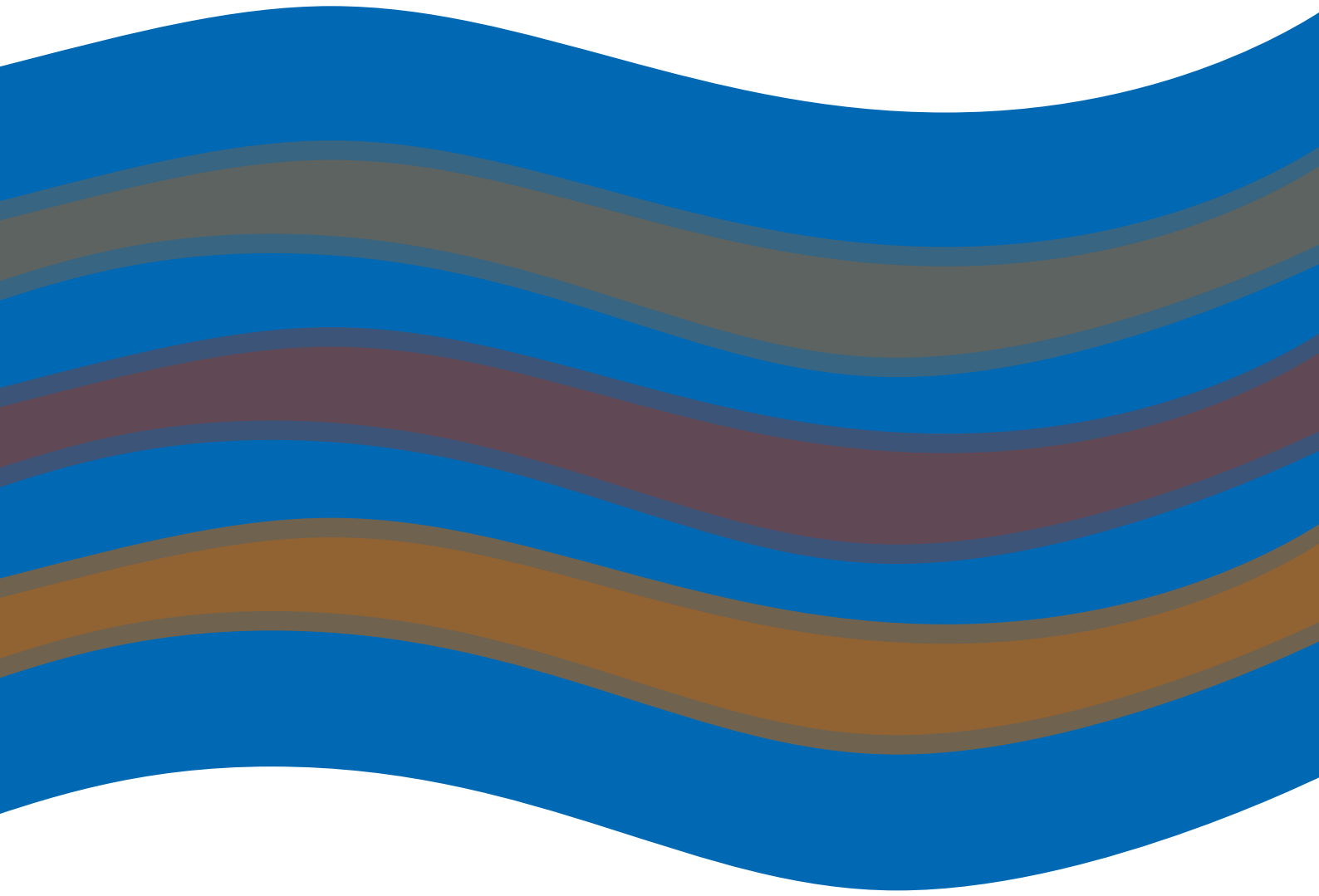


# Groundwater Governance in India

Stumbling Blocks for Law and Compliance



Water Governance Facility Report No 3  
[www.watgovernance.org](http://www.watgovernance.org)

**Disclaimer:**

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder provided acknowledgement of the source is made. WGF would appreciate receiving a copy of any publication that uses this publication as a source. No use of this publication may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from WGF. The designation of geographical entities in this report, and the presentation of the material herein, do not imply the expression of any opinion whatsoever on the part of the publisher or the participating organizations concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Copyright © 2013, Stockholm International Water Institute, SIWI

How to cite: Water Governance Facility (2013) Groundwater Governance in India: Stumbling Blocks for Law and Compliance. WGF Report No. 3, SIWI, Stockholm.

Design by Elin Ingblom, SIWI

## About the Water Governance Facility (WGF)

---

The UNDP Water Governance Facility at SIWI (WGF) provides strategic water governance support to developing countries to advance socially equitable, environmentally sustainable and economically efficient management of water resources and water and sanitation services to improve the livelihood of poor people.

WGF supports developing countries on a demand basis to strengthen water governance reform implementation through:

1. Policy support and technical advisory services;
2. Developing and disseminating water governance knowledge and strengthening capacities
3. Developing and applying water governance assessments at national and global levels

WGF works with water governance in multiple thematic areas such as, integrated water resources management, transboundary water, water supply and sanitation, climate change adaptation, gender and water integrity. It works in several countries in regions such as Central and South Asia, East and Southern Africa and the Middle East.

WGF is a mechanism that contributes to the implementation of the UNDP Water and Oceans Governance Programme. The financial support from UNDP, Swedish International Development Cooperation Agency (Sida) and MDG Achievement Fund (MDG-F) is greatly acknowledged. For more information visit [www.watergovernance.org](http://www.watergovernance.org)

## Acknowledgements

---

This report was written by Jenny Grönwall, partly based on research during field work in Bangalore (2004-2007, 2009 and 2013). Marianne Kjellén (SIWI) has edited the text, which also has benefitted from comments by Håkan Tropp (SIWI) and Srinivasan Iyer (UNDP India).

## Acronyms and Abbreviations

---

BWSSB	Bangalore Water Supply and Sewerage Board
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
IWRM	Integrated Water Resources Management
KGA	Karnataka Groundwater Authority
NASA	National Aeronautics and Space Administration
NOC	No Objection Certificate
PCB	Pollution Control Board

# Content

---

Executive Summary	5
Introduction	6
Governance and Law: From Formulation to Implementation	7
<i>Policy and law as democratic process</i>	8
<i>Implementation in practice</i>	8
India's Groundwater Challenges	9
Groundwater Regulation in India	11
<i>Rights and obligations relating to groundwater</i>	12
Federal Level Streamlining of Groundwater Regulation	13
<i>The Model Groundwater Bills</i>	14
<i>The National Water Policy</i>	14
<i>Attempts at a National Framework Law</i>	15
State-Wise Regulation of Groundwater	16
Implementation and Compliance	18
<i>Command and control in Bangalore, Karnataka</i>	19
<i>Legitimacy issues in Maharashtra</i>	21
<i>Addressing water depletion through electricity in Gujarat</i>	23
Conclusions	26
References	28

## Executive Summary

---

India's development has become strongly dependent on its groundwater resources. More than half of the agricultural sector depends on irrigation from wells, characterised by deep-rooted but often inefficient practices. Apart from rising demands from a growing population with changing consumption patterns, normal variations in monsoon cycles together with climate change are increasing the unpredictability in estimating future water availability. More irregular and intense rainfall patterns are also altering the groundwater recharge potential. Considering the strategic importance of aquifers for storage, the regulation of India's groundwater resources is badly in need of reform. At the policy level the awareness is high that large parts of the country are already severely stressed with a bleak future under a business as usual paradigm. Yet there is insufficient action.

Governing the groundwater has become a growing challenge in large parts of the country where the water table is steadily sinking. Groundwater governance entails the political, social, economic and administrative systems which affect the use, development and management of the resources and the equity and efficiency of water services and allocation. Not the least, it involves the formulation, establishment and implementation of water policies, legislation, institutions and water administration. It emphasises the need for clarification of the roles and responsibilities of government, civil society and the private sector.

The pressure on the available groundwater resources necessitates sound, scientifically based regulations to prescribe behaviour relating to use and abuse. Legal frameworks play a crucial role for efficient governance, for turning policy decisions into rights and obligations, and as a democratic basis for control and accountability. This report analyses the formal legal and institutional framework for groundwater governance in India, with special focus on implementation, enforcement and compliance matters in practice.

As the point of departure, groundwater is intrinsically linked to land under Indian law, meaning that groundwater rights are not vested in the state. Adopting Model Bills from the federal Government, almost half of the States and Union Territories have passed Acts and Regulations on groundwater usage. The current legislation is however generally limited in its application to certain administrative areas that the Central Groundwater Authority has notified, based on monitoring and periodic assessments. The formal law is further based on the setting up of State level authorities for implementation, on well-spacing, registration of existing users, and prior approval for new well structures. Neither component is sufficiently flexible or far-reaching to provide for equity or sustainability.

The federal Government is attempting to pull the State legislators towards more progressive regulation that incorporates the doctrine that the state at all levels is the trustee of groundwater. One of the major arguments for such reform is the wish to sever the link between land and property rights in groundwater, against which there is loud resistance among right-holders.

The proposed changes allow for contextualised legislation and differentiation between alluvial and hard-rock conditions, among other things. However, most of what is known about the groundwater development builds on highly aggregate estimates, in turn based on a rather sparse network of observation wells. Recently, it has been suggested that groundwater users need to better understand the basic hydrogeology of their surrounding environment. Involvement in aquifer mapping would require decentralised governance as well as greater user participation, and may be useful in order to achieve efficiency gains as well as confront problems shaped by low legitimacy.

Implementation of formal groundwater law is usually challenging because of the sheer number of users involved, the monitoring difficulties, lack of updated scientific competence, and financial and technical constraints. This report's case studies of three States (Karnataka, Maharashtra and Gujarat) show a range of stumbling blocks. These include path dependency at the stage of formulation of the law that entails more of the same: the same command and control system based on licensing for new wells in a few notified areas only; and the same upholding of existing rules for right-holders already benefitting from them whereas stricter rules apply to new users only.

The cases illustrate the importance of a number of aspects of groundwater governance: that of integration between institutions at all stages and levels; of legitimacy, political will and vested interests; and of an out-of-the-box approach to the water and electricity nexus. They also highlight that limited human, administrative, technical and financial capacity remains a major bottleneck that on the one hand should be regarded at the time of reform, but on the other hand mustn't make legislators and implementing authorities eschew their responsibilities. Reformed legislation must be coupled with improved institutional arrangements to facilitate implementation and enforcement. In order not to let the prevailing culture of non-compliance stand in the way of law as an enforceable instrument, a continuous process of reinventing and adapting law to the needs of society is vital.

# Introduction

---

India's development has become strongly dependent on its groundwater resources. The rise in absolute and per-capita water demands that is linked to population growth and changing consumption patterns is increasingly met from groundwater sources. The agricultural sector and the industrial both thrive from free access to water from wells. Governing the groundwater is simultaneously a growing challenge in large parts of the country where the water table is steadily sinking. Overexploitation and quality deterioration is spurred or deterred by different policy and reform choices at federal, State and local levels.

The widening availability and demand gap is often held to be a governance problem, commonly interpreted as due to misguided policies, unenforceable legislation, inefficient bureaucracy, institutional fragmentation, low capacity, dated knowledge, poor accountability, corruption, 'vote-bank' politics, lack of stakeholder involvement, and so on. Quality deterioration suffers from partly the same conditions.

The UNDP's concept of water governance is defined by the political, social, economic and administrative systems that are in place and which directly or indirectly affect the use, development and management of water resources and the delivery of water services at different levels of society. Importantly, the water sector is also affected by decisions and development outside of the water sector. Applied to groundwater resources, this concept addresses the following aspects:

1. Principles such as equity and efficiency in water resource and services allocation and distribution, the need for integrated water management approaches and the need to balance water use between socio-economic activities and ecosystems;
2. The formulation, establishment and implementation of water policies, legislation, institutions and water administration based on aquifer conditions and hydrogeological characteristics rather than administrative boundaries;
3. Clarification of the roles of government, civil society and the private sector and their responsibilities regarding property rights, management and administration of water resources and services.<sup>1</sup>

This report analyses the formal legal and institutional framework for groundwater governance in India, with special focus on implementation, enforcement and compliance matters in practice. It maps the recent development in the non-binding policy landscape as well as the law reform processes. The report contains case studies of three different States and concentrates on access and abstraction for agriculture and domestic use while leaving contamination and pollution remediation aside. The main findings show bottlenecks in the formulation and enforcement of law, relating to lack of political will and legitimacy, path dependency, limited implementation capacity, and a persistent culture of non-compliance.

---

<sup>1</sup> Adapted from UNDP's Water Governance Facility, [www.watergovernance.org/whatiswatergovernance](http://www.watergovernance.org/whatiswatergovernance).

# Governance and Law: From Formulation to Implementation

## Policy and law as democratic process

The pressure on the world's available groundwater resources necessitates sound, scientifically based regulations to prescribe behaviour relating to use and abuse. The evolving body of groundwater governance theory suggests that legal frameworks play a crucial role for effective governance and for turning policy decisions into rights and obligations (Mechlem, 2012). Accountability further requires a legal system wherein rights, obligations and responsibilities are well defined.

Formal legislation on groundwater can enhance governance efficiency but needs to be based on a process with a number of steps, taken at different levels and involving a range of actors. The process ideally starts with formulation of non-binding policy, informed by national and international guidelines and best practices and adapted to a national or even local context as necessary. Consultation with the general public or at the least with involved authorities and institutions may be necessary already at this stage depending on the state of regulation already in place.

The law-making process following on policy discussions should, in turn, ideally be based on what was learned from previous consultation or, alternatively, on public opinion invited at this later stage. The groundwater governance process thereafter continues with law enactment, and the law subsequently coming into force, being implemented and complied with, until necessary revisions close the cycle and the process starts anew.

Legitimacy is fundamental and can be attained in a number of ways. Firmly grounding and communicating the principles underpinning change is a necessary development from the command and control management route that governments have conventionally taken when legislating on natural resources. Integration with existing (surface) water law, environmental law in general and non-water sector laws is essential to a holistic approach with due account taken to the complexity of groundwater resources and their use/users. The theoretical backdrop to groundwater legislation therefore stresses how integrated water resources management (IWRM) should be one point of departure, along with consideration of the so-called water-energy-food nexus. With the main exception being the European Union's Water Framework Directive, water is still mostly dealt with in a piecemeal fashion. There is also often an absence of any far-reaching integration between semi-autonomous State law on (ground) water in federal nations like the USA and India. Further, law is rendered more effective when combined with other incentives – such as economic (taxes and fees), physical (for instance fencing off of drinking water protection areas, installation of water conserving fixtures) and behavioural instruments (awareness-raising information and education). Integration finally needs to account for trade-off effects that have negative implications for sustainability and equity in water allocation. For instance, to offer certain users water or energy related

## Box 1 Key Questions for Legal Regulation of Groundwater

The legal framework for groundwater management should provide answers to key questions such as who can access groundwater, where, for which purposes and under which conditions? How are aquifers protected against depletion and pollution? According to which criteria are the finite resources of non-recharging aquifers to be allocated and protected? What kind of monitoring and planning tools have to be used? How will private and public interest be balanced and how are stakeholders to be involved in decision-making and management processes?

Source: Mechlem 2012: 5

subsidies is ultimately a political decision with potentially far-reaching consequences beyond the user group targeted.

One trend in regulation of water is that governments refrain from taking the last step whereby policy gets a legal standing. The real distinction between binding law and non-binding policy may have been blurred for instance among policy research institutes. Importantly, Cullet (2012a) argues that over the past two decades, reforms in the water sector have often been heavily influenced by non-binding water policy rather than law as the instrument through which the legislature sets out the basic framework. It is a concern that existing democratic principles and mechanisms risk being bypassed in favour of less public and less transparent structures for law-making. Policy plays a necessary role as precursor to the legislator's adoption of binding regulations but without law, the result is a democratic deficit (ibid).

Policy lacks the level of legitimacy that is the foundation of law, and also the legal certainty that partly defines the rule of law. Policy-makers can also not be held legally accountable for failures to implement principles set out in non-binding policy documents. Water policy that thus replaces law as basis for decision-making and actions may thereby undermine some basic principles of good governance: the need for transparency, integrity and democratic involvement. The ensuing implications on rights and obligations include such aspects as absence of formal budget allocation decisions for execution of policies, which would more automatically have to follow after adoption of new legislation.

### Implementation in practice

Being an invisible resource, groundwater is often held to be inherently hard to control. Regulating it through law and subsequently enforcing adopted rules inevitably comes with transaction costs. In every society, these tend to strain over-burdened and understaffed administrations in place. Implementation of formal groundwater law is usually challenging because of the sheer number of users involved, the monitoring difficulties, lack of updated scientific competence, and financial and technical constraints. This is particularly the case in countries like China, Mexico and India where groundwater is fundamental for the agricultural sector.

Building capacity through continuous upgrading of both the monitoring system and the know-how is vital for effective implementation. Economic and technical support for institutional strengthening is often needed in developing countries. Insufficient capacity – human, administrative, technical and financial resources – at appointed authorities contribute to groundwater law failing to work in practice, with no or inadequate contribution to aquifer governance as a result. Administrative capacity is indispensable both when law is drafted – to ensure provisions that are comprehensible, coherent and enforceable – and later when it is to be implemented. Unclear organisational frameworks with insufficiently defined and coordinated roles and responsibilities tend to lead to gaps and overlaps. Mechlem (2012: 31f) gives the following recommendations for institutional arrangements at the implementation stage:

- Appointed authorities need to be accountable and transparent;
- Staffing appointed authorities with skilled personnel takes time;
- The capacity available to effectively and universally implement new or amended rights and obligations should be assessed before legislative steps are taken, to help determine feasible approaches;
- The introduction of legislation should be staged appropriately so that the different steps avoid signalling non-implementation;
- Ensuring that non-compliance incurs sanctions across whole jurisdictions is vital to instil respect for the legislation and its objectives.

In the search for model solutions to water management and institutions that can be scaled up and replicated, a number of arrangements have been promoted as panaceas by donor agencies and policy makers attracted to simplicity (Meinzen-Dick, 2007). Strong public government agencies, user organisations and water markets (transferable water rights) have been investigated and identified as the backbone of relatively successful cases. More

lately it has, however, been suggested that the variability of local situations and conditions has effectively hindered such approaches to live up to expectations in other and different contexts. Locally varying hydrogeological conditions would thereby influence groundwater users' level of compliance with applicable regulations, along with other intervening factors such as regulatory awareness, expense, normative values within the community, enforcement style (Cohen and Bakker, 2010). It is important to incorporate the insight that no one size fits all in governance through formal regulation; law-making must be seen as a continuous process of inventing and adapting law to the needs of society, both in time and space. Meinzen-Dick (2007: 15200) stresses the importance of a more nuanced approach that builds on better diagnosis and adaptive learning to find solutions that fit local biophysical, social, and economic conditions. A large multitude of users requires a range of different legislative solutions and institutions while providing for sector-integration.

Contextualised law-making is complex and takes time but the possibilities to target prioritised user groups, sectors and geographical areas should – at least in theory – pay off through a much facilitated implementation process. If local hydrogeological conditions as well as the impetus behind users' behaviour patterns are well understood, measures can more easily be tailored to accommodate for these. It is also worth remembering that groundwater overexploitation is a result of uncountable individual decisions at the micro-level, each arguably rational in its specific local context (World Bank, 2010).



# India's Groundwater Challenges

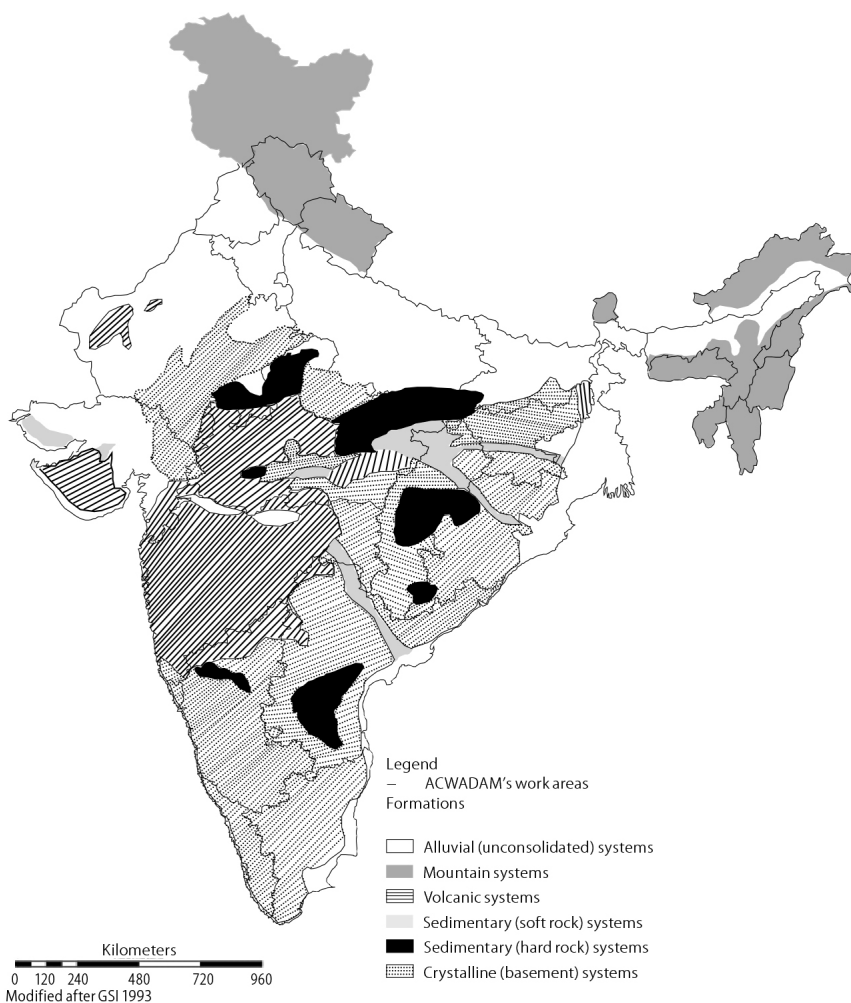
India faces grave water related challenges that impede continued economic growth as well as social and economic development. They put recent investments in the water sector in great jeopardy and risk setting back already made achievements in drinking water access and prevent the attainment of health and sanitation goals. Interconnected demands for water, energy, food and goods make up drivers that also put stress on natural ecosystems and affect the hydrological cycle. In its Twelfth Five-Year Plan, the federal Government's Planning Commission expresses that on a business as usual basis, the total demand for water by 2031 is likely to be 50 per cent higher than today. At most 20 per cent of this gap is estimated to be bridged by augmenting available

supply through additional storage and groundwater retention. The rest of the deficit has to be bridged through greater water use efficiency (Planning Commission, 2013: 22f).

The country's green revolution and food security began in the 1960s largely premised on the use of wells and free or heavily subsidised electricity that enabled pumping of groundwater from the same. Today, India's groundwater use for agriculture is the largest in the world with an estimated almost 30 million groundwater structures in use (Shah, 2009). Increasing water table decline and ensuing scarcity is now threatening food production and rural livelihoods. More than half of India's agricultural sector depends on groundwater irrigation, characterised by deep-rooted but often inefficient practices. Industrial requirements and a perpetual building boom together with the urban transition put further stress on insufficiently managed groundwater resources. The risks tied to a continued race to the bottom are potentially devastating with, among other things, freshwater scarcity pushing farmers to cities that are already facing enormous problems with water supply and sanitation services.

Despite the Millennium Development Goals officially being met on the target 'access to water from improved sources' (WHO/UNICEF, 2012), the majority of the population faces continuous and mounting problems. Inadequate public service deliveries and unreliable infrastructure force people to self-supply and fend for themselves. It is commonly held that 85 per cent of rural domestic users rely on wells (Planning Commission, 2011c). Data for urban dwellers are more uncertain but estimates put the number at 50 per cent (Chakraborti, Das *et al.* 2011), though many more probably depend on groundwater as a complementary source. Alongside impacts of over-extraction from increasing depths and encroachment of important recharge areas, the groundwater quality is rapidly deteriorating. The situation is aggravated by increasingly irregular weather. Normal variations in monsoon cycles together with climate change are already increasing the unpredictability in estimating water availability, and altering the groundwater recharge potential.

Overlay of generalised hydrogeological settings on administrative boundaries (districts and states)



Source: Shankar, Kulkarni *et al.*, 2011.

India probably has the largest rate of groundwater depletion in the world. A long-term negative change of the groundwater table has been estimated based on well observations combined with data from NASA satellites (Rodell, Velicogna, *et al.*, 2009). However, most of what is known about the groundwater development builds on highly aggregate and crude estimates, in turn based on a rather sparse network of monitoring wells. Due to considerable spatial variation in aquifer conditions and especially the heterogeneity of hard sedimentary and crystalline rock strata (Chandra, Nagaiah, *et al.*, 2012), observation well data may not be representative for a very large area. The available knowledge about the vast country's hydrogeological characteristics and of local and regional rates of abstraction and recharge (not the least recharge in urban areas) is limited and partly dated. The general picture has been subject to simplification: the peninsula has been categorised as underlain by hardrock strata whereas the Indo-Gangetic and Brahmaputra plains have been characterised as alluvial. Lately, a more disaggregated map (see page 9) has been developed and resulted in emphasis on monitoring alluvial and soft sedimentary formations at a regional level, and volcanic, hard sedimentary and crystalline rock systems at a more local level (Planning Commission, 2011c, Shankar, Kulkarni *et al.*, 2011).

### **Box 2 The World Bank's Hydrology Project**

The World Bank has been instrumental in capacity building in a number of Indian States through what was called 'The Hydrology Project'. Its two phases, beginning in the mid-1990s, aimed at introducing standard procedures for data collection, processing, validation and management, with the use of modern software for routine quality control and general water resources analysis. It included a training program in order to build up sustainable qualified in-house knowledge within the concerned agencies and thereby promote groundwater resources planning and management. Installation of new piezometers with loggers was one measure to collect data.

# Groundwater Regulation in India

---

The legal framework for groundwater in India is presently restricted by two main elements. First, it is one of the few systems in the world where groundwater rights are not formally vested in the state (in the meaning of the government and its authorities).<sup>2</sup> Second, the competence to legislate on water-related issues is left with the individual States rather than the Centre (the federal Government). Most States (hereafter to be understood as including also the Union Territories) have enacted laws regulating groundwater use or have Bills pending final approval, but the legislation is in the vast majority of cases limited in its applicability to certain notified geographical areas. In general, the system is based on the setting up of State level authorities for implementation, and on user registration and prior approval of licenses.

More recently, the calls for more effective interventions to halt aquifer depletion and deal with quality issues have grown. In response, a large number of experts have shed light on the specific problems and possible solutions of groundwater in India. Not the least, this has happened within Steering Committees and Working Groups set up in connection with the Government's Planning Commission for preparation of its Twelfth Five-Year Plan (for 2012-2017).<sup>3</sup> Some of these were commissioned to analyse the scope for reform of the law on groundwater.

India's legal system is pluralistic and based on a mix of sources. The principles of the British common law system give weight to court precedents, which today have to be applied alongside statutory law and customary law, doctrines and principles of international law. The system is characterised by gaps as well as overlaps between the different parts, meaning that not only the courts but also officials in authorities are often faced with challenges in interpreting the law before implementing it.

Though not for the first time, the Centre is now attempting to pull the numerous State legislators in one direction towards a uniform understanding and approach to the various governance components that are deemed necessary. The fundamental change in principles, approach and strategies of water management that is proposed is motivated by insights into how India is facing a major water crisis (Planning Commission, 2011a; Shah, 2013). Against increasing uncertainties and unpredictability that climate change brings, groundwater recharge also needs to be managed and aquifers viewed more from a strategic storage point of view.

The formal legal framework for groundwater would seem to be set on a firm trajectory of reform, going by recent messages from the federal level. Policy-makers are, according to Dr. Mihir Shah who leads the water resources, rural development and decentralised governance portfolios at the Planning Commission, determined to lay down 'a radical new water resources strategy based on management solutions rather than engineering-based solutions', (Global Water Intelligence, 2012; see also Shah, 2013). The strategy is manifested in a number of pivotal documents such as the reports from the National Water Mission 2011,<sup>4</sup> the Groundwater Model Bill of 2011, reports from the mentioned Planning Commission Expert Groups for the Twelfth Five-Year Plan, and the National Water Policy that was adopted in December 2012. In 2013 a draft Framework Law on Water was circulated to the States.

The lines of thoughts are intertwined and to some extent synchronised in the mentioned documents, giving a fairly coherent picture of the Government's planned road ahead. This is, however, not necessarily reflecting the sentiments of officials at decision-making positions. There are still voices at top levels who are more interested in continuing with supply-side management and large-scale engineering projects – most notably inter-linking of rivers and inter-basin transfer of water – than demand management solutions, conservation, recharge, and incentives schemes.

The Central Government clearly wishes to promote institutional reforms at State level with more room for local adaptation and implementation. Part of this shift includes greater involvement and participation from local governments and communities (such as the elected village councils – *Gram Panchayats* – and Water Users Associations for irrigation). The subsidiarity principle – that decisions must be taken at the lowest appropriate level – is a leitmotif.

To facilitate the relative paradigm shift that the Twelfth Plan (and other documents) entails, the drafting was based on a 'new and inclusive process of plan formulation', and the 'coming together of practitioners and professionals from government, academia, industry and civil society' (Shah, 2013: 40). The Central Government thereby seems to consider that buy-in from key implementers, especially the State Governments, is somewhat ensured. The consultation process for the National Water Policy caused the Ministry of Water Resources to drop some of the purportedly salient features of the original proposal.

---

<sup>2</sup> Texas, USA, and Pakistan are other jurisdictions where the 'rule of capture' allows landowners to extract groundwater from under their lands, even if the water is drained from beneath the land of others.

<sup>3</sup> The subject of Water Resources was for the first time advised by a large number of expert groups. The one on Water Governance in turn had four sub-groups, of which two on groundwater, <http://planningcommission.gov.in/aboutus/committee/index.php?about=11strindx.htm>.

<sup>4</sup> <http://mowr.gov.in/writereaddata/linkimages/MissionDocument8395131900.pdf>.

### Rights and obligations relating to groundwater

Groundwater is intrinsically linked to land (immovable property) under Indian law. The legal system is a legacy of English common law from the colonial time, upheld mostly through English and Indian court rulings from the 19th and early 20th century wherein a legal distinction between surface water and groundwater was laid down. Though not directly regulated in statutory law, the Indian Easements Act, 1882, is illustrated by how landowners are entitled – for beneficial enjoyment of the land, and in relation to another, servient landowner – to extract unlimited volumes of groundwater that percolates underneath.<sup>5</sup> For decades, this natural right has been interpreted as being equal to a *de facto* private good, though it is clear that Indian law does not recognise ownership in groundwater. (For an extensive treatment of the bundle of rights to groundwater as property, including the development in different parts of the USA, see Grönwall, 2008.)

In contrast to the ancient and unscientific formulations in the Easements Act and court precedents there is the doctrine that holds that a society's water resources are held in 'public trust' by the state. Accordingly, there may be an obligation of the state and its appointed agencies to restrict individual right-holders' entitlements after due legislative process. Deemed to be acting as a trustee, the state also cannot grant exclusive rights over water to individuals such as landowners as this doctrine protects the public's right of access. It has been interpreted so that the public has a right to a clean environment, and to expect the state to fulfil certain duties including to exercise authority and to allocate and manage resources such as water, in the public's general interest.

Among the doctrine's implications in India, as interpreted by the Supreme Court, are that the state cannot abdicate responsibility over natural resources even in the absence of enacted legislation. Further, the laws of nature and the ecosystem must inform all social institutions, which should for instance mean that the hydrological cycle should guide regulation of common water sources (*M.C. Mehta v. Kamal Nath*, 1997). Originally, this doctrine laid down that the state has the pre-existing rights over flowing (surface) water, and the scope of its application and whether it could be upheld in regards to groundwater was previously considered limited. The Supreme Court has however mentioned in passing that '[d]eep underground water belongs to the state in the sense that doctrine of public trust extends thereto' [*sic*] (*State of West Bengal v. Kerosam Industries*, 2004). The consequence is that the state and its institutions are accountable to the public for groundwater protection, a fact that has served as the underpinning of the recent legislative paradigm shift.

Groundwater governance necessitates a range of actors and stakeholders to be involved. Besides introducing the public trust doctrine into Indian law, the Supreme Court has been instrumental in pushing the limits for groundwater protection in several other ways, not least to set up the Central Ground Water Authority and render it far-reaching powers (see below). However, the Court's statements are still awaited in one much publicised case it has shied away from since 2005, when a concerned village council appealed against the Kerala High Court upholding the Hindustan Coca Cola Company's right as a landowner to extract 500m<sup>3</sup> of groundwater daily.

Still pending, the Supreme Court is asked to establish whether the public trust doctrine and the right to drinking water as a human right under Article 21 of the Indian Constitution are to trump over the English common law, much like the lower Court initially did (*Perumatty Grama Panchayat v. State of Kerala*, 2004, and *Hindustan Coca-Cola Beverages v. Perumatty Grama Panchayat*, 2005).

---

<sup>5</sup> Regarding groundwater being real property and not a chattel, refer to Planning Commission 2007: 89.

# Federal Level Streamlining of Groundwater Regulation

---

The Republic of India applies a division of power between the Federal Union on the one hand and its States on the other. Under the Constitution, public health, land, sanitation and water are therefore primarily State items (State List, entry 17, Seventh Schedule). 'Water' includes water supplies, irrigation and canals, drainage and embankments, water storage and water power but explicitly excludes inter-State rivers; it is however understood to include groundwater. A recent wish by the Union Government to move 'water' to the so-called Union List (or to the Concurrent List with items concerned with relations between the Union and States) has met with fierce opposition from State Governments (Iyer, 2011).

The limited legislative power in the field does not mean that the Centre lacks mandate to formally regulate groundwater issues. In 1997, the Supreme Court ruled that the Centre Government was empowered to constitute an authority that, in turn, would be empowered to regulate and control groundwater management and development to ensure its long-term sustainability (M.C. Mehta v. Union of India, 1997, applying Article 253 of the Constitution together with the Environment (Protection) Act, 1986). Following the Court order, the Central Ground Water Board (CGWB, set up in 1970) was constituted as an Authority (CGWA). The combined CGWB/CGWA institution is organised as a subordinate office of the Ministry of Water Resources.

One practical function of the CGWA is monitoring and periodic assessments carried out by regional offices and with the help of some 16,000 observation wells throughout the country. The latest assessment was carried out in four different months during 2009. Each State is divided into administrative 'assessment units', usually a district or a smaller administrative unit, and thus not defined in relation to aquifer boundaries but local authorities may also take a watershed approach in its monitoring and publications.

The Planning Commission's Expert Group on Groundwater Management and Ownership has made the narrow interpretation that the Central Government through the CGWA has 'devolved a role to oversee the overall planning for the development of groundwater resources ... and formulation of policies of *exploitation*' as a means to support State level activities (Planning Commission 2007: 95) (emphasis added). This attitude towards groundwater – that it exists only to be exploited to the full – is only partly overplayed today. Importantly, the CGWA has the powers under the Environment (Protection) Act to notify areas where the groundwater resources are deemed to be developed beyond or on the verge of beyond the natural recharge capacity. Following the latest assessment from 2009, State by State, abstraction of groundwater is regulated in 802 'over-exploited' and 169 'critical' assessment units. 162 areas are notified in 13 States – 80 were added in 2012, based on more recent assessments.

Punjab has the largest number of areas notified, followed by Rajasthan and Karnataka. Notification is preceded by a consultative process during which those feeling affected has the possibility to express their opinions. The process is, however, not transparent and it is not clear whether any opinions are ever taken into account. Partly because of the sparse observation network, the notification of areas as such lags behind. This is a serious threat as State groundwater provisions mainly apply within those.

The CGWA is also charged with issuing necessary regulatory directions attached with penal provisions. With effect from November 2012 the Authority issued updated guidelines for abstraction of groundwater by means of electrical pumping (CGWA, 2012). Pursuant to these binding criteria, construction of new groundwater structures is generally prohibited in the notified areas. Clearance can be granted only to Government agencies responsible for drinking water supply, upon application and subject to rainwater harvesting being undertaken.

In non-notified areas categorised as 'safe', 'semi-critical', 'critical' or 'over-exploited' it is mandatory for listed water-intensive industries and infrastructure projects to apply for prior clearance (a No Objection Certificate, NOC). Breweries, soft drink and packaged drinking water manufacturers, and textiles and paper/pulp industries are not to be granted NOC in over-exploited areas. In areas categorised as safe/semi-critical/critical, volumetric norms apply. Accordingly, abstractions can be approved up to 200 per cent, 100 per cent and 50 per cent, respectively, of the estimated groundwater recharge, subject to conditions.

To enforce the regulatory measures in notified areas and control overexploitation and recharge, the Authority has appointed regional and local bodies (Deputy Commissioners or District Magistrates) in each State. Granting of permission for extraction of groundwater is thereby decentralised. The State level Pollution Control Boards (PCB) are furthermore directed to aid in verifying actual requirement and abstraction demand, and to advise on rain-water harvesting structures.

Inasmuch as the introduction of the CGWA was a reform of the previous federal order, it barely strengthened the top-down approach to law-making on groundwater and only in a few respects. The Authority has hitherto only targeted hydrogeological assessments, periodic monitoring, and the circumscribing of quantitative use of groundwater in certain areas but it has refrained from issuing directions aiming to generally protect groundwater bodies or to take measures specifically relating to pollution prevention and remediation. Among the listed functions empowered to the CGWA under the Environment (Protection) Act are also to achieve quality standards, educate people, and persuade States to set up own groundwater Authorities.



The CGWA has notified areas for groundwater regulation and control in a number of States, seven of which presently lack much statutory law with regards to groundwater and also don't have a separate groundwater authority. For instance, in Rajasthan the Pollution Control Board has only issued brief guidelines on NOC for new wells pursuant to the CGWA's previous set of Guidelines.

### **The Model Groundwater Bills**

The Centre Government has sought to rectify the absence of a comprehensive, federal law to formally regulate India's groundwater resources by way of introducing Model Groundwater Bills. Prior to the constitution of the CGWA, streamlining of each State's groundwater legislation was attempted at through a Model Bill first circulated by the Centre in 1970. Updated versions came in 1992, 1996 and – after the CGWA was in place – in 2005.

Through the Bills, the Centre sought to foster a minimum level of control, among other things by recommending the setting up of State groundwater authorities. Further, the template called for registration of existing groundwater structures and a permit-based system, though actual restrictions would apply only to new wells, fitted with electrical pumps. Moreover, the substantial provisions would cover the areas where adverse impact had been noticed through the periodic CGWA assessments. No precautionary principle or the like was suggested outside of these.

It is generally recognised that the old Model Bills have more shortcomings than merits and with an ambition that compels very little either of the States or the groundwater users. Reform of the water policy, law and governance sector was called for from all corners, not least to also cover pollution control. In 2011, a fundamentally amended and altogether modern template came, with due regard taken to the socio-economic environment it has to function within. It was drafted by the Planning Commission alongside with its many different Working and Expert Groups on water and groundwater preparing the Twelfth Five-Year Plan and the National Water Policy released in 2012 (see below), but is yet to receive formal approval from the Ministry of Water Resources.

The new Model Bill introduced a large number of progressive approaches (see Planning Commission 2011a, b and Cullet 2012b for details), including that groundwater is a common heritage of the people and that the state at all levels is its public trustee. It contains objectives and principles that go beyond regulation of groundwater, such as laying down everyone's right to water. This should be read with a provision stating that everyone has a fundamental right to be provided basic water of acceptable quality, and another specifying that 70 litres per capita and day should be the minimum norm. Nonetheless, the Bill stipulates application for permit also for new small-scale (*de minimis*) uses. Such are exempt in many countries' groundwater legisla-

tion to avoid unnecessary burden on the authorities with regards to basic water needs that fall under the human right to water. On the other hand, permits will be granted for indefinite time rather than a fixed, though renewable, time period. This doesn't provide any flexibility in the resource management on the part of the state.

The Bill, against prioritising groundwater for drinking (domestic) purposes provides for groundwater protection zones and security plans. This is to promote aquifer recharge and protect against quality deterioration. Whereas decentralisation is prescribed in the Bill, user participation is not and groups normally excluded from access – foremost landless – risk continued marginalisation.

It is furthermore suggested in the Bill that pre-existing rights should continue to be valid for a period of one year from the entry into force of the Act in respective State, with no compensation offered for rights that become extinguished as a result.<sup>6</sup> Effectively ridding landowners of their natural property right to pump unlimited volumes of groundwater, these are provisions that are much needed but will meet massive resistance. They are therefore likely to be sensitive for law-makers looking to extend their tenure.

Moreover, the pursuit for decentralisation of powers risks being lost among the plethora of new institutions recommended to be set up at different levels besides the multitude of existing ones. In rural areas, the Bill points out the village councils as the lowest appropriate authority for implementation whereas in the urban environment, entirely new 'ward groundwater committees' are proposed. The legislative jurisdiction in relation to 'water' that the States retain provides for necessary local adaptation where the Model Bill is adopted,<sup>7</sup> and gives the prerogative to refrain from setting up special State authorities exactly as proposed.

Koonan (2010) analysed the situation before the latest amendments to the Model Bill, noting that the CGWA and the existing State Groundwater Authorities have almost identical regulatory powers but under different statutes. The State Groundwater Authorities also have mandates similar to those of the State Pollution Control Boards. The adding of one more institution to the list of authorities involved in groundwater regulation may therefore lead to a range of issues of co-operation, co-ordination and overlapping mandates.

### **The National Water Policy**

If the first attempt at streamlining the formal regulation came early, the policy formulation in the water field was a much later product. The National Ministry of Water Resources' Water Policy aims to govern the planning and development of the country's water resources and their optimum utilisation. The first such Policy was adopted in 1987 with subsequent reviews and updated versions adopted in 2002 and in 2012. Not until the 2012 version has it been explicit on groundwater.

<sup>6</sup> Landowners' private property right in groundwater is not a Fundamental Right under the Constitution.

<sup>7</sup> This provides for a differentiation between the hydrogeological characteristics of the country.

The latest and vastly more progressive Policy recommends that groundwater needs to be managed as a community resource held, by the state, under the public trust doctrine to achieve food security, livelihood protection, and equitable and sustainable development for all (Ministry of Water Resources, 2012). Further, the Policy also encourages separation of electricity supply for pumping of groundwater for agricultural use from other rural uses (see case study on nexus thinking in Gujarat below). With regards to water supply both in urban and rural settings, the Policy recommends that surface water be used in conjunction with groundwater and rainwater, with priority given to the source that has the better reliability and quality. For the first time, the Policy acknowledges the importance of good governance and transparent decision-making and points to the need for a national framework legislation on water. It also introduces the need to regard water as an economic good and make use of tariffs and differential pricing as incentives to reduce waste. Public–private partnerships are encouraged for improved services delivery, along with community participation in general, but it is also envisaged that Water Users Associations for irrigators should be given statutory powers to collect water charges and set rates.

Besides being more scientifically and technically inclined than previous National Water Policies, regional differences are taken into account with the admitting that India's water rich eastern and northern parts are in need of improved infrastructure. Adaptation not the least to the impacts of climate change receives attention, and the IWRM approach is mentioned as the main principle for planning and management.

The new decadal Policy was adopted by the National Water Resources Council at the end of 2012, after the Drafting Committee had considered more than 600 comments from the general public and reservations expressed by a few States. Most of the critique related to two areas at the heart of the debate: pricing of water and privatisation of water-related services, and the decades' old and long contested question of inter-basin transfer of water.

One of the salient features of the Policy when the draft was presented was the proposition to amend the Indian Easements Act in order to end the individual property character of groundwater. Some States opposed of the suggested modification in the Act and requested wider consultation with all stakeholders, after which the direct reference was dropped. Commentators have held that 'governments, when it comes to groundwater, seem to be only interested in putting restrictions on the farmers who invest their resources and efforts. [The draft Policy] has touched on a critical issue of modifying the Easements Act, 1882 [...] Sustainability of groundwater use cannot be provided through restrictive legislations and taking away of right of landowners on ground water alone, but would call for more imaginative ways' (Gujja and Joy, 2012). The quote illustrates how politically sensitive it is to attempt at circumscribing landowners' preroga-

tive. By removing the mentioning of the Indian Easements Act it would seem as if the topic is not going to be pushed by the Centre.

### **Attempts at a National Framework Law**

The principles underpinning and expressed in the two first National Water Policies were never directly reflected in the different groundwater Model Bills up till 2005, or in the directions and guidelines from the CGWA. The latest National Policy, however, envisages a Water Framework Law to be enacted by the Centre, essentially as a way to give the Policy legal status. This would define general principles of water resource management and function as an umbrella statement to govern legislatures and the executive at all levels, and be justiciable. A special sub-group set up by the Planning Commission for preparing the Twelfth Five-Year Plan was commissioned to report a draft on the issue, and its recommendations (Iyer, Cullet *et al.*, 2012) were incorporated both in the overall Plan and in the 2012 National Water Policy. In 2013, a new special Committee set up for the purpose delivered a report (Ministry of Water Resources, 2013) with a slightly different second draft (Bill) for a Framework Law.

The public trust doctrine lies at the heart of both Framework Law drafts. Though it is suggested that 'appropriate government' should be the leading star, neither of the drafts are proposing to centralise water management or to change the Centre–State relations. No administrative machinery or institutional structure is envisaged, and consequently no penal provisions are suggested. The draft law(s) does, however, promote that a Water Regulatory Authority be constituted in every State, based on a transparent, participative and consultative governance approach, to develop and manage both river basins and groundwater levels. It also calls for 'community-based institutions' to arrest over-abstraction of groundwater, which is a step beyond what the 2011 Model Bill stipulates.

To enact the Framework Law, the main possibility is to follow a procedure whereby two or more States are persuaded to pass it, after which the Centre can enact the same for the entire country. At the time of writing the Ministry of Water Resources had failed in convincing any State Government. Despite the nation's water resources being under acknowledged stress, it is likely that they see few or no reasons to take directions from the Centre for streamlining purposes.

# State-Wise Regulation of Groundwater

Out of India's 30 States and five Union Territories, around half have by now passed Acts and Regulations with respect to groundwater with reference to the Model Bill(s). A handful have, since some time, been in the final process of passing law. Others have been reluctant for different, often political, reasons. Box 3 provides a list of the presently applicable State Acts and Regulations as well as Bills pending.

With the odd exception, the adopted Acts and pending Bills follow the conventional command and control approach to regulation of CGWA-notified areas only. Blanket prohibi-

tions of new structures for private groundwater abstraction are combined with an obligation to register existing ones, and drilling companies. The method of regulation is on a well-by-well basis and as per assessment unit only, which risks being counteractive to necessary contextualisation as well as to co-operation over borders. Regulation of the depth of wells and zoning arrangements around wells used as public drinking sources are common features, whereas provisions to control the present levels of groundwater development are absent just like protection of groundwater quality. There is no 'integrated'

## Box 3 State Acts and Regulations

- Andhra Pradesh Ground Water (Regulation for Drinking Water Purposes) Act, 1996, and the Andhra Pradesh Water, Land and Trees Act and Rules, 2002;
- Assam Ground Water Control and Regulation Act, 2012;
- Bihar Groundwater (Regulation and Control of Development and Management) Act, 2006;
- Chennai Metropolitan Area Groundwater (Regulation) Act, 1987;
- Delhi NCT Groundwater Regulation Directions, 2010;
- Goa Ground Water Regulation Act, 2002;
- Himachal Pradesh Ground Water (Regulation and Control of Development and Management) Act, 2005;
- Jammu and Kashmir Water Resources (Regulation & Management) Act, 2010, and J & K State Water Resources Regulatory Authority Regulations, 2013;
- Karnataka Ground Water (Regulation for Protection of Sources of Drinking Water) Act, 1999, and the Karnataka Ground Water (Regulation and Control of Development and Management) Act, 2011;
- Kerala Ground Water (Control and Regulation) Act, 2002;
- Lakshadweep Ground Water (Development and Control) Regulation, 2001;
- Maharashtra Groundwater (Regulation for Drinking Water Purposes) Act, 1993, and the Water Resources Regulatory Authority Act 2005, Maharashtra Ground Water (Development and Management) Bill (yet to be notified), 2009;
- Puducherry Ground Water (Control and Regulation) Act, 2002;

West Bengal Ground Water Resources (Management, Control and Regulation) Act, 2005.

In the following States a Bill from the legislature has been adopted but at the time of writing not yet passed or received the final assent<sup>8</sup>:

- Chhattisgarh Ground Water (Regulation and Control of Development and Management) Bill, 2012 (pending);
- Haryana Groundwater Management & Regulation Bill, 2011 (pending);
- Odisha Groundwater (Regulation, Development and Management) Bill, 2011 (pending);
- Uttar Pradesh Groundwater Conservation, Protection and Development (Management, Control and Regulation) Bill, 2010 (pending).

A number of States have adopted highly specialised formal groundwater law that regulates the irrigation sector only:

- Gujarat Irrigation and Drainage Act, 2013 (seeks to replace and repeal the existing Gujarat Irrigation Act of 1879, but will only regulate groundwater pumped for farming purposes);
- Haryana and Punjab (both) Preservation of Subsoil Water Act, 2009 (prohibiting sowing of nursery paddy (rice) and transplanting paddy into the fields before notified dates in order to reduce groundwater use);
- Madhya Pradesh Irrigation Act, 1931;
- Maharashtra Management of Irrigation Systems by Farmers Act, 2005.

<sup>8</sup> The Rajasthan Ground Water Management Bill was proposed in 2006 but fell in 2008; a new version is under process. The Tamil Nadu Groundwater (Development and Management) Act, 2003, was repealed in 2013 and the State Government intends to replace it shortly.



approach that links groundwater to other (water) sectors or to polluting activities. In 2009, a study found that those States that had so far passed Acts had all adopted a non-confrontational grandfathering strategy in refusing to tackle existing overuse of groundwater (Cullet, 2009: 131). Today's Acts don't enable the authorities to re-allocate groundwater between different uses or take either precautionary or pro-active decisions, except for in Andhra Pradesh, whose Water, Land and Trees Act, 2002, is a move to regulate groundwater in conjunction with surface water and other pressing environmental concerns.

The adopted Acts and pending Bills also lack safeguarding of nature protection areas, demarcation of drinking water protection zones besides around individual wells, regulation of emission of listed pollutants and substances (or quantities thereof), and regulation of certain listed activities and point/diffuse sources. The basis for monitoring and control is mostly not the water shed (or sub-river) but an administrative assessment unit such as a District or Block.

Further, there is no provision for involvement of user or community groups at village level or elsewhere. In line with how users are not given much say in the governance of groundwater as a common property resource, the Acts also don't ascertain transparency for data collected in order to promote a feeling of ownership.

In terms of institutions, the previous Model Bills encouraged States to set up new or appoint competent bodies with a minimum degree of authority at different levels. This has been achieved to varying degree on paper, but the power of the appointed agencies has been limited, as illustrated in the case studies below.

With regards to the above-listed pending Bills that are awaiting the final nod, the progressive thinking of the 2011 Model Bill and the 2012 Water Policy (and the draft National Water Framework Law) is not fully reflected in them either.

## Implementation and Compliance

---

The challenges for law-makers and implementing agencies when attempting to close the gap between policy, legislation and the ultimate achievement of objectives are seemingly enormous (Cohen and Bakker, 2010, Mechlem, 2012). To better address these, a contextualised picture of the varying conditions within India is necessary. Research from the field is yet too limited to provide any wealth of lessons about the reasons underlying the lack of implementation, the successes and the failures. What little is available gives a gloomy picture of the potential to effectively regulate groundwater in India, and may give a few key insights to why the Model Bills have not been adopted to a larger degree.

The duty to follow up on legislation once enacted sometimes leads to an unmanageable burden on the available capacity and resource base. The literature gives an example from the State of Gujarat. After the prevailing law on abstracting groundwater for irrigation was amended with effect from the late 1980s, it became impossible for the appointed Regional Canal Officer to supervise all districts for which he was vested power. Judging from this, it would seem unlikely that an equivalent authority in another State would be able to go into the merits of each case and evaluate whether to grant or refuse a license to abstract water from new wells (Upadhyay, 2009).

It has further been suggested that States reluctant to adopt the Model Bills may be concerned that introduction of a licensing type control system could lead to widespread corruption, as well as alienation of the people (Dubash, 2002). Experience also shows how regulation of groundwater overextraction becomes unsuccessful when attempts at changing users' behaviour are

met with anarchy and violent opposition from irrigating farmers, backed by local politicians (Shah, 2009).

The case studies that follow build on previously published and unpublished analyses of implementation of groundwater law in the States of Karnataka, Maharashtra and Gujarat. They illustrate the importance of a number of aspects of 'groundwater governance': that of a minimum of institutional arrangements being in place at both the legislation and implementation stage (Karnataka); of legitimacy, political will and a basic technical understanding for hydrogeology (Maharashtra); and of an out of the box and adaptive learning approach (Gujarat), respectively. In neither of the sites under study are there customary, community-based or other informal arrangements governing groundwater in parallel with the formal rules.

The case of Karnataka shows how legislators and the implementing Authority in the city of Bangalore (locally known as Bengaluru) took what can be termed a command and control approach when recently adopting the (previous) Model Bill, without paying attention to the ongoing reform discussions. In comparison, attempts at a wider outlook were made early on in Maharashtra, but the insights on participation were lost on the way and legitimacy issues and village politics have been found to effectively hinder enforcement. The way irrigation water is a function of energy access offers an altogether different take on groundwater governance in Gujarat, albeit without clear results in terms of groundwater conservation.

### Location of Bangalore, Karnataka



Source: CC-by-sa PlaneMad/Wikimedia

#### Command and control in Bangalore, Karnataka

Karnataka is drought-prone and underlain by the Peninsular Gneissic Complex, where aquifers consist of weathered zones and generally low-yielding fractures at greater depths. It is one of the most urbanised States in India with almost 40 per cent of the people living in towns and cities. Bangalore is the rapidly growing State capital, presently with ca. ten million people, pulling IT technicians but also farmers from all of India who have suffered from drought. A majority rely on groundwater either as a primary or complementary source as the public water distribution is inadequate in most parts of the city, and particularly at the heavily populated fringe. Self-supply from own or local wells is common, as is tanker deliveries from wells at ever greater distances. The poor largely depend on public

standposts (shared, motorised taps), most of which distribute well-water (Grönwall, 2008, 2013).

Two pieces of legislation on groundwater are in force since 2003 and 2012, respectively: the Karnataka Ground Water (Regulation for Protection of Sources of Drinking Water) Act, 1999, which applies alongside the Karnataka Ground Water (Regulation and Control of Development and Management) Act, 2011. In short, the former – based on the 1970 Model Bill – provides for well spacing to protect public sources of drinking water whereas under the latter, well-owners and drilling companies were to register with the competent authority by a set date. Both laws regulate access through a permit-based system. The 2011 Act provides for the constitution of the Karnataka Groundwater Authority (KGA).

The new Act was ultimately signed at the end of 2012 after many years of legislative negotiations, but the final version is based on the 2005 Model Bill. In parallel with it being debated and somewhat watered down, the drafting of the new and considerably more modern Model Bill took place. Yet, Karnataka's legislators did not inform themselves of the ongoing reforms, or chose to take no impression of the calls to empower the state as a trustee and declare groundwater as a common property resource. The

conventional command and control route was taken, showing how the path dependency was stronger than the wish to introduce effective reform.

After the Act came into effect a number of assessment units were notified with the CGWA. Many of the substantive provisions apply only in the notified areas. The Act regulates three main aspects of groundwater abstraction:

- Owners of all existing types of wells were required to apply for grant of registration before the end of March, 2013;
- Drilling companies were to register themselves and their machinery before June, 2013;
- Anyone aiming to dig or drill a new borewell is required to seek prior permission. (The law does not apply to deepening of existing wells, a wide-spread practice.)

<sup>9</sup> The Bangalore Water Supply and Sewerage Board is charged with enforcing the 2009 Rainwater Harvesting Act, but the adherence has been low and the sanction – disconnection of the water supply – has not been issued in a single case.

<sup>10</sup> In November 2013, this was equivalent to 80 USD or 60 Euro.

Current use of groundwater is not sought to be curbed for any purpose, in any area. A seemingly more important but indirect objective of the new law is to collect data about the groundwater conditions, existing structures, and resource use. This objective is in itself at risk due to inconsistencies in the procedural provisions that apply to the implementing authority and insufficient enforcement capacities. Under the Act we find the Karnataka Ground Water (Regulation and Control of Development and Management) Rules, 2013. These consist of different administrative forms for application, permission and rejection, to be filled out by applicants and officials. However, important glitches were introduced with the Rules. For instance, whereas the Act specifies what information an applicant needs to furnish, the Rules are much less detailed. This not only reduces the effectiveness of the law, it also introduces confusion.

Another example of the burden on the implementing Authority when interpreting the provisions is that an applicant for a new well needs to furnish information about the location address, the purpose, what existing water supply exists, and the distance from (an) existing functional well. The decision to grant or refuse a permit for a new well is, however, to be based on a range of other considerations. These include other competitive users, the availability of groundwater and the need to conserve it, the quantity to be drawn and the quality of the local groundwater, long term water table 'behaviour', and likelihood of adversely affecting water availability of any drinking water sources in the vicinity. It is, however, not clear where the Authority is to get the remaining information from on a case-by-case basis. Some general, aggregate data can be found in reports from the State Department of Mines and Geology and the CGWB. It can be presumed that with prevailing resource limitations, the Authority will take shortcuts in this regard.

A permit can be granted subject to conditions, including installation of rainwater harvesting and recharge structures (already compulsory in most cases<sup>9</sup>). Commercial and industrial applicants may be subject to a longer list of additional conditions: adoption of recycling, reuse and treatment facilities, and installation of water meters. A cap may also be set for extraction for commercial and industrial purposes.

Any person digging or drilling a well without a permit will be liable of a fine amounting to up to 5,000 Rs.,<sup>10</sup> and/or imprisonment for up to six months, and risk having the well seized and confiscated. Anyone continuing to extract water from an existing /bore/well without registration is liable of a fine of up to 2,000 Rs. (and/or imprisonment for up to three months). Failure to comply with other provisions is also punishable. The fixed fine levels set in the law cannot have been deemed deterrent even in 2011 and with rapid inflation, they will soon be completely outdated.

Further, the law provides that a person who does not possess a permit shall, among other things, not be eligible to get any supply of electricity to extract water from the well. Though this is not entirely clear from the formulation, the sanction is applicable only to new wells after failure to seek the necessary permission. It comes with a prohibitively high transaction cost of enforcement as it also involves the power supply company; in practice, this company cannot always be supposed to differentiate between the electricity provided for a borewell pump vis-à-vis all other (lawful) purposes of the customer in question.<sup>11</sup>

The 2011 Groundwater Act stipulates that the KGA can delegate powers and duties to specified officers at District level. Each District Collector of the State has consequently been mandated as a Local Groundwater Authority. In the Bangalore Urban District, which comprises the State capital, it seems that the role of 'Local Groundwater Authority' fell not on the District Collector but on the public Water Supply and Sewerage Board (BWSSB) for three reasons (Grönwall, 2013). Firstly, despite the World Bank's Hydrology Project the State Department of Mines and Geology was understaffed after recent retirements and out-location of key persons. It was hence not perceived as able to fulfil the duties under the Act. Secondly, it was felt that implementation of the Act, partly aiming at governing drinking water sources, was a suitable responsibility of the Water Board. A third and possibly more important (although now overplayed) reason was that of seeking to contain the data gathered in Bangalore about the number of wells and the available groundwater resources, in the interest of controlling the dissemination of the same to the Cauvery River Dispute Tribunal.<sup>12</sup>

The BWSSB was neither granted any additional funding nor given any other incentive to deal with the matter. The enforcement challenge resting on the BWSSB is grand in size considering the city's up to 500,000 wells and the limited competence and capacity that the BWSSB has in groundwater management. After it was appointed as the local authority by the KGA, the BWSSB in turn authorised each of its nine zone 'Executive Engineers' to process applications. In practice, the registration of existing users has been done through the water meter readers and assistant engineers who distributed the prescribed form to the around 100,000 customers officially owning wells. The Executive Engineers then granted the certificate of registration. According to one interviewed, there was 'no need' to ever reject an application, as long as the applicant had at least tried to fill out the form properly (pers. comm. 2013).

The deadline for registration of existing wells was formally extended three times. By December 2013 only some 66,000 well-owners had registered and it stood clear that the Board was not going to chase any households through home visits. The Board expressed that it neither had a plan nor enough manpower to check on existing wells or unauthorised sinking of

---

<sup>11</sup> The urban and rural environment admittedly looks different: Domestic electricity requirements are typically single phase connections, while farmers' pumpset connections are three-phase. See further below on Gujarat.

<sup>12</sup> The Cauvery River, from which the majority of the water that is distributed by the BWSSB is pumped, is highly contested between the riparian States in the river basin. A settlement reached by the Cauvery Water Tribunal was eventually notified in the official Gazette by the Centre Government in February 2013. The order had by then been postponed for six years, much in the interest of Karnataka.



new borewells. Through newspapers, officials had (incorrectly) stated both that there 'are no' specific rules to mitigate illegal borewells or penalise people, and that the Board 'can refuse' them permission to continue drawing water from existing wells (New Indian Express, 2013, Deccan Herald, 2013, Vasudev 2013). This dual approach in the Board's interpretation of the stipulated sanctions was also shown earlier in the year when it threatened that power supply would be cut to owners who had not registered their borewells (Madhusudhan, 2013). Ordering the electricity distributor to cut well-owners' mains power supply clearly lies outside the BWSSB's mandate. Such messages that lack backing both in law and administrative capacity can easily backfire and contribute to weakening the law's legitimacy.

The Ground Water Act applies alongside the Ground Water (Regulation for Protection of Sources of Drinking Water) Act. This requires prior permission to be sought for new /bore/wells within 500m from existing wells that are used as public sources of drinking water, meaning those belonging to the BWSSB and the Bangalore municipality (in the peri-urban areas). Extraction of water from existing wells within 500m of a public well may also be prohibited in areas declared as water scarce, for up to one year at the time. Offenders are liable of fine of up to 5,000 Rs. (and/or imprisonment) but it seems that no cases have ever been booked under this law. The District Deputy Commissioner

is the Authority implementing this Act in Bangalore – but at least up till 2009 it had not received a single application for a permit under the law (Madhusudhan, 2009). In fact, the vigilant media has not reported any fines or other penalties being imposed so far in Bangalore under any of the prevailing law.

The enforcement being lax or even non-existent results in an ever-growing disrespect for the legislation and what it seeks to attain and further fuels the culture of non-compliance. Ordinary well owners and prospective such alike remain defiant to conform with what the law stipulates. This may have less to do with the engrained perception that landowners are entitled to abstract unlimited volumes of groundwater than the experience that water access is a matter of 'each to one's own' in the absence of reliable and adequate public services. The legitimacy of the regulations is therefore probably very low. Without awareness-raising campaigns to communicate the wider objectives behind the law it can also be assumed that individual well owners see no personal benefits from registering their existing groundwater structures. The same applies to anyone needing to drill a new well. Many house owners already fail to understand the necessity in them arranging for rainwater harvesting and recharge of the groundwater resources: the greater community good, sustainability and precautionary thinking are not high on the agenda. Neither is there an appreciation of the necessity for strategic storage solutions for the non-rainy days.

#### Location of Maharashtra State



Source: CC-by-sa PlaneMad/Wikimedia

#### Legitimacy issues in Maharashtra

The State of Maharashtra is largely underlain by the Deccan trap basalts where groundwater yield depends on the rate of weathering locally. The State is highly industrialised with Mumbai as India's financial centre and film production hub. The agriculture and allied activities sector contributes some 13 per cent to the State's income but more than half of the residents live in rural areas. Traditionally rainfed, irrigation projects are now receiving strong support.

Maharashtra is regulating the use of groundwater under several parallel laws. The main one is the Maharashtra Groundwater (Regulation for Drinking Water Purposes) Act, 1993. Like its counterpart in Karnataka the general rule stipulates well spacing: a minimum distance of 500 metres must be left between existing public drinking water sources and any new well structure. Most substantive provisions apply in areas declared by the District Collector as potentially or factually scarcity-affected, based on observations during certain times of the year

<sup>13</sup> Refer to [www.mahawssd.gov.in/scripts/index.html#\\_ftnref1](http://www.mahawssd.gov.in/scripts/index.html#_ftnref1).

<sup>14</sup> Refer to [www.mwrra.org](http://www.mwrra.org).

in such areas. The Act provides for restriction of abstraction of groundwater also from pre-existing wells for non-drinking water purposes, and empowers the Collector to ban all further use in overexploited watersheds. The Act also allows for closing of wells, removing of pumps, disconnection of power supply and other actions to attain the objectives of protecting groundwater for drinking.

Years after the Act came into force it was found that the State lacked political will to enforce it. The high-level Sukthankar Committee was commissioned to do an in-depth investigation of the operation, management and maintenance of the water supply schemes in the State (Government of Maharashtra, 2001). The Committee reported in 2001 that only 10 per cent of groundwater abstractions in scarcity-affected areas were 'declared' under the Act and that during the years 1996 to 2000, action against offenders had only been taken in 15 cases whereas restrictions of abstraction from new wells had been initiated in 16 cases (ibid).

The implementation failures prompted the State to rethink the management regime and regulations as the Committee recommended it to set up a Groundwater Regulatory Authority (Upadhyay, 2009). The Committee stressed the need for independent data collection and water usage dispute resolution to be carried out at the very most local community level; the choice of implementation agency should even be decided by the Gram Sabha, who forms a significant part of the village self-governance system in Maharashtra. Though the Committee's recommendations have yet to be adopted as formal law they are to a large extent informing the State (non-binding) policy for rural water supply.<sup>13</sup>

Around this time, minor amendments to the drinking water legislation were instead discussed and some entered into force. In 2005, the Maharashtra Water Resources Regulatory Authority Act was enacted in parallel with the Management of Irrigation Systems by Farmers Act.<sup>14</sup> Wide in scope, the Authority Act strengthened the control of the state over all water resources through empowering a new, central Authority to plan for and allocate water to different users. It seeks to treat surface and groundwater in conjunction through the distribution of entitlements within different categories of users (domestic, industrial and irrigation). The Authority approves of uniform basic volumetric rates for water distributed and through this instrument it aims to incentivise adoption of micro irrigation practices, reuse and effluent treatment, and the polluter pays principle. In practice, the actual regulation of water pertains mainly to canal irrigation but the Authority is to take due account to groundwater through the Drinking Water Act.

With regards to decentralisation as provided for in the Drinking Water Act, experience with local interpretation and enforcement has been rather negative. Field-based analysis in 15 water-scarce villages in the west of the State in 2002-03 found, among other things, a near complete absence of social support for the legislation (Phansalkar and Kher, 2006). There was imprecise understanding of the law, its provisions and proce-

dural matters, and efforts from UNICEF to raise awareness of people's rights had often not been either executed or achieved. The bureaucratic hurdles also abound under the Drinking Water Act. As per the Rules framed under the Act an offence can only be brought to the District Collector if the Gram Panchayat as a whole makes a written formal representation about violation of the well spacing provision and it is verified by a certain Technical Officer. Though the intent was to provide for amicable, local conflict resolution, the end-result in practice was 'bizarre' with regional agencies trying to convince the local one to act on serious problems under its nose (Phansalkar and Kher, 2006: 74).

The researchers conclude that despite acute drinking water scarcity the Act had not been particularly effective in protecting the water sources because neither villagers nor local politicians wanted to disturb the farmers' perceived right to irrigate their fields. Seeking recourse through the law was labelled a 'negative' or 'revengeful' act, not the least among the elected heads of the *Gram Panchayats* who feared for re-elections as much as for their social standing in the villages (ibid p. 76).

Instead of invoking the Act, conventional supply-side management was exercised, thereby further externalising the problem. People preferred to complain to higher elected leaders – often via media – and request new or deeper borewells to fulfil drinking water needs. In addition, entrenched gender inequalities were laid bare. One interviewee said that "I am quite prepared to spend money and ask my womenfolk to trudge long distances or stand in queues for getting our daily drinking water but there is nothing I can do to protect my [orange] orchard if the Government disallows me from irrigating the trees. This is unacceptable" (ibid).

The reported attitudes indicate that village people felt sympathy with the farmers who had fields and irrigation needs close to a public well, perceiving that their geographical situation could lead to unjust results if the law was implemented. This illustrates how water for irrigation trumps over domestic uses. It pinpoints how individual behaviour and political inaction is to a large extent conditioned by economic realities and alternative income generation possibilities, but also by power asymmetries and unspoken priorities between different water allocation needs and user groups.

Local politicians were ultimately unwilling to fulfil their legal and administrative responsibilities, suggesting a lack of acceptance of the law's objectives that corresponds to the culture of non-compliance among end-users. From a governance perspective the local process of decision-making is worth pondering: how, by whom, and under what conditions decisions are made that leads to failed implementation. To deal with such questions is to deal with the system that permeates the rural political agenda. This is admittedly coloured by highly unequal economic relationships and social structures and the fact that it is the well-to-do who benefit most from the present situation (Iyer, pers. comm. 2013).

Another important lesson for improved groundwater governance is underpinned by Phansalkar and Kher suggesting that

<sup>13</sup> The Bill is available courtesy of IELRC at [www.ielrc.org/content/e0917.pdf](http://www.ielrc.org/content/e0917.pdf).

the absence of social legitimacy of the 1993 law could in part be explained by how, in a majority of the cases, the villagers did not have adequate technical understanding to link the increasing scarcity to continuous withdrawal of water. This resonates with a number of analyses recently, concluding that decentralisation to local levels of implementation and enforcement, planning and data collection needs to be accompanied by efforts to empower users in terms of skills and knowledge (Foster, Garduño *et al.* 2007, Garduño, Romani *et al.* 2011, Planning Commission, 2013).

At village level in Maharashtra, the *Gram Sabha* is a key player fostering participation and community self-regulation of land and groundwater use. In pilot projects it has been seen that baseline characterisation of groundwater bodies can be added as a point of departure for improved governance if a local authority makes the first move (Foster, Garduño *et al.*, 2007). There is also vast experience of participatory groundwater management and hydrological monitoring from Andhra Pradesh (Govardhan Das and Burke, 2013). The latter influenced the Twelfth Five-Year Plan to suggest that aquifer mapping programmes would enable more informed participatory management of groundwater (Planning Commission, 2013: 23).

#### Location of Gujarat State



Source: CC-by-sa PlaneMad/Wikimedia

This recent decentralisation trend has researchers and donors returning to emphasising stakeholder and community involvement in groundwater governance. While such tools are receiving increased attention for several good reasons, it deserves to be reminded of how the concept of participation was not long ago problematised based on experience from the ground. Among the negative components lifted were that user involvement may require substantial contributions from local (often poor) people in the form of labour, cash or kind and thus transfer some of the project cost on to beneficiaries. Further, it may demand time investments that few can afford. While participation in development projects often also aims at improving ‘knowledge sharing’, such an objective can be criticised for both concealing and reinforcing oppressions and injustices in their various manifestations (Cooke and Kothari, 2001). At the least, it should be recognised that aquifer mapping is costly and time-consuming and requires training, allocated funding and a centralised reporting system before its full potential can be realised.

The Maharashtra Groundwater (Development and Management) Bill was recently (November 2013) approved by the legislators; the potential future impact of this reform cannot be evaluated yet.<sup>15</sup>

Under the new Act, which goes further than the 2005 Model Bill, the Water Resources Authority is meant to assume powers as a Groundwater Authority and a new agency will be responsible for identification and delineation of watersheds and aquifers. A committee is to assist the Authority in advising communities in rural areas on management of resources. Groundwater quality deterioration is to be prevented, all existing well owners are to register their usage, and drilling of deep wells for agricultural and industrial purposes is to be prohibited or subject to prior approval. Integrated watershed development and artificial recharge is to be planned for.

As is the case in Karnataka, many provisions of the new Act will apply only in such areas that are notified. However, the CGWA has not yet notified a single assessment unit in the State and only seven talukas<sup>16</sup> are observed to suffer from over-exploitation. The official picture of groundwater exploitation in Maharashtra has been described as too rosy, with ‘an element of political compulsion about not declaring watersheds in problem categories as such declaration leads to a ban on banking sector credit for groundwater exploitation’ (Phansalkar and Kher, 2006: 71 footnote 6).

<sup>16</sup> A group of several villages, organized for revenue purposes.



It seems that politicians and officials alike have abandoned their obligations to act in the general long-term interest of the public, and that the CGWA has no means of pushing them.

### **Addressing water depletion through electricity in Gujarat**

The State of Gujarat has large precipitation fluctuations spatially as well as between years and decades, and a history of drought. The groundwater depletion was considered serious already in the mid-1980s but only one assessment unit – in the hard-rock eastern part – was notified by the CGWA until three more were added to the list in 2012. Located by the western coast, salt water intrusion to the aquifers is an increasing problem and the natural levels of fluoride in the bedrock are also major concerns.

The legislator passed a formal groundwater conservation law already in 1973, as the first of all Indian States. It was nevertheless not signed by the Chief Minister due to fears regarding its impact on the State's (then) 300,000 farmers (Chakravarty, 2013). Others have explained the Chief Minister's unwillingness to sign off the Bill with concerns for the administrative and logistical problems of enforcing an Act pertaining to such a large number of dispersed owners of irrigation wells (Shah, Bhatt *et al.*, 2008).

The approach in the 1970s to law as a practically unviable instrument spurred action and research into alternative ways of regulating groundwater abstraction. One part of this took up the nexus between water and energy. A distinct share of the energy consumption could be linked to farmers drilling ever deeper wells and installing more powerful pumps. Increasing water pumping coupled with high electricity subsidies took its toll on the finances of the State and its Electricity Board, which was eventually also unable to meet the needs of the rapidly growing demand. It was felt that the transaction costs for a traditional command and control system, most notably the manual reading of hundreds of thousands of energy metres, were untenable. Meters, tariffs and meter reading staff were all components in a system riddled by endemic corruption.

To reverse the negative trends, socio-technocratic and political realities had to be taken into account (Shah, Mehta *et al.*, 2012). Concerted efforts were put into a complete overhaul of the energy sector, including the very management and work culture within the distribution company. Efficiency gains and rationing of the power supplied for groundwater pumping became an integrated part of the Jyotigram (a.k.a. Jyoti Gram Yojana, meaning 'lighted village') program that was implemented in almost all of Gujarat's 18,000 villages. Before it being rolled out, power was supplied from one and the same source in the villages and was provided in three phases for eight hours for agriculture, whereas domestic and other users accessed electricity in single

phase around the clock. Farmers, however, easily circumvented this rationing scheme by illegally converting single phase into three phase, thereby completely paralysing the rural domestic electricity supply.<sup>17</sup>

The Jyotigram scheme involved an investment of some 260 million USD for laying a new transmission network that separated the supply feeders for agricultural and non-agricultural users, respectively. Non-farm customers can now enjoy 24 x 7 metered 220-volt power supply while farmers get eight hours of 440-volt power supply according to a predictable rotation schedule. Farmers still pay a subsidised flat-rate tariff but the volume of energy consumed has come down, and thereby also the total subsidies (Planning Commission 2007, Shah, Bhatt *et al.*, 2008, Shah, Mehta *et al.*, 2012).

The new system was nevertheless neither popular nor tamper-proof. For long, the dependence on electricity for pumping groundwater had increased in Gujarat just like in many other States, and many farmers had organised themselves into powerful lobbies for maintaining power subsidies (Mukherji, Shah *et al.*, 2012). The decisions to limit the electricity access met with violent opposition from the farmers, backed by local politicians. The transformation of the Electricity Board's internal work culture would, by itself, have helped little in turning it around without transforming the culture of theft, vandalism, political brinkmanship and hooliganism towards its own staff. The high-level political backing of Jyotigram all the way to the Chief Minister was 'necessary but not sufficient to control the anarchy' on the ground: staff members were reluctant to venture into villages for fear of violence from irate mobs; they were often taken hostage and kept in bondage (Shah, Mehta *et al.*, 2012: 6).

The practical solution was to set up dedicated police stations and employ 500 retired army personnel to keep violence in check.<sup>18</sup> In spite also of a sustained campaign to control the culture of rampant power theft, the Electricity Board had to constantly introduce new technologies to outsmart farmers from stealing power from single-phase supply by using phase-splitting capacitors. Engineers designed special transformers that tripped whenever the load exceeded a limit (*ibid*).

More than anything, the Jyotigram scheme has been successful as a load management strategy for the State Electricity Board and as a result, the State now has surplus power. It is however unclear to what point the development of new technical means to keep offenders in check continued. With regards to the transaction costs and the necessity to use ex-army personnel and dedicated police stations to enforce changes on the ground, the case also raises questions of what 'good governance' entails in practice.

<sup>17</sup> In western and southern India, groundwater tables are too low for the aquifers to be tapped by diesel centrifugal pumps (Mukherji, Shah *et al.*, 2012).

<sup>18</sup> The GUVNL, the umbrella electricity services company owned by the Gujarat Electricity Board, has a Vigilance Department headed by an officer on deputation from the police. This coordinates with power subsidiary companies to keep pilferage of energy in check. Mass checking drives performed by a number of special squads are carried out as and when required. There was previously a cash reward for those who wished to anonymously report power theft, [www.gseb.com](http://www.gseb.com) (retrieved October 2013).



Available research has suggested that less groundwater was drawn for irrigation as a consequence of the Jyotigram scheme, but absence of before-and-after data makes the estimations inconclusive. The areas under irrigation seemed to decline, which has been attributed mainly to two factors: farmers could choose to convert to alternative incomes when radically improved access to electricity in the villages so allowed, and access to groundwater via electrified tubewells decreased when the power rationing was enforced through new and more effective means. The latter was in turn linked to how the Jyotigram scheme impacted negatively on water-buying marginal farmers who were previously relying on there being a market for groundwater (Shah, Bhatt *et al.*, 2008: 1238f).

As complementary governance tools, Gujarat has invested also in incentivising rooftop rainwater harvesting, groundwater recharge, drip and sprinkler irrigation systems and rural check dams (partly under the World Bank's Hydrology Project). Combined with the effects of some good monsoon years, these efforts initially helped to increase the water table. However, the positive trend has subsequently been reversed and with growing industrial and urban pressure on the resources, the demand is also constantly increasing (Times of India, 2011).

Furthermore, recent research in Gujarat has reported that technological and economic advances make it possible for farmers to invest in drilling deeper wells and buying more powerful pumps, and abstract water from more than 300 metres' depth. The energy use has reportedly increased over the last two decades without a matching increase in irrigated area and the 'drop per unit of energy consumed' seemingly continues to deteriorate (Narula, Fishman *et al.*, 2011: 6, Fishman, Modi *et al.*, 2011).

Simultaneously, widespread uptake of modern measures for greater water use efficiency in agriculture is yet to be realised. One conclusion has been that with the water table estimated to sit at 250m below ground level in some areas, tubewell irrigated agriculture as practiced today is probably not financially viable (Fishman, Jain & Kishore, 2013).

As part of the alternative approach to governing groundwater, the Gujarat Water Resources Development Corporation Ltd. was established in 1975 and has been endowed with certain management responsibilities. A Groundwater Authority was set up under it in 2001, seemingly in response to the Model Bills of the time. This Authority in turn has powers to reject giving the No Objection Certificate for groundwater abstraction in notified areas and such declared over-exploited, 'dark' or saline. The point of departure being that groundwater law is impractical to implement, the Authority has instead strengthened the energy legislation by issuing resolutions. The State Electricity Board is accordingly instructed not to energise new irrigation tubewells

without permission from the Groundwater Authority. Almost half a million new power connections for small and marginal farmers have nonetheless been granted during the past decade (Shah, pers. comm., 2013).

Several lessons from seeking to govern groundwater depletion solely through regulation of the electricity supply may be learned from Gujarat. A multitude of ingenious measures needed to be designed and implemented along the way and neither rationing, re-wiring, separation of feeders, metering, rotation schemes, and special transformers nor internal work culture transformation should be seen in isolation. It seems clear that not only commitment but adaptive learning and willingness to progressively upgrade the system was fundamental.

It would also seem as if the sheer power of hundreds of ex-military men and the setting up of devoted police stations was an important ingredient to enforce the reform. Seven other States have separated their electricity supply systems for agricultural and other consumers.<sup>19</sup> Only some – including Gujarat – undertook physical segregation of load whereas for the remaining States, virtual segregation was (deemed) sufficient. A recent evaluation indicates that mainly in Gujarat did the authorities have to deal with feeder segregation being 'a continuous activity with a need to set up systems to continuously monitor and enforce discipline' (World Bank, 2013: xii). It is not known how farmers responded to rationing elsewhere.

The 'lighted village' approach is highlighted in the Planning Commission's Twelfth Five-Year Plan and in the National Water Policy, with the recommendation that electricity segregation be rolled out in order to put a stop to free or heavily subsidised power supply. There is, however, an equal need for disincentives to vote-bank dependent politicians who promise farmers free power. The nexus is not only tight between water and electricity, but also between users and those in power.

No other States have so far followed Gujarat's attempts to simultaneously regulate electricity supply and groundwater pumping, in spite of the great potential in linking the two.

---

<sup>19</sup> Evaluating the initiatives in Andhra Pradesh, Haryana, Punjab, Karnataka, Maharashtra, Madhya Pradesh and Rajasthan, the World Bank (2013) made two key findings: a 'one size fits all' approach will not work across States given wide variety in local context and challenges; and all feeder segregation proposals should be evaluated as part of a larger strategic rural power supply improvement program. Groundwater was not mentioned.

## Conclusions

---

Considering their strategic importance, the regulation of India's groundwater resources is badly in need of reform. The resources development happens largely in the private arena and without effective authority control. At the policy level, there is no void of research studies and expert reports with special focus on the situation: the awareness is high that large parts of the country are already severely stressed with a bleak future under a business as usual paradigm. Yet there is insufficient action beyond the reports and policies.

Sustainability and improved efficiency can only be achieved with systematic efforts and a combination of instruments and incentives, legislation being one. In the field of groundwater, law has a particularly bad reputation. The expected resistance from landowners – especially farmers – against restrictions of their right to abstract unlimited volumes of water from wells contributes to unwillingness among law-makers to even suggest changes to the prevailing order. There is indifference, seemingly even apathy, but also rent-seeking among policy-makers, legislators and administrators charged with the duty of implementation. Considering the literally hundreds of millions of direct and indirect groundwater users in the country, and how the majority of well owners can be assumed to be more or less reluctant to changes to their situation, it is easy to concede to the challenge at hand. Limited human, administrative, technical and financial capacity remains major stumbling blocks at all levels, as illustrated by the three case studies.

Fundamental institutions as they are, though, neither legislator nor implementing authorities must eschew their responsibilities. India abides by the rule of law and its citizens should be able to expect clear, sound and updated rules for groundwater control as part of a good governance system. Formal regulation is imperative as a democratic basis for control and accountability and forms the foundation for applying the rights-based approach to equitable water allocation.

In order not to let the prevailing culture of non-compliance stand in the way of law as an enforceable instrument, it would seem necessary to reform both law and the conditions surrounding the very implementation process.

With regards to the former, there is a need to break the path dependency that entails more of the same: the same control system based on licensing for new wells in a few notified areas only, and the same grandfathering approach whereby existing rules are upheld for right-holders already benefitting from them whereas stricter rules apply to new users only. Further, the

progressive texts of recent policy documents including the 2011 Model Bill and the National Framework Law have symbolic value, not least their references to the public trust doctrine. However, the significance of the Ministry of Water Resources removing the direct reference to the Easements Act in the latest National Water Policy (and the Act not being mentioned in the Framework Law drafts) should also not be underestimated. For the principle of groundwater being common property to permeate the landscape, reformed legislation needs to leave the past behind, not ignore it.

One of the major arguments for legal reform has been to sever the intrinsic link between land and property rights in groundwater in the interest of landless people and sustainability in general. In order to shift the present entitlements scenario, a new conceptual approach could be based on a system of water allocations to farmers and industries (and cities). This would not necessarily be at the expense of marginal farmers in hard-rock areas whose livelihood opportunities are already threatened by access difficulties when water tables are lowered beyond their reach. For industrial users, it may serve as a push towards reuse and recycling.

Reformed legislation must be coupled with improved institutional arrangements and strengthened capacity for implementation and enforcement. The case of Bangalore points at the problems formed by an insufficient degree of integration between different Authorities with inadequately defined responsibilities. There is also wide consensus – such as in Gujarat – that a conventional command and control approach is too demanding on the administrative apparatus to be effective; it furthermore suffers from treating groundwater inside its own box only. Experience from Maharashtra shows that local decision-makers with vested interests will inevitably fail to see the own role in mismanagement. The latter also suggests that in order to confront problems shaped by low legitimacy, groundwater users (including local politicians) need to better understand the basic hydrogeology of their surrounding environment.

Taken together, the three case studies indicate that a scientifically informed, decentralised, contextualised and integrated yet wide approach to groundwater governance can be viable given that it incorporates strong accountability and literally powerful means of enforcement. Nonetheless, it is probably the participatory trajectory that will receive most spotlight in the near future, along with voluntary self-restraint and reallocation in communities under severe groundwater stress.

Improved understanding of hydrogeology is supposed to lead to a stage where the norm system is fundamentally altered and the perception of groundwater as a shared, common property penetrates actions and decision-making at all levels. There is, however, little experience from such a new order. Participatory aquifer mapping requires a system where traditionally weak user groups are not taken hostage by powerful ones, and which does not move towards the state manufacturing involvement. More than seeking to base good governance on forced feelings of community, improvements necessitate a change in attitude towards regulation for the common, long-term good. Behavioural change should, among other things, be based on a 'leading by example' approach where high-ranking officials and politicians showcase how they comply with the applicable provisions. Only when the need for reform is internalised and translate into altered conduct at the top can law become a viable tool for change towards a society that takes its groundwater resources seriously.

## References

---

- CGWA (2012). Guidelines/Criteria for Evaluation of Proposals/Requests for Ground Water Abstraction. New Delhi: CGWB, Government of India.
- Chakraborti, D., B. Das and M.T. Murrill (2011). Examining India's Groundwater Quality Management. *Environ. Sci. Technol.* 45(1): 27-33.
- Chakravartty, A. (2013). Gujarat Passes Groundwater Bill. *Down to Earth*, March 31.
- Chandra, S., E. Nagaiah, D.V. Reddy, V. Ananda Rao and S. Ahmed (2012). Exploring Deep Potential Aquifer in Water Scarce Crystalline Rocks. *J. Earth Syst. Sci.* 121(6): 1455-68.
- Cohen, A., and K. Bakker (2010). Groundwater Governance: Explaining Regulatory Non-compliance. *International Journal of Water* 5(3): 246-266.
- Cooke, B. and U. Kothari (2001). *Participation: the New Tyranny?* London: Zed Books.
- Cullet, P. (2009). *Water Law, Poverty, and Development: Water Sector Reforms in India.* New York: Oxford University Press.
- Cullet, P. (2012a). Is Water Policy the New Water Law? Rethinking the Place of Law in Water Sector Reforms. *IDS Bulletin* 43(2): 69-78.
- Cullet, P. (2012b). The Groundwater Model Bill: Rethinking Regulation for the Primary Source of Water. *Economic & Political Weekly Vol. XLVII No. 45.*
- Deccan Herald (2013). Borewell Registration Norm Watered Down After All. *Deccan Herald* May 6.
- Dubash, N.K. (2002). *Tubewell Capitalism: Groundwater Development and Agrarian Change in Gujarat.* New Delhi: Oxford University Press.
- Fishman, R., V. Modi, K. Narula, S. Gulati, S. Mahajan, N. Parekh, D. Patel, A. Patel, A. Kumar Rohila and U. Lall (2011). *Towards Greater Accountability and Efficiency in Groundwater and Energy Use in Indian Agriculture: Initial Report from a Field Pilot in Gujarat, India.* Columbia Water Center.
- Fishman, R., M. Jain & A. Kishore (2013). *Groundwater Depletion, Adaptation and Migration: Evidence from Gujarat, India.* International Growth Center Working Paper (preliminary draft) (retrieved October 2013).
- Foster, S., H. Garduño & A. Tuinhof (2007). *Confronting the Groundwater Management Challenge in the Deccan Traps Country of Maharashtra, India.* Case Profile Collection No 18. GW-MATE. Washington, D.C.: The World Bank.
- Garduño, H., S. Romani, B. Sengupta, A. Tuinhof and R. Davis (2011). *India Groundwater Governance Case Study.* Washington, D.C.: World Bank.
- Global Water Intelligence (2012). *India's Tectonic Shift in Water Policy.* Global Water Intelligence Vol. 13, No. 5.
- Govardhan Das, S.V. and J. Burke (2013). *Smallholders and Sustainable Wells. A Retrospect: Participatory Groundwater Management in Andhra Pradesh (India).* Rome: FAO.
- Government of Maharashtra (2001). *The Sukthankar Committee Report on Operation, Maintenance and Management of Rural and Urban Water Supply Schemes.* Mumbai: Water Supply and Sanitation Department.
- Grönwall, J. (2008). *Access to Water: Rights, Obligations and the Bangalore Situation.* Linköping: Linköping Studies in Arts and Science.
- Grönwall, J. (2013, unpublished). *Water Access Strategies and the Importance of Groundwater for Poor Urban Households in Bangalore, India.* Singapore: Institute of Water Policy.
- Gujja, B. and K.J. Joy (2012). *Unresolved Issues in Water Policy.* The Hindu Business Line 27 February.
- Iyer, R.R. (2011). *Should Water be Moved to Concurrent List?* The Hindu June 18, [www.thehindu.com/opinion/lead/should-water-be-moved-to-concurrent-list/article2113384.ece](http://www.thehindu.com/opinion/lead/should-water-be-moved-to-concurrent-list/article2113384.ece).
- Iyer, R.R., P. Cullet, K. J. Joy, K. C. Sivaramakrishnan, V. Upadhyay, M. S. Vani (2012). *The Draft National Water Framework Act: An Explanatory Note Developed by the Sub-Group of Planning Commission's Working Group on Water Governance for the Twelfth Plan.* New Delhi: Government of India.
- Koonan, S. (2010). *Legal Regime Governing Groundwater.* In P. Cullet, A. Golwlland Gualtieri, R. Madhav et al. *Water Law for the Twenty-First Century: National and International Aspects of Water Law Reform in India.* New York: Routledge.
- Madhusudhan, N. (2009). *Decade-old Water Act Yet to Evolve.* The New Indian Express, 9 July.
- Mechlem, K. (2012). *Groundwater Governance: A Global Framework for Country Action.* Thematic Paper 6: Legal and Institutional Frameworks. Rome: GEF.
- Meinzen-Dick, R. (2007). *Beyond Panaceas in Water Institutions.* Proceedings of the National Academy of Science. 104 (39): 15200-5.
- Ministry of Water Resources (2012). *National Water Policy 2012.* New Delhi: Government of India.
- Ministry of Water Resources (2013). *Report of the Committee for Drafting of National Water Framework Law.* New Delhi: Government of India.
- Mukherji, A., T. Shah and M. Giordano (2012). *Managing Energy-irrigation Nexus in India: A Typology of State Interventions.* Water Policy Research Highlight No. 36. Colombo: IWMI-Tata.
- Narayana, P. and C. Scott (2004). *Effectiveness of Legislative Controls on Groundwater Extraction.* Unpublished paper presented at IWMI-Tata Annual Partners' Meet.
- Narula, K., R. Fishman, V. Modi, & L. Polycarpou (2011). *Addressing the Water Crisis in Gujarat, India.* New York: Columbia Water Center, Earth Institute, Columbia University.
- New Indian Express (2013). *Rampant Sinking of Borewells Still on in State.* The New Indian Express, 14 January.

- Phansalkar, S. and V. Kher (2006). A Decade of Maharashtra's Groundwater Legislation: Analysis of the Implementation Process. *Law, Environment and Development Journal* 2(1): 67-83.
- Planning Commission (2007). *Groundwater Management and Ownership: Report of the Expert Group*. Planning Commission, GoI. New Delhi: Government of India.
- Planning Commission (2011a). *Background and Rationale Draft Model Bill for the Conservation, Protection and Regulation of Groundwater, 2011: Report of the Expert Group*. New Delhi: Government of India.
- Planning Commission (2011b). *Draft Model Bill for the Conservation, Protection and Regulation of Groundwater: Report*. New Delhi: Government of India. [http://planningcommission.gov.in/aboutus/committee/wrkgrp12/wr/wg\\_model\\_bill.pdf](http://planningcommission.gov.in/aboutus/committee/wrkgrp12/wr/wg_model_bill.pdf).
- Planning Commission (2011c). *Report of the Working Group on Sustainable Groundwater Management as input to 12th Plan*. New Delhi: Government of India.
- Planning Commission (2013). *Twelfth Five Year Plan (2012–2017): Faster, More Inclusive and Sustainable Growth*. Vol. I. New Delhi: Government of India.
- Rodell, M., I. Velicogna and J.S. Famiglietti (2009). Satellite-based Estimates of Groundwater Depletion in India. *Nature* Vol. 460: 999-1003.
- Shah, M. (2013). *Water: Towards a Paradigm Shift in the Twelfth Plan*. *Economic & Political Weekly*, Vol xviii, No. 3.
- Shah, T., S. Bhatt, R.K. Shah & J. Talati (2008). *Groundwater Governance Through Electricity Supply Management: Assessing an Innovative Intervention in Gujarat, Western India*. *Agricultural Water Management* 95: 1233-42.
- Shah, T. (2009). *Taming the Anarchy: Groundwater Governance in South Asia*. Washington, D.C.: RFF and Colombo: IWMI.
- Shah, T., M. Mehta, G. Sankar and S. Mondal (2012). *Organizational Reform in Gujarat's Electricity Utility: Lessons for Revitalizing a Bureaucratic Service Delivery Agency*. IWMI TATA Vol. 6.
- Shankar, P.S.V., H. Kulkarni and S. Krishnan (2011). *India's Groundwater Challenge and the Way Forward*. *Economic & Political Weekly* Vol 46 No 2: 37-45.
- Times of India (2011). *Groundwater Levels Have Not Increased, Admits Minister*. Times of India 28 April.
- Upadhyay, V. (2009). *Legal Dimensions of Water Resource Management in India: A Review of Legal Instruments Controlling Extractions to Sustainable Limits*. In L. Crase and V.P. Gandhi (eds.). *Reforming Institutions in Water Resource Management: Policy and Performance for Sustainable Development*. London: Sterling, VA: Earthscan.
- Vasudev, C.D. (2013). *Registration Process of Borewells Goes Dry*. New Indian Express August 28.
- WHO/UNICEF (2012). *Progress on drinking water and sanitation: 2012 update*. Joint Monitoring Programme for Water Supply and Sanitation: Geneva.
- World Bank (2010). *Deep Wells and Prudence: Towards Pragmatic Action for Addressing Groundwater Overexploitation in India*. Washington, D.C.: World Bank.
- World Bank. 2013. *Experience of Rural Load Segregation Schemes in States: Lighting Rural India*. Washington D.C.: World Bank.

### Case law

- Hindustan Coca-Cola Beverages v. Perumatty Grama Panchayat 2005(2) KLT 554.
- M.C. Mehta v. Kamal Nath, 1997 1 SCC 388.
- M.C. Mehta v. Union of India, 1997 (11) SCC 312.
- Perumatty Grama Panchayat v. State of Kerala 2004, (1) KLT 731.
- State of West Bengal v. Kerosam Industries, 2004 10 SCC 201.

### Personal communication with informants

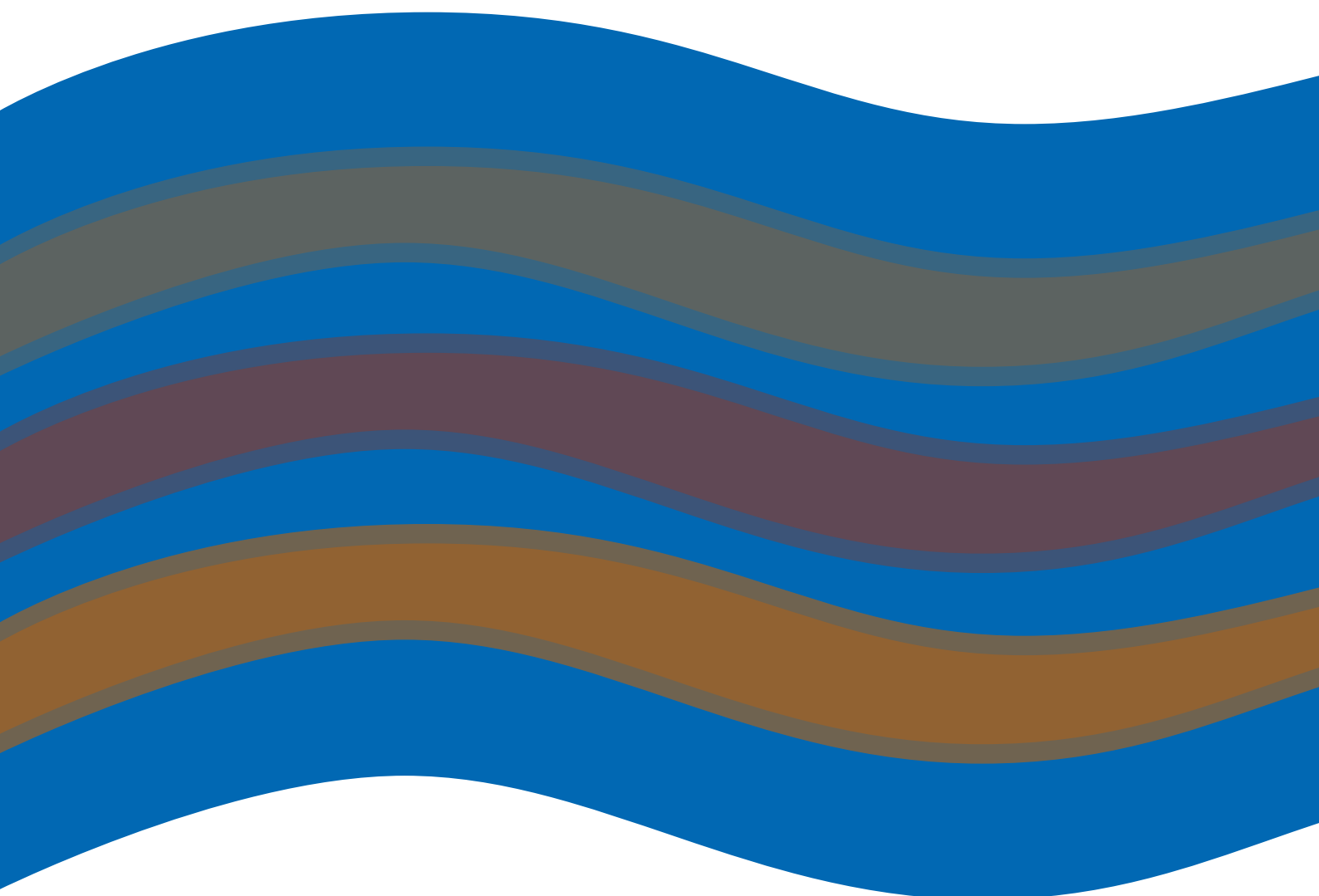
- Executive Engineer (name withheld on request), BWSSB Bangalore, February 2013.
- Dr Tushaar Shah, International Water Management Institute (IWMI), October 2013.
- Srinivasan Iyer, UNDP India, November 2013.

# Groundwater Governance in India

## Stumbling Blocks for Law and Compliance

This report analyses the non-binding policy as well as legal and institutional framework for groundwater governance in India. It puts special focus on implementation, enforcement and compliance matters in practice, drawing from experience in the States of Karnataka, Maharashtra and Gujarat. The case studies show how lack of political will, path dependency, insufficient integration and inadequate capacity at implementing authorities remain stumbling

blocks for compliance with the prevailing law. The regulation of India's vital groundwater resources is in need of reform, to depart from the conventional command and control system and provide for efficiency gains and improved institutional arrangements. Decentralised governance and greater user participation in aquifer mapping may be useful components in order to confront problems shaped by low legitimacy.



*Empowered lives.  
Resilient nations.*



**STOCKHOLM INTERNATIONAL WATER INSTITUTE, SIWI**

Box 101 87, SE-100 55 STOCKHOLM, SWEDEN

VISITING ADDRESS: LINNÉGATAN 87A

PHONE +46 8 121 360 00 + FAX +46 8 121 360 01 + [siwi@siwi.org](mailto:siwi@siwi.org) + [www.siwi.org](http://www.siwi.org)