

1 Community-based Water Law and Water Resource Management Reform in Developing Countries: Rationale, Contents and Key Messages

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Abstract

Water resources management reform in developing countries has tended to overlook community-based water laws, which govern self-help water development and management by large proportions, if not the majority, of citizens: rural, small-scale water users, including poor women and men. In an attempt to fill this gap, global experts on community-based water law and its interface with public sector intervention present a varied collection of empirical research findings in this volume. The present chapter introduces the rationale for the volume and its contents. It further identifies key messages emerging from the chapters on, first, the strengths and weaknesses of community-based water law and, second, the impact of water resources management reform on informal water users' access to water and its beneficial uses.

Impacts vary from outright weakening of community-based arrangements and poverty aggravation or missing significant opportunities to better water resource management and improved well-being, also among poor women and men. The latter interventions combine the strengths of community-based water law with the strengths of the public sector. Together, these messages contribute to a new vision on the role of the state in water resources management that better matches the needs and potentials of water users in the informal water economies in developing countries.

Keywords: community-based water law, water reform, developing countries, IWRM, public sector.

Rationale for This Volume

Since the late 1980s, an unprecedented reform of water resource management has taken place across the globe, as heralded by events such as the declaration of the Dublin Principles in 1992. Worldwide, this reform has radically redefined

the role of the public sector, with the state's conventional primary role as investor in water infrastructure being questioned. Partly as a result of these policy changes, public investments in water have declined in the expectation that the private sector would step in to fill the gap. Existing irrigation schemes have been

transferred from government control to users, while privatization of the domestic water sector has been encouraged. Thus, the role of the state has shifted more towards that of regulator, promoting decentralization and users' participation.

In order to fulfil their regulatory roles, states have promoted measures such as the strengthening of formal administrative water rights systems, cost recovery and water pricing (the 'user pays' principle), the creation of new basin institutions and better consideration of the environment (the 'polluter pays' principle). Together, this set of regulatory measures is usually referred to as 'Integrated Water Resources Management' (IWRM).

Although the emphasis on users' participation suggests otherwise, water resources management reform has paid little attention to community-based water laws in rural areas within developing countries. Community-based water law is defined as the set of mostly informal institutional, socio-economic and cultural arrangements that shape communities' development, use, management, allocation, quality control and productivity of water resources. These arrangements, anchored in the wisdom of time, are embedded in local governance structures and normative frameworks of kinship groups, smaller hamlets, communities and larger clans and groupings with common ancestry. In developing countries, they often exist only in oral form.

Reformers have tended to ignore, frown upon or even erode community-based water law as they have pushed forward the IWRM principles. This is startling, because these arrangements govern the use of water by large proportions, if not the majority, of the world's citizens: the rural women and men, often poor, who, in self-help mode, use small amounts of water as vital inputs to their multifaceted, agriculture-based livelihoods. Moreover, reforms in developing countries have often been financed by bilateral and international donors and financiers whose main aim is the use of water for improving the well-being of precisely these informal users.

Recently, the confidence with which IWRM and its redefined role of the state was promoted has started dwindling. In sub-Saharan Africa, major players like the World Bank, African

Development Bank and the New Partnership for Africa's Development (NEPAD) recognize again that 're-engagement' in investments in agricultural water management, besides domestic supplies, is warranted. The private sector has not taken up this conventional public sector role. Farmers' protests against the new laws in Latin America (see Boelens *et al.*, Chapter 6, this volume) are echoed by African water lawyers concerned about the dispossession of customary water rights holders under the introduction of permit systems (Sarpong, undated).

Academic critiques are also emerging and argue that, while the typical ingredients of IWRM may work in the formalized water economies of industrialized countries, they are inappropriate in the informal water economies of the developing world (Shah and Van Koppen, 2006). As a result, there is a renewed and growing call for a new vision on a more refined role of the state and other public and civil sector entities in water resources management in the informal sectors in developing countries.

This volume seeks to contribute to developing such a vision on the role of the state in which, for the first time, community-based water arrangements play their full roles. Clearly, both the public sector and community-based water arrangements have their strengths and weaknesses, and the key question is not which one is best, but rather which combination is most appropriate to address needs in specific areas and in particular for those most at risk: rural poor women and men.

Finding an appropriate mix requires, first of all, a better understanding of community-based water law itself. Academic understanding of community-based water law has grown significantly during the past decades (cf. Von Benda-Beckmann, 1991; Shah, 1993; Ostrom, 1994; Yoder, 1994; Ramazzotti, 1996; Boelens and Dávila, 1998; Bruns and Meinzen-Dick, 2000). While the focus in this research was previously on irrigation of field crops, the scope has increasingly widened to include homestead gardening, domestic uses, livestock watering, silviculture, fisheries and even the integrated use of multiple sources for multiple purposes (Bakker *et al.*, 1999; Moriarty *et al.*, 2004; Van Koppen *et al.*, 2006).

Many questions concerning the strengths and weaknesses of community-based water arrange-

ments are still open. To name a few: (i) how do communities induce collective action in water resources development and management and how can their systems work at scales beyond the community? (ii) How and under what conditions does spontaneous innovation, an important strength of community-based water arrangements, spread? And (iii) what are critical weaknesses of community-based arrangements where the public sector has a legitimate role in acting to enhance the human well-being through better access to water and its beneficial uses? Answers to these and other questions will be indispensable in identifying the practical implications of communities' strengths and weaknesses for the design of public policies and programmes.

The second requirement in finding a more appropriate mix of community-based water law and public sector intervention is a better understanding of the interface between these two legal systems and of the strengths and weaknesses of the public sector in meeting communities' genuine needs for improved welfare and productivity. As community-based water law has gener-

ally been ignored up till now, positive, mixed or even negative impacts of the imposition of state regulations have mostly gone unnoticed as well. A better understanding of the current interface would allow for the design of more appropriate and effective forms of public support that build upon communities' strengths, while overcoming their weaknesses.

In this volume, global experts bring rich empirical evidence together on these two core issues: community-based water law and its interface with the state and other external agencies. As shown in Fig. 1.1, the locations from which the studies draw and according to which they are organized are diverse. The first set of chapters take a broad approach, looking across low- and middle-income countries in sub-Saharan Africa, Asia and Latin America, including some comparison with high-income countries. The second set covers areas outside Africa including Latin America, India, Mexico and China, as well as the particular case of arid zones and spate-irrigation. The remaining studies, organized in alphabetical order by country,

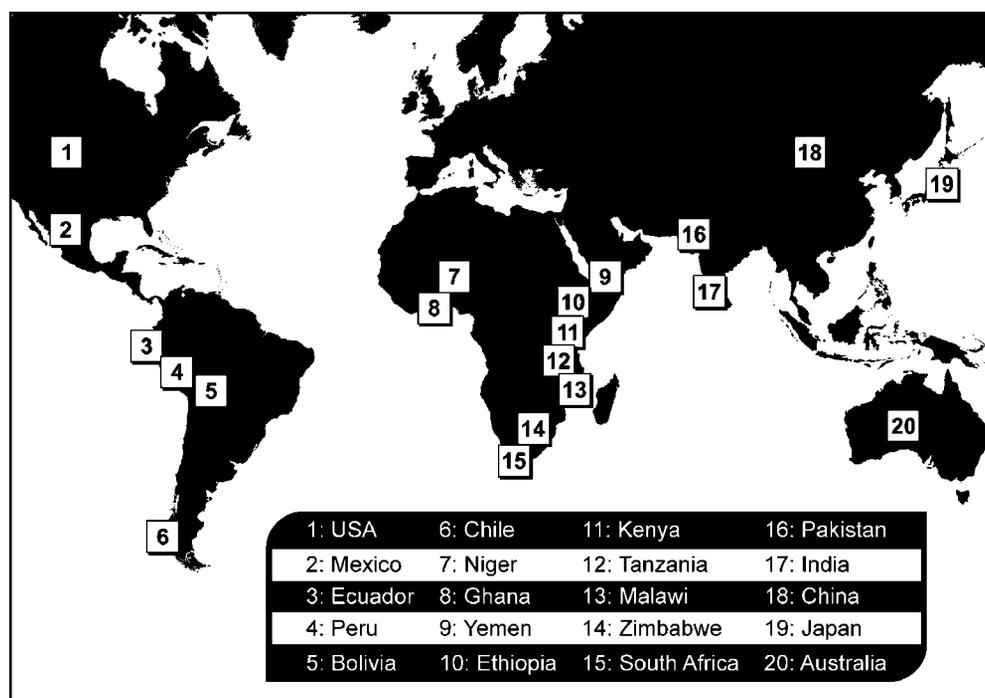


Fig. 1.1. Countries featured in this volume.

focus on Africa, the continent with the largest proportion of informal, rural, small-scale water users.

The following section provides a brief overview of the contents of all chapters. Taking the findings from the large diversity of sites with their varying foci on aspects of community-based water law and public water development and regulation together, some key messages can be derived, as presented in the third section. These messages highlight the strengths and weaknesses to be found in community-based water law and contribute to an emerging vision of the role of the state in water resources management in the informal water economies in developing countries.

Contents of the Chapters

Chapter 2, by Ruth Meinzen-Dick and Leticia Nkonya, sets the scene of pluralistic legal frameworks for water management, conflicts and water law reform, and explores the links between land and water rights. It uses examples from Africa and Asia.

In Chapter 3, Bryan Bruns focuses on the negotiation of water rights at the basin scale. He compares communities' perspectives and priorities with the assumptions that underpin current formal measures for basin-scale water allocation. The chapter identifies a set of measures for community involvement in basin management that would fit communities' own priorities and strategies significantly better.

Chapter 4, by Barbara van Koppen, discusses the entitlement dimensions of permit systems. Tracing the roots in Roman water law and the historical development of permit systems in high-income countries, she highlights differences in Europe's colonies in Latin America and sub-Saharan Africa. In the latter, permit systems were primarily introduced to serve the goal of divesting indigenous users of their prior claims. Current water law revisions promoted as IWRM in these two southern continents risk reviving dispossession of informal rural water users.

In Chapter 5, Tushaar Shah makes an encompassing analysis from the perspective of new institutional economics of the institutional environment of formal water reform and the widely prevailing institutional arrangements in

informal water economies in India, also taking examples from Mexico, China and Africa. From the analysis of a range of water institutions in India it appears that the transaction costs are low and the pay-offs high in the case of six largely ignored major self-help initiatives and one potential indirect public measure. In contrast, irrigation management transfer, water policy formulation, water regulation through permits and seven other formal regulatory measures entail either excessive transaction costs or lack pay-off or both. The conclusion is that, in informal water economies, the state should: (i) support high-performing infrastructural development in a welfare mode; (ii) promote institutional innovations that reduce transaction costs and restructure incentive structures; (iii) better exploit indirect measures; and (iv) improve performance in the formalizing sectors.

In the next chapter, Rutgerd Boelens, Rocio Bustamante and Hugo de Vos discuss the interface between indigenous and formal water rights (permit systems) in Andean societies in Latin America. Evidence from a number of cases highlights the problematic 'politics of recognition' and the need for critical analysis of the power relations underpinning both legal systems.

Chapter 7, authored by Abraham Mehari, Frank van Steenberg and Bart Schultz, compares indigenous spate irrigation arrangements in Eritrea, Yemen and Pakistan. The authors document the fair and well-enforced rules through which farmer groups have made optimal use of highly variable floods for centuries. The need for the public sector to build upon these strengths of community-based water laws is illustrated.

The first of the chapters that focus on African countries, Chapter 8, analyses the intricate collective arrangements for wise wetland use in west Ethiopia and the historically evolving interface with external landlords and government agencies. In this chapter, Alan Dixon and Adrian Wood identify effective fallback authority for rule enforcement as the greatest strength brought about by past external rulers and government, but this role is declining nowadays.

In Chapter 9, Desalegn Chemed Edossa, Seleshi Bekele Awulachew, Regassa Ensermu

Namara, Mukand Singh Babel and Ashim Das Gupta provide a detailed analysis of the the *gadaa* system. This traditional age- and gender-based socio-political system of the Boran in South Ethiopia also influences community-based water laws, in particular conflict resolution. The authors recommend government to build upon, instead of weakening, the *gadaa* system.

In Chapter 10, Albert Mumma analyses the implications of Kenya's new Water Act of 2002 for the rural poor. This centralized law fails to recognize pluralistic legal frameworks. Examples include the requirements for permits for water use, which are open only for those with formal land title, so excluding the majority living under customary land tenure. Water service providers, including informal self-help groups, are required to formalize as businesses. Hence, the author expects limited effectiveness of the Act in meeting the needs of the poor.

Chapter 11, by Leah Onyango, Brent Swallow, Jessica L. Roy and Ruth Meinzen-Dick, discusses the variation in Kenya's water and land rights regimes, including women's rights, as a result of pre-colonial, colonial, and post-colonial land and water policies. Focusing on the Nyando basin, seven different land tenure systems are distinguished and documented, each with specific water rights and with varying influences of customary arrangements.

In Chapter 12, Brent Swallow, Leah Onyango and Ruth Meinzen-Dick focus on poverty trends and three pathways of irrigation and related water resources management arrangements in the same Nyando basin in Kenya. They analyse how recent state withdrawal in the top-down planning scheme led to scheme collapse and poverty aggravation. Schemes served by the centralized agency partially continued and poverty remained relatively stable, while poverty increased slowly in areas with unregulated irrigation in mixed farming.

Chapter 13, by Anne Ferguson and Wapulumuka Mulwafu, analyses the history of irrigation development and also the ongoing irrigation management transfer in two schemes in Malawi, which contributed significantly to livelihoods. Lack of clarity on new responsibilities and lack of training open the door for customary arrangements to resurface and for local elites to capture land and water resources.

Chapter 14 turns to Tanzania. Bruce Lankford and Willie Mwaruvanda elaborate a legal infra-structural framework for catchment apportionment for upstream–downstream water sharing that combines Tanzania's formal water rights system with local informal rights in the Upper Great Ruaha catchment. Various technical designs of intake structures are discussed to identify the design for proportional sharing that best fits the hydrology, users' local, transparent and fair water sharing, and also the implementation of formal water rights.

In the last chapter, Zimbabwe's customary legal systems for basic domestic and productive water uses are compared with the history of formal water law by Bill Derman, Anne Hellum, Emmanuel Manzungu, Pinimidzai Sithole and Rose Machiridza. As argued, the livelihood orientation of customary arrangements aligns well with the priority right for 'primary water uses' in national law and also with the expanding definitions of the human right to water at global levels.

Key Messages

With such a large number of chapters covering so many aspects of water resources management and so large a geographic area, exhaustive systematic comparison on the issues involved is impossible. Nonetheless, there is a remarkable consistency in the findings in a number of key areas. Here, we highlight key messages emerging from an analysis of the evidence across the chapters.

Community-based laws are both robust and dynamic

Community-based water law has shown a surprising ability to both endure and adapt. These are both key attributes of any successful institution and should be considered as the basis for, rather than impediments to, additional change and improvement. Centuries-old knowledge and institutions that are adapted to place-specific ecological characteristics of water and other natural resources and the time-tested sustainable uses of these resources have allowed communities to survive from agriculture, often in harsh ecological environments.

Community-based laws have adapted to, and driven, changing water environments. Much innovation in water development and management has occurred entirely outside the ambit of the state and state regulation, for example as a result of growing population densities, new pumping technologies and water markets, remittances from off-farm employment or new output markets. Innovation occurred not only to expand water supply but also to regulate increasing conflicts over water sharing.

Community-based laws have also adapted to the influence of the state. The penetration of the state to the local level, in particular in rural areas, is generally weak but this varies around the world. In places like China, there is substantially more connection between local and national political bodies than elsewhere. For example, in sub-Saharan Africa the 'traditional' tribal authorities that command land, water and other natural resources often exist side by side with the decentralized 'modern' state represented by the upcoming elected local government (Mamdani, 1996). State influence is especially strong in settlement irrigation schemes; nevertheless, customary elements continue to some extent.

Despite their robustness and dynamism, informal arrangements in rural economies on their own may be insufficient to achieve higher standards of welfare or to cope with major adverse trends, e.g. growing population density, urbanization and out-migration, adverse markets, pandemics, animal disease, civil strife or droughts and floods.

Community-based laws have application outside the community, but with limits

Unlike the widespread assumption that community-based water law is necessarily confined to restricted territories, community-based water law also operates at larger scales. The pastoralists in sub-Saharan Africa – a familiar example – whose water use agreements with each other and settled farmers cover large areas, are also crossing international boundaries. Community rules can also respond to today's growing water scarcity at scales beyond the community. The spontaneous groundwater recharge movement in India, for example, is massive. Similarly, in the

face of increasing abstractions from shared streams, communities in Tanzania initiated upstream–downstream rotations based on customary intra-scheme practices. Communities' methods for negotiating with distant, powerful large-scale users and for protecting their existing and new water uses, strategically soliciting state support, are also illustrated in Bolivia.

A more general pattern of how communities may deal with larger-scale water issues has been developed by Bruns (Chapter 3). He expects communities to: (i) focus on concrete problems or 'problemsheds', especially during crises; (ii) to build strategic coalitions at wider scales based on local water allocation practices and dispute resolution processes; (iii) to seek representation, and not participation by all, in multiple forums that cover the larger scales; (iv) to welcome scientific expertise that demystifies and synthesizes information; and (v) to seek legal support to translate their concrete demands into terms of formal law that defends their demands with state authority.

Understanding and building on these spontaneous problem-solving alliances at large scales are indispensable, although often not sufficient, for equitable and pro-poor public intervention in water sharing across scales.

Community-based laws have livelihoods orientations, but entrench hierarchies

Community-based water law is centred on people's immediate stake in water use. It seeks to enhance members' livelihoods in a generally fair and equitable way. The absolute priority right to water of humans and animals to quench their thirst is universal. In various places, communities also prioritize water and land uses for other domestic uses and small-scale production, even if that means providing right of way over own land or handing over land to the community for water resources development. Such norms at the most local levels on how water should be used to meet basic human needs provide holistic and humane guidance for the current efforts to better define the human right to water at the highest level: the United Nations.

Notions of fairness and equity are also manifest in the widespread norm that those constructing and installing infrastructure and contributing

to its maintenance in cash and kind have the strongest, although not always exclusive, rights to the water conveyed. This principle for establishing 'hydraulic property' ensures security for the fruits of investments. Also, sharing of water and its benefits under growing competition is often proportional. As water becomes scarce, each user takes a smaller share rather than some maintaining their shares while others get nothing. Norms and practices to prevent pollution also exist in community-based laws.

'Localized principles used to manage water and mitigate conflict could also provide valuable lessons for those dealing with water at the international level' (Wolf, 2000, cited in Chapter 2) – or, we would argue, at any level. This is not to say that community-based systems on their own are the best solution to the problems of water governance at all scales. Nor is it to say that some principles of different communities will not clash as the scale of the problem expands. However, also in such conditions, informal laws will be a sound basis from which to search for new possible solutions.

One significant drawback of community-based water law is that every community is both heterogeneous and hierarchical. Customary practices entrench gender, age, ethnicity and class differences. This is in sharp contrast to the goals, if not always the practice, of most modern states. Gender inequities are particularly pronounced. In many traditions, water governance for productive uses is strictly a male domain, excluding women from access to technologies and construction of water supplies. This handicaps women not only in using water for own productive uses, but also in meeting the disproportionate burdens of fetching water for daily domestic use that society relegates to women. The public sector has a critical role to play in removing such inequities by targeting policies and other checks and balances.

Community-based laws both confound and assist enforcement and incentives

Rule setting and enforcement are the Achilles heel of any (water) law, and community-based water laws have both strengths and weaknesses in this regard. One weakness of communities' livelihood orientation is that this also makes it morally more

difficult to hold other water users, relatives and neighbours, accountable to restricting water use for livelihoods or to use the sanction of cutting water delivery to enforce agreed obligations, such as tariff payment or maintenance contributions.

However, the problem of hierarchy in community-based water law can become an advantage for law enforcement. In many instances, authoritative bodies dominated by older men and nested in multi-scale authority structures are feared but accepted because of their power to enforce behaviour in the common interest with limited transaction costs. In other cases, government can provide a useful additional influence. It will often be the case that the mere presence of such authority will be sufficient to ensure compliance, allowing the principle of subsidiarity – the devolution of decision making to the level closest to the resource – to work most of the time. Obviously, in order to meet equity goals and reduce transaction costs simultaneously, the challenge is to develop institutional devices to that end that are *not* based on gender, age or ethnic discrimination.

A clear strength of many cases of community-based water law is the crafting of the right incentive structures for those who deploy most of the effort in the common interest. For tasks like ditch watching, policing, operating infrastructure, maintenance or revenue collection, rewards are provided, even though they often remain modest. These rewards are made dependent upon the performance of the tasks.

Another advantage of community-based law is that rules are defined in terms that match the physical characteristics of water resources. Local norms related to water tend to be principles rather than rules, subject to recurring negotiation according to the ever-changing local conditions of this fugitive and variable resource. Even for spate irrigation, which captures highly unpredictable and variable floods coming from the mountain slopes, communities across countries have developed robust rules accommodating this variability.

Water permit systems and other regulations have eroded the advantages of community-based laws

One IWRM measure that risks eroding the strengths of community-based water law most

directly is the promotion of permit systems. Strengthening permit systems as the single formal entitlement to water, and obliging rights holders under other water rights regimes to convert to permit systems, risks serving the same purpose for which this legal device was introduced by the colonial powers, at least in Latin America and sub-Saharan Africa: dispossession of existing prior claims to water by informal users. Community-based water law intrinsically differs from permit systems. For example, in community-based water law, water is seen as a common property resource that is to be shared, while permits stipulate individual volume-based use rights to state-owned water. It is naive to suppose that one legal system can simply be replaced by another. Moreover, vesting formal rights on the mere basis of an administrative act implicitly favours those proficient in and connected to administration.

Conditions attached to permits, e.g. formal land title or expensive registration requirements, may discriminate explicitly. Forcing permits on rural communities destroys precious social capital, creates the tragedy of the commons and favours the administration-proficient at the expense of all others, most of all poor women. A solution that is sometimes proposed is to allocate permits to collectivities, but this faces problems of defining the 'collectivity', ensuring genuine representation without elite capture and avoiding the 'freezing' of the dynamism of local arrangements. The challenge is to recognize the coexistence of plural legal entitlement systems without burden of proof.

Permits are often also expected to serve as vehicles to impose obligations on water users, for example for taxation or for imposing caps on resource use. This may work if well-resourced water departments target a limited number of formal large-scale users, but enforcing conditions on multitudes of informal water users appears unrealistic. Fiscal and other state measures or indirect measures are often more appropriate.

Regulation under the banner of IWRM can also harm informal rural communities or local entrepreneurs otherwise. Requiring sophisticated business plans for rural communities' self-help water supply risks further undermining well-functioning informal arrangements and

depriving the poorest communities of indispensable financial and technical support. Water quality standards may have similar drawbacks. In these ways, regulatory IWRM measures seriously risk aggravating poverty and polarizing gender inequities.

Opportunities for taking the best from community-based law have been missed

Hard-wiring alien water-sharing rules

The key message emerging from another set of public sector interventions is that they meet communities' needs, but only partially, because critical components – either combinations of technologies and institutions or institutions on their own – fail to match communities' arrangements. Examples include state-supported improvements of intake structures for river abstraction or head works for spate irrigation. They have often succeeded in alleviating the labour required for the repeated rebuilding of traditional structures that typically wash away with strong flooding. However, these technical designs tended to hard-wire sharing rules that deviated from locally prevailing norms. This introduced new inequities. By building upon community-based and community-endorsed rules for sharing, benefits can be considerably enhanced.

Participatory irrigation management

A major missed opportunity in the past decade, leading to scheme deterioration and poverty aggravation, concerned participatory irrigation management. The institutional 'design' underpinning this move towards greater users' participation often boiled down to the assumption that it is enough to bring water users together in associations, often on paper only, irrespective of profoundly opposite interests. These newly created user associations were supposed to swiftly take over former state functions and tasks, including rule setting for water allocation, authority and enforcement, conflict resolution – e.g. between head- and tail-enders – and the creation of incentives for those who were supposed to take up, preferably on a voluntary basis, the hard work of operation, mainte-

nance, cost recovery or conflict resolution. Especially in settlement schemes where state influence had been strongest and the numbers of small farmers largest, schemes have entirely collapsed and poverty been aggravated when government withdrew.

In other cases, the users' spontaneous participation was discouraged. State support can match local initiative well when states provide for bulk water supplies through main pipes or canals, while local users take responsibility for the connections to houses or fields. Yet, even when the latter occurred on the users' own initiative, the state can discourage this and impose newly built public distribution networks up to the field level instead.

In sum, there is a dire need for technical and institutional designs that match both farmers' initiatives and public sector abilities for construction, rehabilitation and co-management of smallholder irrigation schemes. Providing some form of fall-back authority may be the main role for the state that farmers ask for.

Basin institutions

The establishment of basin institutions is another ingredient of IWRM that risks missing important opportunities by discarding community-based water law. These costly new institutions are supposed to allow for integrated planning and implementation but they take up functions that local government, other spheres of government or communities themselves, also at larger scales, can also do and, often, more effectively.

Basin institutions entrench the bureaucratic distinction between water for productive uses – to be managed as core IWRM by basin institutions – and water for domestic uses to be left to local government or the private sector. This distinction complicates service delivery that takes people's multiple water needs from multiple sources as a starting point.

Last but not least, basin institutions are following hydrological boundaries instead of administrative boundaries, because the sharing of limited water resources in one particular basin is assumed to be the key task. Yet, water resources are often abundant but underdeveloped, in particular in sub-Saharan Africa, where less than 4% of water resources have

been developed (African Development Bank Group, 2007). For enhancing year-round storage and conveyance structures, there has rarely been any need for new, fully fledged basin institutions.

Gender

Opportunities have also been missed with regard to redressing customary inequities. Instead of reducing hierarchies intrinsic to community-based water law, public sector intervention has often reproduced or even polarized hierarchies. One example is the weakening of women's land rights in matrilineal societies during the allocation of irrigation plots. Generally, in land and water titling, women's secondary rights in the bundle of customary rights are ignored by concentrating all rights of the bundle of resource rights in men. Customary rights of way to streams, springs and other water points may also be weakened in this way. Effective targeting approaches and public sector checks and balances are still to be implemented consistently to meet the constitutional requirement of ending gender-, age- and ethnicity-based discrimination.

We can get the technologies and institutions right

This volume also documents fruitful and replicable public action in which the strengths of both community-based water law and public sector intervention are combined and lead to improved welfare and productivity, also among poor women and men. Government and other external agencies can play a direct and indirect role in enhancing access to technologies for multiple purposes year-round by providing technical support and smart subsidies or loans and by improving technical knowledge. One way to do so is by appointing engineers for advising water users and local government. This volume also entails various examples of appropriate institutional designs for rule setting and enforcement at low transaction costs and for incentive structures that ensure performance-related reward for those carrying out the legwork of collective action. Furthermore, beneficial use of water is fostered by simultaneously

addressing other factors that are important for realizing the benefits of water use, including training, inputs, markets and health education.

Conclusion

Community-based water law in Latin America, sub-Saharan Africa and Asia is a precious social capital with many strengths: robust resource use is adapted to the locality; rules are dynamic and responsive to new opportunities but communities also consciously and proactively address upcoming problems at both local and larger scales; it is livelihood oriented, although hierarchical (and the latter may partially serve the goal of rule enforcement); it has nested structures for conflict resolution through rules that match notions of fairness and the physical characteristics of water resources. These characteristics are well in line with public-sector goals of enhancing well-being and productivity in rural areas, in particular among the poor. However, community-based water law is largely ignored by officialdom and professionals.

By empirically analyzing the interface between community-based water law and

current IWRM measures, this volume also identifies fields in which the public sector can play an important complementary role or should, in any case, avoid eroding the strengths of community-based water law or missing opportunities to build upon those. The public sector is critical in removing gender, age and ethnic biases and in legally and factually protecting communities' small-scale water uses. Where water is still underdeveloped, the most effective way the state can develop it is by reverting to its conventional role as investor in infrastructure, but now in a genuinely participatory, inclusive and gender-equitable mode of co-development and co-management that, yet, reduces transaction costs and provides incentives. Once water resources are fully developed, equitable water allocation needs to be negotiated at larger scales.

If this volume succeeds in conveying the need for such a new vision on the role of the state in water resource management for poverty alleviation and agricultural and economic growth in developing countries and in provoking thought on how endeavours to reform the water resource management reform can be successful, it will have served its purpose.

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