

Theme 1 Framework for Water Rights

FRAMEWORKS FOR WATER RIGHTS: AN OVERVIEW OF INSTITUTIONAL OPTIONS

framework – a supporting or enclosing structure¹

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Abstract

There is increasing agreement on the need for greater attention to the role of water rights in water resources management. This paper presents an overview of institutional options for water rights. It introduces the reasons why water rights are important and are receiving increasing attention and then presents general principles related to property rights. Various types of institutional arrangements may be used to regulate socially accepted claims to water, including community-based self-governance, agency administration and water markets. Methods for improving water rights and water allocation institutions include forming forums, clarifying water rights, planning and modeling techniques, and capacity building for specialized management agencies. Institutional arrangements and methods for improving water rights and allocation institutions should combine to a framework for water rights that draws optimally on the strengths of various water allocation institutions.

I. INTRODUCTION

The institutional frameworks that structure socially accepted access and entitlements to water take diverse forms, sometimes made explicit in local agreements, rules, and customs; sometimes informal, implicit and embedded in local practices; and in other cases spelled out in legislation and formal permits. Water quantities may be defined in diverse ways: by proportional shares, volume, taking turns, or combinations of different principles. Rights may be held by individuals, groups or other entities. Rights may be for a limited time or in perpetuity, and may vary according to water availability. Rights may be tied to a specific use and parcel of land, or flexible in use and transferable. Rights typically are accompanied by duties and responsibilities. Water quality may be specified, or left unstated.

This paper is written for a conference that will examine ways to improve water allocation institutions, bringing together water managers, regulators, researchers and others concerned with water rights. The paper offers an overview of institutional options for water rights: taking a broad perspective that in trying to improve water resources management it is important to understand the many ways in which access to water is currently controlled and influenced by social institutions, and the multiple means available for improving water allocation institutions. Thus, we go beyond the conventional analysis of water rights as deriving only from government law books and regulatory agencies, to also include a range of other types of water rights that are found in practice.

This paper is particularly concerned with the “rules of the game” that structure access to water when competition over water expands beyond small face-to-face communities. In these cases interaction occurs between strangers who may have few other common concerns beyond sharing an increasingly contested resource. The institutions involved include not just formal water rights supported by laws and licenses, but a range of different negotiation arenas through which different stakeholders in water management may seek to increase, defend or otherwise influence their access to water, whether by building infrastructure, adjusting gates and other water facilities, negotiating disputes, appealing to bureaucratic agencies, suing in court, lobbying for legislation and more.

The next section of this paper presents some of the reasons why water rights are important and are receiving increasing attention, as a means for alleviating poverty, promoting economic growth and protecting habitats and environmental services. We then look at general principles of property rights in the third section before examining three major types of water allocation institutions: agency allocation, user management, and water markets, and how these may be combined and transformed. The fifth section reviews some of the means available for improving water allocation institutions, including ways of clarifying water rights, strengthening forums for interaction among stakeholders, formation of specialized agencies and planning and modeling methodologies. The concluding section summarizes some of the main institutional options for water rights, and opportunities for improving water allocation.

II. WHY WATER RIGHTS?

The institutions that influence access to water matter for many reasons. Life and livelihoods depend on water. Not having enough clean water impoverishes people and blocks opportunities while, conversely, improving access to water can be an important tool for alleviating poverty (WWW 2000; Lipton and Litchfield 2002). Quality of life is affected not only by physical access to water, but also by the degree

of influence people have on water allocation decisions (increase, reduction, transformation of access). Moreover expectations about secure access to water influence investment decisions by subsistence farmers, industrial investors and others.

As long as water is abundant, it is easy to stay ignorant and unconcerned about who else may be sharing the same river, lake, or aquifer. As populations grow, demands on water rise, for household use, agriculture, and industry. Those who use water are increasingly affected by the actions of other people. Coordination becomes more complex and more crucial. In one way or another, water rights institutions, expectations about what claims to water are socially accepted as legitimate, are shaped by such competition, influencing people's ability to obtain water. Similar pressures to define property rights emerge for land and other resources as they become more scarce. But while changes in land tenure institutions are more familiar, studied and debated, changes in water tenure have received less attention.

The unique properties of water complicate the determination of rights, as patterns of water use are very dynamic and complex. Changes in water and land use by humans add sediment, fertilizers, and wastes that flow downstream and can affect other users. Natural fluctuations in stream levels may be increased, with larger floods and more severe droughts, or construction and management of storage reservoirs may narrow variations. Such processes profoundly influence aquatic habitats. Quantity, timing and quality of water flows create, destroy and transform these landscapes. Deforestation, reforestation and other land use changes transform the quantity and timing of water flows into and out of aquifers and rivers. The impacts of climate are mediated by the institutions that regulate access to water. Attempts to protect water quality, preserve wetlands and other aquatic habitats, and prevent intrusion of saline water into deltas and aquifers are also closely linked to water management institutions and activities.

Water rights matter for people's livelihoods, income, and protection of their environment. Thus water rights determine if people are included or excluded in the control of a vital resource for their lives. Improvements in water rights institutions can help reduce poverty, improve economic productivity and protect nature. However efforts to improve water allocations may be ineffective or even have the opposite effects from those intended, unless grounded in a good understanding of social institutions that shape access to water, and a careful assessment of the options available for improving water management. The diversity of culture, environment, economic activities and other conditions means there is no one best way to improve water rights and water allocation institutions. The best route to better water management depends on where you are starting from, with many pathways available.

III. PROPERTY RIGHTS, WATER RIGHTS

Before delving into the different types of water rights, it is useful to examine some of the basic concepts related to property rights in general, and some of the principles that apply from rights to land.

Property rights can be defined as "the claims, entitlements and related obligations among people regarding the use and disposition of a scarce resource" (Furubotn and Pejovich 1972). As long as the resource is abundant, there is little pressure to define rights, or to enforce them. But as the resource becomes more scarce, there is greater competition for it, and property rights can clarify expectations and thereby

reduce conflict over the resource. Bromley (1992:4) points out that “Rights have no meaning without correlated duties ...on aspiring users to refrain from use.” This means that property rights are not a relationship between a person and a thing, but are social relationships between people with relation to some object (the property). What is also crucial is that property rights are effective (legitimized) only if there is some kind of institution to back them up. In other words rights are only as strong as the institutions that stand behind them. In many cases the state is a primary institution that backs up property rights, but this is not necessarily the case. Customary rights may be backed by local authority and social norms. In the case of land rights in Africa, customary land tenure arrangements provided just as much tenure security as government-issued title to the resource (Bruce and Migot-Adholla 1994). The same often applies to water rights (Bruns and Meinzen-Dick 2000). Security of property rights—the assurance that one will receive benefits in the future—matters because it affects incentives to invest in and conserve the underlying resource.

Property rights regimes can be broadly classified as public, private, and common property, based on who holds rights. In public property, the state holds rights; in private property, individuals (or legal individuals, such as corporations) hold rights; and in common property, rights are held by a group of people.

Although many people equate property rights with “ownership” of a resource and the ability to do whatever one wants with it, it is more useful to think of bundles of rights that different parties may hold. These bundles of rights can be broadly defined as use rights of access and withdrawal, and control or decision-making rights to manage the resource, exclude others from it, and to alienate, or transfer, rights to the resource to others (Schlager and Ostrom 1992; F. and K. Benda-Beckmann and Spiertz 1997). Different people, groups, or agencies may hold different and overlapping bundles of rights over the same resource. For example, in the case of water, all women of the community may have rights to draw water from a stream for cooking and washing purposes, animal owners may have the right to water their herds or flocks at certain places, farmers who invested in building an irrigation system have rights to divert water for their crops (all use rights), while the village community, irrigators’ association, or the state claims rights to decide on the timing of water use, changes to the river, and granting of permission to new users (control rights).

IV. INSTITUTIONAL ALTERNATIVES FOR WATER ALLOCATION

Institutional arrangements for water allocation, and particularly for reallocation, can be grouped in three broad types, corresponding to the three major types of property rights regimes (Meinzen-Dick and Rosegrant 1997).

- In user-based allocation, water users join together to coordinate their actions, managing water resources as a form of common property.
- In agency allocation, water is treated as public property, with government agencies assuming authority for directing who does and does not receive water in accordance with bureaucratic policies and procedures.
- In market allocation, which corresponds with private property, water may be allocated and reallocated through private transactions, with users trading water through short or long-term agreements, reallocating rights in response to prices.

These three forms of water allocation institutions may be combined in various ways at different locations and levels of water management. For example, there may be common property management within and between some groups of users, transfers between individual farmers occurring through market-type mechanisms, and agencies administering allocation of water resources between user groups. User management and private exchanges may be based solely on local institutions, or take place in the context of license and other government regulations. A theme of this paper is that improving water management will often be a matter of finding an optimal combination of all three forms of allocation institutions, employing multiple frameworks that draw on the different advantages of self-governance among users, government agencies and market mechanisms.

1. User-Based Allocation

In many places around the world, water rights derive from membership in local organizations that manage irrigation or water supply systems. Access to water often depends on contributions to the original investment, and on fulfilling continuing obligations for operation and maintenance. Allocation of water may be assigned according to shares of the available flow, periods of time, quantities, turns, and other rules (Maass and Anderson 1978). Such rules become embodied and further modified in the physical shape of division structures and outlets, and procedures for distributing water during periods of scarcity.

A common source of problems occurs when outside intervention, intended to improve local systems, is carried out without due attention to the existing local rights and obligations. While perhaps seemingly “fair,” externally imposed criteria, such as allocation in proportion to land area, may ignore local rights and practices and often lack their flexibility and understanding of complexity. They often overlook detailed adjustments made locally to account for such things as earlier investments in building the system; variations in soils, slopes and drainage; and tolerance for minor or temporary violations of local rules (see for example Vermillion 2000). External intervention may also ignore or disrupt local sources of knowledge and legitimacy. At the local level, knowledge and legitimacy may derive from longstanding relations between friends and neighbors, informal or formal organizations, and local values regarding equity, leadership, sanctions and other matters. These local relationships constitute a form of social capital, which provides an essential framework for water rights and allocation at the local level.

In many aspects of natural resources management, including water, there is now more appreciation of the value of local institutions, such as irrigators’ organizations. Rather than ignoring or replacing them, there are attempts to integrate local organizations into government arrangements, for example through the establishment of formal water user organizations, transfer of management responsibilities for irrigation or water supply to community-based groups, and increasing stakeholder participation in planning and management of large water projects and river basins.

As competition over water grows however, local organizations must face competition from other users, particularly those taking water upstream and downstream users who want to limit upstream abstractions. Typically such conflicts extend beyond the bounds of face-to-face communities. Solving such problems requires dealing with strangers who have few links beyond using the same resource. As in other aspects of social and economic life, governments can play a crucial role in creating institutions, including laws, courts and other public services, which help disputants to peacefully resolve their differences and forge enforceable agreements. Important

choices are involved in what role government chooses to play concerning such disputes, whether facilitating negotiations among users, asserting direct control through a government agency or establishing conditions that enable users to transfer water among themselves, or some mixture of these.

2. Agency Administration

During the twentieth century, governments dramatically expanded their roles in many spheres, including water management. Large dams, reservoirs and irrigation systems were built by government agencies, which often continued to operate projects they had built. The rules and procedures of such projects (“project law”) thus played a major role in determining who received water. National constitutions, laws and regulations usually state that water is owned by the nation, with the government authorized to control water resources in the national interest.

This has often been interpreted as a mandate authorizing bureaucratic agencies to control water directly. Allocation decisions were often framed primarily in technical terms of engineering procedures such as irrigation schedules and reservoir operation rules. User participation beyond the lowest level of the system was often absent, or officially restricted to submitting requests. Subsequent decisions were often at the discretion of agency officials, with relatively little communication and accountability to users. Professional norms and bureaucratic procedures thus became a primary basis for water allocation in agency-controlled systems, often with little or no formal specification of water rights of the ultimate users. Agencies building and managing irrigation systems, reservoirs and other projects typically combined regulatory roles, allocating rights, resolving disputes, and authorizing reallocation, as well as directly delivering water.

3. Market Allocation

The holder of a water right, whether an individual, association, municipality or other entity, may be able to transfer their rights over water to others, i.e., one part of the “bundle” of rights would be alienation rights. A water right might be transferred temporarily, or permanently. It might be tied to land, or transferable separately. While individuals often hold use rights to water even under agency or user-based allocation systems, decision-making rights concerning reallocation or transfer may be held by larger institutions, such as water users’ associations or government agencies. Transfers may be something that rights-holders arrange among themselves, or may need to be reviewed and authorized by another body, whether a local irrigators’ organization or a government agency. While short-term exchanges often involve only the interested parties, permanent transactions often require involvement of a third party or legitimizing body.

Short-term water transactions tend to be common within local areas, whether irrigators along a canal swapping turns or pump owners delivering water to adjoining lands. The parties involved in such transactions often know each other quite well as neighbors or relatives, and their agreements tend to be largely self-enforcing. Because they undertake repeated transactions and want to do so in future, they are usually keen on maintaining a reputation of trustworthiness. Under such conditions, short term “spot” markets for water can emerge relatively easily.

For longer-term or permanent water transfers it is harder to create credible commitments. If water rights are not clearly recognized by local communities and

government, and accepted as transferable, then it is difficult to be sure that an agreement will be fulfilled. In the event of disputes, courts may be unwilling to enforce agreements, unless a suitable institutional framework exists for transferable water rights.

Secure water rights combined with trading of these rights in some parts of Chile, for example, has fostered efficient use of water, facilitated a shift to high-value crops, which use less water per unit of output, and induced improved efficiency in urban water and sewage services. Moreover, efficient water use has reduced the huge construction and O&M subsidies to better-off farmers and urban consumers, and has freed up resources for targeted subsidies to poor consumers and small-scale farmers (Gazmuri Schleyer and Rosegrant 1996). However, in some cases when reservoir operators changed the timing of river flows and reduced water availability to farmers downstream, affected farmers were unable to get courts to restore the access to water they had previously enjoyed. Speculative acquisition of rights reduced water availability for current use, and may have fostered monopolistic practices in hydropower production. Dealing with such problems requires an adequate and effective regulatory framework for water markets (Bauer 1997, 1998).

An often-cited advantage of transferable water rights and water markets is that voluntary transactions should direct water to economically more valuable uses. This can lead to increased efficiency of water use, and create incentives for existing users to conserve water, because they can gain by selling or lending the surplus to others. But the nature of water makes it different from other commodities, thereby complicating market transactions. Water use does not affect only the two parties engaging in the transaction: others are also often affected by changes in the time and place where water is used. Thus for water markets to work well such third parties may need access to mechanisms that inform them about changes that might affect them, and the opportunity to object to or put conditions on transactions and possibly to receive adequate compensation if they are harmed by the water transfers.

Figure 1 Three Types of Water Allocation Institutions

	1. User self-governance	2. Agency allocation	3. Water markets
Key characteristics	<ul style="list-style-type: none"> • Collective decision-making among water users, e.g. an irrigators' association 	<ul style="list-style-type: none"> • Bureaucratic agency controls directly 	<ul style="list-style-type: none"> • Trading among users, temporary or permanent transfers
Advantages	<ul style="list-style-type: none"> • Legitimacy, • Local knowledge and experience • Adaptable 	<ul style="list-style-type: none"> • Standard procedures • Technical expertise 	<ul style="list-style-type: none"> • Voluntary • Prices reveal opportunity costs for users
Disadvantages	<ul style="list-style-type: none"> • More difficult if users do not know each other and lack existing relationships 	<ul style="list-style-type: none"> • Information intensive • May be difficult to customize to particular conditions 	<ul style="list-style-type: none"> • Risk of neglecting impacts on third parties • If transactions rare or complex, then hard to establish prices

4. Combinations

As water flows through a basin it may come under the control of a whole range of allocation institutions, changing from private property to common property to agency-controlled state property to open access public property (Meinzen-Dick 2002). Government control over water abstraction often concentrates on major intakes and relies on local institutions for more detailed distribution and conflict management. From the point of view of reducing transaction costs of time, effort and resources required to manage water, such a combination of institutions may be far less costly than reliance on a single type of institution (Guillet 1998). The typical situation is not one of a single, homogenous and consistent regulatory regime, but instead diverse, overlapping sets of rules, through which water flows.

Claims to water can be based on many sources, including community norms, religious values, historic practices, agency regulations, and laws enacted by different levels of government. Rather than a single uniform set of principles and rules, a variety of institutions come into play. Research on legal pluralism has pointed out not just the continuing strength of “local” or “customary” law, but how various legal orders, such as customary law, religious law, and project law, continue to evolve and interact (Griffiths 1986, Merry 1988, F. and K. von Benda-Beckmann and Spiertz 1996, 1997; Spiertz 2000). Rather than a simple duality of state law and local law, there is often a complex interaction that might include local norms and practices, village and district governments, religious values and leaders and other concepts at the local level. Actions of national and state or provincial governments may be shaped through the procedures of projects, legislation, administrative procedures, and court rulings. Each of these legal orders constitutes a framework for allocating water. Different frameworks may be mutually supporting, or in conflict. Water allocation institutions do not stand alone, but may be supported by other institutions such as courts, legislative bodies and administrative agencies.

Many analysts see these overlapping definitions of property rights as inherently problematic, and indeed, it can create confusion, and even exacerbate conflict. However, it also creates space for individuals to maneuver. Claimants and disputants can employ multiple strategies, going to different forums and making various arguments that might favor their claims. The interaction of different kinds of rights and existence of multiple legitimizing frameworks allows for rights to evolve in response to changing pressures on the resource and on society (Meinzen-Dick and Pradhan 2002). Furthermore, neglect of customary rights in the formulation of water law and policies can cause serious opposition from those whose rights are ignored.

Discussions of the interaction between state and local property institutions often perceive these as completely separate systems. However, deeper research often reveals that “local” institutions were established or heavily influenced by external factors such as colonial legal regimes or earlier kingdoms. Similarly water resources that appear to be fully under state control, such as government managed irrigation systems, often turn out to overlay pre-existing local irrigation systems. Local institutions often handle much of internal water allocation, with conflicts usually resolved through community processes rather than bureaucratic or legal procedures. As water is increasingly contested, however, local institutions come into increasing contact with others, bringing different ideas, opportunities and dangers.

5. Transformations

Rules and practices regulating access to water are dynamic. Often they provide principles, guidelines, and precedents, but their application to specific cases is open to further debate and interpretation, which may not occur until forced by a particular problem. Changes in water scarcity shift the value of water to different users, reshaping the incentives to obtain more water or defend current access. New opportunities may arise where water can be far more productive, but require shifting water from some current use. If there is no flexibility in water allocation, obtaining new supplies can be extremely expensive, e.g. requiring building storage reservoirs or diverting water from other basins.

As water becomes more contested, asymmetries between stakeholders may also become more pronounced. Typically urban and industrial users have advantages over rural and agricultural users, including wealth, power, and knowledge of bureaucratic procedures. They also are more easily organized than the large number of dispersed users in rural areas, and therefore may be more effective in defending their interests. Urban and industrial users are usually willing to pay substantially higher prices than the monetary value of water in agricultural use, but they also demand a higher quality of service and reliability. However existing users, such as irrigators, may have their own advantages, including the legitimacy that comes from long standing use, political appeal of sustaining farming lifestyles, and the difficulty for outsiders to control a large number of widely dispersed users.

Water rights do change, evolve and adapt. There is no single or inevitable pathway for change in water allocation institutions. There has been the tendency for agencies to take on increasing roles in water allocation. However this may be due simply to lack of adequate consideration of the existence or possibility of self-governance among users. Markets may play a valuable role in facilitating the voluntary transfer of water to higher value uses, but this still requires a suitable enabling framework on law and infrastructure, as well as protection against negative third party effects. If transactions are too scarce then markets may not develop even when enabling conditions are in place.

Changes in water rights institutions are sometimes discussed as if they will be carefully planned and carried out only after a process of thorough deliberation. In practice, droughts and other crises may precipitate urgent actions which deny some rights and strengthen others, carried out under emergency pressure with relatively little discussion or assessment of alternatives. Ideas formulated in calmer circumstances may lie in wait and then be taken up when there is political attention and urgency.

Protection of instream flows and aquatic habitats often emerges from a process of environmental debate and regulation very different from the irrigation and municipal water supply interests that have tended to predominate in the water sector, bringing new ideas and legal principles into the process of allocating water. Protection of endangered species and wetlands is based on different objectives and criteria than those used to determine volumes of water to be abstracted for use in irrigation or urban water supply. Concern about the environment and public health, reinforced by better technology for detecting low levels of pollutants, has brought increased attention to water quality, and the challenges of controlling point and non-point sources of pollution. Changes in the prevailing balance of interests in the water sector and in the broader political economy may open new opportunities for change that had earlier been excluded or not even considered.

V. IMPROVING WATER ALLOCATION INSTITUTIONS

There are many ways to go about enhancing water allocation institutions. Done well, changes may help to make water use more efficient, equitable and environmentally sound. However there are risks of disrupting existing institutions, exacerbating inequities, or creating perverse incentives that perpetuate or worsen problems, despite any good intentions that may be behind reforms. This section reviews some of the means available for changing water rights institutions, pointing out some of the opportunities and risks associated with each.

Forming forums. Establishing forums or platforms that bring together representatives of water users may be a more urgent and effective approach to addressing water allocation problems than rushing to strengthen administrative procedures for formalizing water rights. Participatory approaches tend to produce results much more easily acceptable by those involved. Involving stakeholders also helps to better prioritize efforts and identify measures that will be most effective in solving real problems in specific locations. Forums may include basin parliaments with authority to determine budgets and policy, water courts or other bodies with quasi-judicial authority to deal with disputes, advisory committees, and federations of water user organizations, as well as more informal networks of individuals and organizations.

The selection of representatives can be an issue, but usually activities can be carried out though transparent, public processes open to any individuals and groups who are sufficiently interested to take part, rather than artificially restricting or excluding participants. It may be important to be pro-active about inviting involvement of those who may live in more isolated areas, be poorer, less well-educated or for other reasons not be as likely to take part even if they could be significantly affected by changes in water allocation institutions. In some cases forums can be made more democratic and inclusive by means of additional outreach to share information, and by supporting facilitators who can aid particular groups of stakeholders in understanding issues and preparing to take part in a participatory process.

In order for forums to be effective it may be important that public involvement goes beyond just dissemination of information through the meeting and formal public hearings. A variety of methodologies are available to use through which committees, citizen panels, and other groups can learn about technical aspects of issues, consider various views and goals, assess policy options and scenarios and formulate recommendations for how to deal with various problems. These can help to examine issues much more deeply and thoroughly.

However if forums do not have meaningful tasks, or lack a genuine opportunity to influence water management, then they may be a waste of time for those involved. Furthermore, not everyone wants to participate. Those who do participate usually are already busy and face many competing demands on their time, so forums and other participatory processes need to be efficient in terms of time, information and other resources. It is important to respect the views of those who may choose not to take part in a particular process, while still finding ways for those who are interested to proceed.

It is worth remembering that government does not have a monopoly on forming forums to address problems in water allocation. User groups, non-government organizations and others outside of government can also take initiatives. They may be able to solve problems themselves, or offer recommendations for further

discussion and consideration in cooperation with others. Groups may be organized on the basis of a particular river basin or sub-basin. In some cases a coalition or alliance of existing civic and community groups may provide an effective structure for addressing shared concerns.

Recognizing rights. A variety of approaches may be taken to formalizing water rights. A gradual approach allowing clarification of rights in response to specific problems and local conditions can provide an enabling framework for improving basin water management.

Improving water rights is sometimes taken to mean that there must be immediate and comprehensive registration in a central cadastre. However this is far from the only—or even the best possibility. Imposing comprehensive registration is likely to be difficult and costly. It risks disrupting existing arrangements, without yielding adequate benefits. Even in the case of land rights, which are easier to establish than water rights, cadastres have proven very expensive. Moreover, even after the cadastre is established, land owners often do not update the records, especially where state structures are less effective than community institutions in effectively backing types of rights over the resource. Other approaches may do more to protect existing users, and make it easier and less costly to improve water resource management.

Implicit rights. Many new moves to “establish” water rights assume a blank slate, in which the state holds all water rights, and can allocate those rights as it wants. But in almost all cases where water has been in use, existing institutions constitute a system of implicit water rights, based on the ways water is currently being withdrawn, and steps taken or not taken to control withdrawals, particularly during periods of shortage. This is not to say such an existing system is ideal, equitable or consistent, but that it is an important point of reference and the empirical starting point. Rather than assuming that a blank slate exists, or that water allocations can easily be revised, it should be recognized that a system of implicit water rights is already in place. Current users will usually view their accustomed use as legitimate, and be inclined to challenge anything that they would see as infringing on their rights.

The current system, including its implicit water rights, possesses the institutional inertia that comes from familiarity and acceptance in current practice. It embodies considerable knowledge about how water is currently distributed and the means available for controlling allocations. This knowledge is not limited to written rules and regulations and ideas about how water is controlled, but includes the tacit knowledge embedded in the physical design of intakes and outlets, and in the evolution of practices that have been found to be workable. This implicit system can be seen as a valuable resource, built on lessons from experience and integrated into local understanding. Where ‘implicit knowledge’ is the key, it is not easily transferable, so there is a comparative advantage for local compared to state control and decision making. Appropriately using and building on the current allocation institutions can make an invaluable contribution to the efficiency and effectiveness of any efforts to improve water allocation institutions.

Acknowledging rights. A crucial first step may be the one of acknowledging existing rights. This does not necessarily require that current rights be registered or formally recorded. Nor does it mean that they must be accepted completely or uncritically, but that they are not simply ignored, disregarded or dismissed as illegal. In common law legal systems, recognition of the validity of such existing practices may be a fairly straightforward process. Civil law can also provide ways to recognize customary practices. One example is the way in which the Japanese River Law

“deems” that agencies treat existing users as if they have water rights, without requiring any separate process of registration or formalization (Sanbongi 2001).

Adjusting characteristics of water rights. The bundle of rights authorized by association by-laws, an agency-issued permit, or a contractual agreement can be adjusted. Quantity, timing, duration, transferability, quality and other characteristics may be changed, or made explicit where they were previously ambiguous or unspecified. If such changes are to constitute improvements, and not just an arbitrary imposition of external models that may be inappropriate, ineffective and even counterproductive, then it will be important to adapt the definition and characteristics of rights in accordance with the history, priorities and values of a particular country, basin and set of water users. Such changes may have major implications for equity, efficiency and other goals, particularly in terms of how they affect the entitlements of existing users and potential access of new water users. Technical analysis and legal drafting can support, but should not neglect or replace, consultation among stakeholders and democratic decision-making.

Integrating water rights frameworks. Where local customs and practice and national constitutions and laws do operate on different principles and procedures, then it may be important to consider ways to improve integration, resolving or reducing conflicts while still trying to maintain the advantages of different institutional frameworks. This need not mean forcing local institutions to fit national mandates, but can also occur through revising laws and regulations, and by means of practical accommodations in how laws are implemented.

Formal recognition of existing rights does pose potential problems. These include the ways in which any process of formalization may, deliberately or inadvertently, transform rights; questions about ratifying existing inequities in who gets water (and differing views and what is and is not equitable); and risks of the recognition process being manipulated and abused. These are linked to the capacity of current governance institutions. Problems can be reduced by transparent, accessible administration in a way that is open to the participation of all users, including those who may be poor, illiterate, located in remote areas or otherwise disadvantaged in dealing with bureaucratic procedures.

As with land titling and land reform, there is much scope for debate about the feasibility for promoting more equitable distribution, and how to best pursue equity under such circumstances. A commonly cited example is the Sukhomajri irrigation system in India, where rights to water under a newly constructed system were assigned to all village members, including landless households, based on labor investment in creating the system (Joshi and Seckler 1982). Rather than simply assigning rights in accordance with landholding, replicating existing patterns of unequal resource tenure, rights were pro-actively allocated in a way intended to increase the assets of the poor. At a minimum this shows the scope for creative alternatives in how rights, particularly to newly developed water supplies, could be allocated.

A more subtle issue is that any formalization, even a minimalist recognition, may transform rights, for example if it individualizes rights that have been held by kin groups or other collective entities. Or authority to resolve disputes may shift to local governments for matters that had previously been dealt with through inheritance systems framed by local customs, religious values or other institutions that may differ from formal law in terms of both concepts and the forums and processes used for dealing with conflicts.

Gradual and selective licensing. In clarifying government frameworks for water rights, the existing system of implicit rights deserves due attention. Means of acknowledging existing rights, without requiring immediate or comprehensive registration, can be explored. In some cases legal requirements for licensing may exist, but may only be implemented for some uses and users. Municipal and industrial users may have to obtain licenses, but not agricultural users. Large-scale uses may require licenses, but not small-scale users. Rather than assuming that comprehensive formal registration is necessary, it may be worthwhile to assess the potential consequences of formalizing rights in the form of licenses or other instruments, considering when and where it may be worth promoting more thorough registration or licensing of water use. This can help not only to economize scarce budgets and focus government efforts on those problems, which deserve highest priority, but also help avoid activities that disrupt existing water allocation arrangements that may still be functioning relatively effectively.

Inventories. Mapping existing water uses, for example the irrigation systems along a stream, may sometimes be seen primarily as a technical matter. Rather than assuming that inventories can only be done by a government agency, it is worth noting that users themselves may initiate and conduct inventories. For example an inventory could be compiled by irrigators along a river reach or within a particular sub-basin. Inventories may be important to show the extent of current use, and hence the limits on new rights that can be issued without impairing existing uses. In many countries, inventories have helped to demonstrate that farmer-managed irrigation systems cover areas as large or larger than those served by government-built and managed irrigation systems, important information in terms of understanding how water is currently used. However, inventories have major implications in terms of which users and uses are recognized by or “visible” to the government. Inventories are thus not only a technical procedure, but should be designed with attention to transparency, accountability, accessibility and other characteristics that may affect not just their accuracy, but how they are perceived and used, and their consequences for the water rights of existing users and potential future water users.

Education and training. Educational activities are of course among the measures available for improving water allocation institutions. This may include communications through meetings, brochures, newspapers, radio, television and other media. Educational activities may spread information about current rules and regulations, or promote awareness of problems that need further attention. Farmer-to-farmer exchange and other forms of peer learning may not just help impart skills and knowledge in more easily understood and appropriate ways, but also provide valuable ways to share experience and facilitate networking among water users.

Planning, modeling and scenarios. Formulating plans can provide a good way to bring together available technical information and use expert analysis to assist in assessing problems and exploring potential solutions. A variety of methods are available for analyzing problems such as those in water resource management, where the same resource is used for multiple purposes by many different stakeholders. Physical models and computer models represent the physical relationships involved, for example the linkages between rainfall, flows into rivers and aquifers, and usage upstream with water availability downstream. Models may also integrate economic information about costs and benefits of water in various uses (Rosegrant et al. 2000). Scenarios can be used to present management alternatives, such as changing how water rights are allocated and allowing greater transferability of rights.

There are important questions to be considered about how planning and modeling are done. Who will be involved? Who defines the problems to be considered? What resources are available? What time frame will be analyzed? How will issues such as environmental impacts and water quality be integrated? There are many options available. Planning can take up much time and expense only to be ignored. Planning that is treated as a narrowly technical exercise and does not involve stakeholders is likely to be ignored, or meet with resistance and rejection.

Strengthening agencies. Much thinking about agencies for river basin management is still dominated by ideas about the Tennessee Valley Authority, set up in the United States in the 1930s. A large government-established bureaucracy carried out construction and management, focused on reservoir construction and operation, operating in a top-down technocratic way. While that is one option, and many attempts have been made to repeat it in various parts of the world (with limited success), there are many other ways in which specialized agencies may play a role in governing basin water resources, including the allocation and reallocation of water rights.

Agencies may act as specialized technical advisors. They may work as a technical secretariat, supporting a body of stakeholder representatives, as with French water “parliaments.” An agency may have a narrow mandate focused on regulatory activities, or may also take on broader resource management roles. Management activities need not include construction, and various agencies may deal with specific issues, rather than having control concentrated in a single agency.

There is a risk of uncritically, and wastefully, copying examples of how water is managed, including the administration of water rights, in wealthy westernized countries, whereas tropical countries usually have very different management priorities (Shah et al. 2001). Safeguarding and strengthening water management on rainfed lands and microwatersheds in upstream areas may do far more to protect livelihoods and prevent poverty than large projects downstream. Bigger may not be better, but instead bring diseconomies of scale that block organizational effectiveness. Unrealistic assumptions about the technical feasibility of new management methods may mean that capabilities of basin organizations fall far short of expectations.

Pathways for change. As discussed above, there are a variety of means available for improving water allocation institutions. These can be chosen and applied in accordance with particular circumstances. However it is crucial to consider the process that will be used. In many cases what is needed is not just refining technical analysis or fine-tuning of regulations. Dealing with new problems, or issues where efforts so far have been ineffective, may require not just involving more stakeholders but crafting new institutions, in the form of regulations, organizations and other institutions, that have the scope, authority, capability and other characteristics needed to deal with the relevant problems.

VI. CONCLUSIONS

For many reasons there is increasing agreement on the need for greater attention to the role of water rights in water resources management. Safeguarding and improving the access of poor people to water is vital for their lives and livelihoods. Clarity and security about water availability is important to poor farmers and others who want to make investments that depend on reliable water supplies. Flows of water for aquatic

environments need to be assured in order to sustain habitats and species, as well as being important for recreation, water quality and other goals.

Various types of institutional arrangements may be used to regulate socially accepted claims to water, including community-based self-governance, agency administration and water markets. In practice, different types of institutions are often combined, and a suitable combination may be more efficient and workable than imposing a single type of allocation. Attempts to improve water allocation institutions can be more effective if they are based on an understanding of all existing institutions and the options available for change. Different river basins have different physical and social conditions, and usually different problems and priorities for improvement. There is no single recipe for improving water rights, but instead a range of options from which to choose.

Methods for improving water rights and water allocation institutions include forming forums, clarifying water rights, planning and modeling techniques, and capacity building for specialized management agencies. These can be used in various sequences and combinations, depending on local problems and priorities, trying to develop frameworks for water rights that draw optimally on the strengths of various water allocation institutions.

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