Reconstituting Water Rights:
Pathways for Polycentric Praxis

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Abstract: Contemporary conflicts about water markets, vulnerability of rural rights to water, river basin organizations, privatization of water utilities, and water as a human right concern not only specific revisions to water policies, laws, and regulations, but disputes about how rules will be made. They raise questions about who takes part, the scope of rulemaking, concepts for framing discourse, decision procedures, and the authority of multiple institutions engaged in revising and enforcing rules regulating water resources. The difficulty of resolving such constitutional-level choices explains some of the polarization, misunderstanding, and frustration apparent in efforts to reform water governance. Increased application of polycentric principles could open more pathways for solving collective action problems and expand options for the survival, creation, and transformation of common property in water.

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INTRODUCTION

Why are efforts to enact water laws based on an international expert consensus of best practices challenged by social movements asserting dangers of immoral commoditization and surrender of sovereignty? Why do rural rights to water remain so poorly defended in many places? Why is water management not arranged according to the logical links among those sharing water within the same basin? Why is the efficiency of private enterprise difficult to harness for delivering urban water supplies? Why is a human right to water not acknowledged universally, and water not provided as an essential human right? Across a range of problems in water governance, there is a pattern of conflict, frustration, and continuing institutional failure.

This paper argues that collective action problems in reconstituting rights to water lie at the heart of many contemporary disputes over water governance. Conflicts over "rules for making rules" influence efforts to safeguard local resource rights, supply basic needs, assure environmental water flows, facilitate efficient reallocation, or find integrated solutions to water conflicts in river basins. These contests concern not just adjustments to different attributes of rights and the interaction of multiple units of governance, but also the intersection of multiple legal and conceptual frameworks within which rights are devised and revised. The ways in which rights to water are asserted and defended are already polycentric and legally plural. A better understanding of the how water rights are constituted and reconstituted can clarify current conflicts concerning water governance and expand options for solving problems.

The first section of this paper reviews a range of conflicts over reforming rights to water, including deadlocked water law revisions, dispossession of customary water rights, river basin disorganization, disputed concessions for urban water supply, and debates about water as a human right. The second section places changes in water allocation institutions into the context of constitutional, collective choice, and operational levels of collective action; multiple dimensions of resource rights; polycentric governance; and legal pluralism in norms and rules. The third section highlights constitutional-level issues of participation, forums, and decision rules in reconstituting rules for making rules about who gets water. The fourth section contrasts the institutional processes for reconstituting rulemaking with those of collective choices in clarifying rights and regulating transfers of rights. The fifth section outlines polycentric alternatives for governance of rights to water, and the conclusions summarize implications for polycentric praxis.

STORMY WATERS

Water Law Stalemates

In a number of countries including Sri Lanka, Thailand, Peru, and Ecuador, efforts to enact new water laws that would clarify water rights, including the potential for tradable water rights, have evoked intense opposition. Social movements, non-government organizations, and other opponents have blocked passage of proposed new water laws. However, such groups have had less success in obtaining institutional changes that would address their concerns such as insecurity of rural people's rights to water and inadequate provision of water for poor people in

cities. In other countries, water laws have been passed, but without implementation that would secure rights established by such laws.

In Sri Lanka, successive attempts to enact new water laws failed to overcome opponents who raised fears of harm to farmers and water falling into the hands of unaccountable foreign corporations.[1] In Thailand, despite seeming consensus within the elite community of water experts and water management agencies, little progress has been made in enacting a draft water law, which has been contested by nongovernment organizations, academics, and other critics. In Peru and Ecuador, attempts to pass water laws modeled on Chile's Water Code failed in the face of popular protests.[2] However, in all these cases, the result seems to have been to perpetuate existing water institutions that still leave rural water rights vulnerable, poor urban residents lacking good water services, and formal authority over water allocation concentrated in bureaucracies with few opportunities for stakeholders to participate in decisions.

Rural Dispossession

In many countries, water rights implicit in existing patterns of water allocation remain insecure, vulnerable to be lost to those with advantages of upstream location or superior economic and political power. A major criticism of water law reforms and other proposals for tradable water rights has been that formalization of transferable water rights risks leading to rural people losing access to water vital to their livelihoods, and water coming under the control of powerful corporations. Reforms are feared to be a means for privatization and commoditization of water in ways that would dispossess existing water users. While aiming to strengthen the power of those holding formal rights, reforms typically offer few safeguards for the access of rural water users. This raises fears that trends by which water use is taken from rural communities with little or no compensation would be made worse, not better. Such conflicts occur in contexts where growing cities such as Bangkok, Jakarta, and Beijing reach out to secure water from aquifers, reservoirs, and nearby (or distant) river basins. In the western U.S., the ways in which the city of Los Angeles acquired of water from the Owens Valley in the early twentieth century, with disputed prices for compensation, protracted negotiations, dynamited aqueducts, and ecological damage, have cast a long shadow across subsequent debates about how cities take water from farmers.[3]

River Basin Disorganization

A central concept in contemporary ideas of integrated water resources management (IWRM) is the need for organization in accordance with the "natural" units of river basins (also discussed in terms of watersheds and catchments). Administrative jurisdictions such as provinces are criticized as both too big and too small for water management, individually failing to encompass the basins within which water is shared, while too preoccupied with a multitude of other tasks to pay adequate attention to problems in water management. River basin organizations (RBOs) are often proposed as a solution, agencies to manage basin water resources.[4] Others emphasize the development of participatory forums that bring together representatives of stakeholders to discuss ways of improving basin management.[5]

Much thinking about river basin management has been shaped by the example of the Tennessee Valley Administration (TVA) in the United States of America, building and operating a series of dams and hydropower plants with a river basin. The TVA example inspired other dam construction and management authorities, such as the

Table 1. Constitutional-level conflicts in water governance

- Stalemated water laws
- Rural dispossession
- River basin disorganization
- Contested concessions
- Human right to water

Mahaweli Authority in Sri Lanka, and the Jatiluhur Authority (now Perum Jasa Tirta II) in West Java, Indonesia. More recently, the Murray-Darling River Basin Commission in Australia has been a prominent example of reform in basin management. The Network of Asian River Basin Organizations (NARBO) supported by the Asian Development Bank is one illustration of the variety of agencies currently engaged in trying to strengthen river basin management. In some cases, such authorities have made some significant achievements, for example the role of China's Yellow River Basin Commission in regulating allocation of water among competing jurisdictions and restoring year-round flows to the sea. However, in many cases, river basin agencies have either not been established or their accomplishments have fallen far short of resolving the problems they were expected to address.

Contested Concessions

Many poor people in growing cities still lack access to secure and affordable water supplies, while paying higher prices for water than wealthier residents. Controversy has raged about contracts assigning rights to private companies to manage urban water supply systems. Proponents have argued that they would bring efficient and expanded services. Critics have charged that these are deceptive promises used to cloak the creation of exploitative monopolies. Transfer of management rights to private companies for urban water supply became a major battleground in debates about "globalization." Cochabamba, Bolivia is probably the most noted example of opposition to an urban water supply concession, where popular protests caused cancellation of the concession and led to the rise of new political leadership. Concessions in other cities such as Buenos Aires, Manila, and Jakarta have also been the subject of dispute, including public protest, legal maneuvering, renegotiation, and cancellation. However, as with the water law reforms mentioned above, progress in implementing alternative approaches to improve water delivery has been less evident.

A Human Right to Water

International human rights law offers foundations for acknowledging a human right to water, as a necessity for sustaining life and a corollary to other social and economic rights.[6] However, by comparison with other internationally-accepted human rights, the legal basis for a human right to water is less clearly established, and less widely acknowledged. Even if such a right becomes more widely recognized and accepted, there are important questions about what could and should be done to put a right into practice. A human right to water was a point of contention at the March 2006 World Water Forum in Mexico, in which the Ministerial Conference failed to reach agreement on proposals to endorse a human right to water as part of the Ministerial Declaration.[7] The process of legal interpretation and approaches pursued by advocates of a human right to water means that the debate has often been framed less in terms of the advantages and disadvantages of such a right and how it

Table 2 Levels of collective action

Constitutional	Rules for making rules	Who decides what, how
Collective-choice	Rulemaking	Devising and revising laws (regulations, customs, etc.)
Operational	Rules-in-use	Practice: acting, including monitoring, disputing, etc.

Sources: Ostrom 1990, 2005

could realized in practice. Instead much of the emphasis has been on a legal (and somewhat ontological) discourse about whether such a right does or does not already exist in international law. Debate about implementation similarly often seems to center on whether or not states have a duty to fulfill a human right to water, and how they might be compelled to carry out their duty.

MAKING RIGHTS

The five issues outlined above share a common pattern of engaging wider debates, not simply about passing a particular bill, but about how rights to water will be determined. They raise questions about "the rules for making rules" and the relative importance of national laws and agencies in contrast to other institutional arrangements for water resource allocation. Proposed reforms often ignore, deny, and threaten to disrupt the diversity of other institutions that shape who gets water, including the multiple dimensions of rights; the role of local customs, and other normative orders; and the options for organizing governance at multiple scales.

Initiatives to revise laws, reassign rights, erect new organizations, issue concessions, and recognize or ignore rights to water engage a broad a range of ideas and interests. In the face of problems of water management, there are more choices than state-led imposition of new rules to uniformly strengthen all dimensions of property rights in water, erasing or overriding the other social institutions that govern who gets water. This section briefly reviews some of the conceptual frameworks that can help understand the ways in which rules about water rights are made.

Rules for Making Rules

Problems in reforming water rights are not simply a matter of revising rules in established forums, but instead confront constitutional challenges of water governance, of how rules will be made: who will take part, what institutions will be involved, and what procedures will be used for making decisions. The Institutional Analysis and Design (IAD) framework distinguishes three levels of collective action, as shown in Table 2.[8] The constitutional level concerns the rules for making rules: who participates in rulemaking, how decisions are made, and what is governed by rules. The collective choice level requires deciding what the rules will be, in forms ranging from agreements among neighbors to formal statutes. At an operational level, rules are put into practice, in ways that involve not only formal rules stipulating what is supposed to happen, but a contested complexity of rules-in-use. Some conflicts may be easily resolved at an operational level, while others require collective choices to modify rules, such as laws and regulations. However, in the

cases that concern this paper, issues rise above the collective choice and operational levels, to also engage constitutional-level questions of the "rules for making rules." Furthermore, the context is not a neutral, technical matter of simply applying a standard model of "best practices" but instead engages the politics of who may agree to or oppose new arrangements to choosing rules.

The difference between constitutional and collective choice levels of collective action is an analytical distinction. In practice, new governance arrangements may be constituted through negotiating an agreement, even if this does not take the form of a formal constitution or charter. This may include arrangements such as agreements to settle court cases or compacts between governments.[9] If new governance arrangements are established as part of solving particular problems, then determination of who takes part in decisions, decision rules, and forums may be closely integrated into collective choices to agree on specific new rules and operational arrangements for monitoring and enforcement.[10] However, where this occurs not through routine operation of existing collective choice institutions but instead through the formation of new "rules for making rules," then addressing constitutional issues may be essential for success.[11] In particular, as discussed later in the paper, institutions may need to encompass a broader set of stakeholders, develop new forums for deliberation and conflict resolution, and use decision rules that require a much higher degree of consensus and legitimacy than would be needed for normal rule revision.

Multidimensional Rights

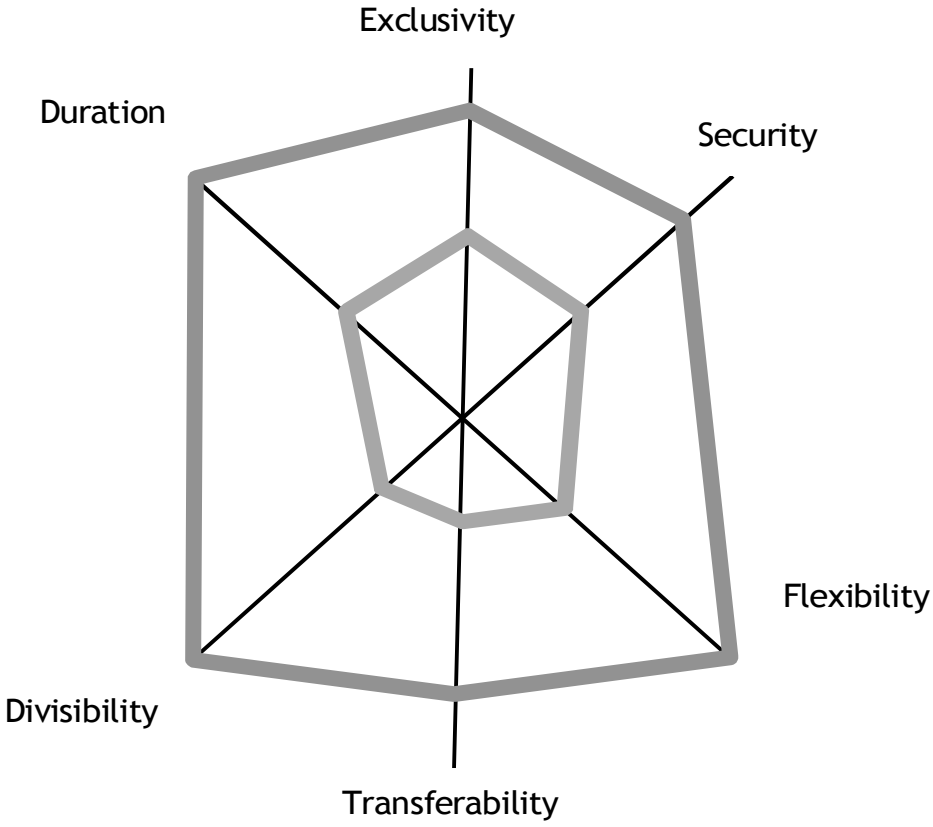
Rules that regulate who gets water influence many aspects of rights, including rights to use, exclude, manage and transfer control over resources.[12] Such rights may be bundled or divided in various ways among various individuals and organizations (including communities, corporations and government agencies). As illustrated in Table 3, separate rules may apply concerning who may enter a resource, who may withdraw resources, who manages the resource, who determines who may be excluded, and how rights to the resource may be transferred.

Table 3. Unbundling Rights

Access: the authority to enter a resource
Withdrawal: the authority to remove units from a resource
Management: the authority to make decisions about how the resource is to be used
Exclusion: the authority to decide who may enter the resource
Transfer: the authority to sell, lease, or bequeath the resource

Source: Schlager and Ostrom 1991

Figure 1. Six dimensions of rights



One influential approach to analyzing rights to natural resources categorizes six dimensions, including duration, exclusivity, security of title, flexibility, transferability and divisibility of rights, as illustrated in Figure 1.[13] Attributes of rights may be adjusted separately along various dimensions, specifying rights (and implicitly leaving other attributes of rights undefined). Thus, there are choices about which dimensions to change, for example the security of rights may be changed without necessarily changing transferability. Rules may reflect attempts to balance public and private interests. Rules may be more or less clear, but are inherently incomplete, leaving space for uncertainty, confusion, and contestation.[14] Rights may be held by water user associations, and other collective entities, rather than necessarily being atomized among individual farmers. Public interests, including basic needs and environmental protection, are commonly cited to justify limiting the exclusivity of water rights.

Table 4. A Property Rights Hierarchy

Multiple National Governments	Common Property
National Government	State Property
River Basin Commission	Delegated Authority
Subnational governments	State Property
Community or association	Common Property
Individual	Private Property

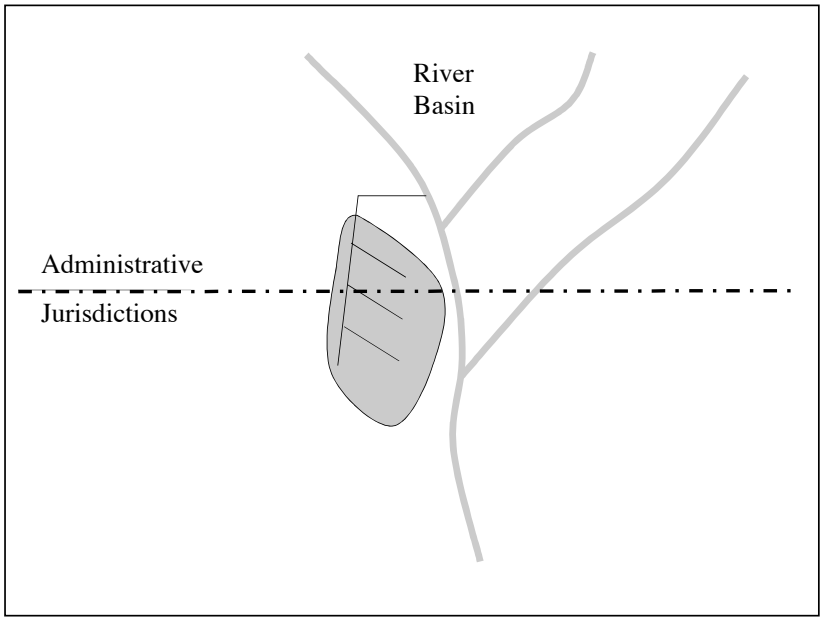
Source: Table adapted from Challen 1998, 2002. See also Yahua Wang, 2004.

At the local level, a community-based right to water may be secured by well-understood local rules that exclude infringement, and allow holders of rights to shift water between uses, and even to subdivide their rights and transfer them to other land and other users.[15] Rural water users may not feel their rights would be enhanced by passage or enforcement of national laws that only permit rights of limited duration, subordinated to downstream priorities for urban "drinking" water, restricted to particular uses, and with transfer allowed only for the entire right and subject to veto by government-agencies. Similarly, they may see little to gain from initiatives to quantify individual atomized rights, that would be invalid if not properly registered, contingent on paying fees to government, and only transferable through an official registry after expensive expert analysis. However, those holding locally-recognized rights often lack effective means to defend against water being taken by those upstream or those with greater political and economic power.

Polycentric Polities

Water rights in a basin, such as Australia's Murray-Darling or China's Yellow River, may involve different rights held by different governance units at different scales, as illustrated in Table 4.[16] Rights of an individual may be nested within an organization such as a water user association, which in turn may hold rights authorized by a state or provincial government, creating a hierarchical structure of rights. However, the boundaries of administrative jurisdictions may cross-cut those of river basins, so that irrigation systems, subbasins and basins cannot be neatly encapsulated within administrative units. Institutions organized along hydraulic boundaries, such as river basin commissions or irrigation districts, may be delegated authority (from above or below) to coordinate and control water use that crosses administrative jurisdictions.

Figure 2. River Basin and Administrative Jurisdictions



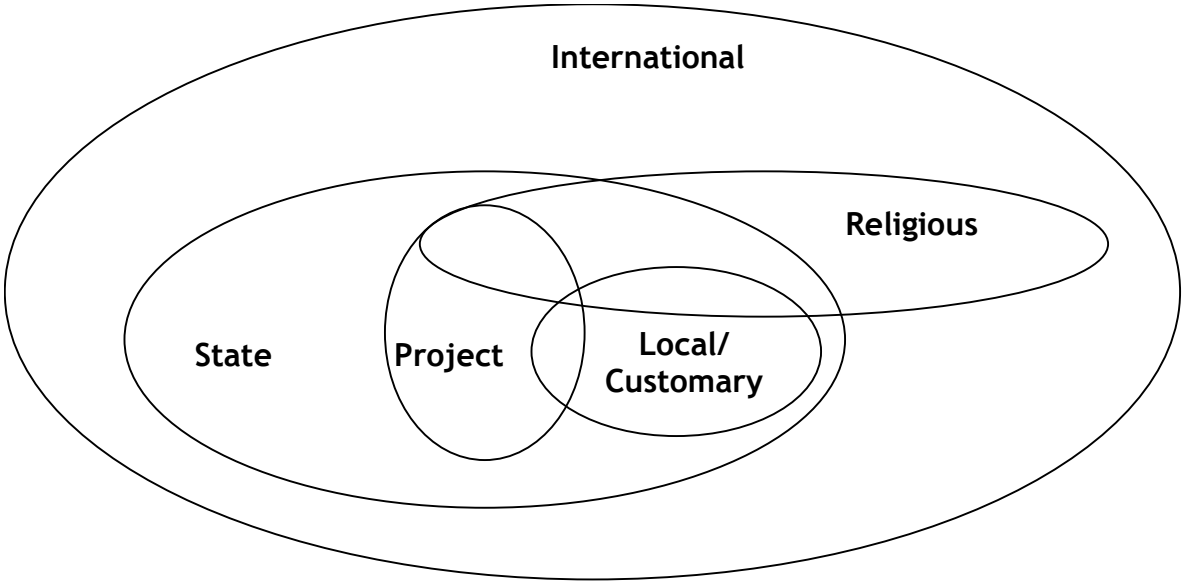
National and subnational governments may share or divide authority over matters such as water, allowing problems to be addressed at different levels in accordance with the distribution of problems and the relevant "publics" of interested stakeholders. Cooperative arrangements may be established involving multiple levels.[17] Smaller jurisdictions within states or provinces may organize provision of local public goods such as water, internally and through cooperation. Management organizations include not only administrative regions such as municipalities and counties, but also specialized entities such as irrigation districts and water utility corporations (publicly or privately owned). Within an institutionally rich environment, a local public economy can emerge as different organizations make choices about providing services themselves, contracting with other public or private producers of services, or shifting tasks to other government organizations.[18] Choice among alternative jurisdictions, by citizens and enterprises, can drive competition and differentiation. A system of polycentric polities offers multiple opportunities for participation in problem-solving.[19]

Overlapping Legalities

Water rights are shaped by multiple sources of order.[20] Communities may sanction customary practices, based on explicit or tacit rules about who is entitled to take water. Administrative jurisdictions may issue licenses or other formal documentation of rights, to individual users, groups, and other corporate entities (public or private). Water allocation among jurisdictions may be determined by mutual agreement, or imposed from a higher-level government. Religious concepts shape ideas and judgments about what needs deserve priority. Legal traditions, secular and religious (common law, civil law, cannon law, shariah, etc.) offer principles and procedures for defining rights and remedies. Assertion of a human right to water can be seen as an attempt to strengthen a global system of values.

Thus, water rights derive not only from multiple scales of government, but multiple sources of order that shape how rights are understood and enforced. Reluctance to resolve conflicts through national law may arise because courts are seen to be ineffectual, corruptible, or too costly in time and money. Disputants may

Figure 3. Overlapping Legal Orders Related to Water



Source: Rajendra Pradhan and Ruth Meinzen-Dick 2003

prefer the forum that offers them the most advantages. However, even if these constraints do not apply, legal proceedings may still be avoided if they employ concepts and principles that vary too sharply from community norms and practices.[21] In disputes, water users may act in multiple forums, invoking various principles to protect and enhance their rights to water.

Water rights are constituted through plural, polycentric processes for making and putting into practice rules regarding many aspects of who may use water. They involve far more than action by national governments to enact and enforce new laws. National initiatives to revise water laws, establish river basin organizations and issue water management concessions can often be seen as denying or weakening the role of other principles, rules, and forums. In simple terms, they may constitute a "power grab," an assertion of authority over other governance institutions. Those who are threatened by such changes, and their advocates, may challenge such changes, both directly in legislatures, and through a variety of other forums and means.

CONSTITUTIONAL QUESTIONS

Many attempts to reform water rights are best understood not just as matters of collective choice in crafting new rules, but instead are constitutional contests about who will take part, the scope of rules, and processes for crafting rules. This explains some of the intensity of opposition to proposals that may exclude some stakeholders from participation in revising laws and regulations, and opposition to rules that would shift decisionmaking authority over water allocation and conflict resolution. Contests over water rights play out in specific circumstances, which shape the available options and pathways for change. Nevertheless, some general issues can be identified in the constitutional-level questions of who takes part, what forums make rules, and how decisions are reached.

Table 5. Constitutional Questions

Who participates?	Which Forums?	What Decision Rules?
• Irrigators • Industries • Cities • NGOs • Legislators • Agencies	• Bureaucracies • Courts • Parliaments • Markets • River basin councils • International treaties	• Hierarchical command • Legal judgment • Legislative majority • Trade transaction • Negotiated consensus

Who Participates?

As water becomes scarce, the scope of interaction expands, creating an action arena that expands beyond localities. A key conflict pits existing users, mainly in agriculture, against the growing demands of industries and urban consumers. Urban water supply utilities seek out new supplies. Agencies that have grown through construction and management of irrigation system are interested in maintaining and expanding their budgets, staff, and authority. Environmental groups and other civil society organizations advocate public interests such as ecological sustainability, social equity, and efficient public expenditure. Government leaders and other policy entrepreneurs propose institutional changes. The growth in scope of competition over water often makes it difficult to solve problems unless institutional changes encompass a broader set of stakeholders, i.e., changes that reconstitute the set of actors engaged in water governance. The terms of discourse may also shift, paying attention to environment, rural poverty, rule of law, and other ideas in ways that that had not previously been as prominent.

Which Forums?

Attempts to reform water rights frequently involve not just collective choice within a single forum, but changes in forums and in the ways different forums are linked. Decisions might shift from agency hierarchies and informal networks of patronage and exchange toward more formal and public processes, changing the weight given to different objectives, and the opportunities available to influence and dispute decisions.

Acknowledging a human right to water, or entering into a concession contract with a foreign country, may bring new or much stronger linkages with international institutions, including bilateral and multilateral relationships and treaties (including those which may be enforceable through domestic law).

Particular reforms implicitly or explicitly seek to expand the authority of a particular forum, whether a national water agency, river basin organization, or corporate concessionaire, shifting where rules are made. Proposals in parliament may represent an attempt to encompass a broader set of interests in water governance, or a vehicle for agencies to strengthen control. Water markets and management concessions may be pursued in hopes of increasing general economic efficiency and prosperity or in pursuit of particular private advantages, and opposed based on convictions about who risks losing from changes.

How to Decide?

While issues of who is included or excluded may be relatively obvious, the implications of changes in how decisions are made may be somewhat more subtle. Increased formalization and stricter enforcement may disrupt informal arrangements that have been negotiated or tolerated in response to local circumstances.

Reforms in water rights potentially change how decisions are made, whether by command, vote, dialogue, adjudication, or private exchange. If existing institutions for water allocation do not enable water rights to be transferred, then establishment of tradable rights implies not just a change in particular rules, but in whether and how water reallocation may occur.

A major reason for concern about establishment of transferable water rights and water markets comes from the potential change in how decisions about reallocation are made, shifting into an impersonal, unfamiliar, and less controllable process within which rural communities and poor people may have little influence. Transferable water rights also depend on a clarity and security in defining water rights that greatly reduces the discretion that water agencies have usually enjoyed in controlling water management.

Establishment of river basin councils or other multistakeholder platforms could contribute to a shift from decisionmaking primarily through internal procedures of an agency hierarchy to a more open and negotiated process. It creates a strong tendency toward seeking decisionmaking through consensus, allowing participants to threaten to block agreements unless their concerns are satisfied. Even if committees are only advisory, and an agency formally retains the final authority to make decisions, others have more options to both lobby during formulation of decision and to threaten or actually take their protests to other forums. To the extent that such platforms operate by consensus rules, formally or informally, decision-making may be complicated and possibly held hostage to the demands of those most willing to hold out for their particular views.

A shift towards more public forums creates opportunities to pushing particular goals, such as environmental sustainability and social equity, that may not have received much explicit consideration in the past. Changes in water laws and other legislation bring not only the dynamics of majority voting and interaction between executive and legislature, but the complexities coalition building.

Attempts to change water rights are not confined to a single arena. Instead, actors face a choice of forums, and different decision rules. Particular reforms imply not just specific changes in how rights are defined, but in the extent to which water allocation may be governed by agency hierarchy, legal rulings, consensus among stakeholders, or outcomes of market transactions, or various mixtures of forums and decisionmaking procedures.

RECONSTITUTING RIGHTS

In reforming water rights, constitutional, collective choice, and operational levels of collective action involve distinct clusters of collective action problems. These differ in aspects such as the frequency of problem-solving, the distribution of shared and divergent interests, and roles of bureaucratic, legal, market, and self-governance institutions. Table 6 highlights constitutional, collective action, and operational issues that seem particularly influential for water rights reform to deal with key

Table 6. Reconstituting resource governance, resolving tenure, and regulating transfers

		1. Reconstituting Governance	2. Resolving Tenure	3. Regulating Transfers
a.	**Collective action level**	Constitutional: stakeholders and scope, rules for making rules	Collective choice: rulemaking, negotiate specific agreements	Operational: applying rules, practice
b.	**Activities**	Forming and reforming forums,	Clarify rights, and ensure recourse for conflict resolution	Implement mechanisms for transfers
c.	**Allocation institution**	User management: establishing participatory governance	Legislation and administration: define and recognize rights	Markets: trade/compensation
d.	**Institutional design problems**	Representation, decision costs, legitimacy	Crafting workable rules, commitment	Enforcement, principal-agent conflicts
e.	**Management challenges**	Authority: arranging jurisdiction	Control: setting limits, caps, licenses	Accounting for transfers & impacts (externalities)
f.	**Transaction frequency**	Low: ad hoc, complex negotiation	Medium: standardize framework for rights	Potentially enabling many exchanges
g.	**Performance criteria**	Encompassing multiple interests, sustainability	Equity in allocation, security, reliability	Efficiency: water productivity
h.	**Dispute resolution**	Who is at the table? Who can veto?	Choose rules and referees	Win-win agreements, safeguards, recourse
i.	**Common property and game theory**	Overuse: tragedy of commons, free riding (negative sum)	Allocation: coordination, assurance (zero sum)	Mutual gains: cooperation (positive sum)

Note: Issues are clustered to show relative emphasis, not as exclusive categories but as heuristic grouping of related topics.
Source: Adapted from Bruns, Ringler, and Meinzen-Dick 2005.

issues of reconstituting rulemaking, clarifying rules, and applying rules to regulate transfers.[22] It shows some of the ways in which constitutional-level collective problems of reconstituting water governance may differ from more specific collective choices to clarify water rights and allow or restrict rights to be shifted among different users. Table 7 offers an overview of constitutional-level issues in the five types of water governance conflicts discussed in this paper.

At the constitutional level, institutional design problems concern how representation is arranged, the transaction costs of creating new forums, reaching agreement on how rules will be made, and doing so in ways that will be accepted as

legitimate. This could create the foundation for collective choices to resolve rules about water tenure, which must deal with difficulties of measurement and monitoring in how rights will be specified. Applying new or modified rules about water rights in practice requires dealing with enforcement, and potential principal-agent conflicts concerning the interests of those tasked with applying rules.[23]

In many cases proposals for reform in water governance would increase the role of user forums, courts, or market exchanges, with administrative bureaucracies losing some of their current discretionary control and having their roles restricted to act as agents to secure rights. Constitutional-level problems can easily turn into turf battles, about which agencies or levels of government will have authority. Constitutional-level reforms are likely to be relatively infrequent, representing relatively unique and one-shot construction of coalitions. Major reforms in rules for making rules typically require not simply a narrow majority of support, but instead seek unanimity, consensus, or at least the preponderance of support from a large majority of stakeholders (and lack of such agreement may be a source of strenuous objections and failed reforms).

Analysis of environmental issues can lead to a conclusion that environmental improvements require not just minor modification of rules and their implementation, but substantial reforms in how public interests in environmental quality, and those advocating such interests, may be represented in decisionmaking. This may occur at the more detailed level such as requirements for environmental impact assessment or at the larger scale of reorganizing government ministries, authorizing basin organizations, and strengthening forms of legal accountability. While specific efforts to clarify water rights may focus on security and fairness of rights, and initiatives for transferable rights emphasize efficiency gains, constitutional-level changes may give more emphasis to more encompassing issues, such as social equity and environmental sustainability.

In terms of the literature on negotiation, constitutional-level questions focus on who has “a seat at the table” (or who refuses to sit at the table).[24] By contrast, clarification of tenure is mainly a matter of choosing the rules of the game and deciding who will act as referee. Transfers focus on the potential for win-win agreements.

The underlying structure of interests in constitutional choice also differs, particularly if a phased approach leads to separation between first seeking agreement on changes in how rules will be made, distinct from the detailed delineation of rights (possibly including specific forms of redistribution), and, (perhaps later), the further determination of more general ways in which transfers in rights may be permitted and regulated. Growth in basin-scale competition for water and weakness in water governance can lead to social dilemmas of open access and externalities, including wasteful hoarding, high costs for guarding and disputing, and environmental destruction, where everyone is made worse. Reducing such losses requires escaping from a negative-sum game, with individual benefits from increased security and reliability, and societal benefits from reducing damaging externalities. In many cases, this may not require the full institutional panoply of detailed water licensing, but instead simpler rules, such as for allocating shares, especially during periods of drought.[25]

Table 7. Constitutional Issues in Reconstituting Water Rights

	Water Law Stalemate	Rural Dispossession	River Basin Dis-organization	Contested Concessions	Human Right to Water
Activities Forming and reforming forums	Lobbying parliaments and executive	Lack of recognition and recourse to defend rights	RBOs agents or overlords? One forum, or many in sub-basins	Weakness of public regulation and accountability	Invoking international law, treaty obligations and national courts
Allocation institution User management: establishing participatory governance	Lack of consultation in drafting legislation	Strong agencies, user organizations weak or absent	What mix of administration, markets, and participation?	Users treated only as dependent consumers	Mandate for government to ensure provision
Institutional design problems Represen-tation, decision costs, legitimacy	NGOs and social movements act as advocates	Lack of federation and networking	How to have inclusive and accountable representation	Lack of user voice in issuing concessions. Suspicion of private monopoly	Establishing principle, primarily elite debate, potential legal standing for poor
Management challenges Authority: arranging jurisdiction	Bills empower agencies, not stakeholder forums	User self-organization crowded out by agency actions	Lack of power. Water agencies oppose rival organizations.	Feeling that government abdicating responsibilities	Clarifying duty of agencies
Transaction frequency Low: ad hoc, complex negotiation	Water Law revisions are rare (legislative agendas busy)	Gradual losses, big impacts during drought	Sporadic drought crises handled with ad hoc measures	Long concessions offer few chances to adjust	Aiming for one big victory
Performance criteria Encompassing multiple interests, sustainability	Bills reflect expert views, not public consensus	Rural interests disregarded	Lots of stakeholders, environmental impacts poorly represented	Fear that profit will override other interests	Agricultural water included or not?
Dispute resolution Who is at the table? Who can veto?	Media debate and public protest to influence legislature	Lack of forums for recourse or joint problem-solving	How to bring so many to the table? Consensus difficult.	Suspicion of collusion in tendering, weak or captured regulation	Debate among lawyers, advocates and officials. Legal and diplomatic decisions
Common property and game theory Overuse: tragedy of commons, free riding (negative sum)	Apparent gains for cities and industry, not for farmers	Externalities, burden of shortages and transfers imposed on rural users (and environment)	Highly asymmetric benefits and costs between upstream and downstream	Still natural monopoly after privatization	Equity for poor implies redistribution

However, clarifying rights requires dealing with the challenges of dividing a common-pool resource, where one person's gain is another's loss. This may represent a coordination game, where everyone can benefit as long as they can agree on a consistent set of actions, or an assurance game,[26] where everyone gains from

cooperation, as long as they have sufficient confidence that all or most others will act cooperatively. More commonly however, monitoring and enforcement of sanctions against those taking water beyond their rights is essential to change incentives. In the case of water flowing through a river basin, the potential for return flows and reuse means that water is not purely a rival or common-pool good. The hydraulic infrastructure of canals, pipes, and storage structures used to deliver water has the properties of a toll good, subject to strong economies of scale, feasible but sometimes difficult exclusion, and subject to congestion as use rises beyond a particular level of capacity.

Transferable rights offer the potential for mutual gains, win-win agreements, forming a positive-sum game where everyone might benefit.[27] However, if rights are not clearly specified and not well protected against infringement, then transfers may easily produce negative externalities. The potential gains from trade may also be large, leading to the potential for conflicts about how the benefits will be distributed. Unclear and unprotected water rights may also allow more powerful users to capture the gains from shifting water into higher-value use, with little or no compensation to those losing water. Conflicts about the distribution of benefits can encourage strategic and speculative behavior, and make it difficult or impossible to create coalitions to support institutional changes.[28] Reforms aimed at revising water rights and at the same time enabling transfers pose challenges of dealing with distributional conflicts, suggesting an alternative strategy of "rights first, transfers later, maybe" may provide a more politically feasible pathway for change.

PATHWAYS FOR PROBLEM-SOLVING

Many proposed solutions to problems in water governance imply greater centralized control.[29] National water laws typically assert state supremacy over water. They authorize agencies to allocate and reallocate water. River basin organizations are pursued as agencies to plan and enforce unified management. Concessions delegate concentrated management authority to private corporations. Provisions for transferable water rights may be perceived as a vehicle for reinforcing the power of private interests to monopolize control over water. Human rights confer duties on states to ensure that rights are fulfilled. However, centralizing solutions are not the only option. A preoccupation with centralized solutions may be responsible for some of the polarization and frustration affecting proposed institutional changes in water governance, as centralizing reforms generate opposition from a range of others with a stake in making rules about who gets water. Polycentric alternatives may offer more opportunities for forming successful coalitions to agree on changes in rules for making rules, including changes in who takes part, which forums are used, and how decisions are reached.

Rather than requiring uniform and centralized management, new rules about water may arise from efforts to solve relatively specific problems of drought, conflict, and shortage. Water laws can provide a framework that allows problem-solving at multiple scales. Water laws can provide means for recognizing rights and multiple forums for dealing with conflicts. Laws can acknowledge the rights of existing users, "deeming" them to be legally secure, without necessarily requiring formal registration.[30] Rights can confirm and protect existing patterns of use and even specific forms of redistribution, without requiring that rights must be easily or immediately transferable. The capacity of rural users to defend their water rights, individually and collectively, can be strengthened. Monitoring and control over the abstractions of competing users can be improved. Questions about whether and how

Table 8. Pathways for Polycentric Praxis

	Centralized	Polycentric
Water law stalemates	Impose formally-registered water rights	Craft coalitions to solve specific water conflicts
Water dispossession	Government protection for rural rights	Enhance user capacity to defend and negotiate rights
River basin disorganization	Control by river basin organizations	Enable self-organization at multiple scales
Disputed concessions	Improve water management monopolies, private or public	Encourage choice and cooperation in local public economies
Human rights to water	Obligate state to deliver water, with legal and political accountability	Stimulate co-production combining public and user provision

rights are generally transferable can be left for later, to be addressed within a context where rights are more secure and the interests of rural stakeholders better-represented in decisionmaking. Rights need not necessarily be atomized down to the level of individual users, but instead may be nested within communities, associations, and user-governed institutions for basin and sub-basin management, as well as within the legal contexts of different levels of government. The choice is not a simpler duality of centralization or highly-dispersed decentralization, but instead of multiple governance scales for resource management.

River basin organizations can be conceived as dominant authorities, able to override the conflicting interests of users and local jurisdictions and enforce a unified system of water allocation. Alternatively, they could be agents, with limited mandates to implement agreements made among multiple governments and other participants. They can be overseen and directed by water parliaments or boards composed of stakeholder representatives. They can be further constrained by obligations to respect water rights, and other accountability mechanisms of the rule of law. Rather than insisting that a single entity manage the entire basin, an enabling legal framework can allow self-organization at multiple scales within sub-basins, to craft suitable agreements and rules about how water will be managed.[31]

Concessions can convert public monopolies into private monopolies. Problems of monopoly provision are worsened if concession contracts are poorly designed, regulatory controls are weak or absent, and tendering and supervision of concessions vulnerable to collusion and corruption. Alternatively, reforms in water supply organizations can be crafted to clarify accountability and contestability in providing services, spread among various local governments, which may choose to act on their own or combine their efforts. Flexibility to unbundle services to be conducted by specialized operating entities can be expanded, with appropriate limits in the duration and scope of authority transferred to operators. Roles of water users in co-producing water services can be recognized, including provision of delivery networks, storage, purification, and other services.[32] Not only can the capacity of regulatory agencies be developed, but mechanisms for public monitoring and accountability can be enhanced, for example through collection and publication of information on water quality and service reliability.

A human right to water can be construed to mandate that states must expand direct delivery of water services. Alternatively, governments at multiple scales can enhance the means available for users to provide themselves with water, including security of water rights, cooperation in organizing to obtain water, and availability of finance for facilities, as well as "smart subsidies" designed to encourage, not crowd out, community efforts.

Social engineering in some form or other may be inevitable,[33] but there are important choices about how institutional changes are undertaken, and the degree of participation and self-governance that may be involved. Strategies of centralized rationality or simplistic devolution to the lowest level are not the only choices. Apparent impasses in improving collective action in water governance may result from inattention to polycentric pathways. Polycentric alternatives offer additional options for constructing coalitions and cooperation, drawing on knowledge and commitments of diverse stakeholders to solve problems.

POLYCENTRIC PRAXIS

> *Praxis: Practical application or exercise of a branch of learning; habitual or established practice; custom;[34] translating an idea into action.[35]*

This paper has been motivated by the question of why so many problems in water governance seem fiercely contentious, polarized, and intractable. Part of the difficulty in solving such problems arises because they are not just a matter of adjusting a few rules, but instead engage more fundamental conflicts about how water will be governed, about setting the rules for making rules. Many of the proposed solutions would deny or destroy the plurality of how water is currently governed. Debate often concentrates on a narrow axis of strengthening centralized control or dispersing rights to individuals and small localities, ignoring the multiplicity of institutional options available at various scales, for governing multiple dimensions of rights.

The scope and scale of emerging problems in basin water governance leads to efforts to reconstitute institutions that make rules and mediate conflicts about rights to water. Sequencing and interplay among constitutional, collective choice and operational levels of social problem-solving shape the feasibility and efficiency of pathways across landscapes of institutional design space. A better understanding of contested rights, levels of collective action, and available pathways can clarify obstacles and opportunities for institutional change in water rights, and for rights to other resources such as land, forests, and fisheries.

A first step involves understanding the ways in which potential changes in water allocation institutions may invoke constitutional-level questions of who is included or excluded from decision-making, and the procedures through which decisions are made. Enacting a new or revised water law can imply an extension of central state control over decisions that have so far been left in local hands. Laws that fail to recognize customary rights assert state authority to the exclusion of other institutions in society. Establishment of a river basin organization may threaten the power of other agencies and jurisdictions. Concessions pose problems of monopoly power. Putting water rights into the framework of human rights law engages the soft law of international norms and standards influencing national reputation, and may open avenues for applying national legal mechanisms to compel fulfillment of rights.

Those who feel excluded from decisions may resist, as may those who feel they would be weakened by new processes for decisionmaking. The challenges may involve not just constructing a legislative majority or issuing a new regulation, but of finding ways to obtain agreement (or avoid being blocked) in a series of linked arenas.

Expanding centralized state power offers an attractive simplicity, the potential for imposing an ostensibly rational ordering on apparent confusion, conflict, and chaos. However, the capacity of the state to destroy existing institutions often far exceeds the capacity to obtain compliance with new institutional arrangements. In many cases, options exist for more plural and polycentric alternatives to survive and flourish, drawing on the strengths of multiple institutions and enhancing institutional diversity. Institutional reforms may be crafted to solve specific water conflicts, rather than imposing universal and uniform schemes. The capacity of communities and individuals and communities to defend and negotiate rights can be enhanced. Legal frameworks and availability of information, legal advice, and other resources can facilitate self-organization at relevant scales. Water provision though choice and cooperation in local public economies can be encouraged. Co-production combining public and user provision can be stimulated. These are only a few illustrations of the many opportunities available for putting polycentric principles into practice.

There is a need to recognize constitutional challenges involved in improving water governance and the plurality of pathways towards solutions. Centralized, state-led solutions are far from the only options, and the diversity of polycentric options deserves exploration. A polycentric praxis offers no panacea, but does open a broader range of options for participatory problem-solving.

NOTES

A later version of this paper may be available at www.BryanBruns.com. This paper does not represent the views of any organization with which the author is or has been affiliated. Responsibility for errors and omissions in the paper lies with the author.

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[1] (Gunatilake and Gopalakrishnan 2002)
[2] (Trawick 2003)and see (Bauer 2004).
[3] (Libecap 2005)
[4] http://www.narbo.jp/ Accessed April 29, 2005
[5] (Boelens et al. 1998)(Steins and Edwards 1998)
[6] Views regarding a human right to water also seem to be influenced by feelings that provision of water for all is feasible, and ought to have been achievable even with past technologies and investment levels. While not strictly inherent in the legal definition of a human right to water, views about feasibility and moral or ethical imperatives for providing water appear to play a powerful role in shaping sentiments on this topic.
[7] "Final Declaration Holds Diluted View of Water as a 'Right.' " Diego Cevallos. Interpress News Service Agency. March 22, 2005. http://www.ipsnews.net/news.asp?idnews=32603 Access April 30, 2006. See also http://www.worldwaterforum4.org.mx/home/..%5Cfiles%5CMinisterial_Declaration.pdf Accessed April 30, 2006 and http://www.worldwatercouncil.org/index.php?id=1019&L=1%2F Accessed April 30, 2006.
[8] For a recent presentation of the IAD framework, see (Ostrom 2005), and see Vincent Ostrom 1999b.
[9] For constitution of new water governance arrangements in California, backed by equity court decrees, see Blomquist 1992 and 2006. For the establishment and revision of interstate water compacts in the U.S., see Schlager 2006.
[10] Formation and revision of agreements about managing water resources thus represents not just adaptive management through existing institutions but also a process institutional reform in "adaptive governance" to deal with "second-order" collective action problems beyond the scope of specialized agencies dealing with a single aspect of water use (Scholz and Stiftel 2005:1).
[11] In another example of constituting new institutions for water governance, the papers in Sabatier et al 2005 offer an insightful discussion the development of new collaborative process for watershed management in the U.S. However, although their theoretical framework discusses the IAD framework and levels of collective action, they assert that "collaborative processes are an experiment in environmental governance at the collective choice level" (Sabatier et al. 2005:179), failing to recognize the constitutional level issues involved in developing institutions that will produce rules.
[12] (Schlager and Ostrom 1992)
[13] (A. Scott 1989)
[14] (Barzel 1997) emphasizes the inherent incompleteness of delineating rights, and the resulting incentives for capturing rights left in the "public domain." Confusingly and regrettably, Barzel uses the term "common property" as synonymous with a condition of no legally or socially protected rights, the condition often discussed in terms of open access, public domain, or *res nullia*. In contradiction to this usage,

Barzel does recognize that many traditional common property institutions involved exclusion and allocation of rights to a delimited community.

[15] See (Maass and Anderson 1978) and (Martin and Yoder 1987) for examples of community-based share systems for water rights that allowed subdivision and transfers between users and locations. More commonly, customary water rights are defined by the rules used to allocate water during periods of shortage, but not explicitly specified as quantities or shares.

[16] (Challen 2000) and (Wang 2004). Note that in this view rights are not limited to legal rights recognized in state permits or licenses but also include the rights embodied in agreements between governments, contracts, and other instruments.

[17] (Ostrom 1999a). For a detailed analysis of success and failure in organizing polycentric groundwater governance, see (Blomquist 1992).

[18] See (McGinnis 1999) (Oakerson 1999)

[19] (Shivakumar 2005)

[20] See (Pradhan and Meinzen-Dick 2003) for discussion and additional references, see also (Spiertz 2000), (Meinzen-Dick and Bruns 2000).

[21] (Ellickson 1991) (Sengupta 2000)

[22] This is a revised version of the table presented in (Bruns et al. 2005).

[23] See (Schlager 2005) for a discussion of commitment, agency, and decision-cost problems in governance of water quantity and quality.

[24] (Edmunds and Wollenberg 2001)

[25] (Steenbergen and Shah 2003) call this a strategy of "rules before rights." In the broader definition of rights used in this paper, "rules are rights," so the question concerns what kind of rules and how they are made.

[26] (Runge 1986)

[27] In the formal logic of game theory, the difference between a negative-sum and a positive-sum game is sometimes treated as a matter of adding or subtracting a fixed amount to payoffs. However, in psychological perceptions losses may be weighed very differently from hypothetical gains, leading to distinct differences in decision-making. For an example discussing the implications of asymmetric perceptions about gains and losses, see (Richards and Singh 2001), citing the ideas of (Tversky and Kahneman 1990).

[28] (Libecap 1989; Libecap 2005)

[29] For a broad critique of state-led approaches to development and the potential for alternatives that promote self-governance and polycentric problem-solving see (Shivakumar 2005).

[30] (Sanbongi 2001)

[31] (Blomquist 1992).

[32] (Ostrom 1997)

[33] (North 2005)

[34] praxis. Answers.com. The American Heritage® Dictionary of the English Language, Fourth Edition, Houghton Mifflin Company, 2004. http://www.answers.com/topic/praxis, accessed April 29, 2006.

[35] practice, praxis. Answers.com. WordNet 1.7.1, Princeton University, 2001. http://www.answers.com/topic/practice-praxis, accessed April 29, 2006.

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