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Politics, Plurality and Problemsheds: A Strategic Approach for Reform of Agricultural Water Resources Management

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Starting from the assessment that past efforts at reform in agricultural water management in developing countries have achieved very little, this article argues that a fundamental change is required in the approach to policy and institutional transformation if the present deadlock in the internalisation of ecological sustainability, human development/poverty alleviation and democratic governance into the 'core business' of water bureaucracies is to be overcome. 'Social engineering' approaches need to be replaced by 'strategic action' approaches that acknowledge the inherently political character and the plurality of actors, institutions and objectives of water management – a perspective operationalised here around the notions of 'problemshed' and 'issue network'.

1 Introduction

The global water-management community has raised high expectations regarding the potential contribution to poverty reduction of improved access to and management of water. Since 1997, there have been four 'World Water Forums', bringing together thousands of water-management researchers, activists, policy-makers, international civil servants, ministers of water affairs, and development investors. Several global networks have grown around water – notably the Global Water Partnership and the World Water Council – plus a variety of international research and capacity-building institutions and initiatives.

There are sound reasons for this emphasis on water as one of the tools to reduce poverty and improve people's lives. At least 1.1 billion people lack access to safe domestic water, and nearly 3 billion to basic sanitation. In rural Africa and Asia, hundreds of millions of poor people have little or no access to reliable water for food and livelihoods: rainfall is inadequate and unreliable, there is no infrastructure bringing water to their fields and homesteads, and in some regions increasing competition is limiting access to water supplies. While there is strong evidence from Asia on the

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positive contribution of irrigation to reducing poverty (Hussain, 2005), such evidence is not available for sub-Saharan Africa, where hunger, malnutrition and disease are widespread. The World Bank and others have recently argued for the importance of investing in 'water security' to create the foundation for long-term economic growth (for example, Grey and Sadoff, 2006; Commission for Africa, 2005). Although others question the Bank's emphasis on large-scale infrastructure (for example, McCully, 2006), few question the importance of improved access to water as a basic strategy to reduce poverty and improve people's lives.

There is also wide agreement that the primary reasons why poverty, hunger, gender inequity, water scarcity, and environmental degradation continue to afflict developing countries are political and institutional, rather than technical, failings. The Global Water Partnership says that 'the water crisis is mainly a crisis of governance' (GWP, 2000: 17, 23; Rogers and Hall, 2003: 15); nearly all development organisations stress the importance of effective governance, institutions and policies for water and in general for poverty reduction and economic growth. However, with some notable national exceptions (for example Mexico, South Africa), much of this emphasis on institutional reform in the water sector remains rhetorical. Achieving institutional reforms is complex and risky for those promoting them, and their benefits usually accrue, if at all, in the long term, while most politicians and development investors have a short-term perspective. But if the rhetorical consensus that institutional reform is critical to success is correct – and we believe it is – then moving from rhetoric to action must also be essential.

This article first critically analyses the experiences with planning and implementing reform in the irrigation sector over the last three decades. Providing water to agricultural crops by means of irrigation infrastructure has been a core component of (agricultural) development strategies in the past half-century, and has made irrigated agriculture the single largest freshwater consumer in many parts of the world (Rosegrant et al., 2002). Efforts at policy and institutional reform in this domain have been characterised by 'social engineering' approaches, failing to acknowledge the inherently political nature of reform processes. We suggest that a fundamental change is required in the approach to policy and institutional transformation if the present deadlock in water bureaucracies' internalisation of ecological sustainability, human development/poverty alleviation and democratic governance concerns is to be overcome. Instead, we propose a politically informed 'strategic action' perspective, which we develop around the notions of 'problemshed' and 'issue network'. Our elaboration moves in three steps: (i) an argument for the centrality of the political; (ii) discussion of the relevance of different types of plurality; and (iii) a presentation of some of the operational implications of the embeddedness and contextuality specific to the agricultural water-management domain. Although the article draws largely on the canal irrigation sector, we believe the analysis is of relevance for water-sector reform in developing countries more generally – and in developed countries, for that matter.[1]

1. In a forthcoming book Tushaar Shah shows that, in South Asia and the North China plains, groundwater irrigation has overtaken canal irrigation, which is also in absolute terms on the decline. This groundwater boom of the past decades has not been the product of government water policies and programmes, but occurred through the private investments of millions of groundwater users (Shah, forthcoming) Individualised as this form of irrigation may be, the regulation of the ecological, social, health and

2 Past approaches to reform: an assessment of social engineering failures

Historically the state has played a leading role in water development, particularly in large-scale irrigation, hydropower and flood-control projects. There are many sound reasons for the state's central role, related to government authority, national welfare and development, and resource mobilisation. Vital natural resources are considered public goods to be regulated, managed and utilised by the state for public welfare. Large-scale development of water resources requires the mobilisation of substantial financial and human resources and a long-term perspective on returns to investments.

The state was the central institution driving the major boom in irrigation development in the second half of the twentieth century. Triggered by the Asian food crises of the 1960s, huge investments were made by governments, donors and multi-lateral banks to create new irrigation schemes. By the mid-1970s, however, it was clear that, while the Green Revolution had significantly reduced food shortages, the new publicly constructed and managed irrigation systems were performing below expectations.

This experience, together with other factors, has generated pressure for reforms in the irrigation sector: governments, donors and investors are concerned that returns on investments are too low; there is continuing poverty and socio-economic inequity even in relatively 'successful' irrigation schemes; there are serious questions about the sustainability of both infrastructure and the environment; and increasing demand for water for other uses threatens the supply for agriculture. If an exclusive focus on agricultural production through water-supply enhancement was previously defensible, it certainly is not today. The rising pressure on agricultural water management is leading to re-allocation of water in time, space and priority, and to new and adapted institutional arrangements to enable and negotiate such re-allocation. Therefore, many governments implement reforms triggered by combinations of internal and external pressures: environmental, social, economic or political dynamics or a combination of these; regime change; pressures from donors and development partners; and international macroeconomic trends such as globalisation of trade.[2]

2.1 Blame the farmers, train the farmers

The first response to pressure for reform was to assume that the problems were largely 'on-farm', i.e., farmers were 'mismanaging' water and therefore needed 'training' as the pathway to better irrigation performance through programmes like 'On-Farm Water

economic problems associated with it very much requires government policy, that is, generally speaking, the establishment of a sustainable groundwater regime. For this, similar issues related to approach occur, as discussed here. In the domain of drinking water supply and sanitation, the significance of government policy and programmes is strong, particularly in the context of the objectives of the Millennium Development Goals. Also in water (pollution) management related to industry government policy is highly significant. Flood management has been an important area of government action. We contend that in all these domains of water management our argument carries relevance.

2. For accounts of irrigation reform experiences see Mollinga and Bolding (2004); Svendsen and Meinzen-Dick (1997); Merrey (1998); and Bauer (2005).

Management' in Pakistan, and 'Command Area Development' in India (Lowdermilk et al., 1978). In some cases farmers were perceived as illiterate, conservative and 'traditional'. This 'blame the farmers' analysis conveniently defined the problem as outside the domain of the water-management agencies, and on the farmers' shoulders and fields. It is difficult to call this 'reform', but it reflects the social engineering paradigm discussed below: the technology is taken for granted and human beings have to be trained to realise its potential. The 'educate the farmers' attitude persists today as a component of social engineering approaches to water-sector reform.

2.2 Organise the farmers: irrigation management transfer

An important dimension of the early attention to on-farm problems was attempts to organise farmers into 'water users associations' (WUAs) at the local level. Donors and some policy-makers saw WUAs, along with training and on-farm infrastructural development, as strategies that would lead to better irrigation performance while also reducing government investment and operation and maintenance (O&M) costs. Before the 1990s only a few attempts were made to give farmers a voice at higher levels of irrigation schemes (Uphoff, 1992). During the 1990s, in a delayed response to pressures to 'roll back the state,' some governments made more serious attempts at 'irrigation management transfer' (IMT), a movement that continues today (see www.inpim.org).

Pilot projects to transfer management from the state to user groups have only rarely been scaled out effectively to cover larger areas. IMT programmes in countries as diverse as Mexico, Colombia, Senegal, the United States, Mali, Australia, New Zealand, Turkey, Sri Lanka and Indonesia have demonstrated some positive results in involving farmers and reducing government expenditures, but have only rarely led to improvements in output performance or in quality of maintenance (Vermillion, 1997). Guidelines for effective IMT implementation are relatively uncontroversial (Vermillion and Sagardoy, 1999), but in very few cases are these met on a large scale (Samad and Merrey, 2005). Negative consequences like strengthening local strongmen (Mollinga et al., 2004), or males over females (Meinzen-Dick and Zwarteveen, 1998) may also occur.

The main sticking point in WUA and IMT programmes has often been the unwillingness of government to delegate or share power with users' organisations. All in all, policies to devolve management to local collective-action institutions have not provided a 'magic bullet' to improve the performance of water systems.

2.3 River-basin organisations: one size fits all?

A more recent trend has been to promote 'river-basin organisations' as a necessary tool for managing competition for water at basin level. There are clear long-term benefits accruing to effective integrated management of river basins. But attempts to impose particular models of river-basin organisations in developing countries, especially those derived from the experiences of rich countries, are not likely to succeed because the objectives and institutional contexts are so different (Shah et al., 2005). Indeed, having a formal organisation even in highly developed basins is not necessary (Svendsen, 2005). Attempting to build organisations for managing river basins that represent the interests

of thousands of water users including small farmers is fraught with difficulties (Wester et al., 2003; 2005). The idea that a specific organisation is necessary for integrated management of a basin may be based on a false assumption that the physical reality of integrated river-basin systems *ipso facto* requires an organisation coinciding with its boundaries.

2.4 Market-inspired reform

In other development sectors, such as electricity and health, disillusionment with state agencies has led to the promotion of markets and private-sector participation. In the agricultural water sector this trend has been restrained by the many sources of market failure, including the potential for natural monopolies and serious externalities. However, there have been several types of reforms associated with some form of privatisation or market instruments.

Involving the private sector in the construction and management of water systems is often advocated in response to the inefficiencies of public-sector agencies, on the assumption that private companies have stronger incentives or lower labour costs. The benefits of investment in irrigation systems are broader than those accruing to direct water users who pay water service charges; they are also social (for example, lower food costs to consumers, food security of small farmers). This duality limits the feasibility of private companies recouping their investment in irrigation systems through user fees. Moreover, the benefits are often slow in coming. Private investment can be encouraged for constructing complementary infrastructure or services, but it is unrealistic to expect private investment to substitute for the traditional role of governments in investing in irrigation projects. Nevertheless, there is an important role for the private sector in groundwater development and making low-cost agricultural water-management technologies such as treadle pumps, small power pumps, and bucket and drip kits more widely available for individual small farmers, male and female.

Two major types of reform aim to create economic incentives for improved water management: water pricing and tradeable water rights. In the former, payment goes to the state or water agency, whereas in the latter, payment goes to the holders of the rights – who may be former water users or other individuals. Administrative water-pricing efforts have often engendered opposition, and in addition foundered on difficulties in measuring water deliveries and collecting fees (Dinar, 2000; Molle and Berkoff, 2007).

Generally, pricing policies to recover the costs of infrastructure development and operation, applied as a blanket measure, risk seriously aggravating water deprivation and poverty. A requirement to pay high fees may cause some poor irrigators to abandon farming and may even cut off poor households from domestic water-use systems. The potential to reduce poverty through subsidised new infrastructure development would be forfeited as well. Pushing poor people out of water use is a perverse form of water conservation and demand management (Schreiner and van Koppen, 2001).

In principle, tradeable water rights represent the greatest degree of privatisation in water management, because they involve the private sector in water allocation, not just in management. In addition to clearly defined water rights (including transfer rights), water markets require physical infrastructure that will allow water to be transferred from one user to another, and institutional arrangements to protect against negative impacts

on third parties when water is transferred. These are rarely found in developing countries (Easter et al., 1998).

As in all market and private property rights situations, the questions of regulation (who sets the rules of the market game, and what are these rules?) and capture of benefits (who wins and who loses?) are central for the assessment of market-inspired reforms. Rather than rushing to devise detailed arrangements for water markets, a phased approach of vesting rights in existing and currently excluded users and clarifying regulatory mechanisms before developing detailed water-market mechanisms may be both more appropriate and more politically feasible (Bruns et al., 2005).

2.5 The dominance of the social engineering paradigm and its problems

The main reason why more than thirty years of attempted agricultural water-management sector reforms as described above have so little to show is the 'social engineering' perspective that such reforms tend to adopt, at least at the level of policy discourse and formal planning. The term 'social engineering' is used here in a specific and narrow sense to refer to linear models for changing societies or organisations. Civil engineers use 'blueprints' while designing physical structures. Application of this model to achieve social change misunderstands the complex, non-deterministic and stochastic nature of social organisations. Social engineering approaches tend to think of institutions as 'things' rather than as relationships and processes, and to search for 'policy levers' that will force change through, usually from the outside. However, key aspects of institutions are that they persist over time, and that change is path-dependent (North, 1990). These fundamentals are too often overlooked in the discussion of 'models', 'best practices', 'lessons learnt', 'toolboxes', or 'blueprints', which suggest that generalised sets of solutions are possible, and undervalue the importance of context specificity and process (actually existing structure and agency). The disappointing outcomes of the numerous attempts to impose 'water users' associations' in such diverse contexts as South Asia, sub-Saharan Africa and the transitional economies of Central Asia illustrate this error (Goldensohn, 1994; Shah et al., 2002; Ul Hassan et al., 2004).

A paradox of policy analysis is that the formulation and implementation of the standardised reform packages with linear implementation strategies that are the hallmark of social engineering are often highly contested, and that policy actors, including government officers, exhibit considerable acumen at strategic action in the process (Hill, 1997; Mollinga and Bolding, 2004). For example, irrigation-management transfer programmes have often foundered because of the overt or passive resistance of irrigation department staff who feel threatened by the reforms.

Our critique of 'social engineering' does not imply pessimism about the possibility of facilitating and guiding social change, but cautions against over-simple prescriptions. Rather than using engineering metaphors, it is more useful to think of organic analogies, in which each institution is a product of its own environment, not a replica of other institutions elsewhere. Its evolution may be influenced, guided or enabled, but not forced. Thus we need approaches that are grounded in the local socio-cultural, political and physical environment. This does not mean acceptance of an unjust *status quo*; but changing long-standing social arrangements requires leadership and is a structured long-

term process. Reform tends to be slow and gradual (with a few exceptions), and is an open-ended, non-linear process with a high level of uncertainty. The processes do not proceed automatically, but are the outcome of social practices in which different individual and collective actors attempt to restructure the institutional arrangements in which they have to operate; hence there is scope for learning processes and adaptation to new conditions, but also for vicious circles and deadlocks.

2.6 Strategic action as an alternative approach to reform

Our sketch of the contours of a 'strategic action' approach to policy reform, as an alternative to a social engineering perspective, has the following three components.

(i) the benefits of a 'problemshed' rather than a 'watershed' perspective, i.e., using 'issue network' as the unit of analysis rather than 'basin';
(ii) the existence, relevance and advantages of plurality in organisations, institutions and water-management objectives;
(iii) the operational implications of the specifics of the embeddedness and contextuality of agricultural water management.

3 From watershed to problemshed: from basin to issue network

Two limitations of social engineering approaches are that they do not acknowledge the inherently political nature of reform processes, and do not acknowledge their embeddedness. Such acknowledgement leads to a rethinking of the unit of analysis and action for policy reform, which is usefully captured with the notions of problemshed and issue network.

3.1 Water management is inherently political

Water management and its transformation is inherently political and often slow. There will be losers and winners; and 'outsiders', whether government agents, or development funding agencies, or researchers, also have their own interests. Furthermore, some interests are more politically powerful than others, often distorting outcomes in favour of special interests. Water management and its transformation is inherently political because it necessarily involves the mediation of the social relations of power among the actors involved in it. How people act in water management and policy depends on their position, their interests and their 'reading' of the situation in which they have to operate. To decide what to do, policy actors and advisers need to make strategic assessments of how policies and institutions related to agriculture and water management can contribute to achieving food security, environmental sustainability, economic growth and poverty reduction – a process of transforming perceptions, interests and objectives into strategies. Of course, policy actors' assessments are mediated by their own position in the social system and perceptions of their own interests. This means identifying

promising entry points for institutional transformation that take into account political feasibility as well as desired outcomes.

Key questions to ask for each situation include:

(i) What will be the benefits of institutional and policy reform and how will these benefits be distributed? What will be the costs and who will bear them?
(ii) Who will be the bearers of institutional transformation: who will constitute the coalition of interest groups to push forward and implement the change?
(iii) Around which issues can such efforts be organised most productively?
(iv) How can these coalitions be supported?
(v) What can realistically be done to adapt the enabling and constraining conditions for this institutional transformation?
(vi) How can knowledge producers and processors such as academics, consultants, and reflective practitioners play a more active role in this process?

The answers to these questions are situation-specific. Detailed generalisation is neither feasible nor useful: the tendency to impose generalised 'solutions' has usually led to failure in the past. Insightful analysis of each situation, while drawing on experiences of other cases as an intellectual and practical resource, is a necessary first step to strategising effective institutional transformation.

3.2 Water management is socially embedded

There is no 'blank slate' starting point for institutional and organisational reforms. Institutions themselves as well as people's behaviour are shaped by their biophysical and socio-economic environment. Historically, developed institutions that are effective in one environment cannot simply be transplanted to another environment, and be expected to have the same effect.

Consistency of proposed reforms with hydrologic, social, economic and political conditions is crucial (Perry, 1995). For example, transferring management of irrigation infrastructure to farmers is more likely to succeed where farmers' water rights are specified, legal support for farmers' organisations is available, infrastructure is designed for decentralised management, and the property status of the infrastructure is clear. Policies emphasising demand management and cost recovery are premised upon water delivery infrastructure, measurement, and fee collection capacity, which are rare in developing countries. Furthermore, the 'enabling environment' has its own dynamics of change, necessitating ongoing technical and institutional adjustment (Molden et al., 2005).

Water governance, management and use are embedded in processes and forces from outside the domain; therefore, both the causes and the solutions of water problems lie partly in other domains. For example, farmers' water-use behaviour depends on internal household decisions on allocating labour, time, money and other resources; the profitability of irrigated agriculture, fisheries and livestock; the overall risk environment, and many other factors; and only partially, if at all, on increasing water-use efficiency as such. The success of reforms of the Office du Niger in Mali lay in the broader reforms to enhance the effectiveness of input and output markets as well as the

restructuring of the management agency (Aw and Diemer, 2005). Negotiating and crafting new types of organisational arrangements for managing irrigation, as for other forms of water management, is not possible without considering broader institutional arrangements and policies in the water, agricultural and rural sectors as well as currency, trade and overall macroeconomic policies.

Unfortunately, water governance, management and use in practice remain highly sector-focused and demarcated. This is visible in the way water organisations have been designed and in the disciplinary nature of water-resources education. It is also characteristic of some multilateral investment banks' and donors' own internal structures, limiting their ability to foster both reform in a broader national context (Molle, 2005) and innovative integrated water development at local level through multiple-use supply systems (Moriarty et al., 2004; van Koppen et al., 2006). The positive side of a demarcated 'single-purpose' approach is that focused and concerted action is possible. The capacity for focused and concerted action needs to be maintained, but set in a broader, more comprehensive problem analysis, including donor-client relations, to 'internalise the externalities' that singular approaches produce. The failure to take historical, sectoral and other forms of embeddedness into account is a major factor limiting the success of previous reforms, because it narrows the scope of both analysis and action.

3.3 Mapping problemsheds and understanding issue networks

The single-sector, disciplinary, instrumental and non-political perspective dominating agricultural water management needs to be replaced by an approach that starts from the primacy of a concrete problem setting and investigates what is required and possible in that setting. Mapping of a water-management problem from a 'problemshed' rather than a watershed perspective (Viessman, 1998: 5) avoids confining the scope of analysis to a hydrologically defined unit. The question regarding the boundaries of a given water-management issue, in space, in time and socially, is treated as an open, empirical question in a problemshed perspective, while, in a watershed perspective, boundaries are pre-defined spatially, sectorally and analytically through the primacy of 'water'. The latter seems unwise, given the complexity and multi-dimensionality of water-management problems. For example, an issue involving wetlands and migratory waterfowl may involve environment agencies and NGOs from outside the watershed and even the country, whereas saving water through conversion from water-consumptive to other crops might require linkages with infrastructure agencies and the private sector to develop markets for alternative crops.

In terms of strategic analysis for institutional transformation, the problemshed can be regarded as an 'issue network'. We use issue network here in the generic sense of the configuration of different actors involved in a particular (policy) issue. It focuses attention on the actually existing social relations in interaction and decision-making processes, and avoids the projection of ideal-type, normative models or assessments of social behaviour and decision-making (see van Waarden, 1992; Howlett and Ramesh, 1995; 1998). Again, it is empirically open to what constitutes the 'issue' and which actors, processes and mechanisms influence it, rather than having preconceived ideas of the structure of the action arena, for example by confining it to the river-basin area and

the actors directly involved in water use and management. Problemshed and issue-network analysis focuses on the interplay of the issue network actors' agency with the institutional and environmental structures that they seek to reproduce or transform.[3]

4 Three pluralities: multiple actors, institutions and functions

By 'plurality' we mean that in any society there are complex, overlapping and sometimes competing networks of actors, rules, functions and organisations. Water governance, management and use are characterised by three types of plurality: (i) multiple actors and organisations involved in water decision-making at different levels; (ii) multiplicity of rules and procedures applicable to a specific issue, as in legal pluralism; and (iii) multi-functionality of water-resources systems and the range of different values attached to these functions. Such complexity and multiple pluralities mean no single reform approach will suffice. Nevertheless, policies for agricultural water management have tended to adopt 'simplifications' (Scott, 1998) in order to make rural societies more amenable to social engineering by states, and to shape landscapes and people to their images of modernity. Plurality needs to be recognised and mobilised for alternative development trajectories.

4.1 Multiple actors in polycentric governance

There are many institutional and organisational models to choose from for water-resources management, such as direct public management (government), direct private management, delegated management by an agency or utility, or community self-management. Despite their names, none of these models are in actual fact single-actor models. Even if a system is formally under government management, farmers and private contractors play an important role; even in farmer-managed systems, the state and markets are critical. Also within the government, there are likely to be many organisations involved, including irrigation agencies and other types of multipurpose government bodies (for example, municipalities or local governments).

Water-resources management always involves multiple organisations. In spite of this, most water-sector reform has been single-organisation or single-institution-focused, and mostly focused on the organisations directly involved in irrigation or water management. Most irrigation reforms have focused on one type of institution or organisation as the linchpin of the policy as outlined in Section 2. However, integrated water-resource management (IWRM) principles and achieving the Millennium Development Goals require co-operation among many actors (including the 'invisible' ones such as women and ethnic minorities) and sectors beyond the agricultural and water sectors, such as health and environment. Although some analysts and policy-

3. We endorse Archer's (1995) distinction between agents, actors and persons when discussing human agency. Our focus is purposive action in the context of policy and institutional reform, and therefore on actors. The view of social transformation suggested here is that of 'structural elaboration through social interaction' or 'morphogenesis' (ibid.). In more ordinary language, we are portraying an open and uncertain cyclic process of transforming the institutional and technical arrangements for agricultural water management by changing the rules of the game and the game itself, through concerted, politically self-conscious strategic action of certain groupings of actors.

makers would like to streamline this complexity, for example by collapsing it into a single river-basin organisation with a very broad mandate, organisational complexity persists.

The main challenge is not finding a single 'right' type of institution or organisation, but identifying the conditions under which each can play an effective role, what can be done to strengthen them, and developing effective co-ordination and negotiation mechanisms among the different types of organisations involved. Examining these mechanisms can reveal when the institutional arrangements create incentives for effective water management, and when there are critical gaps that lead to poorly functioning systems.

Ostrom et al. (1993) argue that 'polycentric governance' arrangements even have advantages in allowing for experimentation to develop rules to fit a range of conditions, and to tap into local knowledge as well as technical expertise. In this, the process of working together to develop the governance arrangements has been as important as the actual configuration of organisations. Another advantage of pluralistic organisational arrangements is redundancy: if one local organisation becomes less effective in providing a service that is important to its members, they may use other overlapping organisations to obtain these; similarly, redundancy may enhance the capacity of local populations to respond to external threats.

4.2 Institutional pluralism

In addition to many organisations having overlapping mandates, there may be a plurality of *institutions* relevant to that issue.[4] The property rights arrangements for water and land in many places in the world illustrate this (Boelens and Hoogendam, 2002; Bruns and Meinzen-Dick, 2000). State law is not the only source of property rights, especially for water. Other important sources include international treaties and law, development project regulations, religious law and accepted religious practices, rules developed by user groups, and customary law, which may be formal written custom or living interpretations of custom. Even within these categories there are often inconsistencies, for example between environmental legislation and other water acts, or between different interpretations of customary law, and there are differences between the formal rules and the rules-in-use. Claims to water rights may be based on any of these, depending on the particular situation. This can lead to confusion and conflict, but it is also an important mechanism for the adaptation of water allocation to local conditions and to change over time. Thus, water rights are more accurately understood as negotiated outcomes than as clearly following from written statutes.[5]

As governments create new water laws for implementing IWRM, there is an increasingly important issue around the incompatibility of state laws imposing uniform and relatively rigid principles and requirements, and the diversity and flexibility of local

4. We distinguish 'organisations', groups of people with shared goals and formalised patterns of interaction, from 'institutions', social arrangements that shape and regulate human behaviour and have some degree of permanency and purpose transcending individual human lives and intentions (see North, 1990).
5. Through and by which organisations' competing property rights claims and interpretations are mediated, is a separate question. State and customary law may have separate organisational frameworks for adjudication.

customary laws, principles and practices. Sometimes, local practices are equitable and effective, and undermining them may be counter-productive. At other times, there may be serious equity issues, particularly biases against women in land and water rights that governments rightly wish to address. However, the effectiveness of national laws in addressing such issues is often very limited (see, for example, Trawick, 2005; Vera, 2006). Overcoming the power relations behind existing institutions requires more than passing new rules or laws; concerted efforts in implementation are also needed.

4.3 Multiple functions, values and voices

Water reform strategies are increasingly expected to address other concerns than water-management issues proper, particularly poverty, equity and ecological sustainability. Ecosystems provide many functions (ecosystem services) to societies, which are valued differently by different groups (de Groot, 1992). Opening up approaches to water management in agriculture involves acknowledgement, systematic mapping and integrated assessment of the many functions of the water-resources system.[6] In the inherently political process of contested and negotiated water-resources use and management three components thus come together: multiple functions (ecosystems services), values (interests or perspectives), and voice (the social articulation of these values by different parties). For ecologically and socially sustainable outcomes, the plurality of functions and values needs to be reflected in water (reform) policies, and mechanisms need to be in place for balancing them (Abdeldayem et al., 2005).

Multiple values and voices in society underpin the organisational and institutional pluralism described above; they are how value and voice find expression. A vexing question from the ecosystem-services perspective is: 'Who speaks for the environment?' (Percival and Alevizatos, 1997). In developed countries 'the environment' has acquired a strong political voice over the past decades. In developing countries attention to environmental conservation is often perceived as 'anti-poor'. It is important to find more effective ways of linking ecosystem services directly to improving the livelihoods of the poor, and creating political coalitions around this integration.

This raises the critical issue of poor and marginalised people who may primarily depend on other water-ecosystem services than the agricultural production function. Poor women, minorities, pastoralists and fishermen are often excluded from or have limited access to decision-making processes. Fishermen and women gardeners are excluded from irrigation-project management committees in Sri Lanka (Bakker et al., 1999), women are excluded from WUA membership in the Andes (Vera, 2005), and the rural poor including small-scale irrigators are not represented in Mexico's river-basin councils (Wester et al., 2003).

The desirability formula is relatively clear: to contribute to both poverty reduction and environmental sustainability, reforms should aim to create a framework for development relationships among the key governance actors – government, civil society and the private sector – that can identify the most effective resource uses and

6. The terminology of production, processing and regulation, carrying and significance ecosystems services has recently been consolidated in the Millennium Ecosystem Assessment synthesis report (MEA, 2005).

management modalities while empowering disadvantaged groups. The problem is how to make this happen. Given the lack of incentives to engage the poor in the governance of water resources due to their inability to contribute to the financing of these institutions, the state must use its authority to enhance their voice and benefits, for example by using water-related projects to generate income or employment.

Plurality of organisations, institutions, ecosystem services and the interests related to them relevant to water management means that it is not realistic to plan sweeping reforms that impose new institutional and organisational frameworks, supplanting all previous arrangements. This does not mean that all processes are inevitably locked into history and context. Although there are limitations imposed on the range of solutions possible in given circumstances based on history, culture and developmental pathways, there is also room to manoeuvre, but through an organic, rather than a mechanistic, process.

5 Politics and embeddedness: operational implications

The embeddedness of agricultural water management and the inherent complexity of institutional transformation make prediction impossible and a social learning perspective imperative. The following operational aspects are critical for encouraging successful institutional and policy reform processes:

(i) *Modesty and realism about feasible options.* Instead of looking for ideal reforms, a higher degree of modesty and realism about what can and cannot be achieved within given constraints and circumstances needs to be practised, and on the basis of such assessments, pragmatic and programmatic choices need to be made on where to allocate time and resources.

(ii) *Out-of-the-sector policy entrepreneurship for better co-ordination.* To address the age-old problem of co-ordination, interaction and collaboration among organisations, water policy-makers and implementers must engage with non-water-sector decision-making to get some water problems solved. The coalitions can go beyond government agencies, to include various private and civil society interests (Sabatier et al., 2005).

(iii) *Reflective practitioners.* Working in a constrained environment requires policy and administrative entrepreneurship, and making creative and effective use of legal, administrative and budget space in the system for developing strategic responses (Schön, 1983). For international donors, implementing agencies and research institutions which tend to be 'captured' by prevailing donor paradigms, this requires a process of self-reflection, questioning and revising existing planning, financing and research prioritisation practices.

In terms of understanding the structural features of policy reform processes, we emphasise three points: (i) the state is the central promoter of reform; (ii) capacity-building, sharing information and public debates are key elements of reform processes; and (iii) implementation through coalitions of empowered stakeholders and political reformers is critically important.

5.1 The state is the central promoter of reform

Different actors may initiate reform. Two examples of water-sector reforms being initiated by civil society/social movements in developing countries, both from India, are a campaign to reduce pollution in the Bhavani basin (Meinzen-Dick et al., 2004), and the long-term struggle of the dam oustees and other social movements in West Maharashtra for an alternative approach to water-resource development (Phadke and Patankar, 2006). There are more examples of donor-led reforms, but these often do not last beyond the project period (if they are implemented at all). The private sector may create demands for institutional change (for example, the large farm sector demand for better-performing irrigation systems in Mexico after NAFTA). None of these initiatives will go far without state 'ownership' of the reforms, that is, without the state accepting them and carrying them forward.

Enrolment of water agencies in reform may partly be achieved via the new roles and challenges for the state that reform brings, for instance in river-basin planning and management; water-rights registration and monitoring; data collection and management; environmental monitoring and assessment; supporting local management institutions; and accrediting private service providers. The regulatory capacity of the state becomes more, not less, vital.

How governments allocate budgets and monitor expenditure is critical to successful reform, but is hardly studied. Lack of transparency has led to calls for, and some practice of, decentralised participatory budgeting in some sectors, but as yet hardly at all in the water sector. If there are specific allocations to target support for women, poverty reduction, and enhancing environmental services, for example, transparent monitoring would be a very important step (on gender-responsive budgeting, see Budlender, 2000).

To meet basic needs and for resource conservation, the state will have to play a leading role, especially if poor people are not able to pay for services provided and the environment has no voice. However, positing the state as the facilitator and often the main driver of reform poses its own dilemma. Frequently the state itself is most in need of reform. Most state institutions have few incentives to overcome gender imbalances, the male-dominated, often 'masculine' engineering culture of water agencies, and the danger of elite capture of policy implementation, for instance. These are political issues, requiring leadership at the political level and coalitions among representatives from the state, the private sector and civil society to generate sufficient 'push' for long-term change.

5.2 Capacity-building, sharing information and public debates are key elements of reform processes

Information, knowledge and the capacity to use it are critical to successful integrated water management and appropriate reforms. But the availability of reliable data transformed into credible information is often limited. In many cases the desired data do not exist. More often, existing data are inaccessible: hydrological data may become state secrets when inter-state water conflicts emerge, or procedures for accessing data

may be excessively cumbersome or expensive. Information may also be interpreted to support particular political agendas, compounded by insufficiently rigorous collection practices: both lead to unreliability. Sometimes, proposed reforms are thwarted by deliberate mis-information dissemination (Vander Velde and Tirmizi, 2004). Differential access to information, for example by men or elites but not women or poor stakeholders, can exacerbate inequity (for example, Vera, 2005). Models are increasingly promoted as 'decision support tools', but the content of the models and their comprehensibility can favour certain groups. To achieve sustainable agricultural water management, reliable information needs to be made available in the public domain, and widely shared and debated, as a means of empowering stakeholders by increasing their knowledge. Innovations such as citizens' committees and public hearings can make important contributions to successful reform processes by creating greater accountability and hence trust (Moench et al., 1999; Bruns et al., 2005).

Transparency and accountability are critical and necessary though not sufficient for a democratic political institutional reform process, and apply whether it is government agencies, user groups, or private contractors who deliver the water services. Building collaborative partnerships among the state, civil society, and the private sector may require investment in building the capacity for collaboration within all the partner organisations. However, the outcome of 'participatory' processes is not pre-ordained: opposing parties may not converge on a common position, or one party may put pressure on others, using superior power. This calls for strong negotiating skills within government agencies, user groups, and other stakeholders. Some conflicts may be resolved locally through customary institutions, but the state has a responsibility to develop tribunals and mechanisms to help users resolve conflicts. In some cases, providing technical information from state agencies may help; in other cases, arbitration and even enforcement roles will be required.

5.3 Implementation through coalitions is critical

We have emphasised the complexity and embeddedness of policies, institutions and organisations. Negotiating effective reform of policies, institutions and organisations requires a structured, context-specific approach based on the recognition of the complex, political and contentious nature of transformation. A 'structured context-specific approach' means that promoters carefully analyse the current situation, options for change, vested interests, potential benefits and costs of change, and potential allies and opposition as the basis for a strategic plan. However, if the changes are identified too closely with a single individual or organisation, they may not become institutionalised; this emphasises the importance of building coalitions around specific shared objectives. The strategic plan must be a flexible guideline that is adapted based on experience, lessons learned, and emerging opportunities. This perspective precludes adopting single-factor panaceas to achieve the desired ends.

The state cannot make lasting changes on its own. Simply rewriting laws or issuing administrative orders will not automatically change water institutions on the ground. No matter how strong the state may be, customary law and institutions will always exist, and are not as amenable to being rewritten by outsiders. There is often a temptation to pass reforming legislation with as little discussion as possible, in order to

minimise opposition (Vander Velde and Tirmizi, 2004). But this is a mistake, because reforms passed in this manner may never be implemented, or may cause a public outcry when they become public. It is much better to engage in a process of public debate and policy formulation to create broader legitimacy and understanding of the reasons for change. South Africa's debates over the reform of its water law illustrate this: it created so much awareness among the public that there had to be follow-through (de Lange, 2004), whereas other countries have reformed their water law (often in response to donor pressures, and with external models) with little fanfare and equally little impact. Creating coalitions around agreed priority reforms, especially where civil society is increasingly influential, is more likely to be successful in the long run than reform by stealth or fiat.

6 Conclusion: the art of institutional reform

Based on the recognition of the inherently complex, political and contentious nature of institutional transformation, this article has argued for a strategic action approach to crafting effective enabling institutions and realistic policies for agricultural water management that internalises ecology, equity and democracy concerns in its core business and 'normal professionalism' (Chambers, 1988). We believe it is precisely the social engineering paradigm based on a linear model and simplistic assessments of what is required that has hindered progress. It is tempting for multilateral investors, bilateral donors, and politicians to focus on single-factor panaceas, as they can be easily communicated and progress can be monitored with a few simple indicators, or so it appears on paper. However, thirty years of experience with such efforts at institutional change in the irrigation sector have achieved minimal success compared with the effort and investments made. That experience demonstrates, indeed, that institutional transformation is inherently complex, political and contentious.

It is remarkable that this lesson has still not been learned and internalised in proposals for institutional reform by many development practitioners. Perhaps one reason is that few policy-makers and investors want to hear the message that institutional reform processes are inherently complex and uncertain. To attract attention to institutional issues, such reforms have often been phrased in terms of engineering analogies that are more familiar in the water field, with a higher degree of certainty than may be appropriate. Another reason is that much reform is promoted through projects which by definition have a limited time span, and whose proponents (whether politicians or development-bank staff) are judged by relatively short-term criteria. A third reason is that the negotiating, team- and consensus-building and communication skills required for successfully championing institutional reforms are in short supply; civil servants and politicians tend to be risk-averse, and promotion of serious institutional reforms is always resisted by those with vested interests in the *status quo*. Social-science research can provide important insights for guiding institutional reform processes; indeed, the insufficiency of such research is an important reason why the outcomes of reform programmes are so uncertain. However, because institutional reform is highly contextual, no useful textbook formulas are possible. Reform remains

an art, a process of learning and adapting that can be supported but not prescribed by social science.

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