Institutional Contexts for Managing Irrigated Agriculture

Douglas J. Merrey[2]

> *The* fact that the problem of designing incentive-compatible institutions — institutions capable *of* achieving *compatibility* between individual, organizational, and social objectives — has not been *solved* at even the most abstract theoretical level means that institutional design proceeds on an ad *hoc* trial-and-error basis — and that the errors continue to *be* expensive. *(Ruttan 1993)*

INTRODUCTION

THE PURPOSE OF this paper is to provide a framework for the work of this workshop. In order to do this, the paper addresses four questions. These questions are:

a. What do we mean by the terms "institution" and "organization"?

b. Why are institutions and organizations important?

c. What are some of the key issues and problem areas, given the range of variation in institutional arrangements for management of irrigated agriculture?

d. What will be the ingredients for a successful institutional framework for irrigation in the future and how can policymakers facilitate the necessary institutional changes'?

The hope is that the discussion of these four questions will provide a useful guide as we are introduced to the experiences from other countries, as we try to grapple with what we think future institutional arrangements will—or should—look like, and discuss what the possibilities are for reform and improvement in the future. The paper is necessarily conceptual; other papers will introduce specific cases and examples as the workshop proceeds. It is also selective: the topic is vast, so I have deliberately chosen issues I believe are particularly imponant.

This workshop is particularly timely. Many of you would have heard that the Nobel Prize for Economics for this year was recently announced. For the first time the prize did not go to classical economic theorists or econometricians, but to two economic historians, Robert Fogel and Douglas North.

Classical economic theory has a tendency to depend on "pure" market analysis; that is, to assume for the purpose of analysis that something like a free market operates, in which individuals act according to rational calculations of material self-interest based on near-perfect knowledge. Of course economists know that none of this is true in reality, but it is a convenient fiction for

---

2 Program Leader, Sector-Level Management of Irrigated Agriculture and Improving Public Irrigation Organizations Programs, IIMI.

analytical purposes. Things like "institutions," culture, politics, etc., are "noise" that interferes with otherwise elegant analyses.

Fogel and particularly North legitimized for economists the study of historical processes and the role of social institutions in economic growth, thus building an important bridge between economics and other social sciences such as sociology, political science. and anthropology. From economists' perspective, of course, we sociologists and anthropologists are students of that "noise" that upsets their calculations, and **is** inherently chaotic and not amenable to scientific analysis.

"Institutional economics" is to a considerable degree the creation of these two economists, along with others. Their central insight is that people's responses to economic incentives are to **a** very large degree a function of the institutional framework within which they live. How people respond to economic incentives, and their consequences for a society are largely **a** function of institutions such as property rights, laws of contract, functioning regulatory organizations and the like. An appropriate, effective institutional framework is a necessary condition for long-term sustainable economic growth and therefore for **a** sustainable productive irrigated agriculture sector.

WHAT DO WE MEAN BY THE TERMS "INSTITUTION" AND "ORGANIZATION"?

The terms "institution" and "organization" are often used loosely and interchangeably. Indeed they are overlapping terms, but it is helpful to distinguish between them, as many social scientists do. "Organizations" are *structures of **recognized and accepted roles***" (Uphoff 1986). Thus, **a** simple voluntary society with a president, secretary, and members is an "organization." It has roles — president, secretary, and member — who have specific functions, and specific relationships among them. Examples of "organizations" include: an irrigation department; a water users association; a cooperative; a voluntary organization (NGO); the German Foundation for International Development and IIMI.

The term "institution" has a different definition: institutions are ***complexes of norms and behaviors that persist over time because they are valued as well as useful.*** Note the key characteristics — they are patterns of norms and behaviors which persist because they are valued and useful. There are thus institutions which are not organizations: the laws of a country are institutions ***in themselves*** which exist separately from the particular courts which enforce them. Unwritten customary rules for sharing water in an indigenous irrigation system may be an institution if it is valued and persists over time in a community — regardless of whether national law recognizes its legitimacy. The market — as a system to set prices through buying and selling goods — is an institution that exists separately from the particular shop or bazaar within which transactions take place. Marriage is an institution, as is kinship; they are valued principles and norms on the basis of which organizations — families, lineages — are formed.

Organizations may be "institutions" or they may not. An organization that includes a set of norms and behaviors that persists because it is valued and useful is an institution. Examples include the family, an irrigation department, a water users organization that persists over time regardless of whether it is legally recognized (though legal recognition may make it more robust — more of **an** institution), a private firm, DSE, or IIMI.

This means that some organizations are not necessarily "institutions." An ad hoc group that forms itself to achieve **a** single short-term objective, then dissolves after some time is an organization that is not an institution. When IIMI was established in 1984 it was an

organization — a structure of roles — but it was yet not an institution, as it had not persisted and developed to the point where it was perceived as valuable and useful. **A** water users organization formed by government officials as part of an irrigation project may be an organization which functions for the construction period; if it persists over time, and continues to fill a need that is valued and useful to its members, it becomes an institution. This is what is meant by the term "institutionalization": a process by which behaviors and roles become valued and therefore worth something, so that they continue as a part of peoples' lives.

WHY ARE ORGANIZATIONS AND INSTITUTIONS IMPORTANT?

Both organizations and institutions are ubiquitous in human society. Humans are a social species, and therefore all societies have organizations — structured roles — and institutions — valued roles, norms and behaviors that persist. Institutions are so much a part of our lives, that we take them for granted; to a considerable extent we internalize them so that our perceptions, our concepts of right and wrong, good and bad, rational and irrational, the categories in which we think, the basic unconscious, unspoken premises in terms of which we look at and interpret the world — all these are products of our living within particular institutional landscapes. **All** of **us** have a complex set of social identities: nationality, parent, child of our parents, kinship group, language or ethnic group, discipline, policymaker, researcher or manager. These identities are all the outcome of the particular institutional framework within which we live and work. So the first part of the answer to the question on why institutions are important is that our personal identities and our mindsets — how we categorize, perceive, think, feel — are largely the result of the particular institutional and organizational context in which we live and work.

Another important function of institutions **is** that they provide a basis for predicting others' behavior. They provide the rules of the game, specify what we can do and cannot do, and what the consequences will be if we do not stay within the limits. Institutions like rules defining basic property rights and contracts make it possible for us to engage in transactions, for example purchasing a piece of land or a house or engaging in business. The institutional arrangements regarding property rights and contracts in the countries of the former Soviet Union obviously had a tremendous impact on what people could do or could not do and are now constraining their capacity to respond to new opportunities; developing new institutions **is** a complex and time-consuming but necessary process.

The fact that rights to water can be privately held in some countries, leading to water markets and sales between farmers and urban water authorities, while in other countries they are inseparable from rights to land or are owned solely by the governments, is an institutional difference with very profound consequences for management of water. Thus we see that institutions are constraints — they establish limitations and boundaries — and they provide the basis for opportunities for change, innovation or "doing business."

Finally, Organizations enable individuals to cooperate with each other, to coordinate their activities, and to mobilize resources that individuals by themselves could not obtain. It is through organizations that people get things done, and that societies grow and develop. Those organizations that are important to the longer-term welfare and functioning of society — or important to significant subsets of people — are ***institutionalized,*** for example, schools, police, business firms, regulatory agencies, irrigation departments, and the like. Without complex organizations and institutions modern societies by definition would not exist.

Informal organizations form and either become institutionalized or disappear in time. Further, informal social relations coexist with formal organizations and institutions. They are functionally necessary, but as the paper on South Asian institutions emphasizes (Bandaragoda

1993), when there is a gap between informal rules and behaviors and the formal institutions, serious problems can arise. In small-scale societies. cooperation and resource mobilization are no less important than in large modern nations; only the scale is different. Those societies whose institutional framework encourages and facilitates a proliferation of organizations tend to be more dynamic and innovative than those that stifle such initiative.

ANALYZING THE RANGE OF INSTITUTIONAL EXPERIENCES: KEY ISSUE DOMAINS

When we read the papers about institutions in other parts of the world later in this volume, we get a glimpse of the wide range of variation in the forms and effectiveness of institutions and organizations governing irrigated agriculture. In some countries, there are also very rapid changes occurring, as governments respond to financial and other pressures by privatizing, restructuring, and the like. There is at present no research basis for definitive statements on what kinds of institutional arrangements work best, and no easy answers to the questions facing countries' irrigated agriculture or water resources sectors.

This section provides one possible framework for analyzing the range of variation, and identifies particular issues that need attention. The discussion is organized under four main headings:

- Legal framework
- Governance
- Organizations
- Finance

Clearly, these are overlapping categories, and it will not be possible to discuss each one in isolation from the others. Nevertheless, it may provide a convenient way of organizing the discussions as we look at other regions' experiences, and analyze the experiences of the countries represented in this workshop.

We should be clear that the domain we are discussing is itself very complex and wide-ranging, and not independent of other domains. The workshop is about institutional frameworks for "irrigation," the application of water to land to grow crops. On the one hand, irrigated agriculture is a sub-domain of the agriculture sector. On the other hand, irrigation is a sub-domain of the water resources sector. Countries vary considerably in how they organize these domains: some countries manage irrigation within the context of agriculture, through a ministry of agriculture for example. Some countries separate irrigation from both agriculture and the management of water resources for other purposes, through a ministry of irrigation for example. Some combine irrigation and land, separating it from water; some create "authorities" separate from line departments to do "integrated development and management of irrigated agriculture. Managing water resources for **all** purposes in an integrated way may he less common in the world, but as competition for water resources increases, this may become more common.

This paper focuses more on the institutional framework for **irrigation** management, while paying less attention to the institutions which support agriculture ***per*** **se.**

Legal Framework

A major impediment to the economic transformation of the countries that were part of the former Soviet Union is that the existing legal framework does not clearly define basic rights and obligations vis-a-vis property, contracts, formation of companies, and the like necessary for a market-oriented economy. An effective legal framework is no less important in the irrigated agriculture sector. In many countries, we find that either some provisions of the legal framework have become constraints in achieving the goals policymakers have, or that there are gaps—areas of silence—that are constraints.

I propose to focus on three issues which have important implications for the effectiveness of a country's legal framework. These are:

- Effectiveness of laws
- Rights to water
- Environmental protection

Obviously, there are many other issues that would have to be covered in a comprehensive discussion; these include land tenure, contract law, conflict resolution, and legal provisions for forming nongovernment or private organizations.

Effectiveness of Laws

Two issues are raised under this heading:

- The basic philosophy of the function of law in society
- The extent to which there is a consistency between the legal framework and observable behavior

These issues get at the broader question of the effectiveness of laws. There are other possible issues; but these two seem particularly important in understanding the potential direction of future reforms.

Philosophy of law. Different legal traditions start from different premises regarding the nature of law, perhaps based on deeply and subconsciously held theories of human nature. To oversimplify, I suggest two contrasting types:

- Those legal systems whose objective is primarily to limit and control undesirable behavior
- Those designed to enable and facilitate desired behavior

Most systems have elements of both, but I suggest that there are important differences in emphasis that have serious consequences for societies.

Laws which place emphasis on limiting and controlling behavior tend by and large to be very detailed: the legislation itself lays down strict details on who may do what, what may not be done, how things are to be done, etc. In other words, the legislative and regulatory functions of law are not clearly separated. An example is the water users associations' laws as adopted in most provinces of Pakistan. These laws specify many details about how a water users association is to be structured, who may be members and who may not be, and how they will transact business. Punishments for not fulfilling the provisions of the law, including not cleaning watercourses, are

also specified. Needless to say, this law has not been effective in encouraging water users associations, and is not enforceable.

The alternative approach is to design laws that specify the basic principles and objectives, in a way that then facilitates people to use the provisions to achieve their objectives. It is up to the civil service, ideally interacting with stakeholders in a transparent public process, to frame implementation regulations and procedures. Laws that make it relatively easy for water users to get themselves organized, that accept diversity in the details of organizational procedures and the like, and that provide incentives which make it worthwhile for people to form organizations are more likely to have the desired impact than the punitive type.

Consistency of the laws and reality. The other important issue is the extent to which legal provisions and reality are consistent with each other. In some instances, there are serious gaps: the lack of a clear legal provision covering water rights, for example, often means that people operate extra-legally, perhaps damaging the resource, or the resource **is** not developed at all. In quite a large number of cases, the legal provisions are no longer effective in influencing behavior. In the first instance, the problem may be simply one of designing and promulgating appropriate laws to fill the gap. In the second instance, the problem is far more complex. If there has been a general breakdown of "law and order" **as** indicated by widespread evasion or ignoring of the law, it may be that a government has lost some of its authority. But in many cases, it also indicates that the laws are no longer functional or appropriate: society has changed to a degree such that new laws are required that are enforceable and fit reality.

Rights to Water

This refers to the definition of who has access to water, how much they may take, what it may be used for, and what are users' responsibilities regarding the quality of water returned to the source. Who pays what to whom for water may **also** he an important issue. I suggest three characteristics of water rights are particularly important for our purposes:

- Clarity
- Security
- Transferability

In principle there are four categories of ways to allocate rights to water:

a. No clear legal provisions regarding rights

b. Government ownership and control through administrative mechanisms

c. Users' ownership and control through recognized organizations

d. Market mechanisms for allocation and transfer of access and use rights

Throughout the world, there **is** a wide variation in provisions regarding water rights, and few "pure" cases fitting under one of the above categories. Although there may be a few countries with no legal provisions at all regarding access to and use of water, we do find countries where the law **is** ambiguous and unclear, leading to conflicts. A complete lack of legal provisions may be acceptable when there **is** a large surplus of water, but **as** competition increases this will lead to depletion in terms of both quantity and quality, and to severe conflicts and imbalances.

In many countries, water is allocated administratively, by the government: the government claims ownership of water, and makes it available to a variety of **users** for particular defined purposes through administrative processes. In such a system, there is a danger of rent seeking and inefficient use of water, especially when allocation among uses is restricted.

In a growing number of countries, administrative allocation is being modified by increasing the role of user groups in decisions regarding water allocation and use. Finally, there is increasing interest among some policymakers, donors, and economists on the potential for improving long-term water management through market incentives, based on private rights to water. Examples of this can be cited from the **USA,** groundwater systems in India, and elsewhere.

In a system dominated by administrative allocation of water, rights to use water may be clear, and may he secure; but only the government can effect transfers of rights of access and use. In a system where users share control with the government, security of rights may he achieved, but clarity may be sacrificed if rights are shared by users and the government; transferability is also likely to be limited within a particular use (say, irrigation) and within aparticular basin if not an irrigation system. It is only in a system governed by market mechanisms, in which individuals or groups or both have clear and secure title to specific measurable quantities of water that full transferability is achievable.

Until recently, no one thought of market mechanisms as appropriate for governing the use and transfer of water. It is still only a theoretical concept in many countries. But it **is** increasingly common in some of the developed countries (California being a well-known but not unique example), and is found in some developing countries, for example Chile (Gazmuri 1992). It is claimed that making rights to water clear, secure and entirely transferable and tradable has led to dramatic improvements in efficiency and productivity of water in Chile, and has reduced the necessity for public investment in new infrastructure. In India and other South Asian countries, sophisticated markets in groundwater have developed in some irrigated areas, sometimes parallel to administrative allocation on public canal systems. There is evidence that these markets promote more equity, not **less** as may be thought, and more efficient and productive use of water; Chambers et al. (1989) have suggested that allocating clear and secure rights to water (and trees) to poor communities would be an effective means to reduce poverty in India.

During the last few decades, irrigation systems were being developed with little regard to the potential for competing demands on water: it was assumed that the water resources were sufficient to meet all the demands. Now even the countries of Southeast Asia, which from a global perspective are not water-deficient countries, are facing serious conflicts and shortages in at least some river basins. Pressures will build for countries to consider market mechanisms for improving water use efficiency; in such a case, the role of governments will shift from control and allocation through administrative mechanisms to regulating and refereeing the process. This is because at present irrigation uses by far the largest amount of water but gives the lowest economic return per unit of water.

The continuing provision of subsidized water to irrigation, while poor people in large cities pay large amounts for low-quality domestic water, is not sustainable (Bhatia and Falkenmark 1992). There **is** no doubt that in many countries water will be transferred from agriculture to other uses; but ***how*** this is to be managed remains a big question.

Environmental Protection

This too is a broad area, but its importance is increasingly recognized. I suggest two inter-related issues:

- The extent to which irrigated agriculture is threatened by the behavior of people upstream of irrigation systems or by irrigators' own behavior
- The extent to which irrigation behavior is a threat to others outside the irrigation system

The former relates to protection of watersheds, **and** the soils and aquifers that are part of the irrigation system, The latter relates primarily to the impact of drainage water whose quality is affected by its use for irrigation, and also to the depletion of aquifers shared with other users. The real issue is, how can laws contribute to protecting the environment?

This question cannot be addressed separately from the questions of philosophy of law, and water rights. From a legal perspective, the choices are the same as the four categories of water rights mentioned above. Lack of legal provision for protecting the quality of water, watersheds, and aquifers is increasingly dangerous in most countries. Attempting to control these matters through government administrative mechanisms — restricting access, licensing, etc.— is the traditional approach, but is difficult to implement, and often leads to what economists politely refer to as "rent seeking" and "externalities."

Shared control with users may be better but by itself does not provide a clear signal for evaluating the costs and benefits of the tradeoffs involved. There is an interesting example of full local control from California for aquifer management. In California, the government's policy is to encourage and support the development of autonomous local institutions which take responsibility for aquifer management: a recent study has shown that while there is considerable variation among river basins in the types of organizations that have emerged and their effectiveness, in most basins aquifers are now managed in ways that appear sustainable (Blomquist 1992).

A key factor of course is the use of market mechanisms for valuing and charging for water. If water is a valuable asset, to which local groups or individuals have clear, secure and transferable rights, they haveconsiderablemotivation to ensure that aquifers are preserved. The same principle applies to water quality: if water **is** a tradable good, and if one's use of the water affects its value to others further downstream, one approach **is** to require upstream users to pay the costs incurred for purification.

Governance

Governance refers to the basic allocation of power and authority, and the boundaries and limits on authority. In federal systems, water is often a responsibility of provinces or states, with the central government attempting to provide overall guidelines, and mediating interstate sharing of water resources. But even federal systems may have highly centralized concentration of authority over water.

I suggest three basic forms of governance:

- Centralized — authority is concentrated in the government bureaucracy
- Decentralized — authority is shared between the higher and lower levels of the bureaucracy
- Devolved — authority is devolved to local organizations

Actual systems may not fit these categories entirely, but exhibit elements of two or even all three of these forms. But the type of governance characteristic in a given country will have a very significant impact on performance, and on what types of future policies may be feasible.

Centralized Authority over Water

In a centralized system, authority over water allocation is concentrated at relatively high levels of government bureaucracies. The government not only makes policy; it **also** takes the primary responsibility for implementing water allocations and deliveries. It controls—or attempts to

control — water allocations among and within sectors; it may manage water distribution directly, or may regulate the use of water through issuing permits or licenses. Such systems are generally characterized by administrative allocation of water, discussed above.

Decentralized Authority over Wafer

In a decentralized system, the government retains authority and control over water, but the locus of control is at lower levels of the bureaucracy, closer to the users. In such a system, there may he a clearer separation of the policymaking and implementation functions, with policymaking retained at higher levels, while implementation within the policy guidelines is at lower levels. This form of governance makes sharing control over water with user groups more feasible and more likely. But administrative control of water allocation and distribution is still likely to be the dominant mode of management, supplemented with the issuing of permits to local users.

Devolved (Local) Authority over Water

This type of governance involves local governments, local boards, and local nongovernment organizations such as utilities, user groups, firms, and individuals having primary control over the allocation, distribution, and decisions about the use of water. In this type of system, policymaking and implementation are clearly differentiated: the higher-level government's role is to set broad policy frameworks, regulate the use of water to avoid abuses or imbalances, and perhaps, provide specialized support services not available in the private sector. In such a system, allocation is most likely to be governed by market mechanisms, though a system of permits issued by local authorities is also possible.

"Turnover" and "privatization" are important issues relative to establishing a devolved or localized system for governance. Turnover generally involves giving authority for management of water and delivery infrastructure to local users, hut often the government retains ownership and ultimate (residual) control. It is not clear to what extent such a policy is conducive to local investment in operation, maintenance and especially long-term improvement,

Privatization is the most common term for the policy of turning over full ownership of infrastructure, as well as clear rights to specific amounts of water. In principle, if local users own the assets and have clear, secure and transferable rights to water, they are more likely to use the water efficiently (especially when there are other potential users willing to pay more for it) and more likely to invest in infrastructural improvements.

Organizations

Following directly from the broad forms of governance, is the question of what types of organizations are found in the irrigated agriculture sector, and what are the implications of the presence of particular kinds of organizations for future developments. The analysis here distinguishes the policy and implementation levels; and within each, identifies a variety of arrangements.

Organization af the Policy Level

At this level, there are three primary types of organization:

- Specialized ministry of irrigation, separate from ministries handling agriculture and other water resource uses

- Ministry of agriculture that includes responsibility for irrigation, but not other uses of water
- Ministry of water resources that includes irrigation as well as other uses of water, separate from the ministry of agriculture

Specialized ministry of irrigation, Some countries have regarded irrigation as so important to their development, and as sufficiently distinctive in the policies and management required, that they have established ministries specialized in irrigation. A common subtype is those countries where irrigation is a wing of a public works ministry, or as in Sri Lanka, a wing of a land development ministry. In these cases, one usually finds a heavy emphasis on relatively large-scale irrigation, and a strong construction-orientation. Problems of coordination with the ministry of agriculture, representing the main clients of the irrigation managers, is a frequent characteristic. I suggest the hypothesis that once a country reaches a situation where there is competition between irrigation and other uses of water, this mode of organizing at the policy level is likely to prove increasingly ineffective.

Ministry of agriculture that includes irrigation. It is not uncommon in some parts of the world to find that irrigation development and management are within a ministry of agriculture at the policy level. This mode of organization increases the likelihood of close integration and coordination of irrigation and other agricultural functions; I suggest the hypothesis that this mode of organizing is more conducive to a stronger management approach to irrigation, with less emphasis on heavy construction.

On the other hand, as competition for water with other users increases, irrigation may continue to dominate beyond a point where it is economically viable. In Israel for example, all water allocations are done from within the ministry of agriculture; although Israel is justly famous for its relatively high irrigation efficiencies, this arrangement may have led Israel into more dependence on irrigated agriculture than is sustainable in the long term (Sexton 1990).

Ministry of water resources that includes irrigation. A third major alternative for organizing irrigation policymaking is to include irrigation in a ministry of water resources, separate from the ministry of agriculture. A subtype would be a ministry of natural resources including water. This approach has the advantage of allowing an integrated and comprehensive approach to the water sector, which is increasingly important in countries facing serious shortages and competition among different water uses. It begs the question of coordination with agriculture, which in most developing countries is still the most important economic sector in terms of employment if not income generation.

It is also possible to combine some of the above types. For example, Egypt has a Ministry of Public Works and Water Resources, within which the Irrigation Department is a powerful management agency. The danger in this approach is that "public works"—construction—may be given too great an emphasis vis-a-vis management of the water supply.

Organization at the Implementation Level

Organization for managing implementation may he congruent with the policy management arrangements described above, or may not. At the implementation level, I suggest there are four basic approaches common around the world. These are:

- Specialized irrigation civil engineering department
- Integrated authority for irrigation and agriculture

- Government-owned autonomous corporations, or utilities
- Management by local entities, with government regulation

Specialized irrigation civil engineering department. This type of management organization is common in those countries having had a British colonial tradition, though it is not restricted to them, A subtype found in some countries is departments that are called water resources departments, though these are usually so specialized in irrigation that the distinction is nominal. Such departments are almost invariably highly centralized hierarchical departments whose staff are largely if not exclusive civil engineers. These departments often have a strong tradition which at least in the past ensured a high degree of loyalty and dedication. They usually have their origins as construction-oriented departments, and construction usually remains their primary interest.

As countries move from a "construction phase" in irrigation to a "management phase," there are increasingly important questions about whether such departments can make the transition to management and service orientation, and if so how they can be assisted to make this transformation. The Department of Irrigation and Drainage in Malaysia is an interesting case of a department that is changing; several states in India are presently designing major projects with donor support to hasten the transformation of their line civil engineering departments into water resources departments oriented toward management and provision of services.

Integrated specialized authorities. Quite a number of countries have established special authorities on particular river basins to manage the "integrated" development and operation of water resources for multiple uses. The Tennessee Valley Authority of the USA is sometimes taken (or mistaken) as the model for these authorities; examples can be cited from Malaysia, India, Sri Lanka and other places. A variation on this type is the creation of authorities that operate parallel to irrigation departments, hut at the tertiary level, to support tertiary irrigation development and farmer involvement. India's Command Area Development Authority (CADA) is a well-known example.

But the classic authorities are created by special legislation, and have special powers and authority for constructing the infrastructure to harness the water resources of a river basin, developing the "downstream" irrigation facilities, settling people or assisting in their reorganization for agricultural production, and providing integrated support services for agriculture, and sometimes other services.

These authorities often have a degree of flexibility, legal authority, and attractive incentives for staff that are lacking in the "normal" management organizations. They are usually effective at creating the infrastructure and getting a project up and running. But their relatively authoritarian approach, and the relatively high costs of administration, often lead to increasingly serious problems. Their authoritarianism — often combined with a high degree of idealistic paternalism — results in a relatively dependent population of clients, rather than the self-reliant autonomous farmers expected in the planning documents (Merrey 1992). Integrated management, with many services provided by and through the government, is also expensive; **as** governments come under increasing financial pressures, the viability of continuing integrated authorities becomes an important issue.

Autonomous government-owned corporations or utilities. There are some cases where irrigation is managed by government-owned corporations, either nationally (Philippines) or by river basin (Morocco). There are relatively few cases of utilities, of the type found in the electricity, domestic gas, and domestic water supply sectors, though this mode of organization is frequently cited **as** having a high potential. Utilities, of course, may he owned by private shareholders and regulated by the government; therefore this type of organization could also appear under the next heading, in which local entities are responsible for management of irrigation.

The advantage of this mode of operation, in principle, is that corporate entities are more flexible and can adapt to changing conditions more easily than can government departments

governed by strict civil service rules. It is relatively easier to build in incentives for performance accountability of staff, and of the organization to its clients. Of course, politicians may regret their reduced opportunities for controlling access to an important resource. The success of this mode of organization is closely linked to financial autonomy, discussed below under ***Finance.***

Local control with government regulation. Local control of irrigation through specialized irrigation companies or "districts" controlled by the user-shareholders is common in some of the developed countries, but relatively rare in developing countries outside Latin America? In this type of organization, there is a legal framework enabling local users to form organizations through which they may construct and own irrigation infrastructure and water rights. In some cases, this form of organization may coexist with a government department which does major construction, and manages large dams and canals, wholesaling water to irrigation districts (the **USA** is an example). The success of this form of management depends on the local entities having clear and secure water rights, which are preferably transferable and tradable as well. The major role of the government in this type of environment is to ensure that titles to water rights are clear, and evaluate and regulate water use to ensure sustainability and economic efficiency. The government may also provide assistance in construction of major works, manage major works, and intervene when drought or other crises make emergency measures necessary.

Finance

Our interest for the purpose of this paper is the institutional implications of the financing of irrigation. There is no such thing as free irrigation: someone pays for it. But ***who*** pays, and the structuring of financial flows vary considerably among countries. These two questions have a profound impact on the institutional framework for, and the performance of, irrigation. Whether users pay directly for irrigation, based on the amount of water they use and perhaps on the quality of the water returned to the source, will have a major influence on how efficiently water is used. Whether users pay the providers of irrigation services directly or indirectly will have a major impact on the incentives for the provider to ensure that the service is responsive to the customers' needs.

Who Pays for Irrigation?

I suggest three variants of "who pays," though these often coexist. They are:

- Free to users.
- Users pay part of the costs.
- Users pay full costs.

Free to users. It is still not uncommon that irrigation water is provided on government schemes without the users having to pay any direct fees. There are therefore no linkages among the ***cost*** of providing the water, the ***economic value*** of the water to the user or to other potential users, and the **use** of the water. It is not surprising that in such systems water is often used inefficiently, and the quality of physical maintenance and operational services is a source of constant complaint. Indirect means of recovering costs, for example taxes on produce, are often used to recover the costs of providing irrigation services, but there is no linkage between payment and the service provided.

---

3 Shah and Bhattacharya (1992) discuss the rise of member-companies for managing tubewells which are coming up spontaneously in Gujarat, India, and which appear to be more robust than tubewell cooperatives.

Users pay part of the costs. It is more frequent to find that users on public irrigation systems pay fees that cover part of the costs of the service, but not the full cost: operation and maintenance costs but not capital costs for example. But outside the richer countries of Europe and North America it is rare to find fees based on the quantity of water used, or the economic value of that water. Evasion of payment among significant numbers of users is also not ,uncommon, as enforcement is difficult. It is also not uncommon that the amount paid is not adequate to cover the full costs of operation and maintenance. leading to deferred maintenance, and subsidized rehabilitation.

Users pay full costs of irrigation directly. On publicly managed irrigation systems. it is rare to find that users are paying the full costs of providing the water (operation and maintenance as well as capital). But on private systems, for example private tubewells in South Asia, or commercial farms, users do pay the full direct costs of irrigation; and markets exist whereby owners of tubewells sell water to their neighbors. Where farmers pay the full costs, especially if other agricultural inputs are not significantly subsidized, there is a strong tendency to grow higher-value crops as lower-value grain crops may not be economical.

Mixed systems of cost recovery. This is probably the most common situation: in South Asia for example, "free" irrigation from public systems coexists with privately financed and owned tubewell irrigation. More commonly, while irrigated agricultural users pay nothing directly. or pay only part of the real costs of irrigation, users in other sectors pay heavily for their domestic and industrial water. In some water-short urban areas, the poorest people with the worst service pay high prices for low-quality water, while farmers and sometimes rich domestic users pay little or nothing (Bhatia and Falkenmark 1992).It is clear that ascountries movetowards moreemphasis on market-based systems for allocating water, as a response to inter-sectoral competition in water-short areas, the present arrangements in which irrigation is subsidized at the expense of others will come under increasing pressure.

The Structure of Financial Flows

No less important than the question of who pays is the question of how payment is made, i.e., how financial flows are structured. Both issues profoundly affect the incentives for providing efficient irrigation services. There are three basic alternatives:

- No one pays directly.
- Indirect financing
- Direct payments by users to provider.

If no one pays directly for water, then there is no incentive either for the user to make efficient use of the water, or for the managing agency to provide good service. This option is therefore not further discussed.

Indirect financing of irrigation. In many countries, for example in South Asia, if the users pay anything for irrigation services, it is not directly to the management agency, but to the government. "Irrigation fees" are collected as a kind of land tax, sometimes based on the crop grown, but rarely based on the amount of water used. This tax is collected by the revenue department of the government, and goes directly into the treasury. Funds are allocated from the treasury to the irrigation department based on criteria that have nothing whatsoever to do with the amount paid in fees. There is thus no linkage between the users' payments and the services received. Whether it provides a good or poor service has no impact on the department's income or staff incentives. This only compounds the problems arising from fees bearing no relationship to the amount of water used, or to the real costs of irrigation.

Direct financing of irrigation. Research has shown clearly that those irrigation agencies which are financially autonomous, to whom water users pay irrigation fees directly, show better management performance than agencies who receive their finances indirectly, such that they are dependent on the government treasury (Small and Carruthers 1991; Svendsen 1992). If an irrigation agency is financially autonomous and directly dependent for a significant portion of its income on service fees paid by its customers, there will be significant incentives to provide good service.

However, it is important over the long term for that agency to have the authority to revise its fee structure as necessary, and to have the flexibility to adjust its human resources, and provide incentives for staff performance. This takes us back to a governance issue: if the autonomous agency has a monopoly, then a transparent system for monitoring and regulating its services and costs, and justifying its fees, will be necessary In other words, the agency should operate as a public utility. An alternative is to devolve ownership and management of individual systems to corporate entities in which the users are shareholders.

CONCLUSION. WHAT WILL EFFECTIVE INSTITUTIONAL AND ORGANIZATION FRAMEWORKS FOR IRRIGATION LOOK LIKE IN 2025?

Principles of Institutional Change

This paper began with a discussion of the distinction between organizations and institutions, and the ways in which institutions pervade our lives and affect our thinking and understanding. Institutions develop historically through a complex process of interactions among technology, environment, and people's behavior and perceptions as shaped by their previous cultural and institutional history. Therefore, institutions in place often have considerable staying power, and seem to have a life of their own which stymie attempts at reform. Resistance to change is likely to he based on a combination of values and limited perspectives of participants, and the strong vested interests many have in existing arrangements.

One implication of this view of institutions and organizations is that they are not readily transferable from one country context to another. We cannot expect that because a particular institution works well in one place, it will automatically apply, as it is, in another. There are cases of transfer but invariably the institution is reinterpreted and transformed into something unique as part of the process. This is not to argue that we cannot learn from others' experience. On the contrary, we can, but what is transferable is the basic idea and concept, suitably transformed to fit into a new context.

The direction and rate of change, the strategies that might be most effective, and the possible options for the near and medium future are constrained by existing institutional arrangements. The trick then is to develop change strategies that are appropriate to the specific situation, and to take a long-term perspective. It is particularly important to avoid adopting solutions to short-term problems that will be nonadaptive or severely constrain future options.

Policymakers must choose between two basic change strategies:

- Radical change imposed from the top down
- Encouraging change through an iterative bottom-up long-term process

The former may be attractive when a country is facing a crisis, or a total breakdown of the existing system, as in the former Soviet Union. But it is highly risky, is likely to be strongly resisted, and may go wrong very easily. The latter requires more patience, but I suggest in most circumstances it is more likely to lead to the evolution of workable solutions, including new institutions. The role of the policymaker in this approach is to set the broad objectives, identify the guiding principles, and act as a coach to facilitate and guide the change process.

Guiding Principles for the Future

Beginning from the different institutional contexts found in various countries, clearly it is not likely or desirable that there will be uniformity in the future. I would like to propose a few broad principles that could guide the evolution of institutions in the water resources and irrigated agriculture sector, principles that apply to other sectors as well. These principles are:

- Clear, secure, transferable water rights
- Decentralized and devolved management organizations
- Government role as facilitator and regulator, not controller
- Accountability
- Financial autonomy and sustainability

I suggest that the workshop participants might wish to consider whether they agree with these principles, whether there are others that should be added, and what the implications will be for the future development of their countries if these principles are adopted,

References

Bandaragoda, D. J. 1993. Institutional framework for irrigation: Salient features of the South Asian situation. Paper prepared for DSE/IIMI Workshop on "Institutional Framework for Irrigation," 1–5 November, 1993, Chiang Mai, Thailand.

Bhatia, R. and Falkenmark. M. 1992. Water resource policies and the urban poor: Innovative approaches and policy imperatives. A background paper for the Working Group on "Water and Sustainable Urban Development, International Conference on Water and the Environment: Development Issues for the 21st Century," 26–31 January 1992, Dublin, Ireland.

Blomquist, W. A. 1992. Dividing the waters: Governing groundwater in Southern California. San Francisco, CA: ICS Press.

Chambers, R; Saxena, N.C. and Shah. T. 1989. To the hands of the poor: Water and trees. London: Intermediate Technology Publications.

Gazmuri, R. 1992. Chilean water policy experience. Provided as background to the presentation at the World Bank's Ninth Annual Irrigation and Drainage Seminar, December 9, 1992.

Merrey, D. J. 1992. Potential for devolution of management to farmers' organizations in an hierarchical irrigation management agency: The case of the Mahaweli Authority of Sri Lanka. Presented at the Symposium on Irrigation and Society in the Context of Mahaweli. Sri Lanka, 24–29 August 1992, Monte Verita, Ticino, Switzerland. (Forthcoming in edited volume.)

Ruttan, V. 1993. Sustainable growth in agricultural production: Poetry, policy and science. Interpaks DIGEST vol. 1, No. 2, Spring 1993. (Reprinted from a paper published by the Department of Agricultural and Applied Economics, University of Minnesota. Staff Paper P 91-47, November 1991.)

Sexton, R. 1990. Perspectives on the Middle East water crisis: Analysing water scarcity problems in Jordan and Israel. ODI-IIMI Imgation Management Network Paper No. 90/3f. December 1990.

Small. L. and Carruthers. I. 1991. Farmer-financed irrigation: The economics of reform. Published in association with IIMI. Cambridge: Cambridge University Press.

Shah, T, and Bhanacharya, S. 1993. Farmer organisations for lift irrigation: Irrigation companies and tubewell cooperatives of Gujarat. ODI Irrigation Management Network Paper 26. June 1993.

Svendsen, M. 1992. Assessing effects of policy change on Philippine irrigation performance. IFPRI Working Papers on Irrigation Performance No. 2. Washington, DC: IFPRI.

Uphoff, N. 1986. Improving international irrigation management with fanner participation: Getting the process right. Boulder, CO: Westview Press.