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Evaluating change in Water Institutions: Methodological Issues and Country Examples

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EVALUATING CHANGE IN WATER INSTITUTIONS: METHODOLOGICAL ISSUES AND COUNTRY EXAMPLES

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I. INTRODUCTION

Wise use of water resources is central to natural resource policy and economic prosperity in many countries around the world. While nations may differ in their aspirations and stages of development, the allocation and use of water resources is often critical to achieving specific regional and national goals including efficiency, equity and overall social welfare. Because economic circumstances change over time, it is often necessary or desirable to change the laws and policy governing water allocation and use in order to solve problems and take advantage of opportunities.

Historically, physical structural projects have been relied upon to address evolving water conditions and changing economic needs. More recently, policy makers have turned their attention to demand side management (like conservation and pricing) in an effort to use the resource wisely. Most recently, analysts and policy makers have become interested in water institutions (laws, regulations and policy) and how they can be designed in a way to cope with change and facilitate the achievement of social and economic goals (Easter et. al., 1998).

This paper outlines the concepts economists use to evaluate how the pressure for institutional change develops and what dynamics are pertinent to the process of change. From an economic perspective, it is tempting to reduce the study to a benefit cost analysis. However, the analysis requires much more. To gain real insight and understanding into the role and importance of water institutions, the analyst must know something about economics and political, as well as hydrology, earth sciences, history and culture. The field is complicated and the analysis is usually neither elegant nor simple.

The overall objective is to generate some insights and ideas into why and how water institutions change, and what factors to look for in order to evaluate actual change at the micro and meso level. The micro level refers to the fundamental forces that generate pressure for institutional innovation, often deriving from individual interests. The meso level refers to the structure and dynamics of the actual process of institutional change, and the factors that may facilitate or pose obstacles to innovation.

Throughout the paper, examples from a variety of countries are provided and described in order to illustrate points and lend some concreteness to the concepts. Economists would expect country context to generate some diversity in the institutional approaches taken to provide access to, and to allocate water. Nevertheless, there may well be some overlap in circumstances faced by different countries and significant opportunities to apply what has been learned from the experience in one country in order to address and resolve the problems faced by another.

II. EVALUATING CHANGE AT THE MICRO LEVEL

Evaluating change in water institutions requires some understanding of political economy. The economic understanding of political economy is rooted in the theory of interest

group politics. The idea is that one must understand the perspective and interests of stakeholders in order to evaluate the pressure for change and also the potential impacts of actual change.

Interest Group Politics

The theory of interest group politics rests upon the idea that individuals are both rational and self interested (Olson, 1965). In standard economic analysis, we assume individuals with a stake in water use and allocation will do their best to meet their own individual objectives, within the existing structure of rights and laws (the initial endowment of income and other resources (including water). In this case the logic is extended to assert that individuals with a stake in water allocation will also seek to change the rules governing allocation in a manner that promotes their interests. Moreover, individuals will attempt to organize themselves with other like-minded parties in a concerted effort to change policy by pressuring political actors.

Individuals with a stake in water use and allocation are not limited to water users alone. Of course, municipal, agricultural and industrial water users who rely on diversions or extractions to operate their businesses are stakeholders. In addition, however, stakeholders include non-water users that have an interest in related outputs or instream uses, like wildlife preservation, recreation and aesthetic environmental quality. Obviously, the goals of interested parties are not always similar in that they may be either economic or non-economic goals. Even when all goals are economic, conflicts between interest groups arise.

The ability of a particular interest group to actually organize and bring pressure to bear on the political system depends on, among other things, 1) the benefits and costs that will be incurred by individuals as a result of changing the rules and 2) the transactions cost associated with organizing with other individuals. How policymakers respond to this pressure is another matter, which is treated in the meso level discussion.

For example, consider a case where a large group of farmers (say two hundred) each have a stake of $100 in changing a particular water regulation in their favor. However, the cost of getting organized would involve some travel and legal costs amounting to $125 per farmer. On the other hand, assume a small set of industrial users (say five) each have a $1000 stake in maintaining the status quo. Also assume that the transactions cost of organizing the industrial users is only $150 per firm, perhaps because an annual industry meeting already exists, so that the potential net gain of $850 is sufficient to stimulate action.

In this case the pressure to change institutions will never materialize, even though the gains to farmers ($20,000 total) far exceed the potential loss to industry ($5000), because, at the individual level for farmers, the costs of getting organized more than offset the potential gains, thereby eliminating the incentive for political action. There are myriad combinations of groups, stakes and transactions costs that each generates a unique outcome in terms of political economy.

Equilibrium and Evolutionary Change

Institutions are in political economic equilibrium when there is no pressure, or, more likely, insufficient pressure for change. Institutions are in disequilibrium, and may change when the political clout of potential winners exceeds the political clout of potential losers (stakeholders in the status quo). Because there is not a clear, direct and proportional relationship between potential economic gains and political clout, actual change may or may not enhance economic efficiency.

Institutions change at different rates and in different directions in different regions and contexts (North, 1990). Clearly, the natural environment is a factor. Water institutions in arid countries garner substantially more attention than water policies in humid regions. For example, in the U.S., in the eastern, more water rich part of the country, the riparian principle was chosen as the original allocation guide. Under the riparian system, property owners have the right to utilize bordering streams, with no explicit limit on beneficial use.

In the arid west, water is allocated based on prior appropriation, which requires diversion from the stream (perhaps to relatively remote locations), with strict limits on the amount of use. However, even within arid regions, institutional change has varied depending on, among other things, the structure of interest groups at a particular time, the cultural context from with those groups and their goals emerge, at the structure of leadership present. For example, while both Wyoming and Colorado water law rely on prior appropriation, they have substantially different dispute resolution mechanisms, which were heavily influenced by the philosophy of important leaders at the time the laws were developed.

Because institutions evolve incrementally over time, evaluating their performance in inescapably incremental as well. There is no once and for all solution. For example, in the eastern U.S., many riparian systems have gradually evolved into permit systems, as water has grown relatively scarce. Evaluating performance in a positive way requires some notion of improved consistency between social goals and institutional structure. The principles of efficiency, equity and overall social welfare may be used to evaluate performance since they indicate the ability of various interest groups to achieve their objectives or, alternatively, face significant frustration.

Economic Goals and Efficiency

Undoubtedly, the pursuit of direct economic gain is the driving force behind many changes in water institutions. Agricultural interests and other producers are often primarily in their profitability. However the extent to which a particular interest group's economic improvement corresponds with an overall increase in economic efficiency is only loosely related. If the interest group in question economic gains are offset by losses elsewhere in the system, their economic position may improve while overall efficiency declines.

It is indeed fortunate if the objectives of the politically prevailing interest group coincide with greater economic efficiency. If, however, it does not, economists have a professional responsibility to identify opportunities to change water institutions in a way that could increase economic efficiency. Once identified, the challenge becomes making persuasive arguments in the political arena in order to influence actual policy.

Institutional arrangements are critical in creating incentives because they 1) define who has access to water resources, 2) establish the range of (legal) choice open to legitimate water users, and 3) determine who can claim income from use and who will bear the cost of use. As such, they are primary in terms of structuring incentives and producing the resulting economic outcome (Bromley, 1982). Economists assert that given the choice domain established by water institutions, individual water users (and others) will behave rationally in a way that maximizes the achievement of their economic or non-economic goals. The interaction between users and the combined result defines the economic outcome at a particular point in time.

Because they create incentives, institutions may also pose a clear obstacle to economic development. Poorly designed institutions send inaccurate signals to water users about the

benefits and costs that accrue to the system as a result of their use and production choices. When individuals respond to a partial or erroneous set of information about the economic consequences of their decisions, the link between individual rational choice and the improvement of overall economic welfare is broken. Incentives are "perverse" and may encourage individuals to use water in ways that reduce overall economic net benefits to the whole.

Countries in the former Soviet Bloc, like Poland and the Czech Republic, provide an excellent, but unfortunate, example of how the lack of economic incentives can lead to seriously inefficient use of resources. Certainly, in the absence of both resource and product markets, the political or administrative principles that guided how water was allocated between various industries and between industrial, domestic, and environmental uses, often led to distributions that were clearly inefficient from a capitalistic perspective (Livingston, Bochniarz and Bolan, 1995).

Equity

As a guiding principle, economic efficiency is powerful, but limited. While institutional change is likely to increase or decrease the aggregate net benefits accruing to a society, it will definitely, and just as fundamentally, change the distribution of those benefits and costs. Because changing the incidence of benefits and costs is inescapable when water institutions change, equity must also be central element of evaluation methodology.

Quite often, equity and distributional issues are a motivating force behind interest group action. Certainly, fairness issues concerning the distribution of water between agricultural and municipal interests are a common theme in water policy controversies around the world. In affluent countries, the distribution of water use benefits between traditional (consumptive) uses and emerging (often environmental, non-consumptive) uses is frequently at issue. In developing countries, poverty is often the key equity issue in shifting water laws and policies.

Equity concerns are often at the root of water policy issues where the rights of indigenous peoples are in question. This theme runs across both developed and developing nations. Institutional issues may concern whether these groups have rights to the water or may address the extent of damage to which these groups may be exposed as other groups exercise their water rights.

For example, in the United States, the question of Native American water rights has been very controversial and has affected water allocation to a great extent in several parts of the country. The Supreme Court case of Arizona vs. California (373 U.S. 546 (1963)) reaffirmed the Winters doctrine which establishes the water rights of Native Americans. Winters vs. United States (207 U.S. 564 1908) states that water rights were in fact granted to Native Americans when Federal reservations were established (thus the name reserved water rights). The great majority of Indian water rights went unexercised for many decades, sometimes for a century. However, they are not lost through non-use, like other water rights in the U.S. Now that these rights have begun to be used, they have required very substantial changes in rights distributions (displacing a great number of existing users) and/or huge compensation packages.

Equity issues surrounding indigenous peoples can also affect water institutions by impacting water development policy. For example, in India, the Sardar Sarovar dam on the Narmada River has brought serious opposition because it would submerge 37,000 hectares of land and inundate the traditional homeland of an estimated 67,000 indigenous Indian villagers (Newsarchives.indianinfo.com, 2003). While the project is intended to bring relief to a drought

prone area of India, it is viewed by many as a large scale abuse of human rights bringing damage to many poor and underprivileged communities. Along with environmental concerns, this issue was a factor in the World Bank's decision to pull funding. While this equity issue is recognized widely as a significant concern, it has not altered the final decision on the dam, due to the weak political power of the effected group.

Social Welfare

In some cases, the overall goal behind institutional change is more fundamental than changing the distribution of benefits and costs. The concern may be the distribution of economic, legal and social opportunity (as distinct from economic outcomes) and the redistribution of economic advantage (Bromley, 1989). The socially desired distribution of economic opportunity reflects a collective attitude about the appropriate social welfare function for the society.

Certainly, South Africa provides an example of how the overall issue of social welfare can be a critical factor influencing natural resource policy. This has been the case for South Africa since the end of apartheid and democratic elections in 1994. Basic access to water for the entire population, especially those disenfranchised in the apartheid era is a fundamental issue that South Africa is trying to address with changing water institutions (Backeberg, 2003). Balancing social welfare objectives with other goals (like cost recovery) is a problem facing a great many countries in the developing world.

The current importance of social welfare as it pertains to water institutions is perhaps best illustrated by the very vocal (while perhaps small) international opposition to privatization of water resources (Gleick, et. al., Pacific Institute, 2003). In this context, privatization refers to transferring some of the assets or operations of public water systems into private hands. While there are many concerns including environmental and equity issues, the main arguments against privatization that point to social welfare concerns are that 1) water provision is (should be) a basic responsibility of government, 2) privatization may bypass under-represented and under-served communities, 3) privatization agreements often fail to include public participation and contract monitoring, 4) agreements may lack dispute resolution procedures and 5) privatization may be irreversible.

This section provides an explanation of the individual motivations that lead individuals to seek change in water institutions and how the same set of goals can be used to evaluate potential or actual institutional change from an aggregate viewpoint. The following section turns to the next level of evaluation at the meso, or middle, level of policymaking. The meso level concerns the actual process of institutional change and the factors that may facilitate or pose obstacles, to innovation.

III. EVALUATING INSTITUTIONAL CHANGE AT THE MESO LEVEL

In order to better understand the evolution of water institutions in practical terms and their impact on economic performance and other social goals, this section decomposes the overall broad notion of institutional change into typologies that capture key analytical and functional elements. At the meso level, institutional change is evaluated in terms of the factors that influence the structure and sequencing of change.

Nestedness and Stages of Change

The breadth and depth of water institutions points to the "nestedness" of institutions. The many levels of water institutions are structurally embedded within each other (Saleth and Dinar, 2003). In this way, a particular rule governing water may be interlinked with a great variety of water rules, linked together by related institutions at many levels. This interdependent structure is extremely important in terms of evaluating what kinds of change in water institutions may actually occur, and what their impact on the system might be.

If several levels of institutions governing water are uncoordinated or conflicting, serious problems can arise in allocating water rationally and in making progressive changes in policy. Analysts in many countries cite fragmentation and uncoordinated policy as a problem in water institutions. For example, in Australia, multiple states have adopted rules and regulations that fail to recognize cross border impacts, which has resulted in ecological damage and basic incompatibility in management systems including data collection (McKay, 2003).

When the basic forces stimulating change in fact materialize, actual institutional change occurs (if it occurs at all) in a stage-based process. While one stage is a necessary prerequisite to the subsequent stage, the process may stop at any point, due to political social and economic obstacles. Three fundamental stages include: 1) changes in the perception of needed institutional change, 2) political articulation of needed changes, 3) steps taken to make changes in water institutions operational and 4) the actual impact of institutional change (Saleth and Dinar, 2003).

The case of Namibia provides an example of how innovation in water institutions can be frustrated at one stage of the process (Heyns, 2003). Since 1997, Namibia has gone through stages one and two of progressive change in water institutions. The need for change has been perceived and politically articulated. Unfortunately, these changes have encountered significant trouble in becoming operational, primarily due to the lack of staffing power and funding. Even though water reform is based on sound rationale, efforts to make change a reality and produce positive impacts on the water sector have been frustrated.

In the sections that follow, some key concepts that are helpful in evaluating the process of actual change are outlined. These factors may affect one of the stages of institutional change. Moreover, there is a considerable feedback effect. Obviously, perception of need affects political articulation, which in turn may lead to operational changes. In addition, the actual outcome of any institutional change (stage four) will influence social perceptions, which may well lead to another round of reform.

The Role of Subjective and Objective Elements in Perception

The perception of needed change in water institutions can result from subjective or objective elements. Two of the most important objective elements are technology and the physical environment. Subjective elements include the ideologies of individuals and groups, biases, and learning.

It is easy to envision how changes in objective resource realities can lead to the perception that water institutions need to be changed. For example, in Australia, the objective reality of serious groundwater overdrafts certainly contributed to the perception that collective caps on groundwater extractions were appropriate (Delforce, et. al., 1990). In some cases, objective elements external to the water sector may contribute to the pressure for innovation in water institutions. For example, in Mexico, broader economic realities, particularly debt relief

problems, structural adjustment and the politics of international aid and lending has been a factor. These elements have been important factors in terms of the growing pressure to liberalize the water sector (Hearne, 2003).

Subjective elements are just as critical to changing perceptions of need for institutional change. The "environmental movement" is a perfect illustration of how biases and ideology evolve by people learning (perhaps from each other). Environmentalism is a "collective attitude" that has grown and definitely influences how individuals evaluate the world around them. In New Zealand, it has been observed that the perception of need has evolved continuously from a focus on flooding, to pollution, to irrigation and then environment (Saleth and Dinar, 2003). While subjective perception is difficult to measure precisely, it can be estimated via contingent valuation and other techniques, like the Delphi method, that are utilized by economists.

The impact of this subjective view on institutional innovation is widespread. It has led to the broad range of changes including the development of instream water rights and proposals to decommission dams (e.g., Hoover Dam) that symbolize past attempts to manage water resources. The role of subjective element of pro-environmental attitudes is not limited to democratic states. This bias was present, and growing, in former Soviet Bloc countries. When Communism collapsed, these bias were transformed into political action and led to substantial innovations in natural resource policy, including those that apply to water resources.

The Pervasiveness of Path Dependency

In order to evaluate the prospect for reforms in water institutions in a particular country, it is critical to consider the significant role of path dependency. Analytically, path dependency refers to the fact that potential changes in institutions are both constrained and enabled by past institutional configurations. Even when the range of possibilities is the same across countries, this does mean each country will face fairly different obstacles in initiating innovations. Path dependence is a factor that helps explain the variety of institutional approaches taken in specific countries, as well as very different rates and directions of change.

Water institutions are linked with related (perhaps other natural resource) institutions, which are, in turn, structurally embedded within the larger legal and agency structure and indeed the overall structure of a particular national government. Path dependence resulting from the embeddedness of institutions means the choice of one institutional component can and usually will affect subsequent institutional arrangements. For example, the general economic liberalizations effected by China, Spain, and many other countries in recent years have had positive impacts on the potential for liberalizing the water resource sector as well (Saleth and Dinar, 2003).

The impact of path dependency, at the broadest level, is clear for countries (like those in Central Europe), which were part of the former Soviet Bloc. For example, the experience of the Czech Republic with a totalitarian regime, as well as its history as part of the Austria-Hungarian Empire, colors the opportunities and obstacles faced at this point in changing water institutions. Because the value of water associated with both fishing and aesthetic beauty were reflected in Austro-Hungarian laws of the 19th century, a historical foundation is established that will facilitate the ability of the Czech government to recognize these values in newly emerging water institutions (Sauer, 2003). In addition, because of the heavy state role in the post World War II era, a centrally managed fund for water resource activities may also be less objectionable than in countries with a different experience.

Institutional Transactions Costs

Once the need for institutional change is perceived, the process of reform requires that new policy alternatives are articulated and eventually implemented. Essentially, in order for change to occur, the political powers that be must take advantage of opportunities and provide leadership. In general, the obstacles that must be overcome, in this regard, can be labeled as transactions costs.

Transactions costs have been defined by Williamson (1985, p. 2) to be "the effort, time and expense necessary to obtain the information necessary to make an exchange, negotiate the exchange and enforce the exchange". These exchanges are essentially economic contracts. Traditionally, the notion of transactions costs referred to the ease or difficulty with which individual economic agents could operate within a given institutional structure. Certainly, the traditional notion is relevant for many countries. For example, in South Africa, recent reforms allowing trade in water rights became effective only after administrative authorities (the Crocodile River Main Irrigation Board) lowered transactions costs by providing both information and coordination services to farmers who were in a position to sell (Backeberg, 2003).

This powerful concept can also be applied to the transactions costs of modifying existing institutions and/or creating new institutional arrangement. When applied to institutional change in the political, rather than economic, sphere, the transactions costs involved refer to costs perceived by political agents in initiating and effecting reforms. To make matters more complicated, due to path dependency, the transactions costs change as the process occurs. For example, the political transactions cost of moving the reform process to midstream and then returning to the status quo might be far greater than the transactions cost of a full successful reform.

Within the political arena, political actors have considerable discretion in terms political contracts they choose to support or oppose. For this reason, political leadership is a key element in evaluating the potential for institutional change. As discretion grows, leadership and commitment to reform become more important. The potential for innovation may be "asset specific", meaning that the possibilities for action may depend on the specific configuration of political actors and their relationship to each other.

Supporting an innovation in water institutions is inherently risky, as any deviation from the status quo will alter power and economic outcomes. In the extreme, political careers may be at stake. This general principle can be illustrated by an air quality case in Poland. In post communist Poland, resource policies were undergoing substantial innovations. In 1992, the environmental minister suggested a substantial reduction in air pollution charges (by 30%). Scientists, environmentalists and industries which had already undertaken the investment to cut pollutants, protested. Ultimately, the ministry backed down, and raised charges again. This experience was a factor in the environmental minister's resignation from office in 1993 (Livingston, Bochniarz and Bolan, 1995). This example point to the challenge of effecting change, without significant vacillation in policy, which can disrupt economic activity.

IV. SUMMARY AND RESEARCH IMPLICATIONS

This paper outlines how water institutions can be evaluated at the micro and meso level. At the micro level, the political economy model can assist in evaluating and understanding the individual stake holders involved and their diverse motives in seeking or resisting change in water institutions. Just as importantly, the model helps to evaluate the political power of various stakeholders, and the likelihood that their aims will find political expression. At the micro level, the model points to how evolving subjective interests and changing objective realities combine to shape the forces for institutional change.

At the meso level, the model focuses on the probability that pressure at the micro level will result in actual change. The role of political agents, and the structure of institutions in the status quo are critical. Political actors will do their own assessment of the opportunities to be had by supporting, or initiating, a proposed institutional change as it compares to the transactions costs that will be incurred. The status quo configuration constrains, to some extent, the range of possible reform. By the same token, path dependence means that a modest change may lay the groundwork for substantial improvements in water institutions in the future.

In conclusion, economists have long been able to assess the narrow and specific economic impact of changes in water institutions. However, the relatively new, developing and much broader political economy model of institutional innovation can help generate real insight into additional important aspects of change. The concepts can help economists evaluate both the potential opportunity for beneficial (or detrimental) change and the obstacles that are likely to be encountered. If addressed in a positive way, these concepts can help regions and countries to adapt to changing conditions and design water institutions that can yield real improvement in the use of water resources.

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