

Methodological Framework for the Assessment of Governance Institutions

H. Diaz and A. Rojas
University of Regina
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Please contact H. Diaz at [**harry.diaz@uregina.ca**](mailto:harry.diaz@uregina.ca).

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This document was prepared to facilitate the methodological discussion on institutional assessment. Its purpose is to provide suggestions for a methodological framework for assessing governance institutions that operate in the area of management of water resources. It discusses the concept of institution, the nature of the formal institutions to be assessed, and the main dimensions of the assessment.

THE DEFINITION OF INSTITUTIONS

The concept ‘institution’, as used in the social sciences, refers to all those means that hold society together by creating and maintaining an ordered system of social behaviors and relationships. Institutions tell us how to behave in specific contexts, what to expect from others, and what is right or wrong. In other words, they organize social actions in order to avoid the chaos of a multiplicity of non coordinated behaviors.

Institutions are defined by Buttel (1997: 40) as: “specific or special clusters of norms and relationships that channel behavior so as to meet some human, physical, psychological, or social need such as consumption, governance and protection, primordial bonding and human meaning, human faith, and socialization and learning” Other social scientists adopt similar definitions. For Homer-Dixon (1999: 213) institutions are “the rules of the game in a society or, more formally, (as) the humanly devised constraints that shape human interaction”. Institutions are defined as “stable and predictable arrangements” for the coordination of human interaction (Ferrante, 2003: 5); as “sets of norms, values, and beliefs, developed to resolve” recurring social problems (Hagedorn, 1994: 367). As we could see, there is a basic agreement about the nature of institutions in all these definitions: they involve rules -- which define roles and procedures for people; have a degree of permanency and are relatively stable; they determine what is appropriate, legitimate and proper; and are cognitive and normative structures which define perceptions and interpretations (O’Riordan and Jager: 68).

Others definitions involve not only rules or norms but also organizations in the characterization of institutions. The World Bank defines institutions as “the rules, organizations, and social norms that facilitate coordination of human action”. Newman follows a similar approach defining institutions as “stable sets of statuses, roles, groups, and organizations that provide the foundation for behavior in certain major areas of life” (Newman, 2004: 302). In the same vein, Jordan and O’Riordan (1999: 4) argue that institutions are “structures of power and their resulting organizational forms, and socialized ways of looking at the world as shaped by communication”. A consequence of integrating organizations into the definition has been a conceptual overlapping between the two terms, where some authors conflate institutions and organizations (Janicke, 1990; Putnam, 1993), while others make a clear distinction between them (IHDP, 2005; North 1990; Papadakis, 1996).

The debate about the overlapping between institutions and organizations are in part related to the different forms that institutions assume in society. According to the definitions presented above, institutions range from highly formalized law systems to the more diffuse hegemonic discourses, from highly formalized settings to informal arrangements. For historical reasons some institutions have become highly formalized, assuming an organizational representation, such as the case of many public organizations. But formal organizations, however, are not the only institutionalized settings that exist in society. Institutions also take the form of less formalized settings where there are no always socially recognized organizational structures and specific purposes attached (Haas et al., 1993: 5). Communities and households are good examples of settings where informal rules –such as reciprocity and trust-- define some of the parameters of people’s behavior and the nature of their relationships, in spite of not having the highly formalized nature of bureaucratic organizations. These settings are not just groups of people living in the same area or under the same roof, but they are also formed by rules, discourses, norms, and all those elements that make organized everyday life possible for those people. This duality between informal and formal institutions, however, does not imply that communities and public organizations are necessarily in opposite binary extremes. Communities could also be characterized by the existence of formal institutions, such as local governments.

No less relevant is the fact that informal and formal institutional settings are internally characterized by different experiences, ongoing processes of negotiation and conflicts, and different discourses about nature. So, the two domains are different and complex realities that require to be understood in terms of their relationships to each other and in terms of their own dynamics.

For the purpose of the project it is important not only to maintain a distinction between formal and informal institutions but also between institutions and organizations (IHEP, 2005: 27-28). Neither a rule nor an organization is an institution. Institutions are set of rules and procedures that organize social and political life and make things happen and, accordingly, they play a central role in defining the level of vulnerabilities of systems. Organizations, on the other side, are a concrete representation of an institution that has become highly formalized. Thus, an institution is an underlying, durable pattern of rules and behaviors, and organizations are the changeable manifestation of that, they are surrogates or stand-ins of institutions embodying the nature and processes of specific institutions. We will do this with the important proviso that organizations and institutions are characterized by a permanent interplay, where organizations could also produce changes in institutions.

To recapitulate, our project is a study of “formal and informal institutions, ranging from social mores and cultural patterns of behavior, to organizations and rules as set out in law” (Voisey and O’Riordan, 2001). In this context, we seek to understand the adaptive capacities of *some* informal institutional actors –rural communities and rural households— and the roles played by formal institutional actors –represented by public and private organizations—in the development of those capacities.

Synthesis:

- Institutions are sets of rules and procedures that allow for the coordination of human actions.
- Institutions could become highly formalized, taking an organizational form. It is necessary, however, to make a distinction between institutions and organizations
- Institutions could be formal and informal depending on the degree of formalization of rules and procedures.

THE ISSUE OF GOVERNANCE INSTITUTIONS

Any society is characterized by the existence of a multiplicity of institutions. A rural community, for example, is characterized by the coexistence of patriarchy, market, social and natural capital. These institutions could impact upon each other in multiple ways, affecting the relationships among local people and the relationships between them and the environment. In terms of our project, this institutional complexity could affect the vulnerability of the community --or some of its components-- by increasing or reducing the adaptive capacity of the community or increasing or increasing its exposure to climate. But rural communities, like many other human settings, function within larger institutional systems that link those settings with the larger society. These institutional systems pervade the lives of the community members by imposing a body of regulations, rules, processes, and resources that may either support or conflict with the local institutions, impositions that are carried out by organizational structures such as political agencies (see Alcorn and Toledo, 2000: 218).

The vulnerability assessments of rural communities should provide us with, first, some basic information of how rural people evaluate the performance of these larger institutional systems; and second, a sense of the degree of legitimacy of these institutions --the predisposition of people to accept the validity of these institutions in terms of reducing their vulnerabilities. This is an important starting point, but our evaluation of the existing institutional capacity must go beyond this initial point and focus on political institutions. In this document political institutions refers not only to those within the domain of government but also to those civil society's institutions that participate in governance: the organization of the relationships between governments and civil society.

There is a strong consensus about the fundamental role that political institutions have played in organizing society and its relationships with the environment. The works of Beck on the "risk society", Foucault's arguments on "governmentality" and Dryzek's approaches to environmental governance are examples of this consensus. There is also a consensus about the relevance of political institutions in addressing concerns regarding environmental deterioration (Papadakis, 1996; Howes, 2005) or social change in general (World Bank, 2002). Thus, there is a need to pay attention to the role played by political institutions in the development of the adaptive capacities of rural communities and households. Political organizations --the formalization of political institutions-- are central to any discussion about "institutional adaptive capacity" since they have a purposeful mandate, a degree of longevity, social acceptance, and a legal basis. Moreover, political

organizations, in the perspective of our project, have a paramount importance given the role that they play in the management of water resources.

The adaptive capacity of a political institution should not be understood as the ability to reduce its own exposure to climate risks but rather as the capacity to perform functions that facilitate the adaptive capacity of their constituencies. Willems, in his discussion of “institutional capacity” and climate policy, describes the nature of institutional capacity, arguing it is the “ability (of a certain country) to mobilize and/or adapt its institutions to address a policy issue, as climate change” (Willems, 2004: 8).

Political institutions require flexibility to deal with the unanticipated conditions that may result from the impacts of climate change. Their role includes implementing an enabling environment that strengthens civil society to deal successfully with the challenges of climate change and by applying specific policies (resource mobilization and allocation and incentives and disincentives). Adaptive capacity, to be successful, must allow for the identification and resolution of people’s problems and the satisfaction of their needs in a fair, efficient and sustainable manner. Thus, the fundamental role of political institutions in is related to their ability to anticipate problems and to manage risk and challenges in a way that balance social, economic, and natural interests.

Our focus should be on those political institutions that organize and participate in the political and administrative systems by which water resources are developed and managed: to say, water governance institutions. Water governance refers to an inter-organizational network that involves government policies and actions related to water, encompassing laws, regulations, and public organizations, as well as those sectors of the civil society that participate in the management of water resources (Hall, 2005: 112; see also Svedin, O’Riordan and Jordan, 2001). In other words, the assessment should be focused on all those rules and organizations that are involved in the management and distribution of water resources in both basins and accordingly, impact upon the vulnerability of rural communities. In this vein, it is important to evaluate not only national and regional/provincial organizations, but also those organizations that exist in the borders between the domains of community and governance institutions, such as local governments, watershed committees, and water consumer organizations, and the relationships between all these layers. There are complex patterns of dependence and autonomy between national, provincial, regional, and local domain of governance that should be understood in terms of assessing the capacity of governance institutions to decrease the vulnerabilities of the communities (see Naess et al., 2005 and O’Riordan, 2001).

Synthesis

- Rural communities function within larger institutional systems that link those communities with the larger society. These institutional systems pervade the lives of the community members by imposing a body of regulations, rules, processes, and resources that may either support or conflict with local institutions.
- Given the centrality of political institutions, there is the necessity to pay attention to the role played by political institutions in the development of the adaptive capacities of rural communities and households. This central role of political

institutions is related to their ability to anticipate problems and to manage risk and challenges in the communities.

- Our focus should be on those political institutions that organize and participate in the governance of water: the political and administrative systems by which water resources are developed and managed.
- Thus, the assessment should be directed to the specific rules that define the use and distribution of water resources and the organizations that participate in the application of these rules (including organizations such as irrigation associations, river council, watershed committees, and others)

THE OPERATIONALIZATION OF WATER GOVERNANCE INSTITUTIONS

For the purpose of assessing the role of governance institutions in the management of water resources and the adaptive capacity of rural communities to water-related climate problems it is necessary to identify the main components of these water governance institutions. These components should represent the main characteristics of institutions: set of rules and procedures, organizational structures, and normative structures which define perceptions and interpretations. In these terms, we suggest four methodological dimensions for the assessment:

1. **Organizations:** Which are the organizations that compose the water governance institution in each basin? What are their formal roles and responsibilities? How do they link to each other?
2. **Instruments:** What are the main policies, plans, and regulations that govern or affect decision-making with regard to water resources in both basins? Are they able to deal with the challenges associated to water problems?
3. **Management and decision-making effectiveness:** What are the main institutional arrangements internal to the organization and how do they impact upon good governance? Do organizations have the necessary ability to deal with challenges of developing a stronger adaptive capacity? What are the main constrain of organizations in terms of dealing with rural communities and households? The assessment of how organizations operate within the basins, which involves the evaluation of elements of coordination; inclusiveness; scope; mix of strategies; adaptive capacity; and effectiveness.
4. **Values regarding climate change and sustainability issues:** What are the main discourses that exist in the governance institutions regarding climate change and sustainability?

1. Organizations:

The assessment should be oriented to identify and describe all decision-making authorities and organizations involved in the management of management of water resources in each basin, as well as their main roles and responsibilities and formal linkages with other organizations. This exercise should be oriented not only to the identification of central and regional government organizations but also local governments and civil society organizations that participate in the process of water

governance (river councils, watershed committees, irrigation associations, and others) and the relationships between these layers. This will allow us to develop a clear sense of the basic architecture of water governance and the distribution of institutional power –the problems of autonomy and dependence-- among the institutions in each one of the basins. We already have a significant amount of data in this area for both basins:

- a. SSRB: The paper on “Institutions and Institutional Adaptive Capacity” elaborated by Diaz, Rojas, Richer, and Jeanne, 2005 contains an appendix entitled “Public and Private Institutions in the Area of Water Resources, Canada and Chile”, which describes the main public and civil society organizations in the two countries. A version of the Canadian section of the appendix containing substantial revisions and additions was produced by Corkal, Inch and Adkins from AAFC-PFRA.
- b. ERB. In addition to the appendix of Diaz’ and Rojas’ paper there are a couple of documents produced by Morales and Espinoza that describes not only the public organizations but also the most relevant civil society organizations involved in the governance of water in the basin. The paper from Zavala et al., “Hidrologia de la Cuenca del Elqui”, also contains a large amount of information.

The work left in this section of the assessment is not significant. It requires systematizing the existing information, mapping the structure and identifying and filling gaps.

2. **Instruments:**

The assessment should identify the most relevant instruments (sets of formal rules) that govern or affect decision-making with regard to water resources in both basins. In addition, it is necessary to gather information about the assessment that the main actors make of the positive and negative aspects of these instruments in terms of dealing with actual and potential water management problems. Instruments of concern for the governance institutional assessment are those that relate in whole, or in part, to areas such as climate change, water resources, consumptive water, disasters, health, and others.

Examples of these instruments are the Saskatchewan Watershed Authority Act, which provides authority to manage, administer, develop, control and protect the water, watershed and related land resources in Saskatchewan, or the Saskatchewan Municipalities Act, which provides municipalities with the powers, duties and functions necessary to fulfill their purposes. In the case of Chile, a fundamental instrument to be evaluated is the Water Code. Documents to be evaluated too are those developed as policy frameworks or guidelines, such as “Water for Life” from Alberta Environment.

Two main tasks should be carried out in this area:

1. A systematic listing and description of the instruments relevant to water governance in the two basins. The information is already available in a diversity of secondary sources: online source materials related to governance instruments; government records; and documents obtained directly from organizations.

2. The design of questions that could be used to gather information about the evaluation that organizations make of these instruments.

3. **Management and decision-making effectiveness:**

The assessment should be directed to identify and evaluate those organizational arrangements that impact upon the governance capacity in the two basins. This governance capacity of the organizations involves their increasing and constant attention to the problems of the different sectors of civil society –rural communities and households in our case-- in the context of climate change-induced variation of water regimes, as well as the predisposition to resolve the problems in a way that is satisfactory to these sectors and the government.

Governance, in the context of an institutional capacity to deal with climate change, is related to:

- a. The openness of political institutions to identify problems and issues in the civil society
- b. The ability of political institutions to seek solutions to those problems and dealing with issues, and
- c. The capacity of political institutions to implement solutions

a. The Identification of Problems and Issues

An important element to assess is the institutional knowledge of the current physical and social vulnerabilities in the basins and of the potential impacts of climate change upon the systems of water supply to human settings, such as rural communities

In these terms we are interested in the ability of organizations “to be sensitive to early signs of problems” (World Bank, 2003: 185-186) in the area of impacts of climate change, especially water resources. The existence of appropriate information systems that allow for the gathering and evaluation of information and to make a reasoned decision based on the information are central factors in fostering this sensitivity. Obviously, the issue is not only the capacity to collect information, but also “the quality” of the collected data in terms of identifying local problems and issues, the needs of different social groups, as well as the ability of the institutions to “return” this data to different constituencies. In these terms, issues that are important to assess are:

- **The gathering of information:** the assessment of governance institutions should involve an evaluation of the information that is gathered, such as the type (i.e. information about quantity and quality of water resources) and level (how spatially disaggregated is the information) of information that is collected. In addition, it should also focus on information gathering techniques (i.e. the collection of “ground” information as a way to grasp local problems and impacts).
- **The purpose(s) for collecting the information:** this section should assess the use that organizations make of the information (i.e. to monitor, to diagnose, and to manage problems); the organization of the collected information; the capacity of the information to identify the needs and problems of different groups and to predict problems; and its effective use for decision-making.

- **The return of the data:** The objective here is to assess how effective is the creation of information for stakeholders (i.e. is the information made available to them, how, is the use of the information by stakeholders evaluated by the institutions) and for other organizations to facilitate the governance process.
- **The openness of governance organizations:** to evaluate the openness of organizations it is necessary to evaluate the transparency, performance reporting, and accountability of their decisions (World Bank, 2003: 187). Issues to evaluate here are the existence of reports to stakeholders, the distributional channels of these reports, and the accessibility to the information contained in these reports ((i.e. expert jargon that exclude versus plain language inclusive of most readers); as well as the openness of institutions to make procedures transparent.

b. Seeking solutions to problems and dealing with issues

The identification of problems –vulnerabilities in our case-- imposes a fundamental challenge to the institution of governance: to resolve the problems in a way that balance the interests of the diversity of stakeholders. The capacity to resolve problems requires also internal organizational arrangements, such as the existence of proper resources in the institutions and their ability to link to other institutions in order to coordinate the solution of problems. A key list of factors to assess in the “processing side” is:

- **Integration of stakeholders to the decision making process:** To assess the fairness of water governance it is necessary to assess how the diversity of interests is considered during the decision-making process. In this vein, the World Bank (2003; 187) emphasizes two elements in this process of balancing interests: getting everybody truly represented in the decision making process and facilitating the negotiation process by the timely distribution of credible, easy to access and understand information and by making sure that all stakeholders ways of articulating their problems and interest are heard. For example, the implementation of (appropriately organized, in an appropriate settings and with appropriate language) stakeholder meetings by the public institutions could be an important tool that helps to reduce tensions between different water users, to establish fair systems of distribution, and to create social capital within the civil society.
- **The availability of human capital, material and fiscal resources within the organizations** (Homer-Dixon, 1999). Given that the absence of certain type of skills and/or financial support could impede the organizations of developing their governance capacities, it is necessary to assess the availability of these resources at each stage of the problem-resolution process. **Coordination:** the degree to which different organizations are involved in the resolution of problems and if they agree and act on shared bases, objectives, and methods. This institutional coordination involves the ability of different agencies to communicate and to constructively debate ideas, information, and solution to problems among themselves. Participants should be asked whether there is effective coordination of responsibilities in the management of water resources in the basin, and whether it is clear which decision-maker is in charge of which area. Other issues that are

important in this area are the autonomy and dependence of organizations with respect to each other.

- **Integration:** Critical to this area is an evaluation of the main constraints to increased involvement in decision-making and the existence of institutional barriers, such as management practices that affect the decision-making processes. Participants should be asked to describe the main constraints to increased involvement by their department/agency and explain if that involvement should change.
- **Subsidiarity and scope:** An analysis of the main problems faced in the management of water resources from the perspective of the different decision-making agencies, and the balance of decision making powers. Participants should be asked to identify whether the capacity to solve the problem currently exists, and identify who should bear the responsibility for resolving the issue.
- **Relevance of climate change and sustainability:** This section should deal with institutionalization of climate change and of adaptation as a viable strategy, in the mandates and decision-making process of the institution. It should assess whether or not decision-makers are responsive to changing environmental, social and economic environments in the basins. Participants should be asked to identify whether changes in the basins are adequately and rapidly addressed, or if improvement is needed to protect the fragile nature of the natural and social environments. This area should also highlight the importance of sustainable development --participants should be asked if current policies affecting water use, economy, society, and environment in the basin support sustainable development, and where change will be needed.
- **The capacity for revisability:** This section refers to the capacity of an institution to learn through experience, and change trajectories and practices as required.
- **Effectiveness:** The objective is to provide an opportunity for self-assessment as to whether the different governance organizations have been effective in their management of the basins' water resources. Participants should be asked to describe the main problems and discuss whether they are improving over time or are still a challenge.
- **Legitimacy:** where the logic of an institution or institutional change are publicly defensible and can gain political community support.

c. The Implementation of Solutions

Assessing the governance institutions must involve also the evaluation of organizational capacities in terms of implementing the solutions to problems and issues. Some of the factors that should be taken into consideration in this area are:

- **The information of decisions:** the capacity of governance organizations to inform about their decisions in areas relevant to the use and distribution of water resources.
- **Capacity building:** The capacities of the institutional solutions, embodied in policies and programs, to promote capacity building and problem solving within the civil society. Examples are the implementation of mechanisms oriented to

expand social capital, protect natural capital and network for mutual support within the rural communities, as well as the strengthening and/or development of NGOs and grass-roots organizations that promote the management of resources and the adoption of adaptive measures to resource scarcities.

- **Monitoring and evaluation:** the capacity of the public institutions to monitor the application of the solutions and to evaluate their degree of success.

This area of the assessment requires significant work. It involves making decisions regarding protocols for dealing with the organizations, selection and preparation of instruments, and the further operationalization of the assessment issues listed in this section. Existing material in this area that could be useful in developing these instruments are: Naess et al, (2005); Social Dimensions of Climate Change Working Group (2005); Wittrock, V., E. Wheaton, and C. Bealieu (2001); IHDP (2005); Noble (2000); and the document of the World Bank on sustainable development (2002)

4. Values regarding climate change and sustainability issues

The discourses (value-frameworks, paradigms and models) articulated by governance institutions to respond to the challenges presented by the management and distribution of water resources deeply affect the ways they operate and, accordingly, their effects upon the vulnerability of rural communities. The assessment, accordingly, should be oriented to identify and evaluate the main values that characterize the worldviews of the governance institutions. A study that may be relevant here is the one that was carried out by Welstead, A., D. Davidson, and R. Stedman (2002; available in www.parc.ca/research_pub_communities.htm).

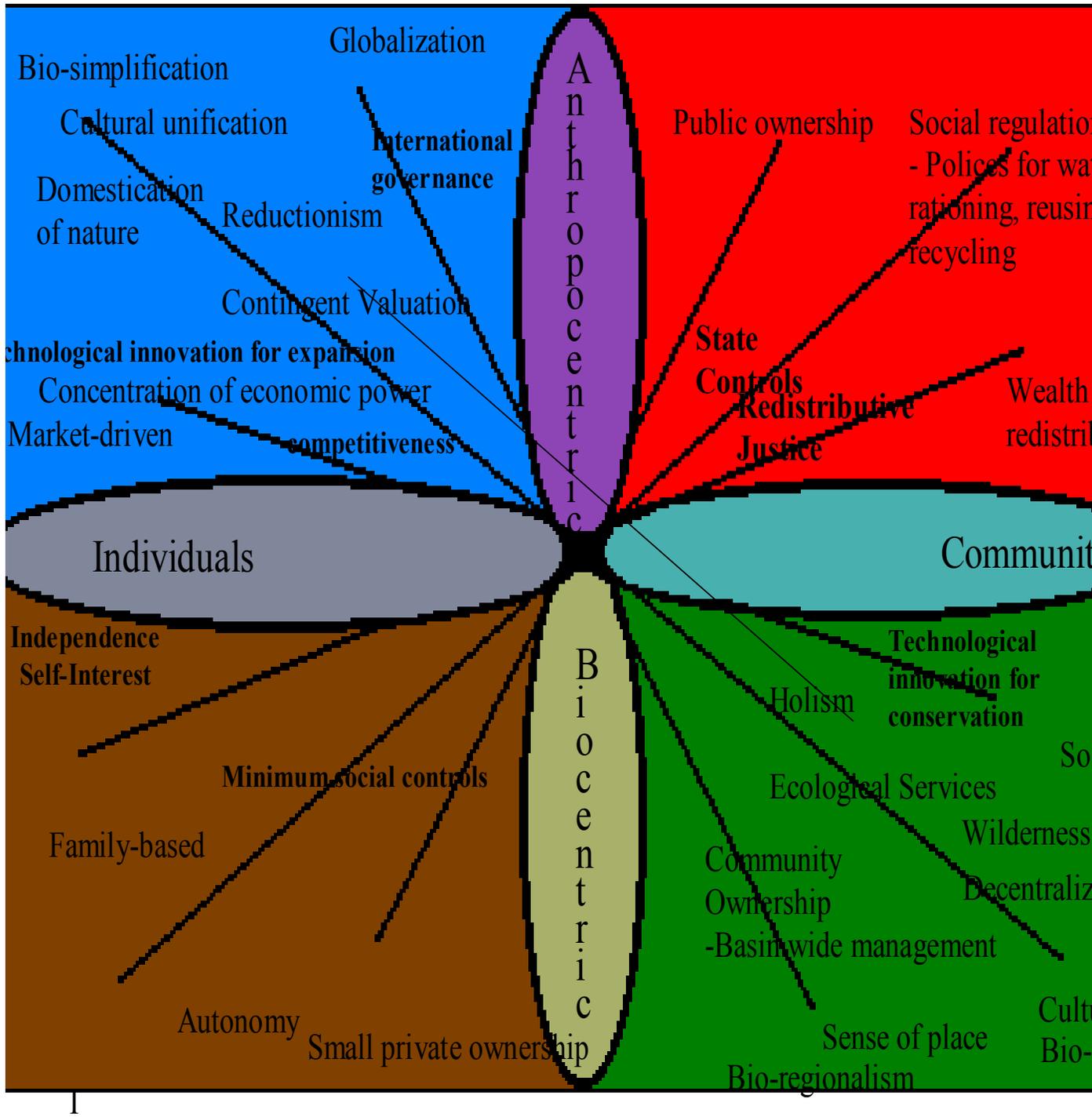
Defining adaptive capacities that enable a system to cope with climate change, such as perceptions of vulnerability, could be quite varied within the water governance institutions in general and specifically the organizations involved in water governance. Some organizations –or individuals within organizations-- may define vulnerability in **strongly anthropocentric** terms, where it is considered more characteristically “about people” rather than “people in places”. Others may consider vulnerability in more biocentric terms, to include biophysical entities, such as ecosystems or coastlines. The first perception is purely anthropocentric because it reduces the effects of climate change to pertain *only* to human systems; whereas the latter perception is a more holistic approach and situates humans *within* the environment, where climate change affects all components and relationships within the eco-system. Closer to biocentrism than to strong anthropocentrism, proponents of **weak anthropocentrism (or ecological humanism)** recognize that while human preferences are deemed the most important in this perspective, here the natural world is also valued because its health is deemed necessary for human survival. They value things human as the most important, but see human dependence on healthy ecosystems and many even argue that a weak anthropocentric position is compatible with valuing nature intrinsically (Murdy, 1993)

As suggested in Diaz, Rojas, Richer and Jeannes (2005), most discourses on climate change (as most ideological constructs) can be located within the interface of two key

axis representing continuums of human values: a continuum having as its core values, on the one hand *individualistic-oriented ideologies advocating individual freedom* and on the other, *socially-oriented ideologies emphasizing social and community responsibility* above everything else. This is of course, the well known axis within which right and left ideologies clash. The former advocating unrestricted entrepreneurial freedom, understood from that perspective, if not as a synonym of individual freedom, at least as its most important pre-condition: free-market economics and consumerist individualism are here the drivers of human progress. The latter, on the contrary, advocates diverse mechanisms of social regulation to arrange more egalitarian distribution of wealth. However, particularly since the emergence of environmentalism and sustainable development another axis of clashing values has emerged: a continuum having on one end, *human-centered or anthropocentric ideologies* and on the other end, *biocentric or ecocentric ideologies*.

The contradictory and varied responses to climate change can be located within the 4 axis or petals in a **Value Paradigmatic Flower** (See [Diagram 1](#) below). In each axis is a cultural or ethical paradigm, and in each quadrant is a corresponding spectrum of core values. Below, we will use this flower model to illustrate the climate change debate, with a focus on responses pertaining to climate change impacts on water. Every colored quadrant shows how institutional responses reflect different core water-related values and paradigms, and aid in explaining if and how policy alternatives can collide or if different consensus can or have been reached. Different policy environments respond at varied combinations of these discourses.

Diagram 1: Value Paradigmatic Flower



Rojas, A. 2002, Rojas & Richer, 2004

An important activity to be carried out with representatives of organizations is to elicit from them what values mapped in the Flower they consider of higher significance. Responses to climate can be mapped, explored and assessed within these large value frameworks and paradigms they tend to support. For the sake of simplicity we will assign colors to the different position. *The Blues* occupy the ideological space resulting from the intersection between individual freedom and strong human-centered values. *The Reds* are placed in the space resulting from the intersection of social responsibility and strong human-centered ideas. *The Greens* can be located in the intersection between social responsibility and bio-centrism. *The Browns* can be located in the intersection between individual freedom and bio-centrism.

The way that governance institutions value water informs how they manage the resource. And in turn, the values the organizational discourses reveal are important keys to understand what potential consensus and conflicts can emerge when they enter into water governance relationships. Most tend to cluster around 2 streams: (1) contingent valuation, and (2) ecological services. In contingent valuation, the value of water is identified by its use value for human needs and wants. It is a method used to measure the “value of non-market and non-use goods and services” in an effort to “estimate respondent’s value of the resource or action in terms of willingness to pay (WTP) or willingness to accept (WTA)” unrealized environmental changes (Duberstein, J., and deSteiguer, J., 2002). Contingent valuation can be based upon anthropocentrism (strong or weak), and can be located in the 2 (“Blue” or “Red”) upper quadrants in the flower model between individualism and community. Examples of adaptive responses informed by contingent valuation, such as WTA water scarcity, can be illustrated if a farmer responds by deciding to rely on crop insurance and/or decides to diversify farm income. Here the farmer decides to accept the problem if he/she finds extra sources of income, and/or receives crop insurance. WTP for water scarcity can be illustrated if a farmer responds by deciding to invest and build a large scale irrigation system and/or decides to rely on dams. Here the farmer decides to pay for the problem by investing or building infrastructure to circumvent the problem of water scarcity. Ecological services considers the value of water to be defined by its intrinsic value and/or as an essential contributor to the health of the ecosystem upon which human life depends. For example, water can be considered as a divine, transformative, and living being; it is a “common patrimony that belongs to the earth and all living beings” (IRDC, 2004). Ecological services can be based upon biocentrism and can be located in the lower right (“green”) quadrant between biocentrism and community. An example of an adaptive response informed by ecological services can be illustrated if a farmer decides to diversify production, enhance water conservation, and increase reliance on the services provided by nature. Here the farmer tries to minimize potential adverse affects of climate change to increase or maintain water availability within regional carrying capacities. Can a middle ground be created in the dialogue between these different values within a governance instance engaged in the search of institutional adaptations to water scarcities? Is the middle ground desirable, possible? This is a key problem to be investigated during consultations with water stakeholders involved in water governance.

Specific responses:

The impacts that climate change poses on water resources typically involve 3 main options for adaptive responses: **(1) increase supply; (2) decrease demand; (3) increase institutional flexibility** (IPCC, 1995; Snover et. al., 1998; Mote et al., 2003). These categories are not tidy and distinct; rather much overlap exists in responses that include increasing supply, decreasing demand and increase institutional flexibility. Many responses that deal with climate change impacts on water resources involve increasing supply. Adaptive responses typically concern building and investing in engineering and infrastructure, such as building dams, large-scale irrigation systems, and drilling water wells (SSCAF, 2003). These responses fall in the upper left (“Blue”) quadrant of the flower between anthropocentrism and individual freedom, since these responses rest upon the notion of further domesticating nature. Other responses involve creating a tiered water pricing system, where either price would be assigned to specified quantities of water, or according to high or low value use (Frederick, 1997). It is assumed here that market prices will naturally promote conservation. This response, if carried out alone, rests upon the assumption that the market will take care of things. Thus, this response can be located within the upper left (“Blue”) quadrant of the flower between anthropocentrism and individuals since the market is deemed the ultimate determinant of social behavior.

The debate that preceded and followed the recently adopted reforms to the Chilean Water Code can be neatly positioned within this framework of competing, conflicting and sometimes overlapping values. The central values embedded in the Water Code established by the military regime in Chile, which created the “water markets” and embarked the country in a process of commodification of water fell squarely in the upper left (“Blue”) quadrant in the interface of individualism and strong anthropocentrism. The reforms to the Code finally enacted by the March 2005 resolution of the Chilean Senate represents a significant displacement towards a weak-anthropocentric and socially-responsible position. Without dismantling the role of the market as a mechanism of allocation of water resources, it provides the Chilean state, through the re-invigorated position of the Direccion General de Aguas (General Direction of Water), with new regulatory tools aiming at arresting the growing process of concentration of control of water in the hands of large agricultural conglomerates and mostly, the monopolistic control of water rights in the hands of ENDESA, the formerly publicly owned and subsequently privatized by the military regime, monopoly of electricity. These reforms are a result of an informal red-green coalition, where questions of re-distributive justice in access to water rights aiming at protecting the most vulnerable sectors is complemented by a greener response aimed at preventing the overuse of water resources in particularly sensitive ecosystems.

Institutional adaptations thus, are influenced to a very significant extent, by the values clashing, competing and overlapping in large ideological, overtly value-driven discourses.

As indicated in Diaz, Rojas, Richer & Jeanne, 2005, responses that involve increasing institutional flexibility, typically involve planning for a wide range of potential impacts on water by incorporating different strategies in management responses. One response is

to identify policies to be pursued when conditions become either wetter or drier, where responses are then phased in to adapt appropriately to the effects (Miller, K., et al., 1997). This response can be located in the upper right (“Red”) quadrant between anthropocentrism and community, since water here is publicly reallocated from low to high value uses in accordance with community needs. Another response is creating and preserving a water safety margin to prevent shortages, which encourages collective responsibility over water, cooperative and integrated basin wide coordination (Frederick, K., 1997; Miller, K., et al., 1997). This response is informed by a policy of no-regret and flexibility (Middelkoop, H. et al., 2001) and can be located within the lower right (“Green”) quadrant of the flower since it implies community ownership, decentralized governance and bioregional sense of places.

Many responses that propose decreasing water demand are influenced by this no-regrets policy, which is a policy, advocated by the IPCC “that will generate net social benefits whether or not there is human induced climate change” (SSCAF, 2003). A host of adaptive responses exist that are informed by this policy. Government responses that encourage the public to conserve water include: “(1) advising the public of potential shortages and monitoring use; (2) requesting voluntary use reductions; (3) prohibiting inessential, high-consumption use such as watering lawns and washing cars; (4) rationing” (Mote, P. et al., 2003); (5) regulations for water reuse and recycling by industrial and commercial users (Miller, K. et al., 1997), and (6) creating measures to reallocate water to uses deemed higher value (Stakiv, E. and Major, D., 1997). Promoting farm production practices that encourage water conservation is a response that can involve: diversifying crops, conserving soil moisture and nutrients, using green cover and buffer zones, protecting wetlands, conservation tillage, water saving (such as with barrels and plastic covers), improving water uptake, and reducing runoff (Brown, 2003; Downing, 2003; SSCAF, 2003). These responses can rest on the principles of weak-anthropocentrism and biocentrism, and can be located in either of the lower (“Green” or “Brown”) quadrants of the flower between community and individuals. These responses rest upon the belief that humans should increase reliance on the services provided by nature, to live within place, and enhance and preserve biodiversity. Finally, many technologies have been proposed to aid in improving water use and efficiency, such as investing in genetically engineered drought and heat resistant crop varieties, and creating more efficient irrigation systems. The assumption here is that adaptation can mean continuing on with business as usual but doing it more efficiently, by continuing to perfect mastery over nature. This response could easily fall in the upper left (“Blue”) quadrant of the flower between individuals and anthropocentrism. But the response of developing more efficient irrigation systems could also easily fall in the lower right (“Green”) quadrant of the flower between community and biocentrism, depending upon the operationalisation of the response; such as whether more efficient irrigation practices are implemented in a way that enhances conservation or expansion. (Diaz, Rojas, Richer & Jeanne, 2005)

Thus, each adaptive response by itself can typically be located within almost *any* of the quadrants of the flower, because the way that each adaptive measure is operationalised

depends upon which discourses inform the institutional operationalisation of the measure itself.

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