Water blues in climate change: The role of institutions in water conflicts and the challenges presented by climate change

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Introduction:

This paper explores the significance of studying water conflicts and the way institutions deal with them, as an important link to understanding communities' exposure, adaptive capacities and vulnerability to climate change. The authors argue that one of the key aspects revealed by the examination of water conflicts is that power differentials in conflict resolution between stakeholders, such as communities and political organizations involved in water governance may increase the exposure, hamper the adaptive capacity and therefore increase the vulnerability of communities. On the other hand, water conflicts also reveal that in the resolution of the conflict the inclusion of a wide spectrum of stakeholders and a genuine effort to understand their interests and values with regards to water issues may decrease the exposure, enhance the adaptive capacity and therefore decrease the vulnerability of communities. Often however, in the resolution of water conflicts both types of outcomes can coexist, whereby for some communities their vulnerability to climate change increases while for others it decreases. The study of the role of institutions in the resolution or management of (or failure to resolve or manage) water conflicts, provides insights to understanding possible and actual institutional learning and needed adaptations to confront climate change-induced water insecurities.

The institutions whose role is more relevant here are those involved in water governance. Institutions involved in resource governance are those who most directly influence decision making, and in the case of water governance these institutions include government organizations responsible for water management and allocation, the ample range of water users and beneficiaries and other civil society organizations. Their role in water conflicts and what they and the communities involved learn from these conflicts provide the focus of the study.

Water conflicts are considered here within the wider stream of studies of *environmental* conflict resolution. Many of the difficulties we encounter to maintain the integrity of ecosystems and the wise use of natural resources are reproduced in cases of water allocation and access, availability, safety and sustainability. In these cases the interests of users are difficult to reconcile and can lead to conflictive situations, particularly under conditions of water insecurity. Thus, we will often refer to water conflicts as a type of environmental conflicts.

The first section of the paper presents the problem statement as articulated by our Institutional Adaptations to Climate Change Major Collaborative Research Initiative entitled "Institutional Adaptations to Climate Change: A comparative study of two dryland regions in Chile and Canada". *In this section we pose the question of whether water scarcities/variabilities are expected to increase conflicts around water at a time*

Comment: Alejandro, I am moving these paragraphs into section 2) conceptualizing water conflicts beause they already get into the conceptualization of what enivornmental/water conflicts are. I other words, I don't think they should be in the introduction, and besides, as it is, the same quote from Sideway is used twice.

when climate change will significantly decrease the availability, reliability and predictability of water which obviously is a foundational element of life.

The second section conceptualizes water conflicts within the wider stream of environmental conflicts. It outlines widely found causes of water conflicts and points out the strategic significance of anticipatory, cooperative ("multistakeholder") approaches to resolve them, in the context of institutional adaptations to climate change and water insecurity. *We argue here that lessons learned in the field of environmental conflicts offer important insights that can be applied to understanding adaptive resolution of water conflicts and offer important institutional and social learnings for adapting to future climate change-induced water conflicts*. The section also argues that social adaptations taking place at the local and regional level are as essential as international agreements and cooperation, and national policies to generate the global cultural transformation needed to adapt to climate change.

In this context, we explore the explanatory value of the concept of *"Adaptive Environmental Conflict Resolution"* (Rojas & Reyes, 2003) and probe it as an approach to address the vulnerability of communities to climate change-induced water insecurities. These water insecurities generate or are expected to generate conflicts and therefore institutional adaptations are needed to face the challenges presented.

This section of the paper *specifically explores current ideas about water governance emphasizing local action and institutional capacities to resolve water conflicts favouring adaptations towards water sustainability.* A number of examples are drawn from the literature on environmental and water conflicts to identify principles and criteria of conflict resolutions that represent successful adaptations to water insecurities.

The third section situates conflicts within the larger question of democracy. It reviews currently accepted ideas in the field of conflict resolutions or management, which in turn frame ways of facilitation and mediation to identify policies and practices which enable adaptation as desirable resources/practices/knowledge base for institutions that have been involved in water conflicts or are expected to be.

The fourth section briefly describes the case studies of water conflicts we have been researching in the areas of study and their vicinity: The case of the Oldman River Dam in Alberta, Canada (a part of the South Saskatchewan River Basin) and the case of the Puclaro Dam in the Elqui River Basin, in the 4th Region of Chile (the two cases will be reported in depth in forthcoming companion papers). Both case studies tend to reaffirm findings in the literature indicating that the building of large water reservoirs as a mayor strategy to achieve water security, despite important achievements in efficient water management, often maintains, or indeed may enhance, inequities in the distribution of water allocation and water rights, hence increasing the vulnerability of the weaker or disempowered groups.. At the same time, both case studies provide ample examples of the social learning and adaptations to cope with future water insecurities and conflicts.

The fifth section presents our discussion and conclusions

I: Problem definition

This paper is part of a series of conceptual-methodological working papers, collaboratively written by various sub-teams within a group 17 investigators from

Canada and Chile involved in the Major Collaborative Research Initiative supported by the Social Sciences and Humanities Research Council of Canada (SSHRCC): "Institutional Adaptations to Climate Change" (IACC http://www.parc.ca/mcri/login0.php). The purpose of this paper is to conceptualize the significance of studying water conflicts and their resolution within the goals of our research agenda. Specifically, we aim at understanding the role of institutions in the resolution of water conflicts as an important element in the assessment of the capacity of institutions to adapt to water insecurities, particularly those related to climate change. The goal of the IACC project is to develop a systematic and comprehensive understanding of the capacities of regional institutions to formulate and implement strategies of adaptation to climate change risks and the forecasted impacts of climate change on the supply and management of water resources in dryland environments. The project addresses this goal through a comparative study of regions at different stages of social and environmental vulnerability: the South Saskatchewan River Basin (SSRB) in western Canada, and the Elqui River Basin (ERB) of north-central Chile. Based on well established and credible scenarios that forecast increasing climatic variability and climate change induced droughts in the two study regions, the project has chosen water as a terrain of investigation or microcosm that can contribute to the understanding of the wider problem of adaptations to climate change (Diaz, et. al, 2003/4).

Due to global warming, it is expected that in many regions there will be an increase in climate-change induced scarcity of natural resources, such as suitable land or sufficient water, with the consequent social disruptions and conflicts. Most governments are adopting, with different degrees of commitment, ***mitigation*** strategies to reduce the emission of greenhouse gasses, signing the Kyoto agreement is an example of the institutional expression of this strategy. Current mitigation strategies alone will not significantly alter the process of climate change and therefore ***adaptation*** strategies are also required (Adger *et al*., 2003; Burton, 1997; IPPC, 2001; Smit and Pilifosova, 2002). Although adaptation strategies can be a spontaneous responses to changes in climate, more effective adaptation strategies are those that are proactive, which are strategies based on sustainability principles and guiding policies that support the development and implementation of practices and processes in anticipation of the expected changes (Diaz, 1995; Diaz and Gingrich, 1992; Gauthier, 1999).

Proactive adaptation strategies and policies are particularly critical in regions that have greatest vulnerability to climate change risks and forecasted impacts of climate change (Handmer *et al*., 1999). The potential for conflict as a response to natural resource scarcity has been well-documented (Gleick, 1993; Homer-Dixon, 1999; Remans, 1995; Yoffe and Wolf, 1999). Social and biophysical realities are intimately linked with the potential for conflict as people experience increased or decreased security, impacts on their well being, and new types of equality and equity or inequality and inequity (Deaton, 2001; Dollar and Gatti, 1999; Ogwanga, 1995; Pong, 1991). People may act or fail to act, invest or dis-invest, in ways that increase resilience or vulnerability, and sustain or degrade ecological systems.

Dryland areas currently subjected to water shortages are at great risk. In Canada, large areas within the prairie region, responsible for 80% of Canada's agricultural output, are particularly vulnerable. Climate Change Impacts and Adaptation Directorate CCIAD (2002) has summarized the potential impacts of climate change on water

resources for the prairies. These impacts include: (1) changes in annual streamflow (possible large declines in summer) with implications for urban and rural localities, agriculture, hydroelectric generation, ecosystems and water apportionment; (2) increased aridity and likelihood of severe drought with losses in agricultural production and changes in land use; and (3) increases or decreases in irrigation demand and water availability with uncertain impacts on groundwater, streamflow and water quality.

The Elqui River Basin in Chile faces similar climate change risks with more dramatic results. Historically, the region has experienced a long-term decrease in annual rainfall and an increase in aridity, accompanied by a deterioration (changing) of environmental conditions. One of the most significant problems has been soil degradation, produced by human activities such as excessive use of dryland agriculture and sheep/goat ranching. The combined result has been a process of desertification at an annual rate of expansion in affected land area of 0.4 – 1.4 %. One of the most critical potential impacts of climate change in the Elqui River Valley will be an intensification of the process of desertification as a result of an increase in mean annual temperature and a reduction in total annual precipitation (Cepeda et.al.2004). While the melting of snow and ice in the Andes mountains may produce an increase in the streamflow of rivers in the short-term, in the long term the region will face an increasing aridity that will have serious implications for the regional population and the existing ecosystems (CONAMA, 1999).

2a. Conceptualizing environmental/water conflicts: Why do environmental conflicts matter?

Over the past decade, in an effort to define a multidisciplinary approach to global, regional and local environmental problems, considerable research has been conducted on the links between environment and conflict. From a human ecology perspective, trends such as population growth mean that human engagement with the environment will grow more extensive and intensive (Dietz, 2003) and presumably offer increased potential for conflict. This, in turn, has led to increased efforts to understand the phenomenon of environmental conflict. . In the case of water, a mismatch between the decrease in supply (scarcity) and an increase in demand from competing users present challenges for its wise use and in the maintenance of the integrity of ecosystems. Thus, we will often refer to water conflicts as a type of environmental conflicts.

While the term conflict itself is a contentious one--capable of sparking fierce philosophical debates--most scholarship acknowledges its politicized nature and because it involves social actors thus distinguishing it clearly from inter-personal disputes. Therefore, environmental (and water) conflicts can be characterized as: “an unresolved disagreement between competing interest groups which has reached the public arena, is controversial and may have political consequences i.e. one interest group is attempting to control the action of another, or its access to a semi-natural resource” (Sideway,2005:Xiii).

Other authors (Brown and Marriot 1993: 234) characterize the broader and somewhat diffuse nature of public policy conflicts where:

- the issue are often complex, many-centred and involve value judgments;
- the nature, boundaries between, costs and participants of a dispute are often unclear;
- there is often a variety of participants who each believe they represent the public interest or a section of it, many of whom act on principle rather than on self interest;
- there are many possible outcomes to the dispute;
- the standards adopted by society may change as understanding, value or technology develops and both the process of efficiently managing the reaction to those changes and the ability to implement agreement over a period of time is likely to be as important as the agreement itself.

In any event, an environmental (water) conflict leads to a halting or even a breakdown in communications among the social actors, which leads them to mobilize resources in order to persuade those who are perceived as the locus of decision-making to act in defence of their interests. When addressing conflicts in general, and environmental conflicts in particular, we have suggested elsewhere (Rojas, et al. 2003b) that while conflict is inevitable, constructive outcomes from a conflict are frequently possible. Environmental (and water) conflicts often involve not only conflicts of interests but clashes of worldviews. Although often conflicts are territorially confined because they are disputes about specific sites and/or the environmental and social impacts of projects changing land and resource use are geographically restricted, there seems to be a deeper human drama involved - the confrontation of values - which shapes and nurtures 'the flame' of environmental/water conflicts. Expressions of (conflicting) 'interests' emerge out of values and their complex nature.. For example, often conflicts emerge out of the rejection of communities, populations or social groups (as in the case of those that define wilderness as having intrinsic, not instrumental value, or those who see water as a sacred element of life), of the very consideration of elements of the natural world as “resources” or fragmented or imbued only with purely utilitarian or economic values. Once values take on the form of conflicting interests, they become as foundational values which are further entrenched in a process of mutual feedback.

Therefore, conflicts may not necessarily be overt or public; they may take the form of “latent conflictivities” that under certain circumstances can become explosive and overt conflicts. Environmental conflicts are very explosive because they normally do not occur within shared systems of meaning; they reflect different values and world views or even different paradigms about development. The disputes are commonly about interests and values, which tend to override the facts (Sabatini, 1995). These “facts” anyway, are never pure objectively-existing entities that can be grasped without reference to the social actors’ (“stakeholders”) ways of making sense of their situation. Therefore, understanding the value basis and local cultural factors influencing the content and dynamics of environmental conflicts is crucial for successful, adaptive resolution. (Rojas, 2003, Rojas et al, 2003b).

Water conflicts often emerge out of conflicting world views and values associated with local culture and traditional water and land use patterns. Hence, modification of the *status quo* associated with long established water rights that govern accessibility and local decision making often create tension, confrontation and conflicts as reflected in the long

battles waged by local communities against the construction of dams. (WCD, 2000:[1]). Yet, the construction of new water management infrastructure, such as dams, and changing land use pattern associated with modern agriculture along with technological innovations are becoming an increasingly common institutional response to climate induced water insecurities. Water conflicts emerge then between those negatively affected and those benefited by new water infrastructure and new water and land management practices. At the same time, the processes used by decision makers often favor new groups of users or new water uses, which can also negatively affect local populations (WCD, 2000:26) The emergence of new rights and the modification of existing rights, become the central issues in the emerging conflicts (Sideways, 2005). In the case of mega projects, such as hydro-electric dams, the displacement of communities generates resistance, conflict and outright confrontation. The cultural impact of changing land and water use, along with displacement of populations has been widely reported. The evaluation of the cultural impact of a dam on the native Pehuenche population in Southern Chile and their relocation is an eloquent example: "The relocation is a process that affects the entire community and its culture. The rupture of family, productive and ceremonial ties constitutes an evident impact that is well underway and of irreversible character*"* (Namoncura, 1999:326).

The above definitions and discussion highlight the presence of organized social structures with adversarial positions and the importance of decision-making structures which provide a channel to resolve or manage a controversy. Yet the "resolution of conflict" may lead to a new phase of cooperation and trust, especially when consensus building has opened the way to negotiations to remove misunderstanding, clarify interest and created a common ground for interested groups. In the following sections we provide an example (2.b) and approaches (2.c, 2.d and 2.e) that present principles for enhancing this process and reaching successful resolution.

2.b Water and Governance: Insights from Research in the Andes.

IDRC (Bruneau, R. 2005;IDRC/Minga, 2003) reports that in the Andes the supply of water is less than the demand, and this situation provides a good case study on approaches to water conflicts that emphasises institutional adaptation[i]. Andean cities such as La Paz, Quito and Bogota face shortages of drinking water, while similar conditions apply to cities such as Trujillo, Arica and Santiago which depend on the Andes for their water supply. Sectors that contribute to the demand for water in the

[1] "The large investments and generalized impacts of large dams have inflamed conflicts linked to their location and impacts, whether they are existing or new proposed dams. Nowadays the building of large dams is one of the most controversial matters from a sustainable development perspective. The proponents highlight the demands steaming from economic and social development that dams attempt to satisfy, such as electricity generation, irrigation, flood control and water supply. Its contenders point towards the adverse impacts of dams, such the increasing indebtment, the overcharges in costs, the displacement and impoverishment of people, the destruction of ecosystems and fisheries, and the unequal distribution of costs and benefits". The construction of large dams has displaced about 40 to 80 million people in the world. Many of them have never been relocated, nor have they received adequate compensation if received at all. Between 1986 and 1993, approximately 4 million people were displaced every year due to 300 large dams built yearly. These numbers give an approximate dimension of the complexity of the problems, although there are huge variations from case to case. WCD, 2002: 13:17.

Andean region include agriculture, industry, particularly mining and urban dwellers. IDRC researchers argue that this water scarcity condition in the region cannot be solved by more water infrastructure; instead it requires institutional innovations for planning, operation and maintenance.

To avoid conflicts, institutions face challenging decisions over water allocations that are fair and equitable. "Different stakeholders take opposing positions, and negotiating water management is as much about the art of diplomacy as it is about the science of hydrology (…)" Therefore, successful institutions must implement approaches that are appropriate to the local "cultures, landscapes, and conditions — and they must be supported by governments at various levels" (IDRC/Minga, 2003: 3-7).

The following are key insights in relation to multistakeholder processes for water management that the Minga Program Initiative (IDRC) is currently involved in and in partnership with various Andean partner organizations.

2.b.i "Participation in Decision-making"

"Participatory approaches are vital in the management of water and other natural resources. Effective participatory approaches build the capacity and skills of individuals and organizations, allowing them to take on a greater role in management, fulfil more responsibilities, and eventually produce more equitable outcomes. In other words, finding solutions lies in the process through which they are sought." (IDRC/MINGA, 2003: 3-7)

According to IDRC researches, the success or failure of participatory approaches to the management of water is highly dependent on the recognition by powerful and influential stakeholders of their mutual dependency with other water users.

2.b.ii "Institution Building and Decision-making" ((IDRC/MINGA, 2003:5***)***

"Rather than development solutions or models, water management institutions need approaches for adapting and responding to change. Adapting to change is fundamentally a local undertaking, yet it can be influenced by decisions taken by authorities located in other communities, cities, or even other countries." (ibid)

In particular, IDRC researches suggest that the traditional Andean systems of water management can be used as "logical starting points" for developing water management institutions since these traditional systems do function and need only be fine-tuned to be more efficient and to adjust to external pressures.

2.b.iii "The Complex Geography of Water ((IDRC/MINGA, 2003:6)

"Problems arise when rules governing water access and use–and the institutions through which those rules are enforced–fail to guarantee social equity or to maintain water quality and environmental integrity. To confront water management challenges

effectively, different jurisdictional boundaries and the spatial coverage of institutional authority need to be informed by an understanding of change and reconciled with watersheds and people's territorial identity" (ibid)

The impacts of water users' actions and their mutual dependencies can be better recognized through a watershed perspective and through a consideration of the users' sense of identity that may transcend a physical place and political boundaries. For some users their sense of identity encompasses—in addition to a physical territory—cultural, economic and historical territories which may not necessarily coincide with a contiguous physical place. This recognition by the users and authorities of shared sense of and mutual dependency that goes beyond mere physical or political boundaries can lead to corresponding motivation and behaviour for a more effective water management.

2.b.iv "Valuing Water ((IDRC/MINGA, 2003:7)
Since local water supplies are limited, it is necessary to value water and decide how to allocate this scarce resource. There may be some circumstances where price is an effective mechanism for promoting conservation or increasing the efficiency of water use. Yet the choice to pursue this option cannot be imposed upon disadvantaged groups to the benefit of private interests or through non-democratic means. Problems arise when large private demands for water are met without proper consideration of the needs of rural communities and ecosystems for their survival."

Often the "economic valuation" of water undervalues cultural and ecosystem roles creating new frictions and conflicts between the "the dominant economic forces" and the "economically disadvantaged" sectors which usually consider water as a common good rather than a "commodity".

The phenomenon of increasing privatization of natural resources, including water, undermines perspectives such as that of indigenous peoples in the Andes who value water as a public good and as a fundamental aspect of their identity. In addition, the water's ecological functions and its role in human health are often externalized.

2c. Approaches to environmental and water conflict resolution

Approaches to resolving environmental conflicts until recently have been framed by the views of the most powerful actors, which have systematically avoided the full participation of all stakeholders in the resolution of environmental conflicts. For two decades there have been calls for new processes of public involvement in environmental decision making that allow for more reasoned conversation. This has generated a growing literature on what has come to be called "analytic deliberation," the integration of scientific analysis and public deliberation to aid decisions." (Dietz, 2003). The hope is that new efforts will lead to better ways to clarify the distinction between "facts" and "values" and better articulate the values that people bring to a dispute. The reality however, indicates that if under ordinary circumstances people very rarely can disentangle values from behaviour ("facts"), this is even harder under the heat of conflict. However, it is precisely the search for conditions that make possible a constructive dialogue among all social actors involved in conflict that requires new processes of participation.

2c.1 A court-based approach or legal action approach

Traditionally, most environmental/water conflicts in which processes of negotiation and mediation have not succeeded, have been "resolved" through the legal system. In this court-based model of conflict "resolution", the problem is defined as a violation or interpretation of the law. This definition sets the boundaries of the discussion and the formulation of the alternatives to resolve the problem. Solutions are oriented to meet legal requirements. The problem is solved by the imposition of a judgement or the interpretation of the law. It is usually a one-shot imposed solution. This process constrains the issues and forces decisions before there is sufficient knowledge to make a better informed decision (Brown, 1993). Moreover, it reflects a model of conflict resolution based on winners and losers which also excludes greater participation and governance. The experience of the Oldman River Dam conflict, a case study within our study on IACC provides ample demonstration of the long-term futility of this approach to conflicts. A similar situation is exemplified by the construction of the hydroelectric Ralco Dam in the Rio Bio Bio, in southern Chile where the confronted interest of native people with the interest of the hydroelectric utility was finally "resolved" by judicial means, rather than by a process of consensus and negotiation. In the latter case, the native people were obliged to accept the compensations paid for abandoning their ancestral territories. They became the losers in the conflict (Baquedano, 2004, Namuncura, 1999).

In the Puclaro dam construction, in the Elqui Valley, the other case study within the IACC study, there was no legal approach to conflicting interests. The government institutions that planned, designed and built the dam to regulate the water flow of the Elqui River, resolved a set of compensation measures to attend to the relocated communities. The groups that benefited most from the dam comprised mostly of medium and well off land owners with greater security and accessibility to water. They never confronted those that eventually became the losers. In fact, the poorer communities upstream with fewer entitlements and whose land and towns were flooded by the dam did not have the organizational capacities to sustain a long conflict or confrontation and arrived at different settlement schemes with government agencies.

2.c.2 Alternative dispute resolution processes

With the rise of alternative dispute resolution processes, which typically involve mediation, negotiation or arbitration, environmental conflicts have begun to be framed in new ways. For instance, the power-rights-interest construct in conflict resolution put forth by Ury, Brett and Goldberg (Conbere, 2001:216-217) acknowledges that different types of conflict resolution will differentially focus on interests, rights and/or power. However, in favouring an interest-based approach[2] (Sideway, 2005:121), it is necessary to consider: What are some possible costs associated with minimising power and rights in environmental conflicts? While mutual interests might be a means to get parties to the negotiating table, any solution will necessarily involve a dialogue on power asymmetries

[2] A power-based process is determined by who is strongest; it is the most common method used. A rights-based process is determined by rights usually defined by law or contract. The least used is the interest-based processes, which focus on identifying and meeting the needs of each party to the greatest extent possible. Mediation and negotiation are examples. (Conbere, 2002: 217). Consensus building, public involvement and participation is also emerging as a tool to resolve disputes as described by Sideway (2005: 121)

among the parties, their perceived rights, and the expression of their relationships as manifestations of their identity. Creative and lasting solutions can only emerge by considering the inter-connectedness of and between stakeholders, and the social, cultural, religious and environmental milieu within which they operate.

Environmental/water conflicts can threaten political and democratic stability when conflicting systems of meaning (values) are misunderstood by the actors and the agencies attempting to mediate and resolve them. This typically happens when consultation, negotiation, mediation and arbitration take place within a system of meaning and knowledge of only one party (for example, within scientific or technologically-expert knowledge, often the dominant speech). When the "resolution" of the conflict happens in these terms, the outcome may be oppressive for some parties, consensus may not follow and environmental stability may not be obtained." (Rojas et al, 2003b). "Disputes over environmental policy won't disappear, but a more systematic understanding of some of the hidden sources of conflict can lead to less heat and more light in environmental disputes, and ultimately to better decisions." (Dietz, 2003). Moreover, the potential for democratic resolution and institutional learning/adaptation is greatly postponed.

This means that by increasing public participation, opening the access to information and developing conditions for dialogue and consensus, and moving beyond "consultation" and litigation, a more democratic way to resolve environmental and water conflicts emerges, with new opportunities to be discovered and more creative solutions to emerge. These are opportunities in turn, for greater understanding of the profound influence of identity, values and beliefs that are at play in environmental and water conflicts. Finally, the path to greater understanding is presumed to lead to lasting and sustainable solutions acceptable to all parties to the conflict. The creation of more socially acceptable solutions, based on consensus building, may provide a path to institutional adaptations.

The review of the literature on water conflicts strongly supports one of the most authoritative works on environmental conflict resolution produced recently by Roger Sideway (2005). It also lends supports to the systematization of findings by IDRC's network and its most important propositions for conflict management and resolution of environmental conflicts in general and water conflicts in particular. These developments in the field of water conflicts point in the same direction of the key principles of Adaptive Conflict Resolution we have proposed before in our study of environmental conflicts (Rojas and Reyes, 2003).

2.c.3. The explosive nature of water conflicts and cooperation dilemma

In a long and well documented historical review of conflict and security Gleick (1998) claims that "Water resources have rarely, if ever, been the sole source of violent conflict or war. But this claim has led some international security experts to ignore or belittle the complex and real relationships between water and security. In fact, there is a long and highly informative history of conflicts and tensions over water resources: the control of water systems as weapons during war and the targeting of water systems during conflicts caused by other factors. Nevertheless, Gleick's historical argumentation supports the long accepted view that conflicts over water will escalate and that upcoming wars will be over water.

The growing conflictivity linked to water stress has been extensively reported for Africa, and the Middle East (Allan, T., 1998, Gleick, 1998). However, there is also widespread acceptance of the theory that wars over water are truly irrational, and not needed because when economic value is assigned to water and when water is treated as a tradable resource, parties see that the gains from cooperation (in managing the water supply?) exceed the cost resulting from the change in ownership. Of course, this is an ongoing debate.

Yet, the latest international dialogue about how to approach water conflicts is delivering some puzzling novelties. Although practically all researchers on water conflicts acknowledge the potential for heightened confrontation among countries, regions and social actors that share trans-boundary water resources, research findings are showing a wealth of already widespread experiences where creative forms of harmonization indicate that genuine cooperation among all stakeholders emerges as the preferred approach. In the international scene, it appears that the most explosive potential water conflicts are avoided because of the shared awareness of their social, cultural, political and environmental costs.

Interestingly, much of the evidence about the importance of cooperative approaches to resolve water conflicts emerges from the many reports, studies and fora published or animated by the Worldwatch Institute (WWI), a well known environmentalist think tank. In a recent online State of the World 2005 Trends and Facts-Water-Conflict and Security Cooperation (***http://www.worldwatch.org/features/security/tf/5****), it was argued that* despite the potential for acute conflict among states and regions, there is no evidence that supports the idea that that ***potential*** inevitably will lead to the ***actual happening*** of a destructive conflict. This, in a world where:

*"*Strikingly, territory in 145 nations falls within international basins, and 33 countries are located almost entirely within these basins. The high level of interdependence is illustrated by the number of countries sharing each international basin; the dilemmas posed by basins like the Danube (shared by 17 countries) or the Nile (10 countries) can be easily imagined" (ibid)

Despite this potential for conflict, the review by WWI lead the participating authors to critique "inflammatory statements by many politicians and headlines announcing coming water wars" or World Bank vice president Ismail Serageldin's staments claiming that "the wars of the next century will be about water." (Serageldin 1995, quoted in *http://www.worldwatch.org/features/security/tf/5*). Thus, the WWI report concludes that:

> "Cooperative water management mechanisms...can anticipate conflict and solve smoldering disputes, provided that all stakeholders are included in the decision making process and given the means...to act as equal partners." (ibid)

It is interesting to notice from the above commentaries, the real reversal of the traditional stands on which mainstream organizations and politicians would dismiss the claims of environmentalists as "doomsayers" or "catastrophists", and conversely, how environmentalists would emphasize the urgent need to mobilize to prevent environmental disasters and denounce mainstream organizations as insensitive to their claims. Of course, a deeper examination of these positions indicates that the potential for explosive conflict does exist, but also that there is already a wealth of experience indicating that a

move towards cooperative water management at all levels is a real possibility. The costs of proceeding through actual armed conflicts (with all the associated human and environmental tragedies) or through political wars (with all the associated court battles, media and advertising campaigns and billions wasted in processes that often lead nowhere) seem to be just too staggering; other options must be explored.

2.d. The case for participation: Identity and transformation in environmental conflict resolution.

So, why have dominant forms of environmental conflict resolutions, like court decisions that create winners and losers and money compensation or political decisions imposed by government persisted? One of the effects of these dominant forms has been an un-integrated and un-holistic approach to environmental/water conflicts. This approach has been influenced by a displacement of the responsibility for environmental policy decisions in most societies from the legislative to the executive (and thus to the administration). This displacement of decision-making has call into question the legitimization of environmental policy decisions and how to deal with their complexity. In addition to the technical, scientific dimension, these problems have a far-reaching social dimension as well because the necessary process of representing various interests/values in political decision-making either does not take place or takes place to a limited degree. The World Commission on Dams revealed a generalised failure to recognise affected people as partners in the planning process, with rights, and to empower them to participate in the process (WCD, 2000:26)[3]. Furthermore, "Regional Consultations held by the Commission [note: World Commission on Dams] underscored that past conflicts remain largely unresolved for a number of reasons, including poor experience with appeals, dispute resolution and recourse mechanisms" (ibid).

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[3] " Evaluation of the planning and project cycle for large dams revealed a series of limitations, risks and failures in the manner in which these facilities have been planned, operated and evaluated:

- Participation and transparency in planning processes for large dams frequently was neither inclusive nor open.
- Options assessment has been typically limited in scope and confined primarily to technical parameters and the narrow application of economic cost-benefit analyses
- The participation of affected people and the undertaking of environmental and social impact assessment have often occurred late in the process and were limited in scope
- The paucity of monitoring and evaluation activity once a large dam is built has impeded learning from experience
- Many countries have not yet established licensing periods that clarify the responsibilities of the owner towards the end of the dam's effective life

The net effect of these difficulties is that once a proposed dam project has passed preliminary technical and economic feasibility tests and attracted interest from government, external financing agencies or political interests, the momentum behind the project often prevails over further assessments. As a result, many dams were not built based on a comprehensive assessment and evaluation of the technical, financial and economic criteria applicable at the time, much less the social and environmental criteria that apply in today's context. That many such projects have not met standards applicable in either context is therefore not surprising, but nonetheless cause for concern.

Administrative procedures for resolving environmental disputes (which erupt into complex conflicts) must attempt to deal with social complexities from the start, including the complex process through which "factual" knowledge is constructed. Only procedures that are both transparent and participatory can make constructive and durable conflict resolution possible. Thus, processes are as important as outcomes. Moreover, often the quality of the process *determines* the outcome of a conflict. The transparency and openness of the process lends legitimacy to the decision or else it shifts the focus of the conflict to the administrative institutions themselves (Sideway, 2005).

2.e. Challenging the Discourse

The last two decades have shown a series of attempts to challenge the conventional means of addressing environmental conflicts. Attention has shifted not only to participation of all actors involved in conflict, but also to the very nature of that participation. Adding to the growing literature on participatory conflict resolution (Sabbatini & Sepulveda, 1997; Sideway, 2005; Conflict Resolution Network, 2006; Morris, 2006) we have contributed elsewhere a set of principles of "Adaptive Environmental Conflict Resolution" (Rojas & Reyes, 2003). Our approach was the culmination of a collaborative research effort involving Chilean and Canadian scholars and actors directly involved in a series of environmental conflicts in both countries. The case studies indicated that several unsuccessful attempts to resolve the conflicts may be linked to the failures to address differences in values of the stakeholders. Even partial success stories were linked to the creation of a common ground, and new creative solutions only emerged when values were acknowledged, respected and treated as elements of the reality of the conflict.

In our conceptualization, "Adaptive Conflict Resolution" is concerned with (Rojas & Reyes, 2003)

a) redressing the power asymmetries
b) creating elements for shared visions of sustainability between the actors in conflict as a basic condition for democratic and ecologically -sound resolution or management of environmental conflicts
c) creating scenarios for harmonization or adaptive conflict negotiation, mediation, consensus building and resolution

Applying this approach to the study of a number of environmental conflicts has led us to identify eight key attributes which constitute what we call ***"environmentally and democratically adaptive conflict resolution or management."*** The proposed principles are:

1. *Early and equitable access to information for all parties involved, including information about all parties' views.* All parties involved have the right and duty to access the most complete information about the pertinent projects, and this information includes the definition of the problem formulated by each stakeholder in the conflict.

2. *Balanced symmetric power relations are provided in negotiations regarding the outcome and decision-making of the conflict*. The accumulated experience of successful conflict negotiation is seriously considered. The process of negotiation is examined from a perspective other than simply one of mobilizing a maximum

of power resources. The desirability of creating scenarios and methods of negotiation that allow parties in conflict to achieve some degree of power symmetry to articulate their concerns is emphasized.

3. *Recognize, respect and nurture the legitimate differences in values and views to enlighten creative solutions. The flame of the conflict must nourish social creativity to improve the quality of the life of those involved in conflict.* The social energy generated by the conflict can enlighten the resolution when the different perspectives and views are welcomed and respected (along with the heightened spirits revolving around the conflict). The open and public engagement is not repressed but promoted and dissent is not considered offensive.

4. *Conflict resolution must ensure ecosystem integrity and restore negatively affected biodiversity.* There are provisions to protect the biodiversity of places affected by the projects that generate conflict. If the biodiversity is already impoverished, these provisions should ensure restoration or remedial action. The health of the soil, the quality of the water and the native flora and fauna of the place affected by a given project are enhanced rather than diminished.

5. *Social capital must be strengthened by the resolution of the conflict.* The communities' social capital (their sense of commensality, solidarity, mutual aid and shared knowledge and their network of social support) is protected and enhanced.

6. *Industries involved in conflict resolution strengthen their technological and organizational adaptations towards sustainability.* The ability of proponent industries to create technological and organizational adaptations towards ecological, economic and social long-term sustainability is enhanced with new learning.

7. *As a consequence of conflict resolution social organizations improve their negotiating abilities and their creativity*. The capacity of environmental organizations to advocate, negotiate and propose creative solutions is improved.

8. *The democratic authority of the state is enhanced when the moral authority overcomes the use of coercion in conflict resolution*. The authority and legitimacy of state democratic organs are reinforced by a perception of maximization of moral authority and minimization of coercive authority.

The implementation of these principles can be translated into specific guiding criteria and also into specific consequences or outcomes, which can be used to assess the institutional adaptations of organizations involved in water conflict, and more in general, their adaptive capacity within water governance structures that face latent or actual conflicts:

PRINCIPLE	**CRITERIA**	**CONSEQUENCE**
1. Early and equitable access to information for all parties involved, including information	Right to have timely access to all relevant information	all parties are adequately informed

about all parties' views		
2. Balanced symmetric power relations are provided in negotiations regarding the outcome and decision-making of the conflict.	redress power asymmetries and establish negotiating processes based on previous successful experiences	parties agree to create new negotiation scenarios on equitable grounds
3. *Recognize, respect and nurture the legitimate differences in values and views to enlighten creative solutions. The flame of the conflict must nourish social creativity to improve the quality of the life of those involved in conflict*	the different perspectives and values of all stakeholders is welcomed, respected and legitimate component of creative solutions	all views are integrated and complexity and creativity generate new solutions
4. *Conflict resolution must ensure ecosystem integrity and restore negatively affected biodiversity*	maintain or restore the ecosystem integrity and its biodiversity	Biodiversity is protected, enhanced or restored
5. *Social capital must be strengthened by the resolution of the conflict*	the protection of local culture and enhancement of social networks should become a critical objective	social capital is strengthened by the resolution of conflict
6. *Companies involved in conflict resolution strengthen their technological and organizational adaptations towards sustainability*	companies should be flexible and ready to adopt an integrated sustainabilty approach towards conflict resolution	companies with greater organizational abilities and capacities to build sustainable and long lasting solutions
7. *As a consequence of conflict resolution social organization improve their negotiating abilities and their creativity*.	social organizations should seek to improve their negotiating abilities and creativity	new and better negotiating abilities are learned by social organizations
8. The democratic authority of the state is enhanced when the moral authority overcomes the use of coercion in conflict resolution.	the authority should not use coercion to impose solutions to a conflict	authority increases its moral standing and legitimacy and democracy is strengthened

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These principles are premised on the idea that "the most explosive conflicts can be channelled in culturally constructive ways. These conflicts can contribute to the creation of new cultural realities, the substance of adaptive conflict resolution." (Rojas et al. 2003, 2) Adaptive resolution and management of environmental conflicts makes imperative the recognition of power asymmetries between mainstream culture and First Nations, environmentalists, and local communities because each has its own knowledge system, values, ideas and voices (Rojas et al. 2003). Equal footing among the stakeholders in the dialogue of constructive conflict resolution (or at least in constructive management) should help to move communities towards overcoming relations of domination of people

over people (class, gender, ethnicity) and people over nature. Thus 'adaptive resolution' of an environmental conflict should be seen as an opportunity to deepen democracy.

The increasing global demand for resources and energy and the growing nature and impact of large capital intensive investments to mobilize resources that fuel the global markets is rapidly changing traditional cultures and management systems, specially in patterns of land use and resource accessibility to local populations (Quiroga, 1995, Pronk, 1997; Sideway, 2005). The lack of strong regulatory bodies and effective public policies often is perceived as a risk, and as a source of more uncertainty in the access to common goods, which is further complicated by the lack of institutional capacities of a shrinking state and its liberalization policies. The growing perception that markets and corporations rule over democratic institutions erodes the institutional legitimacy of the state and democracy, a critical perception emerging in environmental conflicts. Thus, the question of the legitimacy of institutions appears as an important component of institutional adaptation. The organizations involved in water governance must increase both, technical and informational capabilities and processes of decision-making aiming at more transparency.

3. Democracy and transformation

The idea of linking transformation to successful conflict resolution has a clear place in conflict theory. Although transformation is hard and people whose values are threatened further entrench themselves in their defences, a transparent and safe process which does not begin by asking the changes of values but aims at the opportunity to listen respectfully to all parties, can get the entire group of stakeholders into seeing new vistas of the problem and its potential solutions, and new vistas often create conditions for value changes among all parties involved.

Adding to this perspective, Nader and Todd (1978) suggest that ties between stakeholders in conflict may be rooted in a variety of principles: kinship, residence, patron-client, friendship and competition. It is this variety of principles that must inform a dynamic understanding of the social-relational dimensions of a dispute. In sum, without attention to the socio-cultural aspect, any attempt at resolving issues and conflicts will be a superficial and arbitrary attempt. The question that arises then is, how best to facilitate the inclusion of social aspects of identity in resolution of environmental/water conflicts so as to facilitate a lasting transformation?

The literature indicates that successful resolution minimally requires that

a) formal negotiation includes all parties in conflict
b) all parties agree that formal negotiation will be more beneficial than confrontation
c) mediation is considered legitimate by all parties and it is available
d) the parties involved must be prepared to accept and implement the agreements resulting from the negotiation, and
e) an effective system of monitoring and enforcement of the implemented agreements must occur. (Sepulveda and Geisse, 1995; McCarthy & Shoret, 1984t; Maser, 1996; Rojas, Sabatini and Sepulveda, 2002)

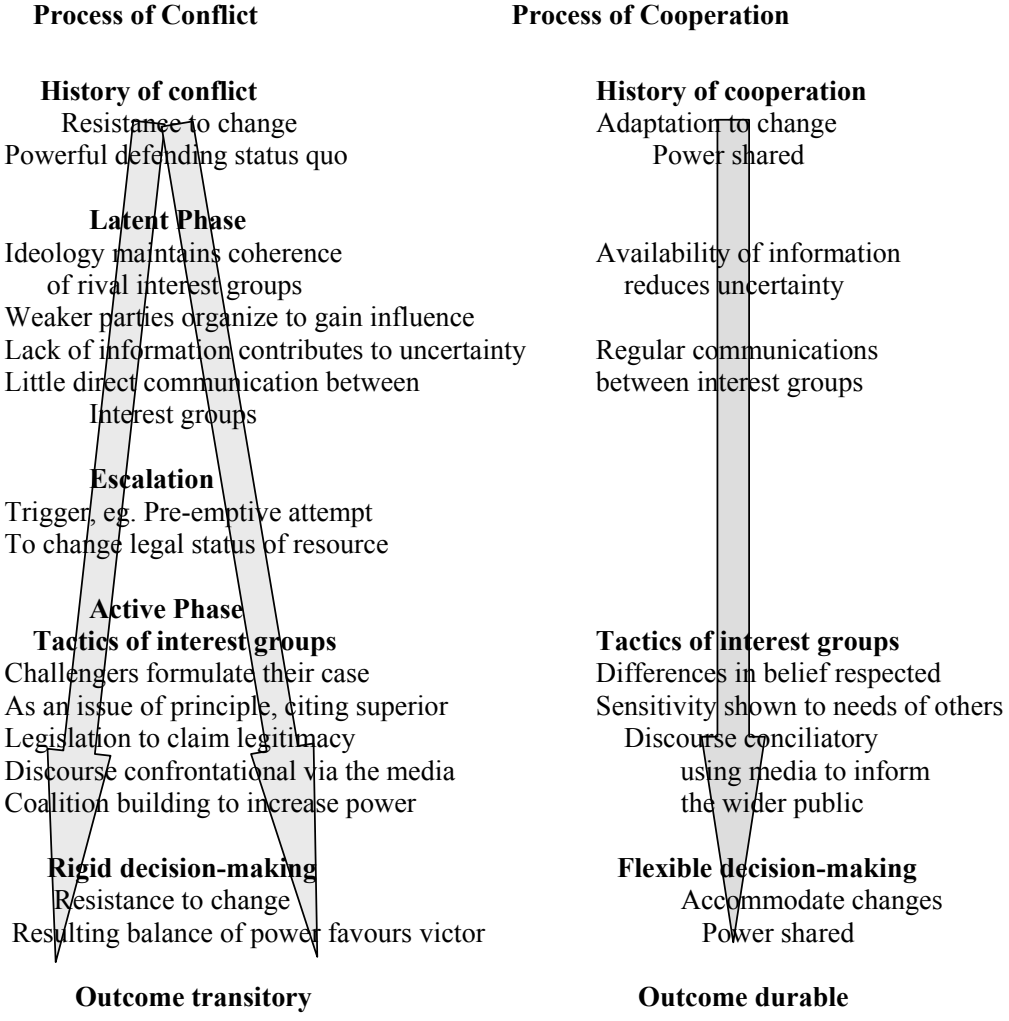
Successful resolution of environmental conflicts (and water conflicts) must also consider the extent to which democratic resolution of conflicts generates organisational change towards sustainability.

One of the greatest barriers to open dialogue between major cultural traditions is the assumption that a universally valid (and presumably secular) framework of knowledge for peace and resolution of conflicts already exists. Said and Funk (2001) argue that this widespread assumption is unreasonable because it breeds complacency, lack of vision, and passive acceptance of dominant paradigms. Dominant paradigms presuppose that peace and human development take care of themselves so long as self-interested actors pursue goals of economic growth and physical security (Said & Funk, 2001). Also, it is argued that the idea of universality of a framework for conflict resolution is exclusive, and implies that approaches based on Non-Western sources, or even religious precepts for that matter, are dangerous and somehow invalid "(Dallmayr, 2000, quoted in Said & Funk, 2001). "It is essential to recognize that the experience of conflict evokes a deep-seated need for affirmation of identity and restoration of meaning. Conflict resolution does more than address material clashes of interest. It speaks to social reintegration, restoration and redemption, existential security, personal transcendence and transformation. The affirmation of individual and group identity achieved through redemptive transformation is essential in giving meaning to conflict and its resolution. (Said and Funk, 2001)

A new ethic for environmental and water conflict mediation and resolution/management should reflect the voices and concerns of all actors. Despite tensions and clashes of interests and values, respectful and creative dialogue is possible, hence the need for formal negotiations that include all parties in conflict. Facing up to the challenges of this complex dialogue can enable a conflict resolution that illuminates the path of adaptive changes towards ecological, social and economic sustainability. It is interesting to notice that in various cases the "warriors" in conflict tend to display knowledge learned from previous disputes that make them more flexible and willing to enter processes of consultation and negotiation at early stages (Rojas & Reyes, 2003)

According to Sideways (2005) as social groups attempt to achieve the upper social position , or the autonomy to exercise rights and authority on the allocation of rights (be that land, water use or access to other resources or decisions) they come into confrontation or interaction with established interest groups and their positions may converge to reach consensus and cooperation, leading to a durable outcome, or they can diverge and escalate through different phases or episodes as the conflict evolves. Hence, conflicts emerge as interest groups attempt to redistribute and/or ascribe a social position regarding access to or control of resources, changing the status quo by creating new scenarios of distribution and control or new rights. Several conditions influence the dynamics of conflicts, such as the exercise of power that leads to a durable or temporary resolution of the conflict if the decision making process is perceived as legitimate by the recipients of the decision. The balance of power between interest groups will influence the outcome of a conflict leading to a process of cooperation or alternatively to a new phase of conflict.

An example of this approach is Sideway's dynamic framework of conflicts, schematically summarized as a transitory outcome with persistent conflict or a cooperative process as a consequence of flexible negotiation:



Dynamic Anlyses of Natural Resource Conflicts and Cooperation in natural Resource Management (from Sideways, 2005:51)

The idea of participation in conflict resolution has also been advanced by Costantino and Merchant (1996) and lately by the stream of writers and institutions involved in conflict resolution, referred to earlier. Central to their perspective is that resolution systems should be simple, easy to use, and accessed and resolved as close to the local level as possible. In the field of conflict resolution, this perspective entrenches the possibility of

self-determination by devolving decision-making power to the local level as much as possible, also known as subsidiarity.

Moreno, while commenting on the role of subsidiarity in social policies in Europe, notes that "territorial identities as sources of legitimacy are intertwined and reflect citizens' multiple attachments to the different institutional arrangements" (Moreno, 2003, 283). Subsidiarity is not about token representations to lend legitimacy to agendas and processes driven by dominant discourses. The principle facilitates the convergence of relationships in order to provide a bridge to consensual resolution or management of environmental and water conflicts. Applied to environmental and water conflicts, the principle of subsidiarity offers a means to prevent the imposition of a majority's will (solutions) to the detriment of weaker stakeholders. In sum, it provides a concrete vehicle for open participation in decision-making during environmental and water conflicts. In doing so, the moral legitimacy and democratic nature of the resolution process is enhanced. Far from arguing that subsidiarity presents the ***only*** means by which democratic participation of stakeholders in environmental conflicts may be achieved, we do assert that it presents a favourable alternative to other means of participation such as representative participation or majority rule or court litigation.

3. 2 Structural obstacles and opportunities

Who are the possible social actors potentially interested in adopting the subsidiarity principle as a vehicle for the facilitation of conflict resolution at the local level? Is this a matter to be resolved at the local level or are there structural forces that act as obstacles to advance this idea?

The evidence seems to be contradictory. At one level, the process of globalisations tends to vertically integrate processes of production, stimulate specialized production according to comparative advantages to compete in international markets and align local governments with the foreign policies of their national counterparts. Local politicians and local governments are subject to these pressures and often must yield to developmental demands of the globalized economy whose investments in the localities bring promises of a better life. At the same time, these globalisation forces actively disrupt local ecosystems and local communities. Local governments and local political forces, acting in the front line must also respond to the disarray of their communities when developmental projects fail to deliver the promises or the "modernizing" effects are perceived negatively by their communities, as it is very often the case. The clash between the macro policies and their impact on the micro level often leads to confrontation between the modernizing and the more conservationist sectors of local communities involved in environmental conflict. A situation is replicated at a larger national level if the conflicts scale up from local to national as evidenced by two recent environmental conflicts affecting water reserves in northern and southern Chile. Large scale investments in the mining sector (i.e. Pascua Lama) received initial governmental support because they were perceived to represent the opportunity for a transformation, modernization and mobilization of local resources in economically depressed regions of the country. Yet, these mega projects also demand new rights to exert control over common resources (glaciers and rivers) and thus entering in confrontations with other interest groups (agriculture, tourism and salmon farming).

These tensions have led in recent years to a new emerging interest in multistake-holder approaches to decision making at the local level, to new levels of political

activity and organization and to efforts to integrate the organizations of the civil society in the decision making. The vast recent literature on "governance" speaks to this trend (Hyden et al., 2004; Johnson, 1997).

4. Institutional responses to water scarcity and water regulation: two case studies from Canada and Chile.

The construction of dams has been a recurrent institutional response to water scarcity and flood regulation. Our study has been researching two case studies in the study regions of Chile and Canada. Both case studies illustrate the emerging water conflicts associated with the river intervention: flooding and displacement of communities and drastic alteration of the habitat and ecosystems of rivers as well as social impacts on local population. What follows is a brief description of the case studies, whose findings will be reported and discussed in forthcoming papers and reports.

4. 1 The Oldman River Dam at Three Rivers, Alberta

The Oldman River Dam built at Three Rivers, Southern Alberta, was aimed at harnessing a portion of the river's flow in a reservoir that floods forty-three kilometers of the river valley and the lower reaches of the two tributaries, the Castle and the Crowsnest River. It is fed by the water melted from snow pack glaciers in the Rocky Mountains and flowing towards its eastern slopes. (Glenn, 1999)

"The Oldman River in southwestern Alberta provides 30 per cent of the water flow for the South Saskatchewan River Basin (SSRB). Completed in 1991, the Oldman River dam was one of a series of large-scale dam projects such as the Gardiner dam on the South Saskatchewan River that were constructed after 1945 to support agricultural and economic development in the arid regions of the SSRB. The government of Alberta built the Oldman River dam to facilitate the expansion of a pre-existing irrigation network serving farmers drought-prone southern Alberta. The total population of the Oldman River Basin constitutes about 10.4% of the total population of almost 1.8 million people in the SSRB" (Marchildon and Daschuk, 2005:1)

The most complete account of the Oldman River Dam conflict is provided in the excellent book by Jack Glennn, "Once upon an Oldman: Special interest politics and the Oldman River Dam." A detailed historical chronology of the conflict and its actual outcome is provided in the companion paper quoted above, by our co-investigators in the Institutional Adaptations to Climate Change Project, G. Marchildon and J. Daschuk, 2005. Here is their summary of the chronology:

"Before the 1970s, the development of water management strategies, and irrigation development in particular, were perceived as a local issue of economic development. Putting water to "use" for the agricultural community rather than having it "wasted" as it travelled downstream was widely accepted as the best means to support economic development in the arid regions of the southern prairies. By the 1970s, however, this assumption was increasingly challenged. With a growing awareness of the inherent value and fragility of natural ecosystems, governments – particularly at the federal level – began to weigh the economic benefits of large-scale water

diversion projects against their potential harm through formal environmental assessments.

In 1973, the federal government established its first "environmental assessment and review process" (EARP). These guidelines served as the basis for Ottawa's responsibility to assess the environmental consequences of development projects until the mid-1990s although the federal government did not always apply its own guidelines. This was found to be the case for the Oldman Dam project, and the Friends of the Oldman River (FOR), an environmental advocacy group, were forced to go through the courts to get the federal government to conduct an environmental review. Only in May 1992, after the Oldman Dam was completed, did a court-ordered EARP examination of the project recommend that the structure be decommissioned. This report stated that "the environmental, social and economic costs of the project" outbalanced the economic benefits."[4] Environmental advocates including FOR have been challenging aspects of the project ever since.[5]

While the EARP guidelines have been superseded by the passage of the Canadian Environmental Assessment Act (CEAA) in 1995, most of the environmental challenges to the continued operation of the dam have stemmed from the 1992 EARP recommendations(…) and the federal government's alleged failure to abide by its own recommendations as set out in the EARP report.

Beyond the salient environmental issues, Aboriginal rights have played a longstanding and central role in this conflict. The Peigan (Pikani) First Nation (PFN) reserve, near Brocket, Alberta, straddles the Oldman River downstream from the dam. Initially, the PFN's leadership was in favour of its construction. Since the selection of the dam site, the PFN has challenged the legitimacy of the project on the basis that the development has adversely affected water flows on the reserve. A protest by the Peigan in the form of a blockade in the late 1970s over the band's surrender of reserve land for an irrigation canal in the early 1920s was critical to the provincial government's choice of a site (Three Rivers) off reserve land.

Initially, the Peigan leadership was not opposed to damming the river as long as the dam was constructed at Brocket, on reserve lands, and proposed co-management of the project with the Alberta government. To avoid this, the provincial government built the dam outside of Peigan territory at Three Rivers, and instead promised to work out an economic development package with the band. When the province subsequently failed to act on this promise, elements within the PFN formed a group known as the Lonefighters who then agitated for redress by the province. In

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[4] Cliff Wallis, "Keeping the Oldman Rolling Along: The Courts as a Tool for Riparian Habitat Preservation." *Environment Network News* (May-June 1993), 19.

[5] Two avenues continue to be pursued by FOR in their opposition to the Oldman project. They have submitted a number of Environmental Petitions to the Environmental Commissioner of the Federal Auditor General's office to force the federal government to abide by the recommendations of the 1992 environmental assessment. FOR's has petitioned the Auditor General as recently as June 2004 in regard to the impact of the dam on fish habitat (see http://www.oag-bvg.gc.ca/domino/petitions.nst/viewe) Another means used by FOR in their opposition to the dam has been the Joint Public Advisory Committee of the Commission on Environmental Cooperation (CEC), a mechanism of the North American Free Trade Agreement (NAFTA). In their submissions to the CEC, FOR has contended that the Government of Canada "is failing to enforce and comply with the *Fisheries Act* and the *Canadian Environmental Assessment Act* (CEAA)." (see http://www.cec.org)

September 1990, a confrontation between the RCMP and the Lonefighters convinced the PFN council to change its position and unite with the Lonefighters and other band members in opposition to the dam.

In 2001, after years of negotiation, confrontation and threats of litigation by band members, the governments of Alberta and Canada reached an agreement on compensation with the PFN in 2001. The band was paid $64.3 million with an annual payment of $500,000 for the use of Peigan land.[6] Each of the band's 2600 members received payment of $1000.

Peigan opposition to the project was not monolithic. Some band members saw the construction of the dam as an infringement of the PFN's inherent right to protect and govern their own land and resources. Still others, including key PFN political leaders, were angry at the failure of the Alberta government to include them as full economic partners in the project. Finally, some band members opposed the dam on spiritual grounds because it threatened territory held to be sacred. This last group shared some common ground with non-PFN environmental advocates although the two groups did not act together.

The imperative of resource development, in this case to supply the irrigation needs of the agricultural economy of southern Alberta, environmental protection and Aboriginal rights is further complicated in the Oldman case owing to the constitutional separation of powers between the federal and provincial governments. The Government of Alberta was the proponent of the project as well as the owner and operator of the dam. The federal government's responsibilities under the Fisheries Act and the Navigable Waters Protection Act, in addition to its fiduciary duties under the Indian Act, presumably required it to act in the best interest of both the Peigan and the environment. However, the constitutional negotiations over Meech Lake and Charlottetown – highly influenced the federal government's actions, or lack thereof, at the time. Given the federal cabinet's desire to bring Quebec within the constitutional fold, Ottawa felt it could not afford to alienate Alberta despite the court rulings and injunctions prohibiting the Oldman River dam's completion and in the face of the vocal opposition from both aboriginal and environmental communities" (G. Marchildon and J. Daschuk, 2005:1-2).

For southern Alberta's farming community, the Oldman is the prime source of water for irrigation in this perennially water-short area. And in the minds of many in this community, harnessing the waters of the Oldman offers the best hope for their continued existence and a prosperous future.

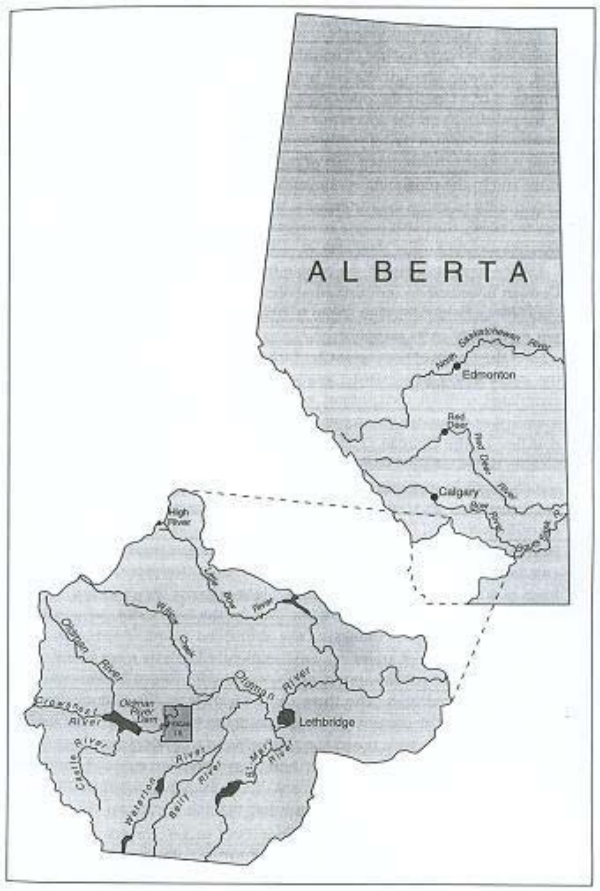
Over the years, the Oldman River and the valley through which it flows have meant different things to different people. For the Peigan First Nation, they are a birthright and a homeland, an ancestral burial ground, a source of spiritual strength, and the thread that binds the Native people with the natural environment. This is land that could also offer the potential for economic development on the Peigan Reserve that could contribute to the well-being of its impoverished residents.

[6] "Peigan to vote on $64-million deal: Compensation offered after building Oldman River Dam." *Calgary Herald,* October 5, 2001, p.4

For those whose farms were flooded by the dam, whose ancestors homesteaded there or who had chosen it as a retreat from the pressures and stresses of urban life, it was a haven, a refuge, a place where they had put down roots

The dam constitute an institutional response to regulate the water supply all year round and overcome the seasonal peaks that characterize the area during the spring and early summer but diminishes to a trickle the rest of the year. Water flow regulation infrastructure is a central element of agricultural policies to phase seasonal as well as inter-annual climatic variations. They can be considered important elements to adapt to climate change and water shortages.

Map: Oldman River Basin and Peigan Reserve



4.2 The Puclaro Dam on the Elqui River

In the Elqui River Valley, the semi-desertic conditions and scarcity of water has led to increasing public investment on infrastructure to regulate water. The Puclaro dam built on the Elqui River has been an integral part of national policies to regulate basins and enhance water security in the region. The construction of the Puclaro dam was initiated in

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1996 and was completed by 1999. It became the largest water reservoir in the area, containing 207 million cubic meters and allowing the irrigation of 20,700 hectares, twice the size of the previous irrigated area. The dam is located about 40 kilometers from its estuary at 432 meter above the sea level. The height of the dam is 595 meters. It benefits about 2,508 water users who hold an average of 8 hectares each. During the construction phase of the dam it became clear that the design had not taken adequately into consideration the implications of the relocation of the population in the flooded area. The five small hamlets and villages inhabited by peasants amounted to about 1,000 people. These groups had different land tenure arrangements, some with well endowed agricultural land and secure access to irrigation water, while others lived on subsistence agriculture and still others made their living raising goat and sheep, surviving on small plots of land and carrying out seasonal migrations. Although 75 % of the inhabitants made their living on subsistence agricultures, the great majority did not have legal land title, only 28% of them did. Their productive land and houses were flooded and their social structure became seriously altered, as recognized in the pre-feasibility studies (INGEDESA, 1994). They were characterized as the "affected population" versus the beneficiaries of the dam, composed of mostly medium size farm owners in the area downwards and west of the dam wall. The beneficiaries are mostly commercial agriculture farmers with predominantly small to medium size farms.

The technical studies recognized the negative social and environmental impact the dam would have over the most vulnerable population of the area. Explicitly it said:
"The generic impact will be the disintegration of the social and cultural organization of a population of rural origin whose main economic activity is agriculture and its patterns of social and cultural organization are those of the peasantry" (INGEDESA, 1994).

The dam became not only a water security infrastructure, it also became the "social frontier" between the population of small-scale farmers and peasants, with low incomes and low educational training, and another larger-scale, more scattered, monocropping commercial farmers with larger political clout and more solid forms of political representation as the "Irrigation Committees" (Juntas de Vigilancia).

In 1997 when the government began to build the dam, they created a special inter-ministerial commission to deal with the process of relocation of the villages. The process generated acute confrontations as a result of the government's decisions aimed at dealing with compensation and relocation of the population into a new area. The local population was not able to maintain a united front as they belonged to different villages and had different land and water use arrangements. As a result, the families were relocated to two different sites, Nueva Puclaro and Nueva Gualliguayca, obtaining quite different treatment and compensations. Many families loss their traditional way of life, all access to irrigation water and felt forcefully relocated and integrated with the neighboring hamlet populations.

The Puclaro dam construction clearly responded to national water security policies, creating many beneficial outcomes to the region's agriculture, improving water efficiency and agricultural output. The dam reflects policies that clearly could be characterized as institutional adaptation to confront future water shortages and climate change. But while the overall cost-benefit analysis seemed to dominate the rationale on water policy, for the relocated population the conflicts are still far from being solved. Water access and water rights still remains a contentious issue for those affected by the dam. Their new land

holding arrangements, in the case of Nueva Puclaro, lack all conditions for farming, with a situation that could hardly allow for sustaining themselves or their traditional knowledge. Hence, a large number of intra-family conflicts have emerged with community structures poorly developed and plagued with conflictivity. Many of the relocated groups seem to have increased their vulnerability vis a vis climate change as they lost their social and cultural grounding to their territory.

Both cases, the Oldamn River Dam and the Puclaro Dam in the Elqui River Valley, are being studied in depth by our team as they represent water conflicts emerging out of state interventions oriented by policies to improve and reduce water variability and enhance institutional adaptations to reduce the vulnerability of agriculture to climate variability. Both cases also represent the complexities associated with the transformation of the territories as commercial and export agriculture becomes the leading economic interest. The pre-existing asymmetries of power which become even more acutely visible as result of the state intervention also portray how the authority of state agencies (and democracy) is eroded by the characteristic of the process and its lacking capacities to properly address the pre-existing social imbalances and newly created vulnerabilities.

5. Conclusions

Trends emerging from the literature on environmental and water conflict resolution seem clear: Institutions that develop adaptive capacities to deal with water conflicts are those that actively seek the participation of all stakeholders. Increasing participation is about posing a challenge to dominant forms of resolving environmental conflict and enhancing democratic values. Domination of a particular discourse is inherently tied to power - which enables one party to "win" at the negotiating table by excluding, subordinating or marginalizing others. Perhaps the only effective way to overcome power asymmetries and to democratize the resolution of conflicts is to balance the voices of all actors involved in the resolution/management process, including negotiation and mediation. This means, in turn, that somebody must provide the resources to make this possible, and most usually of course, the expectation is that it will be provided by the public authorities.

If balancing the voices is the means to balance power, then voice itself is a notion to be explored, examined and questioned. Voice and its expression in the resolution of environmental and water conflicts is rooted in identity, worldview and values, and it is related to forms of representation of interests through organizations, which may or may not successfully represents all in their constituency (i.e. when First Nations' band leaders reach an agreement with businesses and the agreement is rejected by the band members) In contrast to judicial proceedings, in active participation and the expression of their voice, all parties may actively influence the form the solution takes.
In contrast to judicial proceedings, all parties engaged in active participation can actively influence the form the solution takes through the expression of their voice. Genuine and equitable representation of voices not only empowers stakeholders it also further enhances their capacity to negotiate, thus increasing their adaptive capacities.

Lessons learned from the study of environmental and water related conflicts provide a particular opportunity to understand the communities' exposure, adaptive capacities and vulnerability and uncertainty vis a vis access to water, an essential resource in a context of growing climatic changes. It is precisely the role of institutions in managing or

resolving water conflicts and how these resolutions increase or decrease communities' exposure, adaptive capacity and vulnerability that become a central concern for adaptation to climate change. The investigation of what communities and institutions have learned from the conflict reveals important clues about their adaptive capacity. This has been confirmed by the review of the literature on water conflicts and it is emerging as well in our preliminary field work in the study areas. These findings highlight the need of enabling public policy orientated towards? the creation of appropriate scenarios for water conflict resolutions.

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Annex 1.

GUIDELINES FOR INTERVIEWS

General, opening questions:

1) From your point of view, has the conflict of the Oldman River been resolved?
   1.a If yes, in a few sentences, what are the main elements of the resolution? Are you and your organization satisfied with the outcome? Please explain
   1.b. If in your opinion the conflict has not been resolved, what are the pending issues? What future awaits this conflict? What would be a satisfactory outcome from your point of view?

2) The scenarios forecasted by the climate change community indicates that the region of the Oldman River, and that of the entire South Saskatchewan River Basin or the Elqui River Valleywill experience significant changes in the water regime, with sudden increase in intensive water precipitations followed by serious periods of water scarcity and drought. What is your perception and that of your organization of these expected changes? What potential risks would changing water regimes have on your community? What is the state of the discussion and preparedness of your organization with respect to these expected changes?

3) According to your knowledge, are the institutions responsible for water management prepared to adapt to changes in the water regime in the region? If not, what needs to be done? If yes, what are the main adaptive steps taken by those organizations? What are the communication channels between those bodies and your communities? How could they be improved and or created if they are weak or non existent?

Specific questions about the resolution of the conflict:

4) Did the process of resolution of the conflict and its outcome created conditions for a situation of power parity or balance among the different stakeholders?
5) What are the main lessons learned by your organization in the case of the Oldman River Dam conflict?
6) Did the main stakeholders in the conflict come to any kind of consensus after the conflict about how to manage in a sustainable way the water resources in the area? If yes, what are the main elements of the consensus? If not, does your organization have a vision about how water resources could be managed in a sustainable way?

Questions related to Adaptive Resolution of this conflict

7) In hindsight, do you agree with writers about the Oldman River Dam conflict who think that one of the main problem in the generation and unfolding of the conflict was the insufficient sharing of information among stakeholders, about the Dam Project, and about the way each stakeholders view the problem.

a. Did the different stakeholder have some understanding of the others' ways of explaining the problem of the Dam and how it affected them? Some sharing of their respective knowledge and cultural values? Or was it all framed only in terms of the expert scientific knowledge?

b. Was there any kind of forum (besides the media and the courts) to share views and explore the possibility of a common ground? If "Yes", which one(s)? If "No", what could have been done to create them?

8) What is your opinion of the process of negotiation in the conflict? Do you think that all stakeholders felt well represented and with their voices properly heard in the negotiations? Could you share with us your experiences in or about the negotiations?

9) In your opinion, how has the Dam affected the biodiversity of the region where it was built? In hindsight, were the concerns about fish habitat and about natives species of flora and fauna justified?

10) Are the farming community and the agricultural industry of the region better off now that the Dam is operating? What advantages and disadvantages does the Dam offer to adapt to climate change-induced changes in water regimes? Has it increase adaptive capacity? If yes, what are those new adaptive capacities? And if not, why not?

11) Are the communities most affected by the construction of the Dam better of? If yes, in what ways? If not, why not? (Please comment if you can about the Peigan, the farmers, fishermen and the environmentalist).

12) Has the resolution (or outcome) of the Dam increased the ability of proponent industries to create technological and organizational adaptations towards ecological, economic and social long-term sustainability. If yes, could you provide examples? If not, why not?

13) Has the capacity of environmental organizations to advocate, negotiate and propose creative solutions been improved with the experience of this conflict?

14) What is you opinion about the role of the Federal and Provincial government in this conflict? Has their authority and legitimacy been enhanced or undermined by their role in the conflict?

15) What is you opinion about the role of the courts in this conflict? Has their authority and legitimacy been enhanced or undermined by their role in the conflict?

Annex 2.

The Guiding Principles of Consensus Processes[7]

Principle #1 - Purpose Driven. People need a reason to participate in the process.

Principle #2 - Inclusive Not Exclusive. All parties with a significant interest in the issue should be involved in the consensus process.

Principle #3 - Voluntary Participation. The parties who are affected or interested participate voluntarily.

Principle #4 - Self Design. The parties design the consensus process. (one and two)

Principle #5 - Flexibility. Flexibility should be designed into the process.

Principle #6 - Equal Opportunity. All parties must have equal access to relevant information and the opportunity to participate effectively throughout the process. (one and 2)

Principle #7 - Respect for Diverse Interests. Acceptance of the diverse values, interests and knowledge of the parties involved in the consensus process is essential.

Principle #8 - Accountability. The parties are accountable both to their constituencies, and to the process that they have agreed to establish.

Principle #9 - Time Limits. Realistic deadlines are necessary throughout the process.

Public Negotiation[8]

Why negotiate? Doesn't government just make decisions on our behalf and move on? What did we elect them for then?

Interest-based vs. Position-based Negotiation

Position-based parties often perceive themselves as adversaries, fearful and suspicious of each other's motives, demanding their ideal outcome and seldom aware of what is important to each other. Common strategies include:

- playing group's 'cards' very close to their chest and demanding far more than is expected to be received;
- negotiating with a process and end result in mind;
- measuring success in terms of the other side's losses;
- never asking questions without first knowing the answer.

Interest-based parties:

- separate the people and the personalities from the issues to be negotiated;
- identify the interests that must be accommodated to achieve agreement;

[7] CAN/CSA-Z809 Sustainable Forest Management: Requirements and Guidance Document (DRAFT), Prepared by the Canadian Standards Association, 2002, p. 16

[8] Commission on Resources and Environment, The Provincial Land Use Strategy Volume 3, Public Participation, © 1994, p. 39

- translate interests into clear objectives and evaluation criteria;
- negotiate on the basis of accommodating or reconciling interests rather than trading positions;
- develop and assess options on the basis of interest-based objectives and evaluation criteria;
- give careful consideration to the alternatives to a negotiated agreement and recognize that these influence the potential for agreement[9] (BATNA).

Facilitation

Assisting a group to work towards their goals in a process defined and agreed to by that group. Facilitation requires the group to define:

1. Terms of Reference – what the table has defined as goals and objectives for the negotiation process, outlining the scope and depth of the agreement to be reached – "what's on the table, and what's in the parking lot…"
2. Defining consensus – 100% agreement, 80% agreement/20% can live with the outcomes, >50% with no dissenting sectors… whatever the table defines;
3. Defining conflict resolution processes in order to deal with issues that cannot be resolved between sectors at the table;
4. Providing process moderation, assisting the group in managing their timelines towards consensus;
5. Coordinating information and expert opinion, bringing in mediation where and when appropriate, in support of the table processes, and
6. Recording and reporting on agreements.

Mediation

Mediators at critical points in the process can enhance the potential for success in negotiations. A mediator will:

- assess the probability that an agreement can be reached;
- advise on the process structure and rules of procedure;
- assist the parties in evaluating their alternatives to negotiation;
- convening the negotiations;
- training participants in interest-based negotiation;
- brokering ideas and helping parties address difficult issues; and
- drafting materials that address sensitive issues as a starting point for discussion.

[9] R. Fisher and W. Ury, *Getting to Yes: Negotiating Agreement Without Giving In*, Boston, 1981; L. Susskind and J. Cruikshank, *Breaking the Impasse: Consensual Approaches to Resolving Public Disputes* (U.S., 1987)

[i] See Minga Project **http://network.idrc.ca/ev_en.php?ID=45715_201&ID2=DO_TOPIC**