The role of institutions in the resolution of water conflict. Adaptive conflict resolution, vulnerability and adaptive capacity.

Alejandro Rojas, Bernardo Reyes, Lorenzo Magzul, Hector L. Morales, Roxana Borquez, Enrique Swartz

Introduction

This paper reports on one component of a larger international collaborative initiative on Institutional Adaptation to Climate Change (IACC) which seeks to understand the capacity of institutions in dry-land regions to adapt to climate change (Diaz et al 2004). One important goal of the IACC Project is to explore case studies of water conflicts as examples of situations of stress or crisis, in which water governing institutions and communities engagedin the conflict may have gained or lost the capacity to adapt to climate change impacts, and therefore contribute to the increase or decrease of the vulnerability of those communities.

Institutions involved in water governance are those who most directly influencing decision-making aincludingthe government organizations responsible for water management and allocation, and the ample range of water users and beneficiaries and other civil society organizations influencing water use.

Water scarcity and increasing droughts resulting from climate change are expected to increase the frequency and intensity of water conflicts (Diaz et al 2004). How these conflicts are managed and resolved, may increase the vulnerability to climate change-related water scarcities of the communities involved in the conflicts. Or, the outcome of the conflict may improve the communities' adaptive capacity, reducing their vulnerability. Our research on Adaptive Conflict Resolution (ACR) has identified eight specific principles and criteria for conflict resolution that institutions involved in water governance and communities can use to improve their adaptive capacity to face water scarcity.

This paper focuses on the description of the Adaptive Conflict Resolution and vulnerability-adaptive capacity framework, which has guided the actual case studies. The framework presented here can be applied in a wide range of of conflicts as a learning tool about the adaptive capacity of institutions that partake in conflict.

Participation in conflict resolution

For two decades now attention to environmental and water conflicts has shifted from generic participation of all actors involved in conflict, to the very nature of that participation. Adding to the growing literature on participatory conflict resolution (Sabbatini & Sepulveda, 1997, Sideway, 2005, Morris, 2006) we articulated elsewhere a set of principles of "Adaptive Environmental Conflict Resolution" (AECR) (Rojas & Reyes, 2003) here referred to as ACR. 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 (Rojas & Reyes, 2003) indicated that several unsuccessful attempts to resolve the conflicts might be linked to institutional failures to address value differences and power differentials among stakeholders. On the other hand, partial success stories were linked to the creation of a common ground and new creative solutions only emerged when all stakeholders' values were acknowledged, respected and treated as elements of the reality of the conflict. Agencies involved in negotiation processess, attempted to redress power differentials to create a leveled field among stakeholders involved. Now, in the context of the IACC project, we conducted in-depth case studies on**wate**r conflicts, analyzed them through a framework, which integrates ACR and the vulnerability, exposure and adaptive capacity framework of the IACC

At the end of our research on environmental conflicts we concluded that "the most explosive conflicts can be channeled in culturally constructive ways…[and that such] conflicts can contribute to the creation of new cultural realities." (Rojas et all 2002) and in the process, we identified the following principles of "Adaptive Conflict Resolution":

1. ACR requires an early and equitable access to information for all parties involved, including information about all parties' views
2. Balanced and symmetric power relations are provided in negotiations regarding the outcome and decision-making of the conflict.
3. ACR recognizes, respects and nurtures the legitimate differences in values and views to enlighten creative solutions.
4. ACR must ensure ecosystem integrity and restore negatively affected biodiversity
5. Communities' social capital must be strengthened by the resolution of the conflict
6. Companies and public institutions involved in conflict resolution strengthen their technological and organizational adaptations towards sustainability.

7. As a consequence of Adaptive Conflict Resolution social organization improve their negotiating abilities and their creativity.
8. With ACR the democratic authority of the state should be enhanced because moral authority overcomes the use of coercion in conflict resolution.

The implementation of these principles can be translated into specific criteria to guide the institutional adaptations of organizations involved in water conflict, and more in general, their adaptive capacity within water governance structures, with the general aim of reducing power differentials among stakeholders. Of course, purposefully creating a situation of equal footing among the stakeholders' in the dialogue for constructive conflict resolution (or at least constructive management) will not perse overcome structural relations based on power differentials (class, gender, ethnicity) and differences will remain about how to approach relations between people and nature. But attempts to level the field can provide an opportunity for all stakeholders to learn from each other, attain access to information and discover adaptive solutions that could not be seen prior to the dialogue. This, in turn, can help to move stakeholders towards 'adaptive resolution' of an environmental or water conflict. In various cases, even 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 (Morishita & Hoberg, 2003; Rojas & Reyes, 2003)

Democracy and transformation

The literature indicates that successful resolution of conflicts 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) negotiation scenarios and mediation considered legitimate by all parties are 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, Nader and Todd (1978:18), Sideways, 2005)

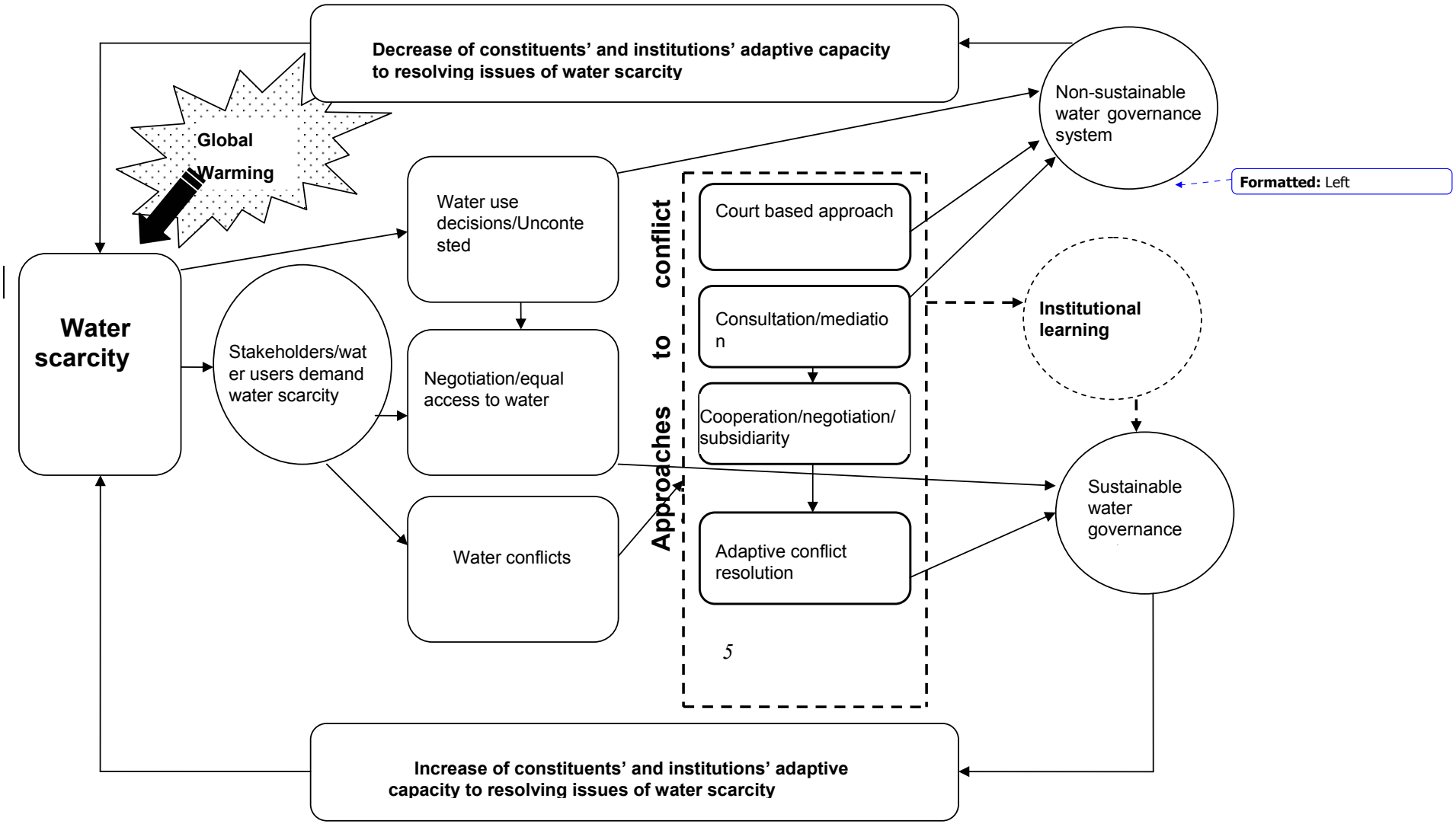
Conflict and communities' adaptive capacity

Figure 1 depicts a model, to trace the path to a sustainable or unsustainable water governance system, in which the constituents of the institutions involved in water governance confer or not confer legitimacy and validity to these institutions. From the legitimacy and validity of these institutions, constituents are open to and accept the development of strategies and measures for water management including those applied at times of water scarcity, exacerbated by impacts of global warming.

Not long ago, in times of water scarcity water governance institutions would implement strategies and measures without consulting the affected communities. The affected communities would often not contest these decisions, even though they may seriously restrict their access to the resource and create local hardships . Thus, this path, seen in the upper part of the model, will eventually lead to a condition whereby both constituents and the water governance institutions loose adaptive capacity to resolving issues of water scarcity.

In more recent years, communities affected by water scarcity conditions have demanded participation in decisions processes, forcing water governance institutions to negotiate with them and to allow them to participate in the decisions. In these instances, these institutions gain the legitimacy and validity from their constituents and, therefore, this decision making process can lead to sustainable water governance condition, especially when an agreement is reached on the decisions taken and that these decisions are considered fair and provide access for all users to the scarce water supply. On the other hand, a condition of conflict arise when communities affected by water scarcity conditions demand participation in the decision making process, but the water governance institutions either do not allow their participation or even if they allow participation an agreement on the decisions taken is not reached, because r the constituents find that their participation in the process is not meaningful (their perspectives and values not genuinely heard or taken into account) and/or the potential results of the decision includes differential access to and benefit from the scarce water supply. Despite the emergence of a conflict, as depicted in the lower path of the model, implementation of ACR principles in the management and resolution of these conflicts could still lead to a sustainable water governance system

Figure 1: **ACR-vulnerability-adaptive capacity model system**



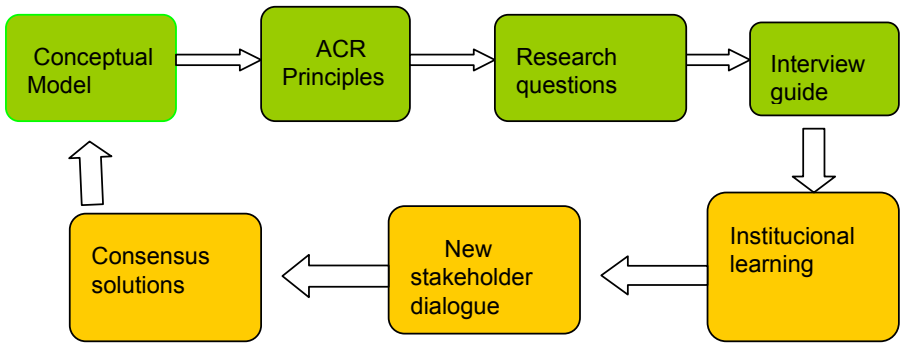
Formatted: Left

Methodology.

Case studies, Adaptive Conflict Resolution and the Vulnerability approach

As already indicated, a given vision of successful adaptive conflict resolution provides principles and criteria that may facilitate the dialogue among stakeholders to generate successful adaptations. At the same time, the vision of ACR provides us a yardstick to study different forms of conflict resolution, to compare them and extract lessons in order to increase the adaptive capacity of communities and institutions. Thus a process of l feedback takes place between: a) the conceptual framework (ACR-Vulnerability-Adaptive Capacity); b) the principles of adaptive conflict resolution; c) the research questions guided by the ACR principles used to evaluate the outcome of a conflict; d) the guide for interviewing the key informants in the research who can contribute their own assessment of the process of conflict resolution and perception about possible institutional learning derived from the conflict; f) then, the multistakeholder dialogue searching common ground and possible consensus, which in turn, may lead to g) institutional adaptations. The green squares in figure # 2 below indicates the steps that lead to integratethe stakeholders' experiences and learnings, the scope and the yellow boxes the quality of the dialogue and the possibility of consensus-based solutions.

Figure 2 Path **to a sustainable water governance system**



The three cases studies

The study was based on three in-depth ethnographic case studies of water conflicts in the two regions experiencing water shortages in Chile (4th Region of Coquimbo and Atacama, the Elqui asnd Huasco River Basins) and Canada (Oldman River in the South Saskatchewan River Basin, Alberta and Saskatchewan), complementing our previous 13 case studies of environmental conflict (Rojas & Reyes, 2003). Two of the three case studies of water conflicts relater conflicts generated by the construction of large dams: the Oldman River Dam in Alberta-Saskatchewan, involving the Piikani Black Foot First Nations, displaced farmers, environmentalists, the Federal Government of Canada and the Provincial Government of Alberta and the Puclaro Dam, in the Elqui River in the 4th Coquimbo Region of Chile, involving displaced communities of peasants, the National and Regional governments and the larger agricultural producers involved in fruit exports. The third water conflict studied was the Pascua Lama conflict resulting from a large gold mining project by Barrick Gold Corporation, a Canadian company that intended to remove the already shrinking glaciers that constitute the strategic water reserve for the Chilean communities of the Huasco River Valley, and of Argentinean communities of the Province of San Juan. The three projects ended up being approved, but the conflict development had profound implications for all stakeholders.

Research questions:

Fieldwork and literature review were guided by the following research questions, reflective of the study goals:

1. Does the type of conflict resolution, and the role played by water governance institutions in them, influence policies of water security affecting in turn, the communities exposure, vulnerability and adaptive capacity to climate change-related water scarcity?
2. What do water conflicts teach about the adaptive capacity of communities involved and the institutions of water governance?
3. What roles have the water governance institutions played in the management and resolutions of the water conflicts studied

(For more detailed monographs on our conceptual framework, and research instruments, please see Rojas, et al 2007 and on the case studies, Rojas 2007 b).

Findings:

The following section compares in a summarized way, how the three conflicts studied were resolved in comparison with the ACR principles

Comparison of Adaptive Conflict Resolution outcomes of the three case study water conflicts: Oldamn River Dam (Canada); Puclaro Dam (Chile) and Pascua Lama (Chile)

1) ACR principle: ACR requires an early and equitable access to information for all parties involved, including information about all parties' views on the nature of the problem.

Outcome:

Oldman River Dam (Canada)): Access to information and participation was not considered equitable and satisfactory by rural communities, environmental organizations and the Piikani First Nation.

Puclaro Dam In Elqui River Basin:. Lack of early scenarios for participation and genuine dialogue, and institutional support for meaningful consultation with affected communities and compensation measures. Authorities provided information to the communities once works were already approved with dual negotiating schemes, further re-inforcing marginalization. "Divide and conquer" approach..

Pascua Lama Conflict: Participation through public discussion and mandatory Environmental Impact Assessment (did not exist when the Puclaro Dam begun construction). Chile's environmental legislation gives the community 60 days "to make observations". But access to information was not considered equitable due to complexity, length and logistical difficulties to access the EIA studies. However, the EIA system allowedthe environmental authorities to demand a set of conditions for approval. Stakeholders' views were presented in public consultations were not binding.. Lack of access to scientific information on the impacts of mining operations on affected glaciers and the hydrological dynamics of the Huasco Basin in the region

2) ACR Principle: Balanced symmetric power relations are provided in negotiations regarding the outcomeand decision-making of the conflict.

Outcome:

Oldman River Dam Conflict: The lack of equitable institutonal opportunities for dialogue were at the root of the conflict and are the main obstacles for an ACR. Mostly federal and provincial government power, allied to irrigation farmers determined the construction and beginning of operation of the dam, ignoring grass-root opposition and even court injunctions ordering the stop of construction works and later, the decommisioning of the dam.

Puclaro Dam Conflict: Clear asymmetries of power in negotiations manifested in the lack of equitable institutional opportunities for dialogue and negotiation. Decisions about the site for their location, appraisal of lands to be flooded as well as time-frame and conditions to find suitable alternative lands, with access to water and fair forms of compensation were all unilaterally defined by authorities and consulting firms. In the end, the capacity to mobilize resources, networking and building alliances led to differential arrangements with the different communities and widespread bitterness within and between communities.

Pascua Lama Conflict: The legal arrangement for an Environmental Impact Assessment does not mandatefthe proponent industry to respond to community-generated remarks. The most well known negotiation was the memorandum of understanding signed by Barrick Corporation, the proponent industry and the Junta de Vigilancia del Huasco (large Farmers' Irrigation Association). It's powerful lobby and its capacity to mobilize resources and organize the communities of the Huasco Valley allowed the Junta to negotiate with the company from a position of strength, but in the end unilaterally accepted l a mitigation and compensation package, in exchange for stopping its opposition to the project and breaking away from the rest of the opposition alliance.

3) Principle of ACR: ACR recognizes, respects and nurtures the legitimate differences in values and views among stakeholders, to enlighten creative solutions.

Outcome:

Oldman River Dam Conflict: Meaningful consultation with stakeholders in the water governance of the Oldman River Basin is now conducted through the Oldman Watershed Council, in which government agencies, businesses, NGOs, and environmental organizations participate. First Nation communities have been invited but so far they have declined. Cross-sectoral representation in the Council is the result of therecognition of the importance of the inclusiveness in management of the water supply at the local level.

Puclaro Dam Conflict: This principle was only partially recognized in the case of the community of Gualliguaica, due to its higher organizational capacity, and the political influence at the regional level of some of its leaders. The rest of the communities (La Polvada and Punta Azul) lacked the resource mobilization and negotiating capacity of Gualliguica, achieved poor solutions that marginalized them. The regional government authority decided to negotiate only with leaders who chose to collaborate to avoid dissenting voices within the communities

Pascua Lama Conflict: The meetings between Barrick and the Junta de Vigilancia (Irrigation Association culminated in a memorandum of understanding by both parties, an unimaginable outcome at the beginning of the conflict. The dialogue between the company and the social organizations opposing the project was just incipient and it was complicated by the company's attempts to "divide and conquer", to isolate those community groups seeking outright rejection of the mining project due to its impacts on the already debilitated glaciers

4) ACR must ensure ecosystem integrity and restore negatively affected biodiversityOutcome:

Oldman River Dam conflict: The Environmental Impact Assessment on the territory of the Piikani Nation is the outstanding issue in the Oldman River Dam conflict. However, the Piikaniclaim that the cotton wood,sweetgrass and fishhabitat has already been deeply disrupted.

Puclaro Dam Conflict: Neither the proponents of the dam nor the community-based organizations advocated against potential negative ecological impacts of the dam and the fragmentation of the habitat of the Elqui. .. Since the dam was built before the Environmental Impact Assessment legislation was established, the authorities had not even mentioned any mitigation of environmental impacts. However as a result of new studies on climate change impacts of dams and a new policy of conservation of biodiversity encouraged by Chile's National Commission for the Environment (CONAMA), ecosystem integrity begins to emerge as a public policy issue

Pascua Lama Conflict: Following the EIA the environmental authority demanded s modifications to the original project, the most important being a prohibition to intervene on the glaciers. However specifications for road building, explosions and dust dispersal do not guarantee that the glaciers will not be negatively affected, due to the characteristics of the landscape and strong winds. Ecosystem integrity was a consideration during the negotiations but the actual effects the minning operation have remained unknown. Community-based organizations are highly suspect of the project because already the exploratory studies strongly affectedthe territory and the glaciers. Also, studies of high altitude complex ecosystems, including glaciers, are at best scarce and incomplete.

5*) *Community Social capital must be strengthened by the resolution of the conflict

Outcome:

Oldman River Dam Conflict: Members of the Piikani Nation see themselves as the most affected: the monetary compensation and the amount of compensation ($64 million) agreed on created severe divisions in the community, culminating with a crisis of legitimacy affecting the Band Councilwhose finances are now under third party management by order of the federal government. Other members feel that the $64 million is not a sufficient compensation for the division created in the community and the environmental impacts.

Puclaro Dam Conflict: The only independent baseline assessment study conducted before construction of the dam, in 1995, found that relocation of villages would cause their disarticulation and loss of social capital. Our interviewees reported high incidence of depression and conflict in the two populations relocated in Villa Nueva Puclaro. The loss of the school, natural habitat and the traditional systems of production due to new arid and desolated environment and the total

lack of social support programs seems to take a heavy toll on the communities. OnlyGualliguaica, the third relocated community, had opportunity for reaffirming their cultural and social capital

Pascua Lama Conflict:
During the early stages of the conflict, social capital was strengthened by the social energy unleashed by the common concern. However, the private agreementsigned by the company and the Junta de Vigilancia, the strongest opposition organization in terms of resource mobilization capacity, weakened the social cohesion achieved until then. The breakdown of the united front of opposition to the project caused desilusionment, questioning of the process of decision making within the Junta de Vigilancia and diminished its influence and legitimacy.

6) ***Companies and public institutions involved in conflict resolution strengthen their technological and organizational adaptations towards sustainability.***

Outcome*:*

Oldman River Dam Conflict:

Government agencies have recognized the need for an ecological baseline assessment around the location of a large project, several years before it is carried out in order to better determine its future ecological impacts

Alberta Environment's "Water for Life Strategy" clearly reflects the lessons learned from the conflict, providing a long term planning for water sustainability and information access. Alberta Environment has been engaged in developing long term planning in response to the reorientation of the federal and provincial governments role in the management of water to meet the needs of a sustainable and ecosystem approach.

The acknowledgment of the need for sharing information among stakeholders about theefforts taken for the sustainable use of water is another key learning. The Alberta Irrigation Districts Association has gone from focusing on irrigation infrastructure to recognizing the multiple uses of water. It intends to stay on the leading edge of efficient irrigation technology and in communicating to the general public the importance of agriculture to the Alberta economy and the steps taken by the District Associations in the sustainable use of water. It has also developed an irrigation model that

monitors the level of available moisture in the soils of each farm, using sophisticated environmental data, including temperature and evapotranspiration rates, in order to more efficiently predict the volume of water needed for irrigating crops.

The Oldman River Dam operation is now strictly monitored: winter snow pack accumulation and the volume of spring run off is closely monitored to integratevolumen of water stored in the reservoir and volume of water supply available for crop irrigation.. Farmers have been able to diversify now into crops with higher economic values.,
Although extreme events such as sudden dry spells or heavy precipitation are difficult to predict, the 2-3 years of storage capacity of the reservoir is sufficient to minimize the short term vulnerability of water users in the Basin.

Puclaro Dam Conflict: The dam is a technological adaptation favored by the community of producers and agro-exporting companies for whom the dam represents more predictable water supply and greater security and returns for their investments. However, after five years the Junta de Vigilancia of the Elqui River does not have a comprehensive assessment of the impacts of the dam on their productive capacities, nor are the full irrigation infrastructure in place.

The Regional Government has the authority to define public investment priorities for regional development, but it has not conducted an assessment of the efficacy of previous investment on the dam, therefore missing important opportunities for institutional learning. There seems to be a lack of vision about the technological and institutional adaptations necessary for long-term economic, ecological and social sustainability and the need to draw lessons from the conflicts generated by the construction of the Puclaro Dam.

Pascua Lama Conflict: The strong opposition of the environmental community and the many conditions established by CONAMA strongly pressured Barrick to introduce significant improvements, partially modifying the productive processes and mitigate the possible impacts of the project, Despite of being mostly reactive responses to pressure, these changes are without precedent and may have important effects in future mining projects of this kind.

***7) As a consequence of Adaptive Conflict Resolution social organization improve their negotiating abilities and their creativity*.**

Outcome:

Oldman River Dam Conflict: Environmental organizations recognize and take credit and pride in referring to the Oldman River Dam conflict as the seminal case that has made early Environmental Impact Assessments a critical requirement for large projects, such as a dam, However, the organization of the Piikani is precarious, with the community deeply divided by the impacts of the conflict settlement.

Puclaro Dam Conflict: The conflict strengthened the negotiating capacity and creativity of the Gualliguaica community, which has generated important initiatives to develop tourism and recreation associated with the artificial lake of the Puclaro Dam and its own historical patrimony. In the absence of and agreement with the other affected communities, the authorities pursued individual negotiations, neglecting and negatively affecting land-workers who did not posses land (inquilinos) and owners without legally recognized rights but who belong in the community.

Pascua Lama Conflict: The organizations opposing the project, unlike the irrigation farmers were not seeking to negotiate with Barrick, because they flatly rejected the very idea of mining the area**.** However, they did improve their capacity to organize and network in the valley and articulate their interest with other sectors of the Chilean society. An important learning here is shown by the shift in the direction of their campaign from opposition to Barrick's mining project to a regional collaborative effort to protect their water sources

Puclaro Dam Conflict: The conflict strengthened the negotiating capacity and creativity of the Gualliguaica community, which has generated important initiatives to develop tourism and recreation associated with the artificial lake of the Puclaro Dam and its own historical patrimony. In the absence of agreement with the other affected communities, the authorities pursued individual negotiations, neglecting and negatively affecting land-workers who did not posses land (inquilinos) and owners without legally recognized rights but who belong in the community.

Pascua Lama Conflict: The organizations opposing the project, unlike the irrigation farmers were not seeking to negotiate with Barrick, because they flatly rejected the very idea of mining the area**.** However, they did improve their capacity to organize and network in the valley and articulate their interest with other sectors of the Chilean society. An important learning here is shown by the shift in the direction of their campaign from the focus on the opposition to Barick's mining project to a regional collaborative effort to protect their water sources.

***8) With ACR the democratic authority of the state should be enhanced because moral authority overcomes the use of coercion in conflict resolution*.**

Outcome:

Oldman River Dam Conflict: Canada's Supreme Court has become a significant force for environmental protection. The Federal Environmental Assessment of the Oldman River Dam is one of the key decisions that the Supreme Court has ruled on for environmental protection. This ruling has established the precedent that an Environmental Impact Assessment must be undertaken prior to commencing any mega project. The court's ruling places the onus on the Federal Government for protecting the environment in areas of their jurisdiction. Moreover, the decision states that an environmental impact assessment includes not only the physical implications, but also the social and economic ones. However, the decision of the Federal Government of Canada and of the Provincial Government of Alberta to proceed with the construction and operation of the dam despite the Supreme Court ruling to delay it until the Environmental Impact Assessment were completed, negatively affected the legitimacy and moral authority of the organs of government.

Puclaro Dam Conflict: Villa Nueva Puclaro inhabitants overtly reject the coercive methods used to forcefully relocate them and the risks to which they were exposed during the construction of the dam, under constant explosions and "stone rains".. By contrast, the beneficiaries of the dam, both above and below the reservoir, perceive a significant increase in the water security, allowing them to attract new investment and technologies which have transformed the Elqui Valley from a small scale agriculture into a modern agricultural production for export based monoculture plantations of avocado and grapes in the hillsides. Although very successful in terms of profit, this form of production is still awaiting an agroecological assessment to evaluate its environmental and socio-cultural impacts on place and people

Pascua Lama Conflict: The conflict affected the legitimacy of the government because it presented the approval of the mining project with conditions for possible improvement the only alternative. Although the environmental authority improved its capacity to critically assess the project by broadly seeking expert knowledge to make demands upon Barrick more stringent, the public was left with the impression that the environmental institutions of the state were too weak because of the lack oftechnically resources, and too vulnerable to the pressure of a multinational corporation. In

the end the environmental authority forbade the disruption n of the glaciers, but the concrete measures to monitor the impacts and stop the project if necessary were not clearly established. Finally, the conflict made evident the weaknesses of the Chilean legislation on water and of the country's policy to protect watersheds and hydric resources

.

Discusión

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 most effective way to overcome power asymmetries, and therefore democratizing the conflict resolution process, is to balance the voices of all actors involved in the management/resolution 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

The increasing global demand for resources and energy and the growing nature and impact of large capital intensive investments to mobilize resources fuelling the global markets is rapidly changing traditional cultures and productive 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, are often perceived as contributors to the increase in risks and uncertainty in accessing common goods, which are further exacerbated 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 and water conflicts. Thus, the question of increasing the legitimacy of institutions appears as an important component of institutional adaptation. To that effect the institutions involved in water governance must increase their technical and informational capabilities and strive for more transparent processes of decision-making. The market forces driving the commoditization of key resources like water, contradicts the recent institutional efforts to conserve critical resources and long term ecosystem integrity.

Conclusion:

Lessons learned from the study of environmental and water related conflicts provide a particular opportunity to understand the communities' 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 to reduce or increase local vulnerability that becomes a central concern for adaptation to climate change. The outcome of a conflict usually produces important social learning: it can leave a community in more vulnerable situation or can conversely, increase its adaptive capacity. The dynamics of social participation in a context of water conflicts provides unique opportunities to assess the long term social and environmental impacts of large scale projects affecting common resources and ecosystem integrity. The flame of conflict stimulates social creativity and places government institutions and large investors under public scrutiny and sustainability test.

References

Diaz, H.P., D. Gauthier, D. Sauchyn, J. Cepeda, D. Corkal, M. Fiebig, S. Kulshreshtha, G. Marchildon, H. Morales, B. Morito, B. Reyes, A. Rojas, S. Salas, B. Smit, E. Wheaton and H. Zavala. 2004. Institutional Adaptation to Climate Change. Social Sciences and Humanities Research Council (SSHRC) Major Collaborative Research Initiative (MCRI) www.parc.ca/mcri/project.php

Morris, Catherine, ed. 2006: Conflict Transformation and Peacebuilding: A Selected Bibliography. http://www.peacemakers.ca/bibliography/

Morishita, Scott and Hoberg, George, 2003: The Great Bear Rainforest: Peace in the Woods? In **Rojas, A & Reyes, B. (eds.**) From fires of destruction to the flames of creativity: Towards an Adaptive Environmental Conflict Resolution.

Lessons from Chile and Canada. University of British Columbia, Liu Institute, Vancouver. CDROM, Institute of Political Ecology, Santiago.

McCarthy, Jane and Alice Shorett, 1984. Negotiating Settlements: A Guide to Environmental Mediation. New York: American Arbitration Association (1984).

Mase, Chris, 1996: Resolving Environmental Conflict: Towards Sustainable Community Development 1996. St. Lucie Press, Delray Beach, FL.

Nader, Laura, & Harry F. Todd Jr., eds. 1978. The Disputing Process-Law in Ten Societies. New York: Columbia Univ. Press.

Pronk, Jan. 1997. Visions of Sustainability. 35.47 pp. In *Dimensions of Sustainability*. Proceedings of the Congress "Challenges of sustainable Development". Amsterdam, 22-25 August, 1996.

Quiroga, Rayen. 1996. Globalization and Unsustainability. An Ecological Economic Perspective. Institute for Political Ecology, Szntiago, Chile.

Remans, W., 1995. Water and war. *Humantäres Völkerrecht* 8, 1.

Rojas, A Reyes, B., Magzul, L.; Morales, Hector L.; Borquez, R.; e Schawartz, E. 2007 Análisis del rol de las instituciones en los conflictos de agua. Infome Final, Unit 1 B, SSHRCC, MCRI Institucional Adaptations to Climate Change. Regina

Rojas, A.; Reyes, B.; Magzul, L.; Morales, H. L. 2006: Water blues in climate change: The role of institutions in water conflicts and the challenges presented by climate change

Rojas, A, 2003: "The mountain's scar, the people's wound: the GasAndes conflict in Cajon del Maipo River in Central Chile". In **Rojas, A & Reyes, B**. op.cit

Rojas, A & Reyes, B. (eds.) From fires of destruction to the flames of creativity: Towards an Adaptive Environmental Conflict Resolution. Lessons from Chile and Canada. University of British Columbia, Liu Centre, Vancouver. CDROM, Institute of Political Ecology, Santiago.

Rojas, A, Grandy, J & Jamieson, J., 2003: “Toward and Adaptive Resolution of Environmental Conflicts: Lessons from Clayoquot Sound”. In **Rojas, A & Reyes, B**.op.cit.