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## Editorial Note

Environmental issues have long been a reference point for research and debate within the field of peace and conflict studies, the relative importance of which continues to increase as the relationship between human security and ecological health becomes more obvious, and environmental consciousness rises in social scholarship more generally.

One particularly significant line of inquiry has been to address the implications of inequality in the distribution of water and other resources on patterns of social interaction. As emphasized in our first article, "Current Trends in Water Management in Central Asia" by Guli Yuldasheva & Umida Hashimova, the realities of resource distribution may lead to negotiation and cooperation among political groups just as readily as it may lead to competition and the threat of organized violence. In post-Soviet Central Asia, the authors argue, the scales of this balance can be tipped towards peace and development if regional consciousness and an ability to compromise for mutual benefit are given political expression.

As environmental considerations have become intertwined with varying ideologies, including those of economic growth and development, another area of research has opened in order to investigate new tensions that have arisen between competing environmental policy agendas. Robert Fletcher's article, "When Environmental Issues Collide: Climate Change and the Shifting Political Ecology of Hydroelectric Power", offers a timely analysis of such conflicting priorities within environmental politics, illustrated by the Pacuare River in Costa Rica, where competing discourses of clean energy through hydroelectric power and conservation through ecotourism have come to a head.

Abosede Babatunde's analysis of "Environmental Conflict and the Politics of Oil in the Oil-Bearing Areas of Nigeria's Niger Delta" moves the discussion towards a consideration of overt armed conflict, and demonstrates the role of both resource endowment and environmental justice in the manifestation of political violence.

At the nexus of theory and practice, Asaf Zohar, Stuart Schoenfeld, and Ilan Alleson's case study of the Arava Institute for Environmental Studies testifies to the potential of environmental education to transcend ethnic and political divides, and to contribute to peacebuilding in Israel and Palestine, while seeking solutions to common environmental challenges faced by the wider region.

Gwendolyn Smith's ethnographic surveys and conflict vulnerability analysis of traditional communities in Ecuador and Suriname also speak to the importance of matching theory with practice, in this case, as a means to ensure that conservation projects for the mitigation of anthropogenic climate change contribute in an appropriate way to peacebuilding and development in marginal communities.

I am grateful to all the authors for their contributions to this special issue of the *Peace and Conflict Review*, as well as to our board of editors, and the Department of Environment and Peace at the University for Peace, particularly Dr Mahmoud El Zain.

As always, submissions and feedback from our readers are highly encouraged, and should be directed to [editor@review.upeace.org](mailto:editor@review.upeace.org).

Ross Ryan  
Managing Editor

# Current Trends in Water Management in Central Asia

Guli Yuldasheva<sup>a</sup>, Umida Hashimova<sup>b</sup>, and edited by James Callahan<sup>c\*</sup>

The primary objective of the following article is to examine current trends in water management in post-Soviet Central Asia. The hypothesis of the article is that ongoing discrepancies and absence of consensus among the Central Asian states on water issues will encourage the growth of economic, ecological, and political threats to the development of the states. The key research approaches are systems and strategic analysis combined with geopolitical, dialectical, traditional-historical, and empirical approaches. The methodology is characterized by an objective approach to the correlation of general and specific in the development of the Central Asian states and their influence on the inner political processes in the region. The methodology allows investigation of the region as a whole system with special interconnections and interdependence of its components in order to define priority strategic goals and tasks of each structural element of the system. Main outcomes and results of the work reveal new tendencies in the current water strategy in Central Asia, some prognosis and recommendations for regional and international actors. The conclusion states that much depends now on the political will and readiness to make compromises by both regional states and external actors and the ways and means they apply to realize their common interests in the region. The research data and results can contribute to making regional strategy more purposeful, concrete, and coordinated and to serve as a basis for scientific-practical searches for new solutions to the problem.

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## General background

Central Asia is located in arid or semi-arid zones and natural evaporation significantly exceeds precipitation. Therefore, the main regional rivers - Syr Darya and Amu Darya with their tributaries - are the only fresh water sources for the entire five countries of the region and are of great importance to the region's economy, since agriculture contributes a large share to the countries' GDP - in Kazakhstan it is an estimated 6%, in Kyrgyzstan 34%, Tajikistan 21%, Turkmenistan 25% (2003 data), and Uzbekistan, 23% (World Bank 2007). More than 90% of the Amu Darya and Syr Darya waters are used for irrigation and about 60% of rural residents using these rivers are engaged in agriculture (SPECA 2004).

Since the Syr Darya and Amu Darya originate in Kyrgyzstan and Tajikistan, these two countries are considered upstream countries, the other three countries - Kazakhstan, Turkmenistan, and Uzbekistan - located at the lower reaches of these rivers and are called downstream countries. Central Asia's irrigated lands are located mainly in the downstream countries - 85% - while only 15% are in the upstream countries (Table 1). This kind of natural distribution pattern of water in the region gave the Soviet-era Kremlin reason to designate Kyrgyzstan and Tajikistan as water providing countries to the rest of the region. During this time, centralized water management controlled by the All-Union Ministry of Water Resources based in Moscow established water limits for each country in the region (Dukhovny 2005). Starting from the 1960s, large construction projects of dams and reservoirs were launched in the upstream countries, while at the same time irrigation systems were developed in the downstream countries. According to the barter agreements concluded during Soviet times that are still partially in force, water collected in the reservoirs in autumn-winter is released in spring-summer to irrigate Uzbek, Kazakh, and Turkmen agricultural lands. In return, the downstream countries provide the upstream countries with gas, oil, coal, and the electricity which the upstream countries cannot produce. This kind of heavily interdependent infrastructure works properly only if these countries remain united. Therefore, it is not surprising that with the collapse of the Soviet Union, this system resulted in negative consequences and caused serious cross-border tensions.

Table 1. Area under irrigation in the Aral Sea Basin, thousands ha and percent. (Eurasian Development Bank 2008)

Year	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	Total
1990	782 (10.5%)	410 (5.6%)	714 (9.4%)	1339 (18%)	4222 (56.5%)	7507 (100%)
1995	786 (9.8%)	416 (5.2%)	719 (9.1%)	1736 (21.7%)	4298 (54.2%)	7955 (100%)
2000	786 (10%)	415 (6%)	719 (9%)	1714 (22%)	4259 (53%)	8101 (100%)

In spite of the fact that Afghanistan is also included in some plans for reviving the Central Asian economy, at present it is not clear when and how unstable Afghanistan will claim its share for the Amu Darya water. That is why this paper concentrates only on the water discrepancies among the post-Soviet Central Asian states, the solution of which will naturally affect positively on all other regional problems, including Afghanistan.

## Conflict potential and threats to the region

The circle of the well-established Soviet water-energy exchange process was broken after independence, as each country in the region started experiencing lack of dialogue, coordinated action, and cooperation among national authorities dealing with water management. As a result, in the post-Soviet years each state had to work out its own strategy of development based on their national interests and available resources. However, those strategies brought little if any results due to difficult economic situations in these countries. In these conditions the uneven distribution of water resources led to the clash between the providers (Kyrgyzstan and Tajikistan) and consumers (Uzbekistan, Turkmenistan, and Kazakhstan) of water. In the so called globalization era, Central Asian domestic and foreign economic, social and political developments are tightly interconnected with global events. Thus, the tense geopolitical situation around the region, accompanied by economic sanctions against a number of Central Asian states, as well as ongoing domestic transformation processes led to the reduction of foreign investment flows into large scale projects in Central Asia. Foreign financial assistance accompanied by technical and expert-consultative assistance to the countries would be timely given the world economic crisis that would radically improve their economies. Nevertheless, the countries have opted for utilising their own capital and natural resources.

Although Central Asia is abundant with valuable natural resources, their distribution in the region is uneven - Tajikistan and Kyrgyzstan are very poor in fossil fuels (oil, gas, coal) but very rich in potential hydropower, while downstream countries are rich in fossil fuels but poor in potential hydropower. For example, Kyrgyzstan almost totally depends on oil and gas imports from Kazakhstan and Uzbekistan. Oil and gas rich Kazakhstan depends on Kyrgyzstan and Uzbekistan for 60% of its electricity and buys gas from Uzbekistan. Kyrgyz and Tajik hydroelectric stations (HES) provide Uzbekistan with irrigation water during planting periods to satisfy its seasonal needs in electricity (Dorian 2006) (Table 2).

Table 2. Structure of the production of primary fuel and energy in Central Asia. (Eurasian Development Bank 2008)

Country	Gas	Oil	Coal	Hydro energy	Total
Kazakhstan	16%	50%	33%	1%	100%
Kyrgyzstan	2%	5%	11%	82%	100%
Tajikistan	2%	1%	1%	96%	100%
Turkmenistan	83%	17%	0%	0%	100%
Uzbekistan	84%	13%	2%	1%	100%
Total	48%	33%	17%	2%	100%

Therefore, while natural resource-rich Uzbekistan, Kazakhstan, and Turkmenistan can elaborate more or less independent strategies in their economies, small and economically weak Tajikistan and Kyrgyzstan have to rely on the success - and largess - of their neighbours, which can incorporate them into large-scale integrated economic projects and thus create favourable grounds for their prosperity. In

this sense, the revival of the Great Silk Road with its transport branches on their territories is of special interest to Bishkek and Dushanbe in their efforts to be integrated into the regional and world economy.

Nowadays, Dushanbe and Bishkek are interested in the use of water for the production of hydro-energy to satisfy their own needs and to export it to third countries. The Tajik government, for instance, considers that the only way to become economically sustainable is to develop their hydro-energy sector “as a priority direction in modernization of the state economy” (Khairulloev 2007). As for Kyrgyzstan, it is more ambitious and wants “to occupy leading positions at the energy market of the region” (Bakiev 2009). In this regard, Dushanbe and Bishkek demand that their downstream neighbors increase financial compensation for the exploitation of their HESes in the irrigational mode. For instance, Kyrgyzstan announced its intention to sell water in the National Kyrgyz Energy Strategy for 2008-2010 (2008).

According to some sources, turning water into a commodity was pre-conditioned by the events in 1999, when Uzbekistan substantially decreased natural gas delivery to Kyrgyzstan due to the latter’s debt (Business Week 2005). In response, Kyrgyzstan demanded financial compensation for water deliveries to cotton fields in Ferghana Valley. Bishkek justifies its position of receiving financial compensation by calculating economic benefits Uzbekistan and Kazakhstan gained using water that was collected and released for downstream and economic losses Kyrgyzstan experiences as a consequence. For example, they say that both Kazakhstan and Uzbekistan were able to increase the territory of irrigated lands by 400,000 hectares thanks to the reservoirs and dams built on Kyrgyz territory (Kurtov 2004). Uzbekistan alone was able to double the territory under cotton cultivation, the source claimed. Kyrgyz experts say that during 22 years of using the Toktogul reservoir Uzbekistan and Kazakhstan received 7.6-8 billion USD of net profit (Kurtov 2004). According to their calculations, annually Uzbekistan earns 360 million USD and Kazakhstan earns 240 million USD using water resources from constructions in Kyrgyzstan.

Table 3. Population dynamics in Central Asia. (The World Bank Group 2005, CIA World Factbook 2009).

Country	Average annual population growth rate, 2003-2015	Population, in millions (July 2009 est.)
Kazakhstan	0.3%	15.4
Kyrgyzstan	1.1%	5.3
Tajikistan	1.1%	7.4
Turkmenistan	1.3%	4.8
Uzbekistan	1.3%	27.5
Total	1.02%	60.4

However, the idea of turning water into a trade unit has not been welcomed by other Central Asian states, especially Uzbekistan and Kazakhstan. These countries insist on the predominantly irrigational mode of HESes, both built in the Soviet era and planning to be built in the present days. These claims can be justified by the fact that Uzbekistan and Kazakhstan account for 53% and 10%

correspondingly of the region's irrigated lands and constitute the biggest share of the region's population (SPECA 2004, Tables 1, 3). Kazakh and Uzbek specialists claim that charging downstream countries for water is unprecedented in international law and within the international community (Taujanov 2009, Rengum 2009a). The mere fact that water originates in a country does not give it the full right to become the sole owner of the water. The upstream countries have to realize that it is universally acknowledged that the absolute sovereignty of upstream countries over available water resources is inadmissible under international law. In this respect, the Preamble of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE 1992) states that transboundary waters shall be used through the elaboration of agreements between countries bordering the same waters.

Lack of trust among parties in the region is another factor that impedes consensus. The upstream parties are highly suspicious of annual water allocation quotas (Bogdanov 2009) established by the Interstate Coordinating Water Commission<sup>1</sup> (ICWC), which is based in Tashkent and therefore sometimes does not comply with established and recommended quotas. The upstream parties may presume that calculations on water allocation quotas are done to the detriment of them and benefit only Uzbekistan.

Nevertheless, although the Central Asian states made significant efforts to avoid "water conflicts", none achieved multilateral agreements, nor did a series of talks between the states under the aegis of the USAID organized in summer 1997 and an Uzbek-Kyrgyz Agreement of December 2000 lead to improvements in upstream-downstream relations (Makhkamov 2009).

Meanwhile, according to some estimates, the demand for water has already exceeded available resources (Eurasian Development Bank 2008). Population growth, melting glaciers, and Central Asia's arid climate constitute natural and human causes for further pressures on drinking and irrigation water. Central Asia's population grows by 1.02% per year (Table 3) which requires additional increases in water resources up to estimated 700 million m<sup>3</sup> annually (UNECE 2008). Climate change and global warming put additional pressure on Central Asian water problems. Scientists predict that by 2025, thousands of small glaciers in the Tajik mountains will disappear, the glaciated area will shrink by 20%, and ice reserves will decrease by 25% (Eurasian Development Bank 2008). The estimated drop in the flow of the two main rivers is 25-30% over the next 20 years (World Water Forum 2008).

The above factors are aggravated by the fact that water conservation has not been a practice among the region's population and water management organizations so far. Major water waste takes place in irrigation due to poorly maintained irrigation and water distribution systems, the use of inefficient irrigation methods, as well as an absence of water-saving technologies (SPECA 2004). Approximately 37% of water meant for irrigation is lost<sup>2</sup> (SPECA 2004). The lack of investment to improve the existing technology coupled with weak management does not allow the situation to improve (Biswas 2008).

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<sup>1</sup> The ICWC substitutes for the Soviet body that used to oversee water management and was established as a result of a treaty between all Central Asian states signed on 18 February 1992 in Almaty. The main responsibilities of the ICWC are annual water allocation for each country in the region and schedules for reservoir operations.

<sup>2</sup> Some sources indicate much higher numbers: 50% (The World Bank 1998) and 60% (Oxford Analytica 2007).

## New tendencies

The severe winter of 2007-2008 combined with serious drought hit Central Asia hard, especially the upstream countries, and resulted in a compound water-energy-food crisis in Tajikistan and Kyrgyzstan. If on the one hand, the upstream countries were unable to provide their population with electricity because the water level in their main HESes, Nurek in Tajikistan and Toktogul in Kyrgyzstan, were receding due to reduced snow melt, on the other hand, the downstream countries limited the export of fossil fuels to the upstream countries in order to meet high domestic demands. In addition, as of 1 December 2009 Uzbekistan is not a part of the Central Asian United Electricity Grid System that was partially providing electricity to some regions of four countries except Turkmenistan. Uzbekistan explained its position that it had to take this decision due to unsanctioned electricity withdrawals by Tajikistan that were threatening the security of transmission lines and caused their damage thus posing a serious threat to energy security of the country (Gazeta.uz 2009). Although Uzbekistan could provide electricity to the parts of the region that were dependent from the grid system by building new electricity transmission lines, Tajikistan and Kyrgyzstan experienced problems in providing electricity to their parts of the country (Kholmatov 2009, Central Asian News 2009).

These negative implications pushed Tajikistan and Kyrgyzstan to accelerate their plans to complete the construction of reservoirs and hydro-electric stations started in the Soviet times and to build new ones. Dushanbe plans to finish Rogun HES with the capacity of 3600 MWt and Bishkek plans to finish Kambarata-1 and 2 with the capacity of 1900+360 MWt. While by building these HESes the upstream countries hope to meet their domestic electricity requirements with a surplus for export to China, Pakistan, Afghanistan, and other countries, the downstream countries fear that the planned large-scale dams might reduce the amount of water available for irrigation and strengthen the control over water resources by the upstream countries.

The upstream Central Asian countries lean towards the notion that economic benefits are enjoyed mainly by the upstream countries that build dams and reservoirs (SPECA 2004). In these terms, Ostrom (1994) argues there are two types of issues when several countries have to use common water resources. The first problem is called appropriation and takes place when only one member enjoys the benefits of the water resources instead of making it available to others. In the situation of Central Asia, once the large-scale dams are built, the filling of empty reservoirs with water will present an appropriation issue and impact significantly on the flow regimes in downstream river sections. The second issue is called provisional and relates to the operation and maintenance of dams that will directly impact the environment and safety of people. Wegerich (2007) presented a similar explanation where he argued that the construction of large dams mainly present a zero-sum game, in which upstream countries receive the benefits and downstream countries are subservient.

Theoretically, building large scale HESes in the upstream can be either advantageous or disadvantageous for downstream countries. If the water from the dams can be used both for producing electricity and agriculture by co-riparian countries at the same time, this will result in a win-win solution. However, if water is released when it is not needed for downstream irrigation, it is only the upstream country that will have the benefits; not the downstream who experience losses in irrigation (Wegerich 2007). With the current difficult political conditions and lack of cooperation among the countries in Central Asia, the downstream countries experience to a lesser or greater extent the latter situation.

However, firstly, if on one hand the intentions of Tajikistan and Kyrgyzstan to develop large-scale dams can be understood and seen by them as a way to become economically sustainable and

reduce poverty, on the other hand, such big projects need to be technically feasible, economically efficient, environmentally friendly (Biswas 2008) and most importantly, negotiated with the countries that historically have been using water from the same rivers. Secondly, there are a range of economic, ecological, and political threats to the viability and stability of the Central Asian region should these plans be carried out:

### ***Economic threats***

In regard to Tajikistan's Rogun HES, a staff member of the Institute of Water Issues at the Academy of Science in Dushanbe, has stated that the construction of Rogun is an ineffective and overly costly project (Petrov 2004), as an alternative plan for diverting the flow of the Pyanj River towards Vahsh HES would require a total cost of 340 million USD, while the Rogun project costs 2 billion USD.

According to another Tajik power engineering specialist's view, the Rogun project is not a cure for the current energy issues the country is experiencing every year (Safarov 2008). First, according to the source, the project itself is not attractive for investors: even if the reservoir is built, several decades will pass before it starts repaying. Second, the source continues that 50-60% of the produced electricity from Rogun will go to a planned new aluminium factory, the remaining 40-50% will not be enough either for selling abroad or providing to the population. Third, every year in winter large-scale reservoirs in Tajikistan have to limit electricity production due to reduced water flow as a consequence of limited snow melting during that period (Safarov 2008). These limitations in combination with usually experienced dry years would result in shortages of electricity production that again will not be enough for its own population and commercial purposes. Thus, the country cannot escape electricity and fossil fuel dependency on its neighbours, regardless of whether or not it builds the Rogun HES.

### ***Ecological and technical threats***

Majority of HESes in the region have deteriorated due to lack of funds for needed renovations and modernization (Dorian 2006) therefore, specialists in the region do not rule out the probability of a replication of the Sayano-Shushensk type of accident that took place in Russia on 17 August 2009. Central Asian large-scale HESes were constructed during the Soviet time under the same general plan and the turbines of Toktogul HES (in Kyrgyzstan) are 35 years old and were bought from the same plant as those for Sayano-Shushensk (AKIpress 2009). The deterioration of the HES equipment in Kyrgyzstan reaches 70% (Centrasia.ru 2009; 12.uz 2009; Belyi parus 2009).

Kyrgyz and Kazakh scientists have highlighted several environmental and technical risks of building a new HES in Kyrgyzstan due to its location in a major seismic zone (Jalgasbaev 2009). The earthquake that took place in 1992 in the Suusamyrl Valley, which had before been defined as a seismically weak region, clearly showed the danger of building new dams in mountainous Kyrgyzstan. Some sections of the Kambarata-2 dam dislodged as a consequence of the tremors and later in 1996 further damage to the dam took place. Indeed, Central Asia's earthquake frequency is one of the highest in the world (GeoHazard International 1997). According to the 1978 official Soviet seismic hazard map, most of the territory of Tajikistan and Kyrgyzstan can experience seismic intensity up to 9 (the highest is 12) on the Medvedev-Sponheuer-Karnik scale which is enough to cause the destruction of many ordinary buildings and heavy damage to well-built structures such as water dams.

At the same time, the radioactive and toxic waste in Kyrgyzstan can pollute its own territory and the territories of Uzbekistan and Kazakhstan in case of landslides and flooding and could cause ecological disaster at the most fertile territory in Central Asia— Ferghana Valley.

Representatives of the Institute of Seismology in Uzbekistan assert that the construction of any big hydro- technical objects in the valley of the Naryn River or on the territory of Rogun HES could stimulate a cascade effect in which an insignificant breakthrough in one place provokes a chain reaction of irrepressible flow of water and dirt masses (Usmanova 2009). This can stir up vast economic and ecological damage to downstream states and sharply increase the seismic activity of the Hyssar-Kokshaal seismogen zone. As a consequence, the Sarez Lake in Tajikistan with the volume of 17 cubic kilometres of water threatens to flood a territory with more than 5 million people (Faskhutdinov 2009).

### ***Political threats***

Problems with payments due to economic difficulties and disagreement over energy and water prices among the countries in the region (Dorian 2006) provoked tensions in Kyrgyz-Uzbek and Tajik-Uzbek relations and has led to confrontations and supply cut-offs.

Although Russia had been giving financial and political support to Kyrgyzstan in building its HESes, the last official stance came during Russia's Vice-Prime Minister's visit to Uzbekistan at the beginning of 2010. He announced that construction of large-scale HESes can not be launched without the consent of neighbouring states and Russia will not finance the projects until it receives the results of international expertise (Central Asian Portal 2010). Moscow had earlier suspended giving credit for a total sum of 1.7 billion dollars meant for the building of Kambarata-1 (Eurasianet 2010). Two possible reasons were given for that: first, Russia, after discovering unexplained spending from the first credit tranche by the Kyrgyz government, was waiting for an explanation. Second, Russia did not want to upset Uzbekistan, whose discontent with Russia was increasing due to the support Russia had given to Kyrgyzstan in building the station.

From its side, Tajikistan inclined to continue energy cooperation with Russia in the framework of the Eurasian Economic Cooperation group, but unlike Bishkek it relies on expanding trilateral cooperation with Afghanistan and Pakistan too. At the New York Summit on the Global Climate Change, Dushanbe reiterated its readiness to increase its hydro energy potential (Rengum 2009b).

During a meeting between the Presidents of Uzbekistan and Kazakhstan that took place in 16-17 March 2010, the Kazakh President announced that he totally shared the concerns of Uzbekistan in regard to the building of Rogun and Kambarata-1 and 2 HESes. He highlighted that he would support the building of the HESes subject to receiving objective international expert analysis of these projects (Panfilova 2010). If an independent international body proves that the downstream countries will not experience any negative consequences, Uzbekistan and Kazakhstan are ready to invest in the construction of large-scale HESes both in Kyrgyzstan and Tajikistan (Rengum 2009a). Thus, Uzbekistan and Kazakhstan request a guarantee that building of new large-scale dams in the upstream countries will not result in worsening the ecological environment or affect the current water usage balance, especially during irrigation seasons.

Overall, two obvious contradictory tendencies exist now in Central Asian development. The first tendency reflects the Central Asian traditional orientation towards Russia, which was demonstrated by signing a customs union agreement on 27 November 2009 by Russia, Kazakhstan, and Byelorussia with

potential inclusion of Kyrgyzstan and Tajikistan (Khramkov 2009, Kirmel 2009). Simultaneously Moscow has signed an agreement with Dushanbe on the mutual cooperation in combating drugs trafficking (Khamrabayeva 2009).

The second tendency reflects efforts of the Central Asian states to reunite themselves. This can be illustrated by the intentions of the parties to continue to strengthen regional cooperation and continuation of multilateral and bilateral negotiations among all sides. It is worth mentioning that for the past many years Central Asian states have been able to find compromises, despite staging economic, tariff, custom's duty "wars" and other non-military conflicts (Joldasov 2009). A certain ethno-national and religious-cultural closeness serves to soften positions of the opposing sides in Central Asia. Therefore, there is a high probability that Tajik-Uzbek water issues and other tensions will be resolved peacefully. First, Dushanbe agreed to conduct independent comprehensive assessments on the techno-economic, social and environmental viability of the Rogun HES. The World Bank is funding a study that will evaluate technical soundness, economic viability and compliance with all relevant environmental and social safeguards of the station (World Bank press release). Second, Uzbekistan is the second biggest trade partner after Russia for Tajikistan (Gazeta.uz 2007). Third, the Tajik-Uzbek Intergovernmental Commission that was inactive for the last 10 years resumed its work in February 2009. Fourth, the cooperative approach of Tajikistan towards Uzbekistan has been reconfirmed recently by the Tajik readiness to sell electricity to Tashkent cheaper than to its own citizens. Forth, the President of Tajikistan proposed to announce the year of 2012 as an International year of water diplomacy during the 64th session of the General Assembly (President.tj 2009).

The former Kyrgyz leader also declared his readiness for constructive dialogue on water issues with all Central Asian states (Zpress.kg 2009). He stressed that the mutually supplemental character of the Central Asian resources is a precondition for a stable energy system (Bakiev 2009). With the current ongoing transformation in the government of Kyrgyzstan and the change of the leadership, the official stance in the water issue is still unclear.

In these circumstances much also depends on the success of Uzbek-American cooperation in construction of the railroad to Afghanistan. The potential success of this project can serve as an indicator for more a favourable transformation in public opinion and unite all opposing sides in the region.

## **Conclusion**

Ongoing discrepancies and absence of compromise and unity among the Central Asian states on water issues have already spawned the growth of economic, ecological, political threats and challenges to the region that have possibilities for turning into local military conflicts. One must ask if this process is reversible and, if so, how to do so.

It is clear that the break-up of the single Soviet hydro-energy system in Central Asia and the absence of large-scale investments into the regional economy, aggravated by the global economic crisis, has forced the states into an autarkic situation in which they concentrate on their own resources, the usage and development of which still demand huge investments and material-engineering assistance. These facts together with the current disintegrated state of the region and circumstances of geopolitical competition have led the Central Asian states into conflict with one another due to their contradictory economic interests.

Hence, external factors coupled with internal problems, including the absence of necessary coordination and political will among the players, the absence of effective control bodies over decision-making, as well as an ineffective legal basis and the underdevelopment of the Central Asian states are the main reasons for present water crisis in the region. Thus, the solution of this problem should be also be found in both internal and external actions: internal efforts should be reinforced by the good will of the external regional players, such as Russia, China and the US, external financial-technical assistance, and objective consultation and expertise from the international structures under the aegis of the UN.

A related factor impeding the resolution of the issue is the direct participation of some of the external regional players in the water issue. Countries which are supporting the construction of new HESes in the upstream should realize that their assistance will only intensify the conflicts among Central Asian countries. This factor together with Chinese, European and other interests in the region can exacerbate the competition and interstate tensions in Central Asia, in case the regional actors do not find adequate balance of interests and do not elaborate compromise approach to Central Asia. The Central Asian countries can and must generate the necessary political will to resolve water problems themselves. Only when the countries in the region will have a unified agenda regarding water use, which will take into account the plans and needs of their neighbors, will the tensions be defused.

### ***Possible prognosis***

In spite of the present difficulties in Central Asia, the chances of large-scale conflicts over water are very small. First, because no country, including the Central Asian states themselves, are interested in a conflict situation. Large-scale conflict in the region could damage the stable export of fossil fuels and other raw materials to the world market. Second, in case of conflicts, the region could turn into a source of illicit drugs, terrorism, and extremism<sup>2</sup> and bring the borders of these threats closer to Europe, China, and Russia – main key actors in the region. Third, the necessity to maintain and expand cooperation in Central Asia is not questioned since the countries in the region are tied by common historical background that play an important role in considering bilateral and multilateral energy relations (Dorian 2006). Fourth, an uneven distribution of natural resources within Central Asia ties them to one another; the countries have to rely on the energy forms that can be more efficiently supplied by other countries in the region (Dorian 2006). Today the Central Asian states themselves have come to an understanding that they have common difficulties and are interdependent on one another and that any national plan in the water energy sphere without its harmonization and regulation in the region will fail. The Central Asian energy system has always been an integral unique complex preconditioned by natural historical development and the geographic peculiarities of the region. The disintegration of the existing regional system in the world of competing regionalized trading areas will never be advantageous for any of the states.

It seems that in these circumstances, the water component of Central Asian policy will force the regional states to reach some form of political consensus. As time passes, there is hope that the approaches to the issue will change as social, economic, and environmental considerations prevail over political gamesmanship. In these circumstances, one can hope that the issue will become more objective and less polarized in the future and thus become more manageable (Biswas 2008).

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<sup>2</sup> Such threat still exists and is even renewed (Pannier and Siddique 2009).

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# When Environmental Issues Collide: Climate Change and the Shifting Political Ecology of Hydroelectric Power

Robert Fletcher\*

While the exploding global focus on climate change may substantially increase attention and funding for sustainable development initiatives in general, it may create newfound conflicts among divergent conservation and development agendas. For instance, climate change appears to be altering the terms of debate concerning the costs and benefits of constructing large dams in ways that remain little analyzed. This issue can be observed in Costa Rica, which recently initiated a major new wave of dam-building which includes a large project on the Río Pacuare, an important ecotourism destination and site of substantial biodiversity, in the interest of expanding the capacity of a sector supplying nearly 80% of the nation's power and widely considered a "clean," renewable energy source. In response to growing climate change concern, the Costa Rican government has vowed to achieve carbon neutrality by 2021, and reducing emissions is a key component of this plan. On the other hand, ecotourism operators contest the governments' assertions of the proposed dam's importance by emphasizing the economic and conservation benefits of a free-flowing river via ecotourism. An increasing critique of ecotourism as a conservation strategy, however, concerns its contribution to climate change through air travel. Thus, in the conflict over the Pacuare River, different models of both conservation and development appear to collide, with biodiversity and climate change on the one hand, and modern and postmodern forms of capitalist development, on the other, all competing to define appropriate resource use in the valley.

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## Introduction

While and colleagues (2009:2) observe that the global campaign to address anthropogenic climate change has recently become “the new ‘master concept’ of environmental governance,” eclipsing biological diversity conservation as the central organizing principle around which ecological work is undertaken around the world. This exponentially-increasing focus on climate change has inspired an unprecedented surge in funding for environmental protection and sustainable development initiatives in general, yet it may hold unforeseen and potentially negative consequences for particular environmental issues that are either marginalized within climate change discussion or that actually run counter to climate change concerns. As While and colleagues (2009:10) point out, “discourses of climate change can be mobilized politically to justify social and technical fixes for states that environmentalists find unacceptable.” The authors point to nuclear power, biofuel production, and population control as examples of problematic policies to which climate change discourse may provide newfound impetus.

In this article, I address another important issue of concern for environmentalists around the globe that appears to be in the process of dramatic reframing by the climate change discussion, namely the construction of hydroelectric dams and their ecological consequences. I describe a recent resurgence in the construction of hydroelectric dams, both large and small, around the world, spurred, in substantial part, by their newfound description as a form of “clean energy” capable of mitigating the greenhouse gas emissions largely responsible for anthropogenic contributions to global climate change. While this issue has been mentioned in several recent publications (e.g., Lohmann 2009; Finley-Brook and Thomas 2010; Hirsch 2010; Imhof and Lanza 2010; Mäkinen and Khan 2010; Moore et al. 2010; Pittock 2010), it has yet to be systematically analyzed and its full implications explored.

Employing a political ecology framework, I endeavor to articulate the multiple levels at which this issue plays out, describing the correlation between circulation of climate change discourse and the resurgence of hydroelectric power at the global level; how this situation has been engaged at the national level within contemporary Costa Rica; and how all of this plays out in contestation concerning dam construction within specific sites in the country, particularly the controversial Río Pacuare in the eastern highlands, where the merits of a major dam proposal have been contested for more than two decades.

First proposed by anthropologist Eric Wolf in the 1970s (Watts 2000), political ecology emerged as a distinctive school of thought in the 1980s, fusing a focus on human-environment relations characteristic of a human ecology approach with a Marxist concern for the role inequality plays in motivating conflict within international political economy (e.g., Blaikie 1985; Blaikie and Brookfield 1987). In the 1990s, the field expanded and diversified, incorporating, in addition to the dominant Marxist strain, an alternate perspective more influenced by a poststructural perspective grounded, by and large, in the philosophy of Michel Foucault (see e.g., Peet and Watts 1996; Watts 2000).

Political ecology thus represents a particular approach to the study of peace and conflict, emphasizing the role of inequality in access to wealth, and the natural resources upon which wealth is based, as one of the principle drivers of the interrelated dynamics of human discord and ecological degradation. In general, however, political ecology differs from environmental security, another perspective that emphasizes the relationship between conflict and natural resources, by focusing on the social relations underlying access to natural resources rather than treating resource scarcity and/or abundance as sources of conflict in their own right, as much of the environmental security literature does (see Peluso and Watts 2001). A characteristic feature of political ecology analysis entails elucidation of the interconnection between the various stakeholders involved in a conflict at different

levels or scales—from the global to the regional to the national to the local—that may underlie seemingly spatially-bounded conflicts, as well as contestation among actors at each of these levels (Watts 2000).

I begin by outlining the global debate concerning the merits of large dams that has emerged over the last several decades, leading to a dramatic downturn in dam construction, and their recent resurgence in relation to growing climate change concerns. I then describe recent research questioning whether dams in fact produce the clean energy proponents claim. Subsequently, I describe how this global discourse surrounding dams is playing out within Costa Rica at present, in relation to a widely-publicized bid to become the world's first carbon neutral nation. I document a vigorous new dam building campaign currently underway in the country and its opposition by environmentalists, led, in the case of Pacuare River, by ecotourism providers offering whitewater rafting excursions that would be highly compromised by the construction of a dam. Finally, moving back to the global level once more, I describe how the anti-dam movement is mobilizing to oppose the reframing of dams as a climate change panacea and how this is likely to affect policy concerning both dam construction and climate change mitigation in the future.

### **Of Dams and Development**

Hydroelectric dams have long been one of the mainstays of conventional development policy, promoted throughout the world as a key element of the industrialization that promised to elevate impoverished nations onto the vaunted “ladder of progress” towards First World status (WCD 2000; McCully 2001). Over the past several decades, however, hydro dams have been subject to a scathing critique on a variety of grounds, led primarily by grassroots groups of dam-affected peoples and the transnational environmental NGOs, such as International Rivers, that support them (see McCully 2001). In addition to displacing somewhere between 40-80 million people worldwide, frequently failing to deliver predicted benefits in terms of irrigation, flood control, and electricity production, and tending to significantly overrun initial cost projections, large dams are seen to precipitate a variety of negative ecological impacts, including: the reduction of biodiversity; impeded fish migration; reduced water quality (both in the reservoir and downstream); increased disease (e.g., malaria, schistosomiasis); increased downstream erosion, increased flood danger; and reduced floodplain soil replenishment (Reisner 1986; WCD 2000; McCully 2001).

This critique led to the formation of the World Commission on Dams (WCD), co-sponsored by the World Bank and various NGOs, which in 2000 produced an exhaustive assessment highly critical of large dams and calling for far more extensive planning, consultation, assessment, and mitigation measures to justify their future construction (WCD 2000). In its Executive Summary, the WCD report concluded:

Dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable. [Yet] [i]n too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment. Lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs when compared with the alternatives. (2000:xxviii)

Patrick McCully, Executive Director of International Rivers and author of the classic dam critique *Silenced Rivers*, calls this report “a thorough indictment of the practices and impacts of the international dam industry,” claiming that it has been “the most important single development of the past five years

to impact on the world of dam building and dam resisting” (2001:xix). The International Committee on Dams, Rivers and People claims similarly, “The World Commission on Dams report vindicates much of what dam critics have long argued. If the builders and funders of dams follow the recommendations of the WCD, the era of destructive dams should come to an end” (in McCully 2001:li).

The WCD report crystallized several decades of vigorous campaigning on the part of anti-dam activists around the world that had led to a dramatic decline in new dam construction. By 2000, according to the WCD, the rate at which large dams were being built worldwide had fallen to less than half of its peak level in the 1970s (WCD 2000), while a number of the most successful dam building companies had either folded or merged with others (McCully 2001). All of this reached the point that McCully, in the introduction to his second edition of *Silenced Rivers*, wrote in 2001, “I believe that public perception of dams is shifting. In many parts of the world, favourable media coverage of anti-dam struggles and arguments is shaking the old belief in dams as shining icons of prosperity and modernity (2001:xvi).” And again: “A new order is emerging for rivers and the people who depend on them, and, despite the fulmination and bluster of the dam industry, an old order will pass (2001:lxiv).”

Now, however, the trend identified by McCully appears to be reversing once more, in large part as a result of the recent surge in global concern for climate change. In the January/February 2010 issue of *Worldwatch*, for instance, Imhof and Lanza (2010) observe,

Following a decade-long lull, a major resurgence in dam construction worldwide is now under way. . . The dam building industry is greenwashing hydropower with a public relations offensive designed to convince the world that the next generation of dams will provide additional sources of clean energy and help to ease the effects of climate change.

Within climate change discourse, hydroelectric power is widely considered a “clean” source of renewable energy that produces minimal greenhouse gas emissions relative to other electricity-generating mechanisms (e.g., coal, oil). The US Department of Energy, for instance, pronounced as early as 1995, “Hydropower plants produce no carbon dioxide. . .no air emissions at all.” (in McCully 2001:141). Similarly, Zhou and coauthors (2008:1078) more recently claim that (small) hydro “is a renewable energy with zero emissions.”

As a result, the growing focus on mitigating climate change provides a new incentive for those concerned to reduce their carbon footprint to invest in hydropower production. McCully himself (2001:141) observed this coming trend in 2001, writing, “The once popular claims of ‘cheap hydro’ are now being replaced by claims of hydro as the answer to global warming.” In 2000, the International Energy Agency Hydropower Agreement produced a report asserting “that hydro projects should receive subsidized loans from aid agencies ‘as a payback of the global community for the protection of nature and the world climate’” (McCully 2001:xxxvii).

This incentive to invest in hydro power is enhanced dramatically by the Kyoto Protocol, particularly its Clean Development Mechanism (CDM), which seeks simultaneously to reduce greenhouse gas emissions among Annex 1 countries and spur sustainable development in less-developed nations. Under the CDM’s provisions ACM0002, the “Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources,” for large projects, and AMS-ID, “Grid connected renewable electricity generation,” for smaller ones, hydroelectric dams can be used as offset projects to compensate for emissions from other industrial sources, on the assumption that dams “reduce or displace fossil energy” (Lohmann 2009:29). As Zhou et al. describe,

With the “Kyoto Protocol” coming into effect, the efforts to reduce green house gas emission are getting more and more attention, especially the clean development mechanism (CDM) activities that are being carried out quickly. As the SHP [small hydro power] is a renewable energy with zero emissions, the CDM market will provide new opportunity to SHP development in the future. (2008:1078)

As an example of the use of the CDM to fund hydropower development, Bumpass and Liverman note that:

the El Canada hydroelectric project in Guatemala used the World Bank Prototype Carbon Fund to channel investment from the Kyoto Protocol signatories Canada and the Netherlands to a local company (Generadora de Occidente) that was replacing fossil fuel with hydro-generated electricity at a rate of about 100,000 tCO<sub>2</sub>e per year. (2008:14)

Indeed, hydro dams currently comprise the single largest project type in the CDM portfolio (Mäkinen and Khan 2010). As of June 6, 2010, according to International Rivers’ database, 1452 projects, with an electricity capacity of 58,770 MW, were either registered or had applied for registration under the CDM. Of these, 707 (52,624 MW) were large projects (greater than 15MW in the CDM’s definition). Of the hydro projects currently registered, 157 were receiving certified emissions reductions (CERs) in the amount of 19,676 million tCO<sub>2</sub>e (tons carbon dioxide equivalent).

This use of the CDM to fund hydro dam construction may expand dramatically in the near future. Lohmann (2009:30-1), for instance, observes,

In the mountainous river valleys of Uttranchal, India. . .scores of dam projects [stand] in line to be part-financed through selling carbon credits to Northern industry . . .In China, 763 hydroelectric dams have applied or are planning to apply to the United Nations to be allowed to sell more than 300 million tons of carbon dioxide pollution rights to Northern industry through the Kyoto Protocol’s Clean Development Mechanism.

Zhou and colleagues (2008) calculate China’s total potential small hydropower offset potential at approximately 18.9 million tCO<sub>2</sub>e, with about 3.15 million tCO<sub>2</sub>e to be added each year due to new projects, and suggest, “Based on the above estimation, before 2012, the annual newly built SHP projects will bring 40.95 million US dollar revenues from CERs. By 2012, the annual CERs’ revenues will increase to 245.70 million US dollars, facilitating the entire SHP development in China” (Zhou et al. 2008:1082). The Obama Administration recently committed the United States to increase hydropower production as part of the nation’s low-carbon development plan, a move praised by the International Hydropower Association, a global industry advocacy group, which also recently issued a press release highlighting the importance of both the CDM in hydropower development and hydropower in the CDM portfolio, and “calling upon governments to raise the importance of the CDM in their agendas.” In addition to direct funding as CDM offset projects, hydro dams may receive indirect funding as well due to their ostensive contribution to reducing a nation’s total carbon emissions, a dynamic that can be used to generate and channel funds by nations selling overall emissions reductions to foreign parties looking to compensate for their own excessive emissions.

The major new source of funding for hydropower production provided or anticipated by the CDM may be one of the main factors giving new life to dam building around the world. As McCully noted in 2001, one of the chief reasons for the decline in hydro dam construction in the 1990s was lack of available funds. He observed:

Money is needed, lots of money, and the industry is currently having major trouble getting its hands on it. The World Bank, long the single biggest funder of the international dam industry, is retreating from its critics and has cut the number of dams it is funding to well under half of its peak level. Funding from other multilateral development banks and national development agencies is also declining. . . Faced with a funding crisis, the industry is desperately looking for justifications for public subsidies. The great hope for the industry is that global warming will come to the rescue—that hydropower will be recognized as a ‘climate-friendly’ technology and receive carbon credits as part of the international emissions trading mechanisms under the Kyoto Protocol. (2001:xvii)

And indeed, this is precisely what appears to be occurring at present. Imhof and Lanza (2010) observe that much of the new wave of dam building is

driven by infusions of new capital from China, Brazil, Thailand, India, and other middle-income countries. In particular, Chinese financial institutions have replaced the World Bank as the largest funder of dam projects globally. Chinese banks and companies are involved in constructing some 216 large dams. . . in 49 different countries, particularly in Africa and Southeast Asia, many with poor human rights records.

Similarly, McDonald et al. (2009) document Chinese involvement in at least 93 major overseas dam projects. Much of this renewed Chinese interest in dam building is fueled by the promise of CDM funding. According to International Rivers, 936 (37,677 MW) of the hydro projects up for funding under the CDM, representing 60.7% of the total, are located in China (including 503—71.15% —of all large projects).

In addition to providing vital new funding, climate change seems to be shifting the moral discourse surrounding hydro dams as well. As While and colleagues (2009:10) observe, “climate change discourse has a powerful moral imperative, especially when it intersects with questions of national security.” Whereas previously hydro dams were cast by their opponents as an immoral blight on the social and environmental landscape (e.g., McCully 2001), in contemporary climate discourse dams are recast as the moral alternative to fossil fuel-based electricity production. Thus, anti-dam activists may be losing much of the moral foundation upon which their critique has been based in the past as well.

### **Clean Energy?**

The claim that hydro power constitutes “clean” energy, while still prominent within popular media, has been increasingly called into question in recent years. An important factor overlooked in such pronouncements, critics claim, is the release of greenhouse gases (primarily methane) from the vegetation submerged beneath a dam’s catchment reservoir. In an article bluntly titled “Why Hydropower is Not Clean Energy,” for instance, prolific dam critic Philip Fearnside (2007) documents extensive methane production by several large dams in Brazil (see also Fearnside 2002, 2004, 2005a, 2005b, 2006; also Mäkinen and Khan 2010). While a minority of this methane is produced directly by the standing reservoir, far more is released when the reservoir water is released downstream through turbines and floodgates (Fearnside 2005a), and still more escapes when reservoirs are drawn down during low water periods and submerged vegetation becomes exposed (Chen et al. 2009; Qui 2009). Evidence suggests that reservoirs in tropical areas produce far higher emissions than boreal ones (Fearnside 2005a); McCully (2001:xxxvi), for instance, claims “the warming impact of a modern gas plant is between five and eight times more than that of a high-emitting boreal reservoir, but that a tropical reservoir can have a warming impact up to sixty-six times greater than that of a gas plant.” A recent study concludes, indeed, that dams and reservoirs are the single largest source of anthropogenic

methane emissions, accounting for nearly ¼ of the global total, amounting to a worldwide annual production of 104 million tons and comprising 4-5% of all human-caused climate warming effects (Lima et al. 2008).

Compounding this are numerous other means by which hydro dams may contribute to greenhouse gas emissions. As McCully summarizes,

A comprehensive accounting of a dam's contribution to global warming should also include the emissions from the fossil fuels used during dam construction, those from the production of the cement, steel and other materials used in the dam, and, probably more significantly, the changes in greenhouse gas fluxes due to the land use and other changes which the dam encourages, such as deforestation, the conversion of floodplain wetlands to intensive agriculture, the adoption of irrigation on once rainfed lands, and the increased use of fossil-fuel-based artificial fertilizers. (2001:145).

Many dams have detrimental impacts on biodiversity as well due to the habitat inundated by their reservoirs. Goldman, for instance, writes of a major dam project on the Mekong River in Laos:

The site of the Nam Theun 2 dam, watershed, and reservoir happens to house one of the most biologically diverse forests in the world, and was once listed for global protection by the World Bank's Global Environmental Facility (GEF). Aside from being a propitious site for a dam, the region (especially the newly designated NNTCA or catchments area) hosts an amazing array of diverse and apparently rare animal and plant species, some of which are, according to the latest commissioned studies, at risk of global extinction. (2004:505-6)

Given all of this, the claim that hydropower represents clean energy and its use to offset emissions from other sources appears as an exemplary case of what Scott (1998) describes as the type of "simplification" by means of which complex phenomena are reduced to common, easy-to-understand measures so that diverse phenomena can be rendered equivalent and therefore "legible" to a single central authority. So long as the auxiliary energy costs of, and greenhouse gases produced by, hydropower production are externalized, the activity appears to reduce one's total carbon footprint. If these hidden costs are exposed and internalized, however, the ostensive benefits of hydropower may disappear. Indeed, far from reducing carbon emissions, hydro power may actually in some cases augment them.

### **Costa Rica: At Peace with Nature?**

The implications of the newfound promotion of hydroelectric dams in service of climate change mitigation are evident in Costa Rica, where a majority of the nation's electricity supply is produced by hydro dams (and other forms of "renewable" energy), a fact often included as evidence of what many consider the country's impressive environmental achievements (Evans 1999). Prior to 1980, Costa Rica indeed gained all of its electricity from hydro; in the 1980s, this number dropped to 90%, with an additional 8% coming from other forms of "renewable" energy such as geothermal and wind (WCD 2000; McCully 2001). By 2004, hydroelectric production had dropped to 80% of the total, with a total of 99% produced by "renewables" (16% geothermal, 3% wind) and only 1% from fossil fuel combustion (ICE 2006:16). The latest report produced by the National Electricity Commission (ICE) claims that hydro currently (as of December 2008) constitutes 78.8% of the nation's total energy supply, with an additional 14.4% produced by other "renewables" and the remainder (7.2%) coming from fossil fuels (ICE 2009:23).

At present, the country's electricity demand is increasing 6% per year, according to ICE's calculations, and is predicted to nearly triple by 2025 (ICE 2006). In order to meet this rapidly increasing demand, ICE, which holds a virtual monopoly on electricity production domestically (a small percentage is produced privately), has developed an ambitious expansion plan with 53.3% of new capacity to come from hydro (an additional 38.3% from fossil fuels and 8.2% from geothermal and wind projects) (ICE 2006). The government hopes to sell excess capacity as an additional revenue source to other regional nations as well in the emerging Central American Electricity Market (ICE 2009). ICE has identified a total of 6474 MW of hydropower generation potential nationwide, only 23% of which is currently being exploited (ICE 2009:41).

Climate change policy appears likely to increase Costa Rica's emphasis on hydropower dramatically in the near future. In 2007, former President Oscar Arias made international headlines by vowing to render Costa Rica carbon neutral by 2021 (the nation's bicentennial), an initiative termed *Paz con la Naturaleza* (Peace with Nature) (see Fletcher forthcoming). The National Climate Change Strategy subsequently created to meet this ambitious goal emphasizes both mitigation and adaptation measures (Dobles 2008). In terms of mitigation, the Strategy calls for emissions reductions in all sectors of the economy combined with carbon capture and storage, primarily through the nation's extensive system of rainforest protected areas and privately owned reserves. In order to finance this ambitious proposal, which is estimated to cost on the order of US \$7 billion dollars (with an equivalent amount to be invested in a new high-speed rail system), the government is seeking to sell its reduced emissions as offsets to high-emitting Northern countries, expanding upon the nation's highly successful payment for environmental services (PES) program that already sells carbon credits to several European nations under the CDM and similar European Trading Scheme (ETS). As the Strategy clearly states,

In order to implement the strategy, an access to new and additional financial resources is required, including official funds, concessions toward developing countries, and carbon markets. Appropriate financial instruments and carbon markets provide effective incentives for developing countries. (Dobles 2008:20)

At present, however, the main push of the Strategy has been merely to compensate for continuing emissions in other sectors (e.g., transportation) through increased sequestration by preserving forests and reducing deforestation and degradation (a strategy known as REDD). With so much of its energy produced by ostensibly "clean" sources, there has been little attempt to date to address the means by which energy is produced. As a so-called "renewable," zero-emission source of energy, hydropower can contribute dramatically to Costa Rica's effort to demonstrate neutrality in terms of the ratio between carbon release and sequestration. As ICE (2009:21) states in support of its dam-building program, "Renewable energy sources provide the double function of reducing dependency on petroleum and permitting clean and sustainable development." Indeed, without designating hydro—upon which the nation's energy supply fundamentally depends—"clean" energy, it is highly unlikely that Costa Rica would have even the slightest chance of achieving its carbon neutrality goal (a prospect many consider dubious at any rate—see Fletcher (forthcoming)).

Partly in response to the government's carbon neutrality campaign, ICE has recently embarked upon a renewed push to construct a number of hydroelectric dams throughout the country, which ICE explicitly pronounces part of "the national political agenda of reducing dependency on fossil fuels and greenhouse gas emissions" (ICE 2009:3, 69). In addition to several projects already near completion, ICE has proposed a series of seven major new dams, with a total generating potential of 1440 MW. At least three of these projects—on the Río Reventazón, in the eastern highlands; on the Río Savegre, near the central Pacific Coast; and on the Río Grande de Térraba in the far south—have already been initiated.

This last project, named El Diquís, 170 meters in height with a projected generating potential of 631 MW, would be the largest hydro dam in Central America to date (more on this below).

Dam construction has a long and controversial history in Costa Rica. Since 1958, 15 large dams and numerous small ones have been built throughout the country, with a total generation potential of 1511 MW (ICE 2009:63). Yet this dam building effort has at times been met with fierce internal opposition that has halted several large projects in their tracks. A 167 MW project first proposed in the 1980s for the Río Pacuare (just south of the Reventazón in the eastern highlands), currently undammed and an important source of tourism revenue via whitewater rafting (the river is world-renowned for this activity), was officially suspended in 2005 as a result of decades of sustained protest and concerns regarding the validity of ICE's environmental impact assessment. In the same period, the infamous Boruca project in southern Costa Rica, which would have been by far the largest dam in Central America with a generating capacity of 832 MW and a height of 230 meters, was halted after more than 30 years of planning and negotiation due to opposition from a coalition of indigenous peoples who would have been displaced by the project and their international supporters (Carls and Haffar 2010).

### River People

One of the main stakeholder groups impacted by the prospect of future dam construction in Costa Rica and elsewhere is composed of ecotourism operators selling whitewater rafting excursions. Whitewater paddlers have long been at the forefront on anti-dam struggles in various parts of the world. In California, for instance, paddlers in the 1970s fought (unsuccessfully) to stop the major New Melones dam on the Stanislaus River in California, then the most popular commercial whitewater run in the United States, an action that led to the formation of the Sacramento-based NGO Friends of the River, which campaigns against dam construction throughout the state (Palmer 1984). Similar campaigns are led by the NGO American Whitewater, a coalition of whitewater paddlers, on a nationwide scale. In South America, whitewater operators contributed to the (equally unsuccessful) effort to halt a series of large dams on Chile's Río Biobío (Fletcher 2001), then considered one of the premiere whitewater runs in the world, and paddlers continue to lead the charge to stop another series of dams intended for the equally-renowned Futaleufú River in Chilean Patagonia (Fletcher 2009).

Similar opposition to dam-building by whitewater paddlers has occurred in Costa Rica as well. Tourism is big business in Costa Rica, which Honey (2008:160) calls "ecotourism's poster child," one of the country's largest sources of revenue, generating 20-22% of total foreign currency and 7-8% of the nation's GDP (Honey 2008:164). Nature-based excursions such as whitewater rafting comprise at least 60% of this total, and just over 9% of all visitors claim to have participated in rafting trips specifically (Honey 2008:161). As noted earlier, in the 1980s ICE began to explore the possibility of constructing a 180-meter dam on the Río Pacuare, widely considered the premiere whitewater run in Central America and among the top ten in the world (Blake and Becher 2006:123), officially announcing the intention in 1996. Opposition from paddlers, both domestic and foreign, as well as members of local communities that would have been impacted, compounded by a questionable environmental impact assessment and concerns about both the structural integrity of the dam site and loss of the biodiversity-rich rainforest in the surrounding watershed, successfully forestalled the project for many years, until it was officially suspended in 2005.

Despite corresponding action on the part of paddlers, however, another hydroelectric dam—the Angostura project—was completed in 2000 on the nearby Río Reventazón. This dam has had a substantial impact on Costa Rica's whitewater industry. Prior to the dam's construction, the Reventazón contained the only beginner (Class II-III) run in the area, the source of the majority of all operators'

business. The demand for this and other runs was such that professional raft guides from around the world were drawn to Costa Rica during the industry's high season between December and April (when the northern hemisphere was deep in winter), most residing in the nearby town of Turrialba, two hours due east of the capital San José. In addition, a far more difficult (Class V) section just downstream of the dam site attracted expert kayakers from around the world as well. Moreover, several national Olympic kayak teams (e.g., France, the US) would regularly arrive for several months each year to reside in Turrialba and train on the Reventazón during the northern hemisphere's winter. Finally, a popular intermediate (Class IV) section on the Reventazón, frequently run before the dam's construction, now tends to flow at such a high level due to outflow from the Angostura dam that it is attempted only rarely by most outfitters.

After the Angostura project's completion, most of this annual influx of foreign paddlers disappeared, along with much of the whitewater business upon which it relied. Most domestic operators, previously based in Turrialba, relocated their facilities several hours east to Siquirres, to the remaining intact whitewater section on the Pacuare. Currently, a mere handful of foreign paddlers arrive each year in search of whitewater employment, depriving Turrialba of a significant source of revenue, as well as local guides who live in Turrialba must commute back and forth to Siquirres each day in order to work.

This has only reinforced the progressive marginalization that Turrialba has suffered for some time now. Once the major population center on the only road between San Jose and the Caribbean Coast, the town was bypassed by the construction of Costa Rica's new Caribbean highway in the late 1980s, and in 1991 the so-called "Jungle Train," which passed through Turrialba as it traced the length of the Reventazón to the Caribbean Coast, was disabled by an earthquake and never rebuilt. With the recent impact on tourism precipitated by the Angostura project, therefore, Turrialba, previously considered the ecotourism capital of the country, has been displaced still further.

With the loss of the Reventazón runs, Costa Rica's whitewater industry has come to rely almost exclusively on the remaining Pacuare section (with smaller operations in various other parts of the country, including Guanacaste, Arenal, and Quepos). The struggle to halt the dam designated for the Pacuare led to the river's distinction as "the first Central American river to be accorded 'wild and scenic' status" (Cassady and Dunlap 1999:166), a category created in the US that precludes human development within a river corridor. In addition, a portion of the watershed's southern flank contains a federally-protected indigenous reserve, the Alto Chirripo (Evans 1999). Moreover, there is an effort underway to make the area into a national park (Blake and Becher 2006:123).

Despite all of this, whitewater operators remain concerned that ICE will resume its drive to dam the Pacuare as Costa Rica's electricity demands continue to grow apace with the country's industrialization. As paddlers and dam opponents Mayfield and Gallo admit of the Pacuare site,

The narrow gorge at Dos Montañas is, no doubt, the dam builder's dream. Through this narrow cleft flows a river with a large, dependable flow (average of 2200 cfs [cubic feet per second]) and the gorge provides an ideal dam site. Completion of this project would, no doubt, supply a number of jobs during construction and a valuable commodity afterwards. (1988:81).

Further, Cassady and Dunlap (1999:166) observe that the Pacuare's "wild and scenic" status "does not necessarily assure protection from previously enacted rights of the national utility company to tap hydro power." Thus, ongoing efforts are underway to organize in opposition to the potential dam, including outreach to the indigenous people living along the river, whom, one outfitter claimed, will

likely form the lynchpin of any future anti-dam effort, as their reserve holds the highest level of protection of all land within the watershed.

And indeed, several signs point to ICE's strong interest in resuming the Pacuare project in the near future. Although the project is not officially listed among those proposed for development prior to 2021 in ICE's most recent expansion plan (ICE 2009:2; Table1.1.), elsewhere in the same document it is referenced repeatedly. For instance, the Pacuare project is explicitly included along with the already-initiated Reventazón, Diquís and Savegre projects as one of "the largest hydroelectric projects" needed "to advance the national political agenda of reducing dependency on fossil fuels and greenhouse gas emissions" (ICE 2009:3, 69). Further on, the project is included on ICE's list of "candidate projects" and even given a projected completion date of October 2016 (ICE 2009:71). The project is also listed on one (#5) of ICE's seven proposed energy development plans (ICE 2009:95). It is included on ICE's map of project and plant locations (ICE 2009:141) as well.

### **Contesting Commodification of Water**

I do not wish to portray contestation concerning dam building on the Río Pacuare as a situation in which the noble environmentalist paddlers bravely confront the evil capitalist developers, however, for whitewater paddlers clearly seek to exploit the Pacuare as a form of capital accumulation as well. A number of researchers have recently pointed out that ecotourism is itself a capitalist industry that functions by commodifying in situ natural resources (West and Carrier 2004; Duffy 2008; Brockington et al. 2009; Fletcher 2009). In this respect, ecotourism is part and parcel of what O'Connell (1994) labels capitalism's contemporary "ecological phase," which seeks to internalize natural resources as an integral component of the production process to be rationally managed for sustainable long-term use rather than externalizing such resources as an expendable input, an approach characteristic of the preceding industrial era. In this sense, ecotourism can be viewed as a form of postfordist, postindustrial—that is, postmodern—capitalist accumulation (Harvey 1989; Mowforth and Munt 2003). Hence, rather than viewing paddlers as selfless activists heroically defending the environment, one can highlight the self-interest involved in their efforts, as the damming of rivers in pursuit of hydro power threatens the natural resource upon which whitewater operators' livelihood depends. And indeed, operators opposing the Pacuare hydro project self-consciously acknowledge this dimension of the conflict. As Rafael Gallo, owner of Rios Tropicales, Costa Rica's largest whitewater company, states, the proposed dam threatens "some 500 jobs directly related to tourism and at least another 2,000 secondary jobs."

Thus, the opposition between whitewater paddlers and dam builders might be understood not as a conflict between capitalism and conservation but rather as a conflict between two different efforts to commodify water within two different regimes of capital accumulation, modern and postmodern, industrial and postindustrial (Brockington et al. 2008). Yet within the framework of climate change discourse, dam builders are attempting to transcend this opposition, framing hydro dams as themselves a form of "ecological capitalism" that serve to conserve resources for long-term sustainability. Goldman describes this in relation to the Nam Theun 2 project, in which

the World Bank and its partners are linking hydroelectric dam and transmission financing to an ambitious string of conservation and protected areas, megafauna running corridors, watershed conservation sites, eco-tourism projects, biodiversity research and development sites, and indigenous peoples' extractive reserves. (2004:506)

As a result, the Bank has enlisted a number of major conservation NGOs, including the World Conservation Union (IUCN), Worldwide Fund for Nature (WWF), and Wildlife Conservation Society (WCS), as collaborators in the project. As Goldman observes of this collaboration,

The environmental projects are the legitimizing vehicle for the dam: Without such a strong public commitment to environmentally sustainable development, the World Bank and its counterparts would not be able to proceed without incurring robust resistance from the highly effective campaigns to stop “traditional” World Bank-style developmentalism. In effect, the Bank’s pro-active response to transnational environmental organizations, networks, and movements are new strategies of global environmentalism that have become institutionalized (with greater and lesser effectiveness) throughout the world. (2004:507)

As a result of such efforts, in rare cases hydro dams may indeed contribute to rather than detract from biodiversity preservation on aggregate. Indeed, as Goldman (2004:517) notes, it is in dam builders’ interest to invest in protecting “the natures that will support capital investments—such as forested mountainous terrain that can act as a watershed buffer for the hydroelectric dams.” In Costa Rica, ICE has engaged in just this strategy, acquiring control of parcels in the watersheds above some of its hydro projects in order to engage in reforestation efforts to reduce siltation and increase projects’ life. ICE manages a substantial conservation area, for instance, in the watershed surrounding its major Arenal project in the north of the country (Vivanco 2006).

Yet even in this, social costs may outweigh the conservation benefits of such efforts. As Imhof and Lanza (2010) contend of the Nam Theun 2 project,

Rather than being a new model of hydropower development, the experience with Nam Theun 2 to date only reinforces lessons learned from other large hydropower projects around the world. Instead of giving hope for the future, Nam Theun 2 threatens more of the same: broken promises, shattered lives, ruined ecosystems.

Finley-Brook and Curtis Thomas (2010) find similar social concerns with large dams throughout Central America often praised for their ecological benefits as well.

In addition to providing new support for dam builders’ actions, climate change hegemony may be weakening ecotourism operators’ position in the debate over appropriate water use. One of the principle attributes of ecotourism commonly celebrated by proponents concerns its contribution to biodiversity protection through ascribing economic value to in situ natural resources and thus providing an economic incentive for their preservation (Honey 2008). One of ecotourism’s central criticisms, on the other hand, increasingly leveled of late, is its contribution to climate change due to the greenhouse gas emissions from long-haul air transport, upon which the industry fundamentally depends (Carrier and Macleod 2005). Hence, the recent displacement of biodiversity by climate change as environmental governance’s new master concept threatens ecotourism’s claim to contribute a net benefit to conservation goals—while dams, paradoxically, have gained newfound support from this shift for their ostensive environmental benefits.

## Conclusion

In the conflict over the Río Pacuare in Costa Rica, then, different models both of conservation and of development appear to collide, with biodiversity and climate change, on the one hand, and modern and postmodern forms of capitalist development, on the other, all competing to define appropriate resource use in the valley. This situation, I have contended, is indicative of overarching

changes in the valuation of large dams in general, propelled, in substantial part, by increasing concerns over the consequences of anthropogenic climate change, in terms of which hydro dams have been newly framed, not as the regrettable ecological disturbance necessary for national development, as they were commonly construed in a previous era, but rather as an ecological force in their own right. This dynamic, I have shown, is becoming increasingly prominent in Costa Rica as the nation strives to achieve carbon neutrality and relies fundamentally upon hydropower to do so.

In sum, the terms of debate concerning the merits of constructing hydroelectric dams seem to have been fundamentally altered by the growing hegemony of climate change as the central organizing principle of environmental discourse and policy. If the Río Pacuare hydroelectric project is reinitiated in the future—which appears likely as Costa Rica’s campaign for carbon neutrality moves forward and domestic power demands increase as predicted—clearly one of its major points of justification will be its contribution to climate change mitigation, as ICE’s explicit mention of the project’s role in “reducing dependency on fossil fuels and greenhouse gas emissions,” cited above, makes readily apparent. In the current climate of climate change hegemony, resistance to dam projects seems to be becoming much more difficult due to both the policy and moral force that they now hold as an agent of climate mitigation.

Perhaps due to this newfound reality, Costa Rica’s once-strong anti-dam movement seems to be eerily silent in relation to the various hydro projects currently under construction. The massive Diquís project, for instance, which has been proposed to replace the moribund Boruca mega-dam, appears to be moving forward with virtually no public resistance (at the time of writing, the project was in the final phase of environmental impact assessment, slated to break ground in 2012 and come online in 2016) (ICE 2010). To its credit, ICE has made substantial efforts to learn from its Boruca failure by engaging in an extensive, at least superficially participatory, process of needs assessment and satisfaction for the approximately 1000 residents who will be displaced by the project (none of whom, ICE claims, are indigenous peoples) (ICE 2010). Hence, Carls and Haffar (2010:113), while critical of the defunct Boruca project, claim, “The design of the smaller project El Diquís offers many advantages in comparison to the Boruca option as far as the size of the area flooded, relocation of people, environmental impacts, number of archaeological sites affected, and finally the costs involved.” Perhaps echoing to a degree the Nam Theun 2 collaboration described above, The Nature Conservancy has already mobilized to being soliciting the Costa Rican government to finance conservation efforts on watersheds feeding the future Diquís reservoir, as part of the organization’s innovative new policy to promote “water funds” designed to transfer payments for environmental services from downstream users to upstream conservers (Benítez et al. 2010).

Likewise, a second large dam currently in construction on the Reventazón has encountered no organized opposition from either local communities or the whitewater paddlers active in the nearby Pacuare protests. As one raft guide explained to me, many paddlers already consider the dam as good as built (despite the fact that there is no actual structure yet) and are concentrating their efforts on the Pacuare, which unlike the Reventazón enjoys a substantial level of federal protection.

The hegemony of climate change discourse is such that even critics of conventional development policy may promote hydropower development as a component of their critiques. In Costa Rica, for instance, a group of young professionals calling themselves “co2neutral2021” has organized to decry the government’s dearth of substantive efforts to actually achieve the carbon neutrality that is its stated goal. In their critique, however, the co2neutral2021 group embraces hydro’s clean image, contending, “Despite the sharply increased demand, Costa Rica has the ability to satisfy the increased

electricity demand with 100% renewable energy. Costa Rica has the potential for an additional 8,500MW of wind, geothermal, and hydroelectric capacity.”

In response to all of this, the anti-dam movement has reframed its efforts and begun to mobilize to counter the dam building industry’s self-promotion of hydroelectricity as climate-friendly power. International Rivers, for instance, has devoted a substantial portion of its web space to critiquing the presentation of hydro dams as clean energy producers, asserting:

River-wrecking dams are the wrong choice for a warming world. . . International Rivers seeks to prevent big hydro developers from exploiting the CDM’s flaws, to fix the CDM’s worst loopholes, to exclude the CDM and reduce the amount of offsets in US climate legislation, and to promote better mechanisms for supporting decarbonization.

The site contains links to various articles with titles such as: “Bad Deal for the Planet: Why Carbon Offsets Aren’t Working...and How to Create a Fair Global Climate Accord;” “The Great Offset Swindle: How Carbon Credits are Gutting the Kyoto Protocol and Why They Must Be Scrapped;” and “The CDM’s Hydro Hall of Shame.” Various promotional videos critiquing hydropower (e.g., “Hydropower: Not as Clean as You Think”) are also available for viewing, including several YouTube clips featuring Executive Director McCully himself. Other pages are devoted to critiquing the merits of specific hydro projects that have applied for CDM registration—for example, the controversial Changuinola 1 megaproject (see Finley-Brook and Thomas 2010) currently underway in Panama.

Such efforts have contributed to limited acknowledgment of the issue on the part of several international bodies, including, recently, both the CDM Executive Board and the Intergovernmental Panel on Climate Change (IPCC), and, even earlier, the WCD itself in its famous 2000 report (Mäkinen and Khan 2010). Despite such acknowledgement, however, Mäkinen and Khan (2010:95) observe that the international community continues to display “relatively little awareness of the issue and it has not entered mainstream discussions of GHG emissions and climate change.” Consideration within policy fora has been still less evident (Mäkinen and Khan 2010).

Hence, whether anti-dam activists’ efforts will ultimately be sufficient to counter the dam builders’ campaign to sell hydro as a global warming solution remains to be seen. Mäkinen and Khan (2010:101) predict that “[a]s scientific knowledge accumulates and becomes more robust, national and global accounting of GHG emissions from water reservoirs is likely to become mandatory.” Similarly, the authors assert,

An independent, credible global body such as the UN system should be called upon to assess scientific information available through published literature, and to commission additional research to fill in the missing gaps. The issue of reservoir emissions needs to cover the full spectrum of the uses of dams using well established climate change policy principles embodied in the UNFCCC. (Mäkinen and Khan 2010: 103)

Likewise, Pittock (2010:450) calls for “more rigorous climate-change policies that limit the perverse impacts of incentives for hydropower.” Concrete steps in the directions advocated by these authors, however, have yet to be initiated. Thus, how such proposals will affect the dam builders’ claim to mitigate climate change, and increasing support for this claim within the international conservation community—as well as how proponents of ecotourism’s use as a conservation strategy will engage with the growing critique of the industry’s own implication in greenhouse gas emissions—remain important questions for the future, to which subsequent research and policy advocacy should be devoted.

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# **Environmental Conflict and the Politics of Oil in the Oil-Bearing Areas of Nigeria's Niger Delta**

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Oil wealth enriches Nigeria, but it has not alleviated the poverty and deprivation in the oil-bearing areas of the Niger Delta. Oil-bearing areas have been exposed to ecological risks that have culminated in the violence characterizing the region. Literature has highlighted the consequences of oil exploitation, such as social tension culminating in violent communal crisis, youth restlessness, and oil-companies' brutal repression. This study examines oil-related environmental externalities and oil-induced politics in the oil-bearing areas. Data were derived from interviews, Focus Group Discussion (FGD) and questionnaires. At present, the oil-bearing areas remain marginalized from the mainstream economic, social, and political activities in Nigeria. The Nigerian government's top-down approach to the development of the oil-bearing areas has not been people-centred and participatory. Recommendations from this study include improved infrastructures, more equitable distribution of resources, improved local governance, effective conflict management mechanisms, and better environmental management.

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## Introduction

The oil-bearing areas of the Niger Delta have the largest mangrove forests in Africa and the third largest in the world. The inhabitants of the area derive a wide range of natural resources from the mangrove forest; including herbal medicine, fish, timber, and vital ecosystem services like stable soil and a flourishing habitat for a variety of wildlife, such as several endangered species, such as the Delta elephant, the white-crested monkey, and the river hippopotamus. In other words, the Niger Delta mangrove provides the means of sustenance to the people, who live largely on a subsistence basis. It also provides an important spawning habitat for Nigeria's commercial fisheries.

However, the advent of oil production in the Niger Delta has led to deforestation and ecological degradation, threatening the renewable natural resources and the ecosystem services in a number of ways. The oil-bearing areas have faced so many environmental problems caused by pollution arising from oil activities such as drill cuttings, drilling mud, fluids used in production, chemicals injected to control corrosion or to separate oil from water, and general industrial waste. Added to this are problems of gas flaring and incidents of oil spills and blow outs (Aworawo, 1999). While spills inevitably accompany oil production, in Nigeria they occur with an alarming frequency and magnitude because most of the oil delivery infrastructure is obsolete and inadequate. Also, sabotage of pipelines is a persistent problem, and spills and pipelines leaks are poorly monitored and often not reported and repaired on time.

In addition, oil exploration and production are linked to poorly designed causeways and canals that the oil industry uses. These affect the hydrology of the seasonally flooded fresh water swamp and the brackish water of the mangrove forest, killing crops, destroying fishing grounds and damaging the drinking water supply.

While it is evident that the environmental effects of oil production are great, it is important to point out that there are also some environmental problems not related to oil exploitation. The recent United Nations development report on the Niger Delta (UNDP, 2006) identified certain environmental problems that are not attributable to the oil industry activities, but rather a result of the natural terrain and hydrology of the Niger Delta. They are flooding, siltation, occlusion, erosion and the shortage of land for development. However, oil-related environmental effects compound and overshadow these others.

The Niger Delta region is a sensitive and fragile ecosystem. In spite of this vast resource endowment and its immense potential for socio-economic growth and contributions to the overall development of Nigeria, the oil-bearing areas within the Niger Delta remain under threat from rapidly deteriorating economic and environmental conditions as well as social tensions. Some critics suggest that the situation has worsened in recent years (ANEEJ, 2004). The perception of local people living in the oil communities is that the government is acting negligently, while the valuable ecosystems on which they depend for their livelihood are devastated by oil extraction. As a result, the situation degenerates into violence and this draws a disproportionate reaction from the government, deepening the people's resentment and sense of alienation.

In spite of the damaging impact of oil exploitation on the environment and livelihoods of the host communities, scientific data on the overall and long-term effects of oil exploitation on the area are only beginning to emerge (HRW, 1999; Nwachukwu, 1999; Aluko, 1999; Okonta and Douglas, 2001; Ukeje *et al.*, 2002; Onosode, 2003). Environmentalists and other experts have focused attention on the

environmental degradation resulting from oil activities and a major bone of contention is the implication of the environmental impact on the livelihood of the people of the oil-bearing areas of the Niger Delta.

The importance of environmental sustainability cannot be overemphasized. This is fundamental to the people's welfare and development as their existence to a large extent relies on subsistence endeavours, which depend on natural resources. While there have been many intricate poverty strategies that have been designed and implemented in the Niger Delta region, and while all these schemes have their own validity depending on the environment, the stark reality in the oil-bearing areas is that decades of these schemes and programmes have not mitigated the crucial problems of exclusion and human deprivation.

As a result, more germane to the survival of the indigenous people is the danger of oil exploitation obliterating their source of livelihood since they rely solely on their immediate environment for survival. Hence, anything that alters their environment threatens their very existence. Oil exploitation has created life-threatening ecological hazards and deterioration of health and social fabrics of the inhabitants of the oil-affected communities. The implication is that the oil industry has exploited the ecosystems for resources beyond the level of sustainability (Ashton-Jones and Douglas, 1998). The ecological problem is a reality that has to be tackled. This will reduce the vicious cycle of poverty and prevent the endemic social conflict that has pervaded the oil-bearing areas of the Niger Delta.

Subsequent sections examine the specific environmental effect of oil exploitation, analyse the politics of oil in oil-bearing areas of the Ondo state and proffer policy options for environmental sustainability and effective conflict management in the Niger Delta. The analysis was derived from survey questionnaires, interviews, FGDs sessions and participant observations.

### **Oil-related environmental externalities in the oil-bearing areas**

The specific environmental effect of oil exploitation on the oil-bearing areas is examined in this section in order to determine the extent of the impact on the people's capacities to generate and sustain their means of livelihood. The analysis shows that oil-bearing areas in the Niger Delta are facing severe ecological devastation, in other words, that the environmental effect is negative. The oil industry activities that affected the environment of the host communities are examined in greater details.

#### *Oil Spillage*

Oil spillage is the most common and controversial of all the environmental impacts of oil exploitation. Constitutional Rights Project (CRP, 1999) defines oil spills as uncontrolled releases of any product relating to oil production including crude oil, chemicals, or waste caused by equipment failure, operation mishaps, human error, or intentional damage to facilities. Oil spillage occurs during the drilling of oil wells and as a result of oil pipelines leakages and during the loading of oil into the tankers (Adewuyi, 2001). Spills are potentially the most devastating on agricultural land and water resources.

UNDP (2006) reports that much of the environmental pollution in the oil-bearing areas is the result of oil spillage due, essentially, to accidents based on human error and equipment failure. The report finds that a total of 6,817 oil spills occurred between 1976 and 2001, with a loss of approximately three million barrels of oil. More than 70 per cent was not recovered. Approximately 6 per cent spilled on land, 25 per cent on swamps and 69 per cent in the offshore environment. Statistics from the Ministry of Petroleum Resources also indicate that between 1976 and 1996, a total of 4,836 incidents resulted in the spillage of at least 2,446,322 barrels (102.7 million U.S gallons) of which an estimated

1,896,930 barrels (79.7 million U.S gallons) were lost to the environment. The extent of the impact on the study area where oil exploitation is largely offshore can best be imagined. Orubu *et al.*, (2004) share this view when they reported that massive oil spills occurring in the riverine areas have done untold damage to the aquatic ecosystem, particularly in the mangrove swamp forest zone.

An average of one oil spill occurs every week and three oil spills are recorded each month in most of the oil-bearing areas of the Niger Delta, in which the proportion lost to the environment is quite disturbing (Awobajo, 1981). Thus, spills lead to the gradual poisoning of the water and the destruction of vegetation and agricultural lands. Oil companies usually attribute the cause of the oil spills to the deliberate action of sabotage, namely, wilful damage to facilities by the local people in protest against the operations of the oil companies. However, in reality, the cause may be due to the use of decrepit pipelines, some reportedly over 40 years old, which criss-cross oil communities. These pipelines are rusty, obsolete, and poorly maintained. Consequently, on-site oil leaks and ruptured pipelines are a serious problem in the Niger Delta.

In addition, oil spills and pipeline fires are regular features and official estimates are that there are at least 300 incidents each year. Clearing of oil spillages is not properly carried out; in most cases, the remaining crude oil is set on fire in which case forests and rivers are set ablaze. Oil spillage has exposed local people to severe hardship, poisoned the land, and polluted water bodies because once a spill occurs, it spreads all over the area, damaging the water and killing aquatic life. In other words, spills and leaks not only pollute groundwater sources and destroy agricultural lands and fisheries, they also pose an immediate threat to human life. HRW (1999) examine the long-term effect of oil spillage, which caused major pollution and stated that while the estimated safe lifespan of a pipeline is fifteen years, in numerous places in the Niger Delta, pipelines aged twenty or twenty-five years can be found.

Mobil's Idaho blows in January 1999 resulted in the spilling of 40,000 barrels of oil. Although it was considered small, the spill spread from the immediate environment in Akwa-Ibom State to Rivers, Cross-Rivers, Edo, Delta and Ondo States. It even spread 85 kilometres into the Atlantic Ocean, going as far as Benin, Togo, and Ghana (Aworawo, 1999).

Field observations revealed sites of oil spillage in certain communities, which turned the water brackish in colour. Generally, the people complained about the negative environmental effect arising from the incidence of oil spillage. The long-term environmental effect as highlighted by the local communities ranged from the depletion of aquatic or groundwater resources to the destruction of forests and mangrove swamps. The people also complained about the devastating impact of spills on all the communities. According to one community leader, an oil spill that occurred on 1st August, 2004 at Chevron's Ewan oil field spread to several neighbouring oil-bearing communities of Igo, Awoye, Odun-Oyinbo, Ubale Kekere, Ogungbeje, and Yoren, destroying fishing grounds, the major source of income for the people. However, the main cause of the spill could not be ascertained. Incessant oil spills have always been a source of agitation and concern in the oil-bearing areas.

### *Gas Flaring*

Gas flaring is another major effect of oil exploitation on the environment of the oil-bearing areas and generates air pollution and heat. Gas flaring is the deliberate burning of natural gas that is produced in the Niger Delta, it creates a ceaseless, high intensity flame. Natural gas is a by-product of oil extraction, which is removed from the earth crust along with the crude oil. The World Bank (1995) shows that gas flaring has been known to be the singular highest contributor to the problem of global warming or global climate change. In the same vein, Orubu (1999) adds that that greenhouse gases such

as methane and carbon dioxide emitted from gas flares contribute to global warming, which could lead to a rise in sea level, accelerate the problem of climatic change and harsh living conditions on earth if not checked. It also has negative effects on the immediate environment as it adversely affects plant growth, wildlife, and human beings. It has been estimated that the total emission of carbon dioxide (CO<sub>2</sub>) from gas flaring in Nigeria amounts to about 35 million tons per year and it is on record that Nigeria flares the highest amount of gas in the world (World Bank, 1995, 2000/2001). The percentage of gas flared in Nigeria, which is about three times the OPEC average, is about 16 times the world average (Ajayi and Ikporukpo, 2005).

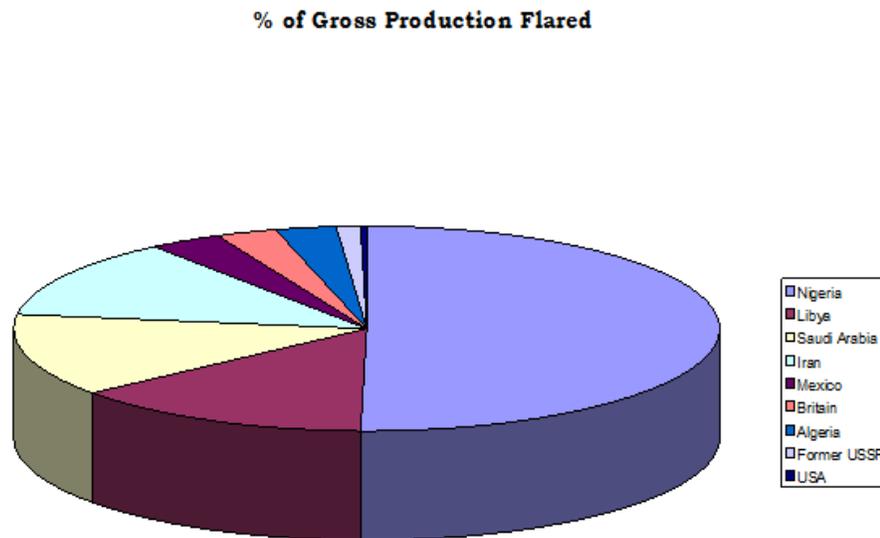
Compounding the people's plight is the close proximity of gas flares to residential areas, forests, and waterways, thereby making living unbearable to human beings, terrestrial and aquatic animals. At the mouth of the canal, from which the open sea is visible from the Awoye community, the distant gas flare illuminates Chevron's Parabe platform, which is nine kilometres away, and the Ewan platform about two kilometres. A study of gas flaring in South-Eastern Nigeria by Isiche and Sanford (1976) found that at the global level, flaring in Nigeria contributes a measurable percentage of the world's total emissions of greenhouse gases. Specifically, due to the low efficiency of many of the flares, much of the gas is released as methane (which has a high warming potential) rather than carbon dioxide. At the local level, the low-lying Niger Delta is particularly vulnerable to the potential effects of sea level rising. Further, air and leaf temperatures increased up to eighty or one hundred meters from the stack, such that species compositions of vegetation are affected.

The most noticeable effect of the flares is light pollution. Across the oil-bearing areas, the night sky is lit up by flares, which during the rainy season reflect brightly from the clouds. It is difficult to differentiate between night and day because of the polluted air and burning light. Communities close to flares complain that the light disturbs nocturnal animals, driving them away from the area. The economic and health cost of heat emissions from the flares and destruction of vegetation are part of the negative externalities of the wasteful flaring of oil-associated gas. Indeed, gas flaring has been identified as the major cause of respiratory infection among the Niger Delta people, as well as the cause of reduced growth potentials of farm crops (Egwaikhide and Aregbeyen, 1999). Though economically sensible for the oil producers, flaring is environmentally destructive. Local communities have borne the brunt of the effects of the gas flares. The destructive impact of gas flares is succinctly expressed in the statement of one community youth leader who stated that the roofs of their houses have been severely corroded as a result of acid rain caused by gas flares, which also affects aquatic fauna leading to a reduction in fishery.

Ibeanu (2000) indicates that Nigeria exceeded the world average for natural gas flaring by seventy-two per cent in 1991. In that year, while the world average for gas flared as a percentage of total production was four per cent, Nigeria flared seventy-six per cent of that total production. Flaring of gas in Nigeria for about 50 years has also been estimated to constitute a waste of 12.5 million dollars annually, an amount that would have been earned if the oil-associated natural gas was captured, sold, or used as a local energy source. However, the lack of delivery and utilization of infrastructure for natural gas in Nigeria render it a useless by-product (Onosode, 2003).

Figure 1 indicates that Nigeria is not just number one; rather, it flares more gas than all the other eight countries put together. Although, with the gas utilization programme, the flare rate is said to have been reduced to about 54%, the proportion flared is still very significant in global terms. Okonta and Douglas (2001) corroborated this and identified the reason for the high rate of gas flares in Nigeria as multinationals involved in oil exploration and production activities in Nigeria flared more gases in the course of their operation than in any other countries where they are involved in oil activities. They

suggest that these oil companies found it economically expedient to flare non-associated gas on site rather than incur the expenses of putting in place facilities to re-inject the gas back into the wells or to collect it for commercial use.



**Fig 1: Gross Gas production flared in major Oil-bearing Countries.**

Source: Author's Analysis, 2007

Natural gas does not have to be flared off; and in many countries, as stated earlier, there is little flaring. Other options for managing natural gas include re-injection into the subsoil and storage for use as a source of energy by local communities and in other part of the country. Yet companies in the Niger Delta opt for flaring because even with the minimal five naira paid to the government for each barrel of gas flared, it is far cheaper than the alternative.

#### *Drill Cuttings*

Oil extraction and production lead to the contamination of streams and rivers through the discharge of various materials into the environment during drill cuttings and drilling mud and fluids used for stimulating production. The major constituents of drill cuttings, such as barite and bentonite clays, when dumped on the ground, prevent local plant growth until natural processes lead to the development of new topsoil. In water, these materials disperse and sink, thereby suffocating local bottom-living plants and animals by burying them (ANEEJ, 2004).

In addition, air pollution arises during drill cutting from the carbon dioxide discharged into the atmosphere as a result of the cracking of wells (Adewuyi, 2001). CRP (1999) identifies the chemicals and

sludge generated in the oil production process to include oily residues, tank bottom sludge, and obsolete chemicals, which, if not properly treated and disposed of, carry high pollution and health risks. Van Dissel (1996), cited in HRW (1999) explains that waste also comes in the form of drilling water. Drilling for oil produces waste, largely mud, which in itself is relatively harmless, but when produced in large quantities can cause problems by changing the acidity or salinity levels of the soil and/or water and by increasing the turbidity of the water. Therefore, the physical environment is altered in the course of oil wells drilling and vegetation is destroyed.

### *Canalisation*

Poorly designed causeways and canals, constructed to bring in heavy drilling equipment, affect the hydrology of the seasonally flooded fresh water swamps and the brackish water of the mangrove forest. Canals disrupt the delicate hydrological system, especially when they are constructed on the border zone between freshwater and brackish water in the riverine areas; as such, they can disrupt the viability of long-established fishing grounds.

In the study area, a canal dug by Chevron near one of the oil-bearing communities in Ilaje has reportedly caused accelerated erosion near the sea and has destroyed the local hydrological system by allowing saltwater into previous freshwater areas, thereby creating a saltwater marsh in place of much higher biodiversity freshwater swamp. Since the canalization of the area, salt water from the ocean has completely altered their ecosystem and endangered the community's means of survival; specifically, the traditional fishing ground and source of drinking water have been wiped out. The Chairman of the Regional Development Council (RDC) of Chevron narrated this to the interviewer and identified some of the environmental effects of Chevron activities on the oil-bearing areas. He could not, however, point to measures taken by Chevron to address this negative environmental impact. Findings seem to indicate that the oil-bearing areas are left to bear the negative environmental impact without any support from the oil companies. However, these artificial canals not only allow saline waters of the Atlantic into freshwater sources, they also lead to the scarcity of drinking water and kill many species of plants, animals and fishes. Their construction has precipitously altered the entire ecosystem, as freshwater is destroyed (Onosode, 2003).

### *Dredging*

This is another environmental effect of oil exploitation in the oil-bearing areas. Dredging destroys the ecology of the dredged area where the spoils are dumped. Although dredged material is, in principle, dumped on land, some of it inevitably washes back into the water, thereby increasing its turbidity and reducing sunlight penetration, which affects plant life and kills fish in the creeks and rivers. Dredged materials in mangrove areas turns acidic once exposed to oxygen and silt dredged as a result of canalization and dumped on cultivated leaves can decrease farm yields.

### *Coastal Erosion*

Coastal erosion affects artificially all the oil-bearing areas of the Niger Delta bordering the Atlantic Ocean. The Ilaje oil-bearing areas are no exception. UNDP (2006) attributed this erosion as partly the result of rising sea levels and strong tidal wave current. Oil and gas activities have also contributed to the increasing menace of erosion through the construction of canals, shore crossing, pipelines, jetties, and moles. The sea waves break on the shore; land is erodes and washes into the sea. Coastal erosion has become a constant threat to many oil-bearing communities of Ilaje beginning as far back as 1988. *The African Guardian*, reports that erosion has laid waste to some coastal communities

Such destruction has affected riverine communities such as Awoye, Ojumole, Umohuma, Ikorigbo, Jirinwo, Molutehin and Ogungbeje (*The African Guardian*, January, 1988).

In recent times, Chevron's seismic activities have left the oil-bearing areas porous, leading to the threat of sea incursion. Awoye and Ayetoro are seriously threatened by sea incursion. In Awoye, for instance, the earliest site, is now some two kilometres into the ocean, an indication that the community is threatened by tidal incursion.

One coastal community leader lamented the hardships faced as a result of tidal incursion. According to him, since Chevron, formerly Gulf Oil, started operation in Ilaje, the riverbed has turned to rivers and sea incursion has become a constant threat. As a result of the encroachment of the ocean, for example, one coastal community is now found at its 6th relocation site. In the case of another coastal town, which until recently comprised a convergence of fishermen and women whose trade attracted patrons from the upland and beyond, sea incursion is a reality that threatens their continued existence. A respondent for one of the FGD sessions at a coastal settlement vividly narrated the hardship the tidal incursion caused the people, stating that, when the powerful tide began encroaching, people were confronted with the reality of tidal incursion and were so afraid that they stayed indoors for days until the waves abated. As a result, all economic and social activities ground to a halt.

In addition, focus group discussion sessions in one coastal community indicate that about 15 years ago, the sea was some 200–400 meters away from the community, unlike the situation now, where the sea is uncomfortably close. Members of that discussion were unanimous in their assertion that the sea incursion is caused by oil industry activities. Prior to oil exploitation, the community only felt the impact of high tide on the sands; the tide did not encroach on the community. They complained that the government has not addressed the problem, even after sending an emissary to them. Although the government gave the contract for the building of an embankment to an indigenous company about three years ago, nothing concrete has been achieved to date. Sea incursion has led to the displacement of the people who are rendered homeless while their economic activities have been paralyzed.

#### *Effluent and Waste from Oil Refineries*

The discharge of refinery effluents into freshwater sources and farmland devastate the environment and threaten human lives. Such effluents contain excessive quantities of toxic materials like mercury and chromium. For instance, fish can store mercury in their brains for a long time and can easily pass this into the human food chain when consumed resulting in adverse effects on human population. Recent studies conducted by the environment group, Environmental Rights Action (ERA, 2000), on some oil-bearing communities revealed that most of the underground aquifers are heavily contaminated with a cocktail of dangerous metal and chemicals.

Crude oil contains thousands of different chemicals, many of which are toxic and are known to be carcinogenic with no determined safe threshold for human exposure (HRW, 1999). Further, materials such as metals, glass, plastic, and crates used by the oil companies, which are later thrown away, have a negative effect on the people and environment. Atmospheric contaminants from refinery operations, such as oxide of nitrogen, carbon, and sulphur have been found to constitute major waste sources. Lubrication oils and other wastes in the form of sludge, bitumen, slope, and oil, sand, or sediment are present in large quantities within the oil flow stations, storage terminals and tanks (Nwakwo and Ifeadi, 1988). Chemical wastes are continuously dumped into the waterways, although the oil companies claim to technically reduce the toxicity of their wastes and properly get rid of them. In one community, the people showed the researcher sites of oil wastes in the water by the riverbanks, which has turned

blackish and emits odour. Gberesu (1989) opines that a high rate of disposal of fluids from the petroleum industry into the river is responsible for the increased floods experienced in the Niger Delta because the disposal has increased the viscosity of the river thereby reducing velocity.

Oil companies usually discharge production water, already contaminated with oil, directly into the surrounding creeks and rivers without adequate treatment. Sludge and other lethal chemicals removed from the bottom of storage tanks in the course of maintenance activities are disposed of in the same way (Okonta and Douglas, 2001). Oil leaks from storage tanks and equipment are also a regular phenomenon and these, combined with hydrocarbon vapour released and evaporated directly from the tanks themselves, have subjected the soil, rivers, and creeks in the vicinity of the oil terminals to slow but relentless devastation.

However, evidence indicates that even though the Nigerian government and oil companies are aware of these negative environmental effects of oil exploitation, they have not made any concerted effort to control the adverse effects of oil extraction, production, and distribution activities on the environment of the host communities.

### **The politics of oil the oil-bearing areas**

Political dislocation in the oil-bearing areas has been primarily the result of oil industry activities. It has been argued that oil companies operating in the Niger Delta have played a very significant role in the collapse of values and systems in the Niger Delta through an adverse reshaping of the local political landscape and the introduction of corrupt and divisive community relation policies reminiscent of the divide and rule tactics of colonial Nigeria (Imobighe, 2004).

Findings reveal that oil-related activities have brought with them the politics of oil and that this has ignited and exacerbated oil related conflicts in the oil-bearing areas. These conflicts are multi-dimensional. The communal conflicts can take the form of conflict within a community, conflict between communities, and conflict between host communities and the oil companies. The intra- and inter-communal conflict is usually oil-induced. The presence of oil has exacerbated political disputes over territory or other rights. While territorial disputes in the area predate the discovery of oil. For instance, the Ugbo and Mahin-Ilaje conflicts during the British rule led to the deportation of the traditional ruler of Ugbo-Ilaje by the British imperial ruler (Curmen, 1937). However, since the discovery and commercial exploitation of oil, many of the conflicts between communities in the area are fuelled by the presence of oil. A case in point is bloody conflict of 1998 between the Arogbo-Ijaw and the Ugbo-Ilaje, which was attributed to the presence of oil in a boundary town between the two ethnic groups (Albert, 2001). Even though the oil industry is blamed for a range of ills and for not doing enough for the areas where they operate, communities are also aware of the potential benefits of having oil pipelines travel through their land or the presence of a flow station and the opportunities for compensation payments and contracts that will result, even if the compensation only reaches a few. Therefore, disputes between communities, which may have been latent can be stirred up by the suggestion that an oil installation is planned as well as damage caused by oil pollution.

Another revelation during FGDs session is the issue of divide and rule tactics of oil companies. Focus group discussions showed that the oil companies use the award of contracts or development projects to deliberately divide communities and thus dominate them without serious challenge to their operation. Whatever the intentions of the oil companies, division and conflict within and between communities often results from, or is exacerbated, by their presence.

Field observation also shows that the politics of oil in the study areas involve only a few, elite, segments of these communities. The elite have profited immensely from the oil companies and the wealth they have amassed is used to control the political behaviour of the larger majority. These elite are usually the traditional rulers and community leaders in these communities. They have become rich from the spoils of oil at the expense of other members of the communities. The elite are prepared to tolerate the inconveniences of oil company presence in terms of environmental pollution in as much as oil companies reward them. Oil money that flows into the hands of these local elites, after taking their share, are passed on to their supporters. These people have lost a voice against the activities of the oil companies because of the financial gain derived from the oil industry. Respect for these elites has broken down in most of the oil-bearing areas of the Niger Delta. The government is also fingered as culprit in the spoils of oil. This assertion was vividly captured in a statement made by one community member participating in a focus group discussion:

The community representatives who are very close to the oil companies negotiate on behalf of the community and collect compensations from oil companies that are less than the community entitlement. For instance, if the community is entitled to N100 million as compensation, they may collect N20 million instead. The government is also culpable of this practice. They negotiate on behalf of the community without our knowledge.

Oil-related activities have increased the people's level of participation in local politics. Since these elites are politicians, being a member of their parties implies that the benefit accruing to them from oil activities will trickle down to their supporters. As such, active participation in party politics, as field observation revealed, is a major factor determining whether a person would benefit from the spoils of oil given to the elite. There is, therefore, a clear financial incentive to political activity, which has negatively impacted on the attitude of the youth toward productive enterprises, especially with regard to fishing and other traditional economic ventures.

Compensation payment has been a major issue in the politics of oil in the study area. The traditional leaders who were responsible for the collection of compensation have been accused of embezzling a large portion of the money designated for the affected community. These have affected the traditional authority of these rulers. Specifically, oil-related activities have led to the emergence of more kingdoms and kings, most of whose legitimacy is contentious. As a result of the crisis that the issue of compensation has generated, youth organizations are now responsible for the collection of compensation on behalf of communities instead of the traditional rulers. The traditional rulers, however, still derive benefits from the oil companies. The general view obtained from interviews and FGD sessions is that traditional rulers are still accorded respect because the Yoruba culture dictates respect for elders. This perception of reverence for traditional authority was further reinforced in the assertion of one youth leader:

Whatever the shortcoming of our traditional leaders, we cannot disobey them outright, as our culture dictates respect for elders. Also, our traditional beliefs exert repercussions for disobedience to traditional authority. As a result, traditional leaders weigh power on their subject.

As inferred from the available data, traditional rulers still exert control over their subjects. The modicum of peace experienced in the study area is attributed to the control these leaders have over their people. They are able to rein in youth when they intervene in disputes between youth and the oil companies. As shown in Table 1, three survey questions supported the findings on the state of traditional institutions.

**Table 1: Perception on the state of the Traditional Authority**

S/No	State of the Traditional Authority	Response			
		Yes	%	No	%
1.	Have oil-related activities affected the respect and honour accorded the traditional rulers of the community?	90	30	144	48
2.	Do they have the final say in any oil-related issue affecting the community?	216	72	30	10
3.	Do they fight for the interest of this community where oil-related issues are concerned?	60	20	192	64

Source: Author's Analysis, 2007

An analysis of the three sampled questions supports the observation made regarding the traditional institutions. Responses to these questions attest to the diminished respect and honour accorded the traditional leaders. Responding to the first question, 90 (30%) of the respondents claimed that oil-related activities have not affected the respect and honour accorded traditional rulers, 144 (48%) believed otherwise, and 66 (22%) did not answer the question. This may be interpreted to indicate that the self-seeking attitude of the traditional leaders accounts for the decline in their status. In the case of question two, observation data indicated that 216 (72%) confirmed that the traditional leaders have the final say in any oil-related issue affecting the community, 30 (10%) disagreed, and 54 (18%) did not respond. The high percentage of people answering 'yes' could be attributed to the culture and belief system of the people, which imposes penalties for outright disobedience to these leaders. With respect to the last question, 60 (20%) believed that the traditional rulers are fighting for the interest of the community, 192 (64%) disagreed, and 48 (16%) were neutral. The high percentage of people answering 'no' would indicate that the majority of the people perceive the traditional leaders to be illegitimate representatives of their people, and shows that they are more concerned with the monetary benefit leaders receive from the oil companies, even when it may be detrimental to the welfare of their people.

The statistical analysis of the political effects of oil exploitation on the oil-bearing areas, using Pearson's chi-square test and shown in Table 2, indicates that there is a significant difference in the political regime as a result of the oil industry's activities. Data generated from the survey questionnaire on the perception of the respondents on the effect of oil exploitation on their political life were utilized. The table shows that Pearson's chi-square value ( $\chi^2$ ) is 5.71 at the first degree of freedom (df) and the significance levels for 2-tail and 1-tail tests are 0.04 and 0.04, respectively. This implies that the results are statistically significant.

**Table 2: Pearson's Chi-Square Analysis for the Political Impact of the Oil Industry**

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
<b>Pearson Chi-Square</b>	5.716(b)	1	0.02		
<b>Continuity Correction(a)</b>	3.091	1	0.08		
<b>Likelihood Ratio</b>	5.288	1	0.02		
<b>Fisher's Exact Test</b>				0.04	0.04
<b>Linear-by-Linear Association</b>	5.399	1	0.02		
<b>N of Valid Cases</b>	18				
a. Computed only for a 2x2 table					
b. 3 cells (75.0%) have an expected count less than five. The minimum expected count is 1.11.					

Source: Author's Analysis, 2007

Based on these results, the hypothesis that there is a significant relationship between oil exploitation and shifts in the political regime of the oil-bearing areas is accepted. In other words, this study suggests that oil-related activities have negatively affected political conditions in the oil-bearing areas, as well as the local environment.

### Conclusion

The oil-bearing area of the Niger Delta is the richest parts of Nigeria in terms of natural resources endowment. The area has large oil and gas deposits, as well as extensive forests, good agricultural land, and abundant aquatic resources. However, the oil communities of Ilaje, like other Niger Delta communities, remain marginalized from mainstream environmental, economic, social, and political activities in Nigeria. The government, both Federal and State, has failed to consider the interests and human rights of the grassroots producing areas. Rather, the government continues to exclude the people and their voices in the effort to develop the country. The government lacks the political will to enact and enforce stringent environmental laws to regulate the environmental consequences of crude oil exploitation in the Niger Delta. As a result of this grave negligence on the part of the government, oil companies continue the destruction of the ecosystem of the Niger Delta region.

The people's efforts to achieve economic and ecological sustainability are being severely threatened. They fear that they will have to move to another location or face extinction in a land so negatively affected by the oil companies, such that it can no longer support them as it once supported their ancestors. In spite of the area's abundant natural resources, the potential for development remains unfulfilled and threatened by environmental devastation and worsening economic, social, and political conditions.

In addition to the negative impact on local communities' economies, environmental pollution and degradation, and lack of access to assets including basic education, clean water, a diversified economy, and healthcare delivery—that hold the keys to unlocking poverty's grip—are other forms of human deprivation. Therefore, in the Niger Delta, marginalization and exclusion from the ownership of assets and lack of access to social amenities define poverty. It is only if and when development strategies address these factors holistically that the possibility of alleviating poverty and reducing vulnerability exists. There should be a people-centred development agenda founded in the region's natural and human capital.

The people of the oil-bearing areas can no longer endure the gross social infrastructural neglect, poverty, ecological catastrophes, and other deprivations they face despite their contribution to the development of Nigeria. Their response to the apparent failure or inability of successive Nigerian governments to protect the land and people from the hazards of hydrocarbon activities such as pollution, oil spillages, incessant gas flaring, human right violations, and subsequent economic deprivation and impoverishment lies in the clamour for resource control. The people of the Niger Delta region strongly believe that the only way their developmental needs can be met is for them to regain ownership, control, and management of their oil resources.

Against this backdrop, the special circumstances in which the people of the oil-bearing areas find themselves require programmes that recognize that poverty eradication and successful rural development depend on the involvement of local communities. There must be a strong focus on strengthening grassroots organizations and on making resources available for community development activities. The programme for addressing rural poverty must identify and target the most vulnerable, empowering them to participate effectively in development activities.

The government, in concert with oil-bearing communities and other stakeholders, should undertake a comprehensive environmental survey of the Niger Delta in order to establish the causes of ecological and socio-economic change over time, and, accordingly, induce corrective action by encouraging relevant stakeholders to address specific environmental and related socio-economic problems in order to improve the quality of life of the people and achieve more equitable development in the oil-bearing areas of the Niger Delta region.

All available evidence suggests that oil companies' destruction of the Niger Delta is informed by near total disregard for the welfare of the local people. Why should these multinationals go to great length to conduct rigorous and extensive environmental impact assessment (EIA) for their operations in Europe and North America and refuse to do same in the Niger Delta? Clearly, what is good for the former countries is not considered necessary or desirable for the communities of the Niger Delta, from whose land these oil companies have extracted billions of dollars worth of oil since 1958.

Oil companies are obliged to adopt all practicable precautions including the provision of up-to-date equipment to prevent pollution and must take "prompt" steps to control and, if possible, mitigate pollution if and when it does occur. They must maintain all installations in good repair and condition in order to prevent the escape or avoidable waste of petroleum. Oil companies can also establish ancillary oil-related industries in the oil-producing communities to absorb the army of unemployed graduates.

Environmental conservation issues that have to be prioritized and tackled in the Niger Delta include agricultural land degradation, flooding, fisheries depletion, deforestation, biodiversity loss, water hyacinth proliferation, toxic and hazardous wastes, oil spillage and pollution, sewage disposal, and solid waste disposal. Therefore, in order to halt the continual degradation of the Niger Delta

environment, the federal government of Nigeria must play a leading role by enacting and enforcing stringent environmental laws that will protect the oil-bearing areas, as well as guaranteeing the people an improved livelihood. Deliberate intervention policies must be implemented speedily to begin massive infrastructural development of the Niger Delta, as well as address the crushing level of poverty among the people of the Niger Delta.

The challenge for the Nigerian government, both federal and state, is to construct and implement enduring policies that recognize the imperative of enhancing the quality of the environment. The government should adopt policies to improve the standard of living and quality of life of rural poor people in the Niger Delta, especially women and young people. A major concern is to reduce current tension and conflict by improving employment opportunities for young people and channelling their energies into the development of sustainable livelihoods and natural resources management activities. The government should also ensure active participation of local people in development activities.

Finally, Nigeria needs to change the distribution of oil revenue in order to reverse poverty in the Niger Delta, a region that has seen few gains from the nation's 50 years of oil production. There should be improved physical and social infrastructure, more equitable distribution of resources, improved local governance, effective conflict management mechanisms, and better environmental management. The situation in the Niger Delta calls for a very serious environmental, political, social, economic, cultural, and spiritual engineering, based on the needs and voices of affected communities, to rehabilitate the people and the land.

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# Environmental Peacebuilding Strategies in the Middle East: The Case of the Arava Institute for Environmental Studies

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This paper examines the Arava Institute for Environmental Studies, focusing on organizational strategies for advancing environmental and peacebuilding efforts across Israel, Palestine and Jordan. The paper will argue that by developing a continuing resource base and a distinct organizational culture, the Arava Institute is able to act as a protective buffer in a region of conflict. It seeks to transform its surrounding societies through three main strategies: 1) by aligning its organizational culture with the life plans of the students who participate in its work; 2) by building both bridging and bonding social capital and; 3) by using this social capital to create new environmental networks both regionally and globally. The analysis highlights the ability of the organization to cultivate a culture of organizational learning, so that it is able to adapt to its changing context while at the same time remaining true to its core mandate.

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## Introduction

While most peacebuilding efforts in the Palestinian-Israeli conflict have collapsed, a small network of environmental peacebuilding organizations has continued its work. In this paper, we contrast the failure of “people-to-people” peacebuilding with the survival for more than a decade of the Arava Institute for Environmental Studies, which brings together students from the region on a common agenda of university level environmental education. The paper pays particular attention to an organizational-level analysis of the institute, examining factors contributing to organizational survival in turbulent conditions, and organizational strategies for transforming their societal environments. The paper will argue that by developing a continuing resource base and a distinct organizational culture, the Arava Institute is able to act as a protective buffer in a politically unstable environment. It seeks to transform its surrounding society by aligning its organizational culture with the life plans of the students who participate in its work, by building both bridging and bonding social capital and using this social capital to create new local and global networks. The analysis highlights the ability of the organization to cultivate a culture of organizational learning, so that it is able to adapt to its changing context while at the same time remaining true to its core mandate.

## The Failure of the “People-To-People” Initiatives

A 2006 issue of the Palestine-Israel Journal of Politics, Economics and Culture (PIJ) (2006) examined the failure of the “people-to-people” initiatives of the late 1990s and early 2000s. These were attempts to “deepen the peace” by bringing together Palestinians and Israelis in order to learn to understand each other. The editors of this issue of PIJ write in their introduction, “The contact between Palestinians and Israelis appeared to fail to produce any meaningful influence on the attitudes of the participants within and beyond the time frame of the meetings” (Perlman and Nasser-Najjab: 6). People-to-people projects are described as “feel-good” enterprises taking advantage of foreign donor funding, accompanied by “thick volumes of unreadable research” funded within narrow parameters (Tamari 2006:16-18). Liel, as director general of the Israeli Foreign Ministry, was responsible for working with the Norwegian people-to-people programs; he writes of knowing by March 2001, during the second intifada, despite well-documented reports of the activities, that “[m]ost of the projects had to be canceled, or had become completely meaningless...” (2006:19). Nasser-Najjab reports that many Palestinians involved in people-to-people activities came to “the view that joint projects conducted and processed in the post-Oslo period were negative and a failure” (2006:30). Israeli participants were “dissatisfied” with the political focus of Palestinian participants and critical of their “passivity in initiating personal contacts” with Israelis (2006: 30, 31). Pundak notes that, “diplomats and politicians ... used the people-to-people element as instruments in the arsenal aimed at harming and weakening the other side” (2006:38). Hanssen-Bauer, director of the Norwegian people-to-people program from 1996-2003, notes that, by the second intifada, “People-to-People activities became almost impossible to carry out. Many peace activists on both sides turned away, sad and disappointed by their former friends on the other side” (2006:45).

In a separate document, Herzog and Hai assert that despite about 500 people-to-people “projects” involving over 100 organizations, and tens of thousands of Israelis and Palestinians from 1993 to 2000, with an estimated cost of US\$20-30 million, these activities “were a fraction of what needed to happen if the reality of conflict and relations between the two societies were to be substantially changed” (2006:15).

### Thinking about Future Initiatives by Asking “What Went Wrong?”

Despite the perception of failure, contributors to the PIJ share the view that “there is still a meaningful role for people-to-people to address the current situation” and wrote about why people-to-people failed, with the intention of “fixing” it—that is, illuminating the factors contributing to this failure (7). The most common explanation for the failure of people-to-people given in the special issue of PIJ is the loss of support from political leadership on both sides. Programs to bring Palestinians and Israelis together went ahead despite the lack of political support, but contentious relations between the Israeli government and the Palestinian Authority were often mirrored inside people-to-people groups. Contributors to the PIJ special issue also comment that reliance on foreign donors drove program design, gave priority to writing reports of “success” in order to justify continued funding, and encouraged opportunistic behavior (Liel, 2006; Tamari, 2006; Nasser-Najjab, 2006).

A separate evaluation by Herzog and Hai (2005) adds to this list of problems—short term funding, ineffective use of funds, different perceptions inside and outside the programs, unrealistic expectations, technical problems, competition for funds, and the difficult debate over whether Palestinian cooperation in people-to-people programs constituted “normalization.” However, the strongest theme that appears throughout the study is the same as those of the PIJ special issue – the lack of a “legitimization strategy.” Neither the Israeli government nor the Palestinian Authority gave people-to-people programs the political support they needed to be models of transformative relationships between Palestinians and Israelis. Nor did the international funders have a strategic vision of how the limited funds they committed were to have a major social impact in the face of widespread skepticism and official indifference or hostility. Despite these lackluster results, Herzog and Hai, like most of the contributors to the special issue of the Palestine-Israel Journal, continue to support the people-to-people initiative “as an important vehicle for reframing discourse and challenging existing perceptions” (Herzog and Hai, 2005; 42). They recommend much more adequately funded future people-to-people activities, supported by “a multi-pronged legitimization effort” (Herzog and Hai, 2005; 41) and an “inter-sectoral dialogue” of activists and funders (43). This evaluation echoes similar points made by Baskin and Al-Qaq (2004).

### The Survival of Peacebuilding: The Importance of Studying Organizational Characteristics

In contrast to the extended discussion of ‘what went wrong,’ a short piece by Cohen in the PIJ special issue (2006) about the Arava Institute of Environmental Studies is, in contrast, positive. Cohen is not alone in finding positive experiences to report. Others have written of both failures and successes (Abu-Nimer, 1999, 2004; Baskin and al Qaq, 1999; Chaitin et al., 2002, 2004; Kelman, 1998; Kuriansky, 2007; Maddy-Weitzman, 2005, 2006, 2007; Maoz, 2003, 2004; Plonski, 2005; Posner, 2006; Rouhana and Kelman, 1994; Suleiman, 2004; van Woerkom, 2004; Wallach, 2002; Zwirn, 2001). Herzog and Hai (2005: 35) note that despite the termination of many people-to-people initiatives, those that continue are “characterized by more professionalism and improved methodology.”

In situations where peacebuilding requires a longitudinal-time frame, it is important to study not only program design, but also to examine the role of organizational characteristics that have allowed some peacebuilding activities to continue even as others have been unable to sustain themselves. This approach suggests a research focus on organizations as tools for societal transformation (Armstrong and Bernstein, 2008; McCarthy and Zald, 1977; Morgan, 2006; Wallach, 2002; van Woerkom, 2004). Maoz

examined characteristics of six peacebuilding organizations and projects that continued to function after the September 2000 surge in political tension and increase in violence. She concluded that the outstanding characteristic they shared was “the high degree of equality and symmetry between Israeli-Jews and Palestinians.” They had co-directors with equal authority over decision-making, and locations on the West Bank in addition to, or instead of, Israel and used English as a neutral language (2004: 569).

The organizational structures of some of the surviving initiatives in environmental peacebuilding, such as EcoPeace/Friends of the Earth Middle East and the water and environment division within the Israel Palestine Center for Research and Information, correspond to what Maoz has described. The Arava Institute for Environmental Studies, however, has different, and in some respects unique, organizational characteristics. The following examination looks first at the institute’s organizational culture—the ways in which it builds social capital—and how it integrates its mission with the life plans of the students who attend. Second, it examines the ability of the organization to inspire a culture of organizational learning, so that it is able to adapt to its changing context, while at the same time remaining true to its core mandate. Data is based on: 1) an on-going multi-year research project on the Arava Institute and its alumni and 2) participant observation.<sup>1</sup> The intent of the paper is to further contribute organizational level analysis useful to those designing future peacebuilding initiatives.

### **Organizations as Instruments for Social Change**

In contexts where a deteriorating political atmosphere makes people-to-people activities more difficult, organizational culture can act as a buffer, supporting shared intergroup values and behavioral expectations (Scott and Davis, 2007; Wilkins, and Ouchi, 1983). A continuing organization can also be a source of social capital (Nahapiet and Ghoshal, 1998), providing routine routes through social networks in order to access the financial, personnel, and expert resources. Continuing organizations, particularly those that are well-networked, are resources for participants as they negotiate life plans incorporating the values they share with the organization.

### **Organizational Culture as a Protective Buffer**

Organizations can act as buffers to a negative political atmosphere by creating frameworks of shared meaning that give participants an alternative set of values and an alternative way of interpreting events. Organizational cultures also have shared behavioral expectations, communicating, for example, the kinds of acts that are destructive of social relationships and thereby setting limits. Where these expectations are based on a culture of mutual respect, they train people in the skills of getting along. Finally, continuing organizations as cultures of shared values and mutual respect not only promote these values and behaviors but also model them (Scott and Davis, 2007).

The Arava Institute for Environmental Studies opened in 1996, in the period that people-to-people programs were being established. Located on a kibbutz near the Jordanian and Egyptian borders, it was intended to be a regional center of environmental teaching and research, recruiting a mixed student body. In that sense, it resembled people-to-people programs. However, while the organizational culture developed at the Arava Institute draws on the shared meaning of people-to-people programs, it draws on other systems of meaning as well. The Arava Institute is a residential

<sup>1</sup> The authors all have connections of one kind or another to the Arava Institute. Alleson is a former student at the Arava Institute, Schoenfeld has participated in research in which the Institute is a partner and is on the board of the Friends of the Arava Institute; Zohar participated in research, teaching, program development, and strategic planning.

university program. Conventional understandings of university education and what life is like on a residential campus are a strong source of shared meanings and behavioral expectations at the institute. People relate to each other through the roles of student, staff, and faculty, and have conventional behavioral expectations about those roles. The institute's culture also draws strongly on the understandings and behavioral norms which are shared among environmentalists. The culture of the kibbutz on which the institute is located also affects the institute's culture.

The institute has been self-conscious about having a clear vision statement, which reads: "The Arava Institute for Environmental Studies will provide the Middle East a new generation of sophisticated professionals that will meet the region's environmental challenges with richer and more innovative, peace-building solutions." The associated mission statement continues,

"Our mission is to create a world-class environmental teaching and research institute at Kibbutz Ketura, which will:

- Deliver teaching at the highest quality and level.
- Play a leading role in research, conservation, environmental protection, and sustainable development.
- Prepare future Arab and Jewish leaders to cooperatively solve the region's environmental challenges.
- Teach future leaders from all over the world that nature knows no borders." (Arava Institute, 2010)

Students with different backgrounds share accommodations, take classes and field trips together, and are together in their spare time for a semester (4 months) or a full academic year (8 months). Some stay longer as interns in various capacities. Cohen (2006:53) writes that this immersion experience in a supportive organizational culture enables participants to forge relationships based on trust, which is vital to honestly tackle the painful realities of the Arab-Israeli conflict.

Enrolment has ranged from a low of 15 to a high of 45 students. About one-third of the students are Jewish Israeli; one-third Arab and Arab Israeli; and one-third foreign, almost all from North America. Table 1 shows detailed enrolments for three recent semesters.

Table 1: Demographic makeup of Arava Institute students, Fall 2009, Spring 2010, Fall 2010.

	Fall 2009	Spring 2010	Fall 2010
Israeli (Arab)	2	2	0
Israeli (Jewish)	13	15	7
Jordanian	4	7	5
Palestinian	11	6	6
North American	13	12	10
Other	0	0	1
TOTAL	43	42	29

Source: Arava Institute

The North American students are typically from that segment of society that is convinced of the seriousness of the environmental crisis and that advocates an Israeli future based on mutual accommodation with Palestinians, the Israeli Arab minority, and surrounding countries.

The institute's organizational culture promotes an environmentalist perspective on the region. The institute provides a space where aspects of regional environmental issues that are marginalized by nationalist discourses can be acknowledged. In the region, rising numbers of people and rising expectations regarding the standard of living collide with depleted and degraded natural resources, widely differential access to natural resources, woefully inadequate conceptions of ecological responsibility, and the potentially devastating local effects of global climate change (ARIJ, 2007; Tal, 2002). The institute is a place where this collision can be acknowledged and the response of informed social mobilization can be fostered. The institute has positioned itself outside of the discourses of "security" and "steadfast opposition," cultivating, instead, an emergent narrative of regional identity based on a common ecology.

Part of the institute's environmentalist culture is its approval of grassroots activism and advocacy. For example, students joined national demonstrations against the trans-Israel highway and the expansion of Israel's southern airport into the ecologically sensitive Ein Evrona reserve. Since 2002, Sababa, the Center for a Healthy Environment in the Arava, has been housed at the institute. The institute continuously advocates for easing restrictions on Palestinians who apply to study in Israel, a position consistent with both its mandate and its interests. During the Second Intifada, Palestinian applicants could not get residence permits, and the institute had to draw its Arab students from Palestinians in Jerusalem with Israeli residence, Israeli Arabs, and Jordanians. The institute joined GISHA, the Centre for the Legal Protection for the Freedom of Movement, in its successful petition to the Israeli Supreme Court against the Israeli Defense Force's sweeping ban preventing Palestinians from studying in Israel.

A few years after opening, the institute created the Peace-building and Environmental Leadership Seminar (PELS) as a required (but non-credit) part of its program. The seminar includes "discussions, workshops, guest lectures, and field trips that provide a forum for every student at the Arava Institute to investigate aspects of the social and political context in which environmental problems develop, as well as the kinds of relationships needed to foster a more just, peaceful, and ecologically secure future" (Arava Institute, 2010). The similarity of PELS to people-to-people meetings is readily apparent, as are its differences. PELS takes place over several months, among people who are living

together. PELS sessions are explicitly set up as places where conversations start, but where they are not concluded.

Reinforcement of the organizational culture continues after students leave. The institute is sending alumni out into the world to be agents of change. The alumni coordinator, a senior staff position, assists with professional development, circulates employment opportunities and information about graduate programs, and networks students from different years who have similar interests. Networking with alumni was supplemented in 2005 with the first conference of the Arava Peace and Environment Network (APEN), which met in Aqaba, Jordan. At the 2006 APEN meeting, control was passed to an alumni steering committee, which subsequently organized alumni conferences and a Facebook page. A private online network established by the institute further enables alumni from different years to organize, share resources, and deliberate current events.

### **Alignment of organizational culture and individual life plans and the importance of social capital**

An organization that has an agenda of social transformation will be concerned with the alignment of its values and behavioral expectations with the lives of its participants. Literature on intergroup contacts has been critical of “inoculation” perspectives on change – the approach that one powerful experience, perhaps with “booster shots” later, will change people sufficiently to turn them into autonomous change agents. Rather, an organization with an agenda of social transformation can recruit those whose values are congruent with those of the organization, work to show participants how living by these values can be part of an unfolding life-plan, facilitate life choices that allow living by these shared values, and be a continuing resource to individuals whose life-goals are congruent with those of the organization.

The concepts of “bonding” and “bridging” social capital capture the change-oriented organization as a buffer insulating an alternative culture, a hub in supportive personal and inter-organizational networks, and a practical resource for those with congruent values. As developed by Bourdieu and Coleman, social capital is understood as an attribute of relationships. As they see it, “to possess social capital, a person must be related to others, and it is those others, not himself [sic], who are the actual source of his or her advantage” (Portes, 1998:7). Putnam, among others, argues that, for the connections between individuals and networks to have value, the connections must be frameworks for reciprocity and trust (2000). Putnam further distinguishes two forms of social capital: bridging (or inclusive) and bonding (or exclusive) (2000:19). Bonding forms suggest an inward focus, typically implying a homogenous composition of participants nested within particular social networks (Putnam, 2000:22). Bridging social capital implies connections and social relations among diverse individuals that transcend ethnic, class, gender, sexuality, religion, or other lines. Whereas bridging social capital can generate new and broader identities, bonding reinforces membership in more homogenous groupings (Putnam, 2000:23). Bonding produces solidarity and trust. Bridging gives network participants access to a wide range of resources.

The Arava Institute has developed a set of practices based on both bonding and bridging. During the four or eight months at the institute, many students bond – with each other, with faculty and staff, and with the ideals of the institution. With these bonds, they have acquired resources they can use – friends to stay with when traveling; potential colleagues for future projects; contacts when they are investigating educational and career opportunities; faculty, staff, and peers to go to for references; people with whom they have learned how to talk and can trust when they need to talk about the Middle East.

This bonding is also a strategy for bridging. Arava students are not a homogeneous group; they come from, and go back to, very different places. Many return having learned things that most people in their home groups have not had the opportunity to know. The time at the institute can be something of a liminal experience, where a person leaves a social status, goes through an intense experience, and is then returned—the same person but changed. Interviews and informal discussions with alumni indicate that this is fitting for the stage of life and the kinds of people who choose to come to the institute. They are personally in a process of change, aware of being members of societies in a process of change.

Bonding extends to faculty and staff. Classes are small; teaching is personal. Almost all staff and a few faculty members live on the kibbutz and are part of the immediate social world of institute students. Staff and faculty have, of course, formal bridging obligations. They go on recruitment trips, conduct interviews with applicants, expose students through coursework to a range of possible career options, steer students toward further study or specific work, write letters of reference, and otherwise—through their research and public policy involvements—cultivate personal and institutional connections that can help students achieve their own goals along with the transformational goals of the institute.

### **Using social capital to create regional and global environmental networks**

As an academic institution, the Arava Institute has formal relationships with other academic institutions. Academic credits were initially granted through a relationship with Tel Aviv University. The institute has now established a relationship with Ben Gurion University. The institute and Ben Gurion University established a joint Master's program and closer cooperation appears to be developing. The institute has also established an exchange program with the Faculty of Environmental Studies at York University in Toronto, which regularly brings former Arava students to York for graduate studies.

The research agenda of the institute and its ties to local environmental advocacy are other forms of bridging. The director of research, like the alumni coordinator, is a key staff position. The institute participates in projects as partners with Palestinian and Jordanian researchers and research organizations. These projects include developing policy options for the Dead Sea, transboundary stream restoration, and a study of health effects from exposure to airborne particles (See Brenner et al, 2002; Lipchin et al 2007). These projects involve links with international networks of research funding, and have brought regional conferences to the institute on a regular basis. While the institute did not begin with a strong technological orientation, a link to that sector may be developing with the establishment of The Arava Power Company, a solar power research center associated with the institute.

The institute has strengthened its social capital by developing the Friends of the Arava Institute. Friends of the Arava Institute is a fundraising initiative, registered as a charity in the United States. In developing this initiative, FAI has created a board whose members bring institutional contacts and legitimacy, as well as fundraising opportunities. Materials produced and circulated by FAI also promote the public profile of the institute.

Another form of bridging occurs via the relationship of the institute to the kibbutz. The institute is a separate legal entity from the kibbutz. Through its development, the institute has had a major impact on the kibbutz: as a tenant on a significant part of its landscape, as a source of employment, and as a socially valuable initiative that the kibbutz can support. The issue of complementary development of the kibbutz and the institute is an important and intimate one for both parties.

## Organization Learning at AIES: Surviving and Thriving through Change

The Arava Institute for Environmental Studies (AIES) was founded at the same time as many other peacebuilding initiatives and has changed in order to survive when most peacebuilding initiatives collapsed. Literature on organizations suggests that the reasons for the survival of some over others can be linked to their capacity to promote both individual learning and organization-wide processes. Cook and Yanow (1993) characterize theories of organizational learning as either focusing on learning by individuals in organizational contexts, or on individual learning as a model for organizational action. Organizations are founded with strategies responsive to specific historical moments. Changes in the context in which organizations work introduce stress at different points in the organization, including pressures to alter core strategies, recruitment and retention of staff, financial resources, as well as changes to products and services. These strains can make an organization ineffective and unsustainable, especially if it is unable to address these challenges through successful learning processes (Chiva and Alegre, 2005).

Collective learning processes in organizations play a critical role in promoting adaptation and strategic renewal under conditions of uncertainty, turbulence, and change (Chiva and Alegre, 2005; Dooley and Van de Ven, 1999, Frank and Fahrback, 1999; Lewis, 2000; Senge et al, 1990, 1994, 1999; Wenger, 1998). Organization theorists have developed many conceptual formulations of organizational-level learning that attempt to capture the nature and significance of these processes of individual and collective learning, and the critical role they play in sustaining organizational adaptation and creative regeneration (Cameron, and Quinn, 1999; Dixon, 2000). Senge (1990: 3) describes such 'learning organizations' as: "...organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together."

Learning organizations create a context that promotes individual and collective learning as a core characteristic of their shared identity. A key dimension that distinguishes learning organizations is their ability to create shared norms, beliefs, and values that promote learning processes across all organizational activities. Since organizational culture is commonly characterized by shared norms, beliefs, and values (Smircich, 1993), it is apparent that collective learning processes can often become a key component of an organization's cultural identity. Studies of the relationship between culture and organizational learning processes highlight the iterative relationship between these constructs (Dixon, 1994; 2000; Cook and Yanow, 1993). These studies offer insights into how learning processes can become embedded in an organization's culture, manifested in common behaviors, values, systems of shared meaning, as well as other artifacts among organizational members (Schein, 1996; 1999). In other words, the culture of an organization provides a critical context in which collective learning processes occur. Organizational learning, therefore, can be understood as a collective activity that jointly acts as an activity of organization-level cultural preservation, as well as one of cultural innovation and regeneration (Yanow, 2000). This perspective on the role and nature of organization and individual learning that unfolds in the context of distinctive cultures suggests a fundamental paradox: namely, that cultures that promote organizational learning can simultaneously preserve and precipitate fundamental change in the cultural status quo.

Dixon's (1994; 2000) model of collective learning is also noteworthy in this regard, highlighting how organization-level learning is inextricably related to individual learning. Dixon separates the individual level cycle of experiential learning from the organization-level of learning and describes

distinctive requirements for learning at these different levels. According to Dixon, both levels of learning, individual and collective, need to occur at the same time for successful organizational learning. Dixon proposes a four-step cycle of collective learning: widespread information generation, integration of new information, collective interpretation, and ongoing revitalization of organizational strategies and practices. In the first stage, information is widely collected and shared by all organizational members. In addition to searching for information about internal organizational strengths, weaknesses, this process also involves the continuous collection of information from multiple stakeholders and external sources. In the next two stages, information is widely distributed and critically evaluated among organizational members. Discussions are grounded in a culture that is based on egalitarian values, especially of respect, equality and freedom to speak openly without fear of punishment or coercion. The final stage culminates with the translation of the learning process into actions, contributing to the ongoing revitalization of organizational strategies and practices.

We attribute the endurance and expansion of the Arava Institute, situated within the collapse of the Oslo Accords alongside an increasingly fragile peace-NGO community, in part, to its particular organizational learning approach. Following Dixon, AIES's strategy can be appreciated through a 4-stage cyclical model.

#### *Stage 1: Widespread Information Generation*

AIES, at any given time, is managing and participating in a number of distinct, yet interrelated organizational activities. As an accredited post-secondary institution, it organizes and delivers an academic program to a diverse group of students, primarily undergraduates. The academic program remains the core organizational activity for AIES, and critical attention of faculty and staff is given to monitoring and assessing student learning. Information is collected through traditional course evaluations--while small class sizes (up to 20 students) allow for group projects, role-playing simulations, and close interpersonal contact between students, Arava program associates, faculty, and staff. This relatively intense level of organizational monitoring and assessment of the direction and quality of student learning generates multiple informal conversations and formal discussions. The exceptionally intense PELS sessions are also a form of information gathering. Their dynamics provide insights to the staff about the issues and emotions each group of students bring from their home environments. It also communicates to the students that the institute is committed to their development and that it cares about the collective journey of each cohort.

AIES' ongoing contact with its alumni offers another illustration of the importance of information gathering at the institute. Alumni engagement represents a central organizational activity at AIES, and is undertaken through both formal and informal channels. The institute's stated focus is on education, environment, and co-existence. Since the intention is to achieve these changes one student at a time, ongoing contact with alumni represents a significant objective that bears directly upon AIES' core mission. Contact with alumni extends well beyond public relations and fund-raising issues; it provides the institute with important information that plays a role in identifying the degree of impact it is having on environment and co-existence issues through former students. Information about the activities and experiences of alumni is widely shared among faculty and staff, and stories of alumni activities relating to peacebuilding and regional environmental matters are part of the culture of conversation of AIES. Stories of alumni activities are often shared with current students, adding further layers to the culture of student-centered discourse at the institute.

Since the institute is also developing as a center for collaborative regional research, it proactively searches for information about potential research and policy work for both faculty and students. The latter was not initially part of the institute's activities, but rather something added a few years after the institute began. More recently, faculty at the Arava have been central in the creation of several international conferences regarding transboundary water systems, and environmental issues surrounding the Dead Sea. Such conferences have brought scholars and environmental practitioners from inside and outside the region, facilitating new research and several publications (e.g., Lipchin et al., 2005).

Activities such as these both contribute new knowledge to ongoing environmental concerns while also demonstrating to students that talk of environmental cooperation is more than theoretical. Students are aware of research projects, and sometimes participate in them. Projects and policy conferences also expose them to regional environmental experts and potential venues for future study and employment.

*Stage 2: Integrate New/Local Information into the Organizational Context*

Frequent information exchanges are a necessary but not a sufficient condition for organization-wide learning processes. Information needs to flow unimpeded within and between organizational members, freely crossing organizational levels and stakeholder groups (Senge et al, 2004). In addition, the quality of these conversations is critical; a culture of shared learning needs to offer members a 'safe space' for honest and open exchanges, readily incorporating multiple and potentially divergent perspectives on program activities, approaches, and strategies.

AIES' small staff plays an important role in shaping the quantity and quality of information that is internalized into the AIES organizational context. While the number of continuing staff and faculty grows each year, the core group consists of a director and six administrators who oversee specific functional areas (e.g., research, accounting, etc.). While specific projects may allow for the hiring of temporary positions, a key role of the core administrative group is to gather and share information on current and potential opportunities that can offer AIES new directions for growth and development.

The physical and social setting plays an important role in providing multiple opportunities for information exchange and dissemination. As noted earlier, AIES is located on Kibbutz Ketura, and virtually all staff and several faculty members are permanent kibbutz residents. While the line between the workplace and private 'living space' is a complex one in such settings, close physical proximity of organizational members generates multiple opportunities for shared information integration and ongoing discussion both within and outside of the workplace. In practice, the interdependence of the institute with the kibbutz translates into a group of people that work together and live together, including living quarters within close proximity, and a common dining facility that brings people together several times a day outside of the office. Consequently, the physical setting also provides a context where staff and faculty frequently interact with other internal stakeholders, such as students and program associates.

The physical setting also plays an important role in the quality and quantity of student interactions and information sharing. Students are in a truly unique physical setting for learning: 1-2 semester long courses in an isolated area in the desert of the Arava Valley provide a context for ongoing interaction both through a rigorous academic program and close living and housing arrangements. These unique surroundings enable students to deliberate social, political, and environmental ideas on an on-going basis over an extended period of time. Finally, by virtue of the institute's location on a kibbutz,

students are embedded in an environment that is more open to regional reconciliation than most Israeli establishments and locations. In this sense, the social setting of the institute offers an enabling context of a safe space for challenging assumptions and ideas about such sensitive issues as regional conflict and culturally embedded stereotypes.

Program associates--consisting entirely of institute alumni--provide staff, faculty, and administration with frequent and timely feedback on student perceptions and experiences. The diversity of the student body is also reflected in this group; in a recent semester, the program associates consisted of two Jordanian, one American, one Canadian, and two Israeli students. The diversity of backgrounds leads to a heterogeneity of views on the meaning and significance of shared information and experience. In addition, alumni, through their ongoing contact with each other, are able to provide the institute with valuable information regarding potential opportunities that may arise within the international scope of alumni work activities. Staff, alumni, and regional and overseas supporters easily share information with each other about opportunities for recruitment, public relations, research, and environmental activism.

The institute's new administrative building serves as a metaphor for the culture of organization-wide information flow and integration. The building, which also serves as an ecological demonstration building, is designed for easy information flow. Its center is an oval meeting room, surrounded by an oval hallway, with offices on the outer perimeter.

### *Stage 3: Collective Interpretation and Shared Learning*

This stage involves collective, organization-wide interpretation of information. The process of information sharing is critical, since meaningful collective reflection and interpretation require openness to new ideas, as well as the questioning of shared assumptions. A safe space to revisit practices and shared understandings can be created through shared norms and values that promote honest, critical reflection. Effective dialogue (Isaacs, 2001) of this nature is grounded in egalitarian values--especially respect, equality, and freedom to speak openly without fear of punishment or coercion. Such cultural attributes give 'permission' for individual members to engage in honest dialogue about organizational challenges and allow discourse to explore new directions in thinking and action.

Many of the conditions necessary for the creation of a safe space permitting collective inquiry of this nature were noted earlier. Organizational norms at AIES allow for a diversity of individual interpretations of shared experiences. Multiple interpretations and experiences from the diverse student body are regularly discussed as part of the learning program. The combination of close living arrangements; small numbers of students, staff and faculty; and the long-term nature of the program represent some of the enabling conditions for the emergence of a cultural environment in which participants can openly identify shared challenges--as well as constructing new group cultural norms, social spaces and joint projects.

### *Stage 4: Action*

Stage 4 of the organizational learning cycle involves the action phase of ongoing revitalization of organizational strategies and practices. Activities in this phase represent the culmination of earlier phases--often resulting in changes in individual and organizational strategies, practices, or even cultural changes, including shared systems of meaning. At the institutional level, there are multiple examples of ongoing revitalization, ranging from strategic aspects of evolving institutional intent, alignment of

emerging competencies with new funding opportunities, and major revisions to program structure and curriculum.

The evolution of the institute's curriculum illustrates this iterative process and its strong relationship to culturally embedded processes of individual and collective learning. Every year, new refinements and additions are introduced, and the impact on student learning is carefully monitored. The institute's academic program is not limited to formal classes. At the early stages of the institute's history, learning goals relating to leadership in peacebuilding--while grounded in its mission and vision--were largely unaddressed by the academic program; instead, they were allowed to emerge through informal student experiential learning. The program now includes the Peace Building and Environmental Leadership Seminar (PELS) described earlier, in order to help students build a basic skill set in required competencies around leadership in coexistence and peacebuilding. Based on student feedback and shared experiences, AIES staff and faculty recognized the need for a structured learning experience addressing this core learning objective. New directions and skill sets were identified and addressed iteratively through time, resulting in the current program; this program comprises of dialogue sessions, peace building and leadership skills sessions, as well as workshops on specific topics facilitated by guest speakers and students.

### **Conclusion: Peacebuilding through Organizational Learning: Cultivating a Network around a Shared Regional Ecology**

Despite the failures of many peacebuilding programs, some organizations have survived to continue the challenging, incremental work of building a culture of peace. The strategy of the Arava Institute has been to create a university level teaching and research program in the service of both environment and peace. It has developed a distinct organizational culture that aligns the institutional mission of social transformation with the life plans of its students. It has positioned itself in the turbulent politics of the region by being clear about its mandate, cultivating its resource base, and acting as a learning organization that promotes internal norms of information generation, integration of new information, shared processes of interpreting new information, and being open to new and revised activities. The institute continues to attract a diverse student body, to engage in research with regional partners, and to be actively involved in regional policy discussions.

This account of the institute's survival and strategy is not a full organizational analysis. There are further questions to be asked, particularly about effectiveness. Effectiveness is an important question, since the agenda of societal transformation is significant. Over 500 students have graduated from the Arava Institute in its ten-plus years of existence. Where are they now, what are they doing, to what extent have they continued the networks and the shared culture fostered by the institute? Since the institute is one of a number of organizations that continue to work on an agenda of regional contact and cooperation, what are the challenges and opportunities of the organizational network of which it is a part? Concerning the emergence of the institute's research activities: how has this organizational dimension been coordinated with the institute's mission of peacebuilding? Regarding the goal of promoting regional environmental cooperation: to what extent has the institute become a valued resource to regional policy makers? This question involves not only environmental policy, but also the linkage between environmental policy and economic / development policy. And regarding the recent promotion of large scale technological projects related to water and energy: to what extent has the institute been able to promote its mission when asked to coordinate its work with business and political interest groups? Since the regional political leadership has been unable to find a framework for Palestinian-Israeli reconciliation, how can the institute negotiate political space to advance its mission?

Finally, as the institute continues to change over time, what are the emerging challenges to survival and effectiveness and how is the institute responding to them?

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# **Carbon-based Conservation Projects in Traditional Communities in Ecuador and Suriname: An Analysis of Vulnerability and Conflict Potential**

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The global climate mitigation effort provides an opportunity for communities that are directly dependent on local resources to receive payments for ecosystem services for the protection of headwaters and forests and the replanting of deforested areas. The general perception is that local communities have a limited ability to participate in such efforts due to a lack of understanding of technical issues. In this study, however, the involvement of communities in decision-making is seen as crucial for project success. This paper assesses the vulnerability context of two collective communities in South America by using the Sustainable Livelihood Framework. The historic development of the tribe, outside dominance, internal values, and systems for decision-making and leadership are important factors in defining vulnerability and subsequently enable development. Local communities can buffer shocks and overcome conflict when their traditional system of peace-building and decision-making is intact, thereby ensuring flexibility, transparency, and ownership in the implementation of projects.

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## Introduction

The meaning of biodiversity conservation has changed since its establishment as an environmental strategy in 1992. At that time, the consensus was that that biodiversity conservation was about the protection of natural habitats and sustainable use of natural resources, and implementation of which focused on establishing protected areas to conserve the species within (Heller & Zavaleta, 2009). The majority of protected areas were established and managed by governments through funding from the United Nations, Global Environmental Fund, World Bank and other institutions. Subsequently, however, conservationists became aware that the protected area model would not be able to counter the increasing pressures on natural ecosystems because of its minimal infrastructure and personnel, averaging one field agent per 600 km<sup>2</sup> (Kaimowitz, 2002).

When highly biodiverse areas came under the pressure of deforestation in the 1990s, the meaning of biodiversity conservation shifted towards the sustainable use of areas for ecotourism, certification of wood products, and marketing of non-timber forest products (NTFPs). For these activities, the local communities needed to be incorporated into the strategies for conservation. However, most conservation efforts have continued to ignore the needs of these, usually poor, communities by undermining their rights and livelihoods with displacement, denying them access to resources, and subjecting them to enforcement measures (Van Vliet, 2010). Conservationists are still learning about the social needs of communities and trying to successfully link biodiversity conservation and development. As a result, few of these efforts have been found profitable and conflict between local communities and protected area management are not uncommon (Southgate & Clark, 1993).

In 2007, biodiversity conservation was reframed for the second time because of the increasing effort for combating climate change. After it became evident that global forests are an important counterbalance to the world's CO<sub>2</sub> emissions (Ring, Drechsler, Van Teeffelen, Irawan & Venter, 2010), the United Nations Framework Convention on Climate Change (UNFCCC) agreed to compensate activities related to marketable payments for ecosystem services. These services include direct payments for protecting headwaters and forest, and indirect payments for halting deforestation and promoting reforestation (Fogel, 2002). However, these schemes are designed by and in favor of the "polluters" and are not expected to have substantial development benefits for the local communities that live in and from the forests. Once again, local communities living in the forest have to be involved, but now the schemes are more complicated due to multiple stakeholders and high-tech trading scenarios.

Studies have revealed that carbon conservation projects are top-down and often result in conflict (Boyd, Gutierrez & Chang, 2007; Hagerman, Dowlatabadi, Satterfield & McDaniels, 2010). One reason for this conflict is that local communities are excluded from decision-making, usually because of time-related factors (Corbera, Kosoy & Martinez Tuna, 2007; Van Vliet, 2010) and inadequate framing (Bisaro, Wolf & Hinkel, 2010). Second, carbon projects have marginal profits due to high start-up costs and low global emission prices (Hagerman, Dowlatabadi, Satterfield & McDaniels, 2010). Third, local communities need some form of education or interpreters to understand the technical aspects of climate change (Gray, Bilsborrow, Bremner & Lu, 2008; Berkes, Colding & Folke, 2002; Lemos, Boyd, Tompkins, Osbahr & Liverman, 2007). Boyd et al. (2007) discuss the literature on carbon projects initiated in nature-dependent communities in Latin America, finding that trustees involved in the establishment of these projects often favor technical assessment over the social issues at the grassroots level.

Carbon projects offer a unique opportunity for improving biodiversity conservation as well as the social and economic development of local forest communities (O'Conner, 2008). In the largest standing forest, the Amazon rainforest, approximately one million indigenous peoples are involved in conservation efforts to protect the source of their daily livelihood (Moran, 1993). These local communities make economic and risk-related decisions regarding the development initiatives that are presented to them. Whether or not climate change mitigation efforts can be considered among these development initiatives is presently debated. It is expected that climate change efforts will provoke conflict, especially for nature-dependent communities (Nordas & Gleditsch, 2007), yet the drivers for climate conflict are diverse and not well understood. Understanding local communities' sensitivities to conflict, including their hidden and non-rational systems, will provide more insight into the formulation of effective carbon-based conservation efforts.

The purpose of this research is to reveal the conflict potential in traditional communities when climate change becomes a driver for biodiversity conservation. Two case studies of indigenous communities with different development levels are presented: the Trio indigenous community in the tropical rainforests of Suriname and the Agua Blanca community on the Ecuadorian coast. The study uses the Sustainable Livelihood Framework (Scoones, 2005), which takes a holistic approach in assessing the role of the individual structures and the result of their interaction when conflict is not yet occurring, as is the case with climate change. With a focus on people, the framework enables an understanding of the specific assets that are present and/or needed to overcome shocks. The result of this vulnerability analysis will be used to assess the conflict potential of each tribe by using a number of participatory methods to understand each community's sensitivities to conflict. The Strategic Conflict Assessment guidelines from the United Kingdom Department for International Development (DFID) (2002) are used to promote a systems approach and to assess the role of the individual structures and the result of their interaction.

### **Livelihood context**

Community livelihoods include all social and material activities required for a means of living. Community livelihood is therefore defined by social, financial, physical, human and natural assets (Scoones, 2005). Analysis of the assets is a tool used to determine an inside-out picture of a community in terms of sustainability and development. The assets are based on the primary and secondary orders of Maslow's hierarchy of needs, consisting of shelter, food, health and safety, and security (Maslow, 1943), and make up the skeleton of the Sustainable Livelihood Framework that focuses more specifically on the interaction between the community system and the outside environment. This framework was designed to facilitate and justify donor interventions (DFID), and through the framework, donors have both an organizational and sectoral perspective into a community's livelihood strategy. In this way, livelihood is linked to internal and external processes and automatically brought into the vulnerability-adaptation dichotomy.

Vulnerability is described as a reaction to an outside stressor and can operate on different levels and scales (Pouloitte, Smit & Westerhoff, 2009). On the community level, scholars relate vulnerability to the risk, exposure, and the sensitivity of the community-system to natural stressors such as climate events (Smit & Wandel, 2006; Hahn, Riederer & Foster, 2009). Only recently have social evaluations of community risk been included (Smit & Wandel, 2006). Because each community has different assets and vulnerabilities, each has a unique way of adapting to shocks based on their previous exposure to similar situations (Larson, 2010). In this way, vulnerability is connected to the adaptive capacity of communities.

The literature provides four types of adaptation-vulnerability analyses for climate change (Smit & Wandel, 2006). The first type focuses on modeling the impact of climate change on communities (Parry, 2002). This research avoids going into detail about the internal processes that communities undergo to adapt to changes. The second type focuses on the specific measures that are taken to adapt to change, and often chooses between different options or scenarios (Adger, Arnelt & Tompkins, 2005; Smit & Wandel, 2006). The third body of literature focuses on measures against adaptation that are holistically calculated into an overall score for vulnerability. This type of research is promoted by the global climate policy debate, seeking to compare and contrast vulnerabilities of countries (O'Brien, Leichenko, Kelkar, Venema, Aandahl, Tompkins, Javed, Bhadwal, Barg, Nygaard & West, 2004). The fourth type of research focuses on the field level experiences of communities in adapting to climate change (Petheram, Zander, Campbell, High & Stacey, 2010).

In the dichotomy of vulnerability and adaptation, the fourth body of research provides an opportunity to study community livelihood and development. Because communities do not necessarily discriminate between climate change related programs and other development opportunities (Pouliotte et al., 2009), a holistic approach can provide further insight to the choices and trade-offs between livelihood opportunities. In this line of thinking, it is assumed that a community livelihood system is not a homogenous unit, and that each type of asset, as it behaves differently to outside shocks, contributes uniquely to the overall vulnerability. However, interactions between the different assets are not sufficiently considered in this livelihood vulnerability analysis. These internal dynamics are rather hidden and have often contributed to the failure of development interventions (Chambers, 1997; Petheram et al. 2010).

Hidden constructs are important factors in societies with a high level of interdependency such as traditional communities. Many traditional societies, including those examined in the present study, are directly dependent on local natural resources. For example, in Latin America alone, traditional communities depend on the forest for 35% of their income (Boyd et al., 2007). Traditional communities are built on relational networks (Lederach, 1995), and thus undergo frequent changes over time. These changing social positions are the result of power tensions between members that correspond to a change in an individual's social capital (organization and network) and/or human capital (skills). Such a change can then influence the availability and distribution of other assets among tribal members, including financial assets. To understand these hidden interactions between assets, an amendment is needed to the sustainable livelihood framework.

One way to consider these internal dynamics is to facilitate community participation in assessing vulnerability. Van Vliet (2010) draws on the adaptation model of Smit and Wandel (2006) to map the vulnerability for climate change from a community perspective. She found that vulnerability context is highly interactive and changes rapidly over time, similar to findings by Vogel, Moser, Kasperson & Dabelko (2007). Van Vliet (2010) proposes to use participatory vulnerability assessments for mapping risks and opportunities for development. However, this approach is only effective when communities perceive a risk. In many cases, for instance with climate change, risk is difficult to perceive (Weber, 2007).

Another approach for assessing hidden interactions is presented by Larson (2010). She underscores that understanding community perceptions is a tool to see hidden barriers and interactions that may have been missed otherwise. For example, Larson (2010) found that family health and safety are more important to communities than the health of the natural ecosystems. The research focused on the family system, which is an open system, constantly subject to change and moving in a forward direction of development. Because the family system functions at the community level, interactions

between the family units (social capital) are unnoticeable. Larson's (2010) diversity approach complements the more homogenous system practiced with the Sustainable Livelihood Framework.

To illuminate hidden local constructs, we propose to adapt the DFID Sustainable Livelihood Framework to traditional community development. Traditional community development holds the promise of future betterment based on communities' learning processes and past, current and future assets (Chambers, 1997; Berkes, 2008). This adapted definition of development suits the dynamic nature of assets based on the collective, dependency nature of the groups. The definition implies their sacrifice of self-interest and complies with the direction of the group (Komarraju, Dollinger & Lovell, 2008). Also, the different types of assets can provide more information about the cooperative or conflict potential of development strategies. It should be noted that this methodology is specifically attuned to collective societies that capture hidden structures. The link between leadership, development, and conflict is only valid in this context, and not applicable to individualistic societies.

Within this framework of development, livelihoods of traditional communities depend on seven rather than five assets, as political and historical assets are added to the analysis of social, human, financial, natural, and physical assets. The historical asset includes the developmental path of the tribe. In tribal communities, past events are transferred from older to younger generations as teachings on ethics, enemies, events, spirits, and other symbols necessary for their cultural existence (Geertz, 1973). Historical events strengthen the collectivity of tribes (Timura, 2001), and hidden social memory drives their development approach. For instance, in the Trio indigenous community in Suriname, the tribes place great value on "keeping their word" in development projects because of a previous event in which they were scammed by another tribe (a swindler is called *pianakoto*).

A second community characteristic to consider is political capital. With growing westernization, tribal leaders have combined traditional leadership with western models and incorporate these into their societies. Also, many tribal leaders are involved in the global movement of human rights on indigenous peoples. For instance, the community of Agua Blanca in Ecuador has obtained both a western and traditional model of leadership succession; candidates are put forward by consensus, after which each community member votes for the preferred candidate. Thus, political ambitions are embedded in the social institution (Avruch, 1998) and seem to have an influence on their development path.

In order to understand the livelihood and development link of communities, there is a need to assess a complete picture of assets from each community, including their historical and political capital. In this way, hidden structures and processes become known and the livelihood strategies and choices can be better understood. The question of whether carbon-based conservation initiatives are seen as a valuable option for sustainable development by collective societies can then be answered. The assessment can provide more insight into the conflict potential of carbon-based initiatives in traditional societies.

### **Case study of community in Machalilla National Park, Ecuador**

The case study was undertaken during a Conflict and International Development course from Nova Southeastern University in Ecuador in July-August 2010. Three in-depth interviews were taken from community members in a non-structured manner, including one traditional leader, one woman, and one man from the community. Leading conservationists and politicians in Ecuador provided additional information on the conservation system and visions from the Government, respectively. Impressions from the natural and cultural environment were obtained by visual observations.

Document analysis was performed after return from the site. Data analysis has resulted in an ethnographic description of the livelihood strategy and conflict potential of the community, and is presented below.

*Ecuador is made up of various ecosystems that provide a highly diverse landscape. One of these ecosystems is located on the Pacific coast and comprises 128,000 ha of marine and coastal habitat, and includes fog and dry forest (nature conservancy). As one of the most beautiful countrysides along the Ecuadorian coast, the region was protected by establishing a national park in 1979. However, in the 16<sup>th</sup> century, the community of Agua Blanca inhabited the region until the Spaniard colonist forcibly removed them from the land. The Spanish conquest is a significant event in the community's historical and present livelihood, because it diminished the population until 1930s, when 45 families proudly returned to their ancestral land (historical asset).*

*To facilitate their return to the land, the community studied the Ecuadorian system and understood that security to land (usufruct title) was only possible with a minimum settlement of 21 families. Since their return, they have built a town and tripled the population as a community livelihood strategy. The land they occupy is full of cultural heritage. Human graves and approximately 600 traditional structures are dispersed over the territory and date back to 800-1500 BC. Bamboo huts with thatched leaves are a visual mark of internal power struggles between leaders, indicating that these (healthy) tensions have been an issue in the past. Tensions in leadership have been resolved by way of the establishment of a hybrid system of traditional and western influences (political asset).*

*Cultural leadership is appointed to a council of five members, consisting of a president, vice-president, treasurer, secretary, and syndicate. The council is chosen every eight years by votes from individual community members, after the candidates have been traditionally put forward. The council serves as the bridge between the community and the outside western system, especially for the discussion of the generation of income. One such activity is ecotourism. Tourism has provided financial security for the tribe for the last 22 years and in this arrangement the community receives U\$ 5 from every entrance ticket of U\$12 for their services as guides. Also, the women sell ceramics to tourists in a special hut near the entrance building of the tourist area. Maintaining this important income generating activity is a livelihood strategy of the community (financial asset). However, the community decided in the asamblea that the conservation of land and forest is their ethical (non-monetary) obligation to nature.*

*Apart from ecotourism are communities engaged in subsistence agriculture and fishing (natural asset). The Agua Blanca community members were once transporters and traders of goods to the nearby town of Puerto Lopez, reaching as far as the countries of Mexico and Peru. The community still lives traditionally from the land, and was particularly dependent on the Buena Vista River. However, since the mid-1990s, the river has lost more than 80% of its volume, most likely due to the effects of El Niño and climate change. Water for agricultural irrigation is now provided by a nearby lake, while drinking water is extracted from a well with a pump and piping system. The community lives fairly close to an access road, which leads to all parts of Ecuador, as well as providing for electricity and telephone access (physical asset).*

*The community has one elementary school with limited supplies and one teacher. The community has only a few people who studied in college. However, the role of women in the community is changing, and one woman is now functioning as treasurer in the asamblea of leaders. Tourist guides*

*speak the national language and were trained by a not-for-profit organization in a short project. Skills are obtained traditionally and transferred through gatherings of men and women in the traditional village, which is closed off to tourists (human capital). This implies that the Agua Blanca community likes to retain its privacy regarding traditional cultural practices. One sacred activity is the collection of plants for medicinal purposes, which is practiced by the majority of the tribal members. The community sees a need for reinstating a traditional spiritual leader and currently a shaman is being trained. The candidate shaman practices Catholic religion and this fits with the missionary-established Church in the village. In this way, traditional and western cultures are embedded into one system. Thus, cultural preservation is an important part of the livelihood strategy in Agua Blanca (social asset).*

*Agua Blanca is experiencing the effects of climate change through drying rivers and it is aware of the possibilities for receiving monetary payments for the conservation of forests. However, the Agua Blanca community members do not have the property title to this land. The community heard from other Indians participating in carbon-based conservation that the projects initiated divisions in the tribe leading to the loss of land and culture. Until three years ago, all planning of land was coordinated by the central government. A change in the constitution gave jurisdiction to local governments to allocate and manage state matters by themselves. The Agua Blanca community is therefore reluctant to participate.*

The above description of Agua Blanca demonstrates that the community adheres to certain values and beliefs embedded in history and culture and has developed its livelihood strategy accordingly. The community is practicing conservation in terms of ecotourism and can easily step into the new frame of carbon-based conservation because of their acquaintance with the money economy. Their major livelihood strategies are: 1) keeping close ties to the land, 2) population establishment and growth, 3) promoting cultural preservation and cohesion, and 4) a strong promise for conservation. These strategies are implemented through a model of compromise; as demonstrated in the case of institutionalizing the shaman and participation in outside projects. Thus, the community creates a mixed model of traditional and western systems that promotes cooperation and avoids conflict.

### **Case study of Trio indigenous community in Kwamalasamutu, Suriname**

This case study is based on the researcher's relationship with the Trio tribe from 2004-2010. The researcher has interacted with the Trios once a month through participant observation, conducted 15 non-structured interviews, as well as focus-group sessions with elders and community members. Additional data was acquired from research documents administered by the not-for-profit organization Amazon Conservation Team (ACT). ACT has worked with the Trios for more than 28 years in preserving biodiversity, health, and culture. The information was analyzed by the researcher and is presented in the following ethnographic description.

*The Trios indigenous communities have practiced a forest culture since 4000 BC in the southern part of Suriname, near the northern border of Brazil. The formerly nomadic community has retracted to the southern part of the country out of fear of Dutch colonists and former African slaves who moved into the rainforest after 1863 (historical asset). First contact was established with missionaries, who constructed airfields and transformed the community with teachings of the bible. A conglomerate of 15 communities with shared history, culture, and language gathered together in the village of Kwamalasamutu to receive bible school and western healthcare. Leaders are chosen by succession and the new leader is always the son of the former tribal leader. Trio tribal leaders receive a stipend from the*

government for time spent administrating the tribe. Decision-making processes are traditional, with power tensions, face saving, and harmony as primary features. However, the missionaries co-appoint the tribal leader to ensure domination. For the last 50 years, the Baptist religion has influenced traditional leadership by giving advice to important decision-making processes (political asset).

The Trio area consists of lowland forest with a high number of fresh water rivers that function as the main transportation routes. The Trios use a farming system that is based upon shifting cultivation of agricultural crops. Because of the large area of suitable land, the Trios are free in using the land for hunting, fishing, weapons, body care, construction materials, medicine, planting crops, and rituals (natural asset). They have no title on land but due to the remoteness of the tribe, there is no enforcement system present. The Trios have compiled an ethnographic map of their lands to convince the government to grant them the title to the land (political asset).

Trios rely on the natural environment for cash income, for example, traditional handicrafts and medicines, and the selling of live animals, bush meat, and fish. Enterprises are non-existent because most efforts are done collectively. Their physical structures – wooden houses on stilts - are made from traditional forest materials. Petroglyphs and other stone drawings, some of which are approximately 5000 years old, are found near the waterways and shelter places. The Trios do not have electricity, but running water and telephone services have recently been provided. A few houses have a generator or solar panel and obtaining electricity is a priority for the Trios. The village is about two hours from the capital by small airplane, where trade can occur. Access roads are non-existent. The village of Kwamalasamutu has one small western clinic providing healthcare for 1500 people (physical asset). One elementary school with limited human and material resources provides formal primary education to children.

The Trios use more than 100 plants for medical purposes. They also provide health services to both tribal members and outsiders. In the last year, these health services are providing a source of income to the shamans and their apprentices (financial capital). As such, the shamans make an herbal extract as a means of earning money (financial asset). Protecting the tribal recipes is an important strategy for securing Trio income. However, other non-traditional sources of income-generation such as ecotourism has not succeed due to 1) the gap between western and traditional systems and 2) a lack of familiarity with the monetary economy because of its fairly recent introduction five years ago. The community has a low level of community-based organization. Except for some women organizations, the primary organized community activity is soccer. Most families visit each other to share food and gossip. In the absence of a public social security system, community members take care of the most vulnerable groups in society, e.g., elders and youth (social asset).

The Trio youth usually do not succeed in finishing elementary school because of the cultural and language barriers (native language of Trio versus the national language of Dutch). Young women and men who do complete school usually fall back into their customary roles. However, school remains an important strategy for Trios to become part of the western society (human asset). There are opportunities for obtaining western skills through not-for-profit organizations in the areas of forest monitoring, computer skills, administrative and financial skills, leadership and communication, craft making, conflict resolution, and cooking. However, language differences often prevent the Trios from participating in development projects.

The community is aware that nature is changing and blame observed climate changes on disrespectful ways of living with the forest. The Trios possess insufficient western knowledge to understand the mechanics and opportunities of carbon-based conservation. However, conservation and acquiring land rights are high priorities for the Trios. For instance, in 2004, the Trios chief sent members

*to live in all corners of the land as a means of traditional demarcation. Trios have always been open to receiving monies for purchasing western goods, e.g., sugar, salt, and batteries. Western goods are seen as a status symbol. Projects are therefore seen as opportunities to create wage labor for more Trios to improve their status.*

As mentioned in the above description, the Trios are opportunistically adopting new developments into their lifestyle; however, these are based on their own development goals. The exploration of Non Timber Forest Products (NTFP) has been chosen as their main activity for obtaining income; however, it is unclear if this is an intermediate activity until new and better opportunities are presented. The Trios livelihood strategy consists of: 1) acquiring the right to land and resources, 2) an openness to modernization, including western education, 3) preserving culture and potential trade secrets and 4) acquiring income for obtaining status goods in Trio society. Trios implement these strategies by accommodating outsiders into their system. While beneficial in many respects, their accommodating approach can elicit conflict when outsiders provide incompatible opportunities to the tribe.

### **Conflict-potential for carbon-based development projects**

The vulnerability assessment maintains that development projects should create a holistic picture to be able to reveal hidden structures operating in collective societies. However, the vulnerability context of the communities provides insufficient information about the potential conflicts that may occur when initiating carbon-based conservation projects. Therefore, conflict analysis gives further insights in the existing structures to overcome external shocks, the conflict actors and the dynamics that may initiate conflict between the actors, according to DFID (figure 1).

Although the literature shows that collective societies usually avoid conflict if it is not possible to resolve, the analysis demonstrates that the history of tribes is closely related with their goals and the development of conflicts. This is underscored by Humpreys (2005), who finds that historic events play a larger role than future events in natural resource conflicts. In our analysis, the Agua Blanca community wants to reinforce their ties to the land, informed by the historical fact that they were removed from the land before. Thus, the tribes see living on the land as a priority and the issue is sensitive to conflict. Similarly, the isolated nature of Trios is now reflected in their struggle for development. Trios want to participate in development at all costs, with or without a dependency-relationship. However, implementing development projects without addressing the basic human needs of Trio people will initiate conflict.

Figure 1: Comparative analysis of conservation-related conflict potential in research areas

	<b>Ecuador</b>	<b>Suriname</b>
Background	Sustainable development initiatives may conflict with the values and beliefs of the Agua Blanca community	Sustainable development initiatives may conflict with internal exercise of power in the community.
History	No recent history of conflict.	Community divided by an ecotourism project in 2008.
Structures	<p><u>Security</u>  <i>International:</i> The global community pushes third world countries to avoid deforestation and protect forests to lower greenhouse gas emissions.  <i>National:</i> Ecuador has no structures in place to avoid influx of outside organizations in carbon trading.  <i>Local:</i> The Agua Blanca community works collaboratively with the Government in management of national park.</p> <p><u>Political</u>  <i>International:</i> The United Nations Framework on Climate Change defines the rules and regulations of combating climate change.  <i>National:</i> Fundo Ambiental National (FAN) is in the process of defining the national framework for climate change regulations.  <i>Local:</i> The Agua Blanca community has a leadership council in place for handling new developments.</p> <p><u>Economic</u>  <i>International:</i> Involvement of global financial institutions, brokers and civil society for carbon trade.  <i>National:</i> Ecuador is in the process of participating in the global carbon trade.  <i>Local:</i> Involvement of community in earning money through organized interaction with outsiders - ecotourism. Community has basic services (electricity, water) for development projects.</p> <p><u>Social</u>  <i>International:</i> Strong movement for indigenous human rights for self-actualization.</p>	<p><u>Security</u>  <i>International:</i> The global community pushes third world countries to avoid deforestation and protect forests to lower greenhouse gas emissions.  <i>National:</i> Suriname has no structures in place to avoid influx of outside organizations in carbon trading.  <i>Local:</i> The Trio community works collaboratively with the local military in territorial protection.</p> <p><u>Political</u>  <i>International:</i> The United Nations Framework on Climate Change defines the rules and regulations of combating climate change.  <i>National:</i> The Ministry of Physical Planning, Land- and Forest management and the Ministry of Environment are in the process of defining the national framework for climate change regulations.  <i>Local:</i> The Trio authority is attuned to the Government / Church and local NGOs for handling new developments.</p> <p><u>Economic</u>  <i>International:</i> Involvement of global financial institutions, brokers and civil society for carbon trade.  <i>National:</i> Suriname is in the process of participating in the global carbon trade.  <i>Local:</i> Involvement of community in individual trade with outsiders. Limited experience with handling money-economy. Community has no basic services (electricity, water) for development projects.</p> <p><u>Social</u>  <i>International:</i> Strong movement for indigenous human rights for self-actualization.  <i>National:</i> The forest-dependent community is living in the lowest poverty situation in Suriname and has no rights to land.  <i>Local:</i> The community is seeking for more employment</p>

	<p><i>National:</i> The forest-dependent community is living in the lowest poverty situation in Ecuador and has only usufruct rights on land.</p> <p><i>Local:</i> The community is seeking for more employment opportunities within the park, instead of in urban areas.</p>	opportunities in territory.
<b>Actors</b>	<p><i>Local community:</i> Agua Blanca community wants to survive and earn income through conservation.</p> <p><i>State of Ecuador:</i> The country wants to participate in the global carbon trade.</p> <p><i>Global community/civil society:</i> The interest is to use the forests of Ecuador for “buying” carbon emissions.</p> <p><i>Not-for-profit organizations:</i> Guidance of communities for fame and promotion of methodologies.</p>	<p><i>Local community:</i> Trios want to obtain basic human services and needs.</p> <p><i>State of Suriname:</i> The country wants to participate in the global carbon trade.</p> <p><i>Global community/civil society:</i> The interest is to use the forests of Suriname for “buying” carbon emissions.</p> <p><i>Not-for-profit organizations:</i> Guidance of communities for fame and promotion of methodologies.</p>
<b>Dynamics</b>	<p><i>Event triggers:</i> Conflict will be initiated by contracts with local communities when not involving the state.</p> <p><i>Strength of greed:</i> The state of Ecuador wants to obtain money from forest conservation to provide for country’s income. The global community institutionalized a capitalistic scheme for forest protection.</p>	<p><i>Event triggers:</i> Conflict will be initiated by overwhelming local communities with money and basic services. .</p> <p><i>Strength of greed:</i> The state of Suriname wants to obtain money from forest conservation to provide for country’s income. The global community institutionalized a capitalistic scheme for forest protection.</p>

The conflict potential of carbon-based project is comparable to that of other development projects. Sikor, Stahl, Enters, Ribot & Singh (2010) and Petheram et al. (2010) promote the implementation of carbon projects in collaboration with other community development initiatives, because they are not seen as separate by local peoples. Development is dependent on the strength of the community to implement such projects. In Agua Blanca, the community has a well-established leadership system to deal with western development projects. The community leadership overcame the acculturation shock and created a structure that has financial authority. Such authority over finances is believed to strongly connect with communities’ decision-making ability (McDaniel, 2002). In contrast, individual leaders of the Trios tribe appear to be more interested in maintaining cultural and physical power because of ongoing struggles with outsiders and insiders (influenced by outsiders).

Similar to the Shuar tribe in Ecuador, the Agua Blanca people have maintained a traditional cultural identity while institutionalizing western development (McDaniel, 2002). Such mixed systems accommodate leaders that acquire skills in both systems, traditional and western. These leaders need to be legitimate in the eyes of westerners and their own community (Lauer, 2006), and they need to have highly developed negotiation and peacemaking skills to overcome conflicts between and within the systems. It was evident from the interviews that the community was well aware of the involvement of other communities in carbon-based development projects. Thus, Agua Blanca leadership is well connected, and maintains a strong external network, which is an indicator of overall community resilience and leadership (Bebbington & Perreault, 1999).

The Agua Blanca community has successfully transformed their traditional leadership, which was historically based on knowledge, to a system based on other resources (Lauer, 2006). In contrast, the Trio tribe seeks funding for basic needs such as health and education, by collaborating with outside funding organizations, without integrating the systems (Ziegler-Otero, 2004). This leads to a dependency-relationship, reflective of weak social capital (Bebbington & Perreault, 1999). The Trios community has not been able to overcome the external shock and is at risk of being swallowed by the outside system. In comparison, the Huaorani tribe of the Ecuadorian Amazon lived in isolation and was overwhelmed by the support for basic needs from the oil companies who were extracting oil in their territory (Ziegler-Otero, 2004).

## Conclusion

This assessment sought to provide an understanding of the livelihood strategies of both communities, as well as an in-depth view of their historical values. These values are embedded in the leadership systems of each group. Because leaders are often the primary point of contact with outsiders, the leadership structure mirrors a community's worldview, and correspondently their conflict potential. In our assessment, the Agua Blanca community attempts to balance traditional culture and practices with participation in development projects and the wider money-based economy. This mixed model of traditional and western practices is reflected in their leadership council. In the Trio community, a similar pattern is observed; however, traditional Trio leadership is less open to change and, therefore, more dependent on outsiders for decision-making, a trend which is reflected in tribal attitudes towards development.

Leadership is believed to be a significant factor in the success of development projects, especially in high-tech projects related to carbon-based conservation (Corbera et al. 2007). The ability of leaders to function within the traditional and the western system and between traditional and western systems may be more important than the educational level of a tribe. For instance, the Huaorani tribe had well educated leaders but the tribal leadership was unable to overcome the pressure of the oil companies in Ecuador and lost legitimacy in the eyes of their own peoples. As a result, conflict occurred and the leadership became divided in favor of the oil companies (Ziegler-Otero, 2004). In cases in which leadership cannot accommodate the pressures of development, conflict is likely to occur. This assessment indicates that community leadership in development projects function better when principles are based on equity. One may see inequities between traditional and western societies, therefore, as a unique opportunity for improving the social and economic equity of local forest communities (O'Conner, 2008; Boyd et al. 2007). However, as revealed in these case studies, equity between the dominant western system and traditional leadership systems does not exist. Rather, greater social stability and development should be pursued through adaptive processes.

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