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**ABUNDANCE IS NOT ENOUGH:
WATER-RELATED CONFLICTS IN THE
AMAZON RIVER BASIN**

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Researching Water-related Conflicts – A Socioenvironmental Approach

The issue of freshwater as a strategic resource has emerged onto the international political stage with a force that has surprised many political leaders, even though this issue has been raised consistently by scholars and activists for decades¹. As with many other environmental problems, the existence of a crisis (or multiple crises) is often the trigger that sparks concern over the use and abuse of a resource that has long been taken for granted as free and abundant. This new surge of interest on water issues has emerged due to the many regional water crises throughout the world's continents in which the *shortage* of freshwater, whether due to biophysical or social distribution factors, is central. These crises, in turn, have drawn specific attention to the world's arid and semi-arid ecosystems as key sites of conflict.

In this paper, I shall present a counterexample through a quick review of water issues in the Amazon River Basin, one of the world's most water-abundant regions. I seek to show that even in areas where the shortage of water is not an issue, conflicts over water can and do arise and present a unique vantage point from which to view water issues. This serves to broaden our view of water crises beyond the tight focus on the quantity of water and move toward an analysis that concentrates on the varied uses of water and its aquatic resources by a plethora of social groups: when is water used? by whom? for what purposes? at what cost? with what impacts? In this framework, the questions of overuse and abuse of water resources become sub-categories within the broader category of use.

In this vein, I will analyze two water-related conflicts in the Brazilian portion of the Amazon River Basin: (1) fishing conflicts in the rich Amazon River floodplain, known locally as the *várzea*; and (2) the two-decade long struggle over the construction of a large hydroelectric dam on the Xingu River. These two cases move against the grain of contemporary analyses of water issues concerned with the privatization of freshwater, in which corporate control over water turns it into a commodity, since they deal with waters that are under federal government control which is not being questioned or threatened.² Nor do these cases revolve around the issue of the contamination of freshwater, particularly due to industrial effluents, which has made water one of the principal sanitary issues facing both urban and rural environments in many parts of the world, since the water resources involved – the rivers and lakes of the *várzea* and the waters of the Xingu River – are not heavily industrialized and do not suffer major problems of water contamination. The question arises: What then are social groups fighting over?

¹ The classic studies of Wittfogel on ancient irrigation systems, beginning in the 1930s, led to the establishment of an important research program in the social sciences on irrigation and water resources that continues through today. See, for example, Wittfogel (1957), Steward (1955) and Worster (1985).

² The issue of the privatization of city water systems has fueled intense economic debate and provoked popular resistance in different parts of South America, as seen in the protests in Tucumán, Argentina, and La Paz and Cochabamba, Bolivia, over the past three years.

To answer this question I shall place the issue of water resources in Amazonia within the research program on environmental conflicts which has emerged in the social sciences during the past two decades as an important site of investigation and action. My disciplinary entry point into this field is from anthropology, particularly that sub-field of the discipline working with a political ecology theoretical framework (see Little 1999). This analysis will be implemented within the geographic scope of watersheds, understood here in their multiple dimensions (1) as a hydrographic region with specific geographical coordinates, (2) as an area containing different ecosystems, (3) as the home to varied and often competing social groups and (4) as the locus for political and environmental mobilization. Within anthropology, the watershed focus can be fruitfully combined with the Bennett's (1969; 1976) notion of "socionatural regions".³

Anthropological political ecology begins its analysis with a focus upon the distinct social groups that reside and exploit a particular watershed. These groups are analyzed according to the specific modes of ecological adaptation that they have developed – the productive systems and technologies that they employ, the natural resources they exploit and the ideologies used to justify their adaptive mode – and the territorial claims to land and water that each group promotes within the larger political context. The focus on social groups serves to highlight conflicting uses and interests, thus requiring an approach that deals directly with conflict as an essential and constitutive element of watershed dynamics. The emphasis on conflicts serves as a guard against biocentric and technical perspectives (including some bioregional ones) that seek to identify some type of "optimal" or "appropriate" use of the watershed and its resources. In general, environmental conflict research has revealed that such optimal uses can rarely be found because use is intimately tied to the values, ideologies and productive needs of each social group. Resource use, then, needs to be evaluated on the basis of an understanding of how the clash of uses between these groups plays out within the environmental restraints of the watershed.

The focus on social groups and their claims can be fruitfully combined with a political perspective based in socioenvironmentalism, whereby analysis is not limited to the scientific endeavor of identifying the underlying causes of environmental conflict⁴ but is also concerned with the resolution of these conflicts since the very social groups involved are clamoring for solutions. As such, the dividing line between pure and applied research is breached and the search for causes of conflict cannot be separated from the search for solutions, since both are intertwined with social groups' modes of ecological adaptation and intergroup relations. In this endeavor, the socioenvironmental movement within Brazil represents an important political reference point due to the unique way that social and environmental issues have been combined to demarcate and promote new types of ecological relationships that call into question existing developmentalist and neoliberal models (see Leis and Viola 1996).

In sum, the research program in environmental conflict invariably leads to discussions and analyses of the issues of control and ownership over natural resources (particularly land and water), of public policy instruments and initiatives, of land-use and water-use strategies, of landscape management techniques and environmental rights

³ The term socionatural region is defined succinctly by Smith and Reeves (1989, 14) as "a system in which diverse human groups have adapted in patterned ways to plant, animal and environmental resources, to one another, to hierarchical market and administrative forces, and to pressure groups and other forms of quasi-organized social and political interest."

⁴ Much of the political science literature on environmental conflicts has this heuristic goal. See, for example, the excellent collection of articles organized by Diehl and Gleditsch (2001).

and citizenship. These are the issues that I seek to highlight in the two case studies as a prelude to the question: What types of solutions to these conflicts have been implemented and what are their results? Before exploring these cases, however, a brief presentation of the Amazon River Basin, its peoples and its ecosystems is in order.

The Amazon River Basin

The Amazon River Basin is one of the most studied and least understood regions of the world. This paradox stems from the fact that common appropriations of Amazonia are shrouded in a veil of myth, hyperbole and desire that tend to distort our understanding of its empirical realities. The collective imaginary that has developed around Amazonia is often more potent than our scientific knowledge of this region. Amazonia has been referred to as the last chapter of Genesis and as a green hell; as both an earthly and a counterfeit paradise; as a land of cinnamon and gold and as an empty wasteland. Thus, the first task one faces in talking about Amazonia is to move beyond myth and hyperbole, which tend to oversimplify our understanding, in order to construct a richer, empirically based, complex perspective.

Amazonia is clearly unique among world regions with regard to its natural attributes. The existence of the largest contiguous block of tropical rainforest has turned it into an icon for the international preservationist movement. Its extremely high rates of biological diversity have also made it a prime site of interest of transnational biotechnological firms. Contrary to common understanding, however, Amazonia is not a homogenous biophysical entity but houses upland, montane, flooded and mangrove forests, has blackwater, clearwater and whitewater rivers and contains a wide variety of ecosystems such as savannas, mountains, floodplains, marshes and lakes.

For the purposes of this paper, special interest will be given to Amazonia as a hydrographic system. The Amazon River Basin⁵ covers 6,607,000 square kilometers, encompasses part of seven different countries and drains most of northern South America. The Amazon River, from its source of the Apurimac River high in the Peruvian Andes to its mouth the Atlantic Ocean of Brazil, has an extension of 6,437 kilometers and receives waters from over 1,100 major tributaries. One of its tributaries, the Negro River, is the fourth largest river in the world. The average discharge of the Amazon River (222,700 m³ per second) is the largest in the world, six times that of the Congo River, with the second largest discharge (Tundisi et alii. 2003a). Indeed, the Amazon River Basin contains approximately 20% of the world's available freshwater.

While recognizing the importance of these biophysical attributes, one must be careful to avoid distorting our understanding of this region from what I have called a "naturalistic bias" of biocentric perspectives focused on the area's faunal and floral diversity (Little 2003a; see also Nugent 1981). The tendency to place inordinate emphasis on Amazonia's natural attributes often serves to obscure from view the tremendous *sociodiversity* of the many human groups that live in the region. When these peoples do come into view, they often suffer from other distortions, whether this be through their depiction as destroyers of the forest, as in the case of cattle ranchers, colonists and wildcat gold miners (see Hecht and Cockburn 1989), through their romanticization as ecologically noble savages, as often occurs with indigenous populations (see Redford 1990; Ramos 1994), or simply as invisible inhabitants without a history of their own, as in the case of the Amazonian *caboclo* (see Nugent 1993). Over

⁵ The following figures include the Tocantins River Basin which is considered here to be part of the wider Amazon River Basin.

250 different indigenous groups, with a total population of over one million, reside in the Amazon River Basin and present an enormous array of linguistic, religious and political diversity. There are also numerous other “traditional” peoples who have emerged from long-term processes of ethnocide/ethnogenesis, biological miscegenation and cultural syncretism, and who are known locally by a host of names: *caboclo*, *camba*, *ribeirinho/ribereño*, *mestiço/mestizo*, *quilombola/cimarrón*. Over the centuries these indigenous and traditional peoples have developed distinct adaptive systems, each with their own knowledge systems and technologies, that are finely tuned to the distinct ecosystems where they gain their sustenance.

Still another distortion is founded in the Edenic discourse about Amazonia, whereby the region is seen as housing pristine rainforests, located in remote areas, isolated from the broader forces of world history (Slater 1996). This vision hides from view the fact that Amazonia has been the site of innumerable frontier expansions that have come and gone and come again and gone again over the past five centuries in what I have depicted as a “perennial frontier” phenomena (Little 2001). These varied frontier waves have involved the extraction and circulation of economic goods within the world economy, placing Amazonia in the forefront of global processes of capital accumulation and revealing that the “globalization” of this region has been an ongoing process since at least the sixteenth century (Little 2000). Ever since the first gold rushes of the late sixteenth century in the Upper Amazon Basin, a parade of forest-based products has been exploited in the region and traded on world markets. A short list of these products includes: cinnamon, quinine, sarsaparilla, cacao, clove, vanilla, barbasco, Brazil nuts and jute. But it was natural rubber whose exploitation turned Amazonia into the epicenter of world capitalist markets during the late nineteenth and early twentieth century (until the dramatic collapse of the Amazon market in 1912) and radically transformed this region.

Frontier expansion into Amazonia gained new impetus in the second half of the twentieth century due to a new developmentalist surge sparked by the interests of national governments (often financed through international agencies) to promote the economic development of these Amazonian regions that were considered to be, by national leaders, as economically backward and demographically empty. Colonization by farmers and cattle ranchers, industrial and placer mining, and the construction of large hydroelectric dams, roads and waterways during the decades of the 1960s, 1970s and 1980s brought many new social actors into the region. A new set of natural resources were extracted from the region to attend world demand for petroleum, natural gas, manganese, bauxite, iron ore, kaolin, gold (once again) and goldfish. This massive burst of economic activity provoked environmental destruction – most notably through deforestation – on an unprecedented scale. The many new development programs and fiscal incentives implanted by national governments served to promote, and in the process accelerate, the productive forces that were causing this destruction.

This new wave of frontier expansion exacerbated existing interregional relations within Amazonian countries, since their respective Amazonian regions were treated by political leaders as a type of ‘national sacrifice area’ for the larger good of ‘national economic development.’ From the perspective of Amazonian residents, these new intrusions were seen as a modern form of ‘internal colonialism’ in which powerful, more developed regions of a nation-state exploit ‘their’ Amazonian regions of its natural resources, leaving poverty and environmental destruction in its wake. Another significant result of recent developmentalist expansion into the region has been the rapid urbanization of Amazonian populations (Browder and Godfrey 1997). The Basin’s two largest cities – Manaus and Belém, both in Brazil and with populations of over one and

a half million people each-have received the bulk of these migrations, through urbanization of other regions has produced medium-size cities in Brazil – Porto Velho, Rio Branco, Tefé, Santarém, Macapá – and other Amazonian countries – Iquitos (Peru), Leticia (Colombia), Lago Agrio (Ecuador).

During the past two decades, developmentalist expansion has been increasingly challenged by a growing environmentalist concern over and appropriation of Amazonia. The most notable change in this direction has been the rapid increase – starting in the 1970s and continuing unabated today – in the number protected areas, such as National Parks and Forests, Biological Reserves and Wildlife Refuges. In Brazil alone, which houses approximately 60% of the Amazon River Basin, the total area of Amazonian lands under protection has increased fivefold between 1975 and 2003 (Barretto Filho 2001; Cesar et alli. 2003). Parallel to this process, which has also been occurring in the other six Amazonian countries (see Rojas and Castaño 1991; Amend and Amend 1992), has been the rising international concern over deforestation of Amazonian tropical forests which reached its peak during the late 1980s. This concern led to the implementation of numerous new programs in all Amazonian countries designed to protect the rainforest and its traditional peoples. The Pilot Program for the Protection of Brazilian Tropical Forests, jointly financed by the Group of Seven Industrialized Countries and the Brazilian government, is the most ambitious of these efforts, and in its ten years of operation has become a multifaceted public policy instrument that has generated new policies in such diverse areas as protected areas, land management techniques, scientific research, small-scale sustainable development projects, and the demarcation and sustainable development of Indian Lands. In spite of these many efforts, deforestation continues throughout the region, though the most intense impacts are concentrated in the so-called deforestation belt that cuts through the states of Rondônia, Mato Grosso and Pará located to along the Basin's southern and eastern borders. An annual average of 17,550 square kilometers of rainforest has been deforested in Brazil over the past 13 years, with 1994-5 (29,059 sq. km.) and 2001-2 (25,476 sq. km.) having the two highest rates.⁶

Other important developments on the environmentalist front include the consolidation of the worldwide discourse on sustainable development at the Earth Summit in Rio de Janeiro in 1992 (Little 1995) and the subsequent role that Amazonia has played as an important site for policy experiments in sustainable development, such as Extractive Reserves and Community Forest Management. In the case of Brazil, strict new environmental laws have also been put in place that provide a legal framework for the enforcement and punishment of environmental crimes, a situation which up to now remains highly ineffective due to the lack of funds and personnel to effectively enforce environmental laws throughout the vast region (Little 2003b).

At the pan-Amazonian level, the emergence, strengthening and consolidation of local organizations of traditional Amazonian peoples level have dramatically changed the contemporary Amazonian political situation. Indigenous groups are clearly in the forefront of this movement, with the creation of the Confederation of Indigenous Nationalities of Ecuadorian Amazonia (CONFENIAE) in Ecuador, the Coordination of Indigenous Organizations of Brazilian Amazonia (COIAB) in Brazil, and the Coordination of Indigenous Organizations of the Amazon Basin (COICA) being milestones in this process. Indian peoples are now representing themselves in national and international forums for the first time ever and their voice has consistently gained in importance and power over the past two decades, particularly with the promulgation of

⁶ Data taken from the annual research reports of the National Institute of Space Research (INPE).

new national constitutions within Amazonian countries that grant extensive rights to Indian peoples.⁷ Internationally, the International Labor Organization Convention 169 on indigenous and tribal peoples is one of the few formal documents currently ratified and in operation in countries throughout the world.

In addition to indigenous peoples, other social groups, often united under the broad banner of “traditional peoples,” have also begun to organize and assert their rights. These groups include the varied maroon societies (called *cimarrones* in Spanish and *quilombos* in Brazil), rubber tappers, Brazil-nut extractors and riverside fishing communities. Both indigenous and other traditional peoples have entered into a series of alliances with national and international environmental, indigenist and human rights organizations (see Conklin and Graham 1995), as well as with sectors of the ecotourism and cosmetics industries (see Anderson and Clay 2002), all of which have served to further strengthen their rights and claims.

Now at the beginning of the twenty-first century, Amazonia is gaining new geopolitical importance due to two highly-precious natural resources: genetic diversity and freshwater. The complex issue of biodiversity is beyond the scope of this paper. What will occupy us in the following sections are the struggles over freshwater and its resources by differing Amazonian groups, with the Amazonian floodplain and the Xingu River serving as our key sites of analysis.

Fighting over Fishing on the Floodplains

One of the most important characteristics of Amazon River hydrodynamics is the enormous variation in the volume of its flow throughout the year, which creates an extensive floodplain area where during the dry season, when the river level is low, only permanent lakes remain and during the flood season, when river level can rise by as much as 14 meters, the area is transformed into an intricate, ever-changing complex of canals, rivers, lakes, islands and beaches. The floodplain also includes widely diverse vegetation marked by differing kinds of flooded forests (Tundisi et alli. 2003a; 2003b). Amazon River floodplains cover an estimated total area of 307,300 square kilometers, or approximately 4.6% of the total Amazon Basin, and are one of the richest and most dynamic ecosystems of the entire Basin.

Freshwater fish represent an important example of ichthyodiversity in Amazonia and are a key element in the Amazonian diet. Over 1,700 different species of freshwater fish have already been identified and it is estimated that this number might be as high as 3,000 (Goulding et alli. 1996: 73). Floodplains play a significant role in the generation of this diversity because the constantly changing system of lakes, marshes and canals promotes species competition and enhances genetic interchange (Tundisi et alli. 2003b: 196). But it is as a source of fish that the floodplains provide the strongest economic function for the region as a whole, particularly in the varied forests which can be flooded from four to seven months a year, though in a few cases this number may be as high as eleven months. When the flooding recedes, many fish are cut off from access to the main river channel and are trapped in lakes or marshes, which facilitates the catching of fish. Currently more than 50 different species of food fishes are marketed, with the most sought-after species for human consumption being *tambaqui*, *jaraqui*, *tucunaré*, various species of catfish, *pirapitinga* and *pirarucu* (Goulding et alli. 1996: 97-105). Nearly 90% of the total food fish catch in the Amazon Basin outside of the estuary region originates in the floodplain (Junk 1984).

⁷ Most notable are the new Constitutions of Brazil (1988), Colombia (1991), Ecuador (1998) and Venezuela (1999).

The most numerous of the human groups that live in the floodplain in Brazil are known locally as *ribeirinhos*, or traditional riverside fishing peoples. Due to the centuries of frontier expansion in the Amazon Region, in which the main Amazon River channel was the major thruway for explorers, slavers, traders and missionaries, the indigenous societies that lived along the floodplain were the first to be decimated by war and disease, were the first to be enslaved by the Portuguese slaving expeditions, and were the first to be rounded up and placed in mission towns by the Jesuits. As such, today very few indigenous societies continue to live along the main channel of the Amazon River in its lower and middle portions. Many of the *ribeirinho* communities that dot the floodplain, however, are descendents of indigenous groups, and the reshuffling and reconstruction among different indigenous societies, together with a high degree of miscegenation with European and African peoples over the centuries has made it difficult for them to claim a specific ethnic identity.⁸ Many of the adaptive strategies, technologies, place names, myths and folklore associated with the floodplain used by *ribeirinhos* are derived, or have been adapted, from prior indigenous practices (see Galvão 1976; Slater 1994). For this reason, the *ribeirinho* population is generally placed within the category of “traditional peoples,” which distinguishes them from recent extra-Amazonian arrivals such as colonists, gold miners and ranchers.⁹

Ribeirinho peoples have developed highly complex adaptive systems that combine extractive and agricultural practices (see Chibnik 1994; Alencar 2002). Fishing is the cornerstone of these adaptive strategies and fish provide the main source of protein for *ribeirinho* families. During the low-water season on the floodplain, excess fish caught are also sold on the local market as a means of generating cash income needed for the purchase of basic foodstuffs and manufactured goods. In spite of their decades-long occupation of the floodplain, *ribeirinhos* do not hold title to the lands and waters that they exploit. In 1946, the Brazilian federal government established the entire Amazonian floodplain as federal lands.¹⁰ This formal control, however, was never translated into effective control or management. Indeed, due to the lack of interest by the federal government, a chronic shortage of staff and the long distances from centers of political power, the federal government essentially abdicated its control over the Amazon floodplain to the interplay of frontier forces that passed through the Amazon River valley during the twentieth century. As such, there are few public policy guidelines for resolving conflicts over floodplain resources, which has fostered direct confrontations between competing groups within volatile frontier dynamics.

Beginning in the 1970s, the rapid growth of Amazonian urban centers in the Amazon River Valley such as Tefé, Manaus, Itacoatiara, Parintins, Santarém, Belém and Macapá produced increased demand for food fish. The direct economic response to this demand was the expansion of commercial fishing fleets along the Amazon River which was accompanied by the use of new fishnet technologies and of boats with fish-

⁸ Nonetheless, it is important to note that in the past five years the region has experienced a process of indigenous resurgence in which many groups who previously considered themselves to be *ribeirinhos* or *caboclos* are now claiming an indigenous identity. Several factors help explain this resurgence: the stigma of being Indian is rapidly losing its force and negative stereotypes are on the decline; communities can gain land rights more readily as Indians than as *ribeirinhos* and this has stimulated many groups to seek formal ethnic identification after which land claims are immediately submitted.

⁹ For an interesting discussion of the political consequences of being categorized as a *ribeirinho*, which has the positive connotation of using traditional, environmentally sound practices, or as a *pescador* (fisherman), which has the negative connotations of being a predator of natural resources, see Esterici (2002).

¹⁰ In Brazil, all interstate rivers and ocean beaches are also under federal control.

freezing capacity. This activity usually concentrated on specific species of fish and drastic reductions in fishing stocks were produced, such as occurred with the *piramutuba* fish which reached its peak of production in 1977 with 28,000 tons and has declined steadily since then (Borghetti and Ostrensky 2002: 454). Another result of the decrease in fishing stocks was that commercial fishing boats needed to travel increasingly greater distances from urban centers in order to maintain their yields, and they began to encroach upon the floodplain areas where *ribeirinhos* have been gaining their livelihoods for decades. Due to the indiscriminate use of new synthetic nets, floodplain lakes were rapidly depleted of fishing stocks and this posed a direct threat to local fisherman who depended upon these lakes year after year. This produced a series of confrontations over fishing rights that reached their peak in the late 1980s and early 1990s (Araújo 1994).

It was during this same ten-year period that local Amazonian groups began organizing at a national level and claiming control over the lands that they and their ancestors had exploited for generations and new models of co-management of land emerged. Extractive Reserves, the most important of these models, were established by law in Brazil in 1989 after a decade of political mobilization by the Amazonian rubber-tappers, under the leadership of Wilson Pinheiro and Chico Mendes (both of whom were assassinated), and environmental groups who had allied with them (see Arnt 1994). Extractive Reserves are federally-created protected areas that cede exclusive collective use rights to resident extractivist populations (principally rubber tappers and Brazil-nut gatherers), while formal title to the land remains with the federal government. The exploitation of the reserve by the local agroextractivist population is guided by a jointly-generated and approved utilization plan in which the federal government and local population are responsible for the *co-management* of the area.

By the early 1990s, environmentalists, scientists and *ribeirinhos* were looking for ways to adapt the principles of co-management to the unique dynamics of the Amazon floodplain. One of the principal issues was how to establish formal control over *lakes*, rather than over land as was most common, a task which was fraught with difficulties on the floodplain due to the fact that lakes often change place, shape and size with each yearly flooding of the river. Several proposals for the establishment of “Floodplain Lake Reserves” were floated in the early nineties (see McGrath et alii. 1993). The first sustained effort to implement effective co-management of the floodplain began in the region of Mamirauá, along the Middle Amazon River, just upriver from the town of Tefé (in the section of the river known as the Solimões River in Brazil) through the efforts of scientists researching the floodplain.

In 1990 the Amazonas State Government established Mamirauá as a state ecological station. With the initiation of the first phase of the Mamirauá Project by the Mamirauá Civil Society network of local environmental non-governmental organizations in 1992, a host of conservation and sustainable management practices were introduced, with particular emphasis given to fisheries management, in direct collaboration with approximately 60 floodplain communities located either within or next to the ecological station. During this time, local residents who were threatened from overfishing by commercial fishing fleets closed fishing to these boats and established an internal zoning scheme which set aside areas for fish reproduction, subsistence fishing and fishing for the market. Other agreements established strict rules concerning the type of fishing equipment allowed. The initial success of these efforts led to the reclassification of the ecological station (which prohibited human residence) as the Mamirauá Sustainable Development Reserve (which permits human residence) in 1996. Its total area of 1,124,000 hectares makes it the largest protected area in Brazil

dedicated to the conservation of flooded forest ecosystems (Sociedade Civil Mimirauá 2003).

In 1996 a management plan for the Reserve was discussed and approved and a 260,000 hectare focal zone was established for strict preservation. Since that time, new management techniques have been developed that combine western scientific knowledge with traditional knowledge and techniques. One of the most interesting cases of this is the management of the *pirarucu* fish, which can grow to a length of three meters and weigh up to 150 kilograms. A simple, traditional method of calculating the number of *pirarucu* in a given lake – through counting the number of times they come up for air within a predetermined time frame – proved to be as accurate as highly technical methods of marking and counting fish, takes only one-tenth of the time to complete and was used for determining stocks and establishing zones. Other measures included the establishment of a catch limit by IBAMA, the federal environmental agency, to a total of three tons per fishing season and limiting the capture to specimens over 1½ meters in length. Within the short span of four years, the stocks of *pirarucu* increased fourfold in the managed areas and catch limits were raised, allowing for a subsequent increase in local income (Viana et alli. 2003). These results were only possible due to the closing off of the lakes to commercial fishing boats. Two other Sustainable Development Reserves – Amanã and Piranha Lake – have since been established by state and municipal governments.

By the late 1990s, new local associations and organizations emerged in the defense of their traditional rights and began involving local and state governments in a host of unprecedented initiatives geared toward community management of fisheries. The principal instrument used by these groups was the development of “fishing agreements,” whereby specific floodplain regions were zoned and restrictions agreed upon at local assemblies and enforced by voluntary environmental agents. The river and floodplain areas around the city of Santarém (pop. 200,000), located along the Lower Amazon River in the state of Pará, contain important fisheries for both traditional and commercial fishing (Almeida et alli. 2001). Even though much of the area’s original floodplain forest has been destroyed (in contrast with the situation in Mimirauá), it is this region where the establishment of fishing agreements has been the strongest. Beginning in 1994 the Várzea Project undertaken by Institute for Environmental Research in Amazonia (IPAM), a Santarém-based non-governmental organization, laid the foundation for these changes with sustained action in the areas of environmental management, education and policy, fisheries research, grassroots organization-building and marketing.¹¹ Currently six different fishing agreements, involving nearly 100 riverside communities, have been established and are being implemented.

Another important new instrument for the consolidation of community management of fisheries is the establishment of Fishing Councils within the existing structure of municipal governments that incorporate numerous riverside communities within a single structure. The municipality of Silves, located in the state of Amazonas, is a leader in this trend and has taken a series of steps to promote and institutionalize local community control over floodplain resources. Still other areas of the Brazilian Amazon Basin that are developing new political and management strategies are Tabatinga, upper Juruá River, Boa Vista do Ramos and Parintins in the state of Amazonas, Gurupá in the state of Pará, the Bailique Islands in the state of Amapá,

¹¹ For a review of this project and a general guide to fishery management on the floodplain, see IPAM (2003).

Guaporé in the state of Rondônia, and the lower Purús River in the state of Acre (Oviedo and Bursztyn 2003).

Many of the initial fishing agreements had no formal legal backing due to the lack of adequate environmental guidelines and the general absence of the federal government in controlling these areas. In many cases, fishing agreements actually increased conflicts due to the exclusion many fishermen and fishing boats based on agreements without legal backing, a situation which was viewed as an example of a local group making and enforcing its own environmental regulations for their own benefit. Nonetheless, these efforts were strengthened with the convening of the First Amazonian Community Fishing Management Meeting held in Manaus in May of 2002 and a second meeting held in Belém in July of 2003. These two regionwide meetings represented a milestone in the political articulation of floodplain communities which have historically been highly fragmented and rarely occupied an important space in the regional political structure. At a more technical level, these meetings promoted an exchange of experiences in community management between fishermen and scientists and was a forum for the launching of new actions geared to consolidate community management of fisheries. One of the most important results of the first meeting was the development of a set of guidelines for the formal recognition of fishing agreements which was presented to IBAMA for its consideration. These efforts paid off with the promulgation, by IBAMA, on December 31, 2002, of Guideline #29 which allows for formal recognition by the federal government of Community Fishing Agreements as legal environmental instruments and outlined specific procedures for the establishment of new agreements.

This case reveals important shifts in political and economic power within Amazonia where, for decades, in the absence of federal government presence, those forces with the greatest economic and political power formed into cohesive regional power elites who benefited from unrestricted extraction of natural resources while generating resource depletion and environmental degradation. Ever since the creation of Extractive Reserves, however, a countertrend has grown in force whereby the mobilization of traditional Amazonian peoples in promoting their claims to control over the resources within their historical areas of residence are being translated into specific environmental policies. The creation of floodplain Sustainable Development Reserves by Amazonian state and local governments and the formal recognition of community fishing agreements are clear examples of the implementation of new policies that support local groups.

How can one account for the success of such instruments and the rapidity with which they were institutionalized with existing political structures? Certainly the fact that local communities are mobilizing and organizing themselves politically, in many cases for the first time ever, is a key explanatory factor. Yet one cannot adequately explain the success of these efforts without recognizing the force with which environmental concerns, promoted by a plethora of environmental organizations and research institutes, have gained legitimacy in the region and placed checks on destructive economic development activities which have been the hallmark of economic frontier expansion for centuries. The environmental factor in many cases has served as the essential 'added ingredient' that has been put environmental protection and sustainable, co-management of these ecosystems on the political agenda of the region, though it would be an exaggeration to state that these developments have 'turned the tide' on the destruction of floodplains.

At the same time, community management of floodplain fisheries must not be seen as a panacea for the region, nor will it 'resolve' many highly complex conflicts

over access to, use of and control over aquatic resources. Many external forces which are beyond the control of local communities need to be taken into account, such as the control over other land uses in the region which disrupt habitats upon which fisheries are dependent, and over habitats outside the region where reproduction of migratory species occurs. To function effectively at this broader level, inter-regional management networks which are able to have an impact on the floodplains as a whole, instead of just isolated swaths, would need to be implemented. This, in turn, requires the development of models that accurately allow for refinements of and comparisons between different systems of fishery management.

The crux of the issue of the long-term ‘resolution’ of fishing conflicts, however, lies in the effort to attend to the interests of all residents in and near the floodplains in some way or another. Among the social actors that would need to be involved in medium and long term solutions to conflicts over aquatic resources – “stakeholders” in the current discourse of conflict resolution – are: *ribeirinho* communities; local fishing associations; commercial fishermen; municipal, state and federal government economic development and environmental agencies; environmental non-governmental organizations; research institutes and universities; and, perhaps most importantly, the growing urban populations that carry great political weight within state governments due to their voting power. Increased market demand will put pressure on the commercial fishing industry to increase productivity and build new transport and marketing infra-structure, and this will surely promote technological and scientific innovations as well. There is currently a lack of scientific data about fish migrations and productivity and about the impacts of deforestation, water buffalo and cattle ranching, and large-scale agricultural projects on the floodplain ecosystem, which gives research institutions a key role to play.

Belo Monte Hydroelectric Complex: Old Dam in New Clothes

River valleys are among the most fertile areas of any biome and the locus of the densest human settlements, and the rivers of the Amazonia are no exception. The waters of the Xingu River form in the central highlands of Brazil and flow in a northerly direction until they empty into the Amazon River at the beginning of this river’s extensive delta with its innumerable islands. This privileged location has made the Xingu River an important waterway for indigenous societies and for European conquerors, explorers and scientists. While centuries of frontier expansions have greatly affected the lower portion of this basin, where fishing villages, ranchers, gold miners and cattle ranchers have installed themselves, today the middle and upper portions of the basin are still predominately controlled by a dozen small indigenous societies, with the varied Kayapó sub-groups controlling the most land and being the most populous of these societies. The construction of the Transamazon highway in the late 1970s and early 1980s by the military government brought a new wave of extra-regional colonization to the Xingu River Basin. Urban growth was another result of road building as evidenced by the rapid growth of Altamira (current population 77,439), located just above the “Big Bend” of the Xingu River, Uruará (45,201), Pacajá (28,888) and Vitória do Xingu (11,142) (Nascimento and Drummond 2003). These extra-regional populations of colonists, ranchers, gold miners, businessmen and adventurers, who flooded into the region from distant parts of Brazil, entered into tense and sometimes violent relations with the basin’s indigenous societies.

Another important action of the military governments (1964-1985) was the implementation of a massive hydroelectric dam building program, which had as its

strategic goal the generation of cheap and abundant electric energy to fuel Brazil's rapid economic growth. One result of this strategy can be seen today in the fact that 97% of Brazil's electric energy is generated by hydroelectric dams. During the dictatorship dozens of medium and large dams were built in the southern and southeastern regions of the country, displacing thousands of people. All of the large dams were constructed by several federal government-owned and operated electric companies, each responsible for a specific region of the country. The massive bi-national (Brazil-Paraguay) Itaipú dam which, went put into operation in 1975 became (and remains) the dam with the largest generating capacity in the world (12,500 MW),¹² displaced approximately 40,000 people and flooded the spectacular Seven Waterfalls of the Paraná River. However, as the 'crown jewel' of the dictatorship's economic development efforts, all local and environmental resistance to the Itaipú Dam was suppressed. The ruling generals also oversaw the construction of three large dams in Amazonia¹³ – the Tucurí dam on the Tocantins River in Pará state, the Balbina dam on the Uatumã River in Amazonas state and Samuel Dam on the Jamari River in Rondônia state – which were built to supply electricity both for the urban centers of the Amazon region (Manaus, Belém and Porto Velho, respectively) as well as feed into the national electricity network. Once again, the military government suppressed any opposition to these dams. Nonetheless, local resistance to dam building continued to grow and several local and regional movements of "people impacted by dams" began to form and consolidate into a political force of regional proportions throughout the 1980s and in 1991 these groups coalesced into the National Movement of People Impacted by Dams (MAB) (see Vianna 1990; Bartolomé 1992).¹⁴

In the late 1970s, Eletronorte, the state-run energy company responsible for Brazil's entire Amazonian region, began preliminary studies for the construction of dozens of large Amazonian dams, with particular focus being given to the free-flowing Xingu River. In 1980 a confidential study was presented to Eletronorte which proposed the construction of six dams in the Xingu River Basin which would flood 1.8 million hectares of fertile river valleys, encompassing a significant part of twelve Indian Lands belonging to seven different indigenous societies. There was no public discussion of this report at the time.

With the installation of a civilian government in 1985, a host of grassroots social movements which had been mobilizing and gaining in strength during the last years of the dictatorship (amnesty for dissidents of the regime was granted in 1979) burgeoned into a powerful civil society sector that reached its zenith of power with the promulgation of a new, highly progressive Federal Constitution in 1988. Two of the most important of these social movements were the indigenous peoples' movement and the environmental movement. The new civilian government, however, continued with project of the construction of large dams and, in 1987, approved a 23-year plan (called Plan 2010 for the year it was to end) which ratified and expanded the plans of the military government, including the implementation of the Xingu River Hydroelectric Complex. The largest (and first to be built) of the six dams was called

¹² This position will be eclipsed by China's Three Gorges Dam which is expected to generate 18,200 MW when it is finished in 2009.

¹³ The existing dams of Curuá-Una near Santarém, Pará, and Coaracy Nunes near Macapá, Amapá, are small dams that generate energy within a restricted micro-regional scope. An exhaustive review of the issues involving energy and Amazonia can be found in the two volumes edited by Magalhães et alli. (1996).

¹⁴ For a history of the movement from its own perspective, see the website: www.mabnacional.org.br

Kararaô, – the name of a war chant of the Kayapó – and was to be built at the Big Bend of the Xingu River, a 100 kilometer-long curve in the river that had a natural 100 meter drop in altitude, a fact which, when added to the height of the dam would provide optimal conditions for powerful generators to be installed. Building the dam at this site would also have a direct impact on the town of Altamira.

In 1988 two Kayapó leaders (Paiakan and Kube-I) were startled to learn of the project during a visit to World Bank headquarters in Washington, D.C. Upon their return to Brazil, they began organizing the widely dispersed Kayapó villages, convened a great gathering of indigenous peoples in the town of Altamira for February 1989, and invited Eletronorte authorities and other federal government officials to explain the project. This gathering was attended by nearly three thousand people, including nearly 1000 Indians, 150 foreign journalists, numerous rural workers and representatives of the international environmental movement (and the rock-star Sting). The highlight of the meeting came when, in front of the cameras of the international press, a young Kayapó woman walked to the podium, placed a sharp machete to the cheek of the director of Eletronorte and began yelling (in Kayapó) against the construction of the dam. This unique case of an Indian-environmental alliance, which came at a time of peak visibility for both these movements, coaxed the World Bank to cancel financing for the dam and Eletronorte subsequently suspended the Kararaô dam project indefinitely.¹⁵

The continuing urban and industrial growth of Brazil during the decade of the 1990s produced increased demand for electricity and for the construction of new dams. Two large dams were constructed on the Tocantins River – Serra da Mesa and Lajeado – and the push for the expansion into the Xingu River was re-ignited at the end of this decade by Eletronorte. In 2001, this company revealed an entirely new proposal for the construction of a dam at the Big Bend of the Xingu River, containing several important changes. First, it was christened with the new name of Belo Monte (Beautiful Mount), thus eliminating any reference to Indian people or use of their language.

Second, it had a new design that would take advantage of the natural drop of the terrain, diverting the river via two 18 kilometer-long canals – thereby cutting off flow of the river through the bend – and in the process flooding only a third of the area (440 sq. km) when compared to the dam in its original format (1,225 sq. km.)¹⁶. This new design would also reduce the number of people and indigenous lands to be affected by the dam: according to the official estimates of Eletronorte only 550 families (including 200 Indian families) would be “directly” impacted by the Belo Monte dam, though thousands of others would be “indirectly” affected. It is precisely the nature and magnitude of these so-called indirect impacts which have been the source of much discussion, debate and uncertainty. Three small indigenous groups that inhabit the Big Bend of the Xingu River (Xipáya, Kuruáya and Arara, with a population of 98 people) would be forcibly grouped with the Juruna indigenous group of the Paquiçamba Indian Land (pop. 73), all of whom might lose river travel access due to the drying up of the river in the low rainfall season. The Xikrin of the Trinchreira Bacajá Indian Land (pop. 390) would also be negatively affected by the drop in water levels of the Bacajá River due to the construction of the dam. Meanwhile, over three thousand other people living

¹⁵ For diverse analyses of the issues involving indigenous peoples and the construction of hydroelectric dams in the Xingu River Basin, see Santos and Andrade (1988) and Posey (1989).

¹⁶ The new design actually involves the construction of two dam, each with its respective electricity generating capacity: Sítio Pimental dam, which would block the flow of the Xingu River, and the Belo Monte dam, where the diverted waters would flow back into the original course of the river.

in the municipalities of Altamira and Vitória do Xingu, many of them indigenous people, would have their houses flooded and require resettlement (Sotto-Maior 2003).

Third, the new dam would have a maximum generating capacity of 11,182 MW, making it second only to the Itaipú dam in this category. Fourth, a twenty-five year, multi-million dollar “Regional Integration Plan” has been promised to be implemented simultaneously with the construction of the dam in an effort to mitigate its impacts and indemnify affected local people. All of these points have been united in a single public relations discourse by Eletronorte that casts the project as being ecologically sound and socially responsible, an image that has been used in the public relations marketing of other dams built by Eletronorte in the Amazon region.¹⁷

Among the social impacts that this program would have to mitigate is the rapid growth of the towns in the basin generated by dam-construction jobs and improvisational migration flows that the news of these jobs invariably provoke. Altamira is expected to increase in population from 80,000 to 200,000, while in Vitória do Xingu the expected increase is from 11,000 to 60,000. Environmental impacts of the dam include the rotting of trees flooded by the dam which generates greenhouse gases and limits the use-value of the water by local inhabitants and sharp reductions in quantity of water flow and fish migrations along different sections of the Xingu River.¹⁸

By the end of the 1990s, organizing local, national and international resistance to the Belo Monte dam proved to be exceedingly more difficult than had been just a decade earlier. The peak of international environmental concern over Amazonia had long passed and many of the indigenous groups that had participated in the 1989 Altamira meeting had subsequently (and successfully) concentrated their political efforts on the definitive demarcation and federal recognition of their respective Indian Lands. Furthermore, the indigenous groups most affected by the new version of the dam are small and not politically articulated, and as such have had little success in organizing a common resistance movement as happened in 1989, when led by the numerous Kayapó. Nonetheless, the regional branch of the National Movement of People Impacted by Dams and the Indigenist Missionary Council of the Catholic Church have lobbied hard against the construction of the dam, organized several meetings and circulated information about the project through their respective support networks.

In 2001 a new factor entered onto the political horizon. Due to a severe lack of rainfall in non-Amazonian regions of the country and as a result of the partial privatization of the electric industry which produced a retraction in new investments in the sector, a nationwide electricity crisis loomed large. The approach adopted by the federal government was to require of all electricity users – residential, commercial and industrial – a mandatory 20% cut their electric consumption, a rationing system which lasted six months until the rainy season came and refilled the hydroelectric reservoirs. In the midst of this crisis, the construction of new dams was announced as a necessary and urgent task upon which the very future of the development of the nation depended. It was in this context that the new Belo Monte dam, now dressed in environmental clothes, was formally announced by the Ministry of Energy and Mines, making its construction appear to be inexorable.

¹⁷ See Baines (2000) for a similar change in public relations discourse concerning the Balbina dam and the Waimiri-Atoari Indian peoples affected by it.

¹⁸ Two excellent guides to the issues of the impacts of large dams are McCully (1996) and Report of the World Commission on Dams (2002).

Just when final approval for the construction of the dam seemed to be guaranteed, a federal prosecutor of the Public Ministry, a unique type of judicial ombudsman that is mandated to protect “diffuse public interests” (such as environmental protection), placed an injunction on the construction of the dam due to irregularities in the way that the Environmental Impact Study had been conducted, thus paralyzing once again the process of implementing this first phase in the Xingu River Hydroelectric Complex. Eletronorte must now go through the process of calling for bids for a new study, which will likely delay implementation of the project for at least another year or two. Meanwhile, another hydroelectric dam, this one on the Madeira River, also within the Amazon Basin, is being considered for construction. A decision will be made soon by the new Worker’s Party ruling government concerning which of these two projects will be implemented first.

What is at stake in this two-decade-long struggle is the use of the Xingu River – its water, its riversides, its flow and its resources – for personal travel, navigation, fishing, drinking and sanitation needs for urban and rural populations, farming, ranching and, of course, the generation of electricity. The river also has symbolic value for the indigenous groups that have inhabited the basin for centuries, making the damming of the river a cultural issue as well. Since the Xingu River flows through two different Brazilian states it is formally under the control of the federal government, which is also the owner and operator of Eletronorte. The federal government, however, also has the responsibility of defending the rights of those citizens who may be adversely affected by and opposed to the construction of the dam, which places it in a highly contradictory role.

In 1997, a National Water Resources Law was passed by the Congress which granted new participatory rights to social groups in decision making over the use of water resources and instituted the entirely new administrative and oversight structure of “watershed committees” to be constituted by representatives of all the stakeholders in a given river basin. While this instrument has been used effectively in other parts of Brazil as a forum for decision making over the uses of a particular river, it has not had much success in the Amazonian region due to the enormous distances and precarious travel conditions which hinders holding regular meetings of a watershed committee and to the diverse sociocultural groups that reside in the basin (as is the case of the Xingu River Basin), creating a set of intercultural obstacles that make it difficult to find the common ground needed for the adequate functioning of these committees (Pagnoccheschi 2003).

The conflicts over the construction of a Xingu River dam also brings to fore the problem of interregional dynamics within Brazil, as the Amazon region is once again being treated as a site of exploitation by extra-regional interests, and has revived the precepts of internal colonialism. In the meeting at the Ministry of Energy and Mines at which the Belo Monte project was formally launched, one member of the Eletronorte staff publically stated that the Amazon region has “a natural vocation for generating electricity.”¹⁹ Clearly this viewpoint does not take into account the “vocation” of the residents of this region. In addition, the dilemmas and contradictions within the federal government, which has formal control over the river, are exposed in their multiplicity. All of the stakeholders in the river basin place pressure on differing agencies within the federal government in an effort to defend what they consider to be their rights as Brazilian citizens. Finally, the weakness of the institutional framework of watershed committees throughout the Amazon River Basin resulting from this region’s unique

¹⁹ The author was present at this meeting.

hydrography makes the resolution of conflicts over the use of these rivers increasingly difficult.

Conclusions

In this concluding section, the two cases of conflict just presented will be analyzed within the specific context of Amazonia and within the broader perspective of the world water crisis. At the level of Amazonia, the importance of grassroots community organizing and mobilization is evident in both cases. The actor-based approach to conflicts adopted here revealed how local organizing was instrumental in changing the way that economic development activities were understood. On the floodplain, the fishing agreements established by fishermen were founded upon a level of local organization and mobilization that had never been evident among dispersed *ribeirinho* communities, while the co-management of floodplain ecosystems through Sustainable Development Reserves emerged as model that was developed from the grassroots up, rather than imposed from above by the federal government. These two policy initiatives attest to notable changes regarding the functioning of the Brazilian government. In Amazonia, the federal government has historically been the level of government most concerned with environmental protection, while local and state governments have generally been dominated by local and regional economic interests. These innovative public policies were put into effect by municipal and state governments operating under pressure from local communities that had historically been marginal to governmental power and were subsequently incorporated into the federal regulatory framework. In the case of the Xingu River, the unprecedented mobilization of the Kayapó and other indigenous groups at the end of the 1980s brought international attention to the issue of the Kararaô dam and proved to be an influential force among such powerful institutions as the World Bank and Eletronorte. On the other hand, the weakness of this grassroots mobilization in the current battle over the Belo Monte dam and the new national energy situation seems to have given Eletronorte the upper hand in the dispute, at least for the moment.

In both cases of conflict examined, local organizing gained in visibility and legitimacy due to strategic alliances with the environmental movement and the effective deployment of an environmentalist discourse. On the floodplain, the implementation of new management policies such as the creation of Sustainable Development Reserves and the establishment of local fishing agreements, to the detriment of economically powerful commercial fishing interests, was only made possible through the effective use of environmental arguments that served to neutralize the reigning economic discourse that has prevailed over the region for centuries and provided new biological arguments for the protection of floodplain ecosystems. On the Xingu River, the two-decade delay in the implementation of the Xingu River Hydroelectric Complex was clearly the result of environmentalist pressures from both national and international sources that have been effectively utilized by local actors, most notably in the Altamira meeting of 1989. The Xingu River case also reveals some of the limits of environmentalist pressures. Several factors seem to indicate that a dam on the Xingu River, whatever its name may be, will eventually be built. A possible generalization that can be drawn here is that to the degree that an economic activity has direct importance to the core functioning of the industrial-based national or international economy, its eventual implementation increases in probability. Since the generation of electricity can be considered as more strategic to the overall Brazilian economy than the Amazonian freshwater fish catch, it

would appear that the fishing agreements have a better chance of succeeding than do the efforts to stop the construction of the Belo Monte dam.

These two cases of conflict also highlight the growing opposition of water-related interests between urban and rural populations. In some cases this may be expressed as a conflict between what have been characterized as “ecosystem people,” who are dependent upon a specific ecosystem for their livelihood, and “biosphere people,” who exploit natural resources wherever they may be located on the planet (Dasmann 1988). In other instances it may take the form of interregional conflicts within a single nation-state, where political and economic interests and forces tied to the centers of power seek to exploit what are considered marginal or frontier regions of the country. The cases of the conflicts over the use of the Amazon floodplain and its resources and of the struggles over the construction of dams on the Xingu River provide empirical evidence for both of these types of tensions.

Within the overall perspective of the world water crisis, these two cases highlight a different set of issues. While the shortage of available freshwater invariably causes conflicts over water, conflicts in the Amazon River Basin in Brazil have shown that the abundance of water is not a panacea for these problems. Rather, a diverse set of issues over the use of water and its aquatic resources and energy generating potential arise. These became particularly evident through the adoption of a socioenvironmental approach which places social actors and their claims in the forefront of research and analyzes these claims within the specific dynamics of the existing ecosystems and political structures. Water issues can be fruitfully understood by determining not only this resource’s biophysical characteristics, but by also identifying who wants to use what water-related resource for what purposes and when. This rapid visit to the Amazon River Basin can serve as a reminder of the diversity and complexity of issues that water raises for human populations wherever they may happen to live.

Finally, the global perspective also alerts us to the possibility of future tensions operating at an international level when nation states vie for control of or access to strategic resources located in other nation states. Though this issue has not been directly explored here, there are strong indications that Amazonia as a region will play an increasingly important geopolitical role in the near future centered upon, among other things, its abundant water resources.

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