Contributing Paper

Report of Social Impacts of Dams: Distributional and Equity Issues- Latin American Region

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Social Impacts of Large Dams Equity and Distributional Issues

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1. INTRODUCTION

This consultancy reports on the social impact of large dams in Latin America, with a specific focus on distributional and equity issues. It is based on the author's research on the binational Yacyreta hydroelectric project for more than fifteen years, on interviews to academics, politicians, representatives of grassroots movements and NGOs interested on the analysis of the impact of dam projects on the River Plate Basin (including projects on the Paraná and Uruguay rivers), and on the analysis of reports and studies on the experiences of different populations with electric companies, relocation agencies, governmental agencies, non-governmental organizations, and lending banks in different parts of Latin America. A careful examination of all these experiences shows numerous similarities in the social impact of these projects which will be addressed in this paper. I will also discuss recent attempts to negotiate the effects of these projects in a more equitable manner.

1.1 Availability of Information on Impacts Upstream, in Command Areas, and Downstream

The terms of reference required an assessment of distributional and equity issues regarding social impacts upstream, in command areas, and downstream. It must be noted that the majority of the reports on Latin America dam projects very rarely mention downstream effects and if they do, the information is insufficient and very often anecdotal. Because most projects and various stakeholders concentrated on resettlement and upstream effects, the aims of this report will be only partially met. I will draw from the scattered information in various reports and will suggest points that require further research. Similarly, studies of command areas are also lacking.

Even though there will be separate reports on resettlement, indigenous peoples, and environmental issues, many of these topics cannot be easily separated if we attempt to identify distributional and equity issues regarding social impacts of dams. We should also keep in mind that the ecological knowledge of the behavior of river basins affected by dams is very incomplete, and therefore, it is quite difficult to assess how they would be transformed and how they would impact populations. This is particularly relevant for the assessment of effects downstream, where some of the environmental effects might be felt many years after dam construction.

2. TRANSFORMATION OF DEVELOPMENT STRATEGIES IN THE LAST DECADES

In order to identify the social impact of large dams in Latin America and the ability of populations to negotiate in an equitable manner, we must understand the political and economic conditions under which these projects had been and are being designed and implemented. These political and economical circumstances have shaped and constrained civil society's response to these engineering projects. Even though development planners often argue that their actions should be limited to providing their technical expertise and that they should be politically neutral, they can rarely escape from the conflictive political scenario in which dam projects

unfold. This is also true for all the other actors involved, including state representatives, the affected population and non-governmental organizations. Assessment of social costs and benefits of projects must be made on the basis of the conflicting interests that are always at work in these undertakings.

Throughout the history of dams in Latin America, we can identify two development scenarios. The first one was characteristic of authoritarian regimes which dominated the political arena of Latin America in the 1970s, the second, coincides with the democratization processes of the 1980s.

2.1 Social impact until the 1980s

Until the 1980s, state-led development was dominant. In Latin America, numerous dams were planned at a time when nation-sates were ruled by authoritarian regimes. The oil and energy crisis of the 1970s led many governments to reconsider energy projects, many of which had been in the making for decades. The development of energy resources was seen as strategic for national industrial development and for national security, high priorities for most, if not all, the military regimes.

In this context, geopolitical conflicts with neighboring nations guided decisions. These geopolitical concerns influenced site selection, which was not always the most economical and the less damaging in social and environmental terms. Dams were designed under conflict hypothesis sustained by military strategists. Because of this, and even though there were certain international mechanisms to deal with the use of river basins which affected more than one nation, dams were planned in isolation and very little information was shared among nations.

This was the scenario for the negotiation of the binational dam projects of Itaipú (Paraguay and Brazil) and Yacyretá (Paraguay and Argentina). At stake, there was not only the need to meet the energy demands for industrialization and urbanization of Argentina and Brazil, but also the need to establish economic and strategic alliances with Paraguay. Until the 1960s, Argentina was one of Paraguay's major economic partners, while in the 1970's Brazil gradually became the major economic partner. Three interrelated works account for this transformation of the Paraguayan economy: the construction of a highway connecting Ciudad del Este (Paraguay) with Asunción, the bridge connecting this city with Foz Do Iguacu (Brazil) and the Itaipú dam a few miles north of these cities. Brazil and Paraguay signed the Itaipú Treaty in 1973. Through this Treaty, they created an Entity responsible for the hydroelectric development of the Paraná River in the areas shared by the two nations. This Treaty led to diplomatic negotiations with Argentina, concerned with the effects of this dam on the Paraná River downstream. The major concerns were related to the effect the dam levels could have in the feasibility of other hydroelectric projects on the Paraná River. Because of this issue, Argentina proposed to the United Nations that countries desiring to use a common river should consult all affected parties before making a decision. After many negotiations the three countries signed agreements stating number of turbines, level of dam reservoirs, sharing information on changes on river flows during dam construction and/or during unusual rains or extremely dry seasons.

Despite agreements, information is often not easily obtainable. The lack of reliable

information curtailed the ability of some nations to negotiate the possible social and environmental impacts of dams planned by neighbor countries. These impacts include changes in river flows, water quality, transformation in the fish population which affected the populations downstream whose subsistence was based either on agriculture or on fishing. It must be noted that neither the Argentine government, nor the Paraguayan government, nor the provincial governments from the two countries have conducted studies to assess these effects downstream. The growth of the cities of Ciudad del Este and Foz do Iguacu is also and indirect effect of the construction of Itaipú, which puts greater pressure on the water quality of the Paraná River and will be seriously affecting health and productive activities in the region. Because of rapid urban growth and lack of adequate planning, the cities lack sewage and garbage disposal systems. Most of the cities' waste disposal is thrown into the rivers without treatment. This situation is changing in Brazil, but not in Paraguay. Toxics from rural production are also drained into the Paraná.

In a context where neighbor countries were regarded as threats and as competitors, dams built in the proximity of national borders, such as the Brazilian Itaipú on the Paraná River, were erected as shields, and did not anticipate other river uses and regional economic demands. The project of this dam did not include navigation locks to prevent possible attacks from Argentina. Today, Brazil is encouraging regional integration and the development of a hydroway connecting the Paraná and Tieté Rivers of the Mercosur (Common Market of the South). Itaipú is now one of the major obstacles for this navigation project. Dams such as Itaipú built mainly for the production of electricity might compete with other river uses such as navigation. This negatively affects the circulation of agricultural production of the region (mainly soy). To solve this problem, there are various solutions proposed, including the construction of a canal. A number of agricultural producers are against some of these solutions because they now benefit from tourism to very special natural environments which will be greatly transformed with the proposed canal.

Because projects were often presented not only in terms of national development, but also in terms of national security, there was little room for making claims. Negotiation, requests for information and/or compensation, were construed as opposition, which could then be seen as anti-nation and subversive. In the majority of the cases, a top-down approach was followed. Most projects were designed without any social and environmental assessment. According to Arnaldo Carlos Muller (1996), who has analyzed very thoroughly how environmental and social policies have changed in Brazil since the early years of dam construction to the present, until the 1970's environmental measures were very limited. He mentions that "in the political context of that period, energy dam did not produce "impacts." they only produced "effects," and always highlighting, that among these effects, there were many benefits. He also notes that at that time, the studies were frequently labeled of "restricted use." He also says that if there were negative aspects, some of those were often ignored to avoid positions contrary to dam construction (1996:50).

Influenced by discussions at international conferences (such as the one in Stockholm in 1972, and the one in Dubrovnik, Yugoslavia in 1973), and some environmental studies conducted by Robert Goodland, World Bank consultant for the dam of Sao Simao in Brazil, authorities gradually started to introduce environmental issues in their agendas. In 1973,

however, even though the national government created the Secretaria Especial de Meio Ambiente (Special Environmental Secretariat), in charge of designing national development plans, which included a greater consideration of environmental issues, but questions related to the energy sector were not yet included. Similarly, through the Estatuto do Indio (a law for Indigenous Peoples), Law 6,001, the national government allowed for the construction of public works on indigenous lands justifying this in the interest of national development and security, two major concerns of the military governments of Latin America during that decade.

In 1975, The Itaipú dam in Brazil decided to include a basic Plan for environmental conservation, which was the first document related to environmental issues for Brazil. Social aspects, however, were only marginally included. Relocation policies were in the hands of another governmental agency (National Institute of Colonization and Agrarian Reform, INCRA), and Itaipú had no responsibility in those issues. The Brazilian national agency for indigenous issues, FUNAI, was in charge of relocating thirteen families. Land allocated was insufficient, and there were no appropriate policies of social accompaniment. When political conditions changed, and there was more room for making grievances, these groups demanded solutions to their social situation. Itaipú later participated in the search for a more definitive solution. Even today, Itaipú has no information available on social impact for the general public. There were some provisions, however, for relocation of infrastructure (e.g. roads, schools, bridges), and funds allocated for archaeological research.

Mitigation of social "effects" was generally limited to some monetary compensation, and/or resettlement in other areas, without or with limited provisions for housing, and infrastructure. In Brazil, until the late 1970s, policies were limited to the liberation of areas to be flooded. Families obtained monetary compensation mainly in the cases in which they could legally prove ownership. Even this, did not always happen. There were no legal mechanisms through which the population could make claims or demand for information. The social impact of some of the early projects was very serious, such as in the Tucuruí and Sobradinho dams. In the case of Sobradinho built between 1975 and 1978, 12,000 families were displaced. These families whose subsistence was mainly based on floodplain agriculture, were relocated in dry areas where their traditional agricultural practices were not feasible and where most of their livestock died. They received no compensation for the loss of their harvests. Most of the resettled villages lacked electricity, even though the dam was mainly built for the production of energy (c. Alves da Costa).

In comparison to other projects designed in the 1970s, the Yacyretá dam was relatively different. Although initial feasibility studies, did not include environmental or social impact assessments, some of these studies were later conducted mainly at the request of lending banks. It was probably one of the first projects with a staff in charge of assessing social impacts. However, budgetary problems, delays, and uncertainty regarding the completion of the dam and social projects, affected the ability of social planners to design adequate planning. The population had no participation in decision-making processes and lacked information regarding their rights.

One important feature of this project, different from other Latin American dams, was that it favored relocation rather than monetary compensation. Homes built in the first years were

of good quality and highly desired by most relocatees. The possibility of obtaining good houses and improving living conditions initially created a positive attitude towards the Binational Agency. This initial situation changed when budgetary problems led decision-makers to build homes of a poorer quality which were not acceptable to the majority of the household beneficiaries. The early homes had a cost of approximately 24,000 dollars, the cheaper constructions--"shell homes" according to the population had an estimated cost of 4,000 dollars. The relationship with EBY's Relocation Agency worsened as time passed and the population realized that although engineering works were advancing, the promised homes would never be built for most of them and that there was no budget guaranteed to even finish the homes of a poorer quality. More than twenty years have passed since EBY took a first Census to identify what it called its beneficiaries. Numerous problems have emerged which could not be anticipated because the dam was planned to be in full operation in the early 1980s. Most of these problems are related to the social dynamics of households, mainly transformations in their life cycle. Many of the children of household beneficiaries are now adults who formed new homes and are requesting for housing solutions. In addition, neither city authorities nor EBY could avoid the settlement of newcomers in some of the affected areas. This situation will worsen if Yacyretá adds more turbines and reaches the planned level 83 of the reservoir.

Population displacement did not always occur peacefully. In the most extreme cases, imprisonment and even deaths occurred (such are the cases for example, of the Chixoy dam in Guatemala and the Urra dam in Colombia, cf. Colajacomo 1999, ASPROCIG 1999).

If social impact was acknowledged, policies were generally limited to the people whose homes and/or business would be flooded with the filling of the reservoir. In the case of Yacyretá, a consulting firm first took a Census in 1977. This Census was quite deficient because it was taken before establishing the definitive reservoir level, it included a greater area than the one effectively affected. In 1979, EBY took a more thorough census to "identify both spatially and socially all families and people living in the areas below the future lake level in the urban sector of Posadas." A Swap operation was simultaneous to this census. Initially, it consisted of giving a folder containing data on the beneficiary's household in exchange of the supporting document granted to each household head interviewed with the 1977 census. At that time, it was decided to establish 1979 as the final date to grant the condition of "beneficiary." Similar actions were performed in Paraguay. All these operations created confusion among the population. People believed possession of the folder granted relocation rights without having to pay for the homes. Only those who could present title deeds could get a home without payment. Those without deeds were granted some monetary allowance for the "improvements"--mainly the house, but had to pay for the new homes in installments. Renters, and some household members, such as relatives of an extended household had no relocation rights. Other excluded cases are discussed in the section on the definition of affected population.

Dam agencies did not always grant relocation and/or compensation rights to all people either living or involved in business or productive activities in the areas to be inundated, an issue that will be discussed later. The majority of the reports of dam projects in Latin America include the cases of fishermen, ceramists, brickmakers, washerwomen among those who were not included in social policies at the beginning of projects (e.g. the Brazilian Porto Primavera dam on the Paraná River, the Paraguayan-Argentine Yacyretá dam, also on the Paraná River).

The population was not informed or consulted regarding choices of options (resettlement sites, forms of compensation, productive alternatives, labor training). Projects were presented as fait accompli and the decision to build dams was not an issue under discussion.

Secrecy characterized this period. Very little information was released to the population, local authorities, and the general public. Even staff members controlled limited information. Access to construction sites and dam project headquarters was also very difficult, and in many cases denied to the common citizen. These factors impinged upon the ability of the population to make claims on the basis of reliable data. Security controls discouraged people's involvement (cf. Ferradás 1998). Access to basic information on social and environmental impacts is still very difficult, as I personally experienced this with the dam project of Paraná Medio in Argentina and with Itaipú in Brazil. The headquarters of Paraná Medio in Buenos Aires, Argentina do not have an information center open to the public. Itaipú has a tourist center and an ecological museum with pictures and data regarding engineering specifications and activities related to reforestation, and rescue of fauna and archaeological artifacts, but no references to the social impacts. No library is open to the public. As a policy, they only respond to specific written requests. After calling to various departments, I was finally able to obtain some information regarding royalties and social impact policies. When projects are binational, such as Itaipú and Yacyretá, even their own staff finds it extremely difficult to obtain information on the social programs in the other country.

At a time when the development paradigm was dominant, large dams were presented as a symbol of modernization and as a means of overcoming the "backwardness" of nation-states. In the early years of Yacyretá leaflets promised the following to the residents of Posadas:

> "Yacyretá is news"
> Transformation of Posadas in the 1980s. In less than ten years, Yacyretá will mean to this capital:
> An international bridge; a new port and its infrastructure; *defensas costeras*-streambank erosion control; a new bus terminal; a new freight terminal; 30 km of new railroads; new highways; including bridges; a water pumping station; a power station; a sewage treatment facility; and newhousing complex for the families occupying houses that will be affected by the Yacyretá works.

Twenty years after these announcements, the majority of these promised works have not even been planned. The international bridge was built but for years, the Yacyretá Binational Agency denied the linkages between this bridge and the dam. Even though the dam is already operating, there is no new power station, water pumping station, port, freight terminal, highways. Many of the relocation homes have not been built. Water shortage is now very serious. Yacyretá was also advertised as a multipurpose project with various benefits besides the production of electrical power. Advertisements of the project promised that the dam would facilitate navigation, tourism, and irrigation. They also asserted that the settlement of new populations and industries will invigorate a largely forgotten sone of the Río de la Plata Basin. Irrigation was one of the many objectives presented to legitimate the project and win the population's favor. Feasibility studies and the Yacyretá project design only refer to irrigation in a very vague way. It is not clear whether specific plans exist on how to distribute irrigation water; neither there are provisions for channels or small reservoirs with the purpose of improving agriculture.

Loss of housing and sources of labor were regarded as sacrifices which a few had to make in the name of prosperity and higher national goals. Burdened with foreign debt--some of it linked to dam construction--and with serious economic crisis, the nation states did not achieve the promised prosperity. Paraguay is probably one of the most extreme examples of the failure of development promises. Although the country increased dramatically the availability of energy power, there were no investments in industries and on rural electrification. Today, it sells part of its energy to Argentina and Brazil. It is not clear how the government invests this income generated by the sale of electricity and by royalties. It is also facing the social problems created by former workers of Itaipú and Yacyretá, now unemployed and settled in marginal areas of cities. This country is now in social and political turmoil and facing one of the most serious economic crises of the last decades. Surely dam construction is not responsible for these failures. But what is worrisome is that there was no planning to take advantage of the tremendous availability of energy and cash income.

Not all the experiences were as negative. As it is discussed on the section of benefits, the increase in energy production met the growing demands of urban and industrial centers which could have faced blackouts if these dams were not built. Unfortunately, even though energy production increased, electrical services in some cities did not necessarily improve. Some countries like Argentina planned dams but did not renew some of their obsolete power stations in cities. In recent years Buenos Aires suffered many blackouts because of lack of maintenance and renewal of power stations, now under the control of private companies.

The social and economic transformation of peasant, indigenous, and marginal communities was seen as inevitable. They were seen as underdeveloped forms which eventually would have to change. A quote from experts of a consulting firm conducting feasibility studies illustrates how some planning experts viewed the urban populations to be relocated: "Those zones, lacking sanitary installations and which are now subject to current floods, will be replaced by modern units provided with these services. During the floods, the inhabited areas facilitate te propagation of contagious diseases, constituting a threat to public health and therefore they should be eliminated." These quotes which clearly showed the biases of the authors, who equated poverty to disease, were curiously included on a section called "benefits of the project Yacyretá-Apipé with regard to the future control of floods."

In the early Brazilian dam projects, the few fishermen who were compensated were given homes in cities. This forced them to abandon their traditional activities(see for example the case of the Porto Primavera dam in Brazil (Kudlavicz 1999). Peasants were initially given some monetary compensation but no land and many of them became either urban squatters or landless peasants, many of them ended joining the movement of the Sem Terra (landless peasants) who are occupying large holdings in Brazil. The underlying development assumptions guiding these early policies assumed that peasant economies were not modern and had to be replaced by more profitable agribusiness. The result of these early policies was depeasantization and land concentration. In Brazil and Paraguay, for example the Itaipú dam construction coincides with the expansion of soy production and the emergence of agribusiness in the region.

It was assumed that the projects would have a trickle-down effect and that the economy

of these communities would be positively transformed (e.g. modernization of agricultural production, monetarization, incorporation to the industrial labor force). Peasant agricultural production was not modernized. Either they lost their land or were given plots in unproductive areas or in areas which required agricultural techniques which they ignored. Technical assistance was not available in the early years of dam projects. Industries were generally in in distant areas and many of them either required little labor or skilled labor for which they had no training.

The general public's initial reactions were rather favorable as these large dam projects created high expectations of labor demand, infrastructure works, and activation of the regional economies. Because the scope of social and environmental impacts was often unknown, concealed or ignored, a general optimism prevailed. Once the process was underway, this optimism gradually faded as people became aware of the social and environmental costs of projects. Today many peasants, indigenous peoples, fihsermen, ceramists, and brickmakers have become organized and are making legal claims. Reactions vary according to the transformations of the legal systems of each country and the organization of civil society. Non-governmental organizations are playing a key role in the presentation of past grievances. Dam agencies are now burdened with numerous lawsuits and peoples' claims. Claims include harvest losses, loss of economic activities (fishing, agriculture), inadequacy of compensation, damages caused by changes in water quality or inappropriate relocation sites.

The Bayano dam built in the 1970s in Panama is a good example of early practices. The project financed by the World bank, flooded more than 350 km2. It displaced indigenous peoples--2000 Kuna and 500 Embera. There were no environmental and social impact assessments. The government failed to give adequate compensation. Resettlement land was less fertile and less productive. Access roads and the construction of the Pan American highway opened the area to colonizers. Peasants and loggers invaded indigenous lands and neither the government nor the World Bank took action to prevent it. There was considerable loss in biodiversity and serious damage in water quality affecting fishing activities and the population's health. Because most natural resources became depleted and indigenous peoples did not obtain legal titles for their land, there had been numerous land disputes for the last decades (Cedestav, Sánchez, González, Wagner 1999).

The Chixoy dam in Guatemala is probably worse. The dam was constructed at a time the country was under an extremely repressive regime. Indigenous peoples were violently displaced in the 1980s. There was no social and environmental assessment or planning. After the political situation changed in this country, the World Bank encouraged and supported compensation procedures in 1996. But while this bank now estimates that the communities reached socio-economic levels prior to dam construction, the population is still making claims for losses. Besides losses in economic activities and food self-sufficiency, there are other damages such as the psychological ones which are harder to estimate, but which seriosuly damaged the ability of these communities to recover (Chen 1999).

Because it was believed that only those living in areas to be flooded, would be affected by dam construction, the majority of the population did not actively seek for information and/or demand participation in decision making processes. Negotiations were thus generally limited to

the energy company and/or some state agency with the affected population. The affected population was exclusively the population residing in areas to be flooded, as it is discussed in more detail below. These agencies often handled these relations in an authoritarian and paternalistic manner. Because decisions were mostly made by central states, without consultation to regional interests, local governments generally had little knowledge of the characteristics of projects, impact, costs, and benefits. Power to negotiate was also very limited. In countries under military regimes, regional authorities were usually appointed by central governments and therefore, they defended national interests rather than regional ones. This was mentioned to me for the case of the Itaipú dam, in which the state of Paraná had little saying at the beginning of the project. The same happened with the Yacyretá dam in Argentina.

At the time national authorities signed the initial agreements, Argentina was still under a democratic regime, but already in a very unstable political situation, which shortly after that led to a military coup. No provincial authorities from Argentina and Paraguay were present at the signing of initial documents. Shortly after that, a military Junta took power in Argentina. The central government appointed regional authorities (who were generally members of the armed forces). These authorities did not make any requests regarding regional interests. Although the political scenario has changed considerably. There are still many conflicts between national and regional interests.

In Brazil, for example, there are numerous litigations between regional representatives and the federal government. For example, the State of Paraná's Attorney General has presented lawsuits against the federal government regarding the construction of the Tibagi dam. They allege that biologists' environmental reports were altered without their permission and that the state of Paraná does not need to construct more dams because it already exports 70 %. They express their concern with the destruction of forests which are now corridors connecting indigenous communities. They also express their concerns with the impact of dam construction on rural farmers and workers (Fonseca de Azevedo 1999).

It must be noted, however, that regional interests are not monolithic. Decision making power in the hands of regional/local powers is no guarantee of the transparency of negotiations and might favor only exclusively the interests of local elites and/or specific interest groups. This became apparent in the Yacyretá hydroelectric project when the headquarters moved from the capital city to the region impacted by the dam. In this brief period the agency resources were employed for political campaigns rather than for proposing mitigating measures for the region.

2.2 Social impact: From the 1980s to the present

A series of transformations at the global, national, and local levels accompanied the democratization processes of the 1980s, many of which had an effect in the way social and environmental impacts are negotiated and assessed. Some of these transformations led some actors involved in dam projects to take steps in the right direction regarding issues of equity and distribution of costs and benefits. Unfortunately, some of the positive new directions have not always been respected, even by those who had proposed them.

2.2.1 **Crisis in the development paradigm**

By the 1980s it became apparent that many development projects have not fulfilled their promise. The economicism of projects and the neglect of social, cultural, and environmental dimensions were criticized. Bottom down approaches became questioned because they generally imposed programs of social change which did not take into consideration the culture and social structure of specific populations. As in most development projects, the failure of dam projects was attributed to the lack of consideration of the social and cultural dimensions.

New concerns and approaches came to replace earlier approaches. Concepts such as local knowledge, equity, accountability, participation, and human rights, sustainable development now dominate the interactions of all actors involved in development practices. This is also true for the arena of large dam projects. It must be noted that the meanings and uses of these terms are not univocal. In some cases they are only employed rhetorically to legitimate practices as usual. In others, they are understood very differently by the various actors participating in these projects, and this generates multiple misunderstandings. Although it is not the purpose of this paper to examine these issues, we must be cautious when claims regarding the success of social impact policies are made by employing these conceptual frameworks. For example, it is not sufficient to claim that a project follows a participatory framework or that a project puts people as priorities. In each particular case, we must examine who participates, at what stage of a project, in what circumstances, with how much power in decision making processes, with what access to key information.

2.2.2. **Multiplication of actors negotiating dam projects**

With democratization processes, numerous actors started to actively participate in the negotiation of dam projects: political parties, non-governmental organizations, grassroots movements, academic and research institutions, regional governments. In some cases, the participation of these actors has been encouraged by multilateral banks, concerned with negative social impacts and the authoritarian styles of the past. This development is positive, but it needs to be improved. In 1983, for example,

The incorporation of these new participants allowed for the identification of social impacts which had been overlooked or ignored. As a result of their demands, and also because of changes in development perspectives, many new practices have been introduced to deal with social impacts. There are now laws in the majority of the countries which require environmental and social assessments before projects are approved. There are federal, provincial and/or state laws and municipal laws. In addition there are other directives such as Brazil's Plano Diretor de Meio Ambiente (PNMD) from 1991 which state that social planning in the energy sector should include: a) the identification of social impacts induced by the project, b) Studies and proposition of options to mitigate the social and economic impacts. Public consultation and revisions (feasibility phase), c) Presentation of alternatives to improve social and environmental conditions to the administrative sector (state institutions), in all the impacted areas (phase of basic project, d) Design and execution of development plans, unifying criteria, establishing agreements with various institutions to achieve social and economic regional sustainability (phase of basic, operational project) (Muller 1996). Recognition of social impacts by electrical sectors and state institutions occurred after numerous lawsuits, social conflicts and the

realization that if social damages are not adequately compensated, it might become more costly and dam projects would be threatened. Most directives contemplate a series of issues which have been sources of conflicts in the early years. However, the majority of them do not yet contemplate one of the major sources of differences: aspects of peasant, indigenous, and craft peoples activities which can not be measured with economic indicators, because many of them only partially participate in the monetary economy. For example, Muller (1996) mentions the following economic indicators:
. Occupational pattern (diversity, technical complexity, labor force (EAP), unemployment and employment rates, labor market).
. Patterns of economic life (salary levels, household income, saving capacity, debts).
. Agrarian policies (size of rural properties, small and large land holdings, land values, market, productivity).
. Energy consumption (family, rural property, business, services, industries, municipal administration, others).
He also adds the following indicators: health, demographic, private sector services, regional development. He also suggests cultural indicators to be assessed.

Muller's detailed book also provides information and Laws and Decrees regulating environmental, social, and indigenous issues (see the listing of Brazilian legislation, Muller 1996: 395-398).

Non-governmental and grassroots organizations contributions are leading to redefine the concepts of affected people and are highlighting the conflicting interests present in these undertakings. However, not all these groups share the same visions regarding key problems and solutions. A question of concern is also their degree of representativeness of the affected people (see for e.g. Ralco and Pangue dam cases in Chile, Castanhao in Brazil, Opaso 1999, Tankha 1999). In some of these dams, they included mechanisms for either public consultations, public audiences, or they created mechanisms to have permanent structures to design development projects with representatives from the communities.

It is hard to assess from the reports how the representatives are chosen and the power granted to them in decision making processes. The only project for which I have more detailed data is the Bío Bio dam projects in Chile. At the initiative of the World Bank, they had created the Pehuenche Foundation which would be in charge of designing development projects for the communities. This organization would have representatives from the energy sector, government, and indigenous representatives. One of the problems with this structure is that it did not grant decision-making power to the indigenous representatives. Another difficulty with planning structures such as this one is that they generally do no take into consideration the existing traditional mechanisms for decision-making processes in the communities. In many indigenous communities decisions are made collectively and representatives are not expected to vote in the name of the community until consensus is reached among all community members (this applies to the Pehuenches affected by the Ralco and Pangue dams in Chile, part of the Bío Bio dam projects). Although participatory bodies are commendable, these structures do not always adapt to the communities political structures. Representatives from underprivileged groups often find it difficult to participate with equal power in decision making bodies with representatives from the dominant society (it is quite difficult to challenge ingrained paternalistic and hierarchical

structures).

2.2.3. **Changes in development orientations**

The increase in global awareness of environmental and social damage generated by insufficient planning in the early experiences of dam construction, combined with a more fluid interaction with various groups from civil society, led the lending banks to substantially modify their policies and directives. In 1992, the Yacyretá agency changed its orientations, reflecting new guidelines imposed by the World Bank. A newly redesigned environmental and social program suggested by international consultants, was presented to environmental NGOs, university professors, municipal and provincial representatives, and representatives from the grassroots organizations of people affected by dam construction from the two countries. However, this meeting was not as participatory as they had expected. People felt, as an informant told me, that "they were invited to listen but not to speak." Moreover, as years passed, it became apparent that participatory practices were only rhetorical. In recent conflicts, EBY's representative in Posadas refused to meet with members of the affected population (mainly brickmakers and fishermen). Only after months of having men, women, and children camping in front of the Posadas city headquarters, this functionary finally met with some of the fishermen and signed an agreement to compensate them for the loss of productive activities. This agreeement was handled in an authoritarian way, the lawyer representing the claimants was not asked to be present, and he now argues that they were pushed to sign papers whithout clearly explaining to them that by doing this, they were renouncing to future claims.

A few countries also passed environmental laws (e.g. Brazil: Law 6938, 1981--national environmental policies, Law 7735, 1989 creating the IBAMA, Brazilian Institute for the Environment and Renewable Resources), Resolutions by CONAMA 001/1986, 006/1987 and 10/1987 deal with Environmental assessments, licensing of large electric projects) and indigenous laws (e.g. Chile: I do not have the number available but I will add this information soon; Brazil articles 231 and 232 of the new Brazilian Constitution of 1989 states that the use of natural resources in indigenous lands can only be carried out with authorization of the National Congress and requires a hearing with the affected communities, and participation in the project results). These laws, decrees, and resolutions have set new standards and constraints for the analysis of social impacts.

There also cases in which provincial governments, encouraged by environmental organizations, have passed laws to oppose to dam construction (e.g. Entre Ríos province in Argentina). Even though there are some points that could be reexamined, I see directives such as those designed by the banks, as a positive outcome of current processes because they create, at least in principle, detailed guidelines for assessing social impacts, mechanisms for requesting inspections if there is evidence that recommended procedures are not followed, they promote greater participation, they acknowledge cultural and land rights of affected populations, and advocate the dissemination of information, among other issues (see for example, World Bank Operational Directive 4.20, 4.30, Resettlement Planning Guidance #783).

Unfortunately, these policies are not enforced in many projects. The case of the Pangue and Ralco reservoirs on the Bío Bío River, Chile, are a worrisome example of this. As discussed

above, the Pangue dam project partially financed by the International Finance Corporation, subsidiary of the World Bank, included an innovative structure, the Pehuenche Foundation which would receive funds from the energy corporation to meet the socio-economic development needs of indigenous peoples, try to facilitate access to energy, guarantee sustainable development, and preserve and reinforce cultural identity. Social and environmental inspections sent by the World Bank listed serious problems regarding social and environmental mitigation. Access to this relevant information, produced by World Bank consultants was withheld. Indigenous peoples lacked valuable information to make informed decisions. Agreements regarding the future of Pehuenche communities were made in secrecy denying the participation of indigenous peoples (cf. Committee for Human Rights (CfHR), American Anthropological Association: 1998, Rehue Foundation Web Page).

2.2.4. **Economic and political transformations affecting projects**

There are a series of economic and political problems which emerged in the last decades which affect the ability of the population to negotiate questions of distribution of costs and benefits and cope with dam impacts. Some of these problems directly transform the dynamics of dam construction and negotiation, and the way costs and benefits are weighed. Privatization and the change in the role of nation-states are the most important. Dominant neoliberal economic models also affect these projects as they encourage new forms of production, trade, and concentration of wealth, which have a negative effect on the economic activities of the most vulnerable populations affected by dams.

2.2.5. **Privatization**

Privatization is affecting the majority of dams. Privatization might occur at different stages of dam construction. Some private companies have bought dams already in operation, others have purchased projects under construction, and others are responsible for all stages of dam construction, including initial planning (Sauer and Scarpinella 1999, Daneri 1999, Cappato 1999). There are a series of emerging problems which require further discussion and both national and international legislation. Major problems are those related with past grievances, accountability, and responsibilities regarding social and environmental impacts.

In projects already completed, such as the Chixoy dam in Guatemala, there are numerous impacts (such as recognition of heirs, economic losses, land rights) which were not solved during the privatization negotiations (either because they were overlooked or because they were unknown at the time (Colajacomo 1999). As discussed above, this dam constructed in the 1980s did not design any social plans and relocation was violently enforced. In the 1990s, the dam was privatized. According to Chen's (1999) report the World Bank first encouraged presentation of grievances and made negotiations to obtain more land for the communities. The electrical company was privatized in 1998, and today neither the company nor the World Bank are taking further responsibility. The issue of privatization is very complex, who takes responsibility for unsolved or unanticipated social situations?

Private companies and lending banks (such as the IFC) are less likely than state companies to consider social and environmental costs. The issue of accountability requires

serious discussion in these situations. Access to information regarding project specifications might be harder to obtain, and it is generally difficult to identify who can be held responsible for specific issues. Disadvantaged groups, who generally lack the legal, economic, and information means to make their demands, find it harder to reach private interlocutors than state agents--who at least have to hear the population's demands to maintain their political clients (cf. for example, Sauer and Scarpinella 1999).

It is argued that the majority of society transfers the benefits of energy production to the private/privatized companies, and the social and environmental costs are paid by states and civil society (these were some of the arguments against privatization regarding Yacyretá). Also, privatization of services, often comes accompanied by legislation favoring price deregulation. Private service providers might negotiate favorable energy prices to attract powerful economic clients such as those in the industrial sector. The economic imbalance created by cost reduction to some, might be transferred to residential uses of energy. It is claimed that some of these issues are happening (cf. Fearnside 1999; Nascimento, Paula, and Douto 1999; and oral communications). If we are concerned with equity, we should carefully study residential and industrial costs to assess distributional issues. We should examine whether industries are being benefited by subsidized energy costs, whether residential costs are higher, whether energy costs are raised in cases in which production costs are stable.

Privatization of public services (such as water and electricity, very often linked to dam construction) is one of the many changes occurring with the restructuration of nation-states, encouraged by finance banks with the purpose of managing the economies of debt-ridden countries. Efficiency of services is one of the goals of these changes. When this efficiency is achieved, this can be considered a positive outcome of projects. However, many Latin American nation-states have not created good legal mechanisms to make demands when the privatized companies fail to provide good services, or when costs of services are not as affordable as planned. Both things are currently occuring in Argentina. Some of the privatized companies are charging higher rates, but they are not investing in maintenance works, and service is deteriorating (e.g. electricity in Buenos Aires city, water in Posadas city--impacted by the Yacyretá dam).

Privatization is also affecting the distribution of water resources. This is particularly important for dam projects which include irrigation and water supply to urban centers and industries. The linkages between dam construction, the creation of water markets and the privatization of water companies must be analyzed. We should carefully assess how these processes affect availability and prices of water. Unfortunately, I do not have much information on this issue, but I can indicate a series of questions requiring examination (see discussion on water and irrigation). With a few exceptions from Mexico and some dams from Brazil, the majority of dams analyzed in various reports are mainly hydroelectric ones. Although some of them claimed to be multipurpose and stated irrigation as a benefit, the majority of them did not make any provisions for irrigation. The Itaipú dam for example, deliberately discourages the use of reservoir water for irrigation because of environmental concerns (risk of water contamination with chemicals used in agriculture).

2.2.6 **Restructuring of nation-states**

Besides privatization, there are other transformations at the level of nation-states, which curtail the ability of governments to face some of the unanticipated problems created by dams. Some of these changes include budget cuts in social, education, and health services.

3. **ON THE CONCEPT OF AFFECTED POPULATION AND BENEFICIARIES OF PROJECTS.**

In most dam projects in Latin America, only those to be resettled had been identified as the affected population. This applies both for earlier dams and recent ones. Only people living in areas to be flooded are recognized as affected. There had even been extreme cases, such as with the Yacyretá binational dam during the years of authoritarianism, in which those to be resettled were called beneficiaries and it was forbidden to employ any other term. Only recently it has been acknowledged that impacts affect a larger number of people both positively and negative.

3.1 People affected upstream

All projects and reports only identify the population living in the area to be flooded with the reservoir filling as affected. Social impact assessments generally discriminate between urban and rural relocation. They also identify social and cultural infrastructure which might be damaged. Many categories of people are generally excluded in these kinds of assessments. Even today, there are generally no separate analysis of differential impacts on women, children, or the elderly.

Most projects in Latin America have been built in internal frontier areas of nations-states with low population densities, poor infrastructure, and predominantly inhabited by peasants, small farmers, fishermen, and indigenous peoples. A significant number of dam projects have been built in tropical and subtropical areas which constitute reservoirs of biodiversity. A smaller number of projects, are also affecting other natural environments such as the Biobio dam projects. These peoples'subsistence is largely based on natural resources radically transformed by dam projects.

Criteria often employed to define affected population in a restricted way (e.g. those living in areas to be flooded) is flawed because it overlooks their survival strategies generally based on the seasonal use and/or exploitation of diverse natural environments. While their homes and cultivation plots might be in the areas to be flooded, other activities might depend from areas outside resettlement zones which are not always considered in the assessment of impacts but which might be affected by deforestation in nearby areas, changes in water supply and/or water quality. Indigenous communites are even more vulnerable because very often their subsistence and socio-cultural ties, go well beyond the site where they had built their homes.

The strategy to build dams in areas until now quite marginal within the national economies, responds to capital accumulation practices characteristic of these last decades. If the energy and/or irrigation supplied by the dams is targeted to the region (which is generally not the case), the communities experience a combination of effects which are felt upstream and downstream. for example, the availability of water and/or energy, or improvements in

navigation and/or other forms of transportation, might attract a series of investments to the region such as establishment of industries like aluminum (see the case of Tucuruí dam, Fearnside 1999), agribusiness, timber and paper companies, and tourism among many other things, which put great pressure on indigenous and peasant populations' economies and often result in land concentration, expulsion, proletarianization, migration, and social disintegration.

Dams such as the Bayano in Panama, and the Tucurui in Brazil also attract new settlers who displace former inhabitants (Cederslav, Sanches, Gonzalez, Wagner 1999). Unfortunately, most reports are very vague when they refer to these changes. We need to evaluate these transformations by analysing the changing demography (changes in land settlement and land tenure, number of migrants, analysis of distribution of land before and after dam construction.

One example from Brazil illustrates how these demographics change. In the 1960s, before the construction of the Itaipú dam, the Municipality of Foz do Iguacu, a few miles downstream on the Paraná River had a total population of 28,080. 24,250 people were identified as "rural" and only 3,830 as "urban." During the decade when Itaipú engineering works started (1970s), the total population was 33,966. At this point the proportion of rural and urban dwellers dramatically changed: 20, 147 urban, 13, 819 rural. One decade later, urban growth was tremendous: a total population of 136,321 people (101,330 urban and 34,991 rural). Higher urbanization does not necessarily indicate modernization and/or improvement in the quality of life. In fact, speculation with land prices and the increase in the cost of land, pushed rural dwellers away from their landholdings. Many of them now reside in the approximately 42 favelas (slums) of Foz do Iguacú. What is also interesting is that the number of rural residents also increased slightly in the 1980s. This might be attributable to the compensation policies of Iguacú. Some peasants from the now flooded areas might have moved downstream. There is no data for rural population in the early 1990s. In 1998 there were only 3,547 people classified as rural(cf. Foztur 1998). Some of these issues will be examined in greater detail on the section of distributions of costs and benefits.

While the majority of dams have affected rural population in the relocation areas, there are a few cases, such as the Yacyretá which had complex urban impacts. As in the rural cases, initially, only those living in areas to be flooded were acknowledged in social impact policies.

3.2 Sectors generally overlooked in the analysis of social impacts

3.2.1. **Women**

When the first hydroelectric projects were designed no assessments were made regarding their impact on women. Women were invisible for development planners. Most gender issues which have recently been noted for resettlement, may also apply for women outside relocation areas. I have found very little information regarding impacts on women either within or outside relocation areas. Even though there will be a separate report on gender, I suggest a few issues which require consideration and research to evaluate impacts on women:

. Household concept:

The way households are conceptualized, influences the recognition of rights of men and women when assessing impacts. If planners only consider households as a unit making "rational choices," gender and generational tensions for distribution of resources might be overlooked. There had been dam projects which worked with concepts of households and/or domestic units (but to my knowledge, only for relocation). In the case of the Yacyretá dam, women were recognized as possible household heads, but this was not the case for other dam projects. Social staffmembers suggested to recognize women headed household because matrifocality is an important feature among the urban poor of Posadas and Encarnación. The idea was not easily accepted at the beginning of the project. Staff members mentioned that EBY authorities (many of them members of the armed forces during the early years) did not want to recognize rights tosingle women. At the beginning of the project, they even encouraged civil marriage as a policy, imposing the dominant society's moral standards.

Although legal recognition of women-headed households was an important positive policy, gender issues were not part of the relocation policies. In the early 1980s very few social researchers in Argentina were concerned with gender dimensions. Women were elegible to compensation rights. Households were analyzed as a unit. Power and resource allocation within households was not assessed. Compensation was granted exclusively for property ownership. Income generating activities which were largely dependent on the location of the home in the proximity to the river and to the homes of wealthier families were not assessed as losses for which they should be compensated. Some of the women washed clothes in the river for middle class and upper class families of Posadas. Others worked in domestic service, prepared food for sale in the streets, or were seamstresses. Neither men nor women were compensated for activities falling outside the "formal economy." Because relocation sites were rather distant from the city center, very few women could afford transportation costs after the move. They also lacked the family social networks they had in their former residence (e.g. help with childcare). To my knowledge, urban relocation policies only make provisions for resettlement. They also grant compensation to businesses in flooded areas whenever these businesses are legally recognized (they are registered as such, they pay taxes). Most of the demands Yacyretá and other Latin American dams are facing are precisely related to these subsistence activities which were not recognized at the beginning of projects.

Although women-headed households were recognized, there were other situations which were not contemplated such as who should be entitled to forms of compensation when men are involved in migrant work and are absent from households for years? Because the project suffered so many delays, and family structure is very dynamic, lawyers will probably encounter very complex situations by the time some of the remaining families are moved.

Recent feminist literature has questioned the economic distinction between consumption and production. If we are concerned with equity issues at the household level, we cannot limit ourselves to the analysis of the production of goods with a market value, when assessing the economic costs and benefits of dams. It is suggested to broaden the concept of production to include activities that provide goods and services to the household that may or may not have a market equivalent. We should also assess changes in time allocation for different activities within the household as an effect of dams (considering both direct and indirect impacts such as changes in systems of communication and transportation, food procurement, and provision of

services such as electrical energy and water).

In 1982, I conducted households' domestic economy studies at the request of Yacyretá. I found that women employed different sources of energy according to their household income and the kinds of foods they prepared (kerosene, alcohol, charcoal, wood, debris collected from the river). I also registered different sources of water for different residential uses: washing, bathing, consumption, sewage disposal. No studies have been conducted regarding people's ability to pay for energy in the new homes (water, gas, and electricity). Most of these households allocated very little income for the use of energy sources and they generally abandoned those for which thay had to pay when their income was insufficient. It would be important to assess how allocation of family budgets changed with the move and whether this affected food consumption (because they need more money to pay for water and/or energy which they used to obtain for free). I found no studies assessing these kinds of impacts which would provide valuable information regarding food security and quality of life after the move.

We should identify which women performed activities are river dependent (e.g collection of water for household use--cooking, cleaning, collection for water for sale, bathing, collection of debris for fuel, collection of materials for household construction, washing clothes both for the household and for income-generation). Do women use the river for transportation? Are these activities transformed with dam construction (because of changes in the quality of water or restriction of access)? Some of these activities might have been transformed positively because dam construction guaranteed access to running water which was not available before. In these cases, women might save time and energy, and household health might be improved.

. Irrigation schemes:

I could only find one case for Mexico examining an irrigation scheme. The following are some of the questions for which I have no answers with the avaialble information. This section might be deleted if you consider it irrelevant. I might be able to obtain some information on my return to the United states in December. There are a few books which were recently published and I will be reviewing in December.

The following questions are being examined for countries such as Mexico and Ecuador which have irrigated agriculture. Most of the studies I know refer to irrigation channels and dams built decades ago. The majority of the Sao Paulo presentations to the WCD referred to hydroelectric dams.

These are some of the questions which current studies attempt to address:

. Does the availability and cost of water impinge on agricultural production? Are there changes in crops and income generating activities? Are these changes gendered?

. Do women have equal access to water? What uses for water are favored? Is there a gender competition for water use? Does this affect women income-generating and household food production such as gardening, raising livestock and small animals? What is the effect on food security?

. How are men and women uses of water distributed spatially?

. Do women participate in irrigated agriculture? Are their rights recognized? Do they participate in decision making processes? Do women contribute to meet economic needs of irrigated agriculture (for seed purchase, fertilizers)? Has this become a burden?

. Command areas:

References to command areas are mostly anecdotal. We could provide divide impacts in command areas into two major categories. One, pertaining to the residential compounds constructed for different kinds of personnel. Antother one, pertaining to towns or cities in the vicinity of these compounds. Regarding the first case, anecdotes generally refer to the social and psychological tensions expereienced in these settings. These artificially created communities have been compared to total institutions, such as religious convents, military barracks, and mining towns. Social conflicts among the various class sectors are very serious to the point that a few families opted to move to urban centers and the men commuted to their jobs.

One of the issues mentioned to me was that most people felt that they were only transitorily living in the area, but that they had no attachments to the place. It was very difficult to establish any sense of community. Because some of these projects take many years, the transitory stituation may last two or more decades. Residents might live all these years without establishing social ties. Both for the Itaipú case and the Yacyretá case, I heard many accounts about people who needed psychological assistance. In the case of Yacyretá, there were professionals from France and Italy who sent their children to special schools and who purchased their food in supermarkets to which the rest of the population had no access. This created resentment among the local professionals and technicians and among the residents in the town of Ituzaingó in the province of Corrientes Argentina, adjacent to the dam site. Male workers were settled in a removed area. They could not bring their families and transportation to the town was restricted. Alcoholism, drug addiction, and prostitution were identified as problems in command areas.

Another problem intimately linked to the command area is the effect of this influx of people in the economy and social life of nearby cities and towns. the Yacyretá dam affected the towns of Ayolas in Paraguay and Ituzaingó in Argentina. It also indirectly affected the population of Posadas (Argentina) and Encarnación (Paraguay), both of them upstream by the reservoir area. Itaipú affected most of the surrounding municipalities. These towns and cities experienced population growth both during dam construction and after major works were completed. They experienced both positive and negative effects. At the beginning there were many investments in urban infrastructure encouraged by the expectations of housing and entertainment demands of the newcomers. After the major works were completed, tourism increased both to the dam sites and to the beaches created by the lake reservoir (in the case of the Itaipú dam in Brazil) and in Ituzaingó in Argentina which is now a week-end resort area for many people from Posadas. Negative effects are mainly the emergence of slum areas in cities such as Foz do Iguacú and Ciudad del Este (Paraguay) after many of the 40,000 former dam workers became unemployed. Another major problem is the lack of planning of urban infrastructure to meet the demands of a very rapid urbanization process (waste disposal problems, inadequate water supply, lack of sewage systems).

Analysis of impacts in command areas are insufficient. Effects of women have been suggested, but we need to conduct studies to evaluate effects. When construction sites are built near existing towns, they are often spatially segregated from the host community. This is the

case of Yacyretá, where the dam site was in the proximity of Ayolas (Paraguay) and Ituizaingó (Argentina). Entrance to the compounds has often been restricted by dam authorities. Interaction with local women has also been spatially discouraged, by placing single male workers in housing units distant from towns. Many of these measures responded to the fear of conflicts with the host community. Ayolas and Ituzaingó were small towns with very traditional and patriarchal family structures. We need to assess how the influx of a predominantly male population, and the arrival of foreign professional and technicians with consumption and entertainment demands previously inexistent in the communities, affected household structure and power dynamics.

3.2.2. **Population whose landholdings are partially flooded**

In these cases, the dominant policies had been to compensate only for the property to be left under water with the filling of the reservoir. Both in urban and rural settlements these policies negatively affect the economic possibilities of the households affected. By dividing productive units (one part left in the proximity of flooded areas, the other relocated in areas physically distant from the original site, the viability of productive activities is significantly hampered). In some cases, homes are relocated, while parts of land under cultivation are left behind, in others, the opposite occurs. These cases have negative effects on household arrangements.

Policies generally reflect an understanding of production within the western tradition. Activities in the so-called informal economy are not assessed for relocation purposes (as I have already mentioned the case of fishermen, washerwomen, brickmakers). In the case of Yacyretá, there were also river activities linked to a frontier economy which provided income to riverine residents but was never declared because it was illegal (e.g. smuggling and prostitution). In rural areas, most of the complaints refer to the low monetary assessment of their income generating activities. People were generally received some compensation for their land, but loss of harvests was not always contemplated. A careful reading of most reports (although it should be verified with further research) that only major crops were assessed but food production for family consumption, and the raising of small animals was not contemplated. This also applies for some of the urban households I have analyzed in the Yacyretá case. Women had vegetable gardens, fruit trees, and samll animals which they could not keep in the new homes. This home production was generally lost with the move affecting household food consumption. Social workers in the case of Yacyretá encouraged flower gardens and discouraged vegetable gardens.

The role played by household members in production is often overlooked . By physically separating sites of production and housing areas as it happened with some brickmakers in the Yacyretá project, the organization of work radically changed. For example, many women can no longer combine childcare, gardening, and the care of their animals with participation in brickmaking activities, now too distant from their homes.

3.2.3. **People whose economic activity is imperiled by the filling of the reservoir**

Men and women living in the proximity of riverine areas have developed a series of activities generally identified as strategies within the informal economy which had been altered

with dam projects. Rivers provided fish both for household consumption and for sale, debris carried by the river and vegetation growing on river banks were used for fuel an house construction, water employed for washing clothes both for the household and as an income-generating activity. Even though some of these activities might have been documented in social impact assessments, they have not always been estimated in the costs of projects.

The Yacyretá project, for example, is now facing claims for compensation from fishermen and washerwomen. Both fishermen and women cliam that they can no longer perform these activities. The fish population has decreased, access to the river is harder, and there are new laws prohibiting fishing activities during some months of the year to protect some endangerd fish species. It is argued that fishing scales and channels are not working as planned and that the fish population diminished upstream. At the beginning of the project, planners minimized the importance of fishing activities. In the early years some fishermen sometimes denied this activity either because they were afraid they would be accused of practicing an activity for which there were already some restrictions or because they felt that by admitting it they were also acknowledging their poverty. Fish was regarded as poor man's food while meat consumption was desirable. Fishermen and washerwomen had become organized in recent years. In part because they realized that in other dam projects they are being compensated. Eby is now offering them 8,000 dollars to each fisherman if they renounce to any future claims. These men are in so much need of money that they have accepted these conditions. Unfortunately, this would not solve their situation and very shortly they will be either making new claims to Yacyretá or to city authorities. There are many similar cases in Latin America. Fishermen are affected upstream and downstream, but only those who can demonstrate their relationship to the reservoir area are now recognized by dam agencies. The economic situation of the region is critical and it is not easy to propose economic alternatives and to reskill this population.

Issues such as this one are quite complex and require further studies. While indeed it is true, that these activities have not been considered at the time the social planning was designed, it is also true that some activities have not been necessarily affected exclusively by dam projects. For example, with regards to the washerwomen, in recent decades numerous laundry-mats have been opened in Posadas, and prices of washing machines are more accessible to middle class sectors who used to employ their services in the 1980s.

3.2.4. **People who had initially been told they would be affected and were later "disaffected.**"

Poor topographic studies and lack of environmental studies resulted in changes in the areas recognized as affected (keeping in mind that the majority of projects work with a limited concept of affected areas). After waiting for relocation and living with uncertainty for more than a decade, many households are now considered outside lake levels, and therefore are not eligible for compensation rights. These situations require redefinition of policies, particularly in cases of projects delayed for decades (e.g. Yacyretá,). These people are doubly affected: First by the damage caused to property values and their quality of life during the wait period; Second, by not getting a new home.

3.2.5. **People living and or having business in the fringes of "affected areas."**
Business which were intimatley linked to river life such as stores which sold supplies to fishermen and boatmen, bars and restaurants near recreation areas floded by the reservoir did not receiveany compensation. These business were never registered. They are not yet making any claims. The only case I know which is making claims is the municiaplity of Guayrá. When Brazil decided to recognize royalties to the affected communities, it granted royalties proportionately to the land lst with the flooding. This municipality lost very little land with the flooding of the Itaipú reservoir. However, most of its local economy was based on the tourist activities generated by the Sete Quedas Falls, which were located near this community but did not belong to the municipality. It is now the most impoverished municipality and it has lost population while the others have grown. Local authorities are making claims but the law does not contemplate these cases.

3.2.6. **People renting rooms, plots, or homes in affected areas (projects vary in the recognition of their rights).**

The majority of dam projects only recognize compensation rights to those who own property and/or in some cases homes even though they might have no legal titles in the flooded areas. People renting homes generally have no relocation rights. Renting in poor marginal areas is often done without contracts and dam agencies often ignore situations which do not fit in the existing legal system. This happened in the Yacyretá case.

3.2.7. **People employed by recognized "affected populations."**

In some of the flooded areas, economic activities are based on informal arrangements between employers and employees. People employed without contracts are usually ignored. After years of litigation, for example some brickmaking activities are now recognized for compensation. But compensation is only given to those recognized as the owners of the business. These activities generally incorporate female and male labor structured through traditional arrangements. Salary is not always included in some of these arrangements, but there might be other services crucial for the subsistance for those who participate in these activities (such as provision of food and housing). If workers are paid, these payments are not officially registered. Today, some of these workers are also starting to make claims. Until now, I do not know of any case in which their demands had been met.

3.2.8. **Members of extended households divided by the move**

Because of the arbitrary lines set by engineering needs crucial social networks have been disrupted. This is the case of compounds of extended families with more than one housing unit. There are cases in which only some units have been resettled and the rest remained in the original sites. This has a serious social and economic cost. This is particularly damaging for women, children, and the elderly. Working women who depended on relatives living in adjacent homes, can no longer rely on them for child care. This affects their ability to seek employment. Older people separated from relatives find it very difficult to meet their daily needs.

3.2.9. **"Intruders" living in areas near the lake and/or river banks**

In many parts of Latin America, land occupation has been rather chaotic and the legal situation of land titles is very complex. This problem pertains both to relocated areas and

contiguous areas (it is also valid for the problems downstream).

Dam projects usually affect relatively marginal areas within the national economies. The population living in them has often been pushed to these sectors by the expansion of economic fronts (this is mostly the case for peasants, and some urban dwellers, but it even applies to some indigenous communities whose territory has been partly occupied by large landowners and other business in recent years). With the announcement of dam construction powerful sectors of the society, who have the means to employ legal mechanisms to claim for land, take a legal hold of areas which are increasing their land values. Land speculation is present in most projects. People who never paid taxes and left land idle for years suddenly reappeared when there was a possibility of compensation. Others, with easy access to information managed to put land under their names.

In Posadas, Argentina (affected by Yacyretá), the land in former slum neighborhoods, was purchased by well-to do residents, who would now have their homes overlooking the lake and the newly built Promenade by the river. The former residents, many of them lacking the means to pay for legal advice regarding the situation of their land titles (if they ever had them), had become intruders for the law and had to leave the area. In these cases, because the areas are not considered affected by the dam agency, the newly created problems are transferred to municipal authorities.

People who are being displaced because riverine areas are now more desirable, occupy other urban spaces, and create new problems of infrastructure, services, legal claims on land, transportation. Their situation regarding land is varied. Some had bought land in installments from companies which had never registered the deeds or became bankrupt and disappeared. Others, thought they bought land when in reality, they purchased only the homes. Others, occupied the land on the belief that they belonged to the state.

Similar cases are found elsewhere in Latin America. The situation is very comparable in command areas and downstream. In the case of Ituzaingó (Corrientes province, Argentina), the construction of the dam contributed to the emergence of sand beaches which encouraged the development of recreation areas. Wealthy families from Misiones province and some from Corrientes purchased land to build expensive week-end homes. These impacts have not been analyzed.

3.2.10. **Municipal and provincial governments**

In projects designed in the 1970s and even 1980s, municipal and provincial (or state) representatives were rarely invited to voice their concerns. With democratization processes, and after the identification of various issues learned through early experiences, local and regional governments identified a series of issues which are now negotiated. Issues under discussion include infrastructure, sewage systems, water supply and water quality, the recognition of effects on streams, coastal clearing.

In the case of Yacyretá, the following are some of the issues which require urgent solution, from the perspective of regional authorities (I am omitting those specific to relocation,

addressed in another report):

. Problems stemming from the lack of treatment of river banks flooded with the filling of the reservoir. It is claimed that the coast of the river is subject to level variations, and that channel flows are slower.

. Streams (there are seven of them) became contaminated and they should be tubed. With the filling of the reservoir they are having higher levels and they flood land with various social uses (residential units, brickmaking businesses, agriculture).

. Delays in construction of sewage treatment plants put the population at health risk. Problems worsened with the filling of the reservoir. Changes on the performance of the Paraná river and tributaries, affect drainage of sewage and contaminated water (from industrial uses).

. There had been no works to recover flooded land (and there is no planning to the present).

. No cleaning of the river banks was performed. The coasts are sources of diseases.

. Rescue of wild animals was insufficient.

. Inadequate clearing of forests and islands. Tree trunks are a threat to dam performance. This demands greater investments which could have been avoided (cf. Losada: 1999).

Many of these problems are acknowledged by the Yacyretá Binational Agency (EBY), but no steps have been taken to solve most of them. For example in environmental reports EBY states that at level 76 of the Paraná river (when the project is completed, it will reach level 83), the impacts on water quality had been: 1) gas saturation, 2) the presence of little dikes impeding adequate flows. These impacts were not anticipated. It is also acknowledged that the quality of water in some areas is inadequate to be processed for drinking purposes, and that coastal waters cannot be used for recreation (EBY, Report #10: May-June 1999, EBY: May 1998; cited in Onestini: 1999, El Territorio, November 1 1999).

Politicians and NGOs claim that the lack of solution for these problems stems from the separation between the so called "major engineering works," for which financing was secured, and complementary works (infrastructure, relocation, environmental mitigation measures), for which financing is uncertain. Throughout the history of this dam, information regarding financing responsibilities was insufficient, and it was difficult for local authorities and actors from civil society to identify who should be blamed for lack of planning.

Another problem now raised by regional authorities, is the payment or royalties and the provision of energy generated by dams in the regions affected by these projects. In Brazil, Law 7990, 1989 establishes that states, federal districts and municipalities should be compensated for the use of hydraulic resources for the production of energy. Law 8,001, 1990 defines how compensation should be distributed. After years of regional complaints Argentina also recognized the concept of royalties.

Brazil has already been paying royalties for some of its dams. In the case of Itaipú, Brazil paid US$ 12,95 millions in royalties to municipalities, states, and federal institutions. Royalties to municipalities are distributed according to the percentage of land lost with the filling of the reservoir. Since 1991, Itaipú has already paid US$ 989 millions.

Error! Bookmark not defined. States, Muncipalities and state agencies	Total in US$ thousands
ANEEL	598,2
MMA	437,8
MCT	259,0
State of Paraná	4,931,0
State of Matto Grosso Do Sul	98,0
Municipalities	
Diamante do Oeste	26,5
Entre Ríos do Oeste	154, 3
Foz do Iguacú	952,6
Guaira	240,8
Itaipulandia	843,0
M. Candido Rondon	267,4
Medianeira	5,4
Mercedes	90,6
Missal	189,1
Pato Bragado	220,8
S. José Palmeiras	9,2
S. Miguel Iguacu	434,3
Santa Helena	1,244,9
Sta. Terezinha Itaipú	197,8
Terra Roxa	7,4
Mundo Novo	69,4
A Montante (this needs transl.)	
States	809,8

Municipalities	863,1
Total	12,950, 5

Itaipú has no control on how the moneys are allocated. They would like to devise a clause requesting that royalties should be employed in social programs and research. Some money goes to federal institutions in charge of environmental and social research. Muncipalities experience with royalties is varied. In some cases nobody knows how the money is allocated. In others, results are visible. A municipality like Itaipulandia has paved all the roads. The muncipality provides agricultural supplies to the population. Local young residents get funded to study at Brazilian universities on condition that they return to the commuity for five years. Santa Helena municipality which has only 20,000 inhabitants gets the largest amount in royalties.

A common claim generally made by authorities of regional governments is that the energy produced goes to distant urban and industrial centers, while the regions remain without electricity or deficient provision. In the case of Yacyretá no provisions were initially made to supply energy to the region, which at the time was paying higher prices than the national average. After years of negotiations, regional authorities finally succeeded in the request to be interconnected to the national system. Because the national electrical system is now interconnected it is impossible to establish whether particular regions benefited from a particular dam. What is possible to say is that although the provinces of Misiones and Corrientes in Argentina suffered most of the flooding and impacts on their towns, cities and the countryside, rural properties still continue without electricity and there are no plans to change this situation.

Another common regional claim, is that regions suffer the costs without obtaining benefits. Payment of royalties to the regions is a recent outcome, which should be enforced in all projects (this has been agreed for Yacyretá in recent years). In the case of Argentina, I could not find any information on royalties. I suspect that provincial governments are still waiting for these payments. Energy companies also pay roylaties to the national governments affected by dam projects (when projects are binational). The criteria is the same as the one applied in the cases of compensations to regions. Countries receive roylaties according to the territorial area lost with the flooding.

Overall, municipal and provincial authorities face environmental problems directly generated by dam projects which affect the quality of life of the regional population. There are a series of problems which are often anticipated but not solved because of a combination of economic and political pressures. Although it is well known that forest and vegetation clearing, must be carefully performed or otherwise it will affect the quality of water and efficiency of dams, there are numerous cases in which these works had been poorly done or not done at all.

In the case of Tucuruí (Brazil), serious damages have been caused because of neglect in clearing. These deficiencies have multiplying effects: they affect water quality, which in turn affects population's health. These effects are felt both upstream and downstream. They increase the number of vectors of disease such as mosquitoes (see Tucuruí), thus facilitating the spread of tropical/subtropical diseases. In the proximity of the binational dam of Itaipú (Brazil and Paraguay), there had recently been cases of malaria, dengue, yellow fever, and cholera. We

should study to what extent these cases are related to dam construction. To assess these issues is quite difficult because the spread of these diseases might also be associated with deficiencies in public health delivery triggered by the current economic crisis.

In Mexico, El Cuchillo dam, a multipurpose project on the Río Grande Basin was hurried to completion. A sewage processing plant was not completed and this caused a serious disaster downstream. The San Juan River, a tributary of the Río Grande became seriously polluted and this affected the 27 th Irrigation district. It is claimed that 70,000 hectares of land were damaged. About 20,000 farming families lost their crops, and 300 fishing families were unable to generate income because of the devastation of the fish population. A city like Reynosa which until then obtained water from the San Juan River is now taking it from the Río Grande, also polluted from the industrial wastes of the maquilas (Sanchez 1999).

4. DIFFICULTIES IN ASSESSING RESPONSIBILITIES AND IDENTIFYING UPSTREAM AND DOWNSTREAM EFFECTS

As discussed in the introductory comments, the concept of downstream impacts has not been developed for any of the dams I have examined. As some of the cases I have examined show, social impacts are also felt in areas outside the reservoir. Cities and towns suffer the pressures of unanticipated population growth. Land prices are higher and poor urban sectors suffer displacement, increasing the number of squatters. Cities and towns in the proximity of the reservoir (which might be located either upstream or downstream--as in the case of Foz do Iguacu) are forced to meet the infrastructure demands of the growing populations (construction of roads, water and electrical power stations, sewage systems, schools, health services). These demands could be met if the concept of royalties were expanded to include not only the urban centers which lost land, but also the ones where displaced populations and unemployed workers move. Obviously, this is not an easy task. It is extemely difficult to separate those impacts attributable to dam construction and those resulting from other socio-economic processes (such as the attraction of immigrants because of tourist activities or as a result of current rural crises).

Many river basins have multiple dam projects. Very few had been planned as a management strategy for the whole river basin. Even in the cases in which they have been planned as a whole, they have not been constructed simultaneously. Mitigating effects which were including in the plans on the assumption that all dams would be constructed could not be achieved because economic, political, and/or social circumstances led to the postponement of some engineering works. The Paraná river is a good case in point. Some major dams such as Itaipú and Yacyretá had already been constructed (although the latter one is not operating at full capacity), others are meeting strong opposition--Corpus and Paraná Medio in Argentina, and Porto Primavera in Brazil (Sauer and Scarpinella 1999, Silva Conceicao 1999, Kudlavicz 1999). To what extent are existing problems in the reservoir area of one dam only attributable to one project? When a dam upstream suddenly releases large quantities of water because of heavy rains and the threats of floods, who is accountable for the sudden bursts of water, the flooding of infrastructure, and the contamination of streams? Both the dam upstream and the one downstream had altered the traditional behavior of the main river and tributaries, and fish population, fauna and flora of the region.

These issues require further studies, particularly in the cases where dams have been built by different nations (e.g. Itaipú, built jointly by Paraguay and Brazil, and Yacyretá, built by Paraguay and Argentina), or by different provinces or federal states. Today, there are very few downstream impacts acknowledged. Changes in fish population are already known. Fishermen and amateur fishermen are already complaining against restrictions imposed by governments. But only those living in reservoir areas are acknowldged by energy companies. There are possible environmental impacts downstream acknowledged by most dam experts. These impacts are mainly related to changes in water quality and alterations on the regional fauna and flora. Monitoring of water quality is only performed in reservoir areas (such as in Itaipú). But we still do not know whether these changes are in fact occurring. Neither do we know whether they would affect agricultural activities.

Regarding these issues it is also hard to assess responsibilities for effects downstream at the level of river deltas when there are multiple dam projects on more than one river. For example, ecologists are concerned about the effects of dam projects on the Paraná River Delta. This area is very rich in biodiversity. The confluence of large rivers masses enables climatic effects, increasing levels of humidity and tempering seasonal and daily temperature changes, which allowed for the presence of species characteristic of subtropical areas of northeast Argentina and West Southern Brazil (cf. Presidencia de la Nación, Secretaría de Recursos Naturales y Desarrollo Sustentable). Rivers carry seeds and often animals found in other ecological areas upstream. Islanders depend on this great variety of fauna and flora. Delta men and women survive on multiple activities related to this ecosystem: fishing, hunting, and furniture ceramic, and basket making. It is uncertain how these areas might be affected in the future. These are also areas requiring ecological and social studies.

5. **DISCUSSIONS ON COSTS AND BENEFITS**

5.1 Spatial distribution of costs and effects

In most cases of dam projects in Latin America, benefits of dams are generally enjoyed in distant urban centers. This is claimed for nearly every dam report I have examined. For years, this was the case of Yacyretá. When this dam was designed, there were no plans to provide energy to the regions suffering the flooding. After years of claims to national authorities, this situation has now changed. Although the establishment of industries was often promised at the beginning of projects, none of these promises materialized. This happens both with hydroelectric dams and multipurpose irrigation dams--for which provision of electrical energy and water has often been planned exclusively to service urban and industrial sectors, located in the more developed regions of countries.

Opinions diverge regarding who are the beneficiaries. For example, planners of the Castanhao dam on the Jaguaribe River, claim that the dam will both provide water to the city of Fortaleza, capital of Ceará, Brazil and to draught-stricken areas (Tankha 1999). Even if this is the case, it remains to be seen, whether water in rural areas will benefit poor landless peasants or whether it will encourage even greater land concentration (an extremely serious problem in this state of Brazil), once water is readily available.

Dam advocates claim that both regions and nation-states benefit as a whole. Opponents, claim that in some dams, even nation-states do not enjoy all the benefits. This is argued for example, for the Tucuruí dam in Brazil, and for Corpus in Argentina. In the first case, it is claimed that most of the electricity produced goes to foreign aluminum companies, which not only benefit from cheap energy, but also add pollution problems to the rivers and natural habitat already seriously damaged by dam construction. At the time Tucuruí was designed Brazil was under a military regime. During the 1970s, energy production was regarded as a question of national security. Policies regarding frontier areas were in the hands of central governments. The country did not have the environmental and social legislation it has today. Regional governments had no saying in decision making processes and could not make any claims regarding how energy should be distributed and/or how it should be used.

In the case of Corpus, which is still in the planning process, the population of Misiones voted in 1996 against its construction because it understood that the electricity will be basically meeting the industrialization needs of the neighboring country, Brazil, and also because of the environmental and cultural damage it would cause. Despite the negative vote of the population the Joint Argentine-Paraguayan Commission (COMIP), has recently released an environmental and social impact report stating that environmental damage will be minimal.

The Argentine National Secretariat of Energy is proposing to continue with this project. Corpus is part of a more ambitious energy project which includes the construction of 28 new dams in the following 15 years. Maps of affected areas include territory upstream, but no territory downstream. It is claimed that only 7,100 hectares would be affected in Misiones and about 700 families in Paraguay and Argentina would be relocated. Regarding existing environmental concerns, addressed for other dams, the technicians state that the influence on climate and evaporation will be minimal. It is also argued that the proposed site design, avoids many environmental problems generated by dams constructed on rivers running through plain ecosystems (for example, the formation of shallow lakes with slow water courses, sources of plagues and diseases).

Assessment of low environmental damage to natural environments is made on the assumption that existing environmental conditions in surrounding areas mitigate possible damages (e.g. existence of subtropical forests). The province of Misiones is involved in ambitious plans of forestation and paper industries, through the introduction of exotic plants. We should assess linkages between these two processes, mainly regarding possible impacts to native fauna and flora, and quality of water. Reports recognize concerns with quality of water, and technicians claim that Corpus will help to ameliorate the negative effects of Itaipú (El Territorio, November 2, 1999). Although today provincial governments have more saying in decision making processes than during the years of the military regime, a recent newspaper article suggested that the national government could still decide to construct Corpus despite of the negative vote of the majority of the Misioneros (90% of those who voted).

6. CLAIMED BENEFITS AND COSTS

Overall, problems created by dams generally outweigh benefits to the regions and local populations. Opposition to dams stems from regional governments and from local populations.

The following are some of the benefits claimed by dam defenders and criticisms raised by various dam opponents:

6.1. Energy supply

This is one of the greater benefits. Electricity in Latin America is unevenly distributed. Many rural areas lack electricity and numerous urban centers have deficient and unreliable electrical systems. Most dam projects failed to provide energy to rural areas and even regional urban centers. However, large dams like Itaipú in the first years of operation was meeting nearly 50% of Brazil's energy needs. Argentina would have also felt an electricity shortage if Yacyretá was not built.

6.2. Flood control

This is a positive outcome when dams are adequately planned. It benefits urban centers and agricultural areas downstream. When this happens, it has multiple effects. It encourages investments because risks of losing infrastructure and/or crops significantly diminish. Engineering designs have often failed to control floods, an issue generally proclaimed in the planning stages. Planning of Itaipú, Yacyretá, and Salto Grande did not prevent the effects of heavy rains on the Paraná and Uruguay River Basins (Cappato 1999).

Flood control may affect soil quality and have a negative impact on some forms of agriculture. Crops might fail in areas where agriculture was largely dependent on soil enrichment facilitated by floods. Because these issues are not generally anticipated, producers lose their income-generating activities. As a result, they either sell their land and migrate, or earn their living through odd jobs producing very little income.

6.3 Irrigation

Many multipurpose projects stress the benefits brought about by irrigation. It is claimed that irrigation facilitates the development of commercial agriculture, mainly for export. The analysis of claims and counterclaims regarding benefits and costs of irrigation schemes would require another essay. While advocates see the full participation in the market economy as beneficial, opponents claim that production costs increase (water price, purchase of hybrid seeds, fertilizers), environmental degradation is very serious, health risks are greater, and that food security is endangered because households abandon subsistence crops). There are also questions about the gender distribution of costs and benefits (see section on women). Another issue to evaluate is to what extent irrigation is linked to land concentration and depeasantization. Countries such as Mexico should be analyzed in detail to weigh the impacts of irrigation. In this case, irrigation should be analyzed in conjunction with the privatization of ejidos and the emergence of water markets.

6.4 Water

Besides claiming that dams would provide irrigation water, dam defenders generally promise improvements in the supply of running water (water pumping, construction of

pipelines, water processing). Although these works are advertised at initial stages of projects, they are not always materialized. This is the case of many Latin American dams (see for example, the Yacyretá dam case). Because water is seen as a scarce resource, policy makers advocate the pricing of water to manage it more efficiently. Feminist critics are challenging the confidence on the market as a sufficient condition for allocation of resources (Folbre 1995, Carrier 1997). Efficiency is measured exclusively in terms of costs, e.g. the allocation of water where it guarantees greater returns. When water efficiency is measured in these terms, we are neglecting the consideration of the social and gendered dimensions of water usage. We should be asking: Is the water available sufficient to meet the needs of the entire population? Which sectors of the population have access to water, which ones do not? Which water uses are favored? Can peasants, farmers, indigenous peoples, and the urban poor afford water prices in the cases in which water becomes available at market prices?

6.5 Development of infrastructure

Construction of roads, railways, ports are often proposed as benefits. When these works are done, they favor the transportation of regional production and the region as a whole might be benefitted: they might trigger new investments and greater labor demand. Recent development critics have also noted that these changes transform the regional social structure. They attract new settlers who compete for land and resources with former residents. They also attract large investors such as agribusiness and timber and paper companies which displace local populations. This in turn, generates more burden to regional governments, which have to face demands of landless peoples and squatter settlements in urban areas. Dam projects rarely include people affected by these works as "affected population."

6.6 Tourism development

Lake reservoirs attract investments in recreational areas (vacation resorts, beaches, boating, amateur fishing). While acknowledging economic benefits for some sectors of society (e.g. service sector), tourism literature stresses that these activities generate multiple problems to the host community: female migration, prostitution, loss of subsistence agriculture, spread of contagious diseases, spatial segregation, increase in the cost of living, lack of housing). Access to the new tourist infrastructure is restricted to the poorer sectors of society because costs are usually beyond their means. This happened both in Posadas and in Ituzaingó in Argentina. Before dam construction, the river was easily accessible and many recreational areas were free. After dam construction most of the new facilities are privately owned. The Yacyretá and the Itaipú dam facilitated these developments (command areas and dams are visited by numerous tourists, beaches are visited by local residents and tourists).

6.7 Employment

It is argued that dams and their indirect effects, generate much needed employment and alleviate poverty. Great expectations exist at the beginning of projects. Local people expect to be hired for dam construction and for the often called secondary works (roads, bridges, water plants, house construction). Transnational capital often wins in the bidding processes for major works. Companies in charge of major works hire mainly transnational skilled workers,

technicians and professionals. There is very little work left for local labor, which generally lacks appropriate skills (c. Ribeiro 1994).

Yacyretá had labor training programs for the affected population (those to be resettled). Labor training was poor and was not specifically designed for the regional labor demands. Very few graduates from these courses managed to obtain jobs, although in the cases of works executed by local companies, some of them (or other local workers) were hired. Itaipú attracted labor from Paraguay and Brazil. When jobs were completed, many of these workers remained in urban areas and became involved in the informal market (e.g. street vendors) of various cities (Foz do Iguazú, Ciudad del Este, Encarnación). We should study the development of these informal sector and the linkages with dam construction. Another issue which requires consideration is the compatibilization of labor laws, mainly in the cases of binational projects. Yacyretá faced many labor strikes which were difficult to solve because of differences in the labor legislation of Argentina and Paraguay (Ribeiro 1994).

6.8 Poverty alleviation

Dams proponents see dams as a good mechanism to alleviate poverty. This claim is more rhetorical than real. I could not find any successful experiences. A combination of factors related to dam construction, irrigation schemes, introduction of commercial agriculture, water and energy prices, negatively affect the more disadvantaged groups. However, poverty and high unemployment rates, cannot be attributed exclusively to dams as Latin American countries have been facing serious economic problems linked to the restructuration of national economies (opening of markets, privatization).

6.9 Food security

Most dam projects do not address food security in their planning. There are some measures taken to compensate for agricultural and/or fishing losses for specific stages of dam construction (e.g. for periods in which the flow of water is minimal because of engineering works, and when flooding occurs). More permanent damages to agricultural activities such as those caused by changes in water quality, soil transformation, increase in plagues (such as mosquitoes) are rarely anticipated, and therefore, there are no mitigation measures.

6.10 Health

Dams contribute to the improvement of the general population's health in the cases where promised infrastructure is provided such as water plants and sewage systems. It also contributes to the health of the relocated population when relocation homes are constructed with running water and/or reliable water supplies. This is an important aspect of the relocation process of Yacyretá where marginal urban sectors, who used to live in floodable areas were resettled in areas with adequate water services. While resettled population now have running water, some resettlement sites for brickmaking activities are still waiting for water provision. Before relocation, floods and unreliable water quality, generated respiratory diseases, diarrheas, and parasites. While this is a significant improvement, noted by beneficiaries, there are also other effects identified both by some municipal authorities and EBY, such as the worsening of

water quality of the river, which provides drinkable water for the population as a whole (see discussions on water and sewage systems). Negative health effects are reported for projects such as Tucuruí. Fearnside (1999) reports the spread of malaria and mercury contamination.

6.11 Fishing

Various analysis of Latin American dams report severe disruption of the fish population which reduces the cash income of the population and threatens food security when fish is one of the main food sources. In the Tucuruí case analyzed by Fearnside (1999) he states, that the number of fisherman diminished because of the decrease of freshwater fish. Local fish catches did not drop the first year but fell dramatically the following year. This is a serious problem downstream. Water passing through the turbines is particularly low in oxygen during the dry season. It does not mix with the flow from the spillway for about 60 km downstream of the dam, leading to reduced fish populations (for similar cases also see, Sauer and Scarpinella 1999, Kudlavics 1999).

7. **GAINERS AND LOSERS**

To assess who the gainers and losers are in each specific project, we need to carefully analyze data regarding changes in household income throughout the different phases of dam construction (at the time of planning, implementation, after construction). This information is not readily available. Even in the cases for which we have some data, it is hard to separate changes directly related to dam construction from those related to larger processes in the global economy. We also need reliable studies on changes in health indicators (incidence of diseases which might positively or negatively correlate with dam related changes), nutritional levels and dietary changes.

Regional demographic and labor market analysis are also necessary. Spatial analysis of issues such as emergence of pockets of poverty both in rural areas, transformation of land tenure patterns, types of crops under cultivation would also help assess gainers and losers.

Other aspects, generally claimed as losses, are those pertaining to the cultural dimensions of projects. Some of these losses include: archaeological and historical sites, disruption of social systems, sites identified with traditional belief systems, traditional knowledge related to health systems and exploitation of natural resources. Many reports from NGOs, and grassroots organizations mention these losses. To assess these losses, we should conduct qualitative analysis for each particular case. This is a highly controversial issue which can not be measured with economicist cost-benefit analysis.

Most reports suggest a worrisome pattern regarding the losers in these projects. Peasants, indigenous peoples, women, fishermen, and hunters are disproportionately affected. Measures to mitigate effects are overall insufficient for these sectors of the population, even though directives on social impact often contemplate the consideration of social, cultural, and economic impact on these groups.

Gainers are mainly industrial sectors (national and transnational) and electric companies

(Fearnside 1999). Nation-states are both gainers and losers. They are gainers because they collect royalties and taxes from new industries established with the prospect of cheap energy. They also gain when these companies create a larger labor demand. They are losers, because they have to face the economic and political costs of environmental and social problems created by dams. They also lose when they commit themselves to subsidize the energy costs of some industries such as aluminum in the case of Tucuruí. Regions are also gainers and losers for reasons discussed in previous sections.

Residents of urban centers are both gainers and losers. They are gainers because they obtain resources such as electrical energy and water. They are losers because they sometimes have to pay high prices for these resources, and also are burdened by the effects of the large debt left by some of these projects (Chixoy dam in Guatemala).

8. REASONS WHY DISADVANTAGED GROUPS ARE LESS PREPARED TO BENEFIT FROM PROJECTS

. Poor access to information. Rural and poor urban populations have limited economic means to travel to places where information regarding projects is kept. Even if they manage to get a hold of relevant documents, it is difficult to understand the possible effects of these projects in their lives. Documents are written in a language difficult to understand for common citizens (in a technical and/or legal language, and even in foreign languages--as is the case with indigenous peoples).

. Lack of economic resources. Legal and technical advice is very costly. Even when help is provided by government and NGOs, it is not sufficient to meet the needs of each individual affected. Inability to obtain credit also discourages innovative strategies to take advantage of new economic opportunities. In the cases where compensation is in cash, the amount is insufficient to start new economic activities. The money is invested to meet immediate needs, and the problems created by displacement, and damages to agriculture, fishing, hunting, and other forms of production (pottery making, brickmaking, basket making) remain unsolved.

. Conflicts between common law and modern legal systems.
Dam policies for compensation are constrained by each nation legal system. Official understandings of what constitutes property are very different from those of affected populations. On my research on Yacyretá I found that many residents believed that they were owners and were thus entitled to relocation rights without having to pay for the new homes, while lawyers claimed they could not recognize their rights because people lacked their title deeds (either because they only had a sales contract, had lost their title deeds, they were never registered, or because they had only bought the house, but not the land) (Ferradás 1998).

National laws do not always recognize communal property. This is particularly important for indigenous communities. In recent years, many Latin American countries had passed indigenous laws and some of them recognize community rights. If property is recognized to individuals, some members of the community might accept offers of compensation, and indigenous communities would disintegrate. We need to examine how property rights are recognized or ignored in the case of women.

. Poor representation in decision-making levels. This situation is currently changing. Indigenous peoples, peasants, and the urban poor are getting organized and claiming for participation in decision-making processes. Some leaders now participate in government institutions and political parties. This development is very encouraging. Unfortunately, leadership is often coopted by political structures (as I observed in Yacyretá) and they stop representing the interests of their communities. When they are hired as government officials, it is expected that they would follow the official position. If they oppose to measures negative to the needs of their communities, they end up fired. This happened in the negotiations of the Ralco and Pangue dams in Chile.

. Projects are fraught with corruption. Corrupt government representatives, powerful lobbies of transnational companies and local economic groups often negotiate projects to their benefit and conceal damaging information to the general public. Lobbying groups of large transnational companies often attempt to coopt political leadrs and groups from civil society (such as NGOs).

9. **GOOD PRACTICES AND MECHANISMS**

To make a fair evaluation on legislation, and dam agencies assessments on social impacts, and to evaluate how they address equity issues, I should compare documentation which is hard to obtain in the area where I am writing this report. The time required to examine such kind of information goes well beyond the limits assigned for the writing of this report.

International lending banks, and national governments have created mechanisms that could bring a more balanced distribution of cost and benefits. Directives for environmental and social assessments, indigenous laws, and mechanisms to guarantee participation such as public audiences are all commendable. These mechanisms could be perfected by broadening the concept of affected population, by creating ways to disseminate information and to negotiate outcomes, by improving vague language which leaves "wholes" which are quickly manipulated by some interest groups to avoid responsibilities, and by finding ways to compensate for losses which cannot be measured with economic indicators.

Enforcement of laws and directives is failing. Environmental and social impact assessments are not always conducted, even though laws require these studies. Energy corporations find ways to circumvent some requirements. In Brazil, Eletronorte avoided for some time environmental impact requirements for Tucuruí-II by claiming that "the project was the continuation of a construction project already underway (Fearnside 1999)." When assessments are made, information is only released after the decision to build a dam is already taken (see Bio Bio debates).

The creation of intersectorial forums, the consultation to the population through referendums and public audiences, the creation of committees with community representatives and other groups from civil society are all important developments which contribute to the transparency of decision-making processes. These mechanisms generally offer a way to become acquainted with social programs and to voice concerns. Very few of these experiences grant power to participate in major decisions.

9.1 Constraints to comply with objective assessments of social and environmental impacts

Expert consultants are hired by interested parties. Objectivity of reports is precluded by various mechanisms. First, by choosing experts who are either politically committed to dam projects, or who depend on selling their expertise as their sole source of income. Second, by conditioning payment of services to approval of reports. Third, by reserving the rights to modify or to withhold information contained in the reports. The unfortunate history of reports produced to evaluate the social and environmental performance of the Ralco and Pangue dams is a sad example of this last point (cf.Johnston and Turner 1999, Alwyn 1998; for similar cases see, Fonseca de Azevado,Ronan Maciel 1999) .

10 **WAYS OF IMPROVING CURRENT APPROACHES TO RESPOND TO THE NEEDS OF THOSE DISPROPORTIONATELY AFFECTED BY DAMS**

1. Redefinition of the concept of affected areas and people to include those excluded in current assessments and policies.

2. Assessment of impacts on households should differentially analyze impacts on different members (generational, gender impacts). Household impacts should examine their transformation through time. As dams generally face delays for decades changes in household composition should be anticipated and screened throughout the project. Recognition of rights to new members should be guaranteed. Women and children contributions to the household economy should be recognized (monetary and non-monetary forms). Separation of members of extended families should be avoided (particularly of the elderly).

3. Dissemination of information should be made in a culturally appropriate manner to guarantee informed decisions. If indigenous populations are involved, mesages should be in their language and legal mechanisms should be appropriatley explained. Even if the population speaks the official language, they generally are not familiar with legal terms and ignore the scope of their rights. On my research on Yacyretá I found that not only the population misunderstood messages, but also some of EBY's staff members assigned very different meanings to the same terms. This led to many wrong assumptions on the part of the population (such as believing they were entitled to a home without payment because they thought they were owners).

4. People who depend on river and natural resources for their subsistence should be adequately compensated. Ideally they should be offered new settlement areas with similar environmental conditions. If this is not possible, options should be discussed with affected peoples. In the cases in which riverine populations used to freely obtain water, construction material, fuel and raw materials for their subsistence activities, planning agencies should guarantee free access to the same or better materials in other areas. In cases in which this alternative is not feasible, other options should be chosen through agreements among the interested parties.

5. The right to land should be recognized for indigenous peoples and quilombo communities -- communities of descendants of runaway slaves (Sales 1999). Even in cases for which there are no earlier treaties or laws, efforts should be made to legally recognize the rights of those who

had occupied the land for generations. The same should apply to some peasant communities.

6. Mechanisms to guarantee access to land and/or to generate other means of subsistence should be set for landless peasants (as in the other cases these issues should be agreed upon all parties). Programs of organic farming should be implemented to guarantee food security and improve health conditions of the population.

7. Municipal and regional authorities should be fully informed on the characteristics of dam projects. They should have a saying regarding dam construction. If dams are constructed compensation sould be granted not only to those areas suffering the flloding, but also to others suffering profound demographic changes and/or suffering damages because of changes in water quality, and development of unsanitary conditions. Responsibilities of energy agencies should go many years beyond dam construction, as regions maight experience effects only some years after completion of engineering works.

11. SUGGESTIONS FOR DEVELOPING POLICIES, CRITERIA AND GUIDELINES TO ADDRES EQUITY ISSUES AND DISTRIBUTIONAL ISSUES

Questions of equity and distribution are highly political and therefore, very controversial. It is very difficult to suggest tradeoffs when differences in approaches respond to very antagonistic projects on the future of society.

The rights of different social groups to choose their development paths are only recognized discursively. Concrete laws and regulations need to be created to translate these ideas into practice. Mechanisms for enforcing these principles need to be created.

Participation and empowerment are generally mentioned as means to guarantee more equitable projects. The meanings of these concepts vary enormously. Many projects which advocate to be participatory, limit this participation to consultation on specific issues, but power in decision-making processes remains in the hands of a few. Too many projects employ participation as a means to legitimate decisions already taken. Participation of all interested groups should start before decisions to build dams are taken and throughout all stages of projects. Representatives from different social groups should be chosen according to their own political standards. These representatives should have the same decision-making power than other members. If communities customarily take decisions collectively, these principles should be respected.

If equity is a concern, communities should have participation in dam benefits (e.g. sharing of a percentage of income generated by project, distribution of shares among affected peoples, allocation of funds for community designed development projects, see for example, de Castro 1999). Likewise, regional governments should have a share in the form of royalties.

Social impact assessments should be made before any decision regarding dam construction is taken. These assessments should clearly show who the beneficiaries are, how and by whom the prices of energy and/or water would be established. If possible, alternative sites should be assessed with an analysis of potential cultural, social, economic, and

environmental impacts. The need of dam construction should be demonstrated (by discussing energy estimates and projections of energy and water needs). An assessment of costs if dam project is rejected, will also be presented, together with an evaluation of alternative energy sources.

Ideally, consultants should be hired by organizations external to the interested parties. To find the financial sources to do this is not easy. Maybe an organization such as WCD or a fund created with moneys from nation-states could do this hiring. Contracts with consultants should respect professional codes of ethics.

Reports should be disseminated freely to all parties. Results should be presented through a combination of public audiences, public forums, community meetings. All interested parties should have the right to voice concerns and request for clarifications. Rejection of projects altogether, postponement of timetables to conduct further evaluations and/or to study new alternatives should be an option at initial stages of projects.

Because many negative effects and questions of equity can not be fully anticipated, monitoring systems checking issues such as changes in income, in health and diet, education, land and wealth distribution, should be implemented. Quantitative analysis of these variables, would be accompanied by more qualitative assessments of cultural and social changes (e.g. transformations within households and in the community, changes in traditional knowledge, loss of cultural property, changing roles of women, conflicts with newcomers, disruption of social organization with the introduction of new forms of production). These monitoring should take place at different stages of projects, and special funds should be allocated to balance off uneven distribution of benefits and costs. Because some effects are not felt immediately (e.g. waiting periods until certain crops might be harvested, deforestation and loss of fauna because of water pollution), monitoring should continue for at least five years after the move.

Besides implementing these monitoring systems, affected people who feel they are experiencing negative impacts should be entitled to request quick appraisals, inspections, and specific research to document the seriousness and scope of the problems and to find solutions.

Responsibilities of all participants should be clearly stated. The general public should have easy access to information regarding accountability issues (who is responsible for what). Mechanisms for making claims should be created.

Funds should be allocated to hire legal consultants to advice the population on how to solve problems with land litigation, and registration of title deeds.

Specific guidelines for social and environmental impact assessments, with provisions for conflict resolution and accountability should be created for private energy ventures. Assessments should include a careful consideration of distributional issues regarding energy use (spatial, and by sectors--industrial, commercial, residencial).

Analysis of impacts should be conducted for the totality of river basins, dams should not be considered as isolated projects.

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