WCD Thematic Review
Social Issues I.1

The Social Impact of Large Dams: Equity and Distributional Issues

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Prepared for the World Commission on Dams (WCD) by:

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The WCD Knowledge Base

This report is one component of the World Commission on Dams knowledge base from which the WCD drew to finalize its report "Dams and Development-A New Framework for Decision Making". The knowledge base consists of seven case studies, two country studies, one briefing paper, seventeen thematic reviews of five sectors, a cross check survey of 125 dams, four regional consultations and nearly 1000 topic-related submissions. All the reports listed below, are available on CD-ROM or can be downloaded from www.dams.org

Case Studies (Focal Dams)

- Grand Coulee Dam, Columbia River Basin, USA
- Tarbela Dam, Indus River Basin, Pakistan
- Aslantas Dam, Ceyhan River Basin, Turkey
- Kariba Dam, Zambezi River, Zambia/Zimbabwe
- Tucurui Dam, Tocantins River, Brazil
- Pak Mun Dam, Mun-Mekong River Basin, Thailand
- Glomma and Laagen Basin, Norway
- *Pilot Study of the Gariep and Van der Kloof dams- Orange River South Africa*

Country Studies

- India
- China

Briefing Paper

- Russia and NIS countries

Thematic Reviews

- TR I.1: Social Impact of Large Dams: Equity and Distributional Issues
- TR I.2: Dams, Indigenous People and Vulnerable Ethnic Minorities
- TR I.3: Displacement, Resettlement, Rehabilitation, Reparation and Development

- TR II.1: Dams, Ecosystem Functions and Environmental Restoration
- TRII.1: Dams, Ecosystem Functions and Environmental Restoration
- TR II.2: Dams and Global Change

- TR III.1: Economic, Financial and Distributional Analysis
- TR III.2: International Trends in Project Financing

- TR IV.1: Electricity Supply and Demand Management Options
- TR IV.2: Irrigation Options
- TR IV.3: Water Supply Options
- TR IV.4: Flood Control and Management Options
- TR IV.5: Operation, Monitoring and Decommissioning of Dams

- TR V.1: Planning Approaches
- TR V.2: Environmental and Social Assessment for Large Dams
- TR V.3: River Basins – Institutional Frameworks and Management Options
- TR V.4: Regulation, Compliance and Implementation
- TR V.5: Participation, Negotiation and Conflict Management: Large Dam Projects

- **Regional Consultations – Hanoi, Colombo, Sao Paulo and Cairo**

- **Cross-check Survey of 125 dams**

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- ABB
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- Finland - Ministry of Foreign Affairs
- Germany - BMZ: Federal Ministry for Economic Co-operation
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- Adrian Adams. *Social Impacts of an African Dam: Equity and Distributional Issues in the Senegal River Valley.*
- Carmen Ferradas. *Social Impact of Dams: Distributional and Equity Issues - Latin American Region*.
- Lubiao Zhang. *Social Impacts of Large Dams: The China Case*.
- Lyla Mehta and Bina Srinavasan. *Balancing Pain and Gains - A Perspective Paper on Gender and Large Dams*.
- Pablo Gutman. *Some Evidences on Overall Distributional and Equity Impacts*.
- Joseph Milewski and Dominique Egre. *Dams and Benefit Sharing. Submission from Hydro Quebec*
- William Adams. *Downstream Impacts of Large Dams*. World Commission on Dams Thematic Review I1a.

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Executive Summary

1. Equity and Dams

The debate about the social impacts of dams revolves primarily around a) whether the positive economic benefits of dams (eg flood control, electricity, irrigation water) outweigh the costs (eg disrupted downstream economies, full costs of resettlement); b) the way in which positive and negative impacts are distributed between people (eg between evacuees and electricity consumers, or between men and women among either group); c) whether such a distribution is equitable. There has been particular concern about impacts on indigenous people, women, and reservoir evacuees. Issues of equity concern the normative issues of fairness or justice of the existing or planned distribution of impacts (between areas, between groups of people, between genders, between 'winners' and 'losers').

The 'social impacts' of dams may be defined as 'impacts on the lives of individual people or groups or categories of people, or forms of social organisation'. Social impacts (on community organisation, kinship or culture, or on relationships) are distinct from environmental or economic impacts, though all of these are closely linked.

The assessment of social impacts is problematic. First, social impacts can be both positive (eg improved welfare resulting from new access to irrigation water) or negative (eg resettlement, decline of downstream fisheries due to flood control). Second**,** social impacts can be direct, (eg the trauma of involuntary resettlement) or the result of a cascade, where environmental impacts generate economic impacts, and these in turn cause social impacts. Third, social impacts and the environmental or economic impacts from which they stem can be interlocked in complex and profound ways. Positive and negative impacts can both flow from the same environmental change. Fourth, the positive and negative impacts of large dams are not evenly spread and there can be significant disparities in impacts, particularly between more and less wealthy groups and individuals; livelihoods are central to social impacts. Fifth, gender has been a missing element in impact assessments of large dams. Gender is one of the basic relational dynamics through which a community organises itself. Dams affect men and women in very different ways. An analysis of the social impacts of a dam that marginalises gender can produce misleading conclusions, at variance with the realities of both women and men, and the specific ways in which large dams affect them.

There are a number of different ways to refer to those impacted by development projects. This review paper uses the term *Interested and Affected Parties* to refer to the whole range of winners and losers from dam construction.

The debate on equity revolves around three main axes, which also reflect the divergence of views and perspectives. The first axis is based on a general balance-sheet approach where the basic question is whether positive impacts of dams outweigh negative impacts. Proponents of dams tend to hold the view that if all the social and economic implications of most projects are taken into consideration, with clear description of all benefits that accrue to regions and nations as a whole, the advantages of these projects outweigh the disadvantages. For opponents of large dams, if all the social and environmental costs of large dams were taken into account, particularly how land and livelihoods have been affected, the magnitude of the disadvantages of such projects would appear clearly and would call such interventions into question.

The second axis concerns the extent to which those who bear the costs reap the benefits, or have access to the wealth generated by the project and vice-versa. Those who receive more than they lose would be gainers, and the other would be losers. Opponents to large dams claim that displaced populations and riverine communities (losing their traditional sources of livelihood and exposed to water-borne diseases) tend to be net losers as they are generally denied access to the benefits

generated. Proponents point to the trickle down effects of dams and the fact they ultimately benefit society at large, including locally affected groups.

The third axis compares the way the costs (taken separately) or benefits (considered in isolation) of the project are distributed between selected groups, spatially (eg upstream and downstream, or among provinces or riparian countries) or temporally (eg current and future generations) units or administrative entities.

This review paper has focussed on the area of agreement among protagonists of dams, that is some groups of people tend to be net losers from dam projects as they are disproportionately affected by negative effects of dams while almost excluded from access to benefits generated. The paper makes the point that equity is more concerned about protecting the poor and the vulnerable, and that there are principles and good practices that could help strive for a no-loser goal, and where losses are inevitable, turn some or most of the losers into winners.

2. The Social Impacts of Dams

The report offers a framework for the analysis of the positive and negative impacts of dams. At each stage, it sets out the first and second order positive and negative impacts, and the interested and affected party or parties.

Impacts During Planning and Construction
Both positive and negative impacts of the planning phase of dams are fairly minor compared to those that come later. Positive impacts accrue through planning, design and construction. Interested and affected parties include not only contractors, consultants and bankers, but the many workers employed on all aspects of the project, and those who are sustained by the business generated by the planning and construction process. Negative impacts in the planning phase relate to the fear and uncertainty created in the possible project area and problems of land speculation and lack of investment. Land speculation affects small landholders or others (eg women) who have restricted access to legal mechanisms. Once dams have been identified with a form of 'planning blight' governments and businesses become reluctant to invest in infrastructure or business facilities that might be flooded.

Building a Large Dam
The most serious negative impacts of impoundment are due to the trauma of resettlement, or the socio-economic and cultural costs to displaced people who are not resettled. Evacuees face the greatest costs in the relocation stage, particularly where it is rushed. Even if conducted peacefully, compulsory resettlement is stressful because of the way in which people are uprooted from homes and occupations and brought to question their own values. Gender is an important factor in resettlement. Women as marginalised entities within marginalised communities are often forced to shoulder the ordeal of displacement far more intensely. The impacts of resettlement linger long after relocation. Positive impacts of resettlement can only be felt after the initial trauma of displacement has receded. Usually it is the second generation of displaced communities that is in a position to use the resources available to them.

A number of communities face particular problems from reservoir creation, for example people whose landholdings are partially flooded and who only receive compensation for part of their land, people having been wrongly told they would be flooded, and people renting land or homes in affected areas who have no relocation rights and are not compensated. People living in areas selected to host reservoir evacuees can experience diverse negative impacts, including economic competition and forced cultural change.

Impacts at the dam site
Impacts of dam construction at the dam site are associated with the construction activity itself. Dams demand large amounts of un-skilled labour and smaller but significant amounts of skilled labour. Some of the latter may come from surrounding communities, however such people often lack key skills (eg literacy, numeracy) and contacts necessary to obtain jobs. Dam design and construction is often done by private corporations, often from outside the country. A proportion of the investment in the dam that is paid locally stays within the local economy.

A large dam construction labour force creates a demand for a wide range of other products, from specialist sub-contractors and local construction, the service and the transportation industry. Often a town builds up at the dam site, and can be an economic benefit of dam construction. However, much of the economic life of dam construction towns is short-lived, and they can revert to 'ghost-towns' once construction is complete. Unemployment can be a serious problem. Dam site settlements can experience secondary negative impacts due to poor environmental regulation and social service provision. Living conditions in dam towns can be poor, and problems such as sexually transmitted diseases are rife. The 'boom economy' of a dam construction town can present significant challenges to socio-cultural identity, and intangibles such as the loss of sense of place and loss of non-monetised dimensions of livelihood strategies. Women are particularly exposed to such impacts.

Impacts in the Catchment
Dam construction negatively impacts on land use in the catchment far above the reservoir where land-use controls are imposed to reduce soil erosion or maintain water yield (eg a ban on agricultural activity or creation of a National Park). The latter may create certain benefit streams (eg from wildlife tourism), however such developments can impose severe costs on subsistence resource users, particularly indigenous people.

Building Power Lines, Canals, Roads etc.
The construction of power lines, irrigation canals, or access roads have positive impacts through work created in construction, and by allowing access to previously inaccessible areas for pioneer farmers, hunters and vacationers. However, negative impacts mirror these positive impacts when local people lose land or resource rights, or there is speculation in land and resources. In-migrants, whether permanent cultivators or itinerant hunters bring a range of threats such as economic competition, disease, and challenges to established cultural norms and practices.

Impacts of Managing the Reservoir and Managing Floods
Direct positive impacts of reservoir management in the reservoir itself relate chiefly to the possibility of the development of new open-water fisheries. Downstream, positive impacts can occur if dams control damaging floods and protect downstream infrastructure and property, or allow agricultural investment and urban development on the floodplain.

Negative impacts of dam construction in downstream environments result from the dependence of social and economic activity in communities along rivers and within floodplains downstream of dams on natural patterns of river flows. Agriculture, fishing and grazing all depend on annual flood cycles, and social organisation is closely adapted around the changing environment provided by the river. The construction of a dam changes the pattern of flows in the river, and this can severely disrupt agricultural, grazing and fishing economies downstream. Floodplain fields no longer flood and require irrigation; floodplain pastures no longer flood and become the subject of disputed tenure; floodplain fish populations fall and so do fish catches.
Social organisation and economic production for hundreds of kilometres downstream can therefore be disrupted by dam construction, with increased rates of out-migration to find work, reduced land values, changed gender roles and many other impacts. Uncertainty about flooding patterns in any particular year (because downstream communities are not informed of reservoir release plans)

exacerbates these problems. Women and indigenous people can be particularly vulnerable to negative impacts in downstream areas.

Impacts of The Supply of Electricity from Hydropower
The main positive impact of hydroelectric power generation is the increase in power availability. Hydropower is relatively clean in comparison to fossil fuels and it avoids the long-term costs and risks of radioactive fuel storage. It can be relatively cheap over long time periods. Secondary positive impacts of hydropower generation include increased economic activity (industry, commerce, household), and reduced domestic drudgery in electrified households (light, cooking).

Negative impacts of hydroelectric power generation include the impact on non-hydropower electricity producers, the problem of methane from flooded vegetation, and the sometimes very major impacts of hydro-dams on downstream people. Downstream impacts include effects on communities dependent on resource use downstream in floodplain, estuary or delta or coastal environments. Continuous releases, and the possibility of unseasonal floods to meet peak power surges, give hydroelectric dams distinct downstream impacts.

Impacts of The Supply of Water for Irrigation
A major use of the water stored in dams is that of irrigation. In some parts of the world (eg China, India), irrigation is a vital and effective element in both national food production strategies, in local and regional economies, and in household livelihood strategies. Irrigation extends the crop growing season, and with high-yielding seeds. Pesticides, fertilisers and machinery significantly increase agricultural productivity. Benefits include increased food production, increased availability of food and lower consumer food prices, stability of crop production between years, increased labour demand and more stability in labour demand, demand for machinery and crop inputs (and the business this generates), increased household income from irrigation, domestic water supply, and lower commodity and food prices. These positive impacts of the supply of irrigation water are enjoyed by irrigating farmers and their households, local businesses, those who purchase irrigated food crops, and those landless labourers and migrants and their dependents who manage to obtain land or work on irrigation schemes.

Negative impacts of irrigation include problems of inequality (particularly due to unreliable or unequal water supply in space and time), poor returns to irrigating farmers (due to high fixed costs and low yields), and associated debt; high maintenance costs, waterlogging and salinity, high crop protection costs; water borne disease and poor public health. There can be problems with the social distribution of the economic benefits of large-scale irrigation schemes. There can be serious distribution problems, between top-enders and tailenders, between landlords and tenants, between farmers and labourers, and at household level between men and women.

3. Principles for Addressing Dams and Equity

The social impacts of dam construction are extremely diverse and complicated. The positive impacts of irrigation or electricity extend far across the national and even international economy, and extend in time for many years. The negative impacts of resettlement or loss of productivity of downstream floodplain land can also reverberate for several generations. Furthermore, many changes set in train by a dam cannot be simplistically allocated to categories of 'positive' or 'negative' impacts, for very often some gain even while others are losing, and such is human ingenuity that even seriously adverse impacts (eg downstream of a dam) can sometimes be ameliorated as successful individuals adapt.

A series of six key principles are outlined in the report.
a. Equity considerations should be a fundamental element of the process of assessing development options. Planning should compare the equity implications of dams and alternative

development options. Dams should not be built unless they yield clear net social benefits at the national scale. Dams should not increase inequality. The existence of an overall balance between positive and negative impacts should not be taken as the only criteria of a project's acceptability. The distribution of costs and benefits is also important, and heavily impacted groups should not bear uncompensated costs without balancing benefits. The doctrine of eminent domain (the rights of the state to impose change in the public good) should be balanced by recognition of other rights (eg rights to use resources, and customary and community use of land). Equity should be considered across all spatial and temporal scales, and across different social groupings (including men/ women, urban and rural citizens, and the powerful and powerless). The notion of 'interested and affected party' specifically needs to take into account that of gender. Dam projects should not exacerbate existing gender or other social inequalities, but should address them. Institution-building needs to extend beyond the project planning and development phase, and needs to address the issue of restitution for past losses.

b. No large dam should be constructed with the use of violence, harassment, intimidation or undue force. Developmental processes that infringe upon the human rights of any section of society should not be accepted; dam projects and planning should not violate internationally agreed standards of human rights. There should be no use of violence, intimidation, harassment or undue force at any stage of the planning process. Special account should be taken to ensure the particular vulnerability of women to any kind of violence associated with dam construction.

c. Analysis of the impacts of dams and other alternatives should consider the totality of impacts including cumulative, off-site (downstream and upstream) and over time. The existing individual and community rights of riverine populations to natural resources that would be affected by planned dams should be recognised in assessing potential losses and in devising mitigation measures. Ignorance of customary law and local understandings of access to, and control over, resources must be avoided. Project appraisal should be broadened to include unquantifiable social and cultural impacts, and must enable these to carry appropriate weight compared to other quantified criteria in decision-making. The 'Precautionary Principle' should be the foundation of the evaluation of all dam projects.

Dams should not be considered as projects isolated from their broader basin contexts. Assessments of the impacts of dams must include specific consideration of all affected people. Trans-boundary impacts should be recognised and affected people in other jurisdictions should be explicitly considered legitimate interested and affected parties in project evaluation.

d. The negative impacts of dams should be minimised, and the positive impacts maximised. Dam construction should maximise the number of beneficiaries and minimise the number of those suffering negative impacts. The proportion of beneficiaries should be maximised, and planning should seek to turn losers into winners. All people who depend on the natural flow of the river and its associated natural resources for their subsistence should receive just and fair compensation in an appropriate and acceptable form for any loss or injury resulting from dam construction, or be among the primary recipients of benefits generated. Planning should ensure that those that face negative impacts of a dam should be the first beneficiaries of the benefits that flow from it. Vulnerable groups need particular protection and should be particular targets of benefits (indigenous peoples, women etc.). Resettlement should be minimised or avoided wherever possible, because of its high cost in human and economic terms, and the extreme difficulty of mitigating or compensating the negative impacts on evacuees. Compensation for evacuees should where possible be in the form of land for land, territory for territory, commons for commons. Planning should seek to allow negatively impacted people to maintain community integrity and viability. There should be adequate institutional and legislative capacity to address the negative impacts of dams, for example a national

resettlement plan. Resettlement and compensation should be conceived of as a 'development project' and subjected to careful planning, appraisal and monitoring, and evaluation of achievement.

e. Participation by interested and affected parties should be integral to all stages of project planning. Dams should be planned, designed and built with real 'participatory' procedures. Cost/benefit analyses should be balanced by participatory forms of planning involving all actors where all have a say in determining and assessing the nature of the costs and benefits and their effects on their lives, livelihoods and environment, as well as the nature of mitigation. The rights of those directly affected by large dams must include the right to be heard, and the right to information in a complete and culturally appropriate form. Gender-sensitive policies are needed to ensure that women can articulate their fears and apprehensions without intimidation or constraint from state, community or other agencies. Dams should only be built with prior and informed consent expressed through local/community/customary democratic processes. Planning should include institution building as an element of project development, to enable affected communities to engage effectively with planners.

f. A programme to monitor and periodically re-examine the impacts of dam development (particularly in downstream communities) should be an integral element of the planning process. Monitoring studies should be based on pre-project benchmarks (demographic, socio-economic and epidemiological), and should be integrated into the project process. In addition to monitoring, there should be periodic mandatory re-examination of impacts. Monitoring should be matched by resources to mitigate impacts not addressed fully by the planning process. Human rights and key socio-economic parameters should be disaggregated enough in order to capture and address imbalances in the distribution of socio-economic costs and benefits of dams. Special financial, human and institutional resources should be built-in the dam project design to address unanticipated social and economic problems emerging from the monitoring activities. Planning guidelines are useful, but there also needs to be a procedure for any residual grievances to be heard and compensated.

4. Planning for Equity

4.1. Managing Adverse Effects and Addressing Equity a key Stages of the Project Cycle

Good planning can minimise the unexpected impacts of dams through the project cycle. Elements of such planning might include:

Needs Assessment. Ensure that consultation processes used to identify needs are culturally appropriate and inclusive of traditionally marginalised groups (rural dwellers, women, indigenous and tribal people, etc.)

Options Assessment. Compare available options on the basis of their potential equity implications, and use equity as one of the key criteria for making choices.

Design. Undertake a detailed social and risk assessment. Internalise identified impacts as much as possible Use social acceptance in addition to conventional economic and financial analysis in order to decide on the project feasibility. Minimise potential impacts through the selection of the site of the project, its size and specification. Include flexibility in the design for future adjustments to changing contexts and unanticipated impacts. Maximise the spread of benefits in the design specifications of the projects (eg multiple dams where possible). Consider all affected groups, and devise means of minimising social impacts. Conceive resettlement as a development opportunity.

Construction. Ensure local and affected communities' access to employment in construction sites.

Operations. Adjust operations to respond to unanticipated impacts (examples include flood release where it could minimise downstream impacts. Include early warning systems to alert downstream population of operation measures that could affect their lives (opening of floodgates)

Monitoring. Collect baseline information, with data disaggregated enough for the monitoring of differential impacts. Set in place a monitoring system with sound social indicators, and ensure full participation of and consultation with affected communities. Undertake period evaluations of project performance and impacts, and share results with interested parties (including local communities)

Relicensing/decommissioning. Use overall equity performance of the dam as one of the criteria for deciding on its relicensing or decommissioning. In both cases, assess and address anticipated equity consequences.

4.2. Turning Losers into Beneficiaries

The core challenge for those proposing and managing dams is to turn losers (those suffering negative impacts of dams) into beneficiaries. Benefit sharing provides a mechanism for those who pay the costs of dam construction (eg those resettled, and those downstream) to share the benefits of dam construction. A range of benefit sharing mechanisms can be identified. These include preferential rates for electricity or irrigation water, a property tax on the dam or other infrastructure, Royalty payments for rights foregone, revenue sharing or equity sharing. Money from such sources could be paid directly to relevant people, or paid to a Trust Fund or to a Local Government Authority. The extent of social benefits generated by such revenues depends upon the effectiveness of local and regional governments.

In some cases impacted communities can invest as partners or owners in a dam project. Here benefit sharing can be extended to a share in equity or indeed full equity ownership and lead to greater control over the redistribution of benefits and the actual design and operation of the project. Communities that do not have the financial means to invest could be provided with the capital required for an equity partnership by the proponent through a long-term loan as part of compensation for the "natural capital" lost in reservoir impoundment. Alternatively, the community could borrow capital from a lending agency based upon a guarantee that the community's share of the power produced by the project will be sold at an agreed price over a long period of time.

Where benefits are delivered through preferential rates for electricity, they favour consumers who make use of large amounts of power (ie businesses and not households), and do not extend to those without access to electricity. Where not everyone has power, such mechanisms have to be combined with rural electrification programmes whose costs would then have to be included in the calculation of net benefits.

4.3. Participation: Letting People Plan

Dams should be planned, designed and built with real 'participatory' procedures. These should include recognition of the rights of potentially impacted parties to be informed of what is planned, and the right to participate in full project cycle including options assessment, planning, and decommissioning. There needs to be acceptance that development should not go ahead without prior and informed consent expressed through local/community/customary democratic processes, and full transparency in the planning process (eg attention to openness and use of local languages). There needs to be respect for local knowledge and effective involvement of people holding it. Planning processes need to be iterative rather than one-shot, and to take account of changing circumstances, and changing awareness of the positive and negative impacts of the dam.

There need to be negotiated and binding settlements, if appropriate involving benefit sharing. Once planning is completed, there needs to be participatory monitoring and evaluation against pre-project benchmark studies in all phases of the dam's life. Where problems develop unforeseen, there need to be procedures for dispute resolution, legal appeal and redress. There need to be mechanisms for independent review. Some groups are less able to benefit from dams (or avoid costs) than others. There is a need to devise ways to empower stakeholders and mediate among conflicting interests (between different local communities, and between affected communities and the state/corporation).

The creation of equitable and legitimate dam projects must involve more than improved planning processes. Participatory planning procedures (while challenging) are one step towards re-linking project planners and the communities their project impacts. However, there is also a need to devise institutions through which affected communities can seek independent review of their situation.

The appraisal of dams must be more holistic, and technical assessments must take account of the distribution of impacts (positive and negative) as well as the overall balance of costs and benefits. There are practical limits to what can be quantified, and there are genuinely intangible socio-cultural variables of importance. Appraisal methodologies muss enable qualitative information to carry due weight in decision-making. Because of the magnitude and complexity of their impacts, dams demand the most advanced techniques of open, transparent and accountable appraisal. Close attention needs to be paid to advances in technical planning procedures such as multi-criteria decision-making or citizens' juries. The details of these methodologies are beyond the scope of this report, but it is clear that there should be strenuous efforts to share experiences of successful open and participatory planning internationally, and to disseminate effective models of best practice throughout the world, across different experiences of governance and civil society.

Social impact assessment can identify risks and can explore remedies. The principles of equity affirm the importance of these concerns at the earliest stage of a project. The rights of those at risk to be heard, to have their rights recognised and respected, are the starting point of equity. The fairness of a development process will, in due course, turn out to be inseparable from its cumulative costs: if vulnerable people are not brought into a collaborative process, then the risks to their wellbeing can only be compounded. These risks will become costs to a project, and will repeatedly have the potential to breach principles of equity.

After decades of acrimony, there is an opportunity for new principles of dam planning that copy best practice and build on a foundation of concern for equity.

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1. Introduction

1.1 Aims of this Thematic Review

This review aims:
1. to address critical knowledge gaps about the positive and negative impacts of dam projects.
2. to review state of knowledge about the distribution of those impacts in space, across the economy, and socially (by wealth, gender, ethnicity etc.).
3. to review available planning approaches and deliberative procedures used to identify and mitigate impacts, or influence their distribution of impacts to improve equity and justice in their distribution (eg between rich/poor, men/women, powerful/powerless).
4. to provide a framework within which the complex patterns of distribution of positive and negative impacts can be appreciated.

It is **not** the purpose of this review to try to answer the much broader question of whether dams are on balance, a good thing. That is part of the function of the work of the World Commission on Dams (WCD) as a whole.

1.2 Debates about Dams

The debate about the social impacts of dams is both complex and fiercely argued. The debate involves several discrete dimensions;

1. **Facts**: There are arguments about the facts of the nature and scale of negative impacts (eg the number or people displaced, the extent of disruption to the lives and livelihoods of people downstream), and about the benefits claimed for dams (the economic and social benefits of electricity generation, water supply, flood control or irrigation).
2. **Overall Balance of Costs and Benefits**: There is argument about whether on balance the positive economic benefits of dams (eg flood control, electricity, irrigation water) outweigh the costs (eg disrupted downstream economies, full costs of resettlement).
3. **Distribution and Equity**: There are arguments about the way in which positive and negative impacts are distributed, between people (eg between evacuees and electricity consumers, or between men and women among either group), and whether such a distribution is equitable. There has been particular concern about the impacts on indigenous people and women, and all reservoir evacuees. Issues of equity concern the normative issues of fairness or justice of the existing or planned distribution of impacts (between areas, between groups of people, between genders, between 'winners' and 'losers').

Advocates of dams tend to emphasise the benefits of dam construction (ICOLD 1981, Turfan 1999). Typical benefits are set out in Table 1.1. Arguments about the benefits of dams, and the approach that should be taken to their negative impacts, typically include the following:

1) Dams provide essential services and benefits, including the supply of water (for irrigation, drinking water, sanitation or manufacturing), electricity and flood control. These are inputs or intermediate goods and services for economic activities that have the potential to deliver widespread improvements in incomes, employment and food security.
2) In many countries (eg India, Pakistan, China), a significant proportion of food production is dependent on irrigation, and that proportion is likely to increase markedly globally through the twenty first century. Dams can provide an essential means of sustaining and expanding irrigated agricultural production, and hence food security, food independence and the potential for agricultural produce trade. Population growth will increase national and global food demand and increase the need for dams to supply water.
3) Dams are designed to alter the distribution of water in space and time, and social impacts on those using the water before or after construction are therefore inevitable. However, these impacts can be

positive (eg supply of water to new users, reduced flood risk) as well as negative (eg reduced opportunity for floodplain agriculture, involuntary resettlement).
4) Negative impacts can be fully compensated, if the dam project as a whole generates net benefits; careful planning and good design can avoid or minimise adverse impacts.
5) Development planning involves making choices about where and how to invest, and there are likely to be winners and losers from all such decisions. Dams are no exception to this rule
6) Alternatives to dams have significant environmental, health and social costs (eg in the case of hydropower, the impacts of coal burning or nuclear power stations).
7) The critical question about dams is not the severity of negative impacts in isolation losses, but the overall balance of costs and benefits, and the adequacy and efficiency of measures to compensate losers. It is important to look at the larger picture of distribution of costs and benefits across all major groups, first to confirm if in fact dams deliver more benefits than costs, and second because the natural sources of funds to compensate the potential losers are the gains of the potential winners.

The opponents of dams make a series of different arguments, emphasising their negative social impacts (eg Baviskar 1995, Goldsmith and Hildyard 1984, Pearce 1992, McCully 1996, Usher 1997):

1) Economic and social costs are considerable, and often have not been taken fully into account in the appraisal of dam projects.
2) Some costs are tangible (eg lost houses, fields or forests), but others are intangible (eg loss of heritage, culture). Both are important.
3) Costs are borne by the particular groups of people, particularly the poorest and least powerful (tribal groups, women, remote rural dwellers); these people are unable to enjoy benefits of the dam (eg irrigation or cheap power). There is therefore an unequal distribution of costs and benefits both socially and spatially.
4) Although these problems are recognised by governments, donors, and professional groups, they are not being overcome effectively because of the inherent rigidities of the dam design process and the inherent complexities of the impacts (eg in remote downstream locations): the surveys necessary to predict impacts take place too late in the design process, and are often not extensive enough to influence the decision to build; they can therefore do no more than provide a basis for compensation or mitigation.
5) The costs of full compensation or mitigation can be so great that they are often not met in full.
6) The complexity of the problems created by dams are such that they cannot always be fully mitigated or compensated. Dams therefore impose net costs on certain groups or categories of people.
7) Calculations of benefit-cost ratios or net present value tend to overestimate direct or primary benefits and fail to take full account of the magnitude of costs, and the distribution of all costs and benefits, particularly those that are secondary or indirect.
8) Those who lose often lack an effective channel for seeking justice, and certainly lack influence on the decision to construct the dam at any stage.
9) Not all impacts can be expressed in economic terms, and these are not effectively captured by any economic approach to the calculation of costs and benefits: for example an attempt to put a money value on a flooded sacred site or ancestor's grave is both theoretically problematic and likely to lack legitimacy among local stakeholders. Legitimate grievances can therefore remain even when there has been a careful compensatory process using a 'cost-benefit' framework.
10) Actual practice lags way behind best practice in many parts of the world, particularly where the institutions of formal civil society (media, access to law, openness of government) are weak.

The negative impacts of many dams already constructed are serious and not in doubt, although in some particular instances they are denied by national planning authorities (sometimes in the face of attempted legal challenge by aggrieved parties), and public discussion of the negative impacts of particular dams, and serious research on those impacts by official bodies (banks and aid donors, engineering bodies or commercial companies) is still limited.

However, the negative impacts of dams is in principle widely recognised by all sides of the dams debate. The difference between proponents and opponents of dams lies principally in two areas:

1. There are different views of the extent to which negative impacts can be avoided, mitigated or compensated (and the adequacy of technical and planning procedures to achieve this);
2. There are different views of the extent to which negative impacts that are inequitably distributed (eg on evacuees and downstream populations) are acceptable.

All dams cause environmental, social and economic change. As Brody (1999) points out, 'most dams take a set of resources - a river and the lands along its banks, generating food and livelihood for local people; and transform them into another set of resources - a reservoir, hydro power and irrigation, providing benefits to people living elsewhere'. There are important issues of distribution and equity in that transformation.

1.3 Social Impacts

This Thematic Review is tasked with reviewing the 'social impacts' of dams. These may be defined as 'impacts on the lives of individual people or groups or categories of people, or forms of social organisation'. Social impacts need to be seen as separate from environmental or economic impacts though all of these are interlinked and impinge on each other. Impacts on community organisation, kinship or culture, or on relationships within a community, fall in the realm of the social as distinct from the economic or the environmental impacts of dams.

Communities affected by dams are not homogenous and therefore it follows that social impacts of dams would have differential implications for the different constituents of these communities. Social impacts include both positive and negative impacts and have to be assessed over a time frame that includes all the various stages in dam planning, execution and after construction. As both benefits and losses occur within a dynamic context whereby changes effected by large dams bring upon communities manifold transitions, various groups within communities affected are impacted differentially.

The unfolding and manifestation of the social impacts of large dams occur over a long time period. Social impacts depend on many factors like ethnicity, gender, caste or class groupings and so on. As dams usually have long gestation periods differential impacts are felt over at least a couple of generations if not more. Social impacts can be experienced as direct or indirect impacts, which have several direct and indirect consequences. All these factors lend complexity to an assessment of social impacts at any given time period.

There are several basic points that need to be made at the outset of the discussion:

Positive and Negative Impacts:
Most dams cause a complex trail of impacts. Social impacts can be positive (eg improved welfare resulting from new access to irrigation water) or negative (eg resettlement, decline of downstream fisheries due to flood control). The pro-dam movement has traditionally emphasised the positive economic and social impacts, and the anti-dam movement has focused on negative impacts. Each has tended to ignore the other. This report attempts to be neutral in its terminology. It will refer to impacts in the generic sense to include both positive and negative impacts. Where relevant, it will label impacts 'positive' and 'negative'.

Direct and Indirect Impacts
Social impacts can be direct, like the trauma of involuntary resettlement, or the result of a cascade, where environmental impacts generate economic impacts, and these in turn cause social impacts. In this context, changed river flooding patterns downstream of a dam can reduce fish populations; the

impact of this on economic returns from fishing has many social impacts. For example, it can cause increased levels of out-migration of male fish catchers. Which in turn can be positive or negative for women in the community. In either case, it brings about changes in the social and gender relations that govern the communities so affected. It can also change the social organisation of communities dependent on fishing for their livelihoods. Changes in livelihood patterns can have multi-layered impacts on the social and cultural norms that govern relationships between women and men in the household and between other social groupings in the community. Direct and indirect impacts may be referred to as primary and secondary impacts (see Table 3.1).

The Complexity of Impacts:
Social impacts and the environmental or economic impacts from which they stem can be interlocked in complex and profound ways. Positive and negative impacts can both flow from the same environmental change. For example reduced downstream flooding can potentially prove to be a boon to riverside infrastructure threatened by floods. On the other hand it can be a bane to farmers whose wells dry out for lack of high floods to recharge the shallow floodplain aquifer. Reduced flooding and drying out of wells have multiple social impacts.

Communities are made up of many interlinked and yet distinct constituencies, and the trajectories of the impacts of these changes can follow many directions simultaneously. An assessment of social impacts has to account for the diverse ways in which communities negotiate these changes in everyday life.

Material Social Impacts:
While the focus of concern about adverse social impacts must be human rights, and culture and social norms, it is important that these are not seen as restricted to non-material dimensions. The question of livelihoods is central to social impacts. Material changes interact with and inform social changes therefore the discussion must address economic as well as cultural dimensions of the transformations effected by large dams; it is important that 'social impacts' are seen to embrace economic issues. The positive and negative impacts of large dams are not spread evenly, and as impacted communities are themselves heterogeneous, there can be significant disparities in impacts, particularly between more and less wealthy groups and individuals.

Positive impacts like increased access to irrigation and electricity can bring about an enhancement of material choices for entire communities or for some sections within communities. Similarly, improved access to means of communication and information can usher in new forms of social and economic mobility. It is important to account for the ways in which these material gains can bring about qualitative changes. Similarly, restricted economic choices or a drop in living standards can have implications for the cultural and social cohesion of a community.

Gender:
Gender has often been a missing element in impact assessments of large dams. Gender is the one of the basic relational dynamics through which a community organises itself (Mehta & Srinavasan 1999). Gender plays itself out as a struggle over resources and labour in the family, community or nation. It also constitutes the axis of power relationships that determine the social, familial and institutional locations of women and men. Dams affect men and women in very different ways. Genderless categorisation of the community, the state and its institutions, have tended to conceal the complexities of everyday exchanges between women and men. An analysis of the social impacts of a dam that marginalises gender can produce misleading conclusions, at variance with the realities of both women and men and the specific ways in which large dams affect them (Mehta & Srinavasan 1999).

Some social impacts of large dams have been extensively documented, especially those negative impacts associated with involuntary resettlement and population displacement. These are discussed in the World Commission on Dams (WCD) Thematic Reviews on *Displacement, Resettlement, Rehabilitation, Reparation and Development* (de Wet et al, 1999), and on *Dams, Indigenous People and Vulnerable Ethnic Minorities* (Colchester 1999). This Review needs to be read alongside these documents. It also needs to be read alongside the Thematic Reviews on irrigation, on financial, economic and distributional analysis and project appraisal.

1.4 Project Affected People: Interested and Affected Parties

Three key questions about social impacts are:
1. Who is impacted by dam construction?
2. How are these impacts experienced?
3. How are impacts distributed between different groups or categories of people?

There are a number of different ways to refer to those impacted by development projects. The Terms of Reference for this study referred to 'Project Affected People', and such a term works well for those now widely recognised to be suffering negative impacts, particularly those subject to involuntary resettlement (de Wet *et al,* 1999, Colchester 1999), and those losing livelihood security through downstream impacts (Adams 2000). However, if social impacts are recognised as both positive and negative, the term is less successful, since it carries an overtone that implies negative impacts. Furthermore, the range of possible winners and losers is very wide indeed (Table 1.1).

Among those who are positively impacted by dams are those in urban areas enjoying cheap electricity, contractors successfully bidding for parts of the construction contract, and conceivably even politicians who are re-elected because of the flows of benefits from a new dam. None of these can be comfortably described as a 'project affected person'.

Table 1.1 Potential Winners and Losers from Dam Construction

Winners
Landowners and farmers (and landless people working on farms) supplied with irrigation water
Domestic consumers of electricity generated
Owners and employees of industry supplied with power
Urban and rural purchasers of food when declines in real food prices can be attributed to increased irrigated output
Domestic consumers of water supplied by the dam
Those with businesses in the new reservoir (fishing, tourism)
Owners of and workers in infrastructure protected from floods
People economically engaged in the commodity chain of irrigated crops (traders, processors, consumers)
Secondary and tertiary beneficiaries of economic gains resulting from the dam (eg employees of those enriched, sellers of goods and services, beneficiaries of enhanced state tax revenue eg in the fork of better health or education)
Organisations lending money for dam construction
Consulting and construction firms
Losers
Evacuees from the reservoir and other areas
Those losing access to natural capital as a result of a reservoir
Those losing resources to irrigation canals or power lines
Those influenced by the construction process except through loss or degradation of resource base
Downstream floodplain resource users (fish-catchers, farmers, pastoralists)

Particular ethnic groups (eg tribal people, indigenous people), the less educated, the poorest, women as opposed to men; (women and men can both be beneficiaries and losers, but among losers women's needs tend to be least acknowledged and attended to).

The concepts of 'winners' and 'losers' are too simplistic as a basis for thinking about the impacts of dams. People who experience impacts may experience both positive and negative effects - involuntary relocatees, for example, may experience certain benefits, and new irrigation farmers might experience certain negative impacts. The nature of positive and negative impacts changes over time (as secondary and tertiary impacts come into play, and not all are easily anticipated; different groups (and different individuals) may evaluate impacts differently).

The term 'project affected people' is better than 'losers and winners', yet it too is unsatisfactory. Among those who are positively impacted by dams are those in urban areas enjoying cheap electricity, contractors successfully bidding for parts of the construction contract, and conceivably even politicians who are re-elected because of the flows of benefits from a new dam. None of these can be comfortably described as a 'project affected person'.

The London Seminar on Social Impacts of Large Dams in January 2000 reviewed a range of terms for those affected by dams, including 'stakeholders' and 'interest groups/*groupes concernée*'. Such terms have become common in planning in some industrialised countries, although they tend to imply that planners should give exactly the same weight to the interests of both major corporate or bureaucratic players and individuals and groups of relatively powerless negatively impacted people. This might be realistic, but it hardly meets the challenge laid down by the anti-dam movement to recognise and give standing to those suffering negative impacts, and to address their needs. The London Seminar proposed the term **'Interested and Affected Parties'** as a better way to refer to the whole range of winners and losers from dam construction. It should be noted that each of the groups or categories in 'interested and affected parties' are heterogeneous and gendered.

1.5 Equity and Distribution

Conventional thinking about equity and distribution, both by those who are proponents of dams and those who oppose them, tend to start from the principle that all the costs and benefits of projects should be set out in full and analysed (Brody 2000). Proponents of large dams take the view that if all the social and economic implications of most projects are set out in full, with clear descriptions of all benefits that accrue to regions and nations as a whole, and a full account is presented of how the dam will meet predicted needs for irrigation, clean water, and energy, then the advantages of these projects can be seen to outweigh the disadvantages. This is not to argue that disadvantages do not exist, but that the sum of impacts has often been on such a scale as to justify many existing dams, and to make projects of this kind a desirable and necessary component in future development.

Opponents of dams tend to take the view that if all the social and environmental costs of such projects are set out in full, with accurate detailing of how lands and livelihoods have been damaged or lost, and the sum of human misery is added up in full, and, at the same time, the potential of alternative sources of water and energy are considered with due care, then the disadvantages of such projects can be seen to be so immense, and doubts about their advantages so compelling, as to call most if not all such developments into question.

An approach of this kind is a well-tried analytical strategy, one capable of yielding important insights into the impacts of dams. However, it will probably not deliver any overall or final judgements about the rightness or wrongness of a project. It is important to recognise that issues of equity and distribution arise in relation to the negative impacts of dams. They are not necessarily of any help

when it comes to seeking an overall judgement about the rightness or wrongness of a project (Brody 2000).

Those familiar with particular dams know that arguments about whether they should or should not have been commissioned or built, are not resolved by an actual or hypothetical framework of equity, distribution and social impacts that aims to balance positive against negative affects. Those in support of such projects continue to point to benefits that are not factored in or are under-stated; those against them continue to identify the harm to communities and environments that, from their point of view, make the projects unacceptable. The debate usually goes nowhere.

In this standard approach, issues of equity and distribution are being expected to resolve matters of overall judgement about the overall "rightness" of a project. In fact, the real value that the concepts of equity and distribution lies elsewhere. Historically in the UK, in the course of defining the relationship between law and equity, two crucial principles emerged. The first is that rights have to be balanced against one another. Equity acknowledges that **different people have different kinds of rights, but fairness requires that these be worked out despite inequalities of power**. To achieve this, they must come to the court together and look for agreement. Also, in coming to equity, they accept a second principle: that one party's rights cannot extinguish another partys rights (Brody 2000). Equity therefore begins with a possible injustice, and then centres on collaboration and acknowledgement of rights as a way of reaching a "fair" or "equitable" resolution. This provides a useful clue as to how the issue of equity might best be relied on in the WCD review of social impacts.

Concerns with equity and equitable distribution have become axioms of social and political ideals, as well as matters of everyday "common sense". Questions of equity and distribution arise for all large-scale projects, even where their benefits are both great and predictable. Development that increases production and wealth in society as a whole but which reduces the living standards for some, or increases relative inequality, may be seen to be both unwelcome and inequitable. The principles of equity and distribution, and therefore the guiding principles for social impact assessment, must speak to concerns about fairness and justice for people in relation to any large dam (Brody 2000).

The wealth of a nation lies in its resources, and in the way it uses and distributes them. It may be said that a central right of a nation is to develop its wealth. This applies to water resources. Different groups of people will have different relationships to any given water resource (such as a river), and a dam has the potential to change these relationships, for better and for worse. The principles of equity suggest that **no one group's rights can be allowed to extinguish the rights of others; and that people must work out together how rival or conflicting rights are going to be balanced.** Thus the right of a nation to make use of its water resources as part of a development process must be seen within the context of the rights of those whose lands and lives depend on the water resource either not being so developed, or being developed in some other way. The issue of equity arises in opposition to these conflicting rights: each side must acknowledge and respect the other, and this must be done as part of an ongoing process. However unequal the balances of political and economic power between the upholders of these opposing rights, neither side can rely on one set of rights being overwhelmed by the other (Brody 2000).

Equity suggests, therefore, that justice is served by a collaborative process of development. If imbalance of political or material power is allowed to obstruct this collaboration, then a principle of equity has been breached. Similarly, if those seeking to change the resource do so without respecting and securing the rights of those at risk, then another principle of equity has been breached. Equity requires that wealth be developed with respect for the interests of all.

The decision to develop a resource, and build a large dam, thus turns on both the right to development and the rights of those whose lands and lives will be transformed by development. The point of

separating these interests, and remaining aware of the right of a nation, on the one hand, and the rights of its communities, on the other, lies in the risks that attach to all large-scale developments. Concern about large-scale developments centres on risks to people, especially those whose lands and lives are most obviously dependent on things that are going to change.

The issue of equity arises when an injustice is deemed to have taken place. Equity does not speak to the benefits of a project, but to its costs. In particular, it directs attention to those who are most at risk - the people whose interests are least likely to be known, acknowledged and protected. Thus equity and risk point to the vulnerabilities of isolated and small populations, indigenous cultures, women and all those for whom development can all too easily mean loss. To be concerned with equity, therefore, is to pay special attention to those at risk. Similarly, the issue of distribution arises in relation to those who will not benefit from a project, and is concerned with identifying where distribution of benefits has the potential to be unfair. This does not address the overall or macro-economic nature of distribution, but focuses, like equity, on those at risk of losing rather than gaining. The issues of equity and distribution should be linked with risks. They raise questions about who is at risk and in what ways risks can and should be minimised (Brody 2000).

A principle of equity can be stated simply as 'worst affected most protected.' Equity issues arise in projects irrespective of their cost-benefit ratios. A project whose benefits, at the macro level, are beyond dispute still can raise issues of equity - there can be individuals, families, communities, sections of community and local environments that are at risk. The task of setting out the benefits that large-scale hydro and irrigation projects have brought in the past, and could bring in the future, is separate from issues of equity, distribution and risk. It may be the case that a particular project gives rise to so many risks, and raises such profound issues of equity and distribution, as to raise overwhelming objections to its development. However, the principles of equity are relevant whatever the scale of the risks - it is the particular task of an analysis of equity to identify the potential for unfairness whatever the overall context of actual or predicted benefits.

2. Towards a Holistic Assessment of Dams

2.1 Costs and Benefits of Dams

Traditional assessments of dams have focused on their economic direct costs (the investment to build a dam and the annual costs of operating it, versus the direct benefits expected from the stream of services (water, power, flood protection. etc.) that the dam will provide. The methodologies of project appraisal are well-developed and increasingly sophisticated. They are reviewed in texts such as Curry and Weiss (2000), and in the WCD Thematic Review on Financial, Economic and Distributional Analysis (McKenney *et al,* 1999).

Critics have repeatedly and convincingly pointed out that most economic assessments tend to overestimate benefits and underestimate costs. In particular, they argue that economic assessments tend to overlook indirect and opportunity costs to riparian environments and people (eg floodplain environmental impacts, loss of natural resources, loss of production opportunities, forced resettlement, social dislocation, etc.), and they fail to deal adequately with non-quantifiable socio-cultural costs. Economic assessments may also fail to account for some indirect benefits (eg local jobs, improved services, local economic growth, the benefits of lower food prices, reduced flood damage, or reduced impacts from alternative development options, eg pollution from coal power stations). There are a series of forms of social impact that are inadequately understood, for example the gender dimensions of social impacts (Mehta & Srinavasan 1999) and the impacts of dams on downstream environments (Adams 2000). There is also too little quantitative research on the indirect or secondary benefits of dams through irrigation, water supply, flood control or power supply, although these benefits are widely (often correctly) taken for granted.

The critical question for an economic appraisal is whether costs are balanced by benefits. If they are, then even if the two are distributed inequitably there is the possibility of devising policies to mitigate impacts or compensate losers for the economic costs they bear. If overall benefits do not outweigh costs, then while a minority may gain, society in aggregate loses, and some people are likely to lose significantly more than others and cannot be fully compensated. Of course, even in such cases, there are still likely to be beneficiaries, such as farmers who get irrigation water, or those who are involved in dam construction. It is precisely the unequal distribution of costs and benefits that, in some political contexts, allows such projects to go ahead even though costs exceed benefits. The overall balance of impacts and their social distribution are separate. But both are important.

Equity and distribution are the key issues that emerge in any discussion on the social impacts of large dams, as is evident from the thematic papers on social impacts. Defining equity from the point of view of the communities affected by large dams requires an understanding of both positive and negative impacts that goes beyond an economistic framework.

Central to the formulation of equity principles are the enumeration not only of tangible costs and benefits, but also the intangibles. The exercise is both qualitative as well as quantitative. There is no denying the importance of some quantitative parameters to measure standards of living in terms of assets such as land, cattle, common property resources, nutritional intake. However, it is important also to focus on what cannot be measured such as cultural identity, social structures, well-being, or political power. This emphasis is essential because these do not fall within the ambit of economistic yardsticks, which tend to be reductionist and narrow in their approach. In the case of displacement loss of cultural identity is intangible. Likewise knowledge systems that are rendered redundant because of loss of forests or other familiar terrain are usually not accounted for. These and other comparable losses are social losses and have long-term implications for the communities that are displaced. As these social and familial losses manifest themselves differentially across gender, their implications are also differential for women and men. Additionally, economic indicators do not cover

those activities that do not fall under a monetised economy. These activities are often central to the way a community, household or individual organise, accumulate and use resources. It is important to consider production of goods outside of the market. The provision of goods and services to the household has to be included in a measurement of costs or benefits. Changes in time allocation for different activities within the household as direct or indirect effects of dams should be looked into (Ferradas 1999).

In terms of gender, social differentiation between women and men demarcates specific spaces and roles for each. An examination of these roles reveals that women's labour within the household and outside is often unaccounted for. As social practices often exclude women from public spaces like markets or political institutions, they are rendered invisible. This invisibility of women in statistics and the policies that ensue from this data renders women's labour as an intangible. For example, how would we cost women's roles in nurturing and providing for the family? How would we account for the amount of time women usually spend in collecting fuel, fodder or water? These examples are pointers to the ways in which women are and can be excluded from official data.

In terms of the positive impacts of dams, increased social mobility and leisure time and enhancing of life choices are intangibles that need to be taken into account. Dams can increase the cultural capital of the beneficiaries, for example by increasing access to information. This too is not easily accounted for in an quantiative framework. These benefits are not spread evenly in society and its implications for equity and distribution are obvious. For example, women may find that their economic mobility has increased as a result of dams, but this may not necessarily translate into an increase in social status.

Thus costs and benefits have to be seen within a broader framework that acknowledges the heterogeneity of communities and the multi-layered nature of the social impacts of large dams. Unless cultural, social and political dimensions are included, it is unlikely that a holistic picture of either costs or benefits will emerge.

It is possible to compare the direct positive and negative economic impacts in the case of any individual dam. It is also relatively easy to single out cases of underestimated costs (eg the predicament of displaced and uncompensated people), or of grossly unequal distribution of the costs and benefits of dam construction (eg the large gains accruing to aluminium industries supplied with huge amounts of below-cost power).

However, a full distributional analysis of all direct and indirect costs and benefits and their distribution is less easy. It would require detailed information on the original situation, on the project's performance, and the well-being of affected people, through time. These data would be needed not only at a local scale but also regionally and nationally, since the costs and benefits of large projects can be spread through the country, and beyond. The first payer is not necessarily the last one: the government will repay itself from taxpayers, and producers from final consumers, all this requiring detailed modelling. Even if such information is available, as time goes by it is increasingly difficult to isolate the effects of a particular project from its broader context. Desk studies re-analysing inadequate data to generate a retrospective statement of overall costs and benefits can only take us so far towards understanding the distribution of the impacts of dam construction.

The World Bank has attempted to estimate direct costs and benefits and social and environmental indirect costs of 50 large-dam projects (World Bank 1996). Benefits analysed were power generation, agricultural irrigation, water supply, and flood control (and are net of all costs other than dam costs). Estimated or measured costs included resettlement, health, fisheries, natural habitat, watershed and sedimentation, downstream effects, and incremental social and environmental costs. This study is controversial and inherently risky.

It is **controversial** for several reasons:

The data on which the analysis is based are poor. Many of the critical categories of data have never been collected, even for major dams funded by multilateral donors. Few figures are available other than power and irrigation benefits. To obtain resettlement costs, the last available figures of actualdisplaced population were multiplied by an "appropriate resettlement cost" of 5 times national per capita GNP. Lump sums were estimated to cover health impacts, loss of fisheries, loss of natural habitat and downstream impacts. Many indirect costs and all indirect benefits have been omitted from this analysis (eg reduced carbon emissions, better local infrastructure, regional or national secondary effects).

Unless data are collected as a standard procedure on social impacts it will not be possible to begin the task of assessing economic distribution of costs and benefits in a systematic and professional matter. It is clear that despite the sofistication of project assessment procedures, the collection of data on social impacts is not yet seen as a necessary element in dam planning, construction or funding.

Figures used in the analysis depend on gross and generalised assumptions about costs. In some cases, these assumptions affect the calculation of benefits and costs significantly (for better or worse). Again, more and better data are needed.

The calculation ignores all impacts that cannot easily be shrunk to an economic calculus: it therefore by definition ignores a wide range of critical social impacts.

The analysis is **risky** for the following reasons:

Hard numbers (however crudely generated) command attention from planners. Once created, such numbers become divorced from warnings about their reliability, and are used in decision-making by donor and government decision-makers. If such numbers are wrong, or omit vital areas, they can be dangerously misleading.

Hard numbers saturate the decision-making process. Things that can be quantified tend to dominate decisions at the expense of things that cannot be quantified. Vital social costs are not quantifiable. There is a danger therefore that they will be less fully incorporated in project evaluation.

Despite the very poor quantity and quality of the information, the World Bank study allows some broad reflections on the overall economic impacts of dams (Gutman 1999).

First, it is clear that the purposes of dams are significant in terms of the broad pattern of distribution of costs and benefits between urban and rural areas. The benefits of hydropower dams tend to be experienced in urban areas, while the benefits of irrigation or multipurpose dams are captured in rural areas, particularly in the form of increased income from irrigated farming, and increased availability of food in the local markets. Those outside the money economy (eg subsistence producers and tribal people) who lose access to natural capital do not usually share benefits. Most of the rural services of multipurpose dams are offered either for free (eg flood protection), or at nominal cost, and hence in this case subsidies go from the city taxpayers to the rural population.

Second, some dams do result in more costs than benefits, and infringe accepted equity goals (Gutman 1999). One example here is the Chixoy dam, completed in 1985 on the Chixoy River in Guatemala with 60MW of capacity to generate some 1,300GWh per year to major cities. It was proposed and evaluated in the early 1970s when expectations of ever increasing oil prices inflated the prospects of any alternative power sources. Engineering studies failed to anticipate severe geological problems

that contributed to cost overruns of 130%, more than three years of construction delays, and serious doubts regarding the useful life of the system. The project was a failure in financial terms, but its social impact was worse. The resettlement of approximately 2 500 Maya Indians was poorly conceived and managed and carried out with violence (Ferradas 1999). It began in 1979 and was still in progress ten years later. Compensation failed to restore pre-project living standards, and the predicament of the local population, both resettled and non-resettled, was tragically worsened by an ongoing civil war. All power benefits accrued to urban areas, but costs were larger than benefits and since the money to pay for the dams came mostly from urban areas taxpayers they experienced net losses (although large domestic and commercial power consumers may be net beneficiaries, if their participation in power consumption is higher than their participation in the tax base). For the rural population the project only had costs: rural taxpayers shouldered part of the project costs, but got no benefits; the displaced population suffered greatly (even if in monetary terms their losses were small compared with other groups). Interestingly, fuller compensation to those resettled would have added little to the project total costs, but then again since the project was a failure across the board, everybody would have been better off without it. It is clear in retrospect that dams such as Chixoy should not have been built (Gutman 1999).

Third, and in contrast to Chixoy, the aggregate data compiled in the World Bank study suggests that some dams have been mostly satisfactory in narrow economic terms for all parties involved, and have rendered overall benefits. This is a more likely outcome in the case of multipurpose dams, since cost and benefits are more widely spread. One example here is the Chungju Dam in Korea, completed in 1984 on the South Han River (Gutman 1999). This provides energy (412MW of capacity) and water for Seoul and adjacent urban areas, irrigation water for 22 000 hectares, and flood protection for rural areas. The project was completed on schedule and with modest cost overruns of 8%. The dam resulted in a reservoir of 9500 ha and required the resettlement 38 670 people that, according to the information available, were fully compensated and relocated successfully. Additional environmental benefits are attributed to the dam, particularly the regulations of discharge in the dry seasons to avoid saline intrusions in the Lower Han River (Gutman 1999).

Fourth, it may be concluded that even where economic benefits have surpassed costs, some groups can end up as significant net losers. One example is the Kedung Ombo Dam, completed in 1993 on the Seran River (Gutman 1999). This provided 30MW of power capacity, irrigation water for 132 000 hectares, increased downstream flood protection (from 20 years to a 100 years return period) and increased urban water supply. The project was implemented on time and with moderate cost overruns (39%). The benefits of this development accrued mostly to rural areas mainly as increased earnings of farmers in the irrigated area (87 000 families, 440 000 people) whose incomes increased between 35% to 150% over pre-project incomes. As food production increased, urban and rural consumers can be presumed also to have participated in the benefits. However, a large proportion of the 27 000 people resettled endure persistent hardship. Compensation was inadequate, and many among the displaced refused the alternatives offered by the government. A 1993 study found that 72% of displaced families were worse off than before.

2.2 Quantifiable and non-quantifiable Impacts

The impacts of dam construction include **quantifiable economic impacts**, in the form of the changed flow of economic costs and benefits resultant of the construction of the dam. These can (in theory at least) be measured quantitatively. They would include firstly reduced or enhanced streams of existing benefits from the river or economic systems supported by the river's water (for example losses from agriculture in the floodplain or the reservoir, or gains in terms of reduced flood damage downstream); secondly, they would include new benefits from new economic activity associated with investment in the dam (eg from the availability of water or power to new areas); thirdly, they would

include other costs associated with investment in the dam (eg the opportunity cost of capital invested in its construction, or secondary benefits of the construction process eg employment).

However, the impacts of a dam also include **unquantifiable socio-cultural impacts**. These are much harder to measure, and may in some cases be impossible to capture in economic terms. These include culture; political identity, freedom, mobility, the impacts of 'modernity', and knowledge (both knowledge made redundant and knowledge gained).

Vulnerable communities, and particularly women, children and the elderly, tend to be impacted by dams in ways that require an evaluation that goes beyond the economic impacts of loss of land or other resources, property or livelihoods (Mehta & Srinivasan 1999). Affected communities (upstream and downstream) also suffer in non-material ways. Mehta & Srinivasan (1999) point out that communities living along a river often define their existence in terms of their natural surroundings. Thus, for example, the Narmada River in India is a marker of community identity. The river and the valley have shaped the history of communities dependent upon it. Disruption of the continuities that the river and the valley represent in terms of local histories can have traumatic impacts. Brody (1999) describes the significance of place and continuity to those displaced by various Canadian dams.

Even something as 'simple' as access to water has complex social and cultural significance. Women evacuees from the Sardar Sarovar Dam on the Narmada River preferred to have access to clean, free-flowing water in the river than pumped alternative: one of them said of life in the Narmada Valley: “Even if we have to climb up the hill we know it is always there, clean, plentiful, and free-flowing; if we are willing to make the effort, it is there. Similarly with other things...Everything is here for us. All we have to do is go and get it.“ (Quoted in Mehta & Srinivasan 1999). Such loss of access and rights to water needs to be set against any new access to water supplied by the dam or associated irrigation development. There will, of course, be a gender-based equity dimension to that water provision.

Research on gender has been particularly influential in challenging the reductionism of mainstream approaches to the measurement of the distribution and costs and benefits of dams and related development projects (Mehta & Srinivasan 1999). Access and control over resources are intrinsic to issues of both equity and distribution, but this cannot simply be interpreted in narrowly economistic terms. Cost-benefit analysis is predicated on a market valuation of costs and benefits. Markets are not neutral, but are ”ideological sites laden with social and power relations” (Mehta & Srinivasan 1999). Some resources are valued more highly than others (eg irrigated land over common property land, or the formal economic activities of men over the informal economic activities of women). Intangibles such as the loss of livelihood strategies which are non-monetised are hard, perhaps impossible, to price in any satisfactory way. Such intangibles are central to women’s lives and activities (and to men's).

The economic cannot be separated from the social and cultural. Dominant modes of enquiry that represent dominant interests are silent about hidden costs and intangible negative impacts in the socio-cultural domain (such as changes in socio-cultural identity and geographical space). These can be crucial for a community’s sense of well-being. These are not well captured by the quantitative metric of cost-benefit analysis. Hugh Brody comments: “How does a government calculate the earnings from export of hydro power against the dispossession and disorientation of several hundred tribal peoples? ... These are not items that can be converted into dollar values without a serious misrepresentation of what actual losses mean” (Brody 1999).

There is fairly universal acknowledgement that dams do cause 'intangible' impacts of this kind, a vast number of them negative, and that they can be very serious. They certainly add considerable force to many anti-dam protests by local people, although very often they are experienced alongside material

hardships or coercion. To local people protesting about a dam, material and non-material impacts are part of the same problem. There is no fundamental logical boundary between 'tangible' social or 'economic' impacts and 'intangible' social and cultural impacts. Both stem from the same changes, and both hurt. To the analyst or dam planner, they can be logically separated, and moreover the existence of these broader social impacts presents a real challenge to established technical thinking about development, and accepted planning procedures, which privilege the quantifiable and the economic above the un-quantifiable and cultural or social. This problem has several dimensions.

Many wider social impacts do not map in a direct way onto Western worldviews (eg about the significance of the dead, or the non-material values of objects in the landscape), and analysts (trained to thinking in Western terms in their work, whatever their own identity) find it difficult to fit them into their thinking: they may even be resistant to doing so.

Wider social impacts cannot easily be captured by any conventional economic measure. Indeed, they are hard to measure using any standardised yardstick.

Attempts to develop measurement techniques (eg the economists' 'willingness to pay', or 'willingness to accept') are problematic. Such techniques are the subject of much debate in environmental planning (eg the debate about 'critical natural capital'). Are there values that cannot be 'traded off' against economic benefits? Arguably architectural marvels (the Sistine Chapel is the classic case) have a value that is beyond economic price, since any copy or alternative is different and less remarkable. So too, it is arguable that the cultural values of people impacted by dams could be something that cannot be simply reduced to money values.

Measurement techniques usually seek to establish Western monetary rationality as a universal value system. It is precisely because of the rationalism and economism that underlies Western notions of 'development' that projects like dams are conceived of and built. It is assumed that they will be desirable if the balance of costs and benefits are positive. This rather defeats the point of recognising non-Western values in the local environment, social practice or religious belief. Conventional economistic project appraisal is built on the rational materialism of Eighteenth and Nineteenth Century Western thought. This is alien to many of those most adversely affected by dams.

There are several responses to these problems. The first is accommodationist: to seek more and better measurement techniques, to see if some way can be found to relate an economic appraisal of costs and benefits to alternative views of 'development' and its impacts. The second is rejectionist: to argue that the social impacts of dams represent a clash of value systems, and that modernist rationality should not be privileged over indigenous values and knowledges. Both views have their advocates in the pro-dams and anti-dams communities. The solution must lie in seeking deliberative procedures for the assessment of dams that embrace both the efficiencies of economic and technical appraisal (which can, for example, seek to avoid or compensate for negative economic impacts) and the debates about justice and alternative values that arise from a serious consideration of non-quantifiable impacts. These are discussed further in Sections 4 and 5.

2.3 Dams and Gender

It is vital that the impacts of dams are understood in the context of gender. Gender is increasingly recognised as a powerful social and cultural construct determining the ways in which social relations are structured between men and women. It constitutes the entire ambit of relations that govern the social, cultural and economic exchanges between women and men in different arenas from the household to the community, state and multi-lateral agencies. Gender is central to how societies assign roles, responsibilities, resources, and rights between women and men. Allocation, distribution, utilisation and control of resources are thus incumbent upon gender relations embedded in both

ideology and practice. Gender analyses do not merely focus on women but also look at the ways in which men and women interact with each other and the gendered nature of their roles, relations and control over resources. However, gender is not a social function that exists in a vacuum. Caste, class and ethnicity impinge on gender and form a complex matrix.

In most parts of the world, there exist gender biases, which disadvantage women. Gender is not a static concept but differs in different cultural, geographical and historical contexts. It is contingent on factors such as age, class, culture, and history. Therefore, it is wrong to assume homogeneity amongst women. Due to its crosscutting nature, no social or equity and distribution analysis can proceed without a discussion of gender (Mehta & Srinavasan 1999). This is not only because women and men enjoy different kinds of rights within the household, community or kinship structures. It is also because perceptions of well-being, power or powerlessness are all predicated on subjective as well as social and cultural contexts. Thus benefits and losses can have entirely different meanings for women and men.

The impacts of dams tend to increase economic inequalities (between winners and losers, and between households more and less able to cope with impacts). For example, those adversely affected have often been historically disadvantaged by developmental processes. Similarly, within the household on balance those socially vulnerable to begin with, bear a large brunt of the costs. Consumption patterns within households and in the community is often predicated on social and economic location. Large dams often do not bring about any social and economic change and sometimes underscore existing inequalities.

Dams also have significant differential impacts within the household. Many impacts are experienced differentially by gender. Economists conventionally treat 'the household' as the fundamental unit within which resources are shared and allocated, but there can be significant structuring within the household, particularly by gender. When economic impacts are considered, people tend to be dealt with 'as undifferentiated families or households' (Colson 1999, p. 25, quoted in Mehta & Srinivasan 1999). Gendered impacts are easily, and often, missed.

The concept of the household can also be problematic in another way, in that, however defined, household composition is not static. People can join households (through birth, marriage, return from working away), and they leave (through death, emigration and marriage). Any delay between a survey of 'households' and project development, or evacuation or compensation, runs the risk that those affected will be different from those surveyed.

In the case of the Yacyretá dam (Paraguay and Argentina), for example, 'derived households' (new family units within the extended household) were an important problem (Ferradas 1999). Rural-urban migrants frequently hold land in their home area under informal tenure, and it is a classic problem of compensation surveys that such people return to claim their rights before they are extinguished. A hasty survey, or one that takes place without proper advance notification, risks excluding right-holders. Emigration can also be a problem, for example assumptions are made about the availability of household labour to clear new farmland, yet evacuee households have lost male labour to urban areas as they seek to survive economically through the turmoil of a slow or uncertain resettlement programme.

Both the planning of dams and the analysis of their impacts has tended to ignore gender, as if differences between men and women in the household, community or nation simply do not exist (Mehta & Srinivasan 1999):

- People affected by dams are conventionally referred to as 'a genderless entity, rather than as a woman or man with different interests and aspirations' (Mehta & Srinivasan 1999).

- The household is seen as a black box instead of a site where women and men both co-operate with each other or are in conflict with each other (Mehta & Srinivasan 1999).
- The family where gender roles are shaped and cemented is often treated as an undifferentiated unit with convergent interests.
- The community earmarked for either compensation or benefits, is viewed as homogenous with male members usually being targeted.
- Women's needs and interests require a specific priority focus in practice and policy for development to be truly gender-just (Mehta & Srinivasan 1999).

It is important to note that these issues are not alternatives or additional to issues of economic impacts: it is simply that economic, social and environmental impacts are gendered: the issue of gender has to permeate all areas of work on social impacts of dams.

3. The Social Impacts of Dams

3.1 Introduction

The social impacts of dam construction can be analysed in various frameworks:

- **Impacts Geographically**: Impacts occur in a range of different environments:
    1. upstream of the dam, both in the form of resettlement (discussed extensively in a separate Thematic Review, Adams 2000), and in the possibility of economic activities in the newly-created reservoir (fishing, tourism).
    2. upstream of the dam in the wider catchment (eg as a result of measures to control land use change, or in evacuee host communities);
    3. at the dam site, often the focus for economic activity related to the reservoir;
    4. in places where the water from a dam (particularly in the command areas developed for irrigation);
    5. in areas supplied with power from a dam (which may be in urban areas far away, and in the manufacturing sector, or among urban consumers of power).

- **Impacts Through Time**: Impacts are felt at different stages of the development process, from planning though to decommissioning:
    1. planning/design (eg negative impacts on land values; uncertainty; unequal ability of affected people to respond due to unequal access to information; positive economic impacts of planning business)
    2. construction (eg positive and negative impacts of the construction town, negative impacts of resettlement and impacts of altered downstream river flows on floodplain agricultural communities)
    3. operation (eg downstream negative impacts, positive impacts of available irrigation water or power; shrinkage of dam-based employment to a few expert jobs; significance of some negative impacts may fade as people adapt and use unrelated new opportunities in different ways)
    4. decommissioning (eg negative impacts of uncertainty, positive impacts of commercial contracts for decommissioning works).

The impacts of dams can be delayed, occurring some time after project development, and can involve complex sets of second- and third-order impacts, for example a lag in the response of downstream ecosystems to hydrological and geomorphological change. Environmental impacts can also be increased by other developments or natural changes, which have synergistic effects on ecosystems, for example the impact of drought on the discharge of dammed rivers in the Sahel.

- **Analysis by Major Activities**

At the London Seminar on Social Impacts of Large Dams in January 2000, Joseph Milewski led a creation of a framework for the analysis of the positive and negative impacts of dams at the key stages of the project cycle (Table 3.1). This framework is adopted here. The structure is both broadly sequential, but also thematic in that it focuses on different features of a dam's possible purpose and operation:

- Planning a Large Dam
- Building a Large Dam
- Building power lines/access roads/ irrigation canals/other infrastructure
- Impounding/flooding

- Managing the reservoir
- Supplying electricity from hydropower
- Supplying irrigation water from the reservoir
- Supplying water from the reservoir
- Managing Floods
- Refurbishment/Upgrading
- Decommissioning

At each stage, it sets out the following categories:

Positive Impacts

- Main potential positive social impact (1st level)
- Potential secondary positive social impact (2nd level)
- Interested and affected party/parties

Negative Impacts

- Main potential negative social impact (1st level)
- Potential secondary negative social impact (2nd level)
- Interested and affected parties

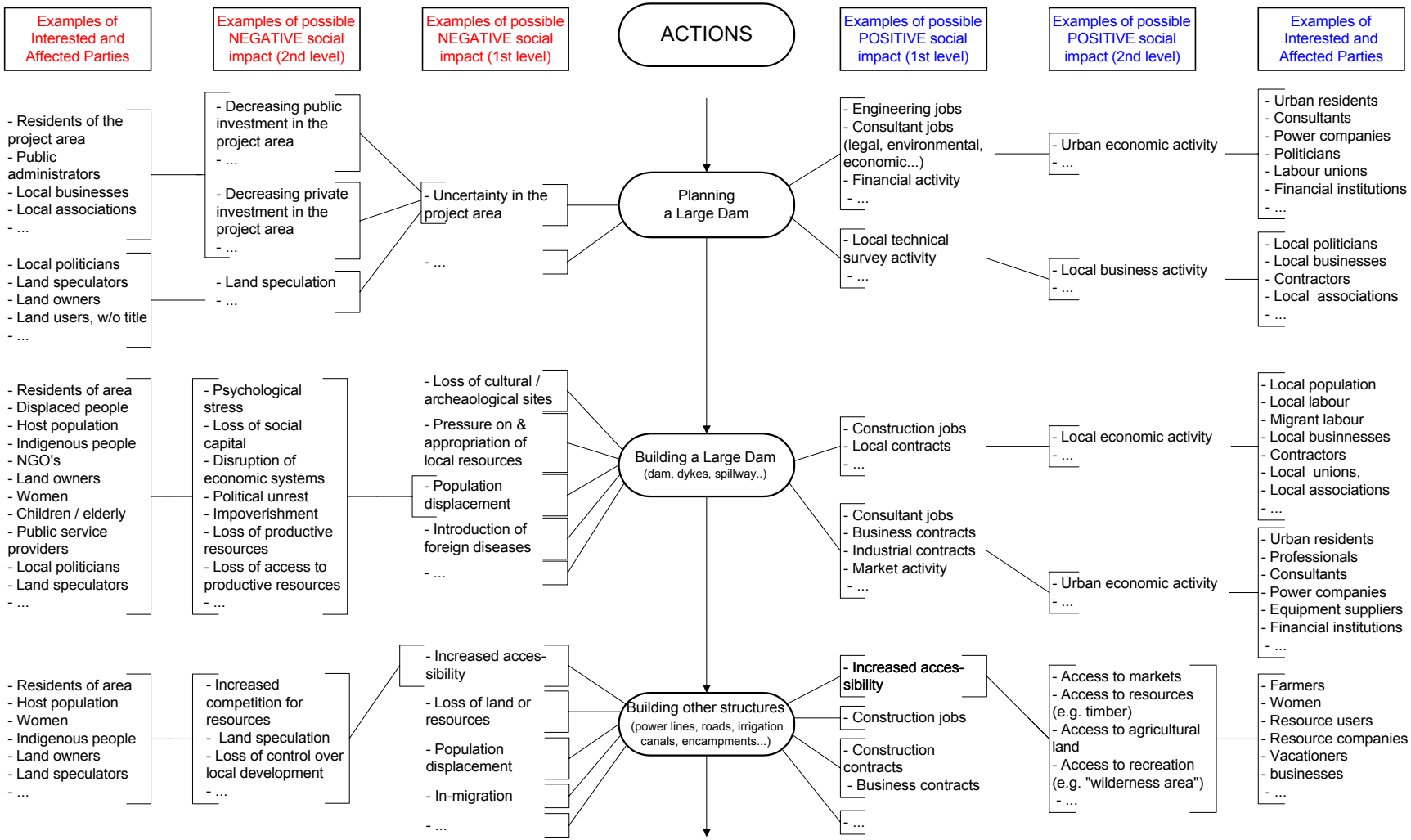
The main benefit of this slightly laborious structure is the even-handed way in which it makes clear that each dimension of a dam project may yield both positive and negative impacts.

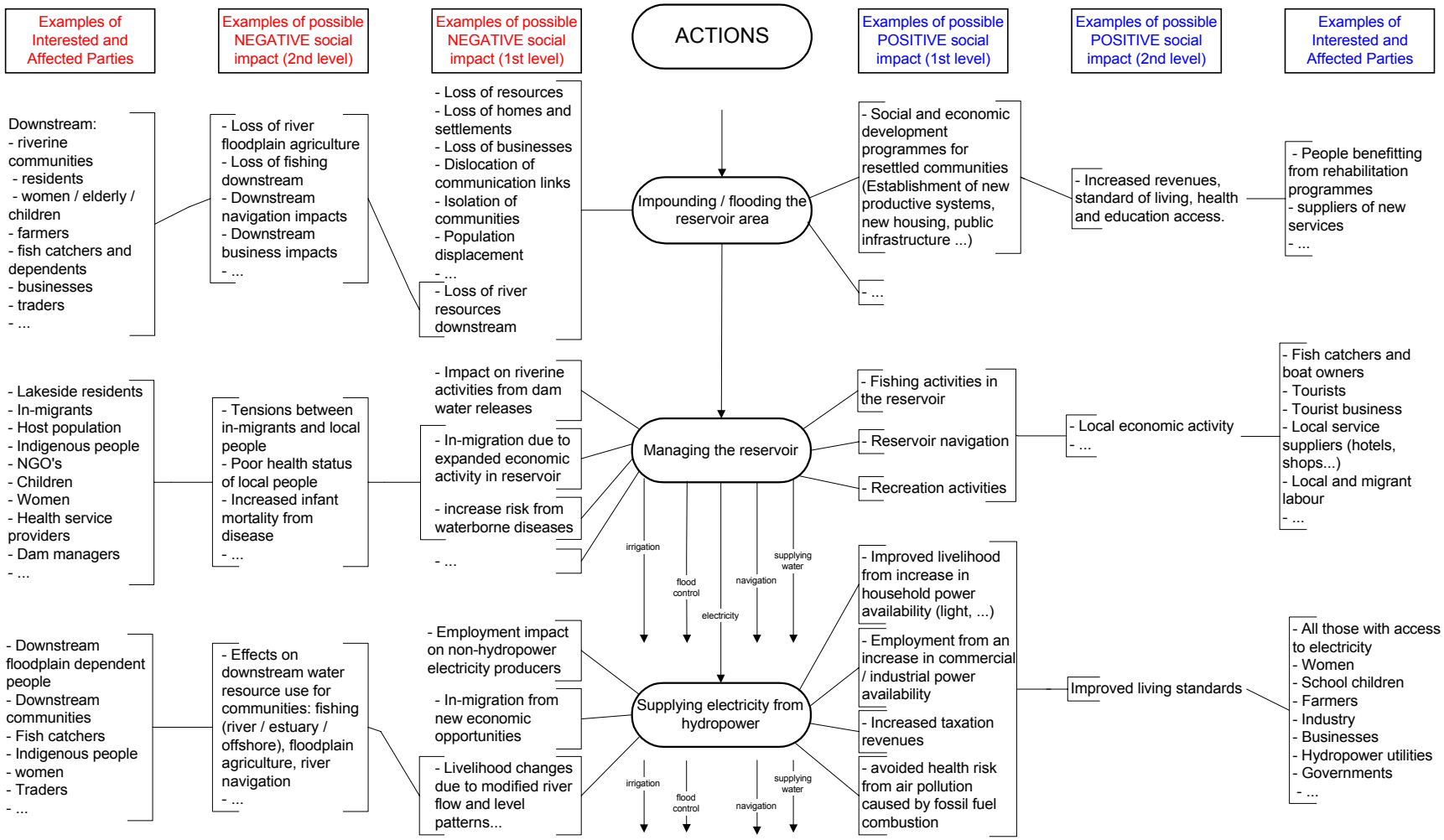
There are several important things to note about this Framework:

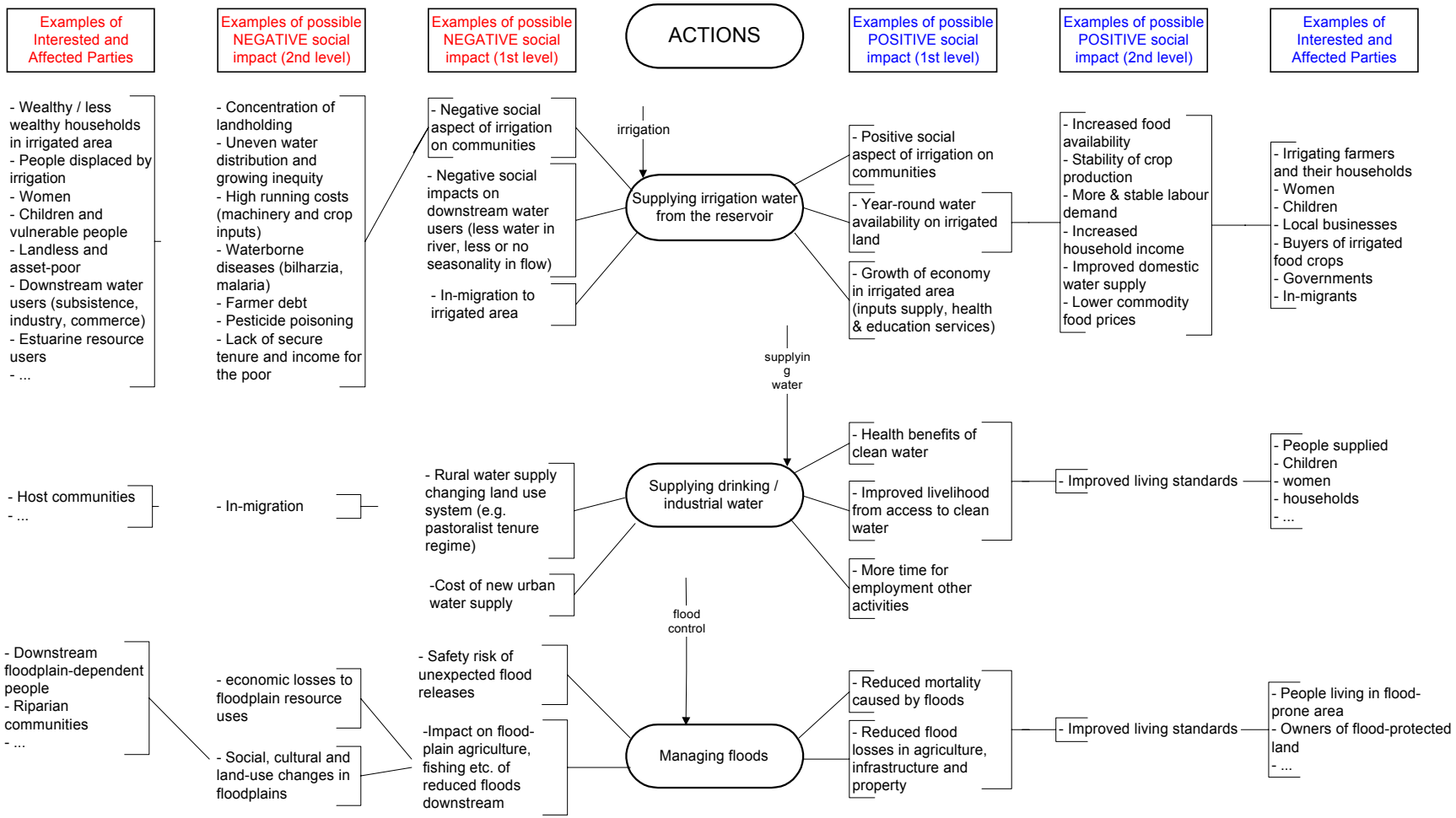
- The table is indicative rather than definitive. Its aim is to set out the scope of positive and negative impacts, rather than attempt an encyclopaedic description of such impacts.
- Not all of these categories will necessarily apply to every dam, particularly those designed to serve a single purpose (eg hydro-power generation or irrigation). The table is intended to be generic, and therefore to refer to dams in both industrialised and non-industrialised economies. Not all categories will be relevant to particular cases (eg to societies where the institutions of civil society or governance are weak).
- The classification of 'positive' and 'negative' impacts is not entirely satisfactory, since it is quite possible for one actor to gain from another's loss. Uncertainty due to the planning process could lead to speculation in land. This could result in profits for speculators as well as losses for residents, depending on their own and others' decisions. Increased accessibility provided by roads or power lines can have both positive and negative impacts, depending on social and gendered locations.
- The listings of positive and negative impacts are not complete; they could be extended ad infinitum, but brevity demands selectivity, and those shown are an indicative and not exhaustive list.
- The order in which positive and negative impacts are listed in the table does not connote their relative importance in any particular case.
- There may be some overlap between categories (eg in the Interested and Affected Parties impacted by construction of a large dam, between Indigenous people, other vulnerable people, women, children, and the elderly). The point of this table is not to provide a planning checklist, but to indicate the nature and range of impacts and those experiencing them.
- There is a degree of redundancy in the table, since a number of the activities produce similar impacts (eg management of reservoir, supply of electricity and supply of irrigation water all have impacts on downstream ecosystems, economies and communities that are broadly similar, see Adams 2000).

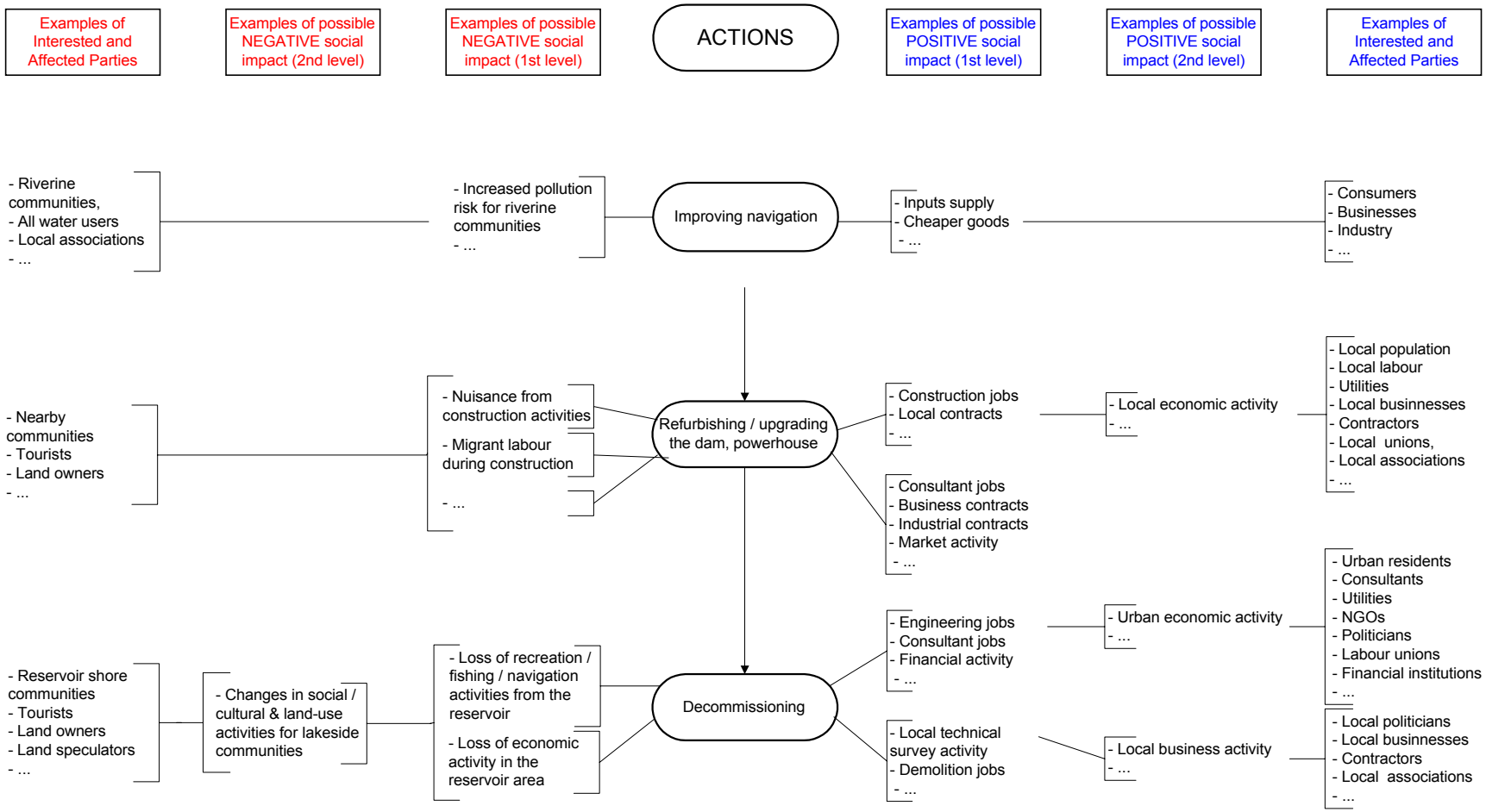
There are few studies of most of the impacts of dams in practice. Economic appraisals of dams obviously make calculations about the economic benefits of power to industry or domestic life, but there is a lack of studies assessing actual economic and social impacts.

Table 3.1 An Indicative Framework for the Analysis of Equity and Distribution Issues Associated with Large Dams (Prepared by J. Milewski et al.)









3.2 Impacts During Planning and Construction

3.2.1 Planning

Both positive and negative impacts of the planning phase of dams are fairly minor compared to those that come later. The major positive impacts of dams at the planning stage are enjoyed by the companies and individuals employed to plan, design and construct them. The interested and affected parties include not only contractors, consultants and bankers, but the many workers employed on all aspects of the project, and those who are sustained by the business generated by the planning and construction process. These organisations form a powerful interest group acutely aware of the possible wider economic benefits of a possible new dam, and they wield considerable influence in debates that shape the received wisdom about dams.

The chief negative impacts of the planning phase relate to the fear and uncertainty created in the possible project area (or series of project areas, if alternative projects are being considered). Economically, this can cause two problems, land speculation and lack of investment. With the announcement of dam construction, people with the means to employ legal mechanisms to claim land, take a legal hold of areas which are likely to increase their land values. This affects small landholders or others (eg women) who have restricted access to legal mechanisms.

Land speculation is a feature of many dam projects. People who have left land idle for years suddenly reappear when there was a possibility of compensation. Others, with easy access to information manage to put land under their names. Clearly there are those who benefit and those who lose from such a process. It leads to changes in patterns of resource use. In Posadas, Argentina, (affected by Yacyretá) land in former slum neighborhoods was purchased by well-to do residents, who 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 to leave the area. 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 weekend homes (Ferradas 1999).

Dams are often discussed years before project development is seriously considered, and once identified in this way a form of 'planning blight' can descend, making governments and businesses reluctant to invest in infrastructure or business facilities that might be flooded. Communities can live for decades starved of investment in this way. A related problem is the fear that many people living in a possible reservoir area feel. Such psychological stress cannot be effectively quantified in economic terms, but is a real issue. Such fear can cause socio-cultural impacts, for example loss of respect for traditional leaders.

Lack of infrastructural facilities can have a direct impact on health care. Funds are often diverted from small development schemes in areas that are to be submerged by dams. In command areas where resources are scarce investment is often channelised to large development projects. This can lead to social and economic marginalisation.

3.2.2 Building a Large Dam

3.2.2.1 Resettlement

The most serious negative impacts of impoundment (as the accompanying paper by Brody (1999) in particular makes clear) are due to the trauma of resettlement, or the socio-economic and cultural costs to displaced people who are not resettled. The costs of resettlement were recognised early in the

period of enthusiasm for large dams in the 1960s (Colson 1971, Scudder 1975), and by the World Bank in 1988.

Very substantial numbers of people have been moved to make way for reservoirs (McCully 1996). The human cost of dam construction varies greatly between countries, but globally it is significant. Locally it can be devastating. For example, in Indiaabout four million people have been displaced by reservoirs and irrigation schemes (McCully 1996). The Sardar Sarovar Dam on the Narmada River will flood 265 000 people, and the Narmada Sagar Dam 170 000 (Singh 1997). A disproportionate number of oustees are people from tribal or landless people (43% of the oustees from the Narmada Sagar Dam for example are landless, [Singh 1997]). Two examples of resettlement projects are presented below in Box 3.1.

Evacuees face the greatest costs in the relocation stage, particularly where it is rushed (Scudder and Colson, 1982). There are a disturbing number of instances where involuntary resettlement of reservoir evacuees has been enforced and accompanied by violence. Some of these examples are very recent, for example in the Narmada Valley (Singh, 1997). It is a suggested principle of this study that no large dam should be constructed with the use of coercion or force (Chapter 6).

Even if conducted peacefully, compulsory resettlement is traumatic, causing 'multidimensional stress' (Scudder, 1975, p 455). This stress arises from the way in which people are uprooted from homes and occupations and brought to question their own values and behaviour, and the power of their leaders (Lumsden, 1975). However, the impacts of resettlement linger long after relocation, for as Gosling comments, “the opportunities for evacuees are more limited in reality than on paper”(1979: p119). The Gwembe Tonga relocated from the Zambian portion of Lake Kariba in the late 1950s suffered enormous initial dislocation, but the development of a gillnet fishery on Lake Kariba, the eradication of Tsetse fly (and sleeping sickness in humans and cattle) and new roads in and out of the area, meant that living standards grew between 1956 and 1974 (Scudder & Habarad,1991). However, they fell (with those in the rest of Zambia) with the collapse of copper prices in 1974, and remained depressed thereafter as infrastructure degraded and economic opportunities within and outside the area remained limited.

The positive impacts of resettlement, if any, can only be felt after the initial trauma of displacement has receded. Usually it is the second generation of displaced communities that is in a position to use the resources available to them. Sometimes, this does result in increased social and economic mobility for those members of the community who are in a position to use the increased access to the market or other job opportunities. However, this is more dependent on the agency vested in people, rather than as deliberate policy. Programme, policy and outcome cannot be directly linked. Communities act upon programmes in complex ways and the consequences can be positive as well as negative.

The social impacts of resettlement represent a central issue in the wider social impacts of dams. However, they are widely understood and reviewed (egCernea, 1988; Scudder, 1991), and are the specific focus of the Thematic Reviews on Resettlement and on Indigenous People (de Wet *et al,* 1999; Colchester, 1999). They are not therefore itemised in detail here. Two examples will suffice:

No attempt at resettlement: Churchill Falls Dam, Canada (Brody, 1999). The feasibility and practicality of developing a hydroelectric dam on the Churchill River was established in the mid 1950s, and an agreement to develop the resource was made in 1966. No pre-project impact assessments were done regarding impacts on people, and no post-project cost-benefit studies have been done subsequently. Like other dams of the same era, Churchill Falls was built in a geo-political context that favoured such projects. The demand for energy in the Northeast United States and south-eastern Canada was high and increasing fast. And the project, like the James Bay hydro

developments, was in a vast, uniform landscape and for the most part deemed to be "uninhabited." The cost-benefit analysis of this project therefore depended solely on measuring the price to be got from the energy generated, against the costs of building and maintaining the dam and transporting power long distances. In fact, the Churchill Falls project, flooded indigenous peoples' lands (Innu and Algonquian Indians whose territories are an interconnected set of family hunting, fishing and trapping areas throughout subarctic Labrador). Innu elders report that they were never told that their lands were going to be flooded. They lost property, resources and grave-sites. They did not lose permanent homes, because the traditional economy was built on a seasonal round of camps and resources - the things they did lose. Families returned after long absences to affected areas to find them under water. The reservoir took several years to fill to its maximum extent. The interests of the Innu in the lands affected by Churchill Falls dam have never been calculated into the costs of the project, and no compensation has been offered or devised. The area is part of a wide reaching Innu land claim, however, and there is a possibility that in due course settlement of the claim will take into account the losses the project has caused to the Innu (Brody, 1999).

- **A poorly organised and implemented resettlement project: Bakolori Dam, completed on the River Sokoto in Nigeria.** The dam was completed in 1978, flooding the homes of 12 000 people. There had been no attempt to involve evacuees in planning, and no specific provision at design stage to set out a specification for resettlement. Survey in the reservoir area was left to the river basin authority, who lacked technical skills. Most of it was in fact done by teams of students, and surveys were completed just prior to the filling of the reservoir (Adams 1988). Complaints about the inaccuracies escalated due to the haste of the survey, the inadequacy of the compensation, and the poor resettlement site (on a barren hilltop remote from the river valley), and together with the similar grievances of those in the irrigation area served by the dam, this led to blockades of the project area by protesters, which then led to violent, repressive action by Federal police (Adams 1988).

Involuntary resettlement is a traumatic experience (Scudder, 1975; Lumsden, 1975; Cernea, 1991). In the past it has often involved the use of force, entailing repression of dissenting voices and violation of democratic rights. Many project-affected communities have not been given adequate notice before submergence, and have simply been flooded out of their homes (Thukral, 1992; McCully, 1996). This is particularly common in the absence of organised protest movements or people's organisations with a strong urban presence.

3.2.2.2 Gender and Resettlement Planning

Women as marginalised entities within marginalised communities are often forced to shoulder the ordeal of displacement far more intensely (Mehta & Srinivasan, 1999; Ferradas, 1999). Women who have protested against forced evictions are particularly vulnerable to violence (Srinivasan, 1997). Resettlement and rehabilitation planning tend to be flawed in their understanding of gender and the effects of resettlement on gender roles (Colson, 1999). Assumptions about gender and the gender roles embedded in social and cultural practices in affected communities, also work to the disadvantage of women, and are not identified by gender-blind policies in planning. Both men and women are disempowered by being uprooted. However, women are often more exposed to the changes imposed upon communities, especially in the domestic and market spheres (Mehta & Srinivasan, 1999).

Both women and men internalise the rigidities of gender assumptions in projected affected communities. These gender assumptions are often reinforced by policy, and play a key role in discouraging women from taking advantage of any new or expanded opportunities that large dams may present (Colson, 1999). The household is usually seen as an undifferentiated unit, with men presumed to be at its head. So, while "the settler, his wife and children" make up the displaced communities, the settler is primarily assumed to be male (Mehta & Srinivasan, 1999). Such

assumptions, embedded in policy and implementation, often exacerbate the inequalities already present in the social organisation of communities.

The negative social impacts of the Sardar Sarovar Project in the Narmada Valley, India, are described by Mehta & Srinivasan (1999). Resettlement has displaced mainly adivasi (tribal) communities. Gender organisation in these communities varies, but none can be said to be entirely free of discrimination towards women. Resettlement has deepened these inequalities. The main gender impacts emerging from displacement and resettlement in this case are:

- The fragmentation of the community has led to a disruption of social cohesion. This has impacted women more severely than men. Isolation from kinship structures because of increased transportation costs has led to increased insecurity and fear amongst women. Some studies have pointed out that women's central anxieties concern the inability to visit their married daughters.

- Women's access and control over resources have been severely curtailed by resettlement. Women do not have land rights in adivasi communities (most adivasi communities in the Narmada Valley are classified as 'encroachers'). However, they had usufructory rights and control over land. Women have not been compensated for the land they have lost. Major daughters, widowed women with land records in the original villages have not been compensated. Women's interests are seen as linked to the household and only men and major sons are being given land according to the Gujarat Resettlement and Rehabilitation policy. Loss of forests, river, forest produce, fuel, fodder and common property resources affect women in the resettlement sites.

- Skills like basket weaving, pottery and the use of herbal remedies are being made redundant at resettlement sites.

- There has been a decrease in women's mobility due to increased intensity of certain kinds of agricultural work at the resettlement compared to original villages and due to the unfamiliarity of the surroundings. The gendered organisation of public space at the resettlement sites has led to an increased insecurity and fear in women. In the absence of kinship support this has social and domestic repercussions. Tensions between a host community and the resettled communities, often arising out of poor resettlement implementation, have often resulted in violence.

- In adivasi villages, women were involved in decision-making processes around the household and the farm. The coming of an unfamiliar monetised economy has marginalised women from these spheres of autonomous control on the farm and the household. For example, women are being forced to take up wage labour and accept lower wages for equal work at the sites. Agricultural production has become more sofisticated at the sites with the introduction of implements, and women can be pushed on to the periphery as is sometimes the case with the introduction of mechanisation.

- Domestic drudgery seems to have decreased in some sites due to availability of new technology such as hand-pumps, or flour mills. However, in some sites, the water is saline causing lentils to take longer to cook. Women complain that saline water makes their skin break out in rashes. (Mehta & Srinivasan, 1999).

- Health seems to have been severely affected because of the change of cropping patterns and the non-availability of adequate nutrition and water facilities. At some sites, infant mortality rates have increased (Mehta & Srinivasan, 1999). Life in resettlement sites is characterised by deprivation and lack of health care.

3.2.2.3 Those Left Out by Resettlement Planning

There are particular problems for certain communities affected by reservoir creation (Ferradas 1999):

- **People whose landholdings are partially flooded**. In Latin America, the most commonresettlement policy has involved compensating only for property that would be actually flooded by the reservoir. This can mean that productive units are divided, with one part left in the proximity of flooded areas, and the other relocated in areas physically distant from the original site, or having homes relocated, while parts of land under cultivation are left behind, or vice versa

- **People who had initially and wrongly been told they would be flooded.** Poor topographic survey at Yacyretá caused errors in the area thought likely to be flooded (Ferradas, 1999). 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 people are doubly affected: first by the damage caused to property values and their quality of life during the wait period, and second by not getting a new home.

- **People living and or having business in the fringes of affected areas.** Businesses which were intimately linked to river life such as stores which sold supplies to fishermen and boatmen, bars and restaurants near recreation areas flooded by the Yacyretá reservoir were not registered and did not receive compensation.

- **People renting rooms, plots, or homes in affected areas.** People renting homes or land in reservoir areas generally have no relocation rights and are not compensated. 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 (eg at Yacyretá, Ferradas, 1999).

- **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 often ignored in resettlement planning. After years of litigation, for example, some brick-making activities at Yacyretá 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 arrangement (such as provision of food and housing).

- **Members of extended households divided by the move**. The arbitrary lines set by engineering needs disrupt crucial social networks. There are cases in which only some units from compounds of extended families with more than one housing unit have been resettled and the rest remained in the original sites. This is particularly damaging for women, children, and the elderly (Ferradas, 1999). Working women who depended on relatives living in adjacent homes, can no longer rely on them for childcare. This affects their ability to seek employment. Older people separated from relatives find it very difficult to meet their daily needs.

- **Host Communities**. People living in areas selected to host reservoir evacuees can experience diverse negative impacts, including economic competition and forced cultural change. These impacts can be particularly severe if the host community consists of indigenous people.

3.2.2.4 Impacts at the dam site

There are a distinct series of impacts of dam construction at the dam site. The most obvious of these are associated with the construction activity itself. As civil engineering projects, dams demand large

amounts of un-skilled labour and smaller but significant amounts of skilled labour. New jobs are therefore created both for skilled trades persons (most of whom are drawn from the national or even international labour market), and for unskilled workers. Some of the latter may come from surrounding communities, including sometimes those flooded by the reservoir, however it is common for reservoirs to be located in areas whose population lack key skills (eg literacy, numeracy) and the necessary contact to obtain even menial jobs unless a positive recruitment programme is in place. Experience in Latin America, for example, shows that there is little recruitment of local labour, except in certain high-profile (and high budget) projects such as Itaipu (Ferradas, 1999).

Dam design and construction is often done by private corporations, often from outside the country. The most senior and best-paid posts will often go to non-nationals, and often non-locals (mostly men). A high proportion of salaries, particularly of highest-paid staff, may be remitted out of the dam area, to distant relatives or even internationally in salary remittances. Only a proportion of the investment in the dam that is paid locally stays within the local economy.

The presence of a large dam construction labour force creates a demand for a wide range of other products. These range from specialist sub-contractors for the dam itself, a local construction industry for the creation and maintenance of housing and office facilities, and a large service industry for the dam construction operation and the people building it. Economic activities range from transportation or building to garden maintenance of personal services. Often a large camp or small town builds up at the dam site, gaining a life of its own on the back of the construction activity. However the barrack-like communities that result are disfunctional, and (as at the Yacyretá Dam) unsuitable for family accommodation because of problems of alcoholism, drug abuse and prostitution (Ferradas, 1999).

The existence of a construction town can be taken as a major economic benefit of dam construction. Brody (1999) comments that both the W A C Bennett and Peace Canyon Dams in Canada are located within 25km of the town Hudson's Hope, on the Peace River and are the biggest employers in the town. Similarly, when questioned about benefits additional to electricity production at the Churchill Falls Dam in Canada, the example given was "A permanent settlement with population about six hundred was established near the dam to service it. This town, [Churchill Falls], still exists" (Brody 1999).

However, much of the economic life of dam construction towns is short-lived, and they can revert to 'ghost-towns' once construction is complete. Unemployment can be a serious problem: a large slum area was left after the construction of the Itaipú Dam in Brazil in the city of Foz do Iguaçu for example, and the government of Paraguay is facing social problems created by former workers of Itaipú and Yacyretá, now unemployed and settled in marginal areas of cities (Ferradas, 1999). While construction of the Revelstoke Canyon Dam on the Columbia River in Canada generated over 11 000 person-year jobs during construction, the local economy suffered rapid let-down after construction, with only 42 permanent jobs operating the dam, an economy not dissimilar to that before construction began (Brody, 1999). The small number of jobs typically supported by a completed dam is concentrated in skilled technical sectors rarely open to local people. The multiple effects of such permanent employment in the wider community are small.

Where urban development is successfully stimulated by dam construction, there can be significant secondary problems due to poor environmental regulation and social service provision. The growth of the cities of Ciudad del Este and Foz do Iguaçu is an indirect effect of the construction of the Itaipú Dam. Because of rapid urban growth and lack of adequate planning, the cities lack sewage and garbage disposal systems. Most of the cities' waste is thrown into the rivers without treatment. This situation is changing in Brazil, but not in Paraguay. Toxic chemicals from rural production are also drained into the Paraná.

Very often the positive impacts of reservoir creation are concentrated in or near the dam site because of the existence of infrastructure (road access, health and education facilities) or of a market (initially among construction workers). New economic activities such as fishing often demand capital (eg deep-water boats and nets). These activities can attract specialist migrants from outside the area (eg Ewe fishermen moving to the Volta Lake) or in-migrants able to recycle formal or informal sector earnings from work on the dam or associated service industry. Dam towns such as Kariba in Zimbabwe have secured the lion's share of the economic benefits of both tourism (game fishing, water sports and hotels) and commercial fishing. The companies owning these facilities are not owned by people from the dam or reservoir area, and if profitable can attract foreign investment.

Dam construction towns are a magnet for evacuees, although these may lack the skills and contacts necessary to obtain skill-enhancing formal sector jobs. Even if those without compensation, re-housing and establishment in new livelihoods are able to find a niche in the dam site urban economy, this is likely to lack security. Living conditions in dam towns can be poor, and problems such as sexually transmitted disease rife.

It is vital to note that not all the impacts at a dam site can be captured by a discussion of costs and benefits. The very nature of the 'boom economy' of a dam construction town presents significant challenges to socio-cultural identity, and intangibles such as the loss of sense of place and loss of non-monetised dimensions of livelihood strategies. These are key dimensions of impacts in all areas of dam construction (Mehta & Srinivasan, 1999), but they are particularly obvious at the dam site. Women's lives and activities in particular are often centred around these intangibles – making it very difficult to calculate the gendered nature of costs and benefits. The technical difficulty of factoring such issues into a cost-benefit analysis does not make them any less important. Even where reservoir evacuees and economic migrants from downstream are able to settle at the dam site, they are subject to considerable cultural and social costs, as a price for a share of economic benefits. Those costs persist long after the ephemeral bounty of the construction boom has passed: unlike workers recruited from outside the area, local people are likely to lack the key skills to move elsewhere and start again, whether building a dam somewhere else or moving through the urban economy.

3.2.2.5 Impacts in the Catchment

Dam construction can have significant negative impacts on land use in the catchment far above the reservoir, particularly due to land-use controls imposed to reduce soil erosion or maintain water yield. A typical side effect of a dam is a ban on agricultural activity in the catchment, sometimes linked with a proposal to create a protected area (eg a National Park) in the catchment. The latter may create certain benefit streams (eg from wildlife tourism); such developments can impose severe costs on subsistence resource users, particularly indigenous people (Colchester, 1999).

3.2.3 Building Power Lines, Canals, Roads etc.

Engineering works that are an inherent part of a dam project can have their own impacts. Such works include the construction of power lines, irrigation canals or access roads. Positive impacts centre on the work created in the construction process. Beneficiaries here include companies engaged in construction, materials or equipment supply, and their employees and shareholders. Roads and powerlines also allow access to previously inaccessible areas, allowing pioneer farmers, hunters and vacationers to enter and exploit their various resources. Negative impacts are, in a sense, the mirror image of these positive impacts. Secondary displacement is a problem: people with land or holding resource rights traversed by utility corridors suffer in much the same way as those losing land to the reservoir, especially if they are not adequately warned and compensated. There can be speculation in land and resources. In-migrants, whether permanent cultivators or itinerant hunters bring a range of

threats from economic competition, disease, and challenges to established cultural norms and practices.

3.3 Impacts of Managing the Reservoir and Managing Floods

There are relatively few direct positive impacts of reservoir management in the reservoir itself (Table 1). Those that exist relate chiefly to the possibility of the development of new open-water fisheries, as happened with the Volta Lake in Ghana and Lake Kariba on the Zambezi. These can generate economic benefits, and need to be considered in an assessment of wider social impacts. The productivity of reservoir fisheries depends on the way in which the reservoir ecosystem develops. This depends on many factors, including the chemistry, turbidity and temperature of inflowing waters, as well as the nature of the land and vegetation flooded. The development of the fish fauna in tropical reservoirs is complex (Lowe-McConnell, 1985), and may involve an initial peak of population as nutrients from flooded areas feed into the ecosystem, followed by a slump to a lower level. Reservoir fish populations may require very different fishing techniques to those used by previous fishing inhabitants of a river floodplain. Invasive floating plants such as the Nile cabbage or the water hyacinth can create problems for fish-catchers (and hydroelectric turbines), as for example at Kariba on the Zambezi.

The negative impacts of dam construction in downstream environments are included in Table 1 under 'managing the reservoir', although they also appear under successive headings as effects of the way release is managed for hydroelectric power or irrigation. These downstream impacts have been reviewed extensively in Thematic Review IIa *Downstream Impacts of Dams* (Adams, 2000). They result from the dependence of social and economic activity in communities along rivers and within floodplains downstream of dams on natural patterns of river flows. Agriculture, fishing and grazing all depend on annual flood cycles, and social organisation is closely adapted around the changing environment provided by the river. The construction of a dam changes the pattern of flows in the river, and this can severely disrupt agricultural, grazing and fishing economies downstream. Floodplain fields no longer flood, and require irrigation; floodplain pastures no longer flood and become the subject of disputed tenure; floodplain fish populations fall, and so do fish catches.

Social organisation for hundreds of kilometres downstream can therefore be disrupted by dam construction, with increased rates of out-migration to find work, reduced land values, changed gender roles and many other impacts. Uncertainty about the flooding patterns to be expected in any particular year (because downstream communities are not informed of reservoir release plans) exacerbates these problems. There is a considerable body of research demonstrating the economic importance of negative downstream impacts, particularly in Africa and other tropical areas (eg Adams, 1999; Adams, 2000; Adams, 1992).

These negative impacts can be set against the possibility of positive impacts, particularly where dams control damaging floods. This has been the dominant view of dams in temperate rivers, for example in Europe, where significant economic dependence on natural capital sustained by river floods has been slight for many centuries. Here dam construction can protect downstream infrastructure and property, and allow agricultural investment and urban development to take place on the floodplain. Similar changes are possible in some tropical rivers, although often at a cost in terms of impacts on floodplain communities.

3.4 Impacts of The Supply of Electricity from Hydropower

The main positive impact of hydroelectric power generation is the increase in power availability, although data on primary and secondary benefits of hydropower generation were not available for this review. Hydropower is relatively clean in comparison with fossil fuels, and particularly with coal

(avoiding pollution from SO2, NOX and particulates, and the greenhouse gases released by fossil fuel burning). It avoids the long-term costs and risks of radioactive fuel storage. It is also relatively cheap over long time periods. Foreign currency can be earned from electricity export. Secondary effects of hydropower generation include increased economic activity (industry, commerce, household), and reduced domestic drudgery in electrified households (light, cooking). There can be health benefits from reduced growth in mortality from respiratory disease, and environmental benefits from reduced growth in acid rain precursor emissions and climate change precursor emissions.

These benefits are experienced by a range of people, including all users of electricity, and particularly women (who bear the burden of domestic work). Hydropower utilities and their owners and employees gain, while industries dependent on rival sources of energy lose: there are negative impacts on residents in areas of fossil fuel extraction (jobs lost) or burning (health benefits but jobs lost). Although hard to measure, there may be global benefits and benefits to future generations from reduced anthropogenic climate change.

Negative impacts of hydroelectric power generation include the impact on no-hydropower electricity producers, the problem of methane from flooded vegetation, and the sometimes very major impacts of hydrodams on downstream people (eg the impacts of the Mananatali Dam in Senegal, see Adrian Adams, 1999). Downstream impacts include effects on downstream floodplain economies (fishing, agriculture, navigation), effects in estuary or delta resource fisheries, and effects on offshore fisheries (Adams, 2000). These impacts are similar to those caused by other kinds of dams, but the continuous releases, and the possibility of unseasonal flood releases in generating arrangements designed to meet peak power surges, give hydroelectric dams distinct downstream impacts. Negative impacts are felt by the owners of enterprises and the workers (and their dependents) in the oil, gas and nuclear industries, by all people in downstream communities, and by downstream industry and commerce. Women and indigenous people can be particularly vulnerable to negative impacts in downstream areas. In common with other dams, hydrodams can of course also cause significant problems of resettlement, as discussed above.

In terms of energy use generated by large dams, we see that there are disparities in consumption. Women as users of energy fall into a separate category. There is a need to assess the changes in energy consumption due to dams in adversely affected communities as well as those who benefit. It has been shown that there are changes in family budget allocation for payment of energy in place of coal or wood. These changes in consumption come about due to various reasons. One of them is the need for extra capital, which may be hard to come by for displaced communities. This change impacts on women's labour directly, as women are usually collectors of fuel. This may put extra pressure on women in resource scarce contexts (the double shift). Additionally, this can also impact on food consumption (Ferradas, 1999). This is a cost that is hardly ever accounted for.

3.5 Impacts of The Supply of Water for Irrigation

A major use of water stored in dams is for irrigation. Irrigation is discussed extensively in a WCD Thematic Review *Assessment of Irrigation Options*. In some parts of the world, irrigation is a vital and effective element in both national food production strategies, in local and regional economies, and in household livelihood strategies. In China, for example, irrigation uses more than half the total water supply, and more than 40% of suitable land has been irrigated: it is estimated that more than 80% of additional food production is expected to come from irrigated land (Zhang, 1999).

The positive impacts of irrigation stem from the availability of water throughout the year (or for an extended part of the year), and the agricultural productivity that this water, and the necessary high-yielding seeds, pesticides, fertilisers and machinery can generate. Benefits include increased food production, increased availability of food and lower consumer food prices, stability of crop production between years, increased labour demand and more stability in labour demand, demand for machinery and crop inputs (and the business this generates), increased household income from irrigation, domestic water supply, and lower commodity and food prices (Table 3.1). These positive impacts of the supply of irrigation water are enjoyed by irrigating farmers and their households, local businesses, those who purchase irrigated food crops, and those landless labourers and migrants and their dependents who manage to obtain land or work on irrigation schemes.

Irrigation is not an economic success everywhere, however. Government smallholder irrigation schemes have required high and sustained levels of subsidy, most notably in the American West, and elsewhere where it has proved persistently uneconomic, notably in sub-Saharan Africa. In the US, dams constructed on the Columbia and Snake Rivers to supply irrigation water reflected a political and ideological commitment to settlement of arid land rather than a serious economic proposition (Brody, 1999).

Irrigation is therefore clearly capable of providing important economic benefits, and represents a potentially vital indirect downstream benefit of dams. An economic assessment of a dam therefore needs to consider the costs and benefits of associated irrigation projects, and analysis of the social benefits of irrigation must address not only the economic performance of the scheme, but national food production and household or individual livelihood security goals.

There is a large literature on the poor economic performance of large-scale irrigation schemes, particularly government smallholder schemes (eg Chambers, 1988). While there is particular criticism of the schemes built in Africa in the 1970s and 1980s (Moris & Thom 1990; Adams, 1991), there are a wide range of recognised problems in both new and established schemes. These include:

problems of unreliable water supply, particularly to tailenders, and related inequality; poor returns to irrigating farmers due to high fixed costs, low yields and associated debt; high maintenance costs, waterlogging and salinity, high crop protection costs; water borne disease and poor public health.

It is very much more expensive to create a new irrigation scheme from scratch in a remote area (for example the Bura project in Kenya, Adams & Hughes, 1990) that requires settlement, than it is to irrigate a similar area where farmers and support services are well versed in the technology.

There are particular problems with the social distribution of the economic benefits of large-scale irrigation schemes (Mehta & Srinivasan, 1999). Poor men and women, and particularly poor women, have constrained rights to land and water in many countries. In India, for example, irrigated land is being concentrated in the hands of larger farmers rather than smaller farmers. In the Senegal Valley, there was what A. Adams (1999) describes as 'a rush for land' by entrepreneurs in Mauritania (Nouakchott businessmen, traders, military men making use of their position in the administration), as ‘private’ schemes proliferated following In the two years, from 1986 to 1988, the area brought under irrigation by these ‘private’ schemes grew from 3 000 hectares to 20 000. In South Asia, the landless – a large bulk of the rural poor – benefit from irrigation only indirectly through wage labour employment on irrigated fields. Where mechanisation is possible (and, if irrigated production is profitable, larger framers are able to accumulate capital and invest), these multiplier benefits tend to be eroded (Scott, 1985).

Irrigated agriculture builds on existing social practices and tenure regimes. If land and water rights are highly differentiated, as in regions such as South Asia where land reforms and land ceiling acts have been ineffective, the benefits from irrigated agriculture will also be differentiated.

Irrigation can provide net benefits at the scheme level, particularly in large-scale private schemes, and small-scale communal schemes. On large-scale smallholder-schemes, economic performance is in many countries more problematic. There can be serious distribution problems at household level, between top-enders and tailenders, between landlords and tenants, between farmers and labourers. There is also a critical dimension of inequality at intra-household level. Gender is an under-recognised dimension of irrigation, just as the importance of women farmers is under-recognised Mehta & Srinivasan, 1999). Research (and irrigation scheme planning) has built-in gender bias. Water users in irrigation systems are conventionally assumed to be men. Even where the established role of women as irrigators is recognised, for example Mandinka women rice farmers in the Gambia, attempts to target these women (and to harness their labour and indigenous skills in rice production) in the Jahaly-Pacharr Scheme, led to 90% of plots being held by men and the women's of rights to their individual plots. Women were locked into intensified work routines under the control of male household heads (Carney & Watts, 1990). The issue of gender and irrigation is explored further by Mehta & Srinivasan (1999), and referred to also by A. Adams (1999).

4. Principles for Addressing Dams and Equity

4.1 Context

The social impacts of dam construction are extremely diverse and complicated, as the previous chapter has sought to demonstrate. The positive impacts of irrigation or electricity extend far across the national and even international economy, and extend in time for many years. The negative impacts of resettlement or loss of productivity of downstream floodplain land can also reverberate for several generations. Furthermore, many changes set in train by a dam cannot be simplistically allocated to categories of 'positive' or 'negative' impacts, for very often some gain even while others are losing, and such is human ingenuity that even seriously adverse impacts (eg downstream of a dam) can sometimes be ameliorated as successful individuals adapt (Thomas & Adams, 1999).

Given this complexity, how can one approach the problem of establishing equity principles for large dams? Such principles are needed for a variety of reasons:

- to provide a common yardstick against which the performance of any given dam can be compared
- to provide a common basis for discussion between the pro-dam and anti-dam movements
- to provide a basis on which the technical methodologies of project assessment can build

One issue for any framework for assessing equity is scale. The equity implications of a dam can be considered at two quite different levels, at the scale of the programme (the dam compared to its alternatives) and at the scale of the dam itself (issues of design). These two scales suggest quite different sets of questions:

4.2 Equity Issues at the Programme Scale

The key question here is 'how do the positive and negative impacts of a dam compare to those of alternative development strategies?' (ie is a dam actually the best solution to the problems we see as of critical importance?) Other alternatives might include:

- For a hydro-electric dam, comparison with the positive and negative impacts on equity of:
    1. other sources of electricity (coal, gas, nuclear, solar, wind etc.);
    2. an energy strategy based on conservation not demand provision (eg a carbon tax, regulation to achieve energy conservation);
    3. not doing anything;
- For an irrigation dam, comparison with the positive and negative impacts on equity of:
    4. improving the water use efficiency of existing irrigation;
    5. investing in alternative forms of irrigation (eg small scale);
    6. investing in improved dryland cultivation;
    7. investing in other bottlenecks on agricultural productivity (eg labour, disease, crop storage losses, plant breeding);
    8. investing in alternative sources of rural employment
    9. greater specialisation in rainfed agriculture, forest production and/or industrialisation and the meeting of food security needs through trade.

4.3 Equity Issues at the Project Scale

The key question here is 'how do the positive and negative impacts of particular plans of where and how a dam might be built compare with alternatives?' (ie assuming we propose to build a dam, what should it be like?). Equity questions here might include:

- Does the dam overall create more benefits than costs?
- Who gains and who loses from the proposed dam?
- Is any group or category of person likely to be worse off as a result of the dam?
- Can their losses be compensated, and if so how?
- How can the design and planning of the dam be organised to turn losers into beneficiaries?
- These equity questions need to be answered in the context of choices of scale, timing and technology.

4.4 Equity Principles

A series of six key principles are outlines below. These were developed extensively following discussion of earlier drafts at the London Seminar on 'Social Impacts of Large Dams' in January 2000, and draw also on the paper on *Social Impact Assessment* for the WCD Thematic Review on Institutional and Governance Issues (Vanclay, 1999). Each principle is stated as simply as possible, and then a series of secondary principles are stated as elaboration

1. Equity considerations should be a fundamental element of the process of assessing development options.
Planning should compare the equity implications of dams and alternative development options.
Dams should not be built unless they yield clear net social benefits at the national scale.
Dams should not increase inequality.
The existence of an overall balance between positive and negative impacts should not be taken as the only criteria of a project's acceptability. The distribution of costs and benefits is also important, and heavily impacted groups should not bear uncompensated costs without balancing benefits.
The doctrine of eminent domain (the rights of the state to impose change in the public good) should be balanced by recognition of other rights (eg rights to use of resources, to customary and community use of land).
Equity should be considered across all spatial and temporal scales, and across different social groupings (including men/ women; urban and rural citizens and the powerful and powerless).
The notion of 'interested and affected party' needs to take specific account of gender.
Dam projects should not exacerbate existing gender or other social inequalities, but should address them. There is a need for more gender-aware and gender-sensitive policies concerning the planning, implementation and monitoring of large dams. Agencies involved in dam-building activities should be committed to achieving high level of gender equality in the project areas. Project appraisal should be sensitive to, and take account of the gender division of labour in the household and community. Interventions should be targeted at both women and men.
Institution-building needs to extend beyond the project planning and development phase, and needs to address the issue of restitution for past losses. This might include internationally recognised procedures for appeal by people impacted by dam development who believe that their rights and needs have been significantly affected.

2. No large dam should be constructed with the use of violence, harassment, intimidation or undue force.

Developmental processes that infringe upon the human rights of any section of society should not be accepted; dam projects and planning should not violate internationally agreed standards of human rights.

There should be no use of violence, intimidation, harassment nor undue force at any stage of the planning process.

Special account should be taken to ensure of the particular vulnerability of women to any kind of violence associated with dam construction.

3. Analysis of the impacts of dams and other alternatives should consider the totality of impacts including cumulative, off-site (downstream and upstream) and over time.

- The existing individual and community rights of riverine populations to natural resources to be affected by planned dams should be recognised in assessing potential losses and in devising mitigation measures, whether these rights are codified or informal, whether they relate to ownership or usufruct rights.
- Ignorance of customary law and local use understandings of access to and control over resources must be avoided in order not to undermine the existing rights that women, indigenous people or other traditionally marginalised groups have over resources, in particular common property resources.
- Project appraisal should be broadened to include un-quantifiable social and cultural impacts, and must enable these to carry appropriate weight compared to other quantified criteria in decision-making.
- The 'Precautionary Principle' should be the foundation of the evaluation of all dam projects.
- Dams should not be considered as projects isolated from their broader basin contexts. Assessments of the impacts of dams must include specific consideration of all affected people, including those living downstream whose subsistence depends on the natural flow of the river and its associated natural resources. These assessments must take specific account of gender.
- Trans-boundary impacts should be recognised and affected people in other jurisdictions should be explicitly considered legitimate interested and affected parties in project evaluation.

- **The negative impacts of dams should be minimised, and the positive impacts maximised.**
- Dam construction should maximise the number of beneficiaries and minimise the number of those suffering negative impacts.
- The proportion of beneficiaries should be maximised, and planning should seek to **turn losers into winners**.
- All people who depend on the natural flow of the river and its associated natural resources for their subsistence should receive just and fair compensation in an appropriate and acceptable form for any loss or injury resulting from dam construction, or be among the primary recipients of benefits generated.
- Planning should ensure that those that face negative impacts of a dam should be the first beneficiaries of the benefits that flow from it.
- Vulnerable groups need particular protection and should be particular targets of benefits (indigenous peoples, women etc.).
- Resettlement should be minimised or avoided wherever possible, because of its high cost in human and economic terms, and the extreme difficulty of mitigating or compensating the negative impacts on evacuees.
- Compensation for evacuees should where possible be in the form of land for land, territory for territory, commons for commons.
- Planning should seek to allow negatively impacted people to maintain community integrity and viability.

- There should be adequate institutional and legislative capacity to address the negative impacts of dams, for example a national resettlement plan.

Resettlement and compensation should be conceived of as a 'development project' and subjected to careful planning, appraisal, monitoring, and evaluation of achievement.

5. Participation by interested and affected parties should be integral to all stages of project planning.

- Dams should be planned, designed and built with real 'participatory' procedures.
- Cost/benefit analyses should be balanced by participatory forms of planning involving all actors, where all have a say in determining and assessing the nature of the costs and benefits and the effects on their lives, livelihoods and environment, as well as the nature of mitigation.
- The rights of those directly affected by large dams must include the right to be heard, and the right to information in a complete and culturally appropriate form.
- Gender-sensitive policies are needed to ensure that women can articulate their fears and apprehensions without intimidation or constraint from state, community or other agencies.
- Dams should only be built with prior and informed consent expressed through local/community/customary democratic processes.
- Planning should include institution building as an element of project development, to enable affected communities to engage effectively with planners. Training and capacity building should be provided especially for vulnerable and disadvantaged groups including women.

6. A programme to monitor and periodically re-examine the impacts of dam development (particularly in downstream communities) should be an integral element of the planning process.

- Monitoring studies should be based on pre-project benchmarks (demographic, socio-economic and epidemiological), and should be integrated into the project process.
- In addition to monitoring, there should be periodic mandatory re-examination of impacts. Monitoring should be matched by resources to mitigate impacts not fully addressed by the planning process.
- Human rights and key socio-economic parameters should be disaggregated enough in order to capture and address imbalances in the distribution of socio-economic costs and benefits of dams. I t is important to generate gender-specific indicators that take into account the varied locations of men and women at all levels of society.
- Special financial, human and institutional resources should be built-in to the dam project design in order to address unanticipated social and economic problems emerging from the monitoring activities. 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.
- Planning guidelines are useful, but there also needs to be a procedure for any residual grievances to be heard and compensated. There needs to be opportunities for impacted people to appeal against injustice, and a fair procedure for hearing that appeal would bring significant advances in the environmental performance of dam projects. An internationally recognised procedure is needed for major projects.

5. Planning for Equity

5.1 Expertise and Participation

Good planning can minimise the unexpected impacts of dams. Many of the best-studied examples of the impacts of dams date from the 1950s and 1960s, and in many instances planning at this time made no formal attempt to consider environmental, social and cultural impacts. Little attempt was made to consider the equity implications of the distribution of the positive and negative impacts of dams at this time. Initially, even gross (and one would imagine obvious problems) such as resettlement were not considered. Brody (1999), for example, describes how the rights of native people to land inundated by dams in northern Canada, and the economic value of their activities there, were simply not considered in assessing the feasibility of projects.

Times have changed, and the techniques of technical appraisal have improved enormously, notably through the development of the Social Impact Assessment (Vanclay, 1999). The best examples of dam design now demand explicit and careful consideration of issues such as resettlement, and increasingly other issues such as downstream impacts are being considered. However, it is clear that lower standards are all too easily accepted, particularly where there is pressure for rapid assessment, or the political pressures to build dams are particularly strong

Geopolitical factors can be highly relevant to the planning and design of dams. Geopolitical conflicts with neighboring nations have been significant in dam site selection in Latin America, and have resulted in dams that were not always the most economical but less damaging in social and environmental terms (Ferradas, 1999). Dams such as the Itaipú on the Paraná River have been built on or near national borders because of the way in which neighbouring countries were regarded as threats and competitors. Poor trans-boundary planning is a common result of such politically influenced location decisions.

Dams built partly with strategic security goals in mind tend to be strongly identified with national interest, and this can constrain full appraisal and discussion of their impacts. Critical review of dam performance can be constrained by fear of seeming to challenge national planing goals or strategic or political interests. A strongly held national ideology of 'modernisation' can also inhibit effective planning. The Yacyretá dam was presented as a symbol of modernisation and as a means of overcoming the "backwardness" of nation-states, making open criticism difficult (Ferradas, 1999). Dams constructed on the Columbia and Snake Rivers in North America reached deep into the national consciousness and ideology of the USA (Brody, 1999). Irrigation has had a similar lure for development planners in Africa, where despite its persistent poor performance it has been a 'privileged solution' to problems of poverty in arid and drought-prone environments (Moris, 1987; Adams, 1992).

People threatened by development, or affected by development, are often in a better position to identify the full range and significance of impacts than technical planners, particularly those remote from a project site. Yet, lack of public participation in planning, and lack of advanced warning of project development in the affected area, combined with inadequate provisions for compensation (or provisions that are perceived to be unfair) are major sources of grievance with dams. Lightfoot points out that planners assume that their expertise allows them to “understand and manage the interests of the farmers better than the farmers do for themselves” (1979: p 30). As a result planners tend to neglect consultation and assistance with self-help projects and favour instead direct intervention in the form of 'compensatory development'.

5.2 Counting the Costs of Dams

It is clear that if planning is to meet equity targets in the distribution of the costs and benefits of dam construction, better data are needed on the nature of social impacts. Present practice does not allow decisions to be made in the full knowledge of either the magnitude of costs or the location of the affected communities. Without such knowledge, it is unrealistic to expect planners to be able to mitigate adverse impacts, or compensate those adversely affected. Without such data it is to be expected that dams will continue to have unexpected, unrecognised and uncompensated impacts on particular groups of people.

Better data are needed on **actual** positive impacts. Many project economists make assumptions in calculating costs and benefits, and there are few published studies of post-project reviews of costs. The number, quality and availability of such studies need to be improved, so that they are available to consultants and others carrying out CBA and SIA on new projects. Without clear self-analysis, new projects are designed using similar assumptions and similar guesstimates to their predecessors. Many of their predecessors have proved to have unforeseen impacts, and in fact provide a very poor model for future projects (World Bank, 1996). Feasibility studies should be required to show evidence of consideration of the lessons of relevant evaluations of previous projects.

At present, appraisals of completed projects are often treated as highly confidential, sometimes because they embarrass governments, donors and contractors. Unless this wall of secrecy is overcome, it is unlikely that dam planning will become the open process that it needs to be. Dam planners are often working in the dark, which is an unenviable position.

Monitoring of the impacts of dams, and a clear programme to monitor the impacts of dam development (particularly in downstream communities) should be an integral element of the planning process, and should be matched by resources to mitigate impacts not addressed fully by the planning process.

'Monitoring' actually needs to consist of a series of separate elements:

- Baseline surveys of demographic, social, health and environmental data, to be carried out as part of the dam planning process;
- Regular repeats of surveys of data on the same parameters;
- Periodic re-appraisal or audit of the dam's positive and negative impacts
- A planning process **during all phases of a dam's life** (planning, construction, operation, decommissioning) that can interpret **and act** on these data.

There is potential for considerable improvement in the way in which these impacts of dams are assessed, and their equity and distributional implications addressed, through the project planning cycle. Some are set out in Table 5.1.

There is little knowledge about socio-economic impacts of dams due to lack of knowledge and monitoring of downstream economic activities. The remoteness of downstream areas and the complexity of impacts downstream and across the floodplain are major constraints on such work, but it is important. New dams should include a formal environmental and socio-economic monitoring programme, specifically designed to provide the data for post-hoc analyses of distribution, and hence to aid the learning of dam designers in this dimension of their work. Established dams should be subject to careful audit, with particular regard being paid to their downstream impacts.

Monitoring must be designed in the light of the way in which impacts change at different stages of the dam project. It should also distinguish between short term and long term affected groups at project preparation (design and evaluation) stage.

Monitoring is also vital to the good management of dams, and should include the establishment of a survey baseline to allow tracking the evolution of formal income and informal livelihoods, the income of identified target groups in relation to the project resource distribution and prices, or one or more key indicators (eg health, education, migration). This survey/tracking needs to take specific account of gender.

Monitoring of itself is of little value unless it is linked directly and clearly to explicit procedures for ensuring accountability for negative impacts, and to procedures for addressing them.

- **Needs Assessment**. Ensure that consultation processes used to identify needs are culturally appropriate and inclusive of traditionally marginalised groups (rural dwellers, women, indigenous and tribal people etc.)
- **Options Assessment**. Compare available options on the basis of their potential equity implications, and use equity as one of the key criteria for making choices.
- **Design**. Undertake a detailed social and risk assessment. Internalise identified impacts as much as possible Use social acceptance in addition to conventional economic and financial analysis in order to decide on the project feasibility. Minimise potential impacts through the selection of the site of the project, its size and specification. Include flexibility in the design for future adjustments to changing contexts and unanticipated impacts. Maximise the spread of benefits in the design specifications of the projects (eg multiple dams where possible). Consider all affected groups, and devise means of minimising social impacts. Conceive resettlement as a development opportunity.
- **Construction**. Ensure local and affected communities' access to employment in construction sites.
- **Operations**. Adjust operations to respond to unanticipated impacts (examples include flood release where it could minimise downstream impacts. Include early warning systems to alert downstream population of operation measures that could affect their lives (opening of floodgates)
- **Monitoring**. Collect baseline information, with data disaggregated enough for the monitoring of differential impacts. Set in place a monitoring system with sound social indicators, and ensure full participation of and consultation with affected communities. Undertake period evaluations of project performance and impacts, and share results with interested parties (including local communities)
- **Relicensing/decommissioning**. Use overall equity performance of the dam as one of the criteria for deciding on its relicensing or decommissioning. In both cases, assess and address anticipated equity consequences.

5.3 Turning Losers into Beneficiaries

The core challenge for those proposing and managing dams is to turn losers (those suffering negative impacts of dams) into beneficiaries. One approach is that of benefit sharing (Milewski *et al,*, 1999). This approach provides a mechanism for those who pay the costs of dam construction (eg those resettled, and those downstream) to share the benefits of dam construction. A range of benefit sharing mechanisms can be identified (Table 5.2). These include preferential rates for electricity or irrigation water, a property tax on the dam or other infrastructure, royalty payments for rights foregone, revenue sharing, or equity sharing. Money from such sources could be paid directly to relevant people, or paid to a Trust Fund or to a Local Government Authority (Table 6.1)

Table 5.1: Benefit Sharing Options (Milewski et al, 1999)

Preferential Rates for Electricity or Water for those negatively impacted by a dam	Local or regional authorities may negotiate free energy or preferential electricity rates with the hydropower producer, which benefits all electricity consumers in their constituency and contributes to local and regional economic development. Similarly, irrigation or drinking water can be supplied to negatively impacted communities at subsidised rates or for free. This mechanism is a form of revenue sharing since it shifts revenues from the dam operator to negatively impacted communities.
Property Taxes paid to a Trust Fund or to a Local Government Authority	In a number of countries, the state allows local or regional authorities to tax dam owners (eg hydropower corporations) on the basis of the dam's property value. This mechanism is not linked to revenues since the tax applies whatever the level of power generated or water supplied by the dam operator. However, it represents a fixed charge for the producer, which has a direct impact on profits.
Royalty Payments for Rights Foregone, paid to a Trust Fund or to a Local Government Authority	Royalties arising if a community foregoes a right in a resource (eg flooded below a reservoir) can be paid into a Trust Fund, or paid to relevant people through some other mechanism.
Revenue Sharing, paying into a Trust Fund or to a Local Government Authority	In the case of revenue sharing mechanisms, part of the revenues are redistributed to local or regional authorities in the form of payments tied to power generation or water charges. Such mechanisms may be the result of negotiations between the authorities and the promoter or may be simply defined in the legislation. In the latter case, the percentages of revenues, which must be transferred to local beneficiaries, and the destination of the proceeds are generally specified.
Equity Sharing or Full Ownership	A variety of mechanisms may allow local or regional authorities to partly or fully own a hydropower facility. Local authorities thus share the risks of the venture but also its profits, if any. Moreover, they gain a degree of control over the design and operation of the project.

A number of different groups of people can be included in benefit sharing procedures. Communities in the immediate vicinity of dam works, and reservoir evacuees should be thought of as the first to receive the fruits of a benefit-sharing programme. However, generally large dam projects are designed for the benefit of wider regional or national constituencies. There are examples of a share of project benefits being redistributed to communities situated close to the project, such as the Itaipu Dam in Brazil and Paraguay. Under Brazil's legislation 45% of the royalties derived from a hydropower project are supposed to be paid to the municipalities which have lost land to the dam. After years of regional complaints Argentina also recognized the concept of royalties (Ferradas, 1999).

However, national or local regulatory frameworks that require benefit sharing from dams tend not to be extended to downstream communities, even if such communities are likely to be affected by a project (Milewski *et al,* 1999). For instance, the Urra 1 project in Colombia requires the redistribution of benefits to concerned communities through a municipality and a watershed management agency. However, legislation applies only to communities within the impoundment zone and in the upstream watershed. Significant downstream impacts were predicted, and the proponent designed a Fisheries Management Plan under the co-ordination of the watershed management agency to mitigate potential downstream impacts. However, this has not been done. In 1999 and 2000, the Colombian Constitutional Court stated that the rights of the Embera-Katio indigenous people and the fishers of

the upper and lower Sinu River should be protected, and that the provisions of the International Treaties signed by the Colombian government should be upheld. Fishermen and indigenous people have marched on the Environment Ministry to demand justice (Müller-Platenberg pers. comm. 1999).

By contrast, in Québec, Canada, recently signed agreements for new hydropower projects were negotiated on a geographical basis with all affected communities, including those both upstream and downstream of the dam (Milewski *et al,,* 1999). The agreements involved large regional municipalities covering several watersheds.

Most benefit-sharing arrangements provide for the redistribution of benefits to local and regional governments, who in turn organise their social redistribution. In certain cases where national or local regulatory frameworks set out benefit sharing requirements to be applied by hydropower proponents (such as in Brazil), the legislation sets out the authorised uses of revenues obtained by municipalities which have lost land to the dam (eg public infrastructure works).

Although the principle of royalties had been legally recognized in various countries in Latin America, only a few of these countries are paying them on a regular basis. Latin American authorities blame payment delays on the current economic crisis (Ferradas, 1999). In 1989, Brazil established that states, federal districts and municipalities should be compensated for the use of hydraulic resources for the production of energy. Royalties have benefited municipalities in the state of Paraná, although as there is no requirement to account for the investments, it is hard to assess how the population is benefiting (Ferradas, 1999).

Brazil is paying royalties for some of its dams. In the case of Itaipú, Brazil paid US$ 12,95 million 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 million. In the case of the Yacyretá Dam (between Paraguay and Argentina), although Paraguay increased the availability of energy power dramatically, it sells part of its energy to Argentina and Brazil. It is not clear how the government invests the income generated by the sale of electricity and by royalties. Paraguay is burdened by debt, and infrastructure works promised at the beginning of the project have not taken place. Many of them are still sources of litigation between regional and national decision-makers. There has been no investment in industries and on rural electrification (Ferradas, 1999).

In some cases communities have the means or the inclination to invest as partners or owners in a dam project, and here benefit sharing can be extended to a share in equity or indeed full equity ownership. For such communities, equity-sharing mechanisms frequently lead to greater control over the redistribution of benefits as well as the actual design and operation of the project. In the case of communities that do not have the financial means to invest in a hydropower project, the capital required for an equity partnership could be provided by the proponent through a long-term loan as a form of compensation for the “natural capital” lost by such communities for reservoir impoundment purposes (Milewski *et al,*, 1999). Alternatively, the community could borrow capital from a lending agency based upon a guarantee that the community’s share of the power produced by the project will be sold at an agreed price over a long period of time. This approach was applied in the case of the Pesamit Agreement (1999) signed between Hydro-Québec and the relatively poor Indigenous community of Betsiamites. A share in a project's equity gives a greater right to local communities to participate directly in the design and operation of the project (Milewski *et al,* 1999). In areas where affected communities lack the level of organisation and potential financial backing, arrangements of this kind may not be possible. Where project impacts are strongly negative on particular communities it is probably unrealistic to think that they would welcome the chance to borrow money to invest in the cause of those impacts.

The extent of social benefits generated by such revenues depends upon the effectiveness of local and regional governments (Milewski *et al,*, 1999). In Latin America, politicians and NGOs blame the lack of compensatory development on 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 the Yacyretá 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 (Ferradas, 1999).
In Brazil, municipalities have varied experience of royalties. Itaipú has no control on how money is allocated. Some goes to federal institutions in charge of environmental and social research. Municipalities spend money on things such as paving roads, providing agricultural supplies, and funding local young residents to study at Brazilian universities on condition that they return to the community for five years. A common claim 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 (Ferradas, 1999).

Where local or regional authorities negotiate free energy or preferential electricity rates with the hydropower producer, the benefits normally extend to all electricity consumers in their constituency, and particularly to consumers who make use of large amounts of power (ie businesses and not households). However, such benefits do not extend to constituents who do not have access to electricity. Therefore, the social implications of such mechanisms are that they are relatively fair inasmuch as everyone has access to power (as in most industrialised countries). In order to be socially acceptable in countries where this is not the case, such mechanisms would have to be combined with rural electrification programmes. The costs of such programmes would then have to be included in the calculation of net benefits.

5.4 Participation: Letting People Plan

It has been suggested above (Principle 5) that dams should be planned, designed and built with real 'participatory' procedures. The need for these have been set out above, and they do not differ markedly from the principles of participatory planning that have become increasingly part of mainstream development planning in the last decade of the Twentieth Century. They need to include recognition of the rights of potentially impacted parties to be informed of what is planned, as well as the right to participate in full project cycle, including options assessment, planning and decommissioning. There needs to be acceptance that development should not go ahead without prior and informed consent expressed through local/community/customary democratic processes, and full transparency in the planning process (eg attention to openness and use of local languages). There needs to be respect for local knowledges and effective involvement of people holding them. Planning processes need to be iterative rather than one-shot, and need to take account of changing circumstances and changing awareness of the positive and negative impacts of the dam. There needs to be negotiated and binding settlements that, if appropriate, involves benefit sharing. Once planning is completed, there needs to be participatory monitoring and evaluation against pre-project benchmark studies in all phases of the dam's life. Where problems develop unforeseen, there need to be procedures for dispute resolution, legal appeal and redress. There need to be mechanisms for independent review.

A number of agencies have made significant advances in recent years in the care with which they approach the issue of equity in the distribution of impacts of development. The World Bank's *Operational Manual on Involuntary Resettlement*, for example, stipulates that customary and formal

rights should be recognised, that those without formal or legal title but with rights under local law or usage, or who have had uninterrupted possession of land for one year prior to census should all be eligible for compensation (World Bank, 1996).

Hugh Brody (1999) points out that the James Bay Corporation has in recent years announced a policy of going ahead with no project unless and until it has the endorsement of the indigenous people living in lands that are to be flooded. Developments of this kind are effectively giving affected populations a right to be heard and an authentic place in the planning process. Brody argues:

> 'Consultation and planning in collaboration with those most directly affected by a dam can also be seen as a form of bargaining. If the communities at greatest risk must be heard, understood and persuaded of a project's benefits even to them, developers of such projects would have the task of finding remedies and mitigation that convince the most vulnerable that they are being fairly compensated'. (Brody, 1999)

However, he goes on to point out that:

> 'this requires diligent and sustained attention to research, consultation, collaborative planning and monitoring. These things exist on paper; they can and should be put into practice. In reality, they rarely are.' (Brody, 1999)

Some groups are less able to benefit from dams (or avoid costs) than others, and possibilities for improving their ability to do so. There is a need to devise ways to empower stakeholders and mediate among conflicting interests (between different local communities, and between affected communities and the state/corporation). Furthermore, Brody argues that if collective rights underpin the measures and processes developers must observe, there must be institutional powers of some kind that represent those who have those rights.

Milewski *et al,al* (1999) recognise the significance of the degree of community control over development for the form that mechanisms of benefit sharing can take. When communities do not or cannot invest as partners or owners in a hydropower project, benefit sharing is effectively limited to revenue sharing mechanisms, such as the supply of free energy or the use of preferential electricity rates, the payment of specific property taxes, or the payment of royalties or water charges. Such communities frequently have limited control over the design and operation of the project, and are essentially passive recipients of benefits hand-outs.

5.5 Redressing Negative Impacts

The creation of equitable and legitimate dam projects must involve more than improved planning processes. Participatory planning procedures (while challenging) are one step towards re-linking project planners and the communities their projects impact. However, there is also a need to devise institutions through which affected communities can seek independent review of their situation.

This is necessary for several reasons:

1. However carefully dams are designed, the complexity of their impacts (particularly in downstream areas) means that it is quite likely that impacts will emerge that were not foreseen, and that have therefore not been mitigated or compensated.
2. Dam impacts act over a long period, and other factors change. Impacts can therefore emerge that were not foreseen at the time of planning. Thus global environmental change might increase the frequency of droughts and reduce river flows, or globalisation may drive adverse economic change. There is a need to keep impacts under review.

3. The dam industry is intent on creating guidelines for sustainable development, and governments are almost universally committed to the welfare of their citizens. However, in the real world, guidelines and good intentions are not always enough. People suffering the impacts of a dam need to have somewhere to go to seek redress, or support. The industry needs some procedure for policing itself.

Brody (1999) suggests the need for a representative body that can scrutinise assessment and consultation procedures or resettlement plans. In Canada, under the James Bay Agreement (and wider political developments) the James Bay Cree and the Quebec Inuit Associations have acquired a lever with which to exert influence on development plans that affect them, including dams. It is the lack of strong and recognised local or regional bodies to represent the interests of those impacted by dams that have created the vocal protests of the anti-dam movement. Consultation ahead of development is very much less painful and less expensive than coping with protest later. It is also a better means of achieving just and equitable development. Brody goes further and suggests the need for an internationally mandated appeals process, possibly an adjunct to the International Court of Justice at the Hague, to respond to appeals by projected affected groups that the agreed standards for consultation, planning and mitigation were not being observed. Appeals could then be based on standards that were themselves a matter of international agreement and principles of human rights.

6. Conclusion

The purpose of this report has been to describe the nature and distribution of the impacts of dams, and to set them out in such a way that their implications for equity can be understood. This is a necessary first step, if future dam projects are to bring the greatest benefits to humankind. It is widely recognised that dams built in the second half of the Twentieth Century have caused negative impacts that could have been avoided, even though in many cases these have been comprehensively outweighed by positive impacts. Issues of distribution and equity have not always had adequate consideration in practice, and it is obviously necessary that they receive that attention as a matter of the highest priority.

The principles described in Section Four of this report provide the basis for planning that takes proper account of equity. These principles need to be applied throughout the project cycle, and in particular at the earliest stages of the consideration of options at both programme and project scale. Participation by all potential interested and affected parties (IAPs) is essential, in order to make sure that their views and needs are heard, and influence programme and project choices. Dam development should enhance the economic opportunities of IAPs and respect their socio-cultural needs. They should never infringe their human rights.

The appraisal of dams must be more holistic, and technical assessments must take account of the distribution of impacts (positive and negative) as well as the overall balance of costs and benefits. There are practical limits to what can be quantified, and there are genuinely intangible socio-cultural variables of importance. Appraisal methodologies must enable qualitative information to carry due weight in decision-making. Because of the magnitude and complexity of their impacts, dams demand the most advanced techniques of open, transparent and accountable appraisal. Close attention needs to be paid to advances in technical planning procedures such as multi-criteria decision-making or citizen's juries. The details of these methodologies are beyond the scope of this report, but it is clear that there should be strenuous efforts to share experiences of successful open and participatory planning internationally, and to disseminate effective models of best practice throughout the world, across different experiences of governance and civil society.

Social impact assessment can identify risks (and here lies the place of the framework of impacts), and can explore remedies. The principles of equity, however, affirm the importance of these concerns at the earliest stage of a project. The rights of those at risk to be heard, to have their rights recognised and respected, are the starting point of equity. Also, the fairness of a development process will, in due course, turn out to be inseparable from its cumulative costs: if vulnerable people are not brought into a collaborative process, then the risks to their wellbeing can only be compounded. These risks will become costs to a project, and will have the potential repeatedly to breach principles of equity. Thus does a project become tainted by both injustice and ever-increasing costs.

After decades of acrimony, there is an opportunity for new principles of dam planning that copy best practice and build on a foundation of concern for equity.

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Appendix I: List of Contributing Papers

Writer	*Contributing Paper*
Adrian Adams	Social Impacts of an African Dam: Equity and Distributional Issues in the Senegal River Valley
William Adams	Downstream Impact of Dams
Hugh Brody	Assessing the Project - Social Impacts and Large Dams
Carmen Ferradas	Report on the Social Impact of Dams: Distributional and Equity Issues - Latin American Region
Pablo Gutman	Some Evidence on Overall Distributional and Equity Impacts
Lyla Mehta, Bina Srinivasan	Balancing Pain and Gains - A Perspective Paper on Gender and Large Dams
Lubiao Zhang	Social Impacts of Large Dams: The China Case

Appendix II: Submissions for Thematic Review 1.1

The WCD is committed to an open and consultative process. To broaden the scope for participation and input from all interested groups and stakeholders the Commission invited submissions on all aspects related to its work programme. As they were received, submissions were classified according to the area(s) of the work programme to which they are relevant. Therefore the submissions used here are those that have been identified as applicable to the Thematic Review 1.1 on Social Impacts of Large Dams: Equity and Distributional Issues

Submissions arrived in parallel to the drafting process of the WCD's reports. Those listed here are the 87 submissions specifically for TR 1.1 which were received January 2000. Also note that submissions are not numbered sequentially.

Every submission has been read carefully. Some are informed individual perspectives on which the WCD can not mediate. For example, there are some submissions that seek the endorsement of the WCD, and the WCD's mandate is neither to adjudicate nor to mediate on specific dams or disputes.

Therefore, the submissions received for Thematic Review 1.1 have been used as background information. All submissions have informed the WCD as to the different positions on the dams debate. A few submissions only included an abstract or an outline for a presentation at one of the consultations with insufficient detail to be included.

Author	Serial Number	Title
Fearnside, PM	CAS010	Social Impacts of Brazils Tucurui Dam
Pedro Alves Costa Roberto Malvezzi	CAS019	Sobradinho Dam
Philip Fearnside	CAS020	Lessons from Tucurui Dam
Anna Cederslav, Shirley Sanchez, Rafael Gonzalez, J. Martin Wagner	CAS021	The Bayano Hydroelectric Dam in Parana
Juraj Zamkovsky, Roman Havlicek	CAS023	Water Supply in Slovakia
ASPROCIG	CAS024	Urra Dam, Colombia
Raimundo Nonato Carmos Silva	CAS025	Considerations on Tucurui Dam for the World Commission on Dams Public Hearing
Sundaraiya, E	ECO008	Environmental Impact and Socio-economic Aspects of Water Resources
Rupchand, KV	ECO011	Socio-Economic Impacts and Issues due to Large Dams in Tamil Nadu, India
Mehta SS	ECO014	Impact of Major & Medium Irrigation Projects on the Socio-Economic Development of Gujarat
Roman Havlicek	ECO022	Dams on Credit Economic, Financial and Distributional Analysis
Valerio Igor Victorino	ECO025	Capitalism, Hydropower and Environment in Developing Countries: The Case of São Paulo Metropolitan Area
Visvanathan, N	ENV010	Impacts of Construction of Large Dams: A Case Study
Mediwake, LW	ENV017	Negative Effects of Victoria Dam Project

Gracia, CL	ENV022	Biscarrues Dam Project, Gallego River, Ebro Basin, Spain
Micceslau Kudlavicz	ENV063	Porto Primavera Dam in Rio Parana
Jose Roberto Fontes Castro	ENV075	Statement on Pilar dam project, Minas Gerais State, Brazil
Gabriela Fried1	ENV079	Swiss Federal Institution for Environmental Science and technology (EAWAG)
V.P. Jauhari	ENV080	Sustainable Development of Large dam - Case Study of Nagarjuna Sagar Dam - India
William Dietrich	ENV082	Impacts of Dams on River Geomorphology
G. Mathias Kondolf	ENV083	Scientific Evidence of the Significant Impacts of Dams on River Geomorphology, with examples from California, USA, and Portugal
Chang Cheng-Yang	ENV084	Experiences from Meinung Dam, KaoPing River, Taiwan
G Mathias Kondolf	ENV085	Dams and Ecosytems Regarding the Impacts of Dams on River Geomorphology, and the Feasibility of Restoration Strategies
Jose Antonio Ribeiro	ENV111	Flavio Nenflidio Carvalho
Birley, M	INS039	Health Impacts
Vladut, T	INS040	A list of Dam Interference (Environmental, Social and Economic)
Robertson Fonseca de Azevado Raimundo Ronan Maciel	INS061	Strategies to save Tibagi River, Parana State, where Construction of Seven Hydroelectric Dams is Planned
Glenn Switkes	INS065	The Tocantins Araguaia Basin: Brazil's "National Sacrifice Area?"
Rubens Ghilardi Jr	INS067	Protected Areas Associated with Electric Projects in Brazilian Amazon
Raul M. Sanchez	INS075	"To the World Commission on Dams: don't forget the law, and don't forget human rights"
Cristian Opaso	INS078	The Bio-Bio Project: A Lesson not Fully Learned by the World Bank
J A K Van Wyk	INS085	The International Politics of Dams: The case of the Lesotho Project
Grainne Ryder	INS086	Changing Institutional and Policy Framework
Juraj Zamkovsky	INS087	Consultation and Decision Making on the Case of Gabcikovo Water Works
Saravanan.V.S	INS090	River Basin Organisations in India: Institutional Frameworks and Management Options -A Case for Fundamental Review
Rodney Bridle	INS091	Submission by British Dam Society on Options Assessment and Decision-making Processes and Internationally Acceptable Criteria and Guidelines for Decision-making in all Aspects of Dam Building Utilisation
Roman Havlicek	INS093	Proposals to Restore the Original Purpose of EIA Procedures and to Improve Their Effectiveness
Rohan D'Souza, Pranab Mukhopadhyay, Ashish Kothari	INS094	Hirakud Mahanadi- India

Roman Havlicek	INS095	Environmental and Social Impact Assessment of Large Dams in Slovakia
Andrew Corbett	INS103	A Case Study on the Proposed Epupa Hydro Power Dam in Namibia
Chand KB	OPT025	Prospects for Large Dams in Nepal
Iyer, R	OPT027	The Large Dams Debate
Datye, K R	OPT045	Multiple use of Waters - Thinking Loud about the Importance of the Fate of the Sao Francisco River
Thakkar, Himanshu	OPT051	A Report on the Impact of Farakka barrage on the Human Fabric (A study of the upstream and downstream areas of Farakka Barrage)
Rohan D'Souza	OPT053	Irrigation Options, Flood Control Options, Project planning
Steve Rothert	OPT055	The Potential of Water Conservation and Demand Management in Southern Africa: An Untapped River
Mike Acreman	OPT056	Managed Flood Releases from Reservoirs- A Review of Current Problems and Future Prospects
Dr Hussein Amery	OPT062	Dams and Water Supply: Effects on Food and National Security
Steve Thorne	OPT076	Electricity Supply and DSM Options
Sharon Matola	OPT082	Unacceptable Approach to Energy Needs in Belize: The Proposed Chalillo Dam
Srinivasan, B & Mehta, L	SOC002	Gender and Dams: The Impact of Large Dams on the Lives of Women in South Asia
Avinash, BJ	SOC006	Distress in Koyna Valley: A brief History of Alienation
Hemadri, R	SOC021	Displacement and Other Social Impacts of Large Dams: The Case of Bisalpur Dam
Kuranawathie, AR	SOC029	Social Impacts of the Samanalawena Project
Gracia, CL	SOC036	Velacha Dam Project: Duero River, Duero Basin, (SPAIN)
Fogel, R	SOC046	A List of Effects/ Impacts of Dams
Rev. Stan, M	SOC048	Inter-Church Enquiry into Northern Hydro Development : Statement of Panel of Commissioners
Henry Acselrad	SOC050	Social Conflict and Environmental Change at the Amazonian Tucurui Dam Region
Roman Havlicek	SOC053	Destruction of Rural Communities as an Inseparable part of the Construction of Large Dams in Slovakia
Ricardo Ferreira Ribeiro	SOC058	Dams on the Jequitinhonha River Drown the Affected People with Progress
Jose Porfirio Fontenelle de Carvalho	SOC062	Eletronorte's Experience with Indigenous People
Claudio Gonzalez – Parra	SOC072	Indigenous People and Mega-projects: The Example of Pehenches en el Alto Bio Bio, Chile
Jaroslava Colajacomo	SOC073	The Chixoy Dam Case
Glevys Rondon	SOC074	Mining and Social Conflict- An Exploration of the Role Played by Mining in Maintaining Social Exclusion using as an example two Case Studies (Venezuela and Peru)
Rosa Maria Ruiz	SOC075	Nipping a Disaster in the Bud

Margaret Maran Nunes	SOC078	The impact of Dams on the Life of Women
K.R.Datye	SOC082	Resettlement, Large Dams and Sustainable Alternatives
Glenn Switkes, IRN	SOC084	"The Ava-Guarani Indians of the Parana River Banks" Beatriz Irene Baron, anthropologist, 1997
Hillary Masundire	SOC088	Kariba Dam: Biophysical and Socio-economic Impacts 40 years after Construction
Jacqueline Ki-Zerbo	SOC089	*Barrages, Securite Alimentaire et Conditionsde vie des populations: Analyse des Beneficces et des Impacts selon le genre*
Dr Munther Haddadin	SOC090	The Socio-Economic Role of The King Talal dam in the Kingdom of Jordan
Lahlou Abdelhadi	SOC091	*Impacts Socio-economiques et Environnemetaux de l'envasement des barrages en Afrique du Nord*
P. Claudio Crimi	SOC092	*Tentativa de analise da situaçáo existente entre as povoaçóes do lago de Cahora Bassa*
Tobias Schmitz	SOC093	The Irrelevance of Large Dams for the Poor: A Perspective from SA
Adrian Adams	SOC094	A Grassroots View of Senegal River Development Agencies: OMVS, SAED
John V. Magistro	SOC095	Dam-Induced Impacts on Food Security and Resource Livelihoods in West Africa: A Case Study from the Middle Senegal River Valley
Jean Louis Bourgeois	SOC097	Planned Dam at Talo, Mali that Threatens the World Heritage Sites (Town and Mosque) of Djenne
Rich Beilfuss	SOC099	Can This River be Saved? Rethinking Cahora Bassa Could Make a Difference for Dam-Battered Zambezi
George Dor	SOC111	The Impact of Large Dams on Debt and Poverty in Africa
A.I.EL Moghraby	SOC118	About Dams on the Nile
Flavio Nenflidio Carvalho	SOC122	Ofaié-Xavantes indians in Porto Primavera Dam
Association of Island Dwellers Impacted by the Ilha Grande National Park	SOC123	History of the Island Dwellers of the Archipel of the Parana River
Dario Jaña	SOC124	Ethnocide of the Pehuenche People in Alto Biobio, Chile: 10 years of Fighting
Margarita de Castro	SOC126	Lessons from resettlements of Urra Hydropower Project
Gilberto Sales	SOC129	Respect for the Rights of Socio Cultural Ethnic Diversity (Indigenous and Quilombos Population)
Antonia Claret Fernandes	SOC137	Emboque dam, Matipo'River, Minas Gerais, Brazil
Jaime Castro Matabanchoy	SOC138	Pasto: Between Thirst and Water

Appendix III: Comments Received for Thematic Review Social Impacts of Large Dams: Equity and Distributional Issues

The WCD is committed to an open and consultative process. To broaden the scope for participation and input from interested groups and stakeholders, the Commission invited specialists, centres of excellence and WCD Forum members to prepare comments on the thematic drafts. Comments were received throughout the progression of the thematic review. The comments were incorporated to the extent possible into subsequent drafts of the thematic.

Every comment has been read carefully. Some are informed individual perspectives on which the WCD can not mediate. For example, there are some comments that seek the endorsement of the WCD, and the WCD's mandate neither to adjudicate nor mediate on specific dams or disputes. Others may go beyond the scope of the individual thematic review.

The comments are separated into Appendix sections relating to specific draft that they refer to. Section numbers referred to in individual commentaries will have changed in the final version of the report.

Comments on Draft of January 2000

a) Prof. Paul Mathieu,	Université catholique de Louvain et Fonds National de la Recherche Scientifique – Belgique
b) Warren A. van Wicklin,	World Bank
c) Jinxia wang, Jintao Xu,	Center for Chinese Agricultural policy, Chinese Academy of Agricultural Sciences
d) Comments by: Armelle Faure-Osei,.	Consultant, France
e) Dr. Cristina Espinosa, Dr. Berg Bergkamp and Erin Grinnell.	IUCN Social Policy, IUCN-Wetlands, IUCN Social Policy
f) Workshop on the Social Impacts of Dam.	14/15 January 2000

a) Comments by Prof. Paul Mathieu, Institut d'Etudes du développement - Université catholique de Louvain et Fonds National de la Recherche Scientifique – Belgique

The report is very stimulating, totally relevant, well written and very well documented, clearly and logically structured and presented : excellent work!
The following remarks are suggestions for very specific and limited changes, and possible improvements.

Parts 1 and 2: I do generally agree on the analysis. Just a few specific comments :

- 1.2.2 The Views of those Critical of Dams

"2) Costs are borne by the particular groups of people, particularly the poorest and least
6) Not all impacts can be expressed in economic terms, and these are not effectively captured by any economic approach to the calculation of costs and benefits ".
• These two points are particularly important: their main logical consequence is that the actual amount of compensation for the 'losers' (eg resettled groups) will basically be the result of a negotiation or bargaining process, result itself strongly determined by the balance of powers of the various groups involved as legitimate stakeholders, and/ or representative legitimately entitled to speak for the stakeholders (see below, about part 5).

• A non-essential, non politically correct remark: there is lot of **insistence on gender bias**, the need to consider gender-specific negative impacts, etc.
This is right, but are these gender impacts and gender recommendations so much more important than other social and socio-biological differences (eg young/ old; wealthy/ poor; etc.) as to deserve such repeated insistence? In many cases, in the framework of the family, the stress of displacement is probably coped with by some family strategies. Some vulnerable categories are the isolated individuals with little 'social weight and capabilities or entitlements', and among these, the isolated women (widows, divorced) especially those with children are probably among the most vulnerable groups and deserve specific attention, but this is also the case for some other categories not only or not necessarily only women: older persons without family support; young people with no assets and little or no family support etc..

Part 3 The social impacts

I do agree, with the framework for analysis. It is clear, seems rather complete, and presents a useful checklist of moments and issues where equity and distribution issues arise. It is certainly a very useful tool for analysis, although it can probably still be completed and certain items detailed (in order to detail and make a thorough analysis of specific questions).

Two remarks here:
1) The 'check-list' presentation puts many different questions and issues on the same level of presentation. How would it be possible to identify some degree in importance and priority of the issues? –Is it possible?
2) The framework rightly stresses that some negative social impacts are "secondary" or 2d level, i.e. the impact is not uniquely, directly and not immediately resulting from some action related to the dam (planning, building, or operating) process, but are the combined (or synthetic) result of specific dam-related action(s) PLUS some other factors or contextual conditions, or structuring processes.

One clear example of this appears at the stage "Supplying irrigation from reservoir": the first mentioned potentially negative social impact is 'Concentration of land-holding'. First, a terminology precision: Concentration of land-holding is not necessarily, per se, a negative impact (in the medium or long term, eg if it allows for increased investment, productivity and labour opportunities, or non-agricultural induced development etc.), "landlessness," or "loss of land" is , certainly in the short and medium-term, a negative social impact (the report rightly mentions below: "lack of secure tenure for the poor").

My question (or suggestion) is the following: would not it be possible and worth to stress this interaction among "dams-related actions" and other "non-(specifically) dams factors" and structuring contexts, policies, institutions, which is the real causal factor (or complex of factors) conducive to certain 2d order, indirect potentially negative social impacts?
Of course, this could not be possible for all the 2d level impacts mentioned, but maybe for some of the most relevant ones, would it be a useful addition to the report.

Part 4 Principles for addressing…

I do basically agree with the equity issues and equity principles formulated.

4.1.2 "Questions might include: (…..)
• How can the design and planning of the dam be organised to turn losers into beneficiaries?"
I suggest two other questions following the one above , such as:
• "How can the design and planning of the dams be organised to avoid (minimize) net losses (or livelihood-threatening losses) for the most vulnerable groups? "
and/or:

• "What compensation would be needed and how should the decision-process regarding compensation be organised in order to avoid (minimise) net losses (or: livelihood-threatening losses) for the most vulnerable groups? "

4.2 Principle **4. Dam construction should maximise the number of beneficiaries and minimise the number of losers.**
This is a very general, well-intentioned, not very time-scale specific statement or principle. Some time horizons should be specified here. There will probably (most often) be losers (net losses or absolute decrease in income and quality of life) for some groups. This principle could it be specified in a not such maximalist or idealist way? (or are principle necessary 'radical' and in some way idealist?).
I do basically agree with all the sub-questions under the above principle 4.

Part 5 Planning for equity

The report is right to stress (earlier in part I, 2.1 –4th point) that "Fourth, it may be concluded that even where economic benefits have surpassed costs, some groups can end up as significant net losers"
The report is right to stress the importance of considering "benefit sharing options" (5.3) , and to recall the following principle "The World Bank's *Operational Manual on Involuntary Resettlement*, for example, stipulates that customary and formal rights should be recognised, that those without formal or legal title but with rights under local law or usage, or who have had uninterrupted possession of land for one year prior to census should all be eligible for compensation (World Bank 1996)." (§5.4).

However, the actual implementation of this principle (possibly in the form of some kind of benefit-sharing agreement: 'negotiated and legally binding agreements') is not only a matter of participatory procedure and guidelines.
The most relevant way to frame and structure the planning and decision making process in such a way that equity and compensation are considered, net losses are minimized, especially for the poorest and weakest groups, is not (only) trough participatory procedures (which can easily be implemented in a manipulative, non-integrated, non-participatory way), but also (and, perhaps, basically) through negotiation, representation, in a not- too asymmetric balance of powers between planners (the State or delegated bodies, acting in the name of the global interest in the medium or long term) and the representative of the weakest and most vulnerable groups. In other words, the issue is how to do in order that the weakest and most vulnerable groups are not absolutely marginalized in the planning and decision process; - that they have some access to key information early in the process; - and that they can be part of a fair negotiation process, whose aim should be to balance "global benefits" (for society or the nation as a whole, in the medium and long term) with "local compensated losses " (losses partly non-quantifiable, for local groups, and especially in the short and medium term).
Participatory procedures and guidelines are not enough for that aim, although they may be an important component of the process.

Other, and certainly necessary conditions in order to translate the principles of equity into reality would be about the following issues: empowerment (of the weakest groups of stakeholders), capacity for representation in a true negotiation, mediation (among conflicting interests), negotiated compensations and sharing of benefits.

"Representation, empowerment, bargaining, appeals process…" are issues and terms mentioned in 5.4, under the very general heading of 'Participation', but these issues are actually about something else or something beyond mere 'participation'. For reasons of clarity and visibility of the issues, it could be useful to mention and discuss these aspects (which are correctly , although briefly presented) under a more precise and specific heading??

b) Comments by Warren A. van Wicklin, World Bank. Date: March 4 2000

Subject: comments on WCD thematic papers on Social Impact (1.1) and Participation, Negotiation, and Conflict Management (5.5) as well as Gender and Downstream Impact background papers for Social Impact

At last Tuesday's meeting the table summarizing World Bank comments on WCD thematic papers indicated that neither of these papers had been reviewed. I feel it is a very high priority for the Bank to provide comments, so I took a few hours this weekend to read the four papers and Volume 2 of the Briefs. Unfortunately these papers come at a bad time for my own work schedule, so I could not devote more time to provide thorough comments, but the following will give you at least an indication of my views. I would urge additional efforts to get some of the 11 people sent the papers to provide comments. I do think every WCD paper should be reviewed by at least three Bank staff, to provide some checks and balances.

General observations. Like other WCD papers, these four papers draw very heavily from the academic and NGO literature, which tends to emphasize the negative impacts of dams, and to appear somewhat anti-dam. I am concerned about the positive impact, pro-dam perspective getting so little space in these papers. Most of the papers also seem to cite the same few dozen bad cases, with very little reported about the majority of dams that did not have these problems. I think this makes it more difficult for the Commission to achieve a balanced perspective. There needs to be some sense of how widespread and representative the problems are, but with a fairly anecdotal approach, the papers fail to provide that basic information. If all I knew about dams was what the WCD papers contain I too would have a much more pessimistic perspective than I currently do.

Social Impact: Equity and Distributional Issues. This paper very clearly and succinctly lays out the pro-dam and anti-dam views on pages 3 and 4. It identifies winners and losers in different project phases and geographic areas. It identifies positive and negative impacts. All of this is to be commended. It points out many areas where there is inadequate attention and knowledge. It lays out a large inventory of issues that should be addressed. There is a section that explores benefit sharing, especially of revenues. It does not explore other forms of benefit sharing (jobs on the project, ongoing employment opportunities, etc.). There is a significant amount of material on good practice principles, but not much on specific recommendations. Nonetheless, the overall quality of the paper does provide good overall guidance on potential ways forward. I found this to be the most satisfying WCD paper I've reviewed.

Downstream Impacts. This is one of the background papers for the Social Impact paper. It begins by saying it aims to address critical knowledge gaps about downstream impacts, but that very lack of knowledge and data prevents it from succeeding. While the paper does a good job of cataloguing an impressively large variety of potential downstream impacts, the paper offers relatively few concrete examples. Furthermore, most of the impacts they examine are negative impacts. Positive impacts are mentioned more pro forma and in passing. There is very little discussion of good practice about how to mitigate negative downstream impacts. The most memorable example is restoring periodic floods downstream, especially from the Manantali dam, but apparently that began in 1997 and it is unclear how well it has worked to date. The paper offers only one page with five principles for taking account of downstream impacts.

Gender and Large Dams. This is another background paper for the Social Impact paper. It suffers from even less empirical evidence than the downstream impact paper. The paper cites the 1998 OED resettlement report several times, which shows how hard up they are for findings. OED did not focus on gender and found even less to report, except for the India case study paper, which the gender paper does not fully take advantage of. Because of the lack of data, the authors freely admit that they draw upon the broader gender and development literature, but it is unknown how much of that is relevant to large dams. The paper strives for balance, but the gender and development literature they

cite is so negative that the paper ends up being very negative, although mainly in the abstract, not about particular dams. The only good practice seems to be what OED found in China. Both authors appear to be from South Asia and the paper disproportionately relies on cases and literature from India, almost to the point that one wonders what the situation is like elsewhere. The paper fails to cite any of the gender and resettlement literature in the Bank (Gopal, Sequeira) although I believe that material is unpublished and not well known outside the Bank. The recommendations appear reasonable, but are fairly general and abstract.

Participation, Negotiation, and Conflict Management. This paper is based fairly heavily on interviews with 23 dam experts from many different countries, types of organizations, etc. The paper does review relevant literature, but has limited emphasis on case studies except indirectly based on the interviews.
This may have been necessary as relatively little appears to have been written about these processes on a case study basis. Therefore the paper is better at laying out the issues than in citing examples of good practice. At points the paper comes across as too theoretical. The paper does cite some good practice, such as Lesotho Highlands. Overall I find this paper to be fairly helpful. The recommendations are mainly suggested tools for conflict resolution, so they are very process oriented. The limitation is that many of these tools might be dependent on societies having good conflict resolution systems. There is relatively little suggested on existing constraints in this regard, and how to move forward. Translating good practice from OECD countries to many developing country contexts could be very difficult.

Volume 2 Briefs. Only the two thematic papers are summarized, not the downstream and gender background papers. The brief on the Social Impact paper is very candid about the lack of information on downstream impacts and gender issues. As with Volume 1, the briefs are more balanced than the papers.
Because these two papers (I.1 and V.5) avoid some of the flaws of the other social impact papers (I.2, Resettlement, and I.3, Indigenous People), the briefs are working with better material. On the other hand, because papers 1.1 and V.5 are fairly rich, the briefs lose more good material. Long lists of questions are no substitute for a concise list of key recommendations. Again, I wonder why the WCD adopted this approach (no recommendations, only questions) for the briefs. At least the brief on Social Impact has a section entitled "A Framework for Addressing Equity" which is a step in the right direction.
Summary. Although all the papers have some limitations, and I think they are a bit too focused on the negative, I am more positive than I was after reviewing the resettlement and indigenous papers. I think these papers are making useful contributions, although much more in terms of laying out the issues than in identifying good practice or other solutions.

c) Comments by: Jinxia wang, Jintao Xu, Center for Chinese Agricultural policy, Chinese Academy of Agricultural Sciences. Date March 2, 2000

On behalf of Prof.Huang, we will give some comments about "The Social Impact of Large Dams: Equity and Distributional Issues" and "Social Impacts of Large Dams: The China Case".

At first, let us to review the "The Social Impact of Large Dams: Equity and Distributional Issues". In general, this is a very good and system review on the social impact of large dams, especially on equity and distributional issues. According to our experience, we have some ideals about the paper:
1) Make out more clear relationship framework among environmental, social and economic impacts of large dams, give clear definitions about three impacts. In the paper, some social impacts you mentioned are more like economic impacts, such as equity issues.
2) When talking about environmental impacts, you had better also include the biodiversity and sedimentation problems.
3) Sometimes the paper should cancel some unrelated discussions, otherwise they will blur the title. Such as " Impacts of the supply of water for irrigation", you mentioned many problems about poor performance of irrigation system. These problems are very common and it is hard to understand the relationship between poor performance of irrigation system and large dam's social impacts.
4) Due to un-quantifiable nature, some social impacts are difficult to assess, but assessment of social impacts is very important. Could the paper propose some methods to assess social impacts more effectively?
5) In "Equity principles" part, you talk about six principles. Under each principle, too many items are included and some are repeated. Could the paper make them concise and arrange them logically?

About Dr.Zhang's "Social Impacts of Large Dams: The China Case", we also have opinions about it.
1) The paper does not focus on the social impacts, but discuss the environmental, social and economic impacts at the same time. More importantly the paper has not made clear the conceptions about the environmental, social and economic impacts of large dams, especially research scopes of social and economic impacts are confused. We think that the paper should put more attention on the social impacts of large dams.
2) When talking about "Benefits from dams for food production and security", the paper has not much evidence, many results come from inferences.
3) Three gorge project has not finished and it is unsuitable for analysing the social impacts of it. Dujiang Yan is too old to know its real social impacts. China has many large dams and some social impacts are very clear, the paper should try to select anther large dam to do case study.
4) When talking about if social impacts of large dams are taken into consideration by China's government, the result of discussion is not very clear.
5) When discussion "some principles, guidelines and approaches", it is not very clear that the purpose of these principles, guidelines and approaches.

d) Comments by: Armelle Faure-Osei, Consultant, France.Date: Feb 25, 2000

j'ai lu attentivement les 3 documents sur l'impact social et j'ai beaucoup appris.
Il m'est difficile de critiquer une étude de cette ampleur et qui me parait une contribution novatrice du point de vue anthropologique. J'avais pourtant souigner 3 points:

1. La principale nouveauté pour moi, c'est l'importance portée à l'étude de la situation en aval des barrages, c'était l'Arlésienne (ou la Cendrillon!) de mon étude préalable du Barrage de Bagré. Pour Bagré, se pose le problème de l'étude de tout le Bassin versant. Quelques

difficultés en amont de Bagré sur la rivière Nakambé. J'ai fait pour la Banque Mondiale la supervision du plan d'Impact Environnemental pour les actions sociologiques du Plan de Réinstallation du Barrage de Ziga, le réservoir destiné à alimenter Ouagadougou en eau potable.
C'était en année -4, bien avant la construction de ce réservoir, et l'aval de la digue du barrage de Ziga avoisinait la zone de l'impact amont du Lac du Barrage de Bagré. En ce qui concerne l'aval du barrage de Bagré, la zone d'étude arrivait à la frontière du Ghana, mais pas au delà bien sur. Pourtant cette année (octobre 1999) il parait que les lachers d'eau de Bagré ont provoqué 40 morts en aval, au Nord du Ghana (information Reuter disponible). Les ingénieurs du barrage de Bagré n'étaient pas au courant quand je leur ai demandé.

La question des frontières sur un Bassin versant mérite d'être soulevée. Plus bas en aval du Bassin Nakambé-White-Volta, il y a le Lac d'Akossombo, bien connu.

2. Pour la pêche, la problématique amont/aval mérite d'être soulignée: sur le lac de Bagré, la pêche a "explosée" bien au-delà de ce qui était prévu dans le Schéma d'Aménagement de 1987, réunissant des populations venant de tous les pays voisins. Cette pêche miraculeuse a peu profité aux populations locales qui n'étaient pas préparée, sauf celles de Niaogho et de Gomboussougou, qui abritaient une population de pêcheur.

3. Cependant, c'est le 3 point que je veux souligner, des femmes bissa (population locale) se sont constituées intermédiaires entre les pêcheurs et les acheteurs qui revendent à Ouagadougou. Elles ont bien développé leurs activités, au point de refuser des crédits d'appui de moins de 500.000FCFA, d'après une étude récente (1999).

Tout cela mérite de nouvelles études de terrain sur l'équité et les relations de genre dans la répartition des bénéfices et les pertes. Je suis évidemment disposée à les entreprendre et je compte monter un projet avec une équipe burkinabè, cela prendra le temps que cela prendra pour trouver les financemants, mais votre étude d'impact social pourra trouver une application et des suites sur le Bassin versant.

Voilà ma maigre contribution pour l'instant,

bien cordialement

armelle faure

e) Comments by Dr. Cristina Espinosa (IUCN Social Policy), Dr. Berg Bergkamp (IUCN-Wetlands) and Erin Grinnell (IUCN Social Policy). Date: Feb. 29, 2000

General comments

It is important to highlight in the first place the contribution that these papers make into the general discussion on large dams. It is an important advance that social impact of large dams and the issue of how costs and benefits are shared among different social and economic groups are considered focal issues for background papers. These papers offer some important clarifications, conceptual definition and empirical examples of how large dams affect local people, the uneven impact on different groups, the need for stakeholders participation and how gender blindness constraint the social equity of large dams and of the analysis made of their impact. They all highlight the need to overcome the narrow focus of economic analysis to include non-economic values, costs and benefits and the need to look at the uneven social impact of large dams, instead of just assessing costs versus benefits without disaggregating how these are distributed among different groups of people.

Once this point is made clear, and due to time limitations, we are going to focus only on what we consider the weakness of the documents. The exception is made for the document on gender, which deserve a separate treatment.

In this regard, the following comments aim to support this process of incorporating these topics and criteria within the mainstream discussion and decision making around large dams. The comments and discussion focus on some important limitations that these documents exhibit, and some suggestions on how to overcome them are included.

The first comment after reading the different papers is that the boundaries between their topics are not clearly defined. There is some artificial division between them. For instance, the paper on downstream impact should be part of the social impact paper. The connecting theme should be how large dams affect the ecosystems and thereby affect the livelihoods of different local groups that rely on them. This way the paper could analyse for different ecosystems and biomes, how the downstream effect affect specific social groups within households, communities and districts (something that is announced in the introduction of the Downstream impact document but never done), as part of a broader analysis of what is the diverse social impact of large dams.

The role of these papers is to present a broad analysis of what are the issues at stake, what is the status of their discussion, what are the main gaps and challenges and what is the way to go. What is missing is a more systemic approach to the way social impact has been addressed, a set of questions that allow the whole hierarchy of value systems behind development paradigms to be explicated, in order to be aware that the different options and choices are framed within certain paradigms and values. It is important to provide a more comprehensive review of the different options and positions, anti and pro dams, let's say to cover 180° ground, from one extreme to the other, in order to better position the debate. This way the background papers can provide better elements for the debate and for making decisions that are better informed. The impression that the documents leave is too biased on the anti dams perspective. Even though we might agree with that position, it would more powerful -and useful for practical purposes- if presented in the context of a more balanced discussion of pro and anti dams approaches.

The second major criticism is that there is no integrated vision in these papers on what is social equity. In the downstream impact, the focus presented in the introduction –which is not followed through the rest of the document—is on the gender differentiation within households and communities, with no explicit reference to other important categories of social differentiation, such as rich and poor, ethnicity, religion, cast, age and seniority, rural and urban, etc. The document on social impact also focuses on gender when addressing social inequity. On the other hand, the document on participation and conflict management focus only on indigenous people and local communities, ignoring the fact that they are not homogenous entities and that ignoring class and gender differentiation will sharp the uneven social impact of any intervention.
There is a need to integrate the different variables or hierarchies of social differentiation in these documents, in order to provide a more clear conceptual framework to understand how these different variables affect the social impact of large dams, and therefore what is required to implement analysis and consultation-negotiation process that taking these factors into account, can achieve more equitable results.

Related to this lack of clear definition of what is social equity, what is missing in the document is an explicit analysis of power structures and dynamics affecting equity as well as an analysis of the institutional dynamics mediating their power relationship. The word stakeholders is mentioned several times but no clear definition of the concept of stakeholder analysis is referred, nor linked with the different categories of social exclusion, such as class, gender, ethnicity, religion, urban/rural, etc.

Who are the stakeholders, how can be identified and engaged in the consultation and negotiation process? What institutional mechanisms are required to ensure that stakeholders with different power will agree on a process of sharing costs and benefits associated to large dams, which is more equitable?

Another weakness of the documents is the lack of links between the concepts of equity and sustainability. The reference to social impact is made directly on people, without relating how large dams impact on their livelihoods affect people in different ways, based on their class, gender, ethnicity, age, etc. It is an important contribution of the papers the recognition of the importance of non-economic values, factors, costs and benefits, to be considered in the costs and benefits sharing, as well as the fact that they are not evenly distributed among different stakeholders. However, the analysis need to be rounded in terms of better addressing the analysis of people's livelihoods as the link between the environmental changes and the well-being of different groups of people. Livelihoods approach also allows the analysis to connect local, national and global levels for analysis, advocacy and policy development.

Issues like transboundary conflicts are not mentioned within the downstream effect, no reference to coastal communities and in general, how within different ecosystems, the livelihoods of different people (in terms of class, gender, ethnicity, age and seniority, etc.) are differently affected.

The geographical focus is also not balanced. For instance most examples of the downstream document are from Africa, without including cases from India and Bangladesh, China that are represent important areas of conflict.

The boundaries between the topics of these documents should be better worked, in order to have them as complementary documents. There is a need to develop a common approach to social impact, equity and participation, to have similar approach to the concepts of stakeholders, local people, social impact, participation and equity as comprehensive enough to include not only main hierarchies such as class, gender, ethnicity, etc. but their interactions. In this regard the concept of livelihoods can provide the necessary linkages between different variables of social differentiation and between the changes in the environments on which local people depend, with the social impact that large dams have on them.

A logical set of questions should go from the more general issue of what should be considered as social impact of large dams, presenting the different positions in regard to pro and anti dam approaches. A balance of potential and constraints of these approaches, well documented with case studies from all over the world, and showing the connection between environmental, economic, social and cultural changes for different people within households, communities, local and national levels, should be presented to position the discussion.

A balance in terms of what practical implications have the different approaches for the equity as well as the sustainability of large dams should be presented.

Clear recommendations of how to identify stakeholders, how to engage them in consultation and negotiation process. The problem of how to define fair participation processes in context of institutional and power asymmetries, should be stated, and recommendations based on lessons learned from experience should be presented for discussion. The focus should be on what institutional conditions and changes are required to overcome the current contexts that shape and reproduce inequitable sharing of costs and benefits associated to large dams. The possibility of discussing the possibility of building or not the dam should be part of the participation process, providing well balanced anti and pro dam arguments. The need to empower disempowered groups and individuals is part of the analysis and should be part of the strategy to achieve more equitable participation, and distribution of costs and benefits associated to large dams.

Specific comments on the paper on Participation, Negotiation & Conflict Management in Large Dams Projects

This is very comprehensive review and presents a systemic picture of the issues at stake, in developing clear procedures to enhance participation, negotiation and conflict management in large dam's projects. However, it has some important gaps that need to be considered to improve the document. Hope you will find these comments useful.

1. Gender is not explicitly addressed in the document as it is an important variable defining specific stakeholders and demanding special provisions required to make stakeholders participation comprehensive and fair. This point is extremely important, since dams as any other intervention has differential impact for men and women, and gender strongly affect the process of participation and conflict resolution at the local level. More elaboration on these issues can be found in *Mainstreaming Gender into Water Management. Why and How* (IRC/WWC 1999). Examples of this omission in the document:

- when referring to the local groups affected by dams (p.ii) or
- when referring to those stakeholders who lack formal organization and representation (p.iii) or
- groups that have traditionally little voice in society (iii) or mentioning the variables affecting participant's attitude (p.iii). Although explicit reference is made to the poor and indigenous people, this concern is not extended to the gender differentiation. It has been well documented the gender blindness experienced by rural development projects, when working at the community level, or even at the household level. This explicit consideration of the way gender differentiates the access to resources, information, decision making, and how the impact of the dam affects men and women, is lacking.
- For instance in page 5, when presenting the common problems identified in the process of involving the public in decisions related to dams,,
- page 6 last paragraphs, when mentioning the different factors affecting behavior; page 8 when describing the different views that stakeholders have of the problem and the need to make assumptions clear for discussion
- Page 10 presents individuals that face insurmountable obstacles when they are not represented by an organized groups, and because they cannot access the process in terms of distance, affordability and understanding of the process, such as indigenous people and poor. Women face these problems also and should be targeted as well.
- Page 12, second paragraph
- Page 12, 4th paragraph, communities see dam as a real opportunity for development. Question: who within the communities. More explicit reference to conflicting interests in terms of class, ethnicity and gender should be made, based on the literature reports.

2. Equitable sharing of costs and benefits derived from large dams, is only mentioned once in the whole document, in page 6 when describing the sources of conflict (in terms of the macroeconomic benefits opposed to the local impact). It is not mentioned as a component of

- successful conflict resolution (page 7),
- best practices for involving the public (page 14 and 15)
- when measuring success (page 20) or
- When describing the principles of conflict resolution (page 21) as part of best practices for resolving conflict. There is no clear explanation of how conflict, which is recognized as inevitable, can lead to sustainable relationships. The reference to skills, expertise, diverse knowledge and strategies cannot ignore the fact that differences leading to conflict require some compromise among the diverse stakeholders, based on more equitable sharing of costs and benefits, more equitable access to information and decision making.
- For instance in page 16, when presenting the four subsidiary principles of good public participation practices, there is no mention to the principle that public participation should

include institutional mechanisms to redistribute information, power, resources that can foster more equitable sharing of costs and benefits among all stakeholders.

3. No clear reference is made on how the impact on the environment will differently affect the livelihood of specific local groups, including men and women, indigenous people, poor, etc. This is an important connection between environmental and social impact, and should be included when discussing the process of participation, negotiation and conflict management

4. The need to discuss the rationale of large dams in the context of integrated water resource planning (mentioned in page 9) and to discuss the implicit assumption of the process, should be highlighted at the beginning of the document. This is important to avoid the impression that public participation is defined only in the frame of an existing, on-going dam project. The need to discuss not only the dam large and diverse impact, but also its rationale and the other alternatives, should be made stronger in the document.

Comments on the paper on gender

The piece on gender is very helpful with regard to the previous critiques. We feel that it could be used as a model on how to approach the difficult task of understanding the complexity of non-economic and social impacts of large dams on communities.

What sets the paper apart?

The **clarity and coherence of the paper** is key. Firstly, there is a process of clearly defining the concept of gender and what it encompasses beyond just the simple notion of women. This means that gender is discussed as including issues of access to resources, changes in social relations, economic activities and decision-making and participation processes. We applaud the authors' ability to identify the issues and outline the concept of gender without reducing this to a simplistic caricature. For example, included in the paper is discussion of the possibility for dams to create opportunities as well as constraints for women and men, not previously enjoyed in the traditional system. This goes beyond the tendency to simply vilify large-scale development, thereby limiting the debate and restricting the ability to envisage working alternatives. A real analysis should be able to envisage all sides of an issue, not just the most obvious.

Secondly, the authors outline the **intersection between gender and dams**. They again clearly identify four or five areas where dams seem to manifest change within communities including: Division of Labour and Economic Activities, Participation and Decision-Making Processes, Institutional Arrangements, Socio-cultural well-being and Identity. This approach could be applied to other social equity areas due to the need to narrow the debate and identify clear areas of focus.

An important element of the paper is the **use of examples**. After outlining the major issues related to dams and gender the authors walk the reader through several case studies which illustrate how i.e., resettlement effects gender and equity, thereby moving beyond geographical and economic considerations. This is valuable in that it helps the reader to envisage how change related to dam development is gendered.

The paper concludes by setting out a number of **recommendations** to counter the gender blindness that has plagued the large dam debate. This we feel is essential to go beyond simple diagnosis of the problem. Envisaging alternatives, outlining concrete actions is crucial to envisaging alternative policy, planning and institutional approaches. Recommendations for change can act to counter the abstract level of such debates regarding social phenomena and the reluctance of some to avoid prescribing action.

f) Workshop on the Social Impacts of Dam. January 14,15 2000

The World Commission on Dams organized a workshop on Social Impacts of Large Dams in London on January 14 and 15, 2000. The objectives of the workshop were the following:

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1. Develop a framework for analysing and improving understanding of distributional and equity aspects of large dams and their alternatives, with specific objectives of suggestions tools and approaches for addressing distributional and equity issues at each of the key stages of the planning and project cycle.

2. Review the structure and findings of the paper on Social Impacts of Large Dams: Equity and Distributional Issues

3. Discuss principles emerging from TR.I.1. and bring together principles emerging from the review papers I.1, I.2 and I.3

About 15 people attended the workshop:
Commissioners:

- Thayer Scudder,
- Joji Carino
- Medha Patkar (second day);

Secretariat staff members:

- S. Parasurman, Senior Advisor
- Madiodio Niasse, Senior Advisor

WCD Consultants contributing to the thematic review I.1. (Social Impacts of Large Dams: Equity and Distributional Issues):

- William Adams (lead writer), UK
- Lyla Mehta, UK and India
- Bina Srinivasan, India
- Hugh Brody (was also facilitating the workshop), UK

Other WCD Consultants:

- Marcus Colchester, lead writer for the thematic review I.3. (Dams and Indigenous People and Ethnic Minorities), UK
- Franck Vanclay, author of the paper on Social Impact Assessment (Australia)

Other invited experts:

- Eduard Naudascher, Prof. University of Karlsruhe, member of the International Association of Hydraulic Engineering and Research (IAHR) (Germany)
- Joseph Milewski, Senior Advisor--Social Aspects, Hydro-Quebec, Canada;
- Chris Perry, Consultant, former IIMI and World Bank (UK);
- Laurence Smith, Senior Lecturer, Dept. of Agricultural Economics and Business Management, Wye College, University of London, UK.

Outputs from the workshop and subsequent discussions by email among workshop participants have informed the drafting of a revised thematic paper in February-March, 2000