

WCD Thematic Review 1.1

Social Issues

The Social Impact of Large Dams: Equity and Distributional Issues

EXECUTIVE SUMMARY

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This is a working paper prepared for the World Commission on Dams as part of its information gathering activities. The views, conclusions, and recommendations contained in the working paper are not to be taken to represent the views of the Commission

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The twentieth century has been the classic era of dam construction to respond essentially to growing food needs, to substantial increases in industrial and domestic requirements for freshwater --a more and more scarce resource-- and to the rapid expansion of demand for electricity. Dams are also built to provide protection against flood damages, facilitate inland navigation, and serve tourism and recreational needs. Even though dams were known since ancient times, modern techniques of dam construction, first conceived in industrial countries are progressively disseminated around the world, especially since the middle years of the twentieth century which saw an astonishing explosion in dam construction. In China, for example, the first concrete dam was built in 1941, and by the end of the 1940s there were 22 large dams. There are now over 22,000 large dams and 23 dams over 100m high in China. In India, 1554 large dams had been built by 1979, for both hydro-electric power and irrigation, together absorbing almost 10 per cent of total public sector investment. Today the number of large dams is estimated at about 45,000.

However, while construction of dams was at its peak in the 1960s and 1970s, it came under scrutiny of two related social movements in industrialised countries. The first was the infant environmental movement, and the second was the critique of top-down technocratic development. Dams, particularly large dams, were classic targets for both groups, for they were vast undertakings, developed following a highly complex and expensive technocratic planning process, and very often they created significant social and environmental impacts. The concerns on social aspects of dams have primarily focussed on the consequences of dams-induced population displacements. There is currently no disagreement among dam protagonists on the importance of handling displacement and resettlement issues with great care, although there remains practical areas where the views still needs to be harmonised.

1. The Debate on Equity

In recent years, the debate on social aspects has slowly shifted towards broader issues, and especially to the general equity implications of dams.

The debate on equity revolves around three main axes, which also reflect the divergence of views and perspectives. The first axis consists in using a general balance-sheet approach where the basic question would be whether the positive impacts of dams outweigh the negative ones. 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 their disadvantages. For opponents of large dams, if all the social and environmental costs of large dams are 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 consist in assessing 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 others would be losers. Opponents to dams claim that displaced populations and riverine communities (losing their traditional sources of livelihood and are 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 consists in comparing the way the costs (taken separately) or benefits (considered in isolation) of the project are distributed between selected population groups, and spatial (eg. upstream and downstream) and temporal (e.g. current and future generations) units or administrative entities (provinces or riparian countries). An example is the differential consequences of dams-induced displacement costs between men and women. On the benefit side, a typical example is the differential access to electricity among urban and rural areas, or between social groups within the same spatial unit. In other words, even a dam generating only benefits can create inequity in the way the wealth is shared. While this issue tends to be overlooked by dam proponents, dam critics insist on the unfair nature of the typical patterns of distribution of costs and benefits.

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, the vulnerable. It also suggests a framework (set of principles, targeted actions at key stages of the planning process and a number of good or promising 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. What is Equity and Why it Matters

The genesis of the court of equity in England in the seventeenth century --court where the notion of equity received its modern meaning-- explains the rationale for focussing the analysis of equity on the imperfect, losing side of dams. The court of equity was established as a way of ensuring that “the common people” could secure justice despite the manifest unfairness of the legal process. ‘Equity’ was where the poor could look for protection against injustice, and where they could rely on judgements that were based on principles of fairness. When the court of equity began to achieve some importance, the courts of law attempted to subvert its effectiveness. Attempts were made to debar lawyers who took cases to equity, and, in a climax of this struggle between law and equity, in the mid-seventeenth century, the Lord Chancellor of the day ordered that plaintiffs at the court of equity be arrested. This struggle between law and equity led to the Lord Cairns Act, which sets out the double jurisdiction of a combined court of law and equity. Since then, the legal process has had the task of balancing legal principles with equity - rules of law with obvious fairness.

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 can not extinguish another party’s rights. Equity therefore begins with a possible injustice, and then centres on collaboration and acknowledgment of rights as a way of reaching a “fair” or “equitable” resolution.

Therefore the issue of equity arises when an injustice is deemed to have taken place. Equity speaks more to the costs of a projects than to its benefits. 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 points to the vulnerabilities of isolated, less powerful populations, indigenous cultures, women and all for whom development can all too easily mean

loss. Similarly, the issue of distribution arises in relation to those who will not benefit from a project, and is concerned to identify where distribution of benefits has the potential to be unfair. This focuses more on those at risk of being net losers and is less concerned about the overall or macro-economic nature of distribution.

The relevance of equity --conceived to focus on potential populations groups potentially at risk-- can be explained from three perspectives. The first one is an ethical perspective equity becomes a concern as moral value. An example is when society imposes upon itself moral obligations of protecting the livelihoods for given social groups, regardless the nature of their rights.

The second perspective is where a rights-based approach is used. In this approach, the rights of the nation (through the state) as well as those exerted by different groups of people over resources affected by dams would be considered on the same footing. One of the key implications of the rights-based approach is that such rights would give non-discretionary entitlements, as opposed to the pro-poor and equitably-driven commitments from the domain of 'charity' (Falk in a text presented at the WCD Forum meeting in Prague, March, 1999)

A third perspective is to pose equity as a means for, or constraint to, achieving efficiency. Views on the inter-linkages between equity and economic efficiency are contested, and experience shows that in some cases promoting equity can in the long term run counter economic growth objectives (consequence of redistribution of irrigated farm-lands regardless the level of preparedness of new landowners to take over in an efficient manner), in others it can be a way of increasing total outputs (improved women's ownership over farmland in certain contexts).

It is however known that inequity affects efficiency in other indirect ways, for example by resulting in conflicts that could delay the implementation of the project and affect the overall construction costs. Most conflicts are indeed triggered by perceptions of unfair distribution of costs and benefits of dams

3. Constraints for assessing and addressing equity

One of the major constraints to understanding, assessing and addressing equity aspects of dams relates to the unavailability of data. Baseline and post-project data are not systematically collected, and if collected, are not sufficiently disaggregated to illuminate differential impacts of dams. Data on positive impacts of dams at the people-level are surprisingly scanty. The validity of some of the key assumptions and predictions (employment generation, benefits on the nation as a whole, poverty alleviation, etc.) on the basis of which dams are built are not systematically verified through post-project reviews. The information on social impacts, where provided tend to focus on reservoir sites and resettlement issues while impacts at other sectors remain rarely documented to an extent allowing meaningful understanding of the distributional patterns of the impacts of dams. Downstream impacts are a good illustration. Gender is another area where the knowledge of the impacts of dams is limited. This is the result of the fact that the planning process of large dams and the monitoring of their impacts are still largely gender-blind.

4. Social Impacts and Equity Aspects of Dams

There are streams of benefits and costs at the various stages of dam projects. Some of these impacts are tangible others are not; some are directly attributable to the dam while others are indirect effects. Some of the impacts might manifest themselves at early stages, others take

several decades before being noticed. Some of the impacted groups live in the vicinity of the dammed river, while others live in remote areas, and even in distant countries. A comprehensive accounting of all these impacts, at these various temporal and spatial scales is impossible. This section is therefore only an illustration of the types of impacts that could occur along the dam project cycle.

Planning and design

One of the major potential impacts at this stage stem from the delay between the decision to build a dam and the actual construction period. 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. On the positive side, the companies and individuals employed for the planning, design and construction activities experience notable benefits. The beneficiaries include not only contractors, consultants and bankers, but also 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.

Resettlement

The most serious negative impacts of impoundment relate to the trauma of resettlement, or the socio-economic and cultural costs to displaced people who are not resettled. The human cost of dam construction varies greatly between countries, but globally it is significant. Locally it can be devastating. There are a disturbing number of instances where involuntary resettlement of reservoir evacuees has been enforced and accompanied by violence. A disproportionate number of oustees are people from tribal or landless people. However, resettlement can have positive impacts which, when they occur, are often only 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 opportunity.

Construction

As civil engineering projects, dams demand large amounts of unskilled 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 which can benefit surrounding communities. Negative impacts are noted at two stages: the possibility of increased prostitution and spreading of STD and HIV-AIDS; and the fact that economic benefits are often short lived, construction towns becoming ghost-cities after the completion of the dam.

The construction of power lines, irrigation canals, and access roads can have significant benefits. Beneficiaries here include companies engaged in construction or materials or equipment supply, and their employees and shareholders. Roads and power lines also allow access to previously inaccessible areas, allowing the settlement of pioneer farmers, and connecting local economies to national markets.

Impacts of reservoir and flood management

The reservoir of a dam can generate economic benefits like fishing, and inland navigation. In many cases it also supports the development of tourism and recreational activities. These in turn can generate employment for both local people and immigrants, and can have positive impacts on the local economies. The reservoir can be managed to control damaging floods. Flood control has been one of the dominant functions 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. Some of the most significant adverse effects of the existence and operation of reservoirs are experienced in downstream areas, especially in tropical zones. Changes in the pattern of flows in the river 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.

Power supply

Hydro-power is relatively clean in comparison with fossil fuels, and particularly with coal (avoiding pollution from SO₂, NO_x 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 often relatively cheap over long time periods. Foreign currency can be earned from electricity export. Secondary effects of hydro-power 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.

In terms of use of energy generated by large dams, there are disparities in consumption. The benefits are often experienced by a range of people, including all users of electricity. These benefits can be very significant for women who bear the burden of domestic work. Despite rural electrification programs that can follow the construction of hydropower dams, often the supply of electricity bypasses rural areas, and especially the settlements of directly affected people. Although hard to measure, there may be global benefits and benefits to future generations from reduced anthropogenic climate change.

Irrigation

A major use of water stored in reservoirs is for irrigation. 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 total water supply, and more than 40 per cent of suitable land has been irrigated: it is estimated that more than 80% of additional food production is expected to come from irrigated land.

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, 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 dependent who manage to obtain land or work on irrigation schemes.

Irrigation is not an economic success everywhere, however. There is a large literature on the poor economic performance of large-scale irrigation schemes. The wide range of recognised problems in both new and established schemes include problems of unreliable water supply, particularly to tailenders, and related inequality; 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 poor public health.

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 had relatively limited effects so far, the benefits from irrigated agriculture will also be differentiated. Typically, 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, 'a rush for land' by entrepreneurs for capital cities followed the completion of the Manantali Dam. In South Asia, the landless – a large bulk of the rural poor – benefit from irrigation only indirectly through wage labour employment on irrigated fields.

7. Framework for addressing equity

As seen above, it is clear that while some people are adversely affected by dams, others (including some of the victims of dams) benefit from increased and more reliable availability of food through irrigation, and improved supply of electricity, to mention only two of the most tangible benefits of dams. Even if there is an on-going debate on the absolute magnitude and the relative significance of these benefits, the fact that they do exist and can be significant to specific communities or to society at large is not contested nor contestable. The question is whether these benefits should be and can be shared more widely and whether they can be achieved without or with minimal sacrifices from specific groups within society. In other words the problem is whether dam projects should strive for a "no-loser goal" instead of being complacent by opposing benefits to costs. The review paper has focussed on these questions, and identifies principles that could be promoted in order to improve equity in the sharing of the impacts of dam projects. A number of actual experiences of risk avoidance or minimization and benefit sharing are also presented.

7.1. Principles

Three basic and inter-related values could be promoted to achieve high levels of equity in dam projects: broadening the understanding of social impacts, their nature and magnitude; striving to a no-loser objective; sharing the wealth and turning losers into winners. In order to translate these values into reality, the following principles can be considered.

- a. Equity considerations should be a fundamental element of the process of assessing development options.** In other words: (i) planning should compare the equity implications

of dams and alternative development options; (ii) the existence of an overall balance between positive and negative impacts should not be taken as the only criteria of a project's acceptability; (iii) heavily impacted groups should not bear uncompensated costs without balancing benefits; (iv) dam projects should not exacerbate existing gender or other social inequalities, but should address them.

- b. No large dam should be constructed with the use of violence, harassment , intimidation or undue force.** Specifically: (i) dam projects and planning should not violate internationally agreed standards of human rights; (ii) there should be no use of violence, intimidation, harassment nor undue force at any stage of the planning process; (iii) special account should be taken to ensure of 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.** In practical terms: (i) 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; (ii) 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; (iii) 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; (iv) gender issues should be specifically taken into account; (v) 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.** Sub-principles include the following: (i) the proportion of beneficiaries should be maximised, and planning should seek to turn losers into winners; (ii) 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; (iii) planning should ensure that those that face negative impacts of a dam should be the first beneficiaries of the benefits that flow from it; (iv) vulnerable groups need particular protection and should be particular targets of benefits (indigenous peoples, women etc.); (v) 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; (vi) 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.** Associated sub-principles include that: (i) 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, and the nature of mitigation; (ii) 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; (iii) 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; (iv) dams should only be built with prior and informed consent expressed through local/community/customary democratic processes.

- 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.** Sub-principles include the following: (i) monitoring studies should be based on pre-project benchmarks (demographic, socio-economic and epidemiological), and should be integrated into the project process; (ii) in addition to monitoring, there should be periodic mandatory re-examination of impacts; (iii) 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; (iv) gender-specific indicators taking into account the varied locations of men and women at all levels of society should be included in the parameters to be monitored; (v) 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; (vi) 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; (vii) there needs to be a procedure for any residual grievances to be heard and compensated, and opportunity should be provided to impacted people to appeal against injustice, and fair procedure for hearing that appeal should be set in place.

7.2. Addressing equity at key stages of the project cycle

An illustration of specific actions that could be considered at key stages of the project cycle include the following ones:

Needs Assessment. Ensure that consultation processes used to identify needs are culturally appropriate and inclusive of traditionally marginalized 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. Map out all social impacts (positive and negative) along the project cycle (See Attachment) and internalise them 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 (example 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 (example 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.

7.3. Ideas for sharing the wealth

There are a number of practices, underway or planned, which give an idea of how equity could be improve in large dam projects. Below are some of these examples.

-- A number of benefit sharing mechanisms can be considered to improved equity in the distribution of the wealth created by dams. These include: (a) free or preferential electricity rates for jurisdictions affected by dams projects (case of Norway), (b) property taxes paid to local or regional authorities (case of France), (c) royalties (case of the Urra 1 dam in Colombia, and the Itaipu bi-national project in Brazil and Paraguay), (d) equity sharing (case of Minastuck project in Quebec, and of a number of agreements between Hydro-Quebec and Indigenous communities)

-- Solidarity mechanisms between project beneficiaries and negatively impacted groups (example of Funds for Reservoir Areas Development used in Japan to foster solidarity between downstream beneficiaries who finance the fund and displaced peoples).

-- In order to address losses facing downstream inhabitants in tropical areas, this solidarity concept can be considered as a national initiative, or be reflected in the benefit sharing mechanisms mentioned above (preferential electricity rates, royalties and/or trust funds benefiting communities in downstream areas or their local government units). Other forms of support to downstream affected communities could be priority access to irrigated land, or to fishing rights, etc..

-- In the case of already existing dams, measures for sharing the wealth/minimising costs can include mechanisms for addressing grievances of the past (example of the Gwembe-Tonga Rehabilitation and Development Project in Zambia), or adjusting the operational priorities of the dam to new demands as in the case of artificial flood releases to revive the traditional functions of the floodplain (case of the Pongolapoort Dam in South Africa, possibly the Manantali Dam in the future)

ANNEX. MAPPING DISTRIBUTIONAL ISSUES AND EQUITY IMPLICATIONS OF DAMS -- AN ILLUSTRATION

Interested and affected parties	Potential secondary NEGATIVE social impact (2nd level)	Main potential NEGATIVE social impact (1st level)	MAJOR ACTIVITIES	Main potential POSITIVE social impact (1st level)	Potential secondary POSITIVE social impact (1st level)
<ul style="list-style-type: none"> Residents of project area Land speculators Public administrators Local businessmen ... 	<ul style="list-style-type: none"> Decreasing public investment in area Decreasing private investment in area Land speculation ... 	<ul style="list-style-type: none"> Uncertainty in the project area Fear by those who are, or believe themselves possibly affected ... 	<i>Planning a Large Dam</i>	<ul style="list-style-type: none"> Engineering jobs Consultant jobs Financial Activity Economic activity ... 	<ul style="list-style-type: none"> • •
<ul style="list-style-type: none"> Residents of the area Public service providers Host population Indigenous people Other vulnerable people Unskilled labour NGOs Women Children/elderly ... 	<ul style="list-style-type: none"> Psychological stress Loss of social capital Disruption of economic system Political unrest Impoverishment Loss of productive resources Loss of access to productive resources ... 	<ul style="list-style-type: none"> Loss of cultural or archaeological sites Foreign diseases (exogenous) Pressure on local resources Resettlement Household debt Appropriation of local resources ... 	<i>Building a Large Dam</i>	<ul style="list-style-type: none"> Construction jobs Firms with engineering contracts Firms with equipment contracts Financial/market activity Local business activity Forest felling contractors 	<ul style="list-style-type: none"> • •
<ul style="list-style-type: none"> Residents of area Indigenous people Women Vulnerable people Farmers Speculators ... 	<ul style="list-style-type: none"> Increased competition for resources Speculation in land Loss of control over local development ... 	<ul style="list-style-type: none"> Increased accessibility Loss of land or resources under infrastructure In-migration (especially forest land) Forced cultural change ... 	<i>Building power lines/access roads/irrigation canals/other infrastructure</i>	<ul style="list-style-type: none"> Increased accessibility Construction jobs Equipment contracts Construction contracts ... 	<ul style="list-style-type: none"> • • • • •
<ul style="list-style-type: none"> Residents of the area Women Elderly Children Ethnic minorities Indigenous people The landless Those renting property or land Those without secure legal tenure to property or land People in host communities 	<ul style="list-style-type: none"> Loss of flows of benefits from flooded land, forest, river Loss of property Socio-cultural loss due to crash modernisation Stress of relocation Loss of access (roads/paths) Loss of business activity Loss of floodplain agriculture Loss of fishing 	<ul style="list-style-type: none"> Loss of homes and settlements Loss of resources Isolation of communities Impacts on host communities Loss of water flow downstream ... 	<i>Impounding/flooding</i>	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

Interested and affected parties	Potential secondary NEGATIVE social impact (2nd level)	Main potential NEGATIVE social impact (1st level)	MAJOR ACTIVITIES	Main potential POSITIVE social impact (1st level)	Potential POSITIVE social impact (1st level)
<ul style="list-style-type: none"> In-migrant conflict with host community ... 	<ul style="list-style-type: none"> In-migration ... 	<ul style="list-style-type: none"> Rural water supply changing land use systems (e.g. pastoralist tenure regimes) Cost of new urban water supply ... 	<i>Supplying water from the reservoir</i>	<ul style="list-style-type: none"> Health benefits sufficient clean water Reduced drudgery More time for employment or economic activity New industrial activity ... 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Downstream floodplain-dependent people Riparian communities ... 	<ul style="list-style-type: none"> Impact of unseasonal flood flows economic losses to floodplain resource uses social and cultural change forced by economic change ... 	<ul style="list-style-type: none"> Risk of unexpected flood releases Impact on agriculture, fishing etc. of reduced floods ... 	<i>Managing Floods</i>	<ul style="list-style-type: none"> Reduced flood losses in agriculture Reduced flood losses to infrastructure and property Regulated river flow for navigation ... 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Residents of project area Land speculators Public administrators Local businessmen ... 	<ul style="list-style-type: none"> Decreasing public investment in area Decreasing private investment in area Land speculation ... 	<ul style="list-style-type: none"> Uncertainty in the project area Fear by those who are, or believe themselves possibly affected ... 	<i>Refurbishment or Upgrading</i>	<ul style="list-style-type: none"> Engineering jobs Consultant jobs Financial Activity Economic activity ... 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Residents of the area Public service providers Indigenous and vulnerable people Children/elderly ... 	<ul style="list-style-type: none"> Disruption of economic system Loss of productive resources ... 	<ul style="list-style-type: none"> Foreign diseases Pressure on local resources ... 	<i>Decommissioning</i>	<ul style="list-style-type: none"> Construction jobs Firms with engineering or equipment contracts Financial activity Local businesses 	<ul style="list-style-type: none">