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DAMMED RIVERS, DAMNED LIVES

THE CASE AGAINST LARGE DAMS

Nearly two million people will be displaced by China's Three Gorges Dam. Credit: Ben Sandler

When Malisemelo Didian Tau first heard about plans to build a big water supply dam on her land in Lesotho, she resisted. But the dam builders convinced her that a few people would have to move away to save many people's lives. They promised Malisemelo and her community compensation, water supply, schools and new homes. But the promises have not fully materialized.

Says Malisemelo, "When we don't get enough compensation for our lands, it is the death of our children and the death of coming generations because they will have nothing to help them survive in the future."

This story would be compelling enough if it were only Malisemelo's story. But it isn't. Between 40 and 80 million people have been forced from their homes and lands to make way for dams. Most have been left further impoverished. Some of the world's most diverse wildlife habitats and fertile farmlands have been flooded beneath reservoirs. Entire river ecosystems have been destroyed.

Across the world, people are recognizing that the costs of large dams have been far too high. In the first comprehensive independent assessment of dams, the World Commission on Dams (WCD), established by the World Bank and the World Conservation Union (IUCN), stated that while dams have made an important contribution to development, "in too many cases an unacceptable and often unnecessary price has been paid to secure those benefits."

Although the rate of dam building has dropped to less than half of its peak in the early 1970s, hundreds of projects are under construction and many more are proposed. Dams continue to be promoted and funded in Southern countries by institutions like the World Bank and Japan Bank for International Cooperation. India, China, Brazil, Turkey, Iran, Laos, Vietnam, Spain, Mexico and Ethiopia are all building or planning numerous dams, which would have severe impacts on rivers and people.

This briefing paper summarizes the social, environmental and economic impacts of dams and outlines better options for water management and energy supply.

SOCIAL IMPACTS

Some say a few people must sacrifice for the "greater common good." But what sacrifice is being asked? Millions have been forced to give up their homes and risk their food security and well-being for dams that are frequently poorly planned and unnecessary. Those forced onto resettlement sites often do not have clean water to drink or enough food to eat. They languish there, stripped of their traditional livelihoods, land and natural resources – the social fabric that binds their communities together ripped apart. Alcoholism, depression, domestic violence and disease increase.

Compensation – if provided at all – is typically inadequate. Cash compensation is rarely enough to purchase comparable replacement land. When land-for-land compensation is provided, those displaced typically receive smaller amounts of poorer quality land. Unable to subsist on their new plots, farming families frequently end up living as migrant laborers or slum dwellers.

People who resist are regularly subjected to violence and intimidation. In China, people have been jailed and beaten for protesting against poor resettlement conditions for the Three Gorges Dam, which will displace up to two million people. One of the worst human rights atrocities associated with dams happened in Guatemala in the 1980s. More than 440 Maya Achí Indians, mainly women and children, were murdered by paramilitaries because they refused to leave their ancestral lands for the World Bank-funded Chixoy Dam. Survivors of the massacre have not yet received reparations for their suffering.

Dams have decimated wild salmon populations in the US.

INDIGENOUS PEOPLE AND WOMEN SUFFER MOST

Indigenous people and other ethnic minorities have suffered disproportionately from the impacts of dams. In India, according to government estimates, 40 percent of all those who have been displaced by dams are *adivasis* or tribals, who represent less than six percent of the Indian population. Almost all the larger dam schemes built and proposed in the Philippines are on the ancestral lands of the country's five million indigenous people.

The impact of dams upon indigenous peoples is especially harmful as most of their communities have already suffered centuries of exploitation and displacement. The trauma of resettlement is also exacerbated because it severs their strong spiritual ties to their land, disrupts their cultural practices and destroys the natural resources their livelihoods depend on.

"We have lost fisheries and our vegetable gardens along the riverbanks. We live in fear and all the time we worry that water from the dam will flood our lands. Sometimes we almost drown. We want our natural river returned to us."

Ethnic Tampoun woman living in Cambodia who has suffered downstream impacts from Vietnam's Yali Falls Dam.

Women are left worse off than men, as compensation payments are usually paid only to the male heads of households. Women may also be affected disproportionately because of their greater dependence on common property resources such as grazing lands and forests. Common property is rarely eligible for compensation and rarely provided at resettlement sites.

SECONDARY DISPLACEMENT AND DOWNSTREAM IMPACTS

Those displaced by reservoirs are only the most visible victims of large dams. Millions have lost land and homes to the canals, roads and other infrastructure associated with dams. Many more have lost access to clean water, fish, grazing land and other resources.

Changes in river flow have drastically impacted the lives of millions living downstream from dams. They suffer from declines in fisheries, poor water quality and disruption of the annual floods which once irrigated and fertilized their fields and recharged their wells. In Africa, the loss of the annual flood has devastated traditional floodplain farming, fishing and grazing. Kainji Dam in Nigeria, for example, directly displaced 50,000 people, but adversely affected hundreds of thousands more because of declines in crop production and fish catches. Some 40,000 people living in the Amazon basin suffered from skin rashes and other health impacts due to the release of dirty water from the Tucuruí reservoir.

ENVIRONMENTAL IMPACTS

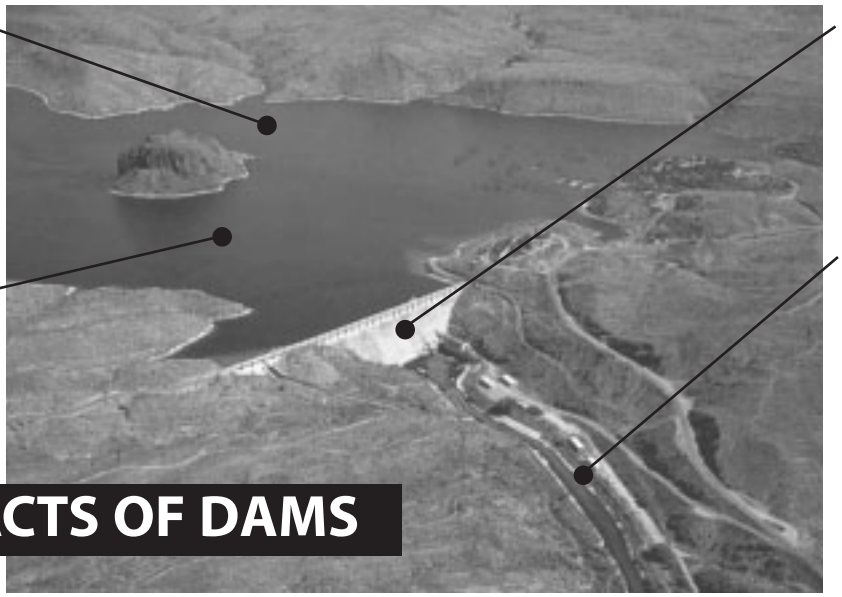
Large dams have had profound and irreversible environmental impacts. Sixty percent of the world's major rivers have been fragmented by dams and diversions. Over a million square kilometers, or just under one percent the world's land surface, have been inundated by reservoirs worldwide. This represents a much greater loss than the raw statistic implies since riverside-land supports the world's most diverse wildlife habitats and most fertile farmlands.

Floods are critical to the lifecycles of species that live in and near rivers. However, flow patterns and other important habitat conditions, such as river chemistry and temperature, have been disrupted by dams. Large dam and diversion schemes have stopped some of the world's major rivers, such as the Indus, the Nile and the Colorado from reaching the sea. In the early 1900s, the Colorado River delta supported a rich array of egrets, jaguars and other wildlife. However, the heavily plumbed river now only reaches the delta in rare flood years and wildlife populations have plummeted. The number of indigenous people who once fished and farmed the delta has also declined.

Dams have reduced biodiversity. This is due to flooding of habitat, disruption of flow patterns, isolation of animal populations and blocking of migration routes. Dams and diversions are the main reason why one-third of the world's freshwater fish species are extinct, endangered or vulnerable. The percentage rises even higher in countries which have been most heavily dammed – to nearly 40 percent in the US and 75 percent in Germany. A significant but unknown percentage of shellfish, amphibians, plant and bird species that depend on freshwater habitats are also extinct or at risk.

FAILED MITIGATION

Proponents of dams argue that the environmental impacts of dams can be mitigated. Past experience, however, shows that



mitigation efforts have largely failed. It is often too expensive, too difficult or simply impossible to recreate the characteristics of wild rivers and the web of life they support. Since 1996, the US government has spent about $430 million annually to mitigate the impacts of dams on fisheries in the Columbia River basin. Despite this enormous expense, most of the wild salmon stocks in the region are either extinct or on the brink.

A growing number of older dams are being decommissioned, mostly in Northern countries, because the social and environmental benefits of removing them outweigh the costs of maintaining them and the limited benefits they produce. In the US, nearly 200 dams were removed in the 1990s, many for environmental reasons.

ELUSIVE BENEFITS OF DAMS

More than 45,000 large dams (higher than 15 meters) have been built around the world to generate electricity, supply water, control floods and facilitate navigation. During the 20th century, an estimated $2 trillion was spent on dams.

While dams have provided considerable benefits, they have often failed to meet expectations. Hydropower dams often do not produce as much power as expected. Irrigation projects do not irrigate as much land or generate as many economic benefits as promised. Water supply dams regularly fail to supply as much water as predicted. While flood control dams have stopped smaller floods, they have also increased the vulnerability of communities to damages from larger floods. Considering the huge amounts of money spent on dams, there is clearly a need for better monitoring of their technical, financial and economic performance.

ARE THERE ALTERNATIVES?

Viable alternatives to dams do exist, and are frequently more sustainable and cheaper. The most important alternative to new dams is to improve the efficiency of existing water supply and energy systems. This may involve reducing leaks in water pipes, retrofitting power plants and irrigation systems with modern equipment or reducing losses in power transmission lines. Another simple and economical option is to reduce the demand for water and energy. This can include recycling, shifting to less water-intensive crops and encouraging the use of more efficient electrical appliances. These options can diminish the need for new or existing sources of supply.

When efforts to conserve resources and improve the efficiency of existing dams are not enough to meet growing demand, renewable energy supply options should be considered. Renewable options include efficient and sustainable biomass, wind, solar, geothermal, and eventually ocean energy sources and fuel cells. Wind power is one of the fastest growing renewable energy options. The cost of wind power in good locations is now comparable to or cheaper than that of conventional sources. Some estimate that 10 percent of the world's electricity could be supplied by wind power by the year 2020. The cost of solar photovoltaics has dropped by 80 percent in the last 20 years, and although still expensive the technology has huge long-term potential.

Small-scale decentralized options have the biggest potential for supplying water and power to rural communities. Rainwater harvesting and micro-hydro dams are easier to implement, cost less and have lower environmental impacts than large-scale infrastructure. The construction of small dams to impound rainwater in India's desert state of Rajasthan has recharged groundwater supplies and increased food security and incomes for hundreds of thousands of farming families.

END OF THE BIG DAM ERA?

Over the last 20 years, a growing international movement has emerged to challenge destructive dams, promote sustainable and equitable alternatives and secure reparations for dam-affected people. This movement has forced the indefinite postponement or cancellation of numerous projects around the world.

Despite what critics say, most activists are not opposed to all big dams. What they are opposed to is current development planning processes that promote dams that benefit a few at the expense of the human rights, livelihoods and dignity of the poor. Many believe that if planners adopted the recommendations of the World Commission on Dams, destructive dams would not be built.

The WCD proposed a new framework for development based on respect for human rights. The WCD recommended that before taking a decision to build a dam, the needs for water, food and energy should be clearly assessed. All options should be considered, and first priority should go toward improving the efficiency of existing systems.

Before constructing new dams, the WCD states that outstanding claims for damages caused by past projects should be resolved. Those who would be affected should be involved in decision-making processes and should be among the first to benefit from projects. No dams should be constructed without the acceptance of affected people. Indigenous and tribal peoples should be given special consideration. For more information on the WCD and its recommendations, visit www.dams.org.

COMMON MYTHS ABOUT LARGE DAMS

"Hydropower is cheap."

Hydroelectricity can be cheap to produce – once the dams are built. But dams are hugely expensive to build and their costs are usually far higher than estimated. The WCD found that on average dams end up costing 56 percent more to build than predicted.

Dam designers typically overestimate how much power their projects will produce. Climate change is expected to increase the frequency and severity of droughts, reducing hydropower production. When these factors are considered, hydropower is frequently a very costly form of power generation.

"Hydropower is clean."

Hydropower dams cannot be considered a clean source of electricity because of their serious social and environmental impacts.

In addition, reservoirs emit greenhouse gases due to the rotting of flooded vegetation and soils, aquatic plants and organic matter flowing in from upstream. Emissions of carbon dioxide and methane are particularly high from reservoirs in the lowland tropics. In some cases, reservoirs may have a greater impact on global warming than similar-sized gas-fired power stations.

"Dams effectively control floods."

Dams can stop regular annual floods but often fail to hold back exceptionally large floods. Because dams provide a false sense of security, they can lead to increased development of floodplains. When a large flood occurs, damages are frequently far greater than they would have been without the dam. Between 1960 and 1985, the US government spent $38 billion on flood control, mostly on dams. Yet average annual flood damage continued to increase – more than doubling.

Dams can also worsen flooding by reducing the capacity of the riverbed downstream. They can also cause serious floods when reservoir operators make sudden releases during extreme storms or, in the worst cases, when dams break. Climate change is expected to increase the severity of floods, with serious implications for dam safety.

"Irrigation dams reduce hunger."

The benefits of large dam-and-canal irrigation schemes have been seriously overstated. These schemes are invariably mismanaged and waste huge amounts of water. They frequently destroy huge tracts of formerly fertile lands through salinization and waterlogging. The construction of reservoirs and canals itself consumes large amounts of fertile land.

Many large irrigation schemes have displaced small landholders and replaced traditional farming systems, increasing landlessness and rural hunger. Advocates of large dams assume that producing more crops will reduce malnutrition. However, people go hungry because they cannot afford food, not because the world does not produce enough. Malnutrition continues in countries like India, Pakistan and the US, which have produced surplus food grains for years.

IRN supports local communities working to protect their rivers and watersheds. We work to halt destructive river development projects and to encourage equitable and sustainable methods of meeting needs for water, energy and flood management. Published in 2003.