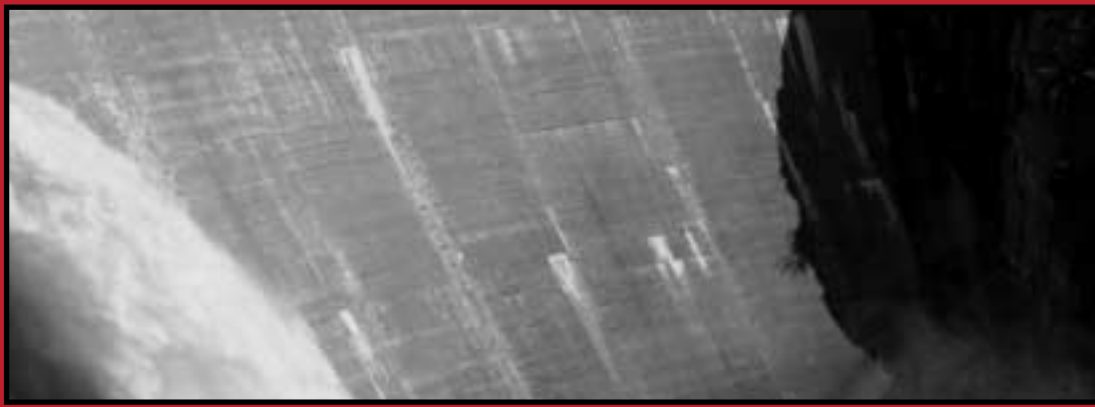


Spheres of Influence



# DAM-BUILDING DECISIONS

A New Flood of Fairness



**D**ams, their walls rising sometimes hundreds of feet or more and holding back incredible amounts of water, evoke awe, gratitude—and intense hostility. By 1997, there were an estimated 800,000 dams worldwide, 45,000 of them taller than a five-story building, according to the World Commission on Dams (WCD). Large dams—those at least 45 feet high, such as the Hoover Dam on the Colorado River and the Itaipu Dam on the Paraná River at the Brazil–Paraguay border—are considered engineering marvels for their ability to control floods, provide electricity, and irrigate once-non-productive farmland, thereby improving the lives of millions of people. But such improvement can come at a cost of environmental damage, displacement of people whose lands are flooded, and economic burdens.

A report by the WCD released on 16 November 2000, titled *Dams and Development: A New Framework for Decision-Making* comprises more than two years of intensive study and recognizes both the beneficial and burdensome effects of dams on people, economies, and the environment. While acknowledging the value of dams, the report states that an unacceptable and often unnecessary price has been paid in societal and environmental costs.

Hoping to initiate a new era with respect to dams, the report sets forth a decision-making framework to guide future development of water and energy resources including global dam construction. It seeks to go beyond a simple cost–benefit analysis and presents a more inclusive approach to analyzing dams. Included in the framework are steps such as looking for options other than dams to meet the goals of dams, making sure the benefits of dams are equitably distributed, and safeguarding the rights of people whose homes and livelihoods are destroyed or jeopardized by dams.

The commission, which began studying the dam-building issue in May 1998, grew out of a workshop on dams in Gland, Switzerland, in 1997. That meeting was sponsored by the World Bank and the World Conservation Union. The commission operated with a \$9.9 million budget provided by more than 50 donors, including energy companies such as Hydro-Québec and Enron, environmental organizations such as the World Wildlife Fund, and the governments of nations such as Denmark and Japan. The WCD's 12 commissioners represent eight countries from both the developed and the developing worlds. According to the WCD Web site (<http://www.dams.org/>), the commission “was created as an independent body, with each member serving in an individual capacity, not representing an institution or a country.”

## Dam Problems

For its report, the WCD reviewed numerous studies of dams done previously by other organizations, including the World Bank and the International Hydropower Association. The commission concluded that dams don't always live up to their promises, can be far more expensive than planned, and often introduce health and economic burdens.

For example, in examining irrigation dams, the commission found that half of the 52 dams studied failed to irrigate the targeted amount of land. One such dam, the Grand Coulee Dam on the Columbia River in Washington, irrigated only half the land it was supposed to. The commission found in a study of 29 dams designed to supply water that one quarter provided less than 50% of what was expected. And

for hydropower dams, about half failed to generate the target amount of electricity, says Deborah Moore, a WCD commissioner and former senior scientist at Environmental Defense.

Dams aren't cheap, either. The cost of dams can be enormous. For instance, three dams studied by the commission cost over \$6 billion each. Financing for these massive projects comes from a variety of sources including banks such as the World Bank, the Asian, Inter-American, and African Development Banks, and private sources. And costs frequently are more than anticipated. “We found that out of 81 dams, 75% of them had cost

overruns. The average cost overrun was 56%,” says Moore. Cost overruns are not unique to such major projects, notes John Briscoe, a senior water advisor at the World Bank, which is a major lender to the developing world of funds for dam projects. But, he adds, there are cost overruns in all big civil works projects. “[Building] a dam is not like building a school building,” he says. “One of the problems can be natural risks such as floods or geological problems that aren't apparent until digging is done.”

The most extensive tolls exacted by dams, though, are in effects on human lives, the commission found. The WCD estimates that 40–80 million people—almost 4 million annually—have been forced to leave their homes and resettle because of flooding caused by dam projects. Based on its examination of published figures, the commission estimates that dam projects in India and China account for the displacement of at least 29 million people. After adding in figures from Africa, the Americas, and Europe, “that 40 million constitutes a conservative estimate,” the commission states.

Displaced people can lose access to resources such as fisheries and forests that provided subsistence livelihoods. According to the report, such losses can lead to malnourishment and subsequent deaths, as happened in the late 1950s in the relocation of 57,000 people who were displaced by the Kariba Dam on the Zambia–Zimbabwe border and moved to resource-poor areas. Displacement is not the only environmental health problem to result from dams. In its submission to the WCD, the World Health Organization (WHO) describes a number of situations in which diseases have resulted from the reservoirs that are created behind dams. Such reservoirs can become contaminated with potentially toxic bacteria that flourish in still water. For instance, cyanobacteria, which the submission labels “an emerging dam-related health issue,” can cause liver ailments and even kill when ingested in untreated water. Schistosomiasis, a parasitic disease that can be fatal, can also arise in reservoirs that result from dams. Malaria, too, is a serious health concern. Mosquitoes that carry the disease thrive in the still water of reservoirs. In properly constructed dams, however, mechanisms may actually impede the spread of malaria, according to Robert Bos, a scientist with the Department of Protection of the Human Environment at the WHO. For example, he says, the reservoirs behind dams constructed by the Tennessee Valley Authority in the 1930s in the United States helped play a role in controlling malaria, then a severe problem in that region. The reservoirs were operated under rules that allowed them to be drawn down quickly. “The idea was if you did a quick draw down you would strand the mosquito larvae, which would dry out and die,” he says.

The WHO has recommended that a health impact assessment be done if a dam is built. Such an assessment would involve looking at the potential for adverse health effects at every stage of the dam project and incorporating measures to mitigate or eliminate any health threats. This might include making sure there is adequate treatment of drinking water and sewage, which the WHO submissions says would reduce the rate of reservoir eutrophication and the occurrence and severity of toxic cyanobacterial blooms, as well as reduce water pollution overall. The commission's report adopts this suggestion and recommends that such health impact assessments be performed.

In addition to adverse health effects, dams can disrupt the economies of the areas in which they are constructed. In what he calls the large majority of cases, WCD commissioner Thayer Scudder, emeritus professor of anthropology at the California Institute of Technology in Pasadena, says that dams have harmed the livelihoods of people who live along the rivers where large dams have been built. In more than four decades of studying the effects of dams on the primarily lower-income people who live below them, Scudder has pinpointed problems such as severe damage to agriculture, which depends on annual river flooding to deposit rich soil on the riverbanks. The regulated flow that replaces floods discontinues this depositing, and consequently crop and grazing land are lost. Similarly, fisheries that are sustained by flooding undergo an estimated 30–70% decrease in output with resulting losses in food and income as a result of damming, according to the Food and Agriculture Organization of the United Nations.

## The Framework

In its report, the WCD sets forth a framework that includes seven strategic priorities to provide a “principled and practical way forward” for decision

making on dam development projects. The first priority is gaining public acceptance. According to the commission, this involves recognizing the rights of and assessing the risks to indigenous and tribal peoples, including ensuring that such peoples give free, prior, and informed consent to dam projects. The commission calls this the single most important factor in dealing with development projects.

"This issue of the rights-and-risks approach is very important," says Janet Abramovitz, a senior researcher at the Worldwatch Institute, a nongovernmental policy and research organization in Washington, D.C. "Traditionally, project risks have been assessed in terms of the investors," she says. "Affected peoples haven't had any control over their risks. Their rights and risks were never included in the decision-making framework in the past."

The second priority is comprehensive options assessment. Alternatives to dams should be considered. Doing so means clearly defining needs for food, water, and energy, and selecting the means of achieving these goals from a range of possibilities.

The third priority is addressing existing dams. Changes in technology, land use, management, and operations practices may enhance the operation of dams and improve environmental and restoration programs.

The fourth priority is sustaining rivers and livelihoods. Rivers and watersheds are the basis for livelihoods of communities affected by dams, and ecosystems that are transformed by a dam must be understood and protected. Impacts of dams can be mitigated by selecting appropriate sites and using measures such as releasing customized environmental flows to maintain the downstream ecosystem.

The fifth priority is recognizing entitlements and sharing benefits. People whose livelihoods and communities are harmed by a dam must play a role both in negotiations that mitigate the harm done as well as in development agreements. The report says that such agreements are fundamental commitments and responsibilities of the state or country and the developer. Affected people must be satisfied that moving from their current context and resources will improve their livelihoods. "Our principle is that there are no more trade-offs to be made," says WCD commissioner Jan Veltrop of Evanston, Illinois, a retired dam designer. "The affected people must benefit. All affected people must participate from the very early stages of planning of a project."

The sixth priority is ensuring compliance. There should be both regulatory and nonregulatory measures to ensure that governments, regulators, and operators meet their obligations. These measures should include both sanctions and incentives.

The seventh priority is sharing rivers for peace and security. The use of resources such as transboundary rivers can promote regional cooperation and development, sharing not only resources but their benefits as well.

## Reaction to the Report

Charles Calhoun, regional director of the U.S. Bureau of Reclamation's Upper Colorado Region, says the bureau is pleased with the report and will be working with foreign governments on implementing such programs as controlled releases to enhance agricultural conditions for people who live downstream of dams. He says that the WCD report has changed the terms of the dam debate for the better and describes the outlook for the framework as positive.

While praising the report for its thoroughness in documenting the impact of dams, Juliette Majot, executive director of the Berkeley, California-based International Rivers Network, says the commission should have gone further: "I think the commission should have called for a moratorium on building new dams until the outstanding problems of existing dams are assessed and addressed," she says. The network has called for such a moratorium.

Majot also applauds the report for including previously ignored groups in decisions concerning dams. She says, "The report is very strong in its recognition of the importance and extent of social impacts [of dams]."

The James Bay Cree Nation and the Pimicikamak Cree Nation in northern Canada endorse the commission's report. In a statement responding to the report, the two nations said that they have been "dispossessed, displaced, and environmentally, culturally, economically, and socially devastated by large hydro-development projects, initiated and built in our traditional lands by the state-owned electricity corporations Hydro-Québec and Manitoba Hydro, respectively, against our wishes and without our consent." They called on world financial institutions to immediately implement strict guidelines to prevent and address the adverse impacts of water and energy projects.

But the International Commission on Large Dams (ICOLD), a group of public- and private-sector organizations concerned with the building and maintenance of dams, has reservations about the process involved in securing the consent of people affected by dams. ICOLD endorses the participation in dam-building decisions by people whose lives will be altered by dams, but describes the effort to secure the consent of affected people as cumbersome. "It's not just 'the majority rules,'" says Harry Blohm, vice president of Montgomery Watson, a California engineering firm, who helped draft the ICOLD response. "[According to the framework], you have to have almost absolute consensus. Some people would be in a position to have enough power within the decision-making process to create substantial delays."

Skanska, a large Swedish construction company, announced in a 16 November 2000 news release that it "would apply the [WCD] guidelines for major hydropower projects." But in an interview, Axel Wenblad, Skanska vice president for environmental affairs, expressed reservations about the guidelines as they pertain to

the participation of affected people. Says Wenblad, "There is a risk they are too cumbersome, if they are going to be implemented according to the letter."

In the view of Linda Church Ciocci, executive director of the National Hydropower Association, a trade organization that represents 61% of the U.S. domestic, nonfederal hydroelectric capacity, the report places too much reliance on alternative sources of power. "They say with energy conservation, good energy efficiency, and renewables, you may have choices that make sense," she says. "That may be true if you're looking for village power. But in many developing countries, such as China, where they have tremendous power needs, you need much larger energy generation sources. We believe hydro is very important as part of that."

The issues dealt with in the framework are clearly of great relevance to the developing world. According to Briscoe, industrialized countries have tapped about 75% of their potential hydroelectric power, but developing countries have tapped only 10%. Developing countries might justly ask why they should be asked to stop at 10% when they are starved for electricity, he says. "The notion that there should be no more dams built in these countries is quite inappropriate." The WCD report, he says, is helpful in stimulating a debate on these issues, though. "We're looking to do things better," he says.

## Opening the Floodgates

The report acknowledges "deep fault lines" separating dam proponents and opponents. Whether these fissures can be bridged has yet to be determined. Briscoe says the World Bank will discuss the report with developing nation governments to ask for their perspective on it and how they want the bank to act in light of it. The major question now, of course, is what the impact of the report and its decision-making framework will be.

The WCD expired with the issuance of its report. The WCD Forum, however, a 70-member advisory group with diverse representatives of governments, nongovernmental organizations, the private sector, and affected people that provided feedback to the commission during the process of creating the report, will meet in February 2001 in Cape Town, South Africa, to decide whether it will continue as an independent entity to carry forward an arena for dialogue on dam issues and ways to put into practice the WCD's framework and ideas. The WCD Web site will remain in operation until at least 2003.

Although the WCD itself has expired, the concerns raised by the commission's report have promoted a flood of discussion of the issues surrounding dam building and water resources that will almost certainly continue to flow, hopefully toward resolution through constructive changes in the way dams are viewed, built, and used.

**Harvey Black**

# A GOOD DAM FRAMEWORK

**1. Gaining Public Acceptance:** Public acceptance of key decisions is essential for equitable and sustainable water and energy resources development. Acceptance emerges from recognizing rights, addressing risks, and safeguarding the entitlements of all groups of affected people, particularly indigenous and tribal peoples, women, and other vulnerable groups. Decision-making processes and mechanisms are used that enable informed participation by all groups of people and that result in the demonstrable acceptance of key decisions. Where projects affect indigenous and tribal peoples, such processes are guided by their free, prior, and informed consent.

**2. Comprehensive Options Assessment:** Alternatives to dams often do exist. To explore these alternatives, needs for water, food, and energy are assessed, and objectives are clearly defined. The appropriate development response is identified from a range of possible options. The selection is based on a comprehensive and participatory assessment of the full range of policy, institutional, and technical options. In the assessment process, social and environmental aspects have the same significance as economic and financial factors. The options assessment process continues through all stages of planning, project development, and operations.

**3. Addressing Existing Dams:** Opportunities exist to optimize benefits from many existing dams, address outstanding social issues, and strengthen environmental mitigation and restoration measures. Dams and the context in which they operate are not seen as static over time. Benefits and impacts may be transformed by changes in water use priorities, physical and land use changes in the river basin, technologic developments, and changes in public policy expressed in environment, safety, economic, and technical regulations. Management and operation practices must adapt continuously to changing circumstances over the project's life and must address outstanding social issues.

**4. Sustaining Rivers and Livelihoods:** Rivers, watersheds, and aquatic ecosystems are the biologic engines of the planet. They are the basis for life and the livelihoods of local communities. Dams transform landscapes and create the risk of irreversible impacts. Understanding, protecting, and restoring ecosystems at the river basin level is essential for fostering equitable human development and the welfare of all species. Options assessment and decision making around river development prioritize the avoidance of impacts, and minimize and mitigate harm to the health and integrity of the river system. Avoiding impacts through good site selection and project design is a priority. Releasing tailor-made environmental

flows can help maintain downstream ecosystems and the communities that depend on them.

**5. Recognizing Entitlements and Sharing Benefits:** Joint negotiations with adversely affected people result in mutually agreed upon and legally enforceable mitigation and development provisions. These provisions recognize entitlements that improve livelihoods and quality of life, and affected people are beneficiaries of the project. Successful mitigation, resettlement, and development are fundamental commitments and responsibilities of the state and the developer. They bear the onus of assuring all affected people that moving from their current context and resources will improve their livelihoods. Accountability of responsible parties to agreed mitigation, resettlement, and development provisions is ensured through legal means such as contracts and through accessible legal recourse at the national and international level.

**6. Ensuring Compliance:** Ensuring public trust and confidence requires that the governments, developers, regulators, and operators meet all commitments made for the planning, implementation, and operation of dams. Compliance with applicable regulations, criteria, and guidelines, and project-specific negotiated agreements are secured at all critical stages in project planning and implementation. A set of mutually reinforcing incentives and mechanisms is required for social, environmental, and technical measures. These should involve an appropriate mix of regulatory and nonregulatory measures, incorporating incentives, and sanctions. Regulatory and compliance frameworks use incentives and sanctions to ensure effectiveness where flexibility is needed to accommodate changing circumstances.

**7. Sharing Rivers for Peace, Development, and Security:** Storage and diversion of water on transboundary rivers has been a source of considerable tension between and within countries. As specific interventions for diverting water, dams require constructive cooperation. Consequently, the use and management of resources increasingly becomes the subject of agreement between countries and states to promote mutual self-interest for regional cooperation and peaceful collaboration. This leads to a shift in focus from the narrow approach of allocating a finite resource to the sharing of rivers and their associated benefits in which countries and states are innovative in defining the scope of issues for discussion. External financing agencies support the principles of good faith negotiations between countries and states that share a river boundary.

**Source:** Adapted from *Dams and Development: A New Framework for Decision-Making, Executive Summary*, available at <http://www.dams.org/report/execsumm.htm>.