



# Dams and Development: A New Framework for Decision-Making

The Report of the World Commission on Dams  
**An Overview**

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<http://www.dams.org>

## The Commission

In April 1997, with support from the World Bank and IUCN-The World Conservation Union, representatives of diverse interests met in Gland, Switzerland, in light of a recent World Bank report, to discuss highly controversial issues associated with large dams. The workshop brought together 39 participants from governments, the private sector, international financial institutions, civil society organisations and affected people. One proposal that came out of the meeting was for all parties to work together in establishing the World Commission on Dams (WCD) with a mandate to:

- review the development effectiveness of large dams and assess alternatives for water resources and energy development; and
- develop internationally acceptable criteria, guidelines and standards, where appropriate, for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams

The WCD began its work in May 1998 under the Chairmanship of Prof. Kader Asmal, who was then South Africa's Minister of Water Affairs and Forestry; its members were chosen to reflect regional diversity, expertise and stakeholder perspectives.

- The WCD was independent, with each member serving in an individual capacity and none representing an institution or a country
- The Commission conducted the first comprehensive global and independent review of the performance and impacts of large dams, and the options available for water and energy development
- Public consultation and access to the Commission was a key component of the process. The WCD Forum, with 68 members representing a cross-section of interests, views and institutions, was consulted throughout the Commission's work
- The WCD pioneered a new funding model involving all interest groups in the debate: 53 public, private and civil society organisations pledged funds to the WCD process

The final report of the World Commission on *Dams, Dams and Development: A New Framework for Decision-Making*, was released in November 2000.

**This overview document** provides a highly condensed summary of *Dams and Development*. We urge readers to refer to the relevant sections in the full report to capture both context and nuances of the findings and recommendations. The full report also includes a detailed list of

acknowledgements that could not be reproduced here, as well as a comment note by Medha Patkar.

## The WCD Commissioners

Extensive consultation with all interested groups resulted in invitations to eminent persons to serve as members of the World Commission on Dams.

They were selected on the basis of their wide-ranging backgrounds, views, and the expertise they bring to the debate, with the Secretary General appointed an ex-officio member of the Commission.

The Commissioners collectively were responsible for fulfilling the terms of the WCD mandate. The Commission's work was advisory in nature and not investigatory. Unlike a judicial commission, the WCD was not set up to adjudicate on specific disputes.

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Minister of Education  
*South Africa*

**Mr. Don Blackmore**  
Chief Executive  
Murray-Darling Basin  
Commission  
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**Prof. José Goldemberg**  
Institute of Electronics and  
Energy  
University of São Paulo  
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**Mr. Göran Lindahl**  
President and CEO  
ABB Ltd.  
*Sweden*

**Ms. Medha Patkar**  
Founder  
Narmada Bachao Andolan  
(Struggle to Save the Narmada  
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**Mr. Achim Steiner**  
WCD Secretary General  
(Ex-officio Member of the  
Commission)  
*Germany*

## The WCD Report - In Brief

The WCD report is a milestone in the evolution of dams as a development option. The debate about dams is a debate about the very meaning, purpose and pathways for achieving development. Through its Global Review of the performance of dams, the Commission presents an integrated assessment of when, how and why dams succeed or fail in meeting development objectives. This provides the rationale for a fundamental shift in options assessment and in the planning and project cycles for water and energy resources development.

The Commission's framework for decision-making is based on five core values - equity, sustainability, efficiency, participatory decision-making and accountability. It proposes:

- a rights-and-risks approach as a practical and principled basis for identifying all legitimate stakeholders in negotiating development choices and agreements
- seven strategic priorities and corresponding policy principles for water and energy resources development - gaining public acceptance, comprehensive options assessment, addressing existing dams, sustaining rivers and livelihoods, recognising entitlements and sharing benefits, ensuring compliance, and sharing rivers for peace, development and security; and
- criteria and guidelines for good practice related to the strategic priorities, ranging from life-cycle and environmental flow assessments to impoverishment risk analysis and integrity pacts.

The Commission's rationale and recommendations offer scope for progress that no single perspective can offer on its own. They will ensure that decision-making on water and energy development:

- reflects a comprehensive approach to integrating social, environmental and economic dimensions of development
- creates greater levels of transparency and certainty for all involved; and
- increases levels of confidence in the ability of nations and communities to meet their future water and energy needs

## ***Dams and Development -- An Introduction***

Dams have been built for thousands of years - dams to manage flood waters, to harness water as hydropower, to supply water to drink or for industry, or to irrigate fields. By 1950, governments, or in some countries the private sector, were building increasing numbers of dams as populations increased and national economies grew. At least 45 000 large dams have been built as a response to meet an energy or water need. Today nearly half of the world's rivers have at least one large dam.

As we start the new century, one-third of the countries in the world rely on hydropower for more than half their electricity supply, and large dams generate 19% of electricity overall. Half the world's large dams were built exclusively or primarily for irrigation, and some 30-40% of the 271 million hectares irrigated worldwide rely on dams. Dams have been promoted as an important means of meeting perceived needs for water and energy services and as long-term, strategic investments with the ability to deliver multiple benefits. Some of these additional benefits are typical of all large public infrastructure projects, while others are unique to dams and specific to particular projects.

Regional development, job creation, and fostering an industry base with export capability are most often cited as additional considerations for building large dams. Other goals include creating income from export earnings, either through direct sales of electricity or by selling cash crops or processed products from electricity-intensive industry such as aluminium refining. Clearly, dams can play an important role in meeting people's needs.

But the last 50 years have also highlighted the performance and the social and environmental impacts of large dams. They have fragmented and transformed the world's rivers, while global estimates suggest that 40-80 million people have been displaced by reservoirs.

As the basis for decision-making has become more open, inclusive and transparent in many countries, the decision to build a large dam has been increasingly contested, to the point where the future of large dam-building in many countries is in question. The enormous investments and widespread impacts of large dams have seen conflicts flare up over the siting and impacts of large dams - both those in place and those on the drawing board, making large dams one of the most hotly contested issues in sustainable development today.

Proponents point to the social and economic development demands that dams are intended to meet, such as irrigation, electricity, flood control and water supply. Opponents point to the adverse impacts of dams, such as debt burden, cost overruns, displacement and impoverishment of people, destruction of important ecosystems and fishery resources, and the inequitable sharing of costs and benefits.

With these conflicts and pressures in mind, the World Commission on Dams began its work in May 1998. One of the Commissioners' first points of agreement was that dams are only a means to an end. What is that end? How central are the challenges that large dams set out to meet? And how well can they meet these challenges?

The WCD concluded that the 'end' that any project achieves must be the sustainable improvement of human welfare. This means a significant advance of human development on a basis that is economically viable, socially equitable and environmentally sustainable. If a large dam is the best way to achieve this goal, it deserves support. Where other options offer better solutions, they should be favoured over large dams. Thus the debate around dams challenges views of how societies develop and manage water resources in the broader context of development choices.

After more than two years of intense study, dialogue with those for and against large dams, and reflection, the Commission believes there can no longer be any justifiable doubt about five key points:

1. Dams have made an important and significant contribution to human development, and the benefits derived from them have been considerable
2. In too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers and by the natural environment.
3. Lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs when compared with the alternatives
4. By bringing to the table all those whose rights are involved and who bear the risks associated with different options for water and energy resources development, the conditions for a positive resolution of competing interests and conflicts are created
5. Negotiating outcomes will greatly improve the development effectiveness of water and energy projects by eliminating unfavourable projects at an early stage, and by offering as a choice only those options that key stakeholders agree represent the best ones to meet the needs in question

## The Changing Context

The Commission's overall conclusions about large dams are grounded in a basic understanding about the relationships between water, dams and development. (See Box 1 for the definition of a large dam.) One of the greatest challenges facing the world in this new century is rethinking the management of freshwater resources. A number of global initiatives and reports have documented the dramatic impact of withdrawals from the world's lakes, rivers and underground aquifers. Total annual freshwater withdrawals today are estimated at 3800 cubic kilometres - twice as much as 50 years ago.

### Box 1. What is a large dam?

According to the International Commission on Large Dams (ICOLD), a large dam is 15 m or more high (from the foundation).

If dams are between 5-15 metres and have a reservoir volume of more than 3 million cubic metres they are also classified as large dams.

Using this definition, there are more than 45 000 large dams around the world.

The imperative to supply growing populations and economies with water when groundwater is depleted, water quality is declining, and there are increasingly severe limits to surface water extraction has brought sustainable water resources management to the top of the global development agenda. These pressures on water contain a wide range of threats, but they also generate the momentum for new opportunities and policy changes.

During the past few decades, societies have moved from seeing water as a free good to viewing it as a limited natural resource and, more recently, as an economic good and a human right. Thus water is recognised as a scarce natural resource, which gives rise to equity considerations in its allocation.

How much water is required for one more person, or one more urban dweller? Water use per capita varies greatly in different regions of the world. Although what constitutes an appropriate level of domestic water consumption is influenced by climate and culture, several international agencies and experts have proposed 50 litres per person per day as enough to cover basic human requirements for drinking, sanitation, bathing and cooking. In 1990, more than a billion people had less than that. At the same time, households in industrial countries and wealthy city-dwellers in developing countries were using 4-14 times as much.



*Dams and Development* notes the forecasts of leading analysts who foresee growing competition for water to meet demands for agriculture, industry and drinking water.

- Competition will increase among the three largest users in global terms - agriculture (67%), industry (19%) and municipal/residential (9%) uses - and these all will continue to draw from the water needed to sustain natural systems
- A consumption factor that may be significant in dry climates is evaporation from reservoirs, estimated to be close to 5% of total water withdrawals
- A projection prepared for the Vision for Water and Food suggests that irrigation alone may require an increase in water supplies in the range of 15-20% by 2025
- By 2025 there will be a total of 3.5 billion people living in water-stressed countries. Empirical evidence suggests that limited water supplies, combined with current agricultural practices and population growth, are a barrier to meeting the goal of food self-sufficiency in more and more countries, increasing the attention paid to food security and the security of other environmental resources
- Two billion people lack electricity, and electricity demand in developing economies continues to rise
- Freshwater species, especially fish, are increasingly threatened, a significant percentage of wetlands have already been lost, and the capacity of aquatic ecosystems to produce many of the goods and services on which societies depend is rapidly declining, making water for nature an essential consideration

During the last century, much of the world turned to dams to help meet escalating demands for water. Indeed, from the 1930s to the 1970s the construction of large dams became - in the eyes of many - synonymous with development and economic progress. Viewed as symbols of modernisation and humanity's ability to control and use nature's resources, dam construction saw a dramatic increase.

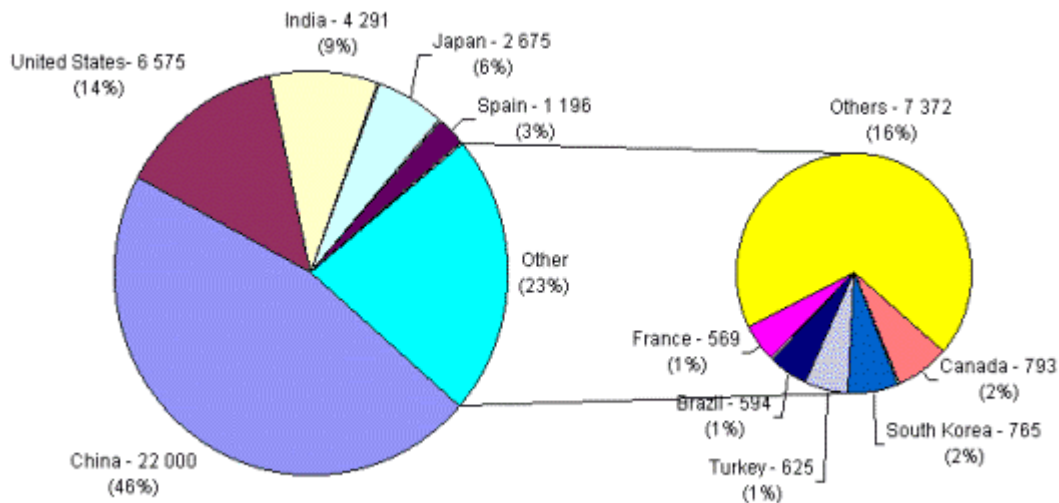
This trend reached a peak in the 1970s, when on average two or three new large dams were commissioned each day somewhere in the world. The decline in dam building since then has been equally dramatic, especially in North America and Europe, where most technically attractive sites are already developed.

The top five dam-building countries account for more than three-quarters of all large dams worldwide (see Figure 1), with approximately two-thirds of the world's existing large dams found in developing countries. Hydropower accounts for more than 90% of the total electricity supply in 24 countries, such as Brazil and Norway. Half of the world's large dams are built exclusively for irrigation, and dams are estimated to contribute to 12-16% of world food production. In addition, in at least 75 countries large dams

have been built to control floods. For many nations, dams remain the largest single investment project in the country.

These hydropower, irrigation, water supply and flood control services were widely seen as sufficient to justify the significant investments made in dams, and other benefits were often cited as well. These included the impact of economic prosperity on a region due to multiple cropping, rural electrification and the expansion of physical and social infrastructure such as roads and schools. The benefits were seen as self-evident. When balanced with the construction and operational costs - in economic and financial terms - these benefits were seen to justify dams as the most competitive option.

**Figure 1: World population of dams, by country**



*Source: WCD estimates, based on ICOLD and other sources.*

## What Is the Debate About?

As noted earlier, the reported returns on the investments made in dams have increasingly been questioned. The notion of costs versus reported benefits emerged as a public concern, given growing experience and knowledge about the performance and consequences of dams. Driven by research and information on the impacts of dams on people, river basins and ecosystems, as well as data on economic performance, opposition began to grow. During the early stages of this process, debate and controversy focused on specific dams and their local impacts. But gradually these locally driven conflicts began to evolve into a more general and ultimately a global debate about dams.

The issues surrounding dams are the same issues that surround water, and how water-related decisions are made, as well as how development effectiveness is assessed. There is little public controversy about the choice between an embankment dam or a gravity dam, or about whether to use earth, concrete or rock-fill. The problems all relate to what the dam will do to river flow and to rights of access to water and river resources; to whether the dam will uproot existing settlements, disrupt the culture and sources of livelihood of local communities, or deplete or degrade environmental resources; and to whether the dam is the best economic investment of public funds and resources.

The debate is partly about what occurred in the past and continues to occur today, and partly about what may unfold in the future if more dams are built. In some countries, it is driven primarily by specific social or environmental concerns; in others, by broader development considerations. In the United States, where the rate of decommissioning is greater than the rate of construction of new large dams, the debate is perhaps as intense as - but qualitatively different from - the debate in India, which along with China is now building the most dams.

The two principal poles in the debate illustrate the range of views on past experience with large dams. One perspective focuses on the gap between the promised benefits of a dam and the actual outcomes. The other view looks at the challenges of water and energy development from a perspective of 'nation building' and resource allocation. To proponents, the answer to any questions about past performance is self-evident, as they maintain that dams have generally performed well as an integral part of water and energy resource development strategies in over 140 nations and, with exceptions, have provided an indispensable range of water and energy services.

Opponents contend that better, cheaper, more benign options for meeting water and energy needs exist and have been frequently ignored, from small-scale, decentralised water supply and electricity options to large-scale end-use efficiency and demand-side management options. Dams, it is argued, have often been selected over other options that may meet water or energy goals at lower cost or that may offer development benefits that are more sustainable and more equitable.

Although there may be agreement on such issues as the need to take environmental and social costs of dams more seriously and to consult systematically with affected people, deep fault lines still separate critics and proponents on a number of financial, economic, social and environmental issues. Among the most intractable are:

- the extent to which alternatives to dams are viable for achieving various development goals, and whether alternatives are complementary or mutually exclusive
- the extent to which adverse environmental and social impacts are acceptable
- the degree to which adverse environmental and social impacts can be avoided or mitigated; and
- the extent to which local consent should govern development decisions in the future

The decision to build a large dam today is rarely only a local or national one. The debate has been transformed from a local process of assessing costs and benefits to one in which dams in general are the focus of a global debate about development strategies and choices.

## **What Did the WCD Global Review of Large Dams Find?**

To fulfil its mandate to review the development effectiveness of large dams and assess alternatives for water resources and energy development, the Commission undertook eight detailed case studies of large dams and prepared country reviews for India and China plus a briefing paper on Russia and the Newly Independent States. (See Box 2 for a list of the case study dams.)

A survey of 125 large dams was also developed, along with 17 thematic reviews on social, environmental and economic issues; on alternatives to dams; and on governance and institutional processes. There were also 947 submissions and presentations at four regional consultations. All these inputs formed the core of the WCD Knowledge Base that served to inform the Commission on the main issues surrounding dams and their alternatives.

### **Box 2. WCD Case Study dams**

**Aslantas dam**, Ceyhan River Basin, *Turkey*

**Glomma-Lågen Basin**, *Norway*

**Grand Coulee dam**, Columbia River, *United States/Canada*

**Kariba dam**, Zambezi River, *Zambia/Zimbabwe*

**Pak Mun dam**, Mun-Mekong River Basin, *Thailand*

**Tarbela dam**, Indus River Basin, *Pakistan*

**Tucuruí dam**, Tocantins River, *Brazil*

**Gariep and Vanderkloof dams**, Orange River, *South Africa*  
(*pilot study*)

The Global Review had three components:

- an independent review of the performance and impacts of large dams (looking at technical, financial and economic performance; ecosystem and climate impacts; social impacts; and the distribution of project gains and losses)
- an assessment of the alternatives to dams, the opportunities they provide, and the obstacles they face; and
- an analysis of planning, decision-making and compliance issues that underpin the selection, design, construction, operation and decommissioning of dams

The WCD's evaluation of performance was based on the targets set for large dams by their proponents - the criteria that provided the basis for government approval and financing. The Commission's analysis gave particular attention to understanding why, how and where dams did not achieve their intended outcome, or indeed produced unanticipated outcomes. An integral part of this research involved documenting good practices that have emerged as a response to past shortcomings and difficulties. Presenting this analysis does not overlook the substantial benefits derived from dams, but rather responds to the question of why some dams achieve their goals while others fail.

## **Technical, Financial and Economic Performance**

The degree to which large dams in the WCD Knowledge Base have delivered services and net benefits as planned varied substantially from one project to the next, with a considerable portion falling short of physical and economic targets. In spite of this, the services produced by dams are considerable, as noted earlier. Irrespective of performance against targets, the Knowledge Base also confirmed the longevity of large dams, with many continuing to generate benefits after 30-40 years of operation.

A sectoral review of technical, financial and economic performance of dams in the Knowledge Base in terms of planned versus actual performance suggested the following:

- Large dams designed to deliver irrigation services have typically fallen short of physical targets, did not recover their costs and have been less profitable in economic terms than expected
- Large dams built to deliver hydropower tend to perform close to but still below targets for power generation, generally meet their financial targets but demonstrate variable economic performance relative to targets, and include a number of notable under- and over-performers
- Large dams built for municipal and industrial water supply have generally fallen short of intended targets for timing and delivery of bulk water supply and have exhibited poor financial cost recovery and economic performance
- Large dams with a flood control component have provided important benefits in this regard, but at the same time have led to greater vulnerability to flood hazards due to increased settlement in areas still at risk from floods, and in some cases have worsened flood damages for a number of reasons, including poor operation of dams
- Large dams that serve multiple purposes also under-achieve relative to targets, in some cases exceeding the shortfalls registered by single-purpose projects, demonstrating that the targets established were often over-optimistic

The review of performance suggested two further findings:

- Large dams in the Knowledge Base have a marked tendency towards schedule delays and significant cost overruns
- Growing concern over the cost and effectiveness of large dams and associated structural measures have led to the adoption of integrated flood management that emphasises a mix of policy and non-structural measures to reduce the vulnerability of communities to flooding

The review also examined factors related to the physical sustainability of large dams and their benefits and confirmed that:

- Ensuring the safety of dams will require increasing attention and investment as the stock of dams ages, maintenance costs rise and climate change possibly alters the hydrological regime used as a basis for the design of dam spillways
- Sedimentation and the consequent long-term loss of storage is a serious concern globally, and the effects will be particularly felt by basins with high geological or human-induced erosion rates, dams in the lower reaches of rivers and dams with smaller storage volumes
- Waterlogging and salinity affect one-fifth of irrigated land globally - including land irrigated by large dams - and have

severe, long-term and often permanent impacts on land, agriculture and livelihoods where rehabilitation is not undertaken

Using the information on the performance of large dams collected in the WCD Knowledge Base, the Commission's report shows that there is considerable scope for improving the selection of projects and the operation of existing large dams and their associated infrastructure. Considering the enormous capital invested in large dams, it is surprising that substantive evaluations of project performance are few in number, narrow in scope and poorly integrated across impact categories and scales.

## Ecosystems and Large Dams

The generic nature of the impacts of large dams on ecosystems, biodiversity and downstream livelihoods is increasingly well known. From the WCD Knowledge Base it is clear that large dams have led to:

- the loss of forests and wildlife habitat, the loss of species populations and the degradation of upstream catchment areas due to inundation of the reservoir area
- the loss of aquatic biodiversity, of upstream and downstream fisheries, and of the services of downstream floodplains, wetlands, and riverine, estuarine and adjacent marine ecosystems; and
- cumulative impacts on water quality, natural flooding and species composition where a number of dams are sited on the same river

On balance, the ecosystem impacts are more negative than positive and they have led, in many cases, to significant and irreversible loss of species and ecosystems. In some cases, however, enhancement of ecosystem values does occur, through the creation of new wetland habitat and the fishing and recreational opportunities provided by new reservoirs.

The Commission found that reservoirs sampled so far by scientists all emit greenhouse gases, as do natural lakes, due to the rotting of vegetation and carbon inflows from the catchment. The scale of such emissions is highly variable. Preliminary data from a Case Study hydropower dam in Brazil show that the gross level of these emissions is significant, relative to emissions from equivalent thermal power plants.

However, in other reservoirs studied (notably those in boreal zones), gross emissions of greenhouse gases are significantly lower than the thermal alternative. A full comparison would require measurements of the emissions from natural pre-impoundment habitats. More research is needed on a case-by-case basis to demonstrate the capacity of hydropower to offset climate change.

Efforts to date to counter the ecosystem impacts of large dams have met with limited success due to the lack of attention to anticipating and avoiding such impacts, the poor quality and uncertainty of predictions, the difficulty of coping with all impacts, and the only partial implementation and success of mitigation measures. More specifically:

- It is not possible to mitigate many of the impacts of reservoir creation on terrestrial ecosystems and biodiversity, and efforts to 'rescue' wildlife have met with little long-term success
- The use of fish passes to mitigate the blockage of migratory fish has had little success, as the technology has often not been tailored to specific sites and species
- Good mitigation results from a good information base; early co-operation between ecologists, the dam design team and affected people; and regular monitoring and feedback on the effectiveness of mitigation measures
- Environmental flow requirements (which include managed flood releases) are increasingly used to reduce the impacts of changed streamflow regimes on aquatic, floodplain and coastal ecosystems downstream

Given the limited success of traditional mitigation measures, increased attention through legislation is now given to avoidance or minimisation of ecological impacts through setting aside particular river segments or basins in their natural state and through the selection of alternative projects, sites or designs. In addition, governments are experimenting with a 'compensatory' approach, offsetting the loss of ecosystems and biodiversity caused by a large dam through investment in conservation and regeneration measures and through protection of other threatened sites of equivalent ecological value.

Finally, in a number of industrialised countries, but particularly in the United States, ecosystem restoration is being implemented as a result of the decommissioning of large and small dams.

## People and Large Dams

In terms of the social impacts of dams, the Commission found that the negative effects were frequently neither adequately assessed nor accounted for. The range of these impacts is substantial, including on the lives, livelihoods and health of the affected communities dependent on the riverine environment:

- Some 40-80 million people have been physically displaced by dams worldwide
- Millions of people living downstream from dams - particularly those reliant on natural floodplain function and fisheries - have also suffered serious harm to their



livelihoods and the future productivity of their resources has been put at risk

- Many of the displaced were not recognised (or enumerated) as such, and therefore were not resettled or compensated
- Where compensation was provided it was often inadequate, and where the physically displaced were enumerated, many were not included in resettlement programmes
- Those who were resettled rarely had their livelihoods restored, as resettlement programmes have focused on physical relocation rather than the economic and social development of the displaced
- The larger the magnitude of displacement, the less likely it is that even the livelihoods of affected communities can be restored
- Even in the 1990s, impacts on downstream livelihoods were, in many cases, not adequately assessed or addressed in the planning and design of large dams

In sum, the Knowledge Base demonstrated a generalised lack of commitment or lack of capacity to cope with displacement. In addition, large dams in the Knowledge Base have also had significant adverse effects on cultural heritage through the loss of cultural resources of local communities and the submergence and degradation of plant and animal remains, burial sites and archaeological monuments.

The Knowledge Base indicated that the poor, other vulnerable groups and future generations are likely to bear a disproportionate share of the social and environmental costs of large dam projects without gaining a commensurate share of the economic benefits:

- Indigenous and tribal peoples and vulnerable ethnic minorities have suffered disproportionate levels of displacement and negative impacts on livelihood, culture and spiritual existence
- Affected populations living near reservoirs as well as displaced people and downstream communities have often faced adverse health and livelihood outcomes from environmental change and social disruption
- Among affected communities, gender gaps have widened and women have frequently borne a disproportionate share of the social costs and were often discriminated against in the sharing of benefits

Where such inequities exist in the distribution of the costs and benefits, the Global Review emphasises that the 'balance-sheet' approach to adding up the costs and benefits is increasingly seen as unacceptable on equity grounds and as a poor means of choosing the 'best' projects. In any event, the true economic profitability of large dam projects remains elusive, as the environmental and social costs of large dams were poorly accounted for in economic terms.

More to the point, failures to account adequately for these impacts and to fulfil commitments that were made have led to the impoverishment and suffering of millions, giving rise to growing opposition to dams by affected communities worldwide. Innovative examples of processes for making reparations and sharing project benefits are emerging that provide hope that past injustices can be remedied and future ones avoided.

## Options for Water and Energy Resources Development

The Global Review examined the options for meeting energy, water and food needs in today's circumstances and the barriers and enabling conditions that determine choice or adoption of particular options. Many options currently exist - including demand-side management (DSM), supply efficiency, and new supply options. These can all improve or expand water and energy services and meet evolving development needs across all segments of society. Viewing these options in an integrated fashion, rather than for individual sectors, suggested the following general findings and lessons:

- Demand-side management options include reduced consumption, recycling and technological and policy options that promote efficiency of water and power at the point of end-use. DSM has significant untapped and universal potential and provides a major opportunity to reduce water stress and power requirements as well as achieve other benefits such as the reduction of greenhouse gas emissions.
- Improving system management can defer the need for new sources of supply by enhancing supply and conveyance efficiency. Needless loss of power and water can be avoided through reductions in water leakages from the system, keeping up with system maintenance and upgrading of control, transmission and distribution technology in the power sector
- Basin and catchment management through vegetative and structural measures offers an opportunity across all sectors to reduce sedimentation of reservoirs and canals and to manage the timing and quantity of peak, seasonal and annual flows, as well as groundwater recharge
- A number of supply options have emerged that are locally and environmentally appropriate, economically viable and acceptable to the public, including recycling, rainwater harvesting and wind power

The ability of various options to meet existing and future needs or to replace conventional supplies depends on the specific context, but in general they offer significant potential, individually and collectively.

## Decision-Making, Planning and Compliance

As a development choice, large dams often became a focal point for the interests of politicians, dominant and centralised government agencies, international financing agencies and the dam-building industry. Involvement from civil society varied with the degree of debate and open political discourse in a country. However, dams in the WCD Knowledge Base reveal a generalised failure to recognise affected people as partners in the planning process, with rights, and to empower them to participate in the process.

Foreign assistance has accounted for less than 15% of total funding for dams in developing countries. Still, the funds provided - more than \$4 billion per year during the peak of lending in 1975-84 - played an important role in promoting and financing large dams in countries building only a few dams. These countries have often been vulnerable to conflicts between the interests of governments, donors and industry involved in foreign assistance programmes, on the one hand, and improved development outcomes for rural people, particularly the poor, on the other hand.

To a lesser extent this assistance has supported larger countries seeking to build many dams (including China, India and Brazil), primarily through the provision of finance for dam-building programmes. In shared river basins, the lack of agreements on water use is an increasing concern and cause for tension, particularly as demands grow and unilateral decisions by one country to build large dams alter water flows within a basin, with significant consequences for other riparian States.

Evaluation of the planning and project cycle for large dams revealed a series of limitations, risks and failures in the manner in which these facilities have been planned, operated and evaluated:

- Participation and transparency in planning processes for large dams frequently was neither inclusive nor open.
- Options assessment has been typically limited in scope and confined primarily to technical parameters and the narrow application of economic cost-benefit analyses
- The participation of affected people and the undertaking of environmental and social impact assessment have often occurred late in the process and were limited in scope
- The paucity of monitoring and evaluation activity once a large dam is built has impeded learning from experience
- Many countries have not yet established licensing periods that clarify the responsibilities of the owner towards the end of the dam's effective life

The net effect of these difficulties is that once a proposed dam project has passed preliminary technical and economic feasibility tests and attracted interest from government, external financing agencies or political interests, the momentum behind the project often prevails over further assessments.

As a result, many dams were not built based on a comprehensive assessment and evaluation of the technical, financial and economic criteria applicable at the time, much less the social and environmental criteria that apply in today's context. That many such projects have not met standards applicable in either context is therefore not surprising, but nonetheless cause for concern.

Conflicts over dams stem also from the failure of dam proponents and financing agencies to fulfil commitments made, observe statutory regulations and abide by internal guidelines. In some cases, the opportunity for corruption provided by dams as large-scale infrastructure projects further distorted decision-making, planning and implementation. Whereas substantial improvements in policies, legal requirements and assessment guidelines have occurred, particularly in the 1990s, it appears that business is often conducted as usual when it comes to actual planning and decision-making. Moreover, where substantial differences arise between proponents and those potentially affected, efforts to modify plans and decisions often must resort to legal or other action outside the normal planning process. Regional Consultations held by the Commission underscored that past conflicts remain largely unresolved for a number of reasons, including poor experience with appeals, dispute resolution and recourse mechanisms.

Throughout the Global Review recent examples and illustrations of good practice are presented that form the basis of the Commission's optimism that these barriers are surmountable, and that these difficulties are not inevitable. As a means of reducing negative impacts and conflicts, these experiences indicate that there are opportunities, and indeed a responsibility, to:

- increase the efficiency of existing assets;
- avoid and minimise ecosystem impacts
- engage in participatory, multi-criteria analysis of development needs and options;
- ensure that displaced and project-affected peoples' livelihoods are improved
- resolve past inequities and injustices, and transform project-affected people into beneficiaries
- conduct regular monitoring and periodic review; and
- develop, apply and enforce incentives, sanctions and recourse mechanisms - especially in the area of environmental and social performance

The Commission's recommendations deliver a way forward that can improve planning, decision-making and compliance, and thereby capitalise on the options available - whether technological, policy or institutional in nature - and provide economically efficient, socially equitable and environmentally sustainable solutions to meet future water and energy needs.

## How Can We Achieve Better Outcomes?

The debate about dams is a debate about the very meaning, purpose and pathways for achieving development. Along with all development choices, decisions on dams and their alternatives must respond to a wide range of needs, expectations, objectives and constraints. They are a function of public choice and public policy. To resolve underlying conflicts about the effectiveness of dams and their alternatives, a broad consensus is needed on the norms that guide development choices and the criteria that should define the process of negotiation and decision-making.

To improve development outcomes in the future we need to look at proposed water and energy development projects in a much wider setting - a setting that reflects full knowledge and understanding of the benefits and impacts of large dam projects and alternative options for all parties. It means that we have to bring new voices, perspectives and criteria into decision-making, and we need to develop an approach that will build consensus around the decisions reached. This will result in fundamental changes in the way decisions are made.

Such a process must start with a clear understanding of the shared values, objectives and goals of development. The Commission grouped the core values informing its understanding of these issues under five main headings:

1. equity,
2. efficiency,
3. participatory decision-making,
4. sustainability and
5. accountability

These five values run through the entire report and are the foci of concerns raised by the evidence presented in the Global Review. They are also aligned with the international framework of norms articulated in the UN Declaration of Human Rights that the Commission cites as a powerful framework of internationally accepted standards.

Considerable support exists for rights, particularly basic human rights, to be considered as a fundamental reference point in any debate on dams - starting with the adoption of the Universal Declaration of Human Rights in 1948 and the related covenants adopted thereafter, through to the Declaration on the Right to Development adopted by the General Assembly in 1986 and the Rio Principles agreed to at the UN Conference on Environment and Development in 1992.

Given the significance of rights-related issues as well as the nature and magnitude of potential risks for all parties concerned, the Commission proposes that an approach based on 'recognition of rights' and 'assessment of risks' (particularly rights at risk) be developed as a tool for guiding future planning and decision-making. This will also provide a more effective

framework for integrating the economic, social and environmental dimensions for options assessment and the planning and project cycles.

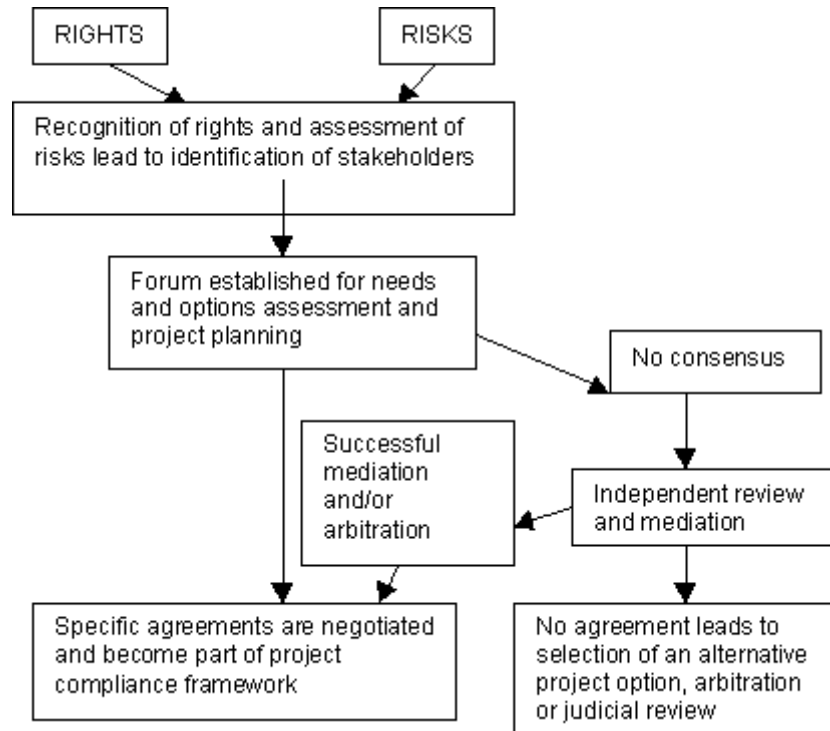
Clarifying the rights context for a proposed project is an essential step in identifying those legitimate claims and entitlements that might be affected by the proposed project - or indeed, its alternatives. It is also the basis for effective identification of stakeholder groups that are entitled to a formal role in the consultative process, and eventually in negotiating project-specific agreements relating, for example, to benefit sharing, resettlement or compensation.

The notion of risk adds an important dimension to understanding how, and to what extent, a project may have an impact on such rights. Traditional practice is to restrict the definition of risk to the risk of the developer or corporate investor in terms of capital invested and expected returns. These voluntary risk-takers have the capacity to define the level and type of risk they wish to take and explicitly to define its boundaries and acceptability. In contrast, as the Global Review showed, a far larger group often has risks imposed on them involuntarily and managed by others. Typically, these involuntary risk-bearers have little or no say in overall water and energy policy, in the choice of specific projects or in project design and implementation. The risks they face directly affect individual well-being, livelihoods, quality of life, even their spiritual world view and very survival.

Dealing with risks cannot be reduced to consulting actuarial tables or applying a mathematical formula. In the end, as in the case of rights and entitlements, they must be identified, articulated and addressed explicitly. This will require the acknowledgement of risk to be extended to a wider group than governments or developers in order to include both those affected by a project and the environment as a public good.

A rights-and-risks approach to options assessment and to the planning and project cycles presents an effective framework to determine who has a legitimate place at the negotiation table and what issues need to be on the agenda (see Figure 2). It empowers decision-making processes based on the pursuit of negotiated outcomes, conducted in an open and transparent manner and inclusive of all legitimate actors involved in the issue, thereby helping to resolve the many and complex issues surrounding water, dams and development. While presenting greater demands at early stages of options assessment and project design, it leads to greater clarity and legitimacy for subsequent steps in decision-making and implementation.

**Figure 2: From rights and risks to negotiated agreements: a framework for options assessment and project planning**



Having laid the groundwork of five core values and a rights-and-risks approach, the Commission developed a constructive and innovative way forward for decision-making in the form of seven strategic priorities and corresponding policy principles. These are written in terms of the outcomes to be achieved. They are supported by a practical set of principles and guidelines designed for adoption, adaptation and use by all those involved in the dams debate. These move from a traditional top-down, technology-focused approach to advocate significant innovations in assessing options, managing existing dams, gaining public acceptance and negotiating and sharing benefits.

## Strategic Priorities for Decision-Making

### Gaining Public Acceptance.

Public acceptance of key decisions is essential for equitable and sustainable water and energy resources development. Acceptance emerges from recognising 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 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.

- Recognition of rights and assessment of risks is the basis for the identification and inclusion of stakeholders in decision-making on energy and water resources development
- Access to information, legal and other support is available to all stakeholders, particularly indigenous and tribal peoples, women and other vulnerable groups, to enable their informed participation in decision-making processes
- Demonstrable public acceptance of all key decisions is achieved through agreements negotiated in an open and transparent process conducted in good faith and with the informed participation of all stakeholders
- Decisions on projects affecting indigenous and tribal peoples are guided by their free, prior and informed consent, achieved through formal and informal representative bodies.

### **Comprehensive Options Assessment**

Alternatives to dams often do exist. To explore these alternatives, needs for water, food and energy are assessed and objectives 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.

- Development needs and objectives are clearly formulated through an open and participatory process before the identification and assessment of options for water and energy resource development
- Planning approaches that take into account the full range of development objectives are used to assess all policy, institutional, management and technical options before the decision to proceed with any programme or project
- Social and environmental aspects are given the same significance as technical, economic and financial factors in assessing options
- Increasing the effectiveness and sustainability of existing water, irrigation and energy systems is given priority in the options assessment process.
- If a dam is selected through such a comprehensive options assessment, social and environmental principles are applied



in the review and selection of options throughout the detailed planning, design, construction and operation phases

## Addressing Existing Dams

Opportunities exist to optimise 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, technological 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.

- A comprehensive post-project monitoring and evaluation process and a system of longer-term periodic reviews of the performance, benefits and impacts for all existing large dams are introduced
- Programmes to restore, improve and optimise benefits from existing large dams are identified and implemented. Options to consider include: rehabilitate, modernise and upgrade equipment and facilities; optimise reservoir operations; and introduce non-structural measures to improve the efficiency of delivery and use of services
- Outstanding social issues associated with existing large dams are identified and assessed; processes and mechanisms are developed with affected communities to remedy them.
- The effectiveness of existing environmental mitigation measures is assessed and unanticipated impacts are identified; opportunities for mitigation, restoration and enhancement are recognised, identified and acted on
- All large dams have formalised operating agreements with time-bound license periods; where re-planning or relicensing processes indicate that major physical changes to facilities, or decommissioning, may be advantageous, a full feasibility study and environmental and social impact assessment is undertaken

## Sustaining Rivers and Livelihoods

Rivers, watersheds and aquatic ecosystems are the biological engines of the planet. They are the basis for life and the livelihoods of local communities. Dams transform landscapes and create risks of irreversible impacts. Understanding, protecting and restoring ecosystems at river basin level is

essential to foster equitable human development and the welfare of all species.

Options assessment and decision-making around river development prioritises the avoidance of impacts, followed by the minimisation and mitigation of 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.

- A basin-wide understanding of the ecosystem's functions, values and requirements, and how community livelihoods depend on and influence them, is required before decisions on development options are made
- Decisions value ecosystem, social and health issues as an integral part of project and river basin development, and avoidance of impacts is given priority, in accordance with a precautionary approach
- A national policy is developed for maintaining selected rivers with high ecosystem functions and values in their natural state. When reviewing alternative locations for dams on undeveloped rivers, priority is given to locations on tributaries
- Project options are selected that avoid significant impacts on threatened and endangered species. When impacts cannot be avoided, viable compensation measures are put in place that will result in a net gain for the species within the region
- Large dams provide for releasing environmental flows to help maintain downstream ecosystem integrity and community livelihoods and are designed, modified and operated accordingly

### **Recognising Entitlements and Sharing Benefits**

Joint negotiations with adversely affected people result in mutually agreed and legally enforceable mitigation and development provisions. These provisions recognise 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 to satisfy 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 national and international levels.

- Recognition of rights and assessment of risks is the basis for identification and inclusion of adversely affected

stakeholders in joint negotiations on mitigation, resettlement and development-related decision-making.

- Impact assessment includes all people in the reservoir, upstream, downstream and catchment areas whose properties, livelihoods and non-material resources are affected. It also includes those affected by dam-related infrastructure such as canals, transmission lines and resettlement developments
- All recognised adversely affected people negotiate mutually agreed, formal and legally enforceable mitigation, resettlement and development entitlements
- Adversely affected people are recognised as first among the beneficiaries of the project. Mutually agreed and legally protected benefit-sharing mechanisms are negotiated to ensure implementation

## Ensuring Compliance

Ensuring public trust and confidence requires that governments, developers, regulators and operators meet all commitments made for the planning, implementation and operation of dams. Compliance with applicable regulations, with criteria and guidelines, and with project-specific negotiated agreements is 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 non-regulatory measures, incorporating incentives and sanctions. Regulatory and compliance frameworks use incentives and sanctions to ensure effectiveness where flexibility is needed to accommodate changing circumstances.

- A clear, consistent and common set of criteria and guidelines to ensure compliance is adopted by sponsoring, contracting and financing institutions, and compliance is subject to independent and transparent review.
- A Compliance Plan is prepared for each project prior to commencement, spelling out how compliance will be achieved with relevant criteria and guidelines and specifying binding arrangements for project-specific technical, social and environmental commitments
- Incentives that reward project proponents for abiding by criteria and guidelines are developed by public and private financial institutions
- Costs for establishing compliance mechanisms and related institutional capacity, and their effective application, are built into the project budget
- Corrupt practices are avoided through enforcement of legislation, voluntary integrity pacts, debarment and other instruments

## Sharing Rivers for Peace, Development and Security

Storage and diversion of water on transboundary rivers has been a source of considerable tension between countries and within countries. As specific interventions for diverting water, dams require constructive co-operation. Consequently, the use and management of resources increasingly becomes the subject of agreement between States to promote mutual self-interest for regional co-operation 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 States are innovative in defining the scope of issues for discussion. External financing agencies support the principles of good faith negotiations between riparian States.

- National water policies make specific provision for basin agreements in shared river basins. Agreements are negotiated on the basis of good faith among riparian States. They are based on principles of equitable and reasonable utilisation, no significant harm, prior information and the Commission's strategic priorities
- Riparian States go beyond looking at water as a finite commodity to be divided and embrace an approach that equitably allocates not the water, but the benefits that can be derived from it. Where appropriate, negotiations include benefits outside the river basin and other aspects of mutual interest.
- Dams on shared rivers are not built in cases where riparian States raise an objection that is upheld by an independent panel. Intractable disputes between countries are resolved through various means of dispute resolution including, in the last instance, the International Court of Justice
- For the development of projects on rivers shared between political units within countries, the necessary legislative provision is made at national and sub-national levels to embody the Commission's strategic priorities of 'gaining public acceptance', 'recognising entitlements' and 'sustaining rivers and livelihoods'
- Where a government agency plans or facilitates the construction of a dam on a shared river in contravention of the principle of good faith negotiations between riparians, external financing bodies withdraw their support for projects and programmes promoted by that agency

## A New Focus for Planning and Decision-Making

The strategic priorities recommended by the Commission lie within a broad framework of existing and emerging policy and regulation at local, national and international levels. (See Figure 3.) Turning these priorities and their underlying principles into reality requires a new focus for planning and management in the water and energy sectors.

This can best be achieved by focusing on the key stages in decision-making that influence final outcomes and where compliance with regulatory requirements can be verified. The Commission has identified five critical decision points when water and energy options are considered. The first two relate to planning, leading to decisions on a preferred development plan:

1. Needs assessment - validating the needs for water and energy services
2. Selecting alternatives - identifying the preferred development plan from among the full range of options

Where a dam emerges from this process as a preferred development alternative, three further critical decision points occur:

3. Project preparation - verifying that agreements are in place before tender of the construction contract
4. Project implementation - confirming compliance before commissioning
5. Project operation - adapting to changing contexts

Each of the five decision points represents a commitment to actions that govern the course of future conduct and the allocation of resources. They are points where ministries and government agencies need to test compliance with preceding processes before giving the green light to proceed to the next stage. They are not exhaustive, and within each stage many other decisions have to be taken and agreements reached. The five stages and associated decision points need to be interpreted within the overall planning contexts of individual countries. The Commission also noted that even when these decision points have been passed, there are certain steps that should be taken to improve outcomes (See Box 3).

**Figure 3. The WCD in a global context**

<p><b>Government</b></p> <ul style="list-style-type: none"> <li>- Water &amp; Energy Policies</li> <li>- Social &amp; Environment Policies</li> <li>- Regulations &amp; Standards</li> </ul>	<p><b>Civil Society</b></p> <ul style="list-style-type: none"> <li>-Codes of Practice</li> <li>-Public Information</li> <li>-Social Audit</li> </ul>	
<p><b>International Standards</b></p> <ul style="list-style-type: none"> <li>-Technical Standards</li> <li>-Water, Health &amp; Safety Standards</li> <li>-ISO standards</li> </ul>	<p><b>World Commission on Dams</b></p>	<p><b>International Agreements</b></p> <ul style="list-style-type: none"> <li>-International Conventions</li> <li>-International Law</li> <li>-Basin Agreements</li> </ul>
<p><b>Multilateral &amp; Bilateral Organisations</b></p> <ul style="list-style-type: none"> <li>-Policy Directives</li> <li>-Impact Assessments</li> <li>-Process Guidelines</li> </ul>	<p><b>Professional Organisations</b></p> <ul style="list-style-type: none"> <li>-Standards</li> <li>-Sector Guidelines</li> </ul>	<p><b>Private Sector</b></p> <ul style="list-style-type: none"> <li>- Codes of Practice</li> <li>- Due Diligence Policies</li> <li>- Certification</li> </ul>

**Box 3. Dams in the pipeline**

There are many dam projects today at various stages of planning and development. It is never too late to improve the outcomes of projects - even ones this large in scale and scope. *Dams and Development* calls for an open and participatory review of all ongoing and planned projects to see whether changes are needed to bring them into line with the WCD strategic priorities and policy principles. In general, regulators, developers and, where appropriate, financing agencies should ensure that such a review:

- uses a stakeholder analysis based on recognising rights and assessing risks, in order to identify a stakeholder forum that is consulted on all issues affecting them
- enables vulnerable and disadvantaged stakeholder groups to participate in an informed manner;
- includes a distribution analysis to see who shares the costs and benefits of the project
- develops agreed mitigation and resettlement measures to promote development opportunities and benefit sharing for displaced and adversely affected people
- avoids, through modified design, any severe and irreversible ecosystem impacts
- provides for an environmental flow

requirement, and mitigates or compensates any unavoidable ecosystem impacts; and

- designs and implements recourse and compliance mechanisms

This process of review implies added investigations or commitments, the re-negotiation of contracts and the incorporation of a Compliance Plan. But additional financial costs will be recouped in lower overall costs to the operator, to government and to society in general as a consequence of avoiding negative outcomes and conflicts.

Social, environmental, governance and compliance aspects have been undervalued in decision-making in the past. In light of this, the Commission developed criteria and 26 guidelines to complement the body of knowledge on good practices and to add value to current national and international guidelines, including those on technical, economic and financial aspects. Seen in conjunction with existing decision-support instruments, the Commission's criteria and guidelines provide a new direction for appropriate and sustainable development.

Bringing about this change will require:

- planners to identify stakeholders through a process that recognises rights and assesses risks
- States to invest more at an earlier stage to screen out inappropriate projects and facilitate integration across sectors within the context of the river basin
- consultants and agencies to ensure outcomes from feasibility studies are socially and environmentally acceptable
- all players to promote open and meaningful participation during planning and implementation, leading to negotiated outcomes
- developers to accept accountability through contractual commitments, for effectively mitigating social and environmental impacts
- independent reviewers to improve compliance; and
- dam owners to apply lessons learned from past experiences through regular monitoring and adapting to changing needs and contexts

The Commission offers its criteria and guidelines to help States, developers and owners, as well as affected communities and civil society in general, meet emerging societal expectations when faced with the complex issues associated with dam projects. This will foster informed and appropriate decisions, thereby raising the level of public acceptance and improving development outcomes.

## What's Next?

*Dams and Development* distils more than two years of intense study, dialogue and reflection by the World Commission on Dams and the WCD Stakeholders' Forum and literally hundreds of individual experts on every facet of the dams debate. It contains all the significant findings that result from this work and expresses everything that the Commissioners feel is important to communicate to governments, the private sector, civil society, international organisations and affected peoples - in short, to the entire spectrum of participants in the dams debate.

The directions are clear. It is one thing, however, to see this. It is another to actively break through traditional boundaries of thinking - to look at familiar issues from a different perspective. This is what the Commission had to do, and found was indeed possible. Similar constructive processes are at work among many of the constituencies that participated so actively in the WCD process.

It is time to bring the debate home. The controversy over dams has appropriately been raised to the international stage. A dissipation of that controversy, however, should allow decisions about fundamental water and energy development choices to be made at the most appropriate level - one where the voices of powerful international players and interests do not drown out the many voices of those with a direct stake in the decisions. For this to work, all the actors have to make a commitment to step out of their familiar frames of reference. The Commission recommends that the report be used as the starting point for discussions, debates, internal reviews and reassessments of what may be established procedures and for an assessment of how they can evolve to address a changed reality.

*Dams and Development* proposes a number of entry points to help organisations identify steps they can take right away in response to the report. In general, the Commission hopes that all interested parties will:

- review carefully and actively disseminate the report
- issue public statements of support for the approach taken
- review dams currently under development with the WCD criteria and guidelines in mind; and
- support investments in building capacity, particularly in developing countries, for options assessment and improved decision-making

Specific proposals are included for national governments and line ministries, civil society groups, the private sector, bilateral aid agencies, multilateral development banks, export credit agencies, international organisations, and academic and research bodies. (See Box 4.) Engaging through these entry points would initiate permanent changes to advance the principles, criteria and guidelines in the report.



#### **Box 4. Selected recommendations for key stakeholders in the dams debate**

##### **National governments can:**

- require a review of existing procedures and regulations concerning large dam projects;
- adopt the practice of time-bound licences for all dams, whether public or privately owned
- establish an independent, multi-stakeholder committee to address the unresolved legacy of past dams

##### **Civil society groups can:**

- monitor compliance with agreements and assist any aggrieved party to seek resolution of outstanding disagreements or to seek recourse
- actively assist in identifying the relevant stakeholders for dam projects, using the rights-and-risks approach

##### **Affected peoples' organisations can:**

- identify unresolved social and environmental impacts and convince the relevant authorities to take effective steps to address them
- develop support networks and partnerships to strengthen the technical and legal capacity for needs and options assessment processes

##### **Professional associations can:**

- develop processes for certifying compliance with WCD guidelines
- extend national and international databases, such as the ICOLD World Register of Dams, to include social and environmental parameters

##### **The private sector can:**

- develop and adopt voluntary codes of conduct, management systems and

certification procedures for best ensuring and demonstrating compliance with the Commission's guidelines, including, for example, through the ISO 14001 management system standard

- abide by the provisions of the anti-bribery convention of the Organisation for Economic Co-operation and Development
- adopt integrity pacts for all contracts and procurement

**Bilateral aid agencies and multilateral development banks can:**

- ensure that any dam options for which financing is approved emerge from an agreed process of ranking of alternatives and respect WCD guidelines
- accelerate the shift from project- to sector-based finance, especially through increasing financial and technical support for effective, transparent, and participatory needs and options assessment, and the financing of non-structural alternatives
- review the portfolio of projects to identify any past ones that may have under-performed or present unresolved issues

The trust required to enable different sectors and players to work together must still be consolidated. Early and resolute action to address some of the issues arising from the past will go a long way towards building that trust in the future. So, too, would an assurance to countries still at an early stage of economic development that the dams option will not be foreclosed before they have had a chance to examine their water and energy development choices within the context of their own development process.

The experience of the Commission demonstrates that common ground can be found without compromising individual values or losing a sense of purpose. But it also demonstrates that all concerned parties must enter into the process in good faith if we are to resolve the issues surrounding water and energy resources development. It is a process with multiple heirs and no clear arbiter. We must move forward together or we will fail.

There will, of course, be further disagreement on these issues. Dynamic debate leads frequently to better outcomes. The Commission believes, however, that business as usual is not a viable strategy. The report closes with a call to action and a challenge to all readers:

We have conducted the first comprehensive and global review of the performance of dams and their contribution to development. We have done this through an inclusive process that has brought all significant players into the debate. And we believe we have shifted the centre of gravity in the dams debate to one focused on options assessment and participatory decision-making. The rights-and-risks approach we propose will raise the importance of social and environmental dimensions of dams to a level once reserved for the economic dimension.

**We have told our story. What happens next is up to you.**

## WCD Forum

Coming from 68 institutions in 36 countries, members of the Forum reflect the range of interests in the dams debate. The Forum acted as a "sounding board" for the work of the Commission, and helped maintain two-way communication with the various far-flung dam constituencies. Forum members can help to build ownership of Commission work. The WCD is also conscious that reports in themselves have little impact if they are not firmly rooted in a process that enables all interest groups to develop an understanding of and confidence in the process itself. Membership of the WCD Forum however does not imply endorsement of the Commission's report and findings.

### Affected Peoples' Groups

CODESEN, Co-ordination for the Senegal River Basin, *Senegal*  
COICA, Federación de Indígenas del Estado Bolívar, *Venezuela*  
Grand Council of the Cree, *Canada*  
MAB, Movimento dos Atingidos por Barragens, *Brazil*  
NBA, Narmada Bachao Andolan, *India*  
Sungi Development Foundation, *Pakistan*  
Cordillera People's Alliance, *Philippines*

### Non-Governmental Organisations

Berne Declaration, *Switzerland*  
ENDA, Environmental Development Action, *Senegal*  
Help the Volga River, *Russia*  
IRN, International Rivers Network, *United States*  
ITDG, Intermediate Technology Development Group, *United Kingdom*  
IUCN, The World Conservation Union, *Switzerland*  
Sobrevivencia-Friends of the Earth, *Paraguay*  
WWF, World Wide Fund for Nature, *Switzerland*  
DAWN, Development Alternatives with Women for a New Era, *Fiji*  
TI, Transparency International, *Germany*  
WEED, World Ecology, Environment & Development, *Germany*  
Swedish Society for Nature Conservation, *Sweden*  
Wetlands International, *Japan*

### Bilateral Agencies / Export Credit Guarantee Agencies

BMZ, Federal Ministry for Economic Co-operation and Development, *Germany*  
NORAD, Norwegian Agency for International Co-operation, *Norway*  
JBIC, Japan Bank for International Co-operation, *Japan*  
SDC, Swiss Agency for Development and Co-operation, *Switzerland*  
Sida, Swedish International Development Agency, *Sweden*  
U.S. Export/Import Bank, *United States*

## Private-Sector Firms

Enron, *United States*  
Harza Engineering Company, *United States*  
Siemens, *Germany*  
ABB, *Switzerland*  
Saman Engineering Consultants, *South Korea*  
Engevix, *Brazil*

## Government Agencies

United States Bureau of Reclamation, *United States*  
LHWP, Lesotho Highlands Water Project, *Lesotho*  
Ministry of Water Resources, *China*  
National Water Commission, *Mexico*  
Ministry of Mahaweli Development, *Sri Lanka*  
Ministry of Water Resources, *India*

## Research Institutes

Centro EULA, Ciudad Universitaria, *Chile*  
Tropica Environmental Consultants Ltd., *Senegal*  
WRI, World Resources Institute, *United States*  
Water Research Institute, *Israel*  
Winrock International, *Nepal*  
Focus on the Global South, *Thailand*  
ISPH, Institute of Hydroelectric Studies and Design, *Romania*  
IWMI, International Water Management Institute, *Sri Lanka*  
Worldwatch Institute, *United States*  
Wuppertal Institute, *Germany*

## International Associations

ICID, International Commission for Irrigation & Drainage, *New Delhi*  
ICOLD, International Commission on Large Dams, *Paris*  
IHA, International Hydropower Association, *United Kingdom*  
IAIA, International Association for Impact Assessments, *South Africa*

## River Basin Authorities

Confederación Hydrográfica del Ebro, *Spain*  
Mekong River Commission, *Cambodia*  
Volta River Authority, *Ghana*  
Jordan Valley Authority, *Jordan*

## Multilateral Agencies

ADB, Asian Development Bank

AfDB, African Development Bank  
FAO, UN Food and Agriculture Organisation  
IADB, Inter-American Development Bank  
UNDP, United Nations Development Programme  
UNEP, United Nations Environment Programme  
WB, World Bank

## Utilities

Eletrobras, *Brazil*  
Hydro-Québec, *Canada*  
Nepal Electricity Authority, *Nepal*  
Mini Hydro Division, *Philippines*  
Electricité de France, *France*

## Financial Contributors

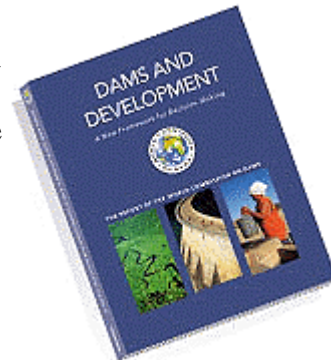
Financial support was received from 53 contributors including governments, international agencies, the private sector, NGOs and foundations. According to the mandate of the Commission, all funding received by it had to be 'untied' - that is, the funds were provided with no conditions attached to them.

<a href="#">Sida</a>	<a href="#">United States Bureau of Reclamation</a>
<a href="#">ABB</a>	<a href="#">Novib</a>
<a href="#">The Norwegian Ministry of Foreign Affairs</a>	<a href="#">United Nations Environment Programme</a>
<a href="#">The World Bank</a>	<a href="#">United Nations Foundation</a>
<a href="#">GTZ</a>	Republic of Ireland
<a href="#">Siemens</a>	<a href="#">The World Conservation Union</a>
<a href="#">KFW</a>	<a href="#">AusAID</a>
<a href="#">South African Department of Water Affairs and Forestry</a>	<a href="#">Goldman Environmental Fund</a>
<a href="#">Harza Engineering</a>	<a href="#">Minbuza, The Netherlands</a>
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<a href="#">Ministry of Water Resources</a>	<a href="#">Ministry of Foreign Affairs, Finland</a>
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<a href="#">Enron</a>	<a href="#">Halcrow</a>
<a href="#">Hydro Quebec</a>	<a href="#">Lotek</a>
<a href="#">Ministry of Finance, Japan</a>	<a href="#">The British Dam Society</a>
<a href="#">National Wildlife Federation</a>	<a href="#">Norplan A.S.</a>
<a href="#">SDC - Swiss Agency for development and Cooperation</a>	<a href="#">Worley International, New Zealand</a>
<a href="#">World Wildlife Fund</a>	<a href="#">Manitoba Hydro</a>
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## The Report in print

Dams provide a unique arena for understanding the complex choices facing societies in meeting their water and energy needs.

By the year 2000 the world had built more than 45 000 large dams. This brief overview provides a summary of *Dams and Development: A New Framework for Decision-Making*, the report of the World Commission on Dams. The report:



- is the product of an unprecedented global public policy effort to bring governments, the private sector and civil society together in one process
- provides the first comprehensive global and independent review of the performance and impacts of large dams
- presents a new framework for water and energy resources development, and
- develops an agenda of seven strategic priorities and corresponding criteria and guidelines to guide future decision-making

Challenging our assumptions, the Commission sets before us the hard, rigorous and clear-eyed evidence of exactly why nations decide to build dams and how dams can affect human, plant and animal life, for better or for worse. This overview illustrates why *Dams and Development* is vital reading on the future of dams as well as on the changing development context - in which new voices, choices and options leave little room for a business-as-usual scenario.

### **Dams and Development: A New Framework for Decision-Making** The Report of the World Commission on Dams

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