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To dam or not to dam?

Five years on from the World Commission on Dams





Dams can bring many benefits, such as energy, drinking water supply and water for irrigation – but these benefits can come at great social and environmental cost. For example, the Kariba Dam, one of seven detailed case studies in the WCD report, is an important source of electricity for both Zambia and Zimbabwe but its construction required the resettlement of 57,000 people from the Tonga minorities. Today, nearly 50 years on, many Tonga still have no access to electricity.

Table of contents

page 3	Introduction
page 4	What was the WCD?
page 4	New evidence on the scale of the problem
page 4	No more bad dams?
page 6	Case studies
page 6	Chalillo, Belize
page 7	Ermenek, Turkey
page 8	Kárahnjúkar, Iceland
page 9	Nam Theun 2, Lao PDR
page 10	Melonares, Spain
page 11	Burnett, Australia
page 12	Signs of change
page 15	Conclusions & calls to action

Introduction

On 16 November 2000, Nelson Mandela helped to launch the report of the World Commission on Dams (WCD), indicating the importance attached to the issue of dams and development by one of the world's greatest statesmen. The 380-page report addressed the benefits and impacts of dams or, in Mandela's words, 'one of the battlegrounds in the sustainable development arena'. Now, five years on, as the dust has settled, we ask – what is the Commission's legacy? Are fewer bad dams being built? Are benefits being shared with affected communities and are more effective environmental protection measures being taken?

This is a pertinent time to ask these questions as dams, in particular hydropower projects, have recently risen back to the top of decision-makers' agendas. This year, the World Bank approved funding for the Nam Theun 2 hydropower project in Laos, its first major investment in this sector since the Bank announced in 2003 its intention to re-enter dams financing with a focus on 'High Reward, High Risk' projects¹. Rising fossil fuel prices, growing energy needs, as well as the ratification of the Kyoto Protocol on climate change all have resulted in a renewed effort to develop the world's hydropower potential. At the same time climate change is likely to increase the demand for water storage. While hydropower and other dams undoubtedly have a role to play in meeting growing energy and water needs, there is also much at stake as in the past too many projects have resulted in excessive environmental damage and negative social impacts, especially for local communities.

In this report, WWF takes stock of what has happened in the five years since the launch of the WCD report. We highlight six cases where governments and dam builders have failed to clean up their act. We also show a number of positive developments from around the world. Overall, we find that the WCD recommendations are as important today for reducing the social and environmental damage caused by dams as they were five years ago. WWF is convinced that applying the WCD's framework, adapted to individual country's situations, will result in better decision-making and projects that have less impact. The world's ailing rivers and the communities that depend on them face a bleak future without prompt action.



The threat of climate change is fuelling the development of large scale hydropower



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According to the International Commission on Large Dams, a large dam is 15 metres or higher. Dams between 5 and 15 metres with a reservoir volume of more than 3 million cubic metres are also classified as large dams. However, impacts of dams are not determined by dam size alone.

What was the World Commission on Dams?

The Commission was established in 1998 as an independent, international, multi-stakeholder process to address what had become one of the most controversial areas of infrastructure development. While dams are seen by some as essential for development and poverty reduction, others claim they actually increase poverty, as well as damage ecosystems. The dam debate had become increasingly polarized during the 1990s and one of the aims of the Commission was to bridge the gulf between the two camps and produce an independent assessment of the performance of dams. Furthermore, it was charged with developing internationally accepted standards, guidelines and criteria for decision-making in the planning, design, construction, monitoring operation and decommissioning of dams².

The Commission comprised 12 independent Commissioners and was chaired by Professor Kader Asmal, one of the ministers in Mandela's cabinet. It spent two and a half years assembling what was undoubtedly the most thorough assessment of dams ever. Yet even with nearly 1000 submissions and countless consultations with stakeholders, the Commission could only examine a relatively small sample of the world's 45,000 large dams³ in detail.

What the Commission found⁴ was that whilst dams have indeed made important contributions to human development, in too many cases an unacceptable and often unnecessary price has been paid, especially in social and environmental terms. In particular it highlighted the adverse impacts on an estimated 40 to 80 million people displaced by dams, on downstream communities and on the natural environment.

To ensure that dams do not impose excessive social and environmental costs, the Commission identified five Core Values that need to be applied to decision-making on water and energy development (see box 1). It went on to recommend a new framework for decision-making, based on seven Strategic Priorities, including the need to gain public acceptance, comprehensive options assessment and sharing benefits. The Commission also developed more detailed Policy Principles and Guidelines. To adapt these Guidelines to specific cases, the Commission identified five key decision stages, including a needs assessment and the evaluation of alternatives before the decision to build a dam is made. Where a dam is found to be the preferred development alternative, three more critical decision points occur in the stages of project preparation, implementation and operation.

The report received a welcome from many quarters, and there has been widespread agreement on the five Core Values. The recommendations of the WCD also reflected a growing international consensus on issues such as integrated water resource management (as adopted in the World Summit on Sustainable Development Plan of Implementation) and integrated river basin management (now a legal requirement in the European Union under the Water Framework Directive), covered under Strategic Priority 4. But there has also been criticism, in particular from within industry, targeted above all at the Policy Principles and Guidelines. Not surprisingly, the dam controversy was not going to go away overnight.

Box 1 – Key elements of the WCD

Key Recommendations of the WCD

5 Core Values – equity, sustainability, efficiency, participatory decision-making, accountability

7 Strategic Priorities:

1. Gaining public acceptance
2. Comprehensive options assessment
3. Addressing existing dams
4. Sustaining rivers and livelihoods
5. Recognising entitlements and sharing benefits
6. Ensuring compliance
7. Sharing rivers for peace, development and security.

5 Key Decision Stages

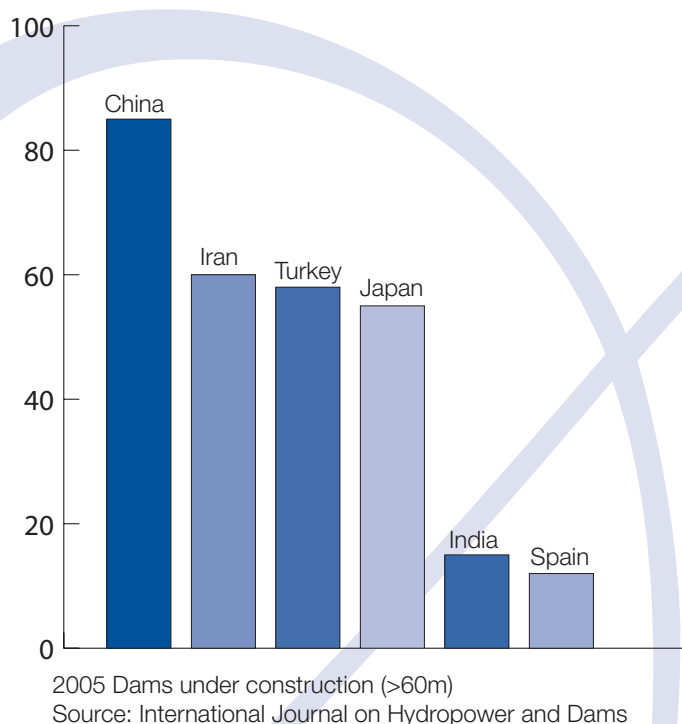
1. Needs assessment
2. Selecting alternatives
3. Project preparation
4. Project implementation
5. Project operation

New evidence on the scale of the problem

Since the publication of the WCD report, a number of authoritative assessments have further revealed the scale of the impact of the world's 45,000 large dams and associated developments, in particular irrigation infrastructure. A study by Nilsson et al⁵ has shown that already 59% of the world's large river systems are fragmented by dams. Overall, humans currently use 54% of accessible runoff⁶ and several major rivers, including the Nile, Yellow, and Colorado Rivers, at times no longer reach the sea. The Millennium Ecosystem Assessment⁷ found that the amount of water impounded behind dams quadrupled since 1960 and that three to six times as much water is held in reservoirs as in natural rivers.

In environmental terms, the effect of this water exploitation is serious. According to the Millennium Ecosystem Assessment, freshwater ecosystems tend to have the highest proportion of species threatened with extinction. The impacts of dams are not just localised. In another recent study Syvitsky et al⁸ estimated that globally, reservoirs are holding over one billion tonnes of sediment, preventing sediment transport to coastal areas, reducing nutrient delivering to agricultural areas and increasing coastal erosion rates. These studies underline that controlling the adverse impacts of dam development is as urgent as ever.

Figure 1 – The World's largest dam building nations



No more bad dams?

Dam construction continues at a rapid pace, in particular in the developing world where growth of water and electricity demand is strongest. As shown in figure 1, China, Iran and Turkey lead in the construction of large dams, although industrialised Japan is not far behind. Currently, close to 400 large dams over 60 metres in height are under construction worldwide, as well as many smaller ones for which data is difficult to obtain. As construction periods are often long, many of these dams will have been started before the completion of the WCD report. It is instructive to look at some dams which have been approved and where construction has started since November 2000, to see how they fare in terms of the WCD recommendations.

The premise of the WCD report was that a new decision-making framework would result in dams that have fewer negative impacts and greater benefits. But five years on, it is not difficult to find dams that fail to meet at least some of the recommendations of the WCD. Here we present our evaluation of six dams which indicate that the controversy is still very much alive and that the lessons highlighted by the WCD have still not been learnt.

Case Studies

1. Chalillo, Belize

Dam height: **50 m**

Reservoir size: **9.53 km²**

Function: **Power generation**

Installed Capacity: **7 MW**

Cost: **US\$30 million (original estimate)**



Construction of the Chalillo Dam nears completion in April 2005.

The decision to build the Chalillo Dam in Belize was taken in 2001 and given that the dam was going to flood more than 1000 ha of pristine rainforest, it was always likely to cause controversy. A preliminary assessment by the London Natural History Museum¹⁰, appended as an annexe to the Environmental Impact Assessment (EIA), suggested that the dam would cause a significant and irreversible reduction of biological diversity in Belize. In particular, it threatened an already endangered population of a Scarlet macaw subspecies (*Ara macao cyanoptera*), possibly resulting in local extinction in Belize. The study recommended a more comprehensive and integrated long-term study of other potential sites. Unfortunately, this was not taken up by the developers, the Belize Electric Company (BECOL, owned by the Canadian company Fortis).

While the generating capacity at the dam is relatively small, the developers cite as its main benefit the creation of significant water storage capacity to increase power generation at a downstream hydropower plant. This is expected to increase Belize's self-sufficiency in electricity by reducing imports of power from Mexico. However the economic viability of the dam has been questioned and an increase in electricity prices was predicted¹¹.

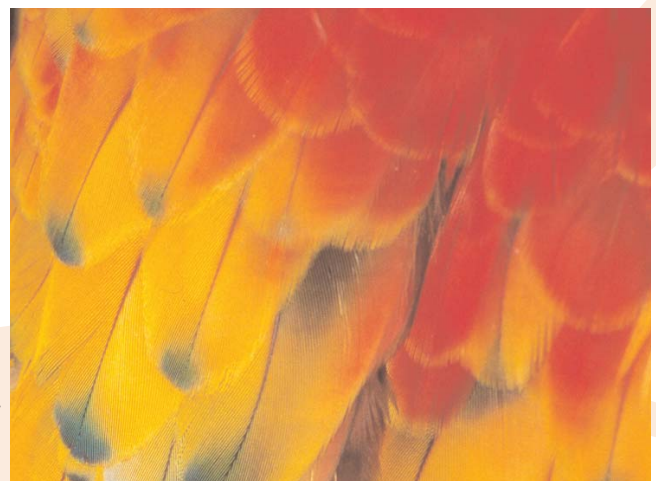
Opposition to the project focused on the inadequacy of the EIA and the legal battle led by the Belize Alliance of Conservation Non-Governmental Organisations (BACONGO) went all the way to the Privy Council in London, the final

court of appeal for Commonwealth countries like Belize. While the Privy Council voted by a majority of three judges to permit the project, the dissenting judgement¹² issued by the remaining two judges leaves significant room for doubt over the adequacy of the EIA.

The dam has now been completed. A large area of rainforest was cleared in preparation of flooding and there are reports of macaw nesting sites having been destroyed¹³. Habitat loss is also affecting other species, and local experts report on the decline of tapir (*Tapirus bairdii*) populations and reduced hunting grounds for jaguars (*Pantera Onca*), which already face a difficult future in Belize¹⁴. In addition there are reports of serious water quality problems downstream of the dam.

Following their narrow court victory, the company and the government of Belize have refused to conduct any of the legally-required follow-up on the dam's impacts or safety, and continue to refuse access to the area by independent observers¹⁵. Furthermore, the government has proposed another dam downstream of Chalillo, which will undoubtedly cause further ecological disturbance. In the meantime, electricity rates have indeed increased by an average of about 12%, with 14,000 households even facing rate increases of 50%¹⁶, although the company cites rising fuel costs as the cause.

In WWF's view, this project fails to observe the WCD Strategic Priorities 2 for comprehensive options assessment, 4 for sustaining rivers and livelihoods, and 6 on sharing benefits.



Wing of the Scarlet macaw, which is threatened with local extinction in Belize.

© WWF-Canada/Anthony B. RATH

2. Ermenek, Turkey

Dam height: **210 m**

Reservoir size: **57.74 km²**

Function: **Power generation**

Installed capacity: **302.4 MW**

Cost: **US\$ 650 million**



© WWF Turkey

The site of the Ermenek Dam.

The Ermenek hydropower project is currently under construction on the Ermenek River, a tributary of the Göksu River in South Eastern Turkey. The Göksu River is one of the last free flowing rivers in Turkey and its delta has been recognised as a Wetland of International Importance under the Ramsar Convention. There are further plans for five hydropower plants on the main stem of the river but there has been no basin-wide assessment of the cumulative impacts of Ermenek and the other projects.

The feasibility study for the project was carried out in 1990, whereas the EIA was not carried out until 1999. No needs and options assessment has been carried out, nor have alternatives been considered such as decentralized renewables, energy efficiency or the cutting of transmission losses that are up to 30% in Turkey. Furthermore, the economic analysis carried out for the project failed to take into account various aspects such as cost of new transmission lines, losses to fisheries and future decommissioning costs¹⁷.

There are a number of shortcomings in the EIA which cause WWF concern about the project's eventual impacts. Ecological surveys were inadequate for assessing the potential impacts of such a large project. For example, the EIA fails to list several threatened plant species which are known to occur in the area. The mitigation of environmental impacts was not covered comprehensively in the EIA. For instance, in WWF's view, the proposed minimum flow is inadequate to maintain downstream ecological conditions.

The project will also require the relocation of 550 people. Transparency is key to public acceptance but in the Ermenek case, cost-benefit analyses have been kept confidential and the EIA report has not been made freely available publicly due to a confidentiality agreement made between the developers and the responsible government agency, Devlet Su İflleri (DSİ - State Hydraulic Works).

In WWF's view, Ermenek falls particularly short in terms of WCD strategic priorities 1 on public acceptance, 2 for options assessment, and 4 on sustaining rivers and livelihoods.



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Turkey is building hydropower plants at a rapid pace, but up to 30% of the country's electricity is lost in transmission.

3. Kárahnjúkar, Iceland

Dam height: **190 m (highest of 3 dams)**

Reservoir size: **57 km²**

Function: **Power generation**

Installed capacity: **690 MW**

Cost: **US\$1086 million**



The area of the future reservoir. The sign indicates the highest level it will reach.

The Kárahnjúkar hydropower project is being built in the highlands of Northeast Iceland, to supply electricity to a new aluminium smelter to be developed by Alcoa, the world's largest aluminium supplier. Iceland, one of the richest countries in the world, has decided to base part of its economic growth on aluminium manufacturing, even though all raw materials have to be imported from far afield. It hopes to gain competitive advantage through the supply of cheap electricity.

The project has caused both local and international controversy, with concerns about the environmental impacts of such a large project in a fragile and pristine arctic wilderness area. More specifically, the project will flood five hundred nesting sites of the rare pink-footed goose (*Anser brachyrhynchus*) and Iceland's only reindeer herd is likely to diminish. Wetlands downstream will also be affected by wind erosion of soils left exposed from construction, the draining of watersheds and the fluctuations of the water level in the reservoir.

The project's EIA was at first rejected by Iceland's National Planning Agency, a decision that was later overruled by the Minister for the Environment. The project remains a divisive issue within Iceland and three Icelandic citizens and the Icelandic Nature Conservation Association took the Minister for the Environment to court for overturning the Agency's decision on the project's EIA.

A coalition of NGOs (Non Governmental Organisations), including WWF, has brought the Kárahnjúkar case to the attention of the Bern Convention Standing Committee¹⁸, which in 2004 issued a set of recommendations regarding mitigation measures for the project to the Icelandic Government. According to the NGO coalition, most of the key recommendations remain to be implemented.

The economics and social impacts of the project have been, and continue to be questioned. A 2005 OECD report¹⁹ suggested that Iceland's large-scale aluminium-related investment projects might result in the overheating of the economy. The report also says that the economic returns of such projects are unclear. Furthermore, it has been suggested²⁰ that government support for education and eco-tourism would provide better development alternatives from an environmental and socio-economic point of view.

While the environmental shortcomings of the project remain, one positive development has been the Icelandic government's proposal of a new national park – potentially the largest in Europe – which will protect Jökulsá á Fjöllum, an adjacent watershed. After the construction of Kárahnjúkar this will be the last free flowing glacial river in the Icelandic highlands.

In WWF's view, the Kárahnjúkar project fails to observe WCD strategic priorities 2 for options assessment and 4 on sustaining rivers and livelihoods.



Work is underway at the Kárahnjúkar dam site.

4. Nam Theun 2, Laos

Dam height: **39 m**
Reservoir size: **450 km²**
Function: **Power generation**
Installed capacity: **1070 MW**
Cost: **US\$1500 million**



© Shannon Lawrence, Environmental Defense

The Xe Bang Fai River – Water diverted from the Nam Theun 2 reservoir will affect both fisheries and river bank agriculture alongside this river.

In March 2005 the World Bank's decision to support the construction of the Nam Theun 2 dam in Laos propelled the project forward after decades of studies and planning since the hydropower potential of the Theun River was first recognised in the 1970's. Its developers promote the project as Laos' best chance to increase government revenues for poverty reduction through the export of electricity to Thailand. The cost of the project is estimated at nearly US\$1.5 billion and it will be at least another decade before revenues will get anywhere near the US\$80 million per year forecast by project proponents²¹.

Of particular concern are the likely widespread social and environmental impacts, ranging from the resettlement of 5,700 villagers to the impacts on the Nakai Nam Theun Biodiversity Conservation Area and fisheries in the Xe Bang Fai watershed. At least 50,000 people who rely on the Xe Bang Fai River for their livelihoods will be affected as water is diverted from the Nam Theun River, resulting in loss of riverbank gardens, reduced access to the river, loss of fish habitat and reduction in fisheries yields. Following the publication of the WCD report and increasing international criticism of the project, an environmental and social impacts safeguards programme was put into place. Efforts to consult stakeholders were also stepped up and consultations with local communities were carried out.

Whilst the attention to environmental and social safeguards is undoubtedly more thorough than for any other project in Laos, the project has gone ahead without a proper assessment of the needs it is supposed to meet or an

analysis of whether it will be the best option to meet these needs (WCD Strategic Priority 2). Independent analysts question the forecasts of Thai energy growth used to justify the project²². Furthermore, throughout the region numerous other dam projects are being planned whose economic viability will depend on exports to Thailand. Even the World Bank remains cautious about Nam Theun 2's contribution to poverty reduction in Laos, stating "If the revenues are spent efficiently, accountably, and transparently – in accordance with project agreements – NT2 **could** provide significant, incremental support to Lao PDR's poverty reduction and biodiversity conservation efforts." (Emphasis added)²³

The need for sustainable economic development in Laos cannot be denied, but the social, environmental and economic risks associated with Nam Theun 2 are considerable. In WWF's view, the question whether Nam Theun 2 really is the best solution to meet Laos' development needs remains unanswered. Only time will tell whether the project benefits will materialize in full.

WWF's believes that the Nam Theun 2 project fails to fully observe WCD Strategic Priority 2 for options assessment. In particular, the project fails in the two WCD key decision stages of needs assessment and selecting of alternatives. Furthermore, there is an urgent need to take a step back from the project-by-project approach in the Mekong basin, where at least 21 more large dams are being planned, and develop a more strategic, basin-wide approach, taking into account the cumulative impacts of multiple dams within the watershed.



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Fisheries in the Mekong basin are of enormous importance to the food security of millions of people. Dam building in the basin without assessing the cumulative impacts could be devastating.

5. Melonares, Spain

Dam height: **42.25 m**

Reservoir size: **14.57 km²**

Function: **Urban water supply**

Cost: **US\$180 million**



© F. Fuentelsaz WWF Spain

Construction is ongoing at the Melonares Dam, despite uncertainties about how water from the dam will be transferred to Seville.

Although Spain already has the largest number of large dams per inhabitant in the world, the National Hydrological Plan, approved in 2001, still included plans for the construction of another 120 dams. Several of these, Melonares, La Breña II and Arenoso, are located in the Andalusian Guadalquivir basin and will severely affect the habitat of the Iberian lynx, (*Lynx pardinus*), the most endangered cat species of the world.

The 1997 EIA for the Melonares Dam, currently under construction to supply drinking water for the city of Seville, highlighted the potential negative impacts of the project on the Parque Natural Sierra Norte, a Regional Nature Park as well as a Special Protection Area (Birds Directive 79/409 EEC) and Site of Community Interest (Habitats Directive 92/43 EEC). It established that the project should only be allowed to go ahead if it can be demonstrated that there are no other alternatives for meeting the water needs of Seville²⁴.

However, when the dam was initially approved²⁵ the needs assessment for urban water supply in Seville failed to take into account key factors, such as water efficiency trends. In fact Seville's water demand in 2005, a year of severe drought, is 134 million m³ per year instead of the 175 million m³ per year forecast in the original dam project proposal. Furthermore, a large number of alternative options, such as supply from existing dams or abstractions from aquifers, were ignored.

In this context, the potential for transfer of water allocations from agricultural to urban supply should have been considered. For Spain as a whole, a WWF analysis has

revealed that four surplus crops – corn, cotton, rice and alfalfa – consume the equivalent of the water requirements of 16 million domestic consumers²⁶. About 88% of the water of the Guadalquivir is currently used for irrigation of often low-profit crops²⁷, such as maize, subsidised under the European Union Common Agricultural Policy. Spain is now implementing water markets, an option offering farmers a way to gain additional income by selling water rights. For example, the Viar Irrigators Community agreed in May 2005 to supply 10 million m³ per year of good quality water from their private Pintado dam to the Seville Urban Water Supply Company EMASESA. WWF believes that such water markets, together with well-designed water conservation measures would have provided a less costly solution than the Melonares dam, with fewer environmental impacts.

Nevertheless, the EU Commission – on request of the Spanish Government - approved funding for the Melonares dam in October 2002. Under the Cohesion Fund the EU contributes about 85% of the budget for the dam and associated environmental mitigation measures. However, funding was suspended in 2005, as there are still uncertainties about how water will be transferred to Seville. Authorities are planning to use an existing irrigation channel, but this would open the possibility that water would be used for other purposes than the urban water supply for which the EU approved the funding.

In WWF's view, the Melonares project does not meet WCD strategic priorities 2 for comprehensive options assessment and 4 on sustaining rivers and livelihoods. In addition the project is weak in terms of WCD standards key decision stages 3 and 4 on project planning and implementation, as incomplete plans have led to suspension of funding during the construction stage.



© WWF-Carmon/Fritz VOLLMAR

The Melonares Dam is one of many developments threatening the natural habitat of the endangered Iberian lynx.

6. Burnett, Australia

Dam height: **37 m**

Reservoir size: **29.5 km²**

Function: **Irrigation and domestic/industrial water supply**

Cost: **US\$150 million**



© WWF-Canon / Tanya PETERSEN

Sugar cane fields in Queensland. The Burnett dam is being built to provide irrigation water for this unprofitable agricultural crop.

While the Australian Government is spending up to US\$2 billion over five years to restore water flows in the heavily dammed Murray-Darling basin, elsewhere in the country dam building is still going ahead. In Queensland, the Burnett River Dam has been under discussion since the 1960s, as a means of improving agricultural production and encouraging urban and industrial development. It was repeatedly rejected as not viable, most recently in 1997. Nevertheless, in November 2003 construction of the dam, the first and largest of five proposed water infrastructure projects on the Burnett River, started and is today nearing completion.

There has been a lack of transparency as concerns the economic assessments of the dams. Access to most studies has been denied to the public on the basis that they contain commercially confidential information. Based on the available information there are serious concerns about the economic viability of the dam as much of it depends on the expansion of the sugar industry. However, the sugar industry has not been profitable and it is likely that producers will be unwilling to pay the high water prices that are needed to achieve full recovery of the dam's costs²⁸. As a result, it is likely that the dam will require subsidies indefinitely.

In addition to economic concerns and a lack of transparency, there are also serious environmental impacts expected from the project, most notably on the Queensland lungfish, (*Neoceratodus forsteri*). The lungfish, listed as a nationally threatened species and protected from fishing under the Queensland Fisheries Act, is found only in a few rivers in Queensland and the Burnett River is one of its prime

habitats. It is extremely specific in its choice of spawning habitat and the Burnett River Dam is likely to further reduce spawning sites and increase the risk of its extinction.

In WWF's view, the decision to build the Burnett River Dam appears to be mainly politically motivated and was taken by the Queensland Government following promises made in the lead up to the 2001 state elections. Construction of the dam was believed to bring substantial employment to the Burnett basin, both through job creation related to dam construction and through expanding agriculture. However, a least cost planning study for the Burnett region, commissioned by the Queensland Environmental Protection Agency, proposed a number of alternatives, including off stream storage and water efficiency measures, some of which would provide more jobs, cheaper water and less environmental impacts²⁹.

In WWF's view, this project fails to observe WCD Strategic Priorities 1 for gaining public acceptance, 2 on comprehensive options assessment and 4 for sustaining rivers and livelihoods.



© L Li / WWF China

Australia is spending millions on restoring river flows in the Murray Darling river basin, whilst continuing to dam up others.

Signs of change?

As the case studies show, there are still numerous examples of individual dam projects that fail to meet one or more of the WCD Strategic Priorities. In particular there appears to be a failure to undertake comprehensive needs and options assessments (Strategic Priority 2). The requirements of the WCD in this Strategic Priority are similar to those of Strategic Environmental Assessment (SEA) which is now being implemented in some countries but is far from common place. Furthermore, EIAs are also often inadequate. A particular problem is the lack of basin-wide assessments of cumulative impacts where multiple dams are proposed (Strategic Priority 4). Transparency, which is essential for fostering public acceptance (Strategic Priority 1), was also found to be lacking in two cases. Only one of the dams examined (Chalillo) was complete at the time of writing and in this case, it appears that benefits (Strategic Priority 5) for the local population have not materialised and people are seeing an increase, rather than the promised decrease, in electricity prices.

The six dams examined here are only a small selection of the hundreds of large dams that are under construction globally and this assessment does not claim to be comprehensive. However, the six chosen dams are indicative of a general lack of application of the WCD recommendations in key dam building countries. South Africa, Mandela's home country, is indeed one of the few countries which has embarked on a comprehensive follow up process to the WCD report. In a three-year process, a multi-stakeholder committee led the South African process to recommendations for changes in policies and procedures.

Internationally, the work of the WCD is being followed up under the auspices of the United Nations Dams and Development Project (DDP³⁰). A multi-stakeholder forum with representatives from governments, industry, financing institutions, affected people and NGOs has been meeting on an annual basis for the last four years. Yet, for example in the case of Nam Theun 2, the views of the forum participants are still miles apart.

The DDP supports so-called 'dialogue' activities as a WCD follow-up and these have taken place in Argentina, Indonesia, Kenya, Namibia, Lesotho, Nepal, Malawi, Pakistan, Sri Lanka, Vietnam, Thailand and Zambia. While multi-stakeholder dialogues in these countries are to be welcomed, they have so far not yielded any specific policy changes. Some developed countries such as Germany, the Netherlands, Norway, Sweden and UK have also initiated follow-up discussions but again with few concrete results. In the case of the UK, the government produced a consultation draft response to the WCD in 2002 but never actually published the final response.

And yet, while formal and tangible responses to the WCD are few and far between, there are some signs that approaches to dam building are changing, even in countries like China, the world's largest dam building nation.

In early 2004, the Chinese Premier Wen Jiabao called for a review of the construction plans for 13 dams on the Nujiang (Salween) River, the last major free flowing river in Asia. This followed increasing public questioning of the development plans for the river, previously unheard of in China. Later in 2004, China's State Environmental Protection Administration temporarily halted the construction of 30 major construction projects that had not complied with EIA legislation. Amongst these were parts of the Three Gorges Project, the world's largest hydropower project, and the Xiluodu Dam. While construction has since resumed, this development still indicates that there is increased attention by the Chinese environmental authorities to the environmental impacts of infrastructure development.

The Yangtze is the river basin most threatened by dam building with 105 dams planned or under construction. April 2005 saw the establishment of the Yangtze Forum which brought together for the first time various central government departments, national and provincial governments, to develop a common vision for the management and conservation of the river. The Chinese authorities recognise that the Forum is essential to build relationships with key stakeholders, such as NGOs and local communities, to improve the efficiency of river management. WWF, which has worked with the Chinese government since 1980 for the conservation of the Yangtze River basin, is a catalyst and supporter of the Forum. It is hoped that the Forum will provide a model for more sustainable river management in China through enhanced integration of the activities and expertise of national and provincial agencies.



The Yangtze Forum provides a platform for developing a more sustainable model of river management in the Yangtze basin.

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Meanwhile, the dam industry, while still broadly critical of the WCD report, and in particular the guidelines, has made some efforts to improve practice. The International Hydropower Association has published sustainability guidelines³¹ aimed at promoting good practice within the industry. While not fully endorsing the WCD, the IHA stresses the acceptance of the Core Values and the objectives of the Strategic Priorities.

Furthermore, a number of financing institutions and Export Credit Agencies now use the WCD recommendations as a global reference point for the assessment of dam projects³². For example, the global bank HSBC Holdings, which is working with WWF in a five-year 'Investing in Nature' Partnership, published a freshwater infrastructure sector guideline in May 2005. The guideline states that HSBC will not provide facilities and other forms of financial assistance, including any involvement in debt and equity capital markets activities and advisory roles, to dams that do not conform to the WCD Framework³³.

While often the focus is on new dams, another of the Strategic Priorities of the WCD, Addressing Existing Dams (Strategic Priority 3), is increasingly receiving attention. The options for improving existing dams are numerous and can bring both environmental and economic benefits. For example, a WWF study in Brazil has suggested that the upgrading of the country's aging hydropower plants could add an extra 8,000 MW installed capacity at low cost³⁴. Environmental benefits can be gained by removal of obsolete dams or by implementing environmental mitigation measures such as fish ladders. In Zambia, WWF has worked together with government and the electricity company to restore environmental flood releases from the Itezhi-tezhi dam. Here, extensive modelling work demonstrated that dam operations can be modified to improve environmental benefits, without affecting the productivity of the dam³⁵.



At the Itezhi Itezhi dam, environmental flows are being implemented without adversely affecting electricity generation.

Conclusions and calls to action

Five years after the publication of the WCD, the debate on dams still rages. Controversy surrounds dams such as Chalillo and Nam Theun 2, and the World Bank's 'High Reward, High Risk' policy for financing large new dams. Yet, as this report has shown, there are also some positive signs of change in decision-making processes relevant to dams, if not the full-blown reform the WCD advocated. Governments like South Africa and institutions like HSBC appear to be heeding the lessons of the past. WWF welcomes these positive developments but also deplores that some dams are still built based on dubious economic arguments, without considering all alternatives, without transparent processes and without adequately addressing serious environmental and social impacts, as demonstrated by the six case studies in this report.

On the fifth anniversary of the WCD, WWF thus urges decision-makers to revisit the findings of the WCD and revise their policies in accordance with the WCD recommendations. In particular, there is a need for dam decision-making to take place within the frameworks of Integrated Water Resources Management and Integrated River Basin Management to ensure that a balance is struck between economic, social and environmental issues within river basins. Where there are plans for several dams in the same river basin, decision-making must move away from a project-by-project approach and assess the benefits and impacts of dam development on a river basin level. From an ecological point of view the assessment of the cumulative impacts of multiple dams within a river system is of key importance. Furthermore, a more comprehensive approach to options assessment is necessary to ensure that alternatives are properly considered. As demonstrated by the case studies in this report, many projects still go ahead without proper needs and options assessment. Strategic Environmental Assessment is a tool particularly suited for delivering both options and cumulative impact assessment but is rarely implemented.

With increasing pressure to develop new dam projects, in particular in developing countries, now is the time to ensure a more systematic implementation of the WCD's recommendations. They are as important for reducing the extensive social and environmental damage caused by dams today as they were five years ago. WWF is convinced that applying the WCD's framework, adapted to individual country's situations, will result in better decision-making and projects that have less impact. The world's ailing rivers and the communities that depend on them face a bleak future without prompt action.

Governments and dam builders have already had five years to clean up their act. WWF - the global conservation organization - says that its time now for governments, dam builders and financiers to implement the WCD recommendations or face a growing public backlash from the unacceptable economic, human and environmental costs of badly planned dams. In particular, they must:

1. Assess needs and options more comprehensively, with particular attention to options for managing the demand for water and power to minimize the need for new dams;
2. Consider new dams only after strategic environmental assessment to ensure that whole river basins are sustainably managed;
3. Ensure that, wherever feasible, existing dams are retrofitted to increase power generation and other economic benefits while reducing social and environmental impacts.

The development of new dams in accordance with the seven Strategic Priorities recommended by the WCD is the best way to ensure that dams really deliver their intended benefits and avoid unacceptable impacts.



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The mission of WWF is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable resources is sustainable
- promoting the reduction of pollution and wasteful consumption

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