Reporting Research

Dams and development

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Dams and development, Environment & natural resources

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Overview

This topic guide aims to shed light on the issues surrounding dam construction for journalists looking to write about the topic. The topic guide considers areas of potential conflict between countries, concerns over policy guidelines regarding dam building and the socio-economic impact of displacement. It highlights research findings, recommendations and case studies – all valuable sources of information for journalists and editors.

- Pros of dams
- Cons of dams
- Dam-building: expert recommendations

This topic guide provides:

- a global overview of the key issues, debates and research,
- story ideas and questions,
- research and other key contacts.

Contents

Lower Subansiri dam and power station in Arunachal Pradesh, Northeast India/ Tania Ghosh - Panos London

Dams are barriers built across rivers and streams to confine and regulate water flow for irrigation and hydroelectricity. However, controversy has surrounded the construction of dams over the past 50 years because of their social, economic, and environmental impact. Using dams to manage rivers is not new; one of the oldest dams was built in around 5000 BC in Mesopotamia. However, the latter part of the twentieth century has seen a dramatic rise in their size and scope. By the 1950s, dams became internationally synonymous with modernity and economic development.

Pros of dam-building

The “Benefits and Concerns about Dams” report, published by the *International Commission on Large Dams* in 1999, found that the single biggest use of water worldwide was agricultural irrigation. By the end of 2025, 80 per cent of additional food production will come from irrigated land and dams will play an increased role in providing these.

Moreover, dams provide a number of benefits: controlling floods, improving irrigation and aiding river navigation. They also provide hydro-electric power or regulate water supply vital benefits to governments being tasked with preserving fresh water supplies and producing energy.

At a time in which supplies of fossil fuels are diminishing, alternative fuels such as hydropower are becoming increasingly important. Hydropower is clean, efficient, dependable and largely renewable. In developing countries with the topography for dams they can plug much needed energy gaps that are required for development.

Cons of dam-building

But many studies have pointed out that these benefits are often outweighed by the disadvantages,

such as mass displacement and environmental costs. The report “Social Impacts of Brazil’s Turucui Dam”, published in the *Environmental Management journal* in 1999, found that there had been a systematic overestimation of the benefits and an underestimation of impact on people and the environment. For example, the author described how the Turucui dam displaced large numbers of people without adequate compensation and reduced downstream fish catches so much that the fish-dependent economy of Cameta collapsed.

Furthermore, many studies have reported that large dams can potentially trigger earthquakes. This is because impounding large bodies of water can result in ‘reservoir-induced seismicity’ especially if the impounded water is on a fault line. In other words, storing large quantities of water such as a reservoir puts strain on the rocks below, which may trigger an earthquake. The Three Gorges dam in China sits on two major faults (the Jiuwanxi and Zugui-Badong) and as the reservoir water levels are altered, it puts a strain on the fault line. The scientists who contributed to the article “China’s Three Gorges dam: An environmental catastrophe”, published by *Scientific American* in 2009, warned that the Three Gorges may be heading for an earthquake due to the changed water level in the reservoir. In addition when water from the reservoir seeps into the soil it causes instability that can trigger landslides. The article notes that since the dam began operating the area has experienced a series of “landslides along a 20 mile stretch of riverbank”.

Arguments around costs-versus-benefits have sparked disagreement and controversy within countries considering dam projects. But disagreement has been particularly acute where rivers cross borders, since any changes made upstream affects the entire ecology of the river downstream.

Dam-building: expert recommendations

The World Commission on Dams (WCD), a multilateral commission wrote a seminal report in 2000 in response to a 1997 World Bank report on the highly controversial issues associated with large dams. The report was written by 12 appointed commissioners with hands-on experience with of dams. The study made recommendations for best practice. To reduce potential conflicts, the report makes suggestions such as devising consultation mechanisms with the parties involved as well as creating compensation structures for those adversely affected. This report was heralded as a breakthrough as it was the first report of its kind to pin down recommendations on the dam building process and how to mitigate against adverse outcomes especially with respect to humans and the environment. However, numerous reports have criticised the WCD many of which will be discussed in the Policy weaknesses section.

The report recommended that all dam projects should subscribe to:

- **Five core values:**
  equity,
  sustainability,
  efficiency,
  participatory decision-making, and
  accountability
- **Seven priorities:**
  Gaining public acceptance,
  comprehensive options assessment,
  addressing existing dams,
  recognising entitlements and sharing benefits,
  ensuring compliance and sharing rivers for peace,
  development and security.

These recommendations were echoed in the report, “Sharing the benefits of large dams in West Africa”, published by *International Institute for Environment and Development (IIED)* in 2010. It highlights the areas of conflict that arose in the proposal and subsequent building stages of the Lesotho Highlands Water project. However, few of the financial institutions funding the building of dams, such as the World Bank, have adopted WCD’s recommendations. You can explore these concerns further in the Key issues section.

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Key Issues

Geo-politics

Dam building has important governance implications if the river in question flows across international boundaries. According to “Introduction: Understanding and linking the biophysical, socioeconomic and geopolitical effects of dams”, published by the *Journal of Environmental Management in 2008* tensions can arise between countries due to the unequal and unfair distribution of the costs and benefits of dams.

In 2010, China started work on its mega-dam project on the Yarlung-Tsampo River in Tibet. The river is also known as the Brahmaputra in India and Jamuna in Bangladesh. The dam proposal attracted controversy because it will affect other countries downstream. The Yarlung-Tsampo is the source of several rivers: Indus, the Mekong, the Yangtze, the Yellow, the Salween, the Brahmaputra, the Karnali and the Sutlej. According to the UK newspaper, The Guardian, in an article “Chinese hydro-engineers propose Tibet Dam” to minimise the risk of conflict between China and India they have both agreed to share plans for hydro-projects on the Yarlung-Brahmaputra.

However, Peter Bossard of International Rivers, a network protecting livelihoods and environment of rivers stated that a dam on this river would reduce sediment load to areas downstream. This is vital as it replenishes fertility of the floodplains of Assam in northeast India and Bangladesh. In addition it could devastate the fragile ecosystem of the Tibetan Pleateux. Bossard makes clear how easily a dam in one country can affect the ecology and economics of another.

Conflict has characterised the countries of the Nile over the use of the water. The Nile traverses ten countries: Burundi, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Uganda and the Democratic Republic of the Congo. According to the report, “Hydropolitics and Geopolitics: Transforming conflict and reshaping cooperation in Africa”, published by *Hydroaid* in 2004, the problem is not just about quantity but also quality. Thus the management of water is not only an issue of good governance, but also ethics and diplomacy, the report finds.

To take an example, even before Egypt started to build the Aswan high dam in 1956 (completed in 1970), the Nile was a source of long-running tension among the countries that share it. Since the completion, tensions have not abated. In 1978 Ethiopia announced plans to harness the Nile for a domestic irrigation scheme, the study reported that Egypt threatened to retaliate with military action.

In 1989, Boutros-Boutros Ghali, the then Egyptian Minister of State Affairs, summed up the core issue surrounding the use of the Nile: “What is worse is that each Nile country expects different benefits from the control and management of water resources … The other African countries … have not reached the level of agriculture through irrigation as we have, and therefore [are] not as interested in the issue of water scarcity. It is the classic difference in attitudes found among upstream and downstream countries which are on the same international river.”

Instead of resorting to military action, the report advocates an integrated management of water sources and basin-system cooperation. This means that countries sharing the Nile need to engage in dialogue with one another over the use of its water especially in dam projects. In 1992 the Nile Basin Initiative was launched to promote co-operation and development in the valley. Although this is a step in the right direction, more work needs to be done, the study reported.

Policy weaknesses

While considerable progress has been made in defining best practice for mitigating the risks and consequences of dam-building, policy and practice fall far behind. The report “Dams and displacement: Raising the standards in broadening the research agenda”, published by *Water Alternatives journal* in 2010 finds that the recommendations outlined by the World Commission on Dams (WCD) report were never officially accepted by large financial institutions. The study argues that the World Bank may not have accepted the report because it was not directly involved in the process of writing it. In the absence of buy-in from big financial institutions the scope and impact WCD report has been limited. The Asian Development Bank only took up 16 of the 26 guidelines but countries such as China and India rejected the report entirely. The study, “Dams and displacement: Raising the standards in broadening the research agenda” outlines some of the criticisms levelled at the WCD report:

- WCD made an excessive number of recommendations that were difficult to apply such as requiring the consent of indigenous populations for dam building. Some critics said this would amount to a veto, making many governments reluctant to accept these terms.
- Character of recommendations not explicit in explanation, thus giving stakeholders unrealistic expectations
- Failed to address the crucial technical aspects of dam building such as those in ecologically fragile mountain areas

- Adopted a rights-based approach that did not give adequate consideration to those to benefit from irrigation water, flood control or electricity
- The stakeholders who were identified did not necessarily reflect those who were affected – in particular, women were not well represented
- Indifferent about the extent and seriousness of the impoverishment effects on the tens of millions of displaced people led to a 'business as usual' approach as on the whole, the affected population were powerless and marginalised.

One of the areas outlined by the WCD was environmental issues. To ensure the protection of the environment, an environmental impact assessment should be a pre-requisite in the proposal stages according to the WCD report. However, even if there are 'grave concerns' of the dam's impact on the environment, the building can go ahead a *Worldwide Fund for Nature (WWF) report in 2005* found. This report, "To dam or not to dam? Five years on from the World Commission on dams", includes a case study on the Chalillo dam in Belize. The Environmental Impact Assessment reported that the dam would cause "significant and irreversible reduction of bio-diversity in Belize". In particular, the assessment found that the endangered population of a scarlet macaw subspecies would be threatened to extinction if the dam went ahead. Despite a court case outlining environmental and socio-economic damage the dam has now been built.

Displacement

The construction of a dam has huge socio-economic implications for a population. Displacement was one of the most pressing concerns highlighted in nearly all the research papers used to compile this guide.

The report "Development induced displacement and resettlement" published by *Forced Migration Online website* states that unlike data on refugees and internally displaced people, there are no indicators or publications specifically dedicated to those displaced from dams. However, the report cites that the World Bank Environment Department estimates that roughly 10 million are displaced each year as a result of World Bank development projects: dam construction, urban development and transport and infrastructure projects. However, personal correspondence between researchers Anthony Oliver Smith and Michael Cernea, cited in the book *Development and Dispossession*, Michael Cernea put the figure closer to 15 million.

Compensation and Consultation

Despite the sheer numbers of people displaced by dams, compensation guidelines tend to focus on the short-term impact of displacement. The WCD report acknowledges this and suggests that compensation packages need to have a longer term focus as resettlement is permanent, many projects have not included such contingency in proposals nor in subsequent stages. In response, many studies have been using frameworks designed for refugees, or internally displaced people (IDPs), to address the problems associated with forced displacement and resettlement as a result of building dams.

Most of the reports highlighted in this topic guide have noted that the economic benefits of dams tend to be emphasised and the social costs underplayed, especially at the proposal stage. The report, "Social impacts of large dam projects: A comparison of international case studies and implications for best practice", published *by Journal of Environmental Management in 2009*, has found that the rural economy has suffered at the expense of an urban bias of the Lesotho Highlands water project (LHWP) in Southern Africa. The study participants reported the loss of water sources and natural springs, access to wild vegetables and herbs (important for both food and medicine purposes). Even though compensation was offered, the report found that the majority of the participants did not receive it. The Rural Development Plan (RDP) in charge of the distribution of compensation was not in effect until 1993 as the RDP's costs were not seen as the responsibility of either the Lesotho or South Africa development agencies.

The report "Development induced displacement and resettlement" published by the *Forced Migration Online website* argues that dams and their associated infrastructure created greater numbers of displaced people than urban development, transportation and other infrastructure projects. Although China and India lead the way in the sheer number of people displaced as a result of dam projects, the proportion of territory and the percentage of the population affected by the largest projects is much lower than some projects in Africa. The report says that the Aksombo dam in Ghana displaced 80,000 people which accounts for approximately one per cent of the country's population. Where the Narmada Saradar Sarovar dam in India displaced an estimated 127,000 people, or roughly 0.013 per cent of the population.

Marginalisation and Poverty

Moreover, the study argues that dam-forced displacement disproportionately affects economically, socially and politically marginalised groups. Indigenous populations and ethnic minorities have borne the brunt in this type of displacement. For example, adivasis (tribal people) in India account for eight per cent of the population but are estimated to make up 40 to 50 per cent of those displaced by development projects.

Health

The impact on human health is also an important consideration at dam sites. The report “Health Impacts of large dams”, published in the Environmental Impact Assessment Review in 1999, found that these structures can have negative effects on human health not only at the reservoir site but also up, and down, stream. An increase in vector-borne diseases such as malaria and schistomosiasis have been documented in several large dam projects. This is because the dam alters the river environment that is favourable for vector borne diseases to flourish in both sub-tropical and tropical areas. For example as dams create reservoirs, there will be an increase of stagnant waters which are breeding ground for mosquitos carrying malaria.

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Resources

Questions for displaced populations

- How did you learn about this dam project? Were you asked what you think of it? If so, how did they ask you?
- Have you been offered compensation? If so, what kind and were you offered the chance to negotiate?
- What can you do with the compensation being offered? What would you advise the government/dam-builders to do instead?

Questions for dam builders

- Why has this site been chosen for dam building?
- Have you carried out an impact assessment of the dam?
- How will the dam contribute to development?
- Many studies say the disadvantages of dams outweigh their benefits. How will this dam ensure that this isn’t the case?
- Which best-practice guidelines are you following?

Questions for local/national government

- Why did you agree to build a dam in this area?
- How are you planning to mitigate the socio-economic and environmental costs associated with dam building?
- How will the dam contribute to development?
- Explain the consultation process for dam building in your country.
- Which alternatives to this dam did you consider? Why did you decide on this project? Which financial and socio-economic studies and projections did you carry out?

Questions for civil society organisations

- How will the dam help foster development in the country/region?
- How might it adversely affect development?
- What was your involvement in the consultation during the proposal stage of the construction?
- Do you see any negative aspects as a result of the dam?
- How do you think the dam will affect the local population?

Glossary

Schistosomiasis (also known as Bilharzia, snail fever): Is a parasitic disease caused by several species of flukes (tremodotes), a parasitic worm called Schistosoma. Although it has a low mortality rate, it often is a chronic illness that can damage internal organs and, in children, impair growth and development. The disease is commonly found in Asia, Africa and South America, especially in areas that have freshwater snails who can carry the parasite.

Riparian - of, inhabiting or situated on a banks of a river

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Links

To find out more about the issues surrounding dam. The following list of organisations have more resources on their websites.

International Rivers Network

International Rivers has been working for 25 years to protect rivers and defend the rights of communities that depend on them. The website has several resources divided into regional section on dam and other river related issues.

Tel: +1 510 848 1155

2150 Allston Way, Suite 300, Berkeley, CA 94704-1378, USA

http://www.internationalrivers.org/

Nile Basin Intiative

This initative was set up by the riparian states of the Nile River through the Council of Ministers of Water Affairs of the Nile Basin states (Nile Council of Ministers, or Nile-COM). The NBI seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security.

http://www.nilebasin.org/

World Bank

The World Bank has a section dedicated to the safety of dams. The resources include publications and fact sheets.

Tel: +1 202 473 1000

1818 H Street, NW, Washington, DC 20433, USA

http://web.worldbank.org/

The World Commission on Dams (WCD)

The website includes the 2000 WCD report and information about how and why the commission came about.

http://www.dams.org/about/history.htm

International Institute for Environment and Development

An independent research organisation based in the UK that finds solutions for the challenges arising from climate change, governance, human settlements, natural resources and sustainable markets.

Tel: +44 (0)20 7388 2117

4 Endsleigh Street, London WC1H 0DD

info@iied.org

http://www.iied.org/

Tales of Resettlement

Panos London Oral Testimony Programme's Tales of Resettlement project provides first-hand accounts from people displaced and resettled as a result of large development projects. These include coal mining, agricultural schemes and dams. These stories confirm that, in addition to economic hardship, one of the most far-reaching effects of forced relocation is social and cultural impoverishment. To find testimonies on dams from Zambia and Zimbabwe: Kariba dam, Lesotho: Highlands Water project and Pakistan: Tarbela Dam please visit: http://panos.org.uk/oral-testimonies/tales-of-resettlement/

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One Response

Jennifer
January 24, 2012

Your article is excellent, let me write a couple of comments.

The World Bank estimates that forcible "development-induced displacement and resettlement" now affects 10 million people per year. According to the World Bank an estimated 33 million people have been displaced by development projects such as dams, urban development and irrigation canals in India alone.
India is well ahead in this respect. A country with as many as over 3600 large dams within its belt can never be the exceptional case regarding displacement. The number of development induced displacement is higher than the conflict induced displacement in India. According to Bogumil Terminski an estimated more than 10 million people have been displaced by development each year.
Athough the exact number of development-induced displaced people (DIDPs) is difficult to know, estimates are that in the last decade 90–100 million people have been displaced by urban, irrigation and power projects alone, with the number of people displaced by urban development becoming greater than those displaced by large infrastructure projects (such as dams). DIDPs outnumber refugees, with the added problem that their plight is often more concealed.

This is what experts have termed "development-induced displacement." According to Michael Cernea, a World Bank analyst, the causes of development-induced displacement include water supply (dams, reservoirs, irrigation); urban infrastructure; transportation (roads, highways, canals); energy (mining, power plants, oil exploration and extraction, pipelines); agricultural expansion; parks and forest reserves; and population redistribution schemes.

Reply

Magda Rossmann
January 25, 2012

Thank you for your comment highlighting the scale of development-induced displacement! If you're interested in the topic of dams and development, please keep checking our website as we'll be updating it regularly with case studies and progress reports. Best wishes, Magda

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