Large Dams: Social Performance
By Karolina Lagercrantz

The first large dam Sadd-el Kafara was built over 250 years ago, but humans controlling the movement of water through dam construction emerged long before (Garbrecht, 1983). Indeed, large dams are built for their inherent social benefits, as they store, divert and allow for the usage of water for irrigation, consumption and electricity (WCD, 2000).

Yet, the discourse around dams largely emphasizes these benefits in monetary and technological terms while neglecting the social reality of dam construction and operation. This handout aims to highlight the positive as well as the negative social impacts from large dams in human terms.

Assessing Impact

Social impact assessment (SIA) has been used following the World Commission on Dams in 2000 to assess the human impacts of large dam projects. SIA is aims to:

“Analyze (by predicting, evaluating and reflecting) and manage the intended and unintended consequences on the human environment” Vanclay (2002b: 388).

Successes: The SIA framework places humans at the center of development projects. By identifying potential impacts in advance stakeholders can make informed decisions about what mitigation practices may be undertaken to prevent damage (Tilt et al, 2008).

Challenges: There is a lack of clear internationally relevant guidelines, as the SIA vary depending on the local circumstances. Only general principals exist, and these are not legally binding. (Tilt et al, 2008)

Indirect Impacts

Cultural Heritage

Archaeological:
Concerns: Inundation of archaeological sites that are located near riverbanks. After High Aswan dam in Egypt, 1730 site destroyed. (Marchetti, 2018)
Intangible cultural heritage, mnemonics and cultural narratives of rivers are altered or lost. (King, 2014)

Contemporary:
Concerns: People, indigenous communities in particular, have an emotional and spiritual relationship with river systems that will be irreversibly altered by dam development (King, 2014).

Cost and Benefit Distribution

Direct Social Impacts

Access to resources:
+ Irrigation, flood control and electricity. Electricity directed to urban areas, irrigation benefitting cash crops/large agribusinesses, which benefit already surplus food areas (WCD, 2000).
- Local communities are displaced and lose access to river ecosystem services. This usually occurs without adequate monetary or land-based compensation (Fearnside, 2016), (WCD, 2000)

Livelihood:
+ Skilled and unskilled job opportunities emerge during the construction and maintenance of dams. Increase in agricultural productivity, development as people have electricity to use lamps and simple kitchen applications.
- Local skills such as fishing are rendered inapplicable to new context leaving vulnerable communities without a possibility to sustain themselves (Ming et al, 2017)

Human Health

Physical:
- Food insecurity in local communities due to disappearance of fish. Food insecurity in China increase with 30% the past 25 years of intensive dam building (WCD, 2000).
- Increase in vector borne disease in tropical areas.
- Eutrophication causing toxic cyanobacteria and mercury contamination of reservoir water (WCD, 2000)

Mental:
- Anxiety and stress of local communities affected by involuntary resettlement (WCD, 2000)
+ National pride and sense of development (Ming et al, 2017)
References


King, Rachel; Eoin, Nic Luı´seach (2014) *Before the flood: Loss of place, mnemonics, and ‘resources’ ahead of the Metolong Dam, Lesotho* SAGE Journal of Social Archaeology Vol. 14(2) 196–223


Politics of Big Dams
By Marley Sansom

International policy

- World Commission on Dams recommends assessing cumulative impacts for a proposed site; necessity of a project given alternative energy sources; fulfilling development processes that are participatory, holistic and transparent.
- Diverging national priorities hinder implementing these into a legally binding agreement, so guideline compliance is voluntary.
- International Rivers’ report presents cases in compliance with these guidelines, where policies reflect them, but the majority of existing dams ignored or predated these recommendations, or their policies were ineffective.
- Various actors, often locals and environmentalists, frequently protest dam construction.
- Canada BillC69 updates move in the right direction, requiring consultation from Indigenous groups but not consent regarding new projects.

Decision makers

- Political systems follow an agenda and framework with implicit power imbalances.
- WCD recommends local participation throughout the planning process, with opportunities for input from all relevant stakeholders.
- Largest benefits/impacts are mismatched.
- Lower Snake River, WA, missed an opportunity for scientific discovery due to election cycles.

Grand Ethiopian Renaissance Dam

- Nile River commences in Ethiopia, whose national development plans focuses on becoming an energy hub for East Africa, hydroelectric dam construction has begun on the river.
- Sudan and Egypt are downstream and rely on the river as their main source of water, but they share no political jurisdiction, economic benefits or decision-making authority regarding the project.

Motivating factors driving dams: national development and sustainable energy

National advancements associated with hydroelectric dams for increasing food and energy security; generating jobs and revenue; alleviating poverty.
Populations proximal/dependent on waterways are more likely to be displaced for a project that provides electricity to urbanized areas; social inequalities stem from uneven distribution of benefits.
Low carbon energy associated with hydroelectric power, influencing development strategies that aim to meet growing electricity demands from renewable resources.
Policies should reflect actual cumulative emissions from dam project’s construction and operation; however most dams to date have been constructed using emission estimates lower than the reality.
Dependency led Kenya to strive for a diversified renewable energy supply.
Alternative options exist—solutions for increasing rural electrification, improving irrigation, and lowering carbon emissions with renewable energy sources should be tailored to local environments and should reflect participatory decisions in compliance with high political standards.


Case Study: Three Gorges Dam

- Largest dam structure at its time
- 2335 meters long
- 185 meters tall
- Reservoir spans 600 km upstream
- 22500 MW capacity
- Project worth 23 billion USD

CHINA’s LOVE FOR DAMS
- Traces back to the 1950s
- Flood & irrigation control
- National stature
- Modern demands for hydropower

Unique political backgrounds
- Heavily politicised
- Totalitarian state
- Limited transparency
- Limited civic participation

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- Showcase of technology and national power.
- Increased energy sovereignty and reduced reliance, from plentiful hydropower production.
| Loss of culture & artefacts: |
- Forced migration in villages and irreversible flooding of archaeological sites. (Qing, 1998)
- Flooding of the ancient city of Kuizhou, which is mentioned by several famous poets and songwriters.
- Religious (Buddhist) monuments. (Leshock & Wright, 2000)
| Controversial treatment of critics: |
- 1993 Goldman Environmental prize winner Dai Qing, jailed 10 months for criticizing the Three Gorges Dam project.
- Adds to the infamous human rights conditions in China, which has been criticized by UN and other concern groups.
| Urbanization: |
- Enhanced rural-urban migration due to resettlement. (Ren, 1998)
- Some farmers stopped farming after resettlement as the land the resettle in are deemed infertile, food security concerns and economic inefficiencies as these farmers often not suited for jobs in the city. (Ding & Zheng, 1992)
- Intensified competition between cities over water which is limited due to the dam restricting flows.
- Restricted flows also intensified water pollution in the river.
| Corruption scandal: |
- Stolen resettlement funds, 97 officials involved and a total of $52 million stolen. (Brookes, 2000)
- Over declaration of assets and asset value by relocators to receive higher amounts of relocation compensations. (Ding, 1998)
- Conflict of interest between stakeholders, EIA paid by hydroelectric companies. (The Economist, 2013)
| Environmental effects & governance: |
- State denied relationships between earthquakes in nearby Sichuan (most notably the 2008 and 2013 earthquakes) and dam completion.
| Resource equity: |
- As of 2014, disposable income per capita in relevant administrative regions (Sichuan, Guizhou, Hubei, Hunan, Chongqing, Guizhou) all under national average ($3283 USD). (National Bureau of Statistics of China, 2014)
- Benefits of dam and development not shared, region economy remained weak even with a world class dam.
- A sign of resettlers struggling to settle in.
- Size of dam known to increase seismic risk.
- Presence of reservoir loosens soil, increasing chances of landslides, which can occur during earthquakes, adding to damages. (Watts, 2011)
References


Economics Benefit

By Brian Marx

- **Hydroelectricity** or hydropower is a very common incentive to build Big Dams in order to fuel a nation’s economy and help its citizens. If used correctly, hydropower can convert up to 95% of available energy, making it the most efficient source of electrical energy. According to the Canadian Hydro Association, hydropower supplies Canada with 63% of its energy.
- Dams are used **recreationally** for boating, water sports, fishing, camping, and more. This can help local communities as it can directly stimulate their economies through tourism. A study shows that a dam in Wisconsin provides the local community with $6.5 million annually just through recreation.
- Many territories resort to Big Dams for **flood control**, which can help save millions of dollars as damages are avoided both in infrastructure and life.
- **Fire and Farm Ponds** can help workers to have a steady supply of economical water for their livestock, help reduce the spread of forest fires, increase fish production, which all either help the economy from being harmed or serve to stimulate it.
- **Irrigation** from Big Dams, if successfully implemented, can be used for many croplands as well as provide thousands of jobs in a given territory. According to the Federal Emergency Management Agency, “Ten percent of American cropland is irrigated using water stored behind dams. Thousands of jobs are tied to producing crops grown with irrigated water.”

Economic Drawbacks

- **Big Dams are often extremely costly.** An estimated $2000 billion have been invested into large dams by governments since 1950.
- Dams often take longer to develop than expected, with **delays** averaging 44%.
- **Cost overruns** average about 96%. That means that if a project is expected to cost $1 billion, it will likely increase to $1.96 billion, almost doubling. The cost of Argentina’s Yacyretá Dam has mushroomed from $2.5bn to $15bn.
- Big Dams continue to be **removed** today due to environmental, political, social and economic issues, making it a major expense to remove the dam altogether. They are removed through the following expensive methods:
  - Dismantling / Partial Decommissioning / Modification / Re-Operation
- Big Dams are **hazardous** to the economy due to extreme climates, natural disasters, degradation, etc.
  - Banqiao Dam killed an estimated 171,000 people in 1975 due to poor designing and a tremendous increase in rainfall.
- Nations such as Zimbabwe, rely on their Kariba Dam for 60% of their national energy. With **droughts** and little rainfall, energy becomes scarcer and more expensive, hurting their nation’s economy and causing blackouts all over the country.
- The World Bank only lends money to Big Dam proposals **which meet strict social, environmental, and safety regulations**, often imposed by the World Commission on Dams. Through private investors, Big Dams are often built without these strict enforcements, causing Big Dams to increase in economic risk because they are more likely to have delays, cost overruns, and poor designing which leads to their removal or eventual decay that can seriously harm the economy and local communities.

Case-Study

**The Diamer-Bhasha Dam in Pakistan**
- Price tag over $8.5bn, paid by government
- Completion date expected in 2021
- Would flood villages and farms, displacing 35,000 people
- Earthquake prone area and is also in a disputed territory with India
- Would provide Pakistan 4,500MW of electricity (New York City uses about 11,000 MW on average each day)
- Yet, about half of Pakistan (80 million), have no access to electricity
- Would this specific dam be more likely to be an economic success, or an economic burden?

**Conclusion:** Big Dams are a main source of electricity for many nations around the world, but are they really the best economic option for all countries? Without proper construction and careful consideration of all the benefits a dam could bring, it could be an economic disaster. Big Dams pose a risk as they average 44%-time overruns, as well as 96% cost overruns, in addition to all the economic drawbacks faced when a dam is built, perhaps it would be best to invest money in other more secure energy producing facilities, such as solar and wind power. When building Big Dams, one should consider all the likely potential economic drawbacks, especially in poorer countries which cannot enjoy all the economic benefits available.
References


Image

https://www.suchtv.pk/pakistan/general/item/71595-sc-gives-immediate-order-for-construction-of-diamer-bhasha-dam.html
BC Hydro submits its first application to the BC Utilities Commission (BCUC) for the third dam on the Peace River, the Site C Dam, with a proposed output of 900MW located in 1983.

The BCUC rejects the proposal after a review process citing a lack of risks associated with the Site C Dam completion include underestimation of costs, revenues, and employment opportunities, loss of critical wildlife habitat, loss of cultural sites, and displacement.

Benefits of the project include, increased energy efficiency (the Site C Dam is estimated to produce up to 35% of the WAC Bennet Dam using 5% of the water reserves), an additional $3.2 billion to the provincial GDP and $130 million to the region GDP, and a guarantee of affordable, reliable energy for the next 100 years.

Currently, there are 3,463 people working at the Site C Dam construction site. There are no ongoing judicial reviews, however in December 2018 the UN Chair of the Committee to End Racial Discrimination called upon the Canadian federal government to halt construction until consent is given by Indigenous groups affected by the dam construction.
References


Environmental Impacts of Big dams

By Urvee Karve

Terrestrial and Aquatic Ecosystems

Large dams have the following impacts on ecosystems:

6. Ecosystems are destroyed through inundation

7. Downstream effects reduce the growth of plant species like riparian cottonwood, which occurred in the Old man river dam project.

8. Large dams hinder migration of species due to construction of roads and alteration of river patterns.

9. They also hinder the upstream movement of fish species like ‘Sturgeon’

10. Species such as the Yangtze River Dolphin have gone extinct because large dams such as the

Ecological Research and monitoring

- Intensive and extensive research must be conducted to evaluate the impact of a project. The two existing dams on the Peace river (extensive research) were not considered when assessing adverse environmental impacts in the Site C Dam project. Thus, the overall impact of the dam was not studied.

- Some developers use outdated research when accessing the impact of a project to the environment. This research is not helpful as the environment changes considerably over time.

- Many mitigation measures are absurd and details on them is almost never given.

Water Bodies

Big dams have the following impacts on water bodies:

- Creation of reservoirs cause chemical changes in the water, such as the conversion of inorganic mercury to methyl mercury, which is harmful to fish and the humans that consume them.

- Hydrological pathways are altered

Cumulative impacts & shifting baseline conditions

6. Overall impact of many big dam projects, such as the 50 dams built on Ontario river should be considered.

7. The past and present and future environmental conditions must be studied. Large dam projects neglect the historical context of the environment and constantly change the landscape, which results in the
References:


