

# Chinese dams go global: opportunities for more sustainable hydropower

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## *Large dams – the Chinese way*

China as the world's largest dam-builder, spearheading hydropower development in Southeast Asia and Africa

Large dams have been controversially debated for several decades due to their large-scale and often irreversible social and environmental impacts. In the pursuit of low carbon energy and climate change mitigation, hydropower is experiencing a new renaissance in many parts of the world. At the

since 2000 or now under construction (International Rivers, 2015), in a time when other dam-building nations and organisations, particularly those from the OECD, withdrew from the dam-building industry. This project is the first comparative study of Chinese hydropower dams in Africa and Asia and its

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forefront of the renaissance of large hydropower dams are Chinese dam-building firms as the world's largest dam builder. They are leading the global hydropower sector in terms of number and size of dams built, investment sums and global coverage. Chinese companies and banks are involved in more than 300 Chinese overseas dams, most of them in Southeast Asia and Africa. The large majority of these are large dams, with 171 projects completed

social, environmental, economic and political impacts. The project involved detailed empirical research in China, Cambodia (Kamchay dam), Ghana (Bui dam), Malaysia (Bakun dam) and Nigeria, which represent different facets of China's hydropower developments in the global South. A brief summary of the project's findings and policy recommendations are mentioned below.

## *The 'China goes global' project*

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This project, funded by the UK's Economics and Social Research Council ESRC, is the first comparative study of Chinese hydropower dams in Africa and Asia and its social, environmental, economic and political impacts. The project involved detailed empirical research in China, Cambodia, Ghana, Malaysia and Nigeria, which represent different facets of China's hydropower developments in the global South. This project focussed on the Bakun dam (Malaysia), the Bui dam (Ghana), the Kamchay dam (Cambodia) and the planned, but unsuccessful Zamfara dam (Nigeria). The research engaged with local communities affected by the dams, national institutional actors in Africa and Asia and Chinese dam-builders, financiers and institutional actors. The project aims to inform corporate behaviour of hydropower firms in China and world-wide and to contribute to shaping national and international policy responses for sustainable hydropower.

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## Opportunities and challenges for sustainable hydropower

Chinese dam-builders, national governments and international public institutions and regulatory bodies can contribute to improved hydropower development together

The project finds that Chinese dam-builders and financiers open up opportunities for low and middle income countries in Africa and Asia to attract large investments, to build up energy and water management infrastructure which in turn can contribute to national development goals and economic growth. However dam planning and building needs to be done in a more sustainable way that takes into account national development priorities, the needs of local people and the impacts on natural habitats. In remote rural areas, such as in Zamfara state in Nigeria, local people hope that dam-building will have positive impacts on their lives, including access to electricity, irrigation, employment, roads and social services. The reality after a dam has been constructed is however often different. Local communities

affected by the Bakun, Bui and Kamchay dams in Malaysia, Ghana and Cambodia report how their livelihoods and access to natural resources have declined, how they are struggling to make a decent living and feed their families. At the Bakun and Bui dams, local people have been displaced and resettled. At the Kamchay dam, some local people affected by the dam do not have electricity access. At the same time, national institutions and Chinese dam-builders and financiers are often unaware of the full extent of the local social and environmental impacts of these dams. With regards to environmental impacts, a wide difference in environmental management exists between dams. Some cases have been reported where Environmental Impact Assessments (EIAs) and mitigation actions to reduce the impacts on wildlife have been

conducted to a relatively high standard, for example at the Bui dam in Ghana. At the same time, a separate governing institution to address the management and impact of the dam has been set up. Our research finds that the corporate behavior of Chinese dam-builders is to a large extent influenced by the national legislations, policies and practices set by the national governments in Africa and Asia. Also, international public institutions and industry bodies, such as the World Bank and the IHA, can provide international standards for corporate behavior in the hydropower sector. By working together, Chinese dam-builders and financiers, national host governments, and international public institutions and regulatory bodies can help to make the hydropower sector more sustainable.

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**Project website:** <https://www.soas.ac.uk/cedep/research/cgg/>



## *The case studies: implications*

### **Bakun dam, Malaysia:**

Generating capacity: 2,400MW, estimated cost: US\$2.6 billion. The financiers are thought to be ExIm Bank, while the developers are the Malaysia-China Hydro JV consortium composed of Malaysian Sime Darby, Sinohydro and others. Sinohydro is the builder. The dam operator is the Malaysian utility company Sarawak Hidro.

**Bui dam, Ghana:** Generating capacity: 400MW, estimated cost: US\$621 million. The financiers are China's ExIm Bank and the Ghana Government, the builder is Sinohydro and the developer is the Ghana Government.

### **Kamchay dam, Cambodia:**

Generating capacity: nearly 200MW, estimated cost: US\$280 million. The financiers are ExIm Bank, while the builders, developers and contractors are Sinohydro.

### **Zamfara dam, Nigeria:**

Generating capacity: 100MW, estimated cost: app. US\$160 million. The financiers are ExIm Bank, while the builders, developers and contractors are China Geo-Engineering Corporation. Not built yet.

### **Socio-economic implications**

Some of the most contentious socio-economic impacts of large dams are displacement and resettlement experienced by the affected local population. For the Bakun dam, about 10,000 indigenous people were forced to resettle. Traditionally, they lived by the river banks and hunted in the surrounding forest, some were semi-nomads. The dam

construction forced them off their customary land into new sedentary settlements, far away from the river, surrounded by oil palm plantations and logging activities. For resettled subsistence farmers at the Bui dam the less fertile, small plots of land given as compensation pose a threat to food security and livelihoods. At the Kamchay dam the dam's biggest socio-economic impact is on poor bamboo collectors who produce baskets from the bamboo they used to collect in the forests flooded by the dam's reservoir. Since the dam construction many locals have seen sharp declines in their livelihoods and some took micro-credits from NGOs and financial institutions. Lack of access to natural resources such as forests, land and rivers, and hence a decline in people's traditional livelihoods has led to a monetarisation of their lives, sometimes without providing alternative options such as local employments, training and adequate schooling.

### **Environmental implications**

Some dams are being built in protected habitats or areas of outstanding natural value, including the Kamchay and Bui dams that were built in Bokor National Park, Cambodia and Bui National Park, Ghana and the Bakun dam that was built in the tropical rainforest of Borneo, Sarawak, East Malaysia. These areas are home to endangered and/or endemic species such as the orangutan (Bakun), the Asian elephant (Kamchay) and the black hippopotamus (Bui). Dam construction, flooding the reservoir area and building access roads destroys the

habitat of these species and other animals and plants. Other well documented impacts of large dams are hydrological changes including river flow alterations, changes in water quality, impacts on aquatic life, greenhouse gas emissions from decaying organic material in the reservoir etc.

### **Legal and political considerations**

There are two predominant types of contracts for large dams: BOT (Build, Operate, Transfer) and EPC (Engineering, Procurement and Construction) contracts. While EPC contracts are common for large dams, BOT contracts are often in place where national expertise in dam-building is lacking. This was the case for the Kamchay dam, Cambodia's first large dam. The BOT contract states Sinohydro will operate the dam for 44 years after which the dam will be transferred to Cambodian authorities. Local engineers and authorities need to be trained by dam-builders to take over the management and responsibility for the dam in the long-term. Also, the role of the national host government determines corporate behavior of overseas dam-builders. In countries where social and environmental legislations are in place and strictly followed, such as Environmental Impact Assessments (EIA), dam-builders are more likely to follow best practice. The EIA for the Bui dam was evaluated by experts as being of high quality and conducted by an international consultancy. Contrary, the EIAs for the Kamchay dam and Bakun dam were sketchy and not easily accessible to the public. For the Kamchay dam the full EIA

approval was granted several months after the dam was already in operation, which hardly left any choice of alternatives.

There are also local political risks. The Zamfara dam in Nigeria was driven forward by the former governor of Zamfara state. After the elections the political powers changed and a new governor has been appointed who has little interest in the dam. This also means China Geo-Engineering Corporation, who are planning to build the dam, face considerable investment risks and difficult negotiations caused by national and local political instability.

## Policy recommendations

### **The need for social safeguards**

This project's research found that large dams often disproportionately affect the rural poor, including indigenous people. Tens of millions of people have been displaced because of dams world-wide. For those people directly affected by dams, loss of access to natural resources such as fertile land, forests and water puts an additional strain on lives and livelihoods. At the same time, few of the affected people have access to considerable assets, formal employments, education and training. We therefore suggest that dam-builders and national governments need to put in place social safeguards to support the lives and livelihoods of the people directly affected by dams. This could include offering education, training and employment (for example as technicians or dam engineers) to people affected by dams. In

addition, compensation payments should be longer term. Instead of one lump sum, compensation could be paid out as smaller sums over a longer period of time or partly paid out as food subsidies. Along these lines, some valuable lessons have been learned in Sarawak, Malaysia for newly-built dams (e.g. Murum) after the challenges with the Bakun dam. Land-for-land compensation is preferable as it helps poor people being self-sufficient and contributes towards their food security. The quality and size of compensated land should be at least equal to people's land before the dam construction. Customary land rights should be recognized. In addition, we recommend that electricity access and competitive electricity prices should be available to people affected by dams. Also, affected people should have the right to participate in decision-making as negotiating partners and downstream-affected people need to be entitled to compensation for their losses.

### **Protecting the environment**

While large dams are considered a low carbon energy source, it is undisputed that they have major impacts on the natural environment. This project's research found large discrepancies between dams in the way EIAs were conducted, managed, approved and monitored. We suggest that national governments have strict EIA legislations in place, in addition to robust impact mitigation and ecological protection measures for large dams e.g. wildlife rescue operations, afforestation

schemes. Funding should be set aside and funding access rules should be clearly identified to enable the implementation of mitigation measures. We recommend that no dam developments take place in national parks, protected areas, biodiversity hotspots or areas that are the habitat of endangered species.

### **The role of national host governments and local politics**

The sustainability of hydropower projects can be increased by having robust national legislations and policies in place. Our research found that having a national governing body in place for managing the dam and monitoring its impacts can be beneficial, such as at the Bui Power Authority. At the same time, investments in countries with instable political systems bear a huge investment risk, as the Zamfara dam shows.

### **International standards for sustainable corporate behavior**

International guidelines, standards, policies and assessment tools to increase the sustainability of the hydropower sector include the World Bank / IFC standards, the IHA's Hydropower Sustainability Assessment Protocol, the recommendations of the World Commission on Dams and the Equator Principles for financial institutions. The problem is that often dam-builders and financiers do not follow these. We suggest that dam-builders ensure that their projects adhere to these standards to increase the sustainability of corporate behaviour in the hydropower sector.