

KAFUE FLATS, Zambia: Preserving Biodiversity through Water Management

Africa needs more infrastructure to collect, store and distribute water. However, this infrastructure, particularly large dams, tends to disrupt the natural water cycles and the ecosystems relying on them. How can water and hydropower management be reconciled with these fragile ecosystems? The Kafue Flats case illustrates the role that technological innovation and cooperation can play in this respect.

The Kafue River in Zambia is a major tributary of the Zambezi River. The Kafue Flats is a 6,500 square kilometre floodplain midway along the river that was once one of the richest wildlife habitats in Africa and sustained local peoples through hunting, fishing, and cropping on the Flats as floods receded at the end of the wet season. Following construction of the Kafue Gorge hydro-electric dam downstream of the Flats, the Itezhi-tezhi Dam was built upstream in 1978 to store wet season peak flows to maximise hydropower production at the lower dam, which is the primary power source for Zambia. The operations of the upper dam interrupted the beneficial wet season flooding of the Kafue Flats, resulting in serious social and ecological impacts. Around 1.3 million Zambians from several ethnic groups live in the greater watershed and about 300,000 of these people rely directly on the Kafue Flats.



Photo: WWF-Canon / Frans Schepfer



Photo: WWF-Canon / Martin Harvey

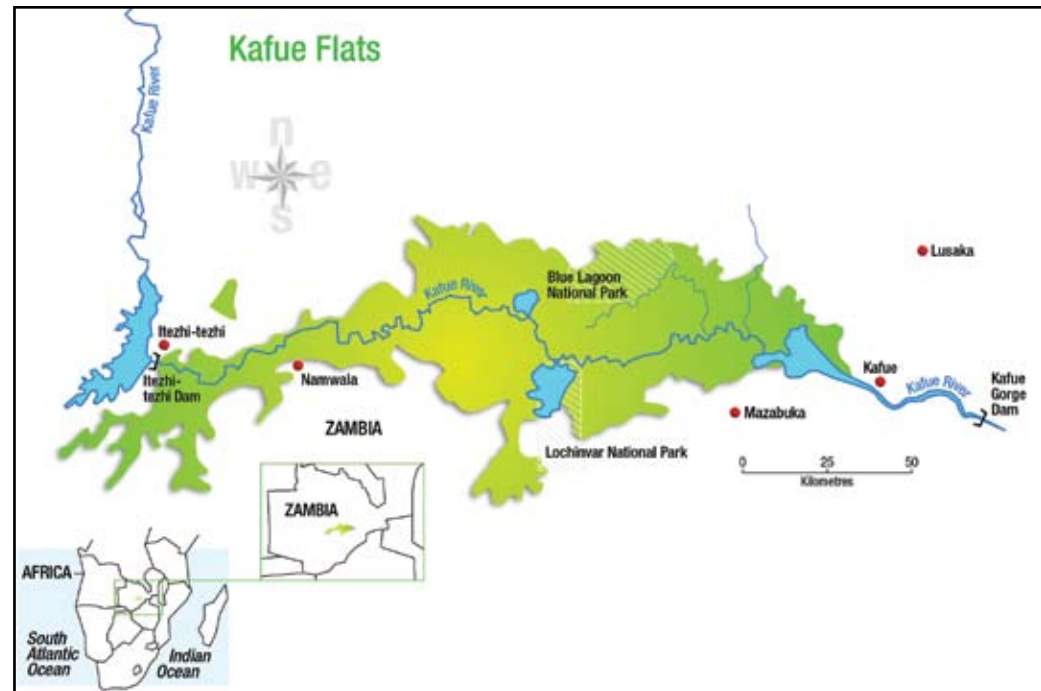
Sugar cane farms rely heavily on water from the Kafue River for irrigation, and effluents from sugar-cane processing are discharged back into the river. Rich in nutrients this causes plant growth (Water hyacinth) which clogs up waterways. Local people have problems navigating the river and fish suffocate.



Working together for multi-stakeholder gain

In 1999, the World Wildlife Fund (WWF) initiated dialogue among the Zambian Government, the Zambia Electricity Supply Corporation (ZESCO), local peoples and commercial farmers, to restore a more natural flow pattern to water releases from the Itezhi-tezhi Dam. It brought in Dutch technical expertise on flows management, and served as an advocate for conservation. The Zambian Government's Ministry of Energy and Water Development (MEWD) is the government regulator that has sought to reconcile conflicting objectives in managing the dams, while also promoting development. ZESCO is the government owned supplier of electricity who operates the dams, and has sought to minimise their impacts on local people and the environment. Local peoples are from different cultures and have different interests, ranging from traditional owners who wanted to see restoration of the environment and traditional livelihood activities, commercial farmers wanting a reliable irrigation water supply, and recent residents of the region looking for improved livelihoods. Local people were involved via their local chiefs and headmen and community steering committees.

The two following years (1999-2000) were spent scoping the project and building working relationships. Between 2000 and 2002, an integrated water resources management study for the flats was undertaken by Dutch consultants, using WWF funding and under the supervision of ZESCO and MEWD. The KAFRIBA (Kafue River Basin) hydrology model was developed, based on a Pitman rainfall model. It has been linked with real time data, obtained from the new rainfall and river gauging stations installed in the catchment to predict water flows and reservoir levels. In 2004, an agreement was reached among all partners to implement new dam operating rules associated with the KAFRIBA model.



In early 2007, a major flow mimicking natural wet season flooding was released for the first time. Concurrent modules have been launched for wetlands rehabilitation, focusing on infrastructure development, tourism enhancement and community-based natural resource management.

The long term results are expected to be considerable. It is anticipated that, as a result of the restoration of a wet season flood from 2007, the environmental health of Kafue Flats will start to improve. The livelihoods of local people are expected to show a similar trend, with increased fish and pasture productivity, the development of a wildlife based tourism industry and sustained irrigation capacity. Environmental health is expected to improve, especially in reserves, where populations of the threatened Kafue lechwe antelope should increase. Besides, hydro-electricity production will be maintained or increased, thanks to a better management of water flows.

Increasing impacts

The project has already had dramatic implications in terms of water governance. It has influenced development of Zambian Government policy on water resources. The Integrated Water Resources Management Strategy for the Kafue Flats developed under this partnership was endorsed by the Ministry of Energy & Water Development in 2002. The project has also seen the designation of over 3 million hectares of wetlands as Ramsar sites in the Kafue River basin, fulfilling Zambia's commitments under the Ramsar Convention on Wetlands. WWF is in dialogue with the Zambian Government on the integration of the successful methods at Kafue Flats into the proposed new Water Act, including provisions for establishment of Sub-Catchment Councils. The project has also informed the national Water Resources Action Plan and National Wetlands Strategy.

The results are clearly conditioned by the specificities of the Kafue Flats. Besides water abundance that characterises the Zambezi River and has helped ease the sharing of water, the initiative has benefited from the long-term commitment of the various partners. The implementation of this project has been time consuming, lasting more than 8 years so far, and costly. For the first 6 years alone, the Kafue Flats initiative cost more than US\$1 million. Furthermore, effective

environmental flow systems require agreements in the societies concerned on the social, economic and environmental values to be sustained by these flows, to determine the needed volume, quality and timing of water flows. This can be a powerful process for improving governance and promoting societal harmony.

There is considerable opportunity to replicate in other areas where dams are having ongoing environmental and social impacts. Successful projects will depend on the willingness of governments, dam operators, NGOs and local communities to collaborate; good water governance; availability of funding and data; access to technicians; and limited development on floodplain areas that will enable restoration of environmental flows. Re-operating dams to provide environmental flow releases is being undertaken in many places in the developed world, including in the European Union, United States of America and Australia. Rarely have these methods been successfully applied in developing countries, despite the potential for substantial benefits for people.



Photo: WWF-Canon / Frans Schepper



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At a Zambezi River basin scale, discussions are underway on the feasibility of up-scaling of the environmental flows model from Kafue Flats to other dams, mainly the Kafue Gorge, Cahorra Bassa and Kariba dams, so as to extend benefits to the entire course of the rivers in Zambia and Mozambique.

These discussions include the Zambezi River Authority, the Joint Operational Technical Committee for Cahorra Bassa and Kariba dams, and the SADC agreement for an IWRM strategy for the Zambezi under the auspices of its shared water protocol. Further, preparations are underway to develop a conjoint operation and management strategy for the three dams.

*Inspection of drying fish in
Shimungalu fishing village
on the Kafue River*

