



## Contact

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# Environmental flows

## Itezhi-tezhi, Zambia

The Itezhi-tezhi reservoir was designed to provide hydropower and year-round security of water for the 900 MW Kafue Gorge hydropower scheme located downstream. The Itezhi-tezhi dam was designed with additional storage capacity to allow an annual flood release of 300 cumecs during March each year. This flood release recharges the ecologically important Kafue Flats area of floodplain swamp and marshland below the reservoir.

### Overview

#### Scheme Specifications

##### Dam Name

##### Scheme operator

ZESCO Ltd

##### Size of scheme (MW)

120 MW

##### Country

Zambia

##### Catchment area

105620 sq km

##### River

Kague

##### Effective reservoir capacity

4.95 billion m<sup>3</sup>

##### Construction years

1976-1978

##### Reservoir size

370 km<sup>2</sup>

### Details on sustainability aspect

#### Environmental flows

The Kafue Flats area of the Zambesi Basin covers about 6500 km<sup>2</sup> located to the west of the Zambian capital Lusaka. These wetlands are recognised internationally as an area of high natural values as well as a major resource for the local and regional population, estimated at 700 000 people.

As well as providing 120 MW of hydropower, the Itezhi-tezhi dam was designed to ensure security of water to the 900 MW Kafue Gorge hydropower dam 230 km downstream.

Scheme operator ZESCO is required to maintain a 40 cumec (cubic metre of water per second) from Itezhi-tezhi flow for ecological and abstraction purposes. Also, during March each year, a flood flow of a minimum of 300 cumecs (slightly below the annual natural runoff for the whole catchment) for a four-week period is released. This flow, called the '*March freshet*' is intended to replicate the natural flood cycle and recharge the downstream wetlands and floodplains. Itezhi-tezhi dam was designed with an extra 803 million cubic metres storage capacity specifically to meet the flow requirements of the March freshet and is the first dam in Africa to be so designed. It is worth noting that at the time of design and construction, the sciences of environmental impact assessment and of environmental flows were barely in existence anywhere in the world.

Despite the March freshet, the Kafue Flats have seen a number of ecological changes. Seasonal variability of flow is much less; water levels in the flats are higher than natural during the dry season and areas previously ephemeral wetland are now permanent. Maximum flooded area has not significantly changed, but the duration of these flood flows are reduced. This has seen a shift in the area and distribution of ecological communities, particularly with a greater number of dryland species becoming established in many areas. This has impacted on the native fauna, and in particular contributed to a reduction of the Kafue lechwe, an endemic antelope.

Since 1998, ZESCO and the Zambian Government, with the involvement of environmental NGO WWF, have been developing better management plans for the Kafue Flats. An Integrated Water Management Strategy was developed and phase 1 of the implementation was completed in 2002. This phase included the concept of improving the dam operating rules. Phase 2 involves both design and implementation stages to further develop the hydrological network and refine operating rules.

New operating rules for the Itezhi-tezhi dam were put into operation in May 2004. The new rules more closely mimic natural flood patterns, and is intended to preserve both the environmental and socio-economic values of the Kafue Flats.

## Other Aspects

### Multiple Use

In 1992, the Lake Tanganyika sardine (*Limnothrissa miodon*) was introduced by the Department of Fisheries to increase food supply and local employment. The introduction followed detailed limnological studies on fish species, production and habitat utilisation which determined the sardine's preferred habitat was empty of other species. The stimulus for the introduction was the success of introducing *Limnothrissa* into Lake Kariba and the follow-on growth in the fishing industry.

## Further Information

Partners For Wetlands

<http://www.partnersforwetlands.org/report/report-may2003-zambia.html>

New Agriculturalist Online

<http://www.new-agri.co.uk/02-4/focuson/focuson6.html>