



## Management of aquatic weeds on the Kafue river in Zambia

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THE KAFUE RIVER runs for 1576km from its source in the north near the Zambia/Congo DR boarder before it joins the Zambezi in the south. The control of aquatic weeds on the Kafue was started by the Department of Water Affairs in 1969. The problem of water hyacinth (*Eichhornia-crassipes*) infestation became very noticeable in the 1990's when vast mats comprising of floating hyacinth, hippo grass, papyrus, creepers and other aquatic weed species collected on the upstream sides of the road and railway bridges covering the entire breadth of the river (ECZ, 1999). The portion of the river heavily infested is about 200km from Nakambala Sugar Estates in Mazabuka to Kafue Gorge Hydroelectric Power Plant. Some infestations have been noticed upstream the Kafue and its tributaries especially the Kafubu river in Ndola.

The proliferation of the water hyacinth has been largely attributed to water pollution which has enriched the Kafue water with phosphorous and nitrogen nutrients. Most of Zambia's industrial activities take place in the Kafue basin. Major industries include mining; farming; paper manufacturing; food processing; timber and sugar manufacturing. Industrial and wastewater discharges into the Kafue are the major sources for nutrients. The negative impacts of the river weed infestation are many and vary. Some of these are:-

- High evapo-transpiration resulting in reduction of water resources available;
- Deterioration of water quality due to eutrophic conditions created by floating; and
- Obstruction of the river channel for navigation and interference to hydro power generation.

All these factors have impacted badly on the health and livelihoods of local communities. The weeds are the breeding grounds for mosquitoes, snails and other vectors necessary for spreading of water borne diseases.

### Legal and institutional framework

The following pieces of legislation and institutions are used in the control of aquatic weeds in Zambia:

- The Water Act (1948) is administered by the Water Board and the Department of Water Affairs to ensure that the quality of the wastewater and industrial effluents into rivers are not going to cause adverse pollution. Polluters are reported to the ECZ(MDD, 1999);
- The Environmental Protection and Pollution Control Act(1990) and the Environmental Impact Assessment Regulations are enforced by the ECZ to ensure that the potential polluters get permits to discharge their effluents

into natural water courses. The effluents should be of a specified standard before they are discharged into the environment;

- The Department of Maritime and Inland Waterways took over the clearing of the weeds on waterways and rivers from the Department of Water Affairs in 1996. This function need to be supported by legislation; and
- Other relevant legislation are the Local Government Act(1991), the Agriculture Act National Resources Act, Water Supply and Sanitation Act(1997) and the Town and Country Planning Act. All these assist in the management of aquatic weeds as they assist to prevent pollution (WHO, 1995).

### Control measures

The Environmental Council of Zambia (ECZ) carried out a mapping survey of the whole country to identify the various aquatic weeds in the country and plotted the locations of infestation on the Map of Zambia in 1999. The water hyacinth and other aquatic weeds such as salvania, red fern and hippo grass were located in the upper and lower portions of the Kafue (ECZ, 1999).

Below are the control measures currently being implemented:-

#### Chemical control

The case of chemical spraying has been used on the Kafue to control the weed but has been discontinued. This was discontinued for fear of polluting the water and fish in the river. Kafue river is the source of domestic water supply for Lusaka, Kafue, Mazabuka and other towns in the basin. The chemicals used were 2-4D and glyphosate (ECZ, 1990).

#### Mechanical control

The Department of Maritime and Inland Waterways was mandated to take over the clearing of aquatic weeds in Zambia from the Department of Water Affairs in 1996. A dredging machine was deployed in the Kafue river in mid 1999 to clear the portion upstream the road bridge. The job was completed by the end of January, 2001; the floating weeds were dislodged and drifted down to Kafue Gorge.

#### Manual control

Local people are employed to remove the water hyacinth mats upstream the railway bridge by the Zambia Railways Company Limited. Contracts are given to cut and remove the floating meshes of weeds from bridge piers, canoes and machetes are used in this exercise.

The Zambia Electricity Company (ZESCO) employs the same method to control the weeds at Kafue Gorge. In 1994, the Army was contracted to do the job.

#### **Fencing off the water intakes**

Metal booms fencing structures floating on the lake are used to keep off the weeds from choking the water intakes for the hydroelectric generating turbines at Kafue Gorge Hydroelectric Power Station.

#### **Biological control**

The Environmental Council of Zambia brought in weevils to feed on and destroy the water hyacinth in 1997. The success of this method depends on how the weevils multiply in numbers to attack the weeds.(ECZ, 1999)

#### **Pollution control**

Control of point and non point pollution of the river environment reduces aquatic weed proliferation. Enforcement of environmental laws and moral standing of potential polluters will go a long way to eradicate the spread of aquatic weeds in Zambia. Nakambala Sugar Estate has long stopped discharging irrigation runoff into the river to prevent pollution.

#### **Discussion**

The use of chemicals to spray the water hyacinth has been received with mixed feelings due to the fact that this might pollute the river and may endanger aquatic and human life.

Mechanical harvesting of the weed is faster but very expensive as it requires huge capital investments to bring in the machine. Running costs are also equally high.

Water pollution awareness campaigns should be intensified to instil a sense of responsibility in communities and industries not to pollute rivers by adopting good practices in conducting their business.

#### **Conclusion**

Long term solution to aquatic weed infestation lies on the prevention of water pollution and involvement of key stakeholders to implement measures that will reduce and eradicate the weeds. The recycling of irrigation run off by Nakambala Sugar Estate had drastically helped to control pollution.

#### **References**

- ECZ, 1999: Kafue River Nutrient Loading Study.  
MDD, 1999: Restructuring Report of the Ministry Of Energy and Water Development.  
WHO, 1995: Water Resources Development and Vectorborne Diseases in Zambia.

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