

Pollution in the Tanzanian Waters of Lake Tanganyika

by Francis M. M. Chale

Pollution can be defined as the anthropogenically accelerated inputs of plant nutrients, organic components of sewage, heavy metals, pesticides, and compounds likely to stem from oil exploitation and shipping. The LTBP Pollution special study sets out to identify the sources, trends, and impacts of such inputs.

Owing to its large size and volume, one might not expect Lake Tanganyika's water quality to be affected by human activities. However, the increasing pace of agricultural activities in the lake catchment, the tendency to cultivate on steep slopes bordering the lakeshore and the inflowing rivers, and the use of fertilisers and pesticides, all contribute to the deterioration of the lake's water quality. Shipping and industrial activities in the catchment also represent potential sources of pollution to the lake.

Pollution studies in Tanzania have centered on Kigoma Bay. The bay is shallow and on its eastern side are located ship docks, oil storage facilities and an oil jetty. The TANESCO power plant is situated on the south-western side of the bay. These industries and others have been shown to be having a significant effect on the water quality of Kigoma Bay.

Agro-chemicals : The amount of the agro-chemicals used in the lake's catchment on the Tanzania side is little. Rukwa Region, for example, used an average of 4963 tonnes of fertilisers annually between the 1991/92 and 1996/97 growing seasons, 5.40 tonnes of pesticides and herbicides, and about 3160 litres of chemicals, per year. Most of the chemicals (between 43% in 1991/92 and 92% in 1996/97 growing seasons) were used in Mpanda District which is not a part of the lake's catchment. Kigoma Region uses far less agro-chemicals than Rukwa Region. It can therefore be safe to say that there is hardly any pollution in the lake coming from agricultural run-off.



Stanislaus Muhoza working with pollution samples at the Kigoma Station, Tanzania

Shipping and Harbour oil spills : Kigoma town is at the terminus of the Central rail line. It handles goods for Burundi and the eastern part of the Democratic Republic of Congo. Mixed dry cargo and oil products pass through the harbour. Between 1992 and 1997 there were an average of 345 ships and 556 wooden boat rotations, respectively, per year. The amount of oil products exported through the harbour averaged 18,520 cubic metres

annually between 1995 and 1997. Studies on bottom-dwelling organisms in the dock area showed the presence of oil in the sediments and, probably as a direct result of this, the absence of live macro-invertebrates, such as snails, which are very sensitive to oil pollution.

Power generation : For a long time, it has been observed that waste oil from the Tanzania Electricity Supply Company (TANESCO) has been flowing into the lake. It is not uncommon for a substantial oil slick to be seen covering extensive areas including the town's water intake. In several areas, there are permanent pools of oil on the shore.

Human settlements : Kigoma town has a population of about ninety thousand people. These people depend on the lake as a source of domestic water, fishing and bathing. Also, for many people, Kigoma bay is used as a recipient of their domestic wastes including sewage. The current levels of plant nutrients (nitrogen and phosphorus) in the bay is higher compared to the open waters. For example, nitrogen and phosphorus levels in the bay average 54 $\mu\text{g/l}$ and 16 $\mu\text{g/l}$, respectively. In the open waters



Dr. Francis Chale preparing water samples for analysis at the Kigoma Station, Tanzania

the levels for the two nutrients average 47 $\mu\text{g/l}$ and 7.1 $\mu\text{g/l}$, respectively. Similarly, plant biomass in the bay is higher (2.20 $\mu\text{g/l}$ chlorophyll *a*) compared to the open water (1.59 $\mu\text{g/l}$ chlorophyll *a*). In the bay, the water is green, leading to a low water transparency (average 4.54 m), while the open waters are much more transparent (average 11.14 m).

From the above, it can be concluded that for the Tanzanian coastline, agriculture currently poses little threat to Lake Tanganyika. The only place which can be considered to be polluted is Kigoma Bay, which is heavily impacted by oil, oil by-products and domestic wastewater. The use of untreated water from the bay may thus be considered a health hazard.

Dr. Francis Chale is the LTBP Pollution Special Studies Co-ordinator for Tanzania.