

- waste-water disposal
- the potential for lake-fringe based wetland aquaculture without impairing the natural functions of the environment.
- safeguarding lake water quality
- facilitating reproduction, feeding and shelter of commercial fishes.

Projects in the Program

Wetlands in fish/food production: Impact of wetland degradation on fish production and water quality.

■ The impact of water hyacinth on fishery production and lakeshore communities; the transfer of biological control technology for the weed.

■ Lake Productivity mechanisms and the causes, effects and control of excessive nutrient enrichment/pollution.

Observations / Research results

The role of wetland vegetation with respect to water quality protection and fishery enhancement is poorly understood but wetland destruction is proceeding very fast.

■ The water environment of Lake Victoria has significantly changed over the past 30 years and the changes most probably

negatively affect productivity mechanisms and food chain relationships and ultimately, overall fishery productivity. Further research is ongoing to determine the nature and extent of the changes that are causing them and to establish their impact on fish production.

■ Water hyacinth has spread rapidly to fringe all sheltered bays and inlets as well as other shore areas in lakes Victoria, Kyoga, Albert and the River Nile. Preliminary observations indicate devastating environmental impact on fish breeding, feeding and shelter, and serious socio-economic effects on the lakeshore communities.

■ The use of biological control weevils to manage water hyacinth is closer to reality now that:

- active broodstock facilities are in place at NAARI
- reproductive viability has been established on Lake Kyoga.
- extensive 'seeding' of all major hyacinth infestations on Lake Kyoga with adult weevils has been achieved. It is anticipated that within two to three years populations of the weevil have increased sufficiently to bring the water hyacinth on Lake Kyoga and the Nile under control.

THE LIMNOLOGY PROGRAM

**NATIONAL AGRICULTURAL
RESEARCH ORGANISATION**

FISHERIES RESEARCH INSTITUTE

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Background

The Program of Limnology / Water Environment is concerned with the well-being (wholesomeness) of water as a medium which facilitates complex life processes leading to production of valuable resources notably fish; and as a commodity for direct human utilization. This role is vital in view of the importance of fish as a source of high quality protein, employment and income in Uganda. Essentially water is life.

Study area

Research is conducted on lakes Victoria, Kyoga, Albert, Edward and George. Highest priority is given to the first three lakes in view of the high yield of their fisheries and the rapid environmental and biological changes that have been detected in them over the past few years. It is planned to extend the studies to rivers and wetlands.

The program studies:

physical conditions (temperature, dissolved gases e.g. oxygen, water depth and mixing regimes, etc).

■ chemical parameters (nutrients e.g. nitrogen and phosphorus; pollutants etc) particularly those limiting productivity.

■ biological communities particularly of plants eg. wetland plants and algae; simple animals whose life processes and activities influence the physical and chemical features of the water environment and its productivity and ultimately directly and/or indirectly determine fishery productivity.

■ Climatic influences (seasonal variability of processes and the effects of rainfall, temperature, wind, etc. on these processes).

Constraints

The major constraints addressed include:

■ Destruction & degradation of wetlands in view of possible attendant implications on water quality and the life cycles of fish; Possible solutions are sought.

■ Water weeds - water hyacinth is currently the only major water weed constraint in Uganda.

■ Nutrient enrichment of water environment and pollution - usually through human influence.

■ Inadequate data / information on lake productivity mechanisms and food chain relationships vital for

fishery production.

Objectives

The mandate or objectives of the Limnology and Water Environment Program include:

■ To determine the natural physical, chemical and biological characteristics and processes of the water environment which significantly influence its productive capacity in terms of fish; and in particular to show what ecological interactions determine the distribution and abundance of fish.

■ To establish the impact of human activities in the catchment on the water environment notably through:

- destruction of marginal wetlands
- bad farming practices leading to siltation and pollution with agrochemicals
- introduction of troublesome exotic species like water hyacinth
- release of excessive nutrients eg. from industrial and domestic sewage

■ to develop packages for wise use of aquatic resources and management strategies which promote sustainable use of the water environment e.g. guidelines on multipurpose use of wetlands and/or water for:

- growing crops etc.,
- biomass harvests for crafts, thatching materials, etc.