# TITLE PAGE

**Socio-economic conditions in fishing villages on Lake Victoria.**

Samuel Vivian Matagi[1*], Lance Everest Okwerede[2], Godfrey Arwatta-Bua[2], Juliet Kutuusa[2], Ann Rita Akinyo[3] and Elizabeth Jeannette Aisu[4]

[1] *Corresponding author

Savimaxx Limited
P.O. Box 25250
Kampala
Mob: 256 712 654651
e-mail: matagisamue1@yahoo.com

[2]Central Laboratory
National Water and Sewerage Corporation
P.O. Box 7053
Kampala
everestokwerede@yahoo.com

[3]Edge Business Centre
P. O. Box 6000
Kampala
erassociates@yahoo.com

[4]Rainbow Development Consulting Associates
P. O. 7707
Kampala
eaisu@isae.mak.ac.ug

## ABSTRACT

Increasing population pressure and socio-economic activities within the Lake Victoria basin have resulted in deterioration of the lake ecosystem. In an attempt to reverse this trend, a multi faceted, internationally funded, project called the Lake Victoria Environmental Management Project (LVEMP) was established in 1992 by the three riparian Governments of Kenya, Tanzania and Uganda. Fishing villages, because of their large number, proximity to the lake, and poor sanitary conditions, are considered to be a significant threat to lake water quality. This paper discusses preliminary findings for the fishing villages on the Ugandan side of Lake Victoria. A total of 21 settlements were visited covering all ten districts that have a shore line with Lake Victoria. Five were studied in detail. It was found that topography influenced the type of settlement pattern, which in turn affected life style and living conditions of the fisher folk with resultant negative impacts on the lake water quality. Potable drinking water, sanitation, living conditions, fishing operational costs and nutrition are major problems in the fishing villages. Sanitation emerged as the single most critical problem. When the communities were asked which intervention would elevate their problems while protecting the integrity of the lake, toilets were ranked the highest followed by water purification facilities, fish slabs, clinics, piers and primary schools, respectively. Out of the 21 fishing villages, five were selected and given a grant of US $ 15,000 each, to build micro-projects of ecological sanitation toilets (ECOSAN). The next phase of the project will be to identify the nature and quantity of the pollutants coming out of the fishing villages.

## KEY WORDS

Socio-economics, fishing villages, living conditions, Lake Victoria

## INTRODUCTION

Increasing population pressure and socio-economic activities within the Lake Victoria basin have resulted in deforestation, agricultural expansion, rapid urbanisation and industrialisation. The impact of these anthropogenic activities on the lake ecosystem has been dwindling fish stocks, biodiversity decline, increasing eutrophication (Hecky, 1993; Lowe-McConnell, 1997), algal blooms, increased water turbidity and faecal contamination resulting in higher water treatment costs. The health of the lake ecosystem has been further impacted by a water hyacinth invasion which interferes with light penetration; oxygen levels, fish breeding sites, fish landing sites, recreation, lake transport and hydro electricity power generation (Matagi, 1998).

In an attempt to reverse the deteriorating trend of the lake ecosystem, a multi faceted project called the Lake Victoria Environmental Management Project (LVEMP) was established in 1992 by the three riparian Governments of Kenya, Tanzania and Uganda. Financial support was provided through the Global Environmental Facility of the World Bank, the European Union and other financiers including bilateral programmes. The initial 5 year phase of LVEMP was to identify and quantify all anthropogenic activities that negatively impact on the lake. Fishing villages, located on the shores in large

numbers with generally poor sanitary and living conditions are considered to be a significant threat to lake water quality. This paper discusses the preliminary findings of the socio-economic dynamics of the fishing villages on the Ugandan side of Lake Victoria.

## METHODS

Socio-economic status field surveys were carried out between 1996 and 1999 in all ten districts that had a shoreline on the Ugandan side of Lake Victoria. A total of 21 fishing villages were visited and five were studied in detail; Kiyindi, Waka Waka, Dimo, Lambu and Musozi. In the preparatory stage for the baseline survey, work started with desk work and a literature review. Information was obtained from the frame surveys carried out by the Fisheries Department (Kitakule and Reynolds 1991; Tumwebaze and Cohen, 1997). Additional information was gleaned from a Map of Uganda (Kisaamo, 1969). Quantitative and qualitative methods of data collection were used in the field.

### Sampling Design
Stratified random sampling was used to select the respondents. In this case, the sample was stratified into four different categories; fishmongers, business community, landlords and women. Five respondents were selected from each strata and a village had a total of 20 respondents.

In qualitative studies, small samples of individuals, groups, or events were chosen, (Sekaran, 1999) to cut down costs and energy expenditure. For Focus Group Discussions (FGD) three groups of the respondents were chosen; fishmongers, business community and women. From the five villages, one FGD was conducted with each different group category of the respondents. At any one discussion, a total of 12 respondents were met. In total, 15 FDGs were held, with a total of 180 respondents.

### Data collection methods

Qualitative and quantitative methods of data collection were used in the field.

### Qualitative methods
Under qualitative methods, Focus Group Discussion (FGD), Key Informants and observation techniques were applied.

### The focus discussion group
Focus Group Discussion (FGD) was used to gather data relating to the feelings and opinions of a group of people who are involved in a common situation. Under the guidance of a group leader, selected participants of 7–12 homogeneous participants are stimulated to discuss their opinions, reactions and feelings about a type of a situation (Hussey, 1997). From the five villages, there was one FGD conducted with each group of the different categories of the respondents. The Local Councillors of the area helped with mobilization of these respondents.

**Key informant interview**

Direct interviews were held with the fisher folk, local authorities and district authorities as described by Boja and Popescu (2000). In some selected fishing villages open-air public participatory awareness and sensitization campaigns were carried out.

**Direct observation method**

Whereas the above methods required responses from the subject, it was possible to gather data without asking questions of respondents (Sekaran, 1999). People were observed in their natural work environment and their activities and behaviors were recorded. Places of waste disposal, presence of latrines, and water handling was observed. Observation was done in a natural setting as recommended by Vogt (1993).

## Quantitative methods

A questionnaire was designed and used to collect information from a sample of respondents. The questionnaire had the following sub sections; economic activities, living conditions, water, sanitation, drainage and pollution activities that affect the lake were obtained.  A 'community needs' assessment was carried out. The participants were also asked how they would participate in the prevention of lake pollution since their own activities directly impact the lake.

**Data analysis**

Data and information collected using questionnaire responses from numerous respondents were statistically analyzed.  Open-ended questions were coded appropriately. The questionnaire-based data was then entered in a statistical package using EPI INFO and analyzed using SPSS. Findings were determined arising from the analysis and interpretation of information. The qualitative data was analyzed using matrix format whereby responses were ranked and then written out.

**RESULTS**

Four types of settlements were identified from the 2l settlements that were visited in the 10 districts that have a shore line with Lake Victoria: (i) fishing villages (ii) fish landing sites (iii) piers and (iv) recreational areas (Table 1). Fishing villages had the most adverse impact on the lake ecosystem. This was attributed to their large residential/transient populations compared to other settlements and to the fact that all their wastes discharge directly into the lake.

There are two distinct shorelines topographies in the lake basin; (i) steep slopes mostly in the eastern parts of Uganda and (ii) gentle land-lake interface found in the western areas. The topography of the shoreline has influenced the nature of settlements, population size and distribution, inhabitant composition and the nature of economic activities other than fishing. Four settlement patterns were identified; (i) hill top settlements (ii) slope settlements (iii) shoreline settlements (lake-land interface) and (iv) combined settlements (Fig. 1). Hilltop and slope settlements were found mostly in the east. The buildings were either permanent or semi—permanent. In the western areas the settlements were at the

lake— land interface, where dwellings tended to be temporary structures. In the east the fishing communities are mostly indigenous local people with few immigrants. Cultivation and animal husbandry is possible. Fisher folk tend to stay on their plots of land, which are far away from the fish-landing sites and therefore the population is scattered. In the west the land is low lying and flat and the soils are sandy and water logged making agriculture and animal husbandry impossible. Large, nucleated lakeside settlements are common.

**Table 1 List of fishing villages visited 1996-1999**

| No | Name of fishing village | District | Type of settlement | Topography Type | Settlement Pattern |
|----|------------------------|----------|--------------------|-----------------|--------------------|
| 1 | Dimmo* | Masaka | Fishing village | Flat | Shore-line |
| 2 | Waka Waka* | Bugiri | Fishing village | Gentle/Flat | Combined |
| 3 | Lambu* | Masaka | Fishing village | Flat | Shore-line |
| 4 | Musonzi* | Kalangala | Fishing village | Gentle/Flat | Combined |
| 5 | Kiyindi* | Mukono | Fishing village | Gentle/Flat | Combined |
| 6 | Kasensero | Rakai | Fishing village | Flat | Shore-line |
| 7 | Kasenyi | Wakiso | Fishing village | Gentle/Flat | Combined |
| 8 | Majanji | Busia | Landing site | Steep | Hill top |
| 9 | Bwondha | Mayuge | Fishing village | Gentle/Flat | Shore-line |
| 10 | Bulungo | Masaka | Fishing village | Gentle/Flat | Combined |
| 11 | Lugala | Bugiri | Fishing village | Gentle/Flat | Shore-line |
| 12 | Bugoto | Mayuge | Fishing village | Flat | Combined |
| 13 | Senyi | Mukono | Fishing village | Flat | Shore-line |
| 14 | Bukoba | Mayuge | Fishing village | Flat | Shore-line |
| 15 | Bukene | Mayuge | Fishing village | Flat | Shore-line |
| 16 | Masese | Jinja | Landing site | Steep | Hill top |
| 17 | Katosi | Mukono | Fishing village | Gentle/Flat | Combined |
| 18 | Lukaya | Masaka | Fishing village | Flat | Combined |
| 19 | Misoli-Bunonko | Wakiso | Fishing village | Gentle/Flat | Slope |
| 20 | Kigungu | Wakiso | Landing site | Gentle/Flat | Hill top |
| 21 | Nakiwogo | Wakiso | Landing site | Gentle/Flat | Hill top |

*Detailed studies carried out on the first 5 shore-line settlements



Fig.1. Fishing Villages settlement patterns on Lake Victoria.

(i) Hill Top settlements   (ii) Slope settlements   (iii) Shore line settlements   (iv) Combined settlements
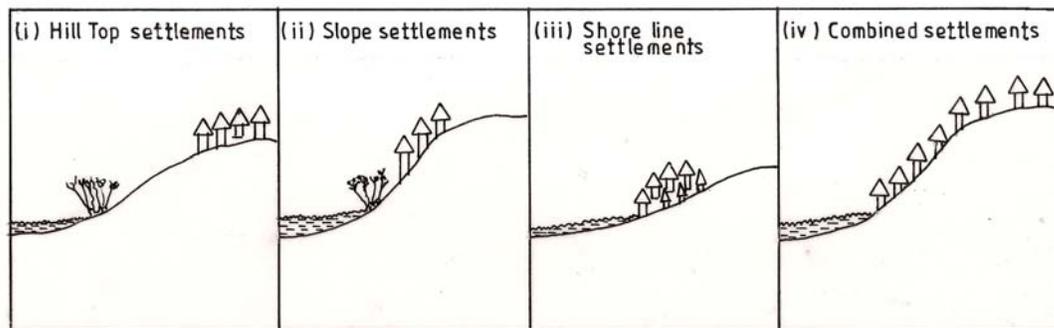
Fishing is the main economic activity. The area in the west is remote with a sparse indigenous population. There has been an influx of non indigenous people attracted by fishing.

The population dynamics of the fishing villages showed interesting trends, over 64% of the population were transient (Table 2). This non resident population only does business in the fishing villages during the day and then leaves at the end of the day. The impact of this population is best shown by the situation in Waka Waka. Waka Waka was described by the area Local Council 1 Chairman as *"simply a flood of people on market days"* and that *"the whole place becomes impassable and only leaves a huge heap of garbage and human excreta scattered all over the place. You come here on Monday after the market day you will see for yourself,"* (NWSC, 2001).

**Table 2 Fishing villages populations**

| Village | Resident Population | Transient Population | Households | Average Household Size | % of Resident Population |
|---------|--------------------|--------------------|-----------|------------------------|--------------------------|
| Kiyindi | 1,386 | 600 | 364 | 3.8 | 43 |
| Wakawaka | 1,308 | 1,000 | 386 | 3.4 | 76 |
| Dimmo | 896 | 500 | 210 | 4.3 | 56 |
| Lambu | 729 | 576 | 293 | 2.5 | 79 |
| Musonzi | 619 | 400 | 339 | 1.8 | 65 |

Source NWSC 2001

**Economic activities**

Lake Victoria accounted for 48.4% of the Ugandan fishery in 1998, earning US $20 million before the fish ban (Statistics Department, 1999). In that year fish exports were second to coffee. Because of the important role fishing plays in the national economy both as a foreign exchange commodity and as a source of cheap animal protein it has received the attention of the government, the international community and financial lending institutions.

Fishing and its downstream activities like fish processing and sales tops the economy (97%) followed by business/retail trade (1.5%), eating houses and bars (1.01%) and accommodation rental (0.5%) (Table 3).

**Table 3 Types of economic activities**

| No. | Type of economic activity | %age |
|-----|---------------------------|------|
| 1 | Fishing | 97 |
| 2 | Business/Retail trade | 1.5 |
| 3 | Landlord | 0.5 |
| 4 | Restaurant/eating houses | 1 |
| 5 | Entertainment | 0.01 |

Fishermen use nylon gill nets, cast from dug out canoes, plank canoes or boats mounted with outboard engines. Most fishing vessels have a maximum of three fishermen. Fish sales inject cash into the fishing communities stimulating a chain of other economic activities. The business community in fishing villages provides essential goods and services plus other luxury items. Lack of land for gardening or animal husbandry combined with the fishermen's life style and work schedule causes fisher folk to eat in public places, rather than in their homes. This has lead to a boom in the 'hotel' and 'restaurant' business. There are many lodges, which provide cheap accommodation at between US $ 2-5 per night. Three types of landlords were identified (i) absentee landlords (10%), who stay outside the shoreline settlement (ii) resident landlords (5%), who stay within the settlement and rent out their houses commercially and (iii) direct occupancy (85%), those who live in their own premises (Table 4). Most of the permanent buildings are owned by absentee landlords who collect monthly rent. Resident landlords are usually on the local councils that form the administration body of the fishing villages.

**Table 4 Type of landlords**

| No. | Type of Landlords | %age |
|-----|-------------------|------|
| 1 | Direct occupancy | 85 |
| 2 | Absent landlord | 10 |
| 3 | Resident landlord | 5 |

One of the most advanced industries in fishing villages was entertainment. There are video halls and bars many of which double as disco halls. The main clientele is, of course, the fishermen who are usually young men. The entertainment goes on into the early hours of the morning. Prostitution, with all its associated health risks, is common.

**Socio-economic problems in fishing villages**

The major problems observed were sanitation, potable drinking water and related health issues, accommodation, nutrition and the high cost of fishing operations (Table 5).

**Table 5 Socio-economic problems of fishing villages**

| No. | Problem | Rank %age |
|-----|---------|-----------|
| 1 | Sanitation | 80 |
| 2 | Fishing costs | 10 |
| 3 | Drinking water | 5 |
| 4 | Living conditions | 4 |
| 5 | Nutrition | 1 |

## 1. Sanitation

Poor sanitation was the most frequent problem encountered in all fishing villages (80%). The study showed that sanitation coverage was below 20% of demand (NWSC, 2001). The high water table and sandy soils make construction of deep pit latrines difficult. They either fill up fast or collapse because of the loose sandy soils. Fisher folk are forced to build brick and mortar raised latrines, which are expensive, and can only be developed as communal facilities. Hence, traditional public pit latrines were the most common (Table 6). The Population/Stance ratio ranged from 45 in Lambu to 231 in Kiyindi (NWSC, 2001). All the latrine facilities are pay-per-visit. The sanitation charges are prohibitive and a major deterrent to the use of the facilities by the majority of would-be users. Most such facilities have been developed without thought about their operation and maintenance. As a result they become filthy and fall into disrepair, forcing people to abandon them and defecate wherever they can. Polythene bags are frequently used for excreta collection and discarded at random using the helicopter method. Bathrooms are usually roofless enclosures. Bathroom and kitchen refuse is scattered through the neighbourhood, finally ending up in the lake. Solid waste collection and disposal is unorganised. Garbage, plastic and polyethylene bags litter the villages, making them very unsightly. In some cases there are dumps where garbage is left to dry and be burnt later. Dry banana peelings are occasionally burnt at night since the smoke repels mosquitoes from the houses.

**Table 6 Human excreta disposal practice**

| Parameter | Fishing Village Kiyindi | Wakawaka | Lambu | Musonzi | Dimo |
|---|---|---|---|---|---|
| Population | 1386 | 1308 | 729 | 619 | 896 |
| No. Pit Latrines (Public) | 1 | 1 | 4 | 1 | 3 |
| No. Pit Latrines (Private) | 0 | 0 | 0 | 0 | 7 |
| Total No. Pit Latrines  Stances | 6 | 6 | 16 | 6 | 25 |
| Require No. Pit Latrines Stances | 48 | 70 | 80 | 42 | 55 |
| Septic Tank | 0 | 0 | 1 | 0 | 0 |
| Population/Stance | 231 | 218 | 45 | 103 | 36 |

Source NWSC 2001

## 2. Drinking water and health related issues

The main drinking water source in many fishing villages is lake water. However it is contaminated by lakeshore activities such as fish gutting, boat loading and unloading, bathing, washing of clothes and utensils, and most of all, faecal and garbage contaminated run-off from the fishing villages. Petrol and oil from the boat engines can be seen floating on top of the water. Algal blooms result from nutrient enrichment of the lake due to the village catchment. Children are usually sent to collect water, which they draw from near the shore. The water is directly utilized without boiling hence there is a high incidence of water borne and related diseases like cholera, dysentery and typhoid. Microbiological tests show that lake water is heavily contaminated with faecal material.

The faecal coliform count ranged from 0-236/100ml (NWSC, 2001). Epidemics are most common during the rainy season when the scattered human excreta around the villages is washed into the lake. The 1997 and 1998 El Nino floods led to cholera outbreaks in most of the villages. In Waka Waka settlement, for example, five died due to cholera causing the people to flee the village.

## 3.      Accommodation

The high water table and sandy soils make building permanent structures expensive. Most villages have a large transient population. As a result, temporary dwellings using simple construction materials are more common than permanent structures (Table 7). The population density in the built up area is high, around 10,000 people/km$^2$. The flammable building materials and proximity of houses present a high fire risk. Poor storage of petrol for out-board motor engines makes the situation worse. The cost of building houses ranged from US $ 20 for a grass house to US $ 1,500 for a permanent structure. Building a raised pit latrine costs about US $ 8,000. This explains why so few pit latrines are constructed.

**Table 7  Types of buildings**

| No. | Type of Building | %age |
|-----|------------------|------|
| 1 | Permanent | 0.5 |
| 2 | Semi-permanent | 1.5 |
| 3 | Mud and wattle | 90 |
| 4 | Grass huts/mama igiya pole pole | 5 |
| 5 | Polyethene and cardboards | 3 |

## 4.      Fishing operation costs and income

The initial investment for fishing gear, boat engines and petrol is high. The returns on the other hand are low and slow. Lake Victoria is a "free resource" accessible by all (fisheries regulations are not adequately enforced). High fishing pressure has lead to (a) over fishing (b) low fish yields (c) use of illegal fishing gear including reduced fish net sizes (d) fishing in spawning grounds and (e) the use of poison to increase fish catch. Water hyacinth which used to be a menace to fishing in the mid 1990's has been reduced due to a combined approach of biological control methods and mechanical means. The remoteness of many villages, poor roads, lack of electricity and communication facilities has made transport and storage of fish very difficult. The fisher folk are forced to smoke the fish, which has low returns compared to fresh fish fillet exported by the fish processing industries.

Some unscrupulous fishermen have resorted to the use of pesticides to poison fish.  In at least one case this  caused the death of two children. The Uganda National Bureau of Standards (UNBS) imposed a fish ban, which was followed by a European Union ban on fish imports from the East African region. The ban had a devastating effect on fishing village economies and the riparian countries at large. At around the same time (1996-

1997) the El Nino phenomenon had a four-fold impact on the fishing villages. Water levels in Lake Victoria rose by about 0.8m, shoreline settlements flooded, roads and bridges were washed away and many villages became inaccessible. Cholera broke out in the lake region and people fled the villages. Villages like Dimmo, which had a population of 5,000 ended up with a population of 1,000.

## 5.      Nutrition

The nutrition status in fishing villages is poor. Food is mostly dry rations which include; maize flour, cassava, rice, dry beans, peas, and groundnuts. Although fish should be plentiful, the high price that fish fetches on the local and international market means that little remains in the villages for consumption by the fisher folk. Local communities usually feed on fish carcasses after filleting.  Fresh foods like bananas, the staple food, vegetables, meat and fruits are scarce. Ignorance and food preference lead to unbalanced diets. Both adults and children show signs of *marasmus*. Many children have signs of kwashiorkor, which leads to a pot bellied appearance. Alcohol and drug abuse are not uncommon in fishing villages, which can contribute to poor eating habits among adults and may lead to neglect of children.

## CONCLUSIONS

Fishing villages because of their residential/transient populations and associated socio-economic activities have a high potential to pollute Lake Victoria due to the nearness of the settlements to the lake, population growth, topography and poor sanitary behaviour. Activities such as over-fishing, fish poisoning, dispersal of human excreta and solid waste disposal have a direct impact on the lake. Throughout all the field visits and participatory discussions sanitation emerged as the single most critical problem. When the communities were asked which intervention would elevate their standard of living while protecting the integrity of the lake, toilets were ranked the highest after water purification facilities. Next in priority were; fish slabs, clinics, piers and primary schools, respectively (Table 8). Five fishing villages were given a grant of US $ 15,000 each to build a micro-project of ecological sanitation toilets (ECOSAN). The next phase of the project will be to identify, quantify, and create simulation models of the pollutants coming out of the fishing villages. Information dissemination and awareness campaigns will also be included.

**Table 8 Micro project preference**

| No. | Type of Project | Preference %age |
|-----|-----------------|-----------------|
| 1 | Toilets | 90 |
| 2 | Water purification | 5 |
| 3 | Fish slabs | 2 |
| 4 | Clinics | 1 |
| 5 | Piers | 0.5 |
| 6 | Primary Schools | 1.5 |

**FOLLOW UP ACTIVITIES**

Follow up activities were conducted between the years 2001 and 2005, to address the issues raised above. They included; information dissemination workshops on sanitation, water pollution control, use of ECOSAN in high water table and sandy soil settlements, soil erosion abatement along shore-line slopes by use of good agricultural methods and tree planting, partnership and entrepreneurship development by local business persons.

Incentives in the form of wheel-barrows, hoes, racks, spades, gum-boots and rubber hand gloves have been given to settlements that excelled in cleanliness of the landing sites. Local communities have been encouraged to form different types of business groups and come up with proposals for funding through the help of NGOs and CBOs like Uganda Fisheries Fish Conservation Association and others.

Landing sites like Waka Waka and Lambu with a large number of boats have received funding from different organizations for construction of modern piers and fish landing slabs. Fishing villages like Katosi and Kiyindi have been connected to the national electricity grid which has had a marked effect in the socio-economic development of these villages assisting them in their growth into towns. Tree planting in Majanji landing has not only controlled soil erosion but also created ample shade for daily business.

More developmental projects are to be implemented, as per local community requests, during the $2^{nd}$ phase of LVEMP II. However, there will be continuity in monitoring activities that negatively impact on the environment with specific emphasis on assessment and evaluation of mitigation measures. Regular meetings to review regulations and by-laws put in place to control environmental degradation are to be carried out.

**POST SCRIPT SOCIO-ECONOMICS OF FISHING VILLAGES AFTER 1999**.

This paper has been submitted for publication nearly 10 years after the research was completed. Over the years more studies have been undertaken particularly by the Fisheries Research Institute, Jinja Dr. J. Balirwa *per com*. Furthermore, modern methods such as Geographical Information Systems (GIS) have been employed . In the 1990's we estimated fishing villages on the Uganda side of Lake Victoria to be between 600-1000 (NWSC, 2001), GIS methods give 552–597 between 2002 -2004 (Table 9). A summary trends in the socio-economic fishery indicator is given in Table 9. The overall indication is that there has been improvement of living conditions in fishing villages. For instance potable water supply has increased from 0 – 41, while toilet facilities have increased from 0 to 95.

**Table 9 Trends in socio-economic fishery indicator related to Nile Perch case - Lake Victoria**

| Indicators | | Year | | |
| --- | --- | --- | --- | --- |
| | | 2000 | 2002 | 2004 |
| Landing Sites | | 597 | 552 | 554 |
| | | | | |
| Facilities | | | | |
| | Banda | 56 | 33 | 21 |
| | Cold Rooms | 7 | 4 | 0 |
| | Toilet Facilities | 0 | 95 | 41 |
| | Portable Water | 0 | 21 | 41 |
| | | | | |
| Boat Repair Facilities | | 221 | 40 | 23 |
| No. Of fishers | | 34,889 | 41,674 | 37,721 |
| No. of BMUs | | 0 | 0 | 0 |
| No. of fishing crafts | | 15,544 | 18,612 | 16,775 |
| outboard engines | | 2,031 | 3,250 | 3,173 |
| Total Number of all gill nets | | 54,454 | 52,846 | 56,246 |

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## ACKNOWLEDGMENTS

# REFERENCES

Boja, V., and I. Popescu 2000. Social ecology in the Danube: Theory and practice. Lakes and Reservoirs: Research and Management 5: 89-92.

Hecky, R. E. 1993. The eutrophication of Lake Victoria. Verh. Tnternat.Verein. Lirnol. 25: 39-48.

Hussey, J. and Hussey R. 1997. A practical guide for undergraduate and postgraduate students:151-163.

Kisaarno, P. S. 1969. Map of Uganda. Government Printers, Entebbe.

Kitakule. J. S. and Reynolds J. F. 1991. Fishing notes and records. Organisation and conduct of fishing community survey, Lake Victoria. Socio-economic Field Report No. 20. UGA/87/007.

Lowe-McConnell, R. 1997. EAFRO and after: a guide to key events affecting fish communities in Lake Victoria (East Africa). South African Journal of Science 93:570-574.

Matagi, S.V. 1998. Environmental Technology in Uganda: A country synopsis. In: Environmental Technology Assessment (EnTA) in Sub-Saharan Africa. UNEP-IETC Osaka/Shiga. Report 3: 259-277.

NWSC (2001). Management of Industrial and Municipal Effluents and Urban Runoff in Lake Victoria Basin. Fishing Villages Vol: II. Consultancy Report prepared by Mott MacDonald in association with M & E Associates for the Government of Uganda, Ministry of Water, Lands and Environment, Lake Victoria Project, National Water and sewerage Corporation.

Sekaran, U. (1999). Research Methods for Business. Southern Illinios University at Carbonadale.

Statistics Department 1999. Uganda Table of Statistical Abstracts 1999. Entebbe

Tumwebaze, R. and Coenen, F. J. 1991. Report on the frame survey conducted in the Ugandan pail of Lake Victoria. UGA/87/007. BIOSTAT Group.

Vogt, W. Paul (1993) *Dictionary of Statistics and Methodology*, Newbury Park: Sage.