LAKE VICTORIA ENVIRONMENT MANAGEMENT PROJECT]

PILOT STUDY ON CATCH ASSESSMENT SURVEYS BY BMUs FOR SUSTAINABLE MANAGEMENT OF LAKE VICTORIA

By

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Summary

The need to have a functional CAS system for Lake Victoria fisheries, to monitor changes and have reliable indices of relative abundance for the management of fisheries resources has been realised by all stakeholders interested in the sustainability of the fishery resources. The necessity to restore and strengthen the CAS system was equally expressed and recognised under the LVEMP by World Bank 'Aide Memoir' (AIDE MEMOIR RECOMMENDATIONS SECTION 44).

Following these concerns, this study with an objective to evaluate the performance, the extent of training needed and the mechanisms to ensure reliable catch statistics are collected by the BMUs was conducted by TAFIRI in collaboration with District Fisheries Officers in three selected beaches in Mwanza Region. This pilot study was conducted for 18 days, six days in each of the beaches (Chole in Misungwi, Ihale in Magu and Kijiweni in Sengerema Districts respectively. Interviews, training and experimental data collection were conducted for two days each in the respective landing sites.

The interviews gathered information from 90 respondents of age group between 18 to 80 yrs. Their level of education mainly was Primary School Certificate (67%), 23% were Secondary School leavers while 7% were below standard VII and 3% illiterate. About 70% of all the respondents were willing to collect fisheries data on payment of TZS 1000/= to 3000/=. Among the 70 respondents, 26 (35%) were BMU members and 44 (65%) were non-members to BMUs. Training was in two sessions, first session was on 'the importances of catch statistics and the trends in catch and effort: management perspective and policy and planning for sustainable fisheries. Decline in CPUE as an indicator of overexploitation was emphasized. The effect of uncontrolled effort and impact of illegal gears and practises were detailed covered'. This session created awareness to all age groups of different education levels. The second session was on the data forms to be used. The terms used had to be elaborated and how to record and measure for the different parameters. This appeared to be technical due to the language used in the forms (English).

All the trainees in the respective landing sites attended the experimental data collection exercise. Their performance was judged during recording and measuring of fish, their promptness to follow a landing boat and keenness in the whole exercise. BMU membership

and being a residence were added qualities. Of the twelve members selected (4 in each of the three landing sites), 5 were BMU members and 7 non-members. Leaders of BMUs and of the village Councils were encouraged to oversee the operations and not to participate in the data collection directly. The non-members to BMU proved to be competent than some of the BMU members.

To overcome the main obstacle of limited and unqualified manpower after retrenchment, engaging the landing site communities, in particularly the BMUs, will ensure sustainability in data collection. However, training to create awareness and commitment, has to be conducted

A protocol to involve BMUs in CAS is detailed discussed but training before they are assigned any responsibility is crucial. Likewise, it is impossible to expect to get any valuable fisheries data without any investment. The payment of 2000/= or 3000/= Tanzanian Shillings per day has to be considered. More commitment is needed from the sector planners and managers to direct resources to monitoring of the fishery. The Fishery Department have to include CAS budget in her annual budgets to be approved and allocated as a budget line under government funds. However, the currently existing projects as LVEMP, SIDA and IFMP could be consulted to fund the reviving and establishment of a functional CAS system.

Caution is needed as BMUs may not be willing to portray their beaches to be non-compliant to management regulations and thus illegal gears may not be recorded. Occasional checks by fishery officers are very important. There is also a need for the research institution to conduct independent quarterly surveys to give an independent estimate of the stocks and monitor changes in CPUE and the fishing practises while collecting biological information, which may not be collected by the BMUs.

1. Introduction

An understanding of the historical patterns of exploitation of any fishery is a prerequisite in any attempt to perform stock assessment. What is known about abundance of fish populations and how the stocks respond to exploitation comes primarily from the analysis of catch records (Hilborn & Walters, 1992; King, 1995). Consequently, management of fisheries relies on the outputs of stock assessment for which a well-organised data collection system is required (Cowx, 1996). Fisheries are not static systems; they develop through dynamic processes, which involve several stages that can be monitored through the collection of information on catch and fishing effort either from what is being landed, i.e. fisheries dependent data collection, or from research surveys, i.e. fisheries independent data collection. As early as 1928 the need to monitor the status of Lake Victoria's fisheries was expressed when gill net CPUE started to decline (Lowe-McConnell, 1997). During the establishment of the East African Freshwater Fisheries Research Organization in 1947, a fisheries dependent monitoring system for data collection was established (Wanjala & Martens, 1974). With the collapse of East African Community in 1977, under the assistant of FAO Committee for Inland Fisheries of Africa (CIFA), each country operated independent systems for data collection in the late 1970s following the procedure designed under FAO with catch per boat per day as a sampling unit and a boat as a unit of effort (Bazigos, 1974; Lyimo *et al*., 1990; Rabuor, 1991; Orach-Meza, 1991). Amid lack of funds, equipment, and committed personnel the system has operated with problems and the reliability of the data is questionable (Bernacsek, 1986; CIFA, 1988; Reynolds *et al.*, 1989; Ssentongo, 1990).

In Tanzania, a fishery statistical collection system operated under the Fisheries Department, with fisheries staff stationed on the selected beaches. The daily catch per species and per canoe for as many days as possible was recorded. The data were then compiled at district and regional level, and sent to the Statistics Department of the Fisheries Department under the Ministry of Natural Resources and Tourism to produce annual statistical records (Ligtvoet & Mkumbo, 1991; Mous *et al*., 1991; Budeba & Mous, 1995). With decentralization in the early 1990s, the regional and district fishery staff came directly under the local governments, who were more interested in revenue collection than statistics and with retrenchments in the late 1990s further deterioration of the system occurred. As a result, there are no systematic annual fisheries statistics reports for the Tanzania part of the lake from 1995.

To monitor the 'health' of a fishery and to determine the effectiveness or otherwise of management strategies (King, 1995) time series data on catch and effort is the basic data required. The two frame surveys conducted in 2000 and 2002 have been of great use in establishing the current effort into the fishery in terms of gears and fishing canoes. Nevertheless, unless what those gears are landing is also monitored, such information has limited application in stock assessment. A good monitoring system depends on regular and personal contact with fishers (King, 1995; Hilborn and Walters, 1992) and catch and effort data is regularly collected. It is therefore crucial to resume the Catch Assessments Surveys (CAS) as immediately so that this crucial information is available for planning and evaluation of management measures.

Under the Lake Victoria Fisheries Research project (LVFRP) some initiatives were done to collect such data but covering only 9 beaches out of 597 beaches recorded during the frame survey (2000). Despite of the limited coverage, the data facilitated the current estimates of total yield and was as well used for extrapolation of trends from the last recorded catch and effort data in 1995. Nevertheless, time series catch and effort data is very important to monitor the 'health' of a fishery and determine the effectiveness of management strategies implemented. Catch assessment surveys under the LVFRP project were terminated in February 2001, but since then a number of management measures have been implemented and enforced as the ban of beach seines, under size gillnets (< 5") and slot size with no monitoring of the resources to evaluate the degree of success of the measures and the changes in the resource base and exploitation patterns.

The availability of funds, enough and competent manpower has been the main limiting factors. To overcome these, it is anticipated that the use of Beach Management Units (BMUs) in future surveys will be more cost effective and will provide personnel at spot in respective landing sites. However, this needs collaborative efforts between Fisheries Management and Fisheries Research Institutes to identify and train the selected BMUs likewise facilitating them. This was also recognised under the LVEMP by World Bank 'Aide Memoir' which recommended for a pilot phase of a Catch Assessment program to involve BMUs to be conducted by TAFIRI. The recommendation is here quoted *'This component should work closely with Fisheries Management component to develop a Catch Assessment Protocol that could eventually be implement by BMU's after a pilot phase implemented by TAFIRI. TAFIRI should then evaluate its eventual implementation by Fisheries Management*

Component through selected BMU's to determine the accuracy and efficiency of the protocol to provide this essential monitoring information on the fishery' (AIDE MEMOIR RECOMMENDATIONS SECTION 44).

This study, with an objective to evaluate the performance; the extent of training needed and the mechanisms to ensure reliable catch statistics are collected by the BMUs was conducted by TAFIRI in collaboration of District Fisheries Officers in three selected beaches. The sampling design started under the LVFRP Phase II was used as groundwork. TAFIRI – Mwanza centre has a stock assessment component responsible for collecting both the fisheries dependent and fisheries independent data, the former at a limited coverage due to financial and personnel limitations. However the experienced gained and the expertise was used to train the selected BMUs while evaluating their potentiality and the mechanisms to implement the actual program.

2. Objective of the survey

To conduct a pilot catch assessment survey involving selected BMUs to evaluate their potential in collecting fisheries catch statistics and suggest a protocol for CAS by BMUs.

Specific objectives:
- To establish mechanisms to effectively involve BMUs in CAS programme.
- To identify training needs of the selected BMUs such that they will be well equipped to conduct future CAS.
- To establish the needed personnel per landing site for accurate recording and realistic coverage.
- To conduct training and conduct an experimental data collection exercise with the selected BMUs
- To evaluate the efficiency of BMUs and come up with recommendations and the protocol of operation for the BMUs in CAS.
- To identify an incentive package for BMUs involved in CAS
- To identify possible risks in involving BMUs in the CAS program and suggest improvement measures.

3. SURVEY DATES
28th February to 20th March 2003.

4.   Selection of BMUs

Generally, landing sites for Lake Victoria fisheries are species specific and it was therefore important to have three sites, each for Nile perch, Dagaa and *O. niloticus*. Presence of a functional BMU at the given landing site was a key factor in the selection. However due to limited resources, the pilot study was designed for Mwanza Region with possibilities of extending to Mara and Kagera.

Pilot study area: (Mwanza Region)
- Ihale in Magu district was selected for Nile perch fishery
- Chole on the southern end of Mwanza Gulf in Misungwi district for *O. niloticus* and other endemic species.
- Kijiweni in Sengerema district was selected particular for Dagaa but Nile perch data was also recorded.

5. Methodology

- Questionnaires (Appendix 1) focusing on assessing the competence of the BMU members and their understanding on the importance of CAS and accurate data recording were used to identify the training needs of the BMUs in order to conduct the training and experimental data collection. Interviews were conducted for two days in each beach.
- Training to the BMU and other beach community members on the importance of CAS and accurate data recording followed the interviews for one day. The key parameters to be recorded were elaborated. The list of trainees is also attached (Appendix 2).
- Experimental data collection by interested Beach members under supervision of two researchers and a district fisheries officer was conducted for one day in each of the three landing sites. At the end of the day, the training team, BMU and village leaders and all the members participated in the experimental data collection convened to select 4 members to basing on their performance during the training, residence status and general conduct.
- The selected members (4 from each BMU) then collected data for 8 days without supervision.
- One researcher went in turn to collect the data forms.

- The research team using the questionnaires, observations during training and experimental data collection and the data forms did data analysis and evaluation of performance.

6. Results

6.1. Interviews: composition of the respondents and the perception on CAS.

The interviews gathered information from 90 respondents in total (42 from Ihale, 24 from Chole and 24 from Kijiweni). Of the total, males were 71 and females 19 giving a ratio of 1:3.7, F: M. The interview was biased to BMUs at the start but as it was realised that all members were not available on site, anybody encountered at the respective beaches and was willing to be interviewed was included.

The age group of respondents was between 18 to 80 yrs. In the age group of less than twenty yrs only one candidate representing 1.2%; Majority were in the age group of 20-40 yrs, 57 of them representing 63.3% and above 41 yrs were 32, which is 35.5% of all the respondents.

The level of education of the respondents was mainly at primary school certificates (67%), while 23% were of secondary education, 7% below standard VII and 3% illiterate.

The level of awareness varied considerably from beach to beach but BMU leaders in all the three beaches knew the importance and to some extent the use of CAS data. However, the willingness to get involved in the exercise had varied perceptions. Respondents who knew the importance of CAS data and could do on payment basis were about 37% and 9% could do voluntarily. Those who did not know the purpose of fisheries data collection but still could do on payment were about 39% while 7% of them could do on voluntary basis. In general, about 70% of all the respondents were willing to collect fisheries data on payment of TShs 1000/= to 3000/=.

6.2 Training: Training needs and the levels.

Training was conducted to 70 of the respondent of the interview of which 26 (35%) were BMU members and 44 (65%) were non-members to BMUs. Twenty of them did not turn in for the training. From the interviews, the topics to be covered for training were identified.

Training was in two sessions, first session was on 'why do we need catch statistics and the trends in catch and effort: management perspective and policy and planning for sustainable fisheries. Decline in CPUE as an indicator of overexploitation was emphasized. The effect of uncontrolled effort and impact of illegal gears and practises were detailed covered. Further emphasis was on why should fisheries data capture all these information and how will it be used eventually for management and planning purposes to ensure sustainability of the resources and thus livelihood to the communities. This session created awareness to all age groups at different education levels. All appeared to be convinced and eager to participate in CAS either by actual involvement or by convincing others to cooperate in providing the information required.

The second session was on the data forms to be used, the terms used and how to record and measure for the different parameters. This appeared to be technical due to the language used in the forms (English) in comparison with their level of education. Although all of the trainees were following but majority had to translate the terms to Swahili in their respective data forms. Language necessitated further elaborations especially with the abbreviations used.
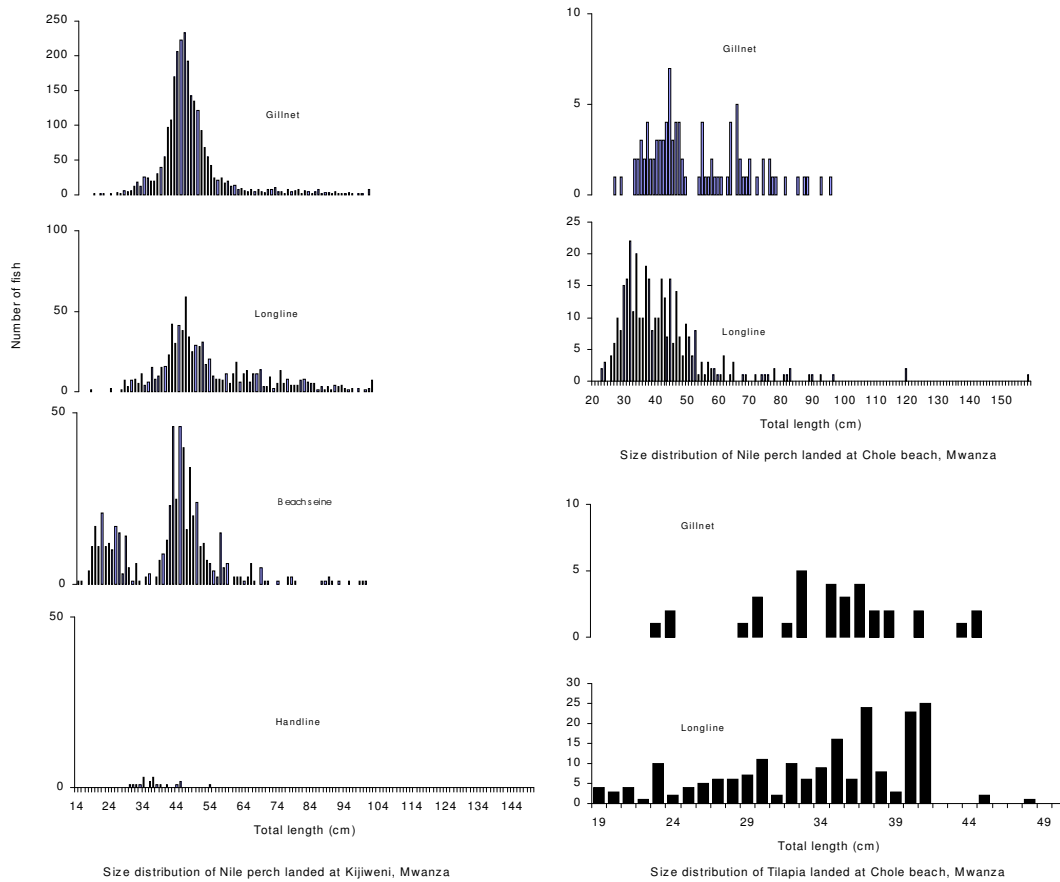
6.3. Experimental data collection and selection of beach members for data collection.

All the trainees in the respective landing sites attended the experimental data collection exercise. Their performance was judged during recording and measuring of fish, their promptness to follow a landing boat and keenness in the whole exercise. BMU membership and being a residence were added qualities. Of the twelve members selected (4 in each of the three landing sites), 5 were BMU members and 7 non-members. Leaders of BMUs and of the village Councils were encouraged to oversee the operations and not to participate in the data collection directly. The non-members to BMU proved to be competent than some of the BMU members.

6.4 Performance in the data collection exercise.

The selected members worked in pairs and thus made two teams in each of the three landing sites. Each team sampled an average of 11 boats per day. Some managed to sample a maximum of 15 boats. All parameters to be recorded were covered and there was no marked variation on the general landing site information amongst the teams. The lengths of Nile perch recorded per site are presented (Fig.1). Taking into consideration the differences observed in the use of different gear types and sizes, the distributions from the different

beaches appeared to be well recorded. Very few tilaapine species and other endemic species were recorded at Chole beach. Dagaa were recorded at Kijiweni but the collectors were not trained to measure lengths due to the level of precision required for Dagaa length measurements. Researchers can conduct independent quarterly surveys through which size distribution of Dagaa catches could be established.

Size distribution of Nile perch landed at Kijiweni, Mwanza

Size distribution of Nile perch landed at Chole beach, Mwanza

Size distribution of Tilapia landed at Chole beach, Mwanza

Figure 1. Length frequency distributions of Nile perch from the three beaches sampled during the study

Other details collected per beach are attached (Appendix 3). All the parameters to be collected were well recorded. The catch per boat and for different species was also recorded and even for by catches of haplochromines in the Dagaa fishery.

7. Discussion

7.1 The importance of CAS and the level of awareness of BMUs

Catch per unit of effort (CPUE) data is usually used as an index of fish abundance assuming that changes in CPUE accurately reflect changes in the abundance of fish in the stock. It is

therefore important to have catch and effort data reflecting the real situation in the fishery. Most of the problems in using CPUE data to accurately reflect the changes in fish abundance are related to the way fishing effort is recorded. With the changing fishing practices especially for Nile perch fisheries where there is active gillnetting and triple vertical joining of nets; and with the decline in Nile perch catches forcing fishermen to shift to dagaa, *O.niloticus* and the other species, it is imperative to have a consistence system of statistical data collection for management purposes.

During the current study, about 46% of the respondents were completely unaware of the need and use of fisheries data and considered it to be only a bother to the fishers. Although 70% of them were willing to get involved in the surveys but it was only on payment basis. It is therefore important to find a mechanism to train the beach communities on the importance of collecting such data before they are entrusted the responsibility. From this study, after the training of two days BMU and other community members exhibited a reasonable capability to conduct the survey and at a minimum pay. The amount paid was Tshs 1950/= per day and it appeared to be acceptable with exception of few members who were expecting Tshs 5000/=, the same amount paid as lunch allowance during the training. The coverage of a mean of 11 boats per day per team gives an indication that one team of two members per selected beach will be sufficient for the CAS.

7.2 Protocol to involve BMUs in CAS

7.2.1. Training and selection of BMUs and respective beach community members

Fisheries Researchers in Collaboration with Fisheries Department should go from one landing site to another assessing the status of the BMUs and conduct training while at the same time selecting two members at each selected beach who will undergo an extra training of one day to be equipped to conduct the CAS. The selection should be done based on their willingness, enthusiasm, understanding, residence and general character. These attributes have to be confirmed by the BMU and village leaders as well as the community at large.

7.2.2. Selection of landing sites/beaches.

Allocation of sampling beaches: Stratified random sampling using proportional sampling i.e. allocation of sampling beaches in proportion to number of landing sites per region as follows
Landings per region:- (Frame Survey results)
Mara = 147

Mwanza = 284

Kagera = 167

Proportions per region

Mara = 147/(147+284+167) = 0.246

Mwanza = 284/(284+147+167) = 0.475

Kagera = 167/167+284+147) = 0.277

Number of beaches to be sampled

This has to be decided in relation to the manpower, financial resources and sampling days. Let X be total budget allocated for 10 days of data collection of which each recorder will be paid 2000/=. Then the total number of recorder (Y) will be X/(10days*2000/=). The total number of recorders = Y /2 (Two for each beach) will give the number of beaches to be sampled.

The total number of beaches ($Y/2$) is then allocated according to the proportions:

Mara = 0.246*Y/2 beaches

Mwanza = 0.475* Y/2 beaches

Kagera = 0.277* Y/2 beaches

Landing sites are first grouped into three strata: Large (with more than the average number of canoes in the region), Medium (with more than half of the average number of canoes to less than the average number) and Small (with less than half of the average number of canoes in the region).

> Mwanza region: with an average number of 27 boats per landing beach, is stratified as follows: Beaches under Large stratum = 122, Medium = 98 and Minor = 99 beaches. It advised to reallocate 50% of the (0.475* Y/2) beaches allocated to Mwanza region to the large stratum, with more than 27 canoes, 30% to medium stratum, with more than 14 to 26 boats and 20% to minor stratum, with less than 14 boats. These beaches will be selected using proportional sampling procedure based on the number of beaches under a given strata in a given district. Finally beaches with an established BMU or with members, which indicated during training to be competent in conducting the CAS will be selected accordingly. However, geographical location and main fishing grounds have to be considered in stratification to ensure wide coverage.

Mara region: with an average number of 25 boats per beach and 0.246*Y/2 beaches allocated for sampling, is stratified as follows: Large stratum 50% of 0.246*Y/2 beaches to sites with more than 25 boats; Medium: 30% of 0.246*Y/2 to sites with boats more than 12 and less than 25, and Minor: 20% of 0.246*Y/2 8 beaches to sites with less than 12 boats.

Kagera region: with an average number of 24 boats per beach and 0.277* Y/2 beaches, will also be stratified accordingly.

The average numbers of canoes in a landing site per Region have to be updated accordingly following the most recent Frame Surveys. However the stratification procedure will not change. Representation of the three main commercial species will form another level of stratification.

7.2.3.Sampling/data recording procedure

In each of the selected beaches, data will be collected for 10 days in a month and the days have to be coordinated such that Dagaa landing sites will all be sampling during the same days of moonless nights. Fixed days in a month could be agreed for the other fisheries and Fisheries officers in the respective sites will have to ensure conformity.

Data forms have to be channelled to the districts and eventually to the researchers, who after analysis have to send reports to the Fisheries department.

Funds for the recorders and the forms have to be processed and distributed by and through the District Fisheries Officers who happen to have motorcycles.

District Fisheries Officers in collaboration with BMU leaders will be the overseers of the whole operations and can make occasional checks to ensure data is accurately collected.

7.3. Source of funds

To ensure sustainability of the CAS operation, the Fisheries Department have to include its budget in the Department budgets for the respective financial year. Dependence on project funds can assist to initiate the process and establish a functional system. Once a system of

CAS is restored and is operational, the Fisheries Department have to own the system and include it in the financial budgets.

8. Conclusion and recommendations

The need to have a functional CAS system for Lake Victoria fisheries, to monitor changes and have reliable indices of relative abundance for the management of fisheries resources cannot be overemphasized. CPUE can be a useful index of the size of a given stock, if the sources of variability are minimized through standardization of data collection. Without reliable time series trends in CPUE it is impossible to track changes in the abundance of the stocks supporting a fishery at levels where sustainable yield can be regulated. According to a generalised development model of uncontrolled fisheries, which is currently the situation in Lake Victoria, a collapse phase is expected unless fishing effort is controlled and carefully managed (Hilborn & Walters, 1992). With the brake-down of the CAS system in Tanzania from 1995, it is difficult to establish the trends in the fishery and the levels of exploitation which makes management of the fishery very difficult as it is easy to set limits in fishing effort than reduce effort after overcapacity. It is therefore essential to restore and strengthen the CAS system to collect the fisheries dependent data.

To overcome the main obstacle of limited and unqualified manpower after retrenchment, engaging the landing site communities in particular, the BMUs will ensure sustainability in data collection. However, training to create awareness and commitment has to be conducted while collaborative efforts to select competent personnel among the BMU and other community members have to be undertaken by the fisheries staff and community leaders but basing on performance during training, residence status and general conduct. Once data recorders are identified and trained, the second main obstacle, which is the availability of funds, has to be talked. It is impossible to expect to get any valuable fisheries data without any investment. The ideas of involving BMUs without any payment may again lead to unreliable data and luck of dedication. It was only about 8% of the respondents were willing to conduct the survey without payment. The payment of 2000/= or 3000/= Tanzanian Shillings per day for only ten days in a month times the total number of selected beaches have to be considered.

More commitment is needed from the sector planners and managers to direct resources to monitoring of the fishery. The Fishery Department have to include CAS budget in her annual budgets to be approved and allocated as a budget line under government funds. However, the currently existing projects as LVEMP, SIDA and IFMP could be consulted to fund the reviving and establishment of a functional CAS system.

With the current set-up in the Lake Victoria fisheries, where there is a rampant use of illegal gears and fishing practises due to high demand to fish processing factories as well as the local market; urgent measures are needed to ensure fisheries statistics are collected. Caution is needed during selection of the data collectors, as they will be community/BMUs members, and may not be willing to depict their beaches to be non-compliant to management regulations. Occasional checks by fishery officers in their respective areas are very important.

Although the forms for CAS were regionally harmonised and are in English, there is a need to translate them to Swahili to ensure they are clearly understood by the data collectors and they are not forced to memorize the terms.

The research institution could be conducting independent quarterly surveys to give an independent estimate of the stocks and monitor changes in CPUE and the fishing practises while collecting biological information, which may not be collected by the BMUs.

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13. Appendices
Appendix I

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TANZANIA FISHERIES RESEARCH INSTITUTE (TAFIRI)

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LAKE VICTORIA ENVIRONMENT MANAGEMENT PROJECT (LVEMP)

QUESTIONNAIRE ON CATCH ASSESSMENT SURVEYS

Date__ / ____ / ____   Number----------------------

Region_____   District_____   Village_____   Beach _____

Dear Respondent

The fisheries of Lake Victoria continued to decrease every year because of high flocking of people into the fishery. People find it simple to engage themselves into fisheries due to its nature of being a free access enterprise. Reliable estimates of fish abundance of the fishery are commonly known from catch and effort data. This can be achieved if the plan and system of collections are in place. Good data can bring reliable estimates of fish abundance hence; proper management decisions of the fishery. The main purpose of this questionnaire is to gauge your capability and understanding of fisheries catch statistics that are collected regularly by the fisheries Officers. I hope you will be willing and cooperative to answer precisely this questionnaire. At the end we shall use this questionnaire to get the right candidates that will assist in collecting fisheries catch data.

1. **Name of respondent:** _____ **Sex:**   Male   Female
2. **Age:**   _____
3. **Level of education:**

Illiterate	Other (specify)
Adult Education	
Primary education	
Secondary education	

4. **Duty: (tick):**

Fisherman	Businessman
Farmer	Civil servant
Boat Maker	Boat engineer
Headsman	Other (specify)

5. **Have you ever heard of fisheries catch assessment surveys? (Tick with V).**
   Yes   No
6. **Have you ever participated in fisheries statistical data collection exercise?**
   Yes   No
7. **What type of fisheries statistical data did you collect?**

Counting of boats and fishermen	Measuring of water
Measuring weight of fish	Counting of birds found along the lake shore
Measuring length of fish	Other (specify)

8. **What type of fish do you know? (Tick with V)**

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Oreochromis (Sato)	*Rastrineobola* (Dagaa)
Clarius (Mumi)	*Brycinus* (Soga)
Lates (Sangara)	*Bagrus* (Hongwe)
Synodontis (Gogogo)	*Labeo* (Ningu)
Schilbe (Nembe)	*Protopterus* (Kambale mamba)
haplochromine (Furu)	*Mormyrus* (Mbete)

9. **If you have collected fisheries catch statistics what type of fish were you measuring?**

Oreochromis (Sato)	*Rastrineobola* (Dagaa)
Clarius (Mumi)	*Brycinus* (Soga)
Lates (Sangara)	*Bagrus* (Hongwe)
Synodontis (Gogogo)	*Labeo* (Ningu)
Schilbe (Nembe)	*Protopterus* (Kambale mamba)
haplochromine (Furu)	*Mormyrus* (Mbete)

10. **Do you know the importance of collecting fisheries statistical data?**
    Yes   No

11. **If the answer is <u>Yes</u> Explain** _____

12. **Can you differentiate male from female fish?**
    Yes   No

13. **If the answer is <u>Yes</u> what type fish can you differentiate (specify)** _____

14. **What fishing gear do you know?**

Gillnets	Beach seine
Hook and line	Poison fishing
Dagaa fishing gear (Hurry-up and Lift net)	Other (specify)

15. **What fishing vessel do you know?**

Sese pointed both ends	Out board engine
Sese pointed one end	Karua
Ngama	Other (specify)

16. **What means of boat propulsion do you know?**

Paddle boat	Out board motor engine
Sail boat	
In board motor engine	Other (specify)

17. **Can you differentiate a fishing boat from fish collector boats?**
    Yes   No

18. **Suppose you are selected to collect fish catch data do you have time to do the work?**
    Yes   No

19. **If the answer is <u>yes</u> do you expect any payment?**
    Yes   No

20. **If the answer is <u>yes</u> what sort of payment do need?**
    (Specify)………………………………………….

21. **If payment is in terms of money how much do you intend to be paid per day?**

22. **Give your opinion with regard to fish catch data collection:** _____
_____

Recorder: _____

Address: _____