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FISHCODE

MCS

REVIEW OF A MONITORING, CONTROL AND SURVEILLANCE SYSTEM FOR LAKE TANGANYIKA FISHERIES

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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REVIEW OF A MONITORING, CONTROL AND SURVEILLANCE SYSTEM FOR LAKE TANGANYIKA FISHERIES

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PREPARATION OF THIS DOCUMENT

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1. INTRODUCTION

By the late 1980s, it was recognized that fisheries resources could no longer sustain a rapid and often uncontrolled exploitation and that the devising of new approaches to fisheries management embracing conservation and environmental considerations was urgently needed. A number of global initiatives were organized on this matter in the early 1990s[1] and led to the preparation of an international Code of Conduct for Responsible Fisheries (CCRF) by FAO. The CCRF, which was unanimously adopted on 31 October 1995 by the FAO Conference, provides a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment. Among the CCRF principles that should guide States in the management of their aquatic living resources, two are particularly relevant to our study –

(i) "Conservation and management decisions for fisheries should be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic and social factors. States should assign priority to research and data collection in order to improve scientific and technical knowledge of fisheries including their interaction with the ecosystem. In recognizing the transboundary nature of many aquatic ecosystems, States should encourage bilateral and multilateral cooperation in research, as appropriate."[2]

(ii) "States should establish, within their respective competencies and capacities, effective mechanisms for fisheries monitoring, surveillance, control and enforcement to ensure compliance with their conservation and management measures, as well as those adopted by subregional or regional organizations or arrangements." [3]

The purpose of MCS entails two major aspects – (1) ensure compliance with fisheries management rules; and (2) collect scientific and other information relating to fishing activities on the basis of which sound fisheries management measures can be devised.

Today, the widespread failure of fisheries management is generally attributed to the inability of regional organizations, States or local authorities to enforce successfully or otherwise ensure compliance with their fisheries regulations and to monitor closely and accurately the behavior and performance of the fishers. Therefore, it is critical to improve the effectiveness of monitoring, control and surveillance (MCS) systems to ensure the sustainable use of the world's fisheries in general and that of Lake Tanganyika in particular.

Prior to any further consideration, it is important to understand what the concept of MCS refers to. There is ample literature on the subject of MCS and several definitions and interpretations can be found. Those retained in this document were established by the FAO MCS Conference of Experts held in Rome in 1981 and are defined as follows –

(i) Monitoring is "the continuous requirement for the measurement of fishing effort characteristics and resource yields[4]."

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[1] They include the International Conference on Responsible Fishing, held in Cancun 1992, the United Nations Conference on Environment and Development (UNCED), in particular its Agenda 21, and the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, adopted in 1995.

[2] Article 6 on general principles, 6.4, p. 5.

[3] Article 7 on fisheries management, 7.1.7, p. 17.

[4] Note that in the Lake Tanganyika Monitoring Programme, monitoring is defined as "the systematic recording and periodic analysis of information" (Mannini 1999).

(ii) Control is "the regulatory conditions under which the exploitation of the resource may be conducted.";

(iii) Surveillance is "the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities."

The main purpose of this paper is to review the MCS system for Lake Tanganyika fisheries through the assessment of – (1) the feasibility of both the monitoring programme (section 3) and the proposed management measures set out in the FMP (section 4); and (2) the adequacy of MCS regulations provided for in the fisheries legislation of the four lacustrine States (Zambia, Democratic Republic of Congo, Tanzania and Burundi) for establishing and implementing both such programme and measures (section 5).

2. Role of MCS in fisheries management[5]

This section examines the role of MCS in the various stages of the fisheries management process. Such process can be broken down in three distinct phases – (a) formulation of fishery policy; (b) formulation of management plan; and (c) implementation.

(a) Formulation of fishery policy

When considering which type of MCS systems would be most suitable to ensure sustainable utilization of the fisheries resources occurring in the waters placed under their countries' jurisdiction, fisheries managers in the four lacustrine States should have due regard to –

(i) the costs of the proposed MCS system;

(ii) the feasibility of the MCS approach; and

(iii) the characteristics of the fisheries to which such system should apply.

(i) The costs of the proposed MCS system should be commensurate with the value of the fishery to the users or society. In order to make the proper decision, fisheries managers would need to have adequate information, *inter alia*, on the role of the fishery in providing employment to different interest groups and on the contribution of the fishery to food security.

(ii) The feasibility of a MCS approach is dependent, to a large extent, upon the human and financial resources available to the various agencies, administrations or institutions responsible for its carrying out. Therefore, precise and updated information on the quantity and quality of relevant staff and the availability and maintenance of MCS equipment should be made available to decision-makers. Only approaches, which are feasible, should be considered.

[5] The analysis presented in this section summarizes the essence of the principal provisions of the guidelines relating to MCS provided for in the FAO Technical Guidelines for Responsible Fisheries on Fisheries Management (No 4, 1997).

(iii) The type of MCS system to be adopted should be tailored to the characteristics of the fishery.

(b) Formulation of management plan

Availability of accurate and relevant information is crucial for management planning. It is the responsibility of fisheries management authorities to set up and supervise the structures and mechanisms for routine collection and analysis of the necessary data. The data to be collected should not be limited to biological information, but should also include environmental, economic and social aspects of the fisheries as well as basic information on fishers, boats and fishing gears.

The verification and validation of data is essential to ensure it is accurate and complete, as the risks of collecting erroneous or inappropriate data is very high. Methods to validate data vary with the type of data to be verified and include[6] –

(i) checking logbooks against landings data;
(ii) sampling catches for species composition;
(iii) inspecting data collection methods by statistical staff; and
(iv) interviewing fishers.

It is recognized that fish stocks must be managed as units or conservation and management measures will almost certainly fail to achieve the desired objectives. Where stocks are shared between different countries, as is the case in Lake Tanganyika, this requires cooperation between management authorities of the concerned countries. The task of cooperative management is best achieved through the devising and adoption of a common data collection system, based on common definitions, classifications, methodologies and standardized format.

Adequate training of staff involved in the analysis of collected data is critical as interpretations and conclusions derived from them will furnish the basis upon which conservation and management measures will be devised. Only conservation and management measures, which are feasible, should be considered.

(c) Implementation

Ensuring compliance with conservation and management measures is critical to achieve responsible fishing. Unfortunately, failure of management fisheries is widespread and generally due to the inability of enforcement authorities to adequately carry out their tasks. Surveillance operations must be tailored to the value and characteristics of the fishery and must be commensurate with financial resources available. Where small-scale fisheries predominate, as is the case in Lake Tanganyika, it is usually recommended to foster strong awareness of the need for conservation and management and develop cooperative MCS systems based on control of access to certain areas by local communities. In addition, it is important to ensure that penalty schemes provided for in fisheries legislation act as deterrents so as to dissuade fishers from violating management measures.

[6] FAO Technical Guidelines for Responsible Fisheries on Fisheries Management, No. 4, 1997, p.28.

3. Monitoring

This section, based on LTR reports prepared by Mannini (1999) and Cacaud (1999), reviews the data collection system proposed in LTMP, examines provisions on monitoring provided in national legal frameworks in order to assesses their adequacy for implementing such data collection system and formulates recommendations.

3.1 Lake Tanganyika Monitoring Programme

The main objective of the Lake Tanganyika Monitoring Programme (LTMP), which will form an integral part of the FMP, is to ensure the continuous monitoring of key parameters[7] of the lake ecosystem, and hence to provide information on the lake productivity.

The LTMP will be implemented on a regional basis using national expertise developed during the execution of the Scientific Sampling Programme in the framework of the Lake Tanganyika Research (LTR) Project. National competent departments or research institutions will be responsible for the carrying out of the LTMP under the supervision of a Regional Coordinator to be appointed on a yearly basis among the most experienced scientists in the region. Initially, labor costs will be supported by national administrations or institutions, while operational, maintenance and supervisory costs will be borne by external funding.

It was recognized that unless a practical approach was adopted, it would be impossible to implement successfully a monitoring programme in the Lake Tanganyika area. Hence, the mechanism of data collection, which is proposed in the LTMP, is based on the three following key elements - feasibility, simplicity and sustainability. Feasibility indicates that the proposed mechanism should be commensurate with both human resources (quantity and quality) and equipment available in research stations around the lake. Simplicity relates to the use and maintenance of equipment. Sustainability aims at ensuring the regular and long-term collection of data. Moreover, as it is a regional programme, emphasis is placed on the necessity to develop standard procedures for both collection and analysis of data in all four lacustrine States.

A systematic assessment of human resources and equipment available in each research station[8] around the lake was conducted in order to appraise – (i) whether the expertise available was adequate, both in terms of quantity and quality, to handle, process and analyze data relating to meteorology, water level, limnology, zooplankton and fish biology; and (ii) whether inventoried equipment was adequate and in good working condition to collect data relating to these fields. With regard to human resources, results of this survey show that generally expertise is considered to be satisfactory in both Mpulungu and Bujumbura, whereas it is insufficient in both Uvira and Kigoma. However, it was found that basic analysis capacity was inadequate in all four research stations. As regards equipment, it appears that apart from Uvira, available equipment in each research station would be sufficient to carry out basic data collection in all required fields, provided that necessary repairs and calibrations are executed as indicated in the LTMP.

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[7] The parameters to be monitored, as initially proposed by the Lake Tanganyika Research Working Group on Monitoring were the following – wind speed, gust and direction, air temperature, relative humidity, solar radiation, air pressure, rain fall, water level, water temperature, dissolved oxygen, transparency, vertical light penetration, chlorophyll a, zooplankton biomass, shrimp abundance, catch per unit of effort and composition of fish catch in relation to fishing gears and areas.

[8] Mpulungu (Zambia), Uvira (Democratic Republic of Congo), Kigoma (Tanzania) and Bujumbura (Burundi).

The choice of parameters to be included in the proposed LTMP was dictated by the feasibility of ensuring their constant monitoring and by the capacity of each research station to perform a basic analysis of the collected data. Hence, parameters were divided into two distinct categories, essential and desirable parameters. The latter, being parameters that cannot be immediately measured locally but that would need to be monitored once local circumstances would have improved.

In addition to the measurements of selected parameters, the proposed LTMP provides for – (i) the monthly sampling of commercial catches[9] at selected landing sites in all four lacustrine States in order to determine the catch composition by species and the fish size distribution; (ii) the collection of catch and fishing effort statistics so as to evaluate the catch per unit of effort (CPUE) and monitor changes in fishing capacity; and (iii) the collection of information on the socio-economic characteristics and the behavior of resource users in order to determine the most suitable management measures. Additionally, it recognizes the need to conduct periodic national catch assessment surveys and frame surveys on the lake.

3.2 Monitoring provisions in national legal frameworks

For the purpose of this paper, distinction is drawn between two broad categories of parameters, those relating to meteorology, water level, limnology and zooplankton on the one hand and those relating to fish, fisheries and the fishing industry on the other. The former are *objective* parameters that can be accurately measured by means of an instrument, provided it is properly calibrated, and include water temperature, chlorophyll a, wind speed and dissolved oxygen, whereas the latter, which are designed to assess fish catch and fishing effort cannot be simply measured by means of an instrument but require the collection of an array of information stemming from, *inter alia*, fishers interviews and fish catch sampling at landing sites. It is clear that all is needed to carry out measurements of parameters belonging to the first category is the availability of adequate equipment and its corollary the capacity of each national administration to make such equipment available. By contrast, collection of information that is necessary to assess parameters belonging to the second category not only depends on the capacity of the administration but also, to a large extent, on the collaboration of resource users. Enhancing resources users' collaboration may be best achieved through the adoption of legal provisions requiring their supplying prescribed data, as they do not naturally tend to volunteer information on their fishing activities.

This section examines monitoring provisions contained in fisheries legislation of each lacustrine State in order to assess their adequacy for collecting information on fishing activities and the fishing industry.

a) Zambia

The Fisheries Act No. 21 of 1974 empowers the Minister to prescribe the records to be kept and the information to be provided by any person fishing in a commercial fishing area [section 8 (2) (e)]. It also provides for the registration of both fishers and boats used for the purpose of commercial fishing (sections 9 and 10 respectively)[10]. In addition, the Minister may prescribe

[9] LTMP is designed to monitor catches of the three commercial pelagic fish stocks of Lake Tanganyika, namely, *S. tanganicae*, *L. miodon* and *L. stappersii*.

[10] Similar provision is provided in section 21 (1) (b) dealing with the Minister general regulatory powers.

records to be kept locally by Fishing Development Committees [section 21 (2) (c)].

The Fisheries Regulations 1986 stipulate that the Director of Fisheries may issue a fishing license subject to such terms and conditions as he or she thinks fit [section 9 (1)]. Although the type of conditions that may be imposed by the Director of Fisheries are not specified, this broad scope provision clearly enables him or her to subject the holder of a fishing license to the regular supply of catch record. Additionally, these regulations establish a register of fishing licenses in which information relating to both the licensee and the area in respect of which a license is granted should be entered.

The importance of collecting information pertaining to fishing activities is recognized by the draft fisheries bill[11] as no less than three distinct provisions deal with this issue –

(i) section 8 (1) (e) empowers the Minister to prescribe the records to be kept and the information to be provided by fishers;

(ii) section 52 (2) (i) is similar to that above but broader in scope as the Minister is authorized to require the keeping of records and the provision of statistical and other information by the Fisheries Service, Central Fisheries Board, Fisheries Management Boards and other management bodies;

(iii) section 12 (3) (f), which sets out required elements to be included in every fishery management plan, provides that such plan should specify the statistical and other data required to be reported in order to ensure effective management and development of the fishery management area to which it applies.

b) Burundi

The 1937 Decree on Hunting and Fishing, which is the principal fisheries law in Burundi, does not contain any monitoring provisions and in particular is silent on the issue of catch record keeping. Likewise, beneficiaries of exclusive fishing rights are not required to furnish to the administration any information on their fishing activities[12]. By contrast, the 1961 ministerial regulation on Fishing in Lake Tanganyika provides that conditions to fishing licenses include the provision of any information relating to fishing activities as prescribed by the Minister.

The need to collect information on fishing activities is emphasized and supported by a number of provisions in the draft fisheries bill[13]. It stipulates that the fisheries management plan must spell out the type of data to be collected and the procedures whereby they are to be collected [article 4 (2(b)]. Holders of fishing licenses are required to furnish all prescribed information on their fishing activities and their failing to do so may lead to the imposition of sanctions (article 6).[14] Moreover, the Minister is required to periodically order the execution of a

[11] 1997 draft fisheries bill (Kuemlangan 1997).
[12] 1932 Decree on Exclusive Fishing Rights (Decret du 12 juillet 1932 portant reglementation des concessions de peche).
[13] The 1998 draft fisheries and aquaculture bill, which is a variation of the 1992 FAO draft fisheries and aquaculture bill, is supplemented, *inter alia*, by a draft decree on exclusive fishing rights and draft fisheries regulations.
[14] Note that the 1992 FAO draft, on which the current draft is based, contained even more precise and compelling language as failure to furnish required information by a license holder was sanctioned by the

frame survey so as to gather information on fishing enterprises, professional fishers, fishing boats and fishing gears (article 5).

Contrary to the 1932 Decree on Exclusive Fishing Rights, the draft decree on territorial use rights explicitly requires the beneficiary of such rights to provide catch information (article 7 of Annex).

Lastly, the draft fisheries regulations require that the master of every industrial fishing unit operating in any water placed under the jurisdiction of Burundi keep a logbook (article 29). A copy of the logbook must be submitted to the Fisheries Department at the end of each fishing campaign (article 30). Failure to keep a logbook or to submit it to the competent authorities as well as falsification of the information entered into such logbook may be sanctioned by the suspension or the revocation of the fishing license (article 32).

c) DRC

As mentioned in section 3.2 (b) above, the 1937 Decree on Hunting and Fishing and the 1932 Decree on Exclusive Fishing Rights, which are also applicable to DRC, do not contain any monitoring provisions. However, the 1958 and 1959 fisheries regulations on Lake Tanganyika, applicable to the Kivu and Shaba regions respectively, stipulate in their article 9 that holders of industrial fishing licenses must provide information on their fishing activities to the Fisheries Department. Article 9 of the 1959 fisheries regulations specifies that catch report should include information on the weight of the catch per species of fish.

The draft fisheries bill[15] empowers the competent regional authority to carry out periodically a frame survey aiming at collecting information on fishing enterprises, professional fishers, fishing boats and fishing gears (article 18). It also contains a general provision requiring that all license holders and beneficiaries of exclusive fishing rights provide statistical data and catch information to the Fisheries Department (article 40). Failure to furnish such data and information is regarded as a serious offense and is punished accordingly [article 56 (1) (4)].

d) Tanzania

The Fisheries Act 1970 does not contain any specific monitoring provisions but enables the Minister to generally regulate the fishing industry and more specifically to make order prescribing the terms and conditions of fishing licenses [article 4 (3) (b)].

The Fisheries Principle Regulations 1986 require that every licensee furnish to the licensing authority records pertaining to fishing activities [article 19 (1)]. They also provide for the establishment of both regional registers [article (4) (2)] and a central register of fishing vessels [article 9 (1)].

3.3 Conclusions and recommendations

a) LTMP

It was indicated in section 2 (a) above that election of the most suitable MCS system for any

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suspension or cancellation of the fishing license (article 10).

[15] 1985 draft fisheries bill (Tavares 1985).

fisheries is generally achieved through the taking into consideration, by fisheries managers, of three major criteria, namely, the feasibility, the cost and the adaptation of the proposed MCS system to the characteristics of the local fisheries. Thus, it is proposed in this section to apply each of these criteria to the proposed LTMP in order to assess its general adequacy to carry out the monitoring of Lake Tanganyika fisheries[16].

Feasibility is undeniably one of the underlying principles that guided the devising of the LTMP, as proposed monitoring measures have been thoroughly tailored to the availability of both human and equipment resources in each research station around the lake (see section 3.1). For instance, though much needed, some measurements, such as light penetration and chlorophyll a, have been postponed based on the observation that equipment available was not working properly and that local expertise in research stations was insufficient to adequately use such equipment and satisfactorily analyze the collected information.

The cost of implementing the LTMP will initially require an estimated US $10,000 per country and per calendar year. An additional US $10,000, essentially covering travel and communication expenses, will be made available to the Regional Coordinator to carry out his or her functions. These funds will be provided by FAO and channeled to the Officers in Charge (OiC) of research stations through FAO representatives in each of the four lacustrine States. While costs of LTMP have clearly been kept to a minimum, they nonetheless exceed the current national capacity to bear such costs. Also, as external funding is only guaranteed for the initial period, it might be advisable to include in the LTMP a time frame and a scheme designed to ensure the long-term sustainability of this programme.

The LTMP offers a specific approach for the collecting of data and the monitoring of commercial fisheries in Zambia as characteristics of Zambian commercial fisheries differ substantially from those of the three other lacustrine States.

In conclusion, it appears that the approach adopted for the formulation of the LTMP is consistent with the FAO CCRF guidelines.

b) Legal frameworks

Current fisheries legislation in all four lacustrine States contains general provisions requiring fishers to furnish information on their fishing activities. However, no legal framework under consideration provides for a comprehensive set of regulations detailing the type, frequency and format of the information to be supplied. In addition, none of the fisheries legislation requires the conduction of periodic frame survey on fisheries and fishing industry. In this regard, it is important to note that both draft fisheries legislation in Burundi and DRC provide for the carrying out of such survey.

It is recommended that a comprehensive set of regulations, detailing the type, frequency and format of information to be supplied by fishers engaged in both artisanal and industrial fishing operations, be developed in all four lacustrine States in light of the measures proposed in the LTMP and that conduction of periodic frame survey, designed to assess the state of the fishing industry, be required by every fisheries legislation.

[16] Though criteria referred to in section 2 (a) were designed to guide fisheries managers in their choice of the most suitable global MCS system, it is assumed that these criteria can be equally used to assess the adequacy of a monitoring programme.

Once comprehensive sets of regulations referred to in the paragraph above would have been developed and information would be supplied on a regular basis, then mechanisms of validation and verification of data would have to be designed and incorporated in the LTMP in order to ensure the accuracy of the collected information.

4. Management measures proposed in the FMP

This section examines the feasibility of the management measures proposed in the FMP in view of local circumstances. Analysis of the legal provisions enabling the implementation of such measures is not included in this document but can be found in the LTR report on Institutional and Legal Aspects relating to the Management of Lake Tanganyika Fisheries (Cacaud 1999).

- Retirement/Phasing out of beach seining on the lake

As was recognized in the FMP, the phasing out of beach seining on the lake is heavily dependent on the availability of viable alternative fishing methods. Hence, the inclusion in the FMP of projects designed to develop, test and replicate such alternative fishing methods to seining (developmental accompanying measures).

- Establishment of prohibited fishing areas (beach seining and industrial fishing)

Use of prohibited fishing areas requires the capacity to patrol in these areas to ensure that infringements do not occur. This is likely to be problematic, as enforcement operations on the lake are currently quasi-inexistent. Establishment of prohibited fishing areas needs to be complemented by the devising of alternative enforcement schemes, e.g. involvement of fishers and local communities in enforcement activities (see section 5.2).

- Determination of licensing ceilings for both industrial fishing units in the south and lift net units in the north.

As was already indicated in the report on Institutional and legal Aspects relating to the Management of Lake Tanganyika Fisheries (Cacaud 1999), implementation of such measures should be accompanied by the inclusion of specific provisions in the FMP encouraging the negotiation and conclusion of access agreements between lacustrine States in order to ensure the redeployment of fishing units that would no longer be authorized to operate in their traditional fishing grounds.

- Use licensing systems as a means to control individual entry into fishery

It should be emphasized that fisheries legislation in all four lacustrine States already provides for licensing systems but that they have never been enforced in the Lake Tanganyika area. In addition, it is important to note that data provided by the socio-economic investigation (SEC) clearly indicate that in general fishers are strongly opposed to the idea of imposing any restriction on individual access to the lake fisheries. Implementation of this measure will therefore require an important effort of information and explanation.

- Control of access by local community and community-based management structures and mechanisms

Implementation of these two measures will require sound knowledge of customary fishing rights and traditional authorities (structure, powers) around the lake. Study of such rights and authorities should be provided for in the FMP.

5. Implementation

The main purpose of a MCS system is to ensure that fishery policy in general and the conservation and management arrangements for a specific fishery are implemented fully and expeditiously.[17] This section examines whether participatory mechanisms, enforcement and surveillance schemes and regimes of sanctions provided in fisheries legislation in all four lacustrine States are sufficient to ensure the proper implementation of the measures proposed in the FMP.

5.1 Participatory mechanisms

It is generally anticipated that the need for surveillance to ensure compliance with management measures will diminish with the participation of fishers and other interest groups in the decision-making process. Participatory mechanisms have indeed been designed to gain adherence of stakeholders to conservation and management measures in order to prevent repeated violations of such measures. Such mechanisms range from simple consultation with fishers and other interest groups to the delegation or devolution of powers to decentralized fisheries management bodies or local or traditional authorities. Although it should be the primary responsibility of fisheries management authorities to set up proper mechanisms of participation, it is clear that the establishment of what may be perceived by such authorities as the most suitable mechanism of participation may be contingent upon the decision of political authorities in view of the political implications that implementation of the proposed mechanism may have, e.g. devolution of powers to local or traditional authorities.

Principal participatory mechanisms provided for in fisheries legislation of the four lacustrine States are summarized below.

a) Zambia

The Fisheries Act No.21 of 1974 empowers the Minister to establish Fishing Development Committees in respect of any commercial fishing area (section 12). It does not specify whether such committees would serve purely advisory functions or would be vested with some regulatory powers. The Act does not contain any other provisions aiming at involving fishers or other interest groups in the decision-making process.

The draft fisheries bill establishes, at central level, a Central Fisheries Board serving advisory and coordinating functions (section 13) and comprising 10 members, out of which 7 represent fishing communities (section 14). It empowers the Minister to create Fishery Management Boards, which are advisory bodies, in respect of any fishery management area (section 18).

[17] FAO Technical Guidelines for Responsible Fisheries on Fisheries Management, No. 4, 1997, p. 67.

Each such boards is made of 10 members, out of which 6 represent traditional rulers and fishing communities (section 19). The Commissioner is required to consult Fishery Management Boards to prepare fisheries management plans in respect of fishery management areas (section 12). Moreover, the draft fisheries bill authorizes the Minister to delegate any of his or her powers under the bill to a Fishery Management Board or any person or group of persons. This may include the delegation of regulatory powers [section 8 (3)].

b) Burundi

The 1937 Decree on Hunting and Fishing and the draft fisheries bill do not provide for the participation of fishers or other interest groups in the management process.

c) DRC

As indicated above, the 1937 Decree on Hunting and Fishing does not contain any participatory mechanisms.

The Ordinance No. 274/Agri of 1945 empowers provincial Governors to establish a Local Fisheries Committee in each province. Few such committees were established and nowadays are no longer in operation.

The draft fisheries bill creates a National Fisheries Committee at central level to advise the Fisheries Commissioner on all fisheries-related matters (article 7). Its composition is to be defined by regulation. It also establishes Regional Fisheries Committees to advise competent regional authorities on all fisheries-related matters (article 8). The number of members of such committees may vary from one region to another but should include representatives of fisher associations and cooperatives [article 9 (3)]. Regional Fisheries Committees must prepare regional fisheries management plans in consultation with fishers and other interest groups (section 12 (4)] and should be consulted for advice prior to the devising of fisheries regulations by regional Governors [article (20) (3)].

d) Tanzania

The Fisheries Act 1970 does not contain any type of participatory mechanisms.

5.2 Enforcement/surveillance

The report on Institutional and Legal Aspects relating to Lake Tanganyika Fisheries has shown that fisheries management authorities around the lake have very limited resources to carry out surveillance operations both on the lake and onshore. Local circumstances indicate that this situation is unlikely to change any time soon. Therefore, strengthening of traditional surveillance mechanisms such as patrolling should be ruled out and alternative options should be envisaged. Particular attention should be given to –

(i) the involvement of fishing communities in enforcement activities; and

(ii) control of access to inshore fisheries by local communities.

The first option would be easier to achieve where fishers actively participate in the decision-making process, as they would tend to naturally assume greater responsibility for

surveillance. Adoption of such approach may also require formal recognition of certain individuals in local communities as "local enforcement inspectors". Fisheries management authorities would then have to design the procedures whereby individuals could be appointed as local enforcement inspectors. They would also have to determine the extent of the powers to be granted to such inspectors. These powers should be clearly spelled out in the law and may either coincide with or be less than those granted to other enforcement inspectors.

The second option, which is part of the measures proposed in the FMP, is based on the recognition of local customary rights. Its implementation would therefore require an assessment of the existence of such rights around the lake and an appraisal of the capacity of traditional authorities to enforce these rights. One may think that civil wars that have engulfed both the DRC and Burundi over the past decade may have eroded the powers of traditional authorities around the lake in these two countries.

5.3 Regime of sanctions

It is widely recognized that penalties sanctioning violations of fisheries regulations should be sufficiently severe to deter fishers from repeatedly infringing upon such regulations. Consequently, the level of fines should be commensurate with fisher revenues[18] and periodically adjusted to reflect, *inter alia,* significant changes in fisher incomes or devaluation of local currency. To be complete the regime of sanctions in every fisheries legislation of the four lacustrine States should make provision for the suspension and/or revocation of fishing licenses[19].

5.4 Recommendations

In light of the above, it is recommended to -

(a) Introduce some form of participatory mechanisms in both fisheries legislation of Burundi and Tanzania.

(b) Ensure consultation with fishers and other stakeholders prior to the devising of fisheries regulations in all four lacustrine States.

(c) Study customary fishing rights around the lake to determine whether access control mechanisms to inshore fisheries by local communities can be designed and implemented.

(d) Devise mechanisms of enforcement involving local communities in light of the study provided for in item (c) above.

(e) Reassess the regime of sanctions provided for in fisheries legislation of all four lacustrine States.

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[18] This information may not be readily available but can be obtained through the carrying out of frame surveys.

[19] Fisheries legislation of all four lacustrine States provides for the revocation and/or suspension of fishing licenses -

- in Burundi, article 69 of the 1937 Decree on Hunting and Fishing and article 14 (2) (b) of the draft fisheries and aquaculture bill;
- in DRC, article 69 of the 1937 Decree on Hunting and Fishing and article 62 of the draft fisheries bill;
- in Zambia, section 16 of the Fisheries Act No. 21 of 1974 and sections 30 (1) (b), 41 (c) and 42 of the draft fisheries bill;
- in Tanzania, section 16 of the Fisheries Principal Regulations.

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