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Report of the

EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

Georgetown, Guyana, 4–7 September 2007

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EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

Georgetown, Guyana, 4–7 September 2007

compiled by

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PREPARATION OF THIS DOCUMENT

This document is the final report of the FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery that was held in Georgetown, Guyana, from 4 to 7 September 2007. Financial support for the Expert Consultation was provided by the FAO FishCode Programme through the FishCode Trust (MTF/GLO/125/MUL).

The purpose of the Expert Consultation was to generate practical guidance regarding the range of funding arrangements that are available for funding fisheries management as part of FAO's ongoing efforts to assist countries in the implementation of the FAO Code of Conduct for Responsible Fisheries.

This document includes the recommendations and guidance as well as coverage of the discussions regarding key components of successful fisheries management regimes, the means to fund and deliver fisheries management services, and the different ways to put these practices into effect. The document also includes the extensive background documentation prepared for the Expert Consultation about the best practices in sustainable, effective and cost effective fisheries management as well as six case studies expanding on how different countries finance fisheries management.

Metzner, R. (comp.)
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ABSTRACT

The *Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery* was intended provide practical information, guidance and recommendations useful to agencies interested in examining their fisheries management funding arrangements as part of facilitating more informed choices regarding funding options, the allocation of scarce resources, and improving overall performance.

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries – benefits that can be considerable as has been demonstrated in a number of countries.

The dilemma that often faces countries is that the management to capture long-term benefits often involves considerable expenditure in both transition arrangements and in ongoing management costs. These costs often exceed the funding available to fisheries management agencies through normal government appropriations. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where public funding to support the management of fisheries is often limited.

Three key questions were addressed:
• How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
• Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)? and
• Who is best situated to provide specific fisheries management services (government or private sector)?
Overall, the group recommended that FAO should both develop Technical Guidelines on Funding Options for Successful Fisheries Management and hold an expert consultation to further elaborate the transitional issues of moving to sustainable fisheries, with a view to developing technical guidelines on this complex topic.

CONTENTS

PART I – RESULTS OF THE EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

RECOMMENDATIONS AND GUIDANCE

Successful fisheries management regimes

1. The group[1] recognized that there are a growing number of international experiences of successful fisheries management that contribute to economic development which provide valuable lessons for the future.
2. The group agreed that there are five main components of successful fisheries management, involving interrelated functions and activities. These components are objectives and policy, legislation and regulations, institutional arrangements and capacity, decision-making process, and applied fisheries management activities (research, administration and management, compliance and enforcement).
3. The group agreed that for these main components to be effective, fisheries management policy should:
   - provide clear direction that is relevant to local circumstances;
   - be elaborated in collaboration with stakeholders where appropriate;
   - provide for sufficient institutional capacity to ensure objectives are met;
   - be supported by political leaders; and
   - have the ability to address and deal with conflicts and often competing objectives.

Fisheries management funding arrangements

4. The group recognized that there is a range of potential arrangements for funding fisheries management.
5. The group recognized that funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific fisheries management regime that is used.
6. The group recognized that most countries fund fisheries management through government appropriations.
7. The group agreed that cost recovery is a desirable tool for funding fisheries management services as it improves accountability and efficiency.
8. The group agreed that costs are best attributed to those who primarily benefit and that costs need to be directly linked to defined services for effective recovery.
9. The group agreed that cost recovery in marginal fisheries may be inappropriate without management reform designed to improve financial viability.
10. The group recognized that there are very few examples where service provision is formally delegated from government to the private sector but concluded that this approach has considerable potential.
11. The group recognized that there is a range of mechanisms for generating government revenue (e.g. access, license, and other fees) and agreed that these should be distinguished from cost recovery when they are not directly linked to specific services.
12. The group agreed that care should be taken in applying revenue-generating mechanisms because the way they are applied will affect the behaviour of resource users.
13. The group noted that self funding provides an opportunity for groups to increase their involvement in fisheries management and is an effective approach, when used appropriately, because it ensures that delivery of services is directly accountable to those who pay for the services.

[1] The term “group” is used to refer to the participants in the Consultation.

14. The group noted that partnerships and collaborative arrangements have the potential for galvanizing support to address particular fisheries management issues.

15. The group emphasized that donor assistance is of critical importance to underpin fisheries management activities, while recognizing the risk of creating dependency on external funding and diverting attention from critical national policy objectives.

Delivery of fisheries management services

16. The group recognized that the essential roles for government to perform in fisheries management are to set policy; establish and implement laws; undertake some elements of enforcement; ensure quality of services provided through outsourcing, and to establish access and allocation arrangements.

17. The group agreed that there is flexibility in the provision of all other fisheries management services and that the private sector may be well suited to deliver many of these services.

18. The group recognized that fisheries management funding is often both scarce and difficult to reallocate and also identified opportunities and mechanisms for prioritizing and allocating financial and human resources (e.g. risk-opportunity analysis, market-based approaches, etc.).

Strategy development

19. The group recognized the importance of having a robust strategy for achieving cost-effective fisheries management and noted the difficulties of generating support to introduce necessary management changes.

20. The group noted that many countries currently have a development focus targeted at increasing fish production, whereas the move to sustainable fisheries often requires the imposition of constraints that limit harvests.

21. The group identified a variety of conditions (e.g. changes in stock status, political changes, responding to natural disasters, etc.) that may provide the impetus to embark upon fisheries management change and outlined a series of steps that may be followed when developing and implementing a fisheries sector strategy.

Transition considerations

22. The group recognized the importance of an effective transition process when fundamental changes in fisheries management are considered and noted that this process is complex and may take many years.

23. The group agreed on a range of factors to be considered when developing a plan for transitioning to successful and cost-effective fisheries management and noted that the sequence of transitional steps is critical and dependent on the particular conditions and circumstances of the country concerned.

24. The group agreed that transitional issues are of such fundamental importance that the topic warrants further elaboration.

Overall

25. The group recommended that FAO should:

- develop Technical Guidelines on Funding Options for Successful Fisheries Management; and
- hold an Expert Consultation to further elaborate the transitional issues of moving to sustainable fisheries, with a view to developing technical guidelines on this complex topic.

PART II - REPORT OF THE EXPERT CONSULTATION ON LOW-COST FISHERIES MANAGEMENT STRATEGIES AND COST RECOVERY

INTRODUCTION

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries. The benefits that can be derived from management of fish stocks for long term sustainability can be considerable as has been demonstrated in a number of countries.

However, the dilemma that often faces countries is that such management to capture long term benefits often involves considerable expenditure in both transition arrangements and in ongoing management costs. These costs often exceed the funding available to fisheries management agencies through normal government appropriations. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where public funding to support the management of fisheries is often limited.

In addition to fisheries management activities, there are a number of emerging initiatives that have the potential to increase the funding pressures faced by fisheries management agencies, including such things as ecosystem management, the Code of Conduct for Responsible Fisheries (CCRF) and associated International Plans of Action, ecolabelling, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

To implement fisheries management, these and other emerging initiatives, there is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities. For example, the overall performance of a fisheries management programme can be enhanced by making informed decisions concerning the allocation of funds to alternative fisheries management activities, securing stable funding for fisheries management expenditures and considering who can most efficiently provide fisheries management services (government or private sector).

A detailed examination of the funding issues described above can help address one of the most fundamental problems faced by fisheries management agencies worldwide, which is the lack of adequate funding and the many competing uses for the funds that are available.

The primary objective of the Expert Consultation was to provide practical information and tools that will be useful to agencies interested in examining their fisheries management funding arrangements.

It is important to stress that the intent is not to instruct governments and fisheries management agencies on how to allocate their budgets but rather to make available information that can facilitate more informed choices when faced with funding options.

Three key questions were addressed:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

The following reports were prepared for the consultation:

- Case studies in fisheries management from Ghana, India, New Zealand, Nicaragua and Sweden;
- Best practices in sustainable, effective and cost-effective fisheries management in LIFDCs; and
- Financing fisheries management in LIFDCs.

This Report of the Expert Consultation highlights key findings and conclusions, as well as recommendations for further work. The focus was on practical information that will be useful to agencies interested in examining their fisheries management funding arrangements with a view to improving overall performance.

OPENING OF THE EXPERT CONSULTATION

The Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery was held at the Grand Coastal Hotel, Le Ressouvenir, Georgetown, Guyana, from 4 to 7 September 2007 at the kind invitation of the Government of Guyana. The list of experts who attended the Consultation is attached as Appendix B. The experts were selected on the basis of their specialized knowledge. They served in their personal capacities and not as representatives of their respective governments or organizations.

Fisheries experts from Australia, Canada, Ghana, Guyana, India, New Zealand, Nicaragua, South Africa and Sweden participated in the Consultation.

At the official opening of the Consultation, the Acting Chief Fisheries Officer of Guyana, Mr Tejnarine Geer, welcomed the participants, and said that it was an honour for Guyana to collaborate with FAO in hosting the Expert Consultation. He noted that Guyana and countries of the Caribbean region have a duty to ensure that the fisheries resources of the region were utilized and managed in a sustainable manner to support the high consumption of fish and to contribute to the food security.

After welcoming the participants and specially invited guests on behalf of the Director-General of FAO, Mr Jacques Diouf and the Assistant Director–General, Fisheries Department, Mr Ichiro Nomura, Mr Bisessar Chakalall, Secretary of the Western Central Atlantic Fishery Commission, took the opportunity to express sincere appreciation and thanks to the Government of Guyana for hosting the Consultation and for their kind hospitality. He mentioned that the Consultation was about the challenges being faced by developing countries, like Guyana, in funding fisheries management activities. He noted that one of the main objectives of the Expert Consultation was to explore cost effective funding arrangements that have the potential to support fisheries management activities in Low-Income Food-Deficit Countries (LIFDCs) and developing countries and the application of appropriate funding arrangements to support essential fisheries management activities.

The Minister of Agriculture of Guyana, Honourable Robert Persaud, then welcomed the participants and guests to the opening session of the Consultation on behalf of his Government. He noted that according to FAO the overall potential from wild capture fisheries from the oceans has been reached. Given the tremendous increase in world trade of fish and fisheries products, the current high demand may only be met through a more cautious and effective fisheries management, aimed at maintaining fully exploited fishery resources and recovering those that are overexploited or depleted and increasing aquaculture production. The Minister said that even though Guyana could further exploit its marine fishery resources it was now placing more emphasis on the development of aquaculture with the active participation of the private through the recently formed Aquaculture Association of Guyana.

The Minister mentioned that fish is the major source of animal protein in Guyana. It is estimated that per capita annual consumption of fish was nearly 46 kg, about three times the world average. The fishery sector employs about 9 000 fishers and fish farmers and some 5 800 persons in processing and marketing. Around 15 000 jobs thus depend directly on fisheries, and many more people benefit indirectly from fishing-related occupations, such as boat building, supply and repair.

In inviting the Expert Consultation to provide him with comments on the recently completed draft Fisheries Management Plan (FMP) for Guyana, which will be submitted to Cabinet in the near future, the Minister recognized that it was not the remit of the Consultation. He wished the Consultation success in its deliberations and indicated that he looked forward to receiving the report of the meeting since it may be applicable to the draft FMP of Guyana.

ELECTION OF THE CHAIRPERSON

The participants in the Expert Consultation elected Mr M. Arbuckle as Chairperson.

ADOPTION OF THE AGENDA AND TIMETABLE

The Expert Consultation adopted the Agenda as presented in Appendix A to this report.

DISCUSSION

Successful fisheries management regimes

It was noted that many fisheries worldwide have experienced a similar evolution, that is moving from a situation of abundant resources to a period of expansion characterized by the use of more effective fishing

technology and increasing harvests, followed by stock decline and fishery closures. In these instances, which were experienced in both developed and developing countries, the conduct of fisheries often places a burden on taxpayers rather than making a positive contribution to national economies, including food security and poverty reduction.

In contrast, in some instances, fisheries have operated for a long time on a sustainable basis and have contributed to economic development rather than detract from it. In many jurisdictions the generation of wealth from fisheries through the creation of resource rents is a central feature of their success. Such wealth creation has particular importance in LIFDCs as it can provide a source of revenue to underpin economic development if reinvested in the national economy. The extent to which fisheries are able to operate on a sustainable basis, producing social and economic benefits, is directly linked to the fisheries management arrangements that govern fisheries.

The group concluded that the components of successful fisheries management involved interrelated functions and activities in five areas identified as:

- Objectives and policy;
- Legislation and regulations;
- Institutional arrangements and capacity;
- Decision-making processes; and
- Applied fisheries management activities (research, administration and management, compliance and enforcement).

The performance of any fisheries management regime is determined by the specific features associated with each of the five components within the existing social, political and cultural context. It was agreed that the presence of these components, listed above, is not sufficient to ensure success in managing fisheries. For example, good policy and legislation will not go far without the institutional capacity to implement it.

To be effective, fisheries objectives and policy should be developed in collaboration with stakeholders, provide clear direction that is relevant to local circumstances, have sufficient institutional capacity to ensure objectives are met, and be supported by political leaders, and have the ability to address and deal with conflicts and often competing objectives. In addition, the direction set by policy has important consequences with respect to clarifying the roles and responsibilities of various interests associated with the fishery (e.g. parties involved in co-management agreements; conservationists, other industries), enabling effective management and determining the types of funding arrangements that can potentially be brought to bear.

Fisheries management is a dynamic process that is subject to ongoing review, monitoring and modification. An effective fisheries management regime that promotes resource sustainability creates incentives for fishers to participate in fisheries management to protect their longer term interests. The establishment of appropriate fiscal systems and access rights are an important factor in this regard.

Fisheries management funding arrangements

Worldwide, it is common for governments to fund fisheries management activities through normal appropriations although there are increasing numbers of examples whereby fisheries management is funded by alternative arrangements. The group recognized that funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific fisheries management regime that is used.

The group considered the following approaches to funding:

- Government funding and delegation of responsibilities:
    - Appropriations;
    - Cost recovery;
    - Delegation of responsibilities; and
    - Mechanisms for revenue generation;
- Self-funding;
- Partnerships and collaborative agreements; and

- Donor assistance.

Government funding

Appropriations

The group noted that government funding is normally conducted through an appropriations process. This is to ensure appropriate accountability of government agencies for expenditure.

Revenue generation, including cost recovery, under such regimes are normally paid into the consolidated fund to reduce conflict of interest between the collection of revenues and the delivery of services. However, this situation, which is necessary for accountability often creates tensions in the process of allocating funds within government given competing political demands. The group noted that careful attention needs to be given to the way revenue generation and service delivery are linked.

It is important to recognize that in addition to normal appropriations, many governments provide subsidies in various forms, such as exemption from taxes, grants and export incentives. It is increasingly recognized that some subsidies exacerbate resource management problems.

Cost recovery

Frequently, in addition to government funding, some countries have a policy of cost recovery where a portion of the fisheries management costs are recouped from specific user groups (e.g. domestic commercial fishers, foreign fishers, recreational anglers).

Cost recovery is distinct from other fees that may be paid to government in that there is a direct link between the fisheries management services and the fee paid by users of the service. The rationale for such cost recovery is that those who benefit from fisheries management activities should contribute to their funding.

The group agreed on a number of points associated with the use of cost recovery. They were:

- Requires a system for measuring the level of fisheries management expenditures by activity and by fishery.
- Promotes efficiency (e.g. cost reductions) in the provision of fisheries management services.
- Increases accountability within fisheries management service providers (government agencies as well as others).
- Should be based on an approach where the costs are attributable to those who primarily benefit.
- Should be sensitive to the ability to pay. Introducing cost recovery in marginal fisheries may not be appropriate without management reform designed to improve financial viability.
- Should be considered in the broader context of government financial administration (e.g. consistency with approach followed in other sectors).

Cost recovery has been introduced successfully when the following conditions existed:

- When introduced coincident with a change in fisheries management that has the potential to increase participants' net earnings and/or additional fisheries management expenditures are required;
- Harvesters have an incentive to pay for certain services (e.g. a service provided by government would otherwise be discontinued or paying for a service will increase net revenues); and
- Harvesters have a significant role in determining how funds are spent (e.g. concept of "user pay, user say").

In conclusion, the group noted that cost recovery can be a desirable tool for funding because it helps generate greater accountability and efficiencies in management, but the group also recognized that it had to be associated with particular services and be affordable.

Delegation of responsibilities

The group noted that there is a distinction between delegation and outsourcing. The latter is common practice, while there are limited examples where governments have formally delegated fisheries management responsibilities to the private sector. Nonetheless, one such example was the administration of the quota

registry in New Zealand, where the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then become responsible for ensuring the provision of the services with the agreement of the Minister of Fisheries.

Overall, the group concluded that there is potential for further delegation subject to appropriate standards and in situations where providers have the incentives to deliver the service.

Mechanisms for revenue generation

The group agreed that it is important to distinguish between cost recovery and other methods by which governments generally generate revenue from the fisheries sector when the other methods are not being applied to recover the costs of specific services. Some such examples include:

- Access fees/licence fees;
- Auction of access rights;
- Quota fees or fish landing charges; and
- Export licences and royalties on fish exports/imports.

The above types of charges might be applied by the resource manager (usually government), but the way and extent to which they are applied affect the incentives for users of fisheries services to pay for costs and to operate in a sustainable manner. Creating a capital asset by, for example, auctioning out a resource for a number of years, will create incentives to operate sustainably. In contrast, collecting annual resource rent through a tax does not increase participants' long term interests.

In addition, there are provisions in some countries to direct revenues from certain violations (fines) that may be used to fund fisheries-related activities. The group noted that care needs to be taken in the ways such revenues are utilized to avoid misuse of coercive powers.

Self-funding

The group noted that self-funding provides an opportunity for groups to carry out work in support of fisheries management or produce information either contrary or complementary to the current management.

Such activities might include alternative stock assessments, infrastructure, research, some aspects of compliance such as monitoring, stock enhancement, and so forth. These arrangements work best when the private sector objectives are aligned with those of the government and when the benefits will be returned to the funders. These approaches have the advantage of being directly accountable to those who pay for the services.

Partnerships and collaborative agreements

The group noted the opportunities for arrangements such as partnerships and agreements with universities, twinning[2], in-kind contributions, public-private sector partnerships (e.g. biologist and fisheries management agency) and encouraged their further use. Partnerships, particularly government to government offer good opportunities to transfer knowledge of successful fisheries management experiences.

In general, the group concluded that it is important to be aware of the risk of diverting attention away from core mandates in pursuit of objectives of others (funding capture). In situations where partnerships involve access arrangements and/or joint ventures, there is a need to ensure that both partners to an agreement have sufficient capacity to engage in such agreements.

Donor assistance

The group recognized that donor assistance is often of critical importance to many developing countries to underpin fisheries management activities, particularly when starting the process of building capacity in fisheries management agencies.

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[2] This could be a relationship between an institute in a developing country and a partner in an industrial country, or it could involve several institutes from both developing and industrial countries. The advantages of twinning lay in the extensive, well-organized and potentially long-lasting exchange of information and personnel and in the sharing of facilities that the concept envisions; however, the challenge is in making these linkages viable and durable.

As with partnerships and similar arrangements, there is a risk of funding capture and dependency, and reduced incentive to innovate. In addition, it may encourage countries to use approaches that may not be well-suited to the local management needs[3], may involve inappropriate technology or may inadvertently miss appropriate target groups. Nonetheless it can be useful for facilitating transitions in the way fisheries management is carried out.

Delivery of fisheries management services

Governments have the responsibility for managing fisheries resources; however, there is considerable flexibility with respect to how government exercises this responsibility and in the provision of fisheries management services. The nature and extent of the services provided is influenced by policy.

The group considered that there are some essential roles of government to perform. These roles are to: set policy and establish laws; undertake some elements of compliance (e.g. search and seizure); ensure quality of services provided through outsourcing; and to establish access and allocation arrangements.

The group noted that, where provided by government, the delivery of fisheries management services can be accomplished more effectively if done in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack the necessary structure to contribute. Building organizational capacity and capability therefore may be necessary. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc.

Given the common property nature of fisheries resources, governments tend to play a prominent role in all aspects of fisheries management, yet there is at least the potential for government services, that are not essential to the role of government, to be provided by the private sector.

In recent years, some governments have sought to improve the cost effectiveness of fisheries management by enabling the private sector to deliver many of the services traditionally provided by government agencies. This has involved identifying those services that are well-suited to private sector delivery versus functions that should remain in government. This generally involves establishing formal organizational structures (e.g. a collective organization), hiring skilled staff and carrying out specific activities such as research, administration, management, compliance and enforcement.

Allocation of financial and human resources

The group recognized that the process of allocating scarce funds is particularly vexing given the competing demands for use of such resources and the complexity and inter-relationship between the services being delivered. In this regard it was noted that government budgets tend to be fairly rigid with annual allocations which to a great extent are linked to fixed costs (mainly staff) and which are difficult to reallocate.

The group noted that there may be opportunities to achieve greater benefits if one or more of the following approaches are utilized:

- risk-opportunity based analysis (qualitative or quantitative)[4];
- investment in fisheries management based on where the best return exists;
- where possible, use market-based approaches to allocate scarce resources; and
- by pursuing efficiencies in service delivery, some financial resources may be freed-up to support other activities, for example.

For the above processes to be effective, strong leadership is crucial, both political and organizational, and in both the public and private sector.

[3] For example, the Dr. Fridtjof Nansen Survey Programme. Whilst this survey programme has been valuable in providing data for certain fisheries (for example, Ghana's demersal stocks), the donor-scheduled timing of the surveys meant that the timing was not optimal for assessing sardinella and pelagic stocks.

[4] It is important that goals are clearly defined if following this approach.

Strategy development

Having discussed the key components of fisheries management, and the means of funding and delivery of fishery management services, the group considered ways of putting these practices into effect.

The group noted that many countries currently have a development focus targeted at increasing production from fisheries while the move to sustainable fisheries often requires the imposition of constraints that significantly limit the harvesting sector. Therefore, the group agreed that, at the outset, it is important to reconcile these potentially conflicting objectives (e.g. expansion of employment in the fish harvesting vs. controlling the total harvest to achieve sustainability).

The group identified a variety of conditions that may provide the impetus to embark upon a new fisheries management strategy, including the following:

- responding to events such as natural disasters or the collapse of a fish stock and improvements and changes in knowledge about the state of the environment or the fish stock;
- anticipating a change in fishery conditions (e.g. reduced stock availability, increased cost of harvest inputs such as fuel, declining fish prices, etc.) and reacting in a manner that positions the fishery for long-term sustainability;
- taking advantage of an opportunity to derive greater benefits from the fishery through a change in the management approach. In these situations, the impetus can come from government or the private sector;
- taking advantage of outside assistance;
- responding to political changes;
- attempting to comply with international commitments and norms, such as UNCLOS[5]; and
- responding to market requirements such as health certification and ecolabelling.

In addition, the group agreed that the transition to a best-practice framework needs to have a long-term focus based on successful examples. With this in mind, the development of a strategy can follow a somewhat generic process (outlined below), although the specific features will vary depending on the circumstances of the country.

It was agreed that the scope of the fisheries strategy needs to be clarified early in the process. For example, the challenges are greatest in countries with poor governance where the necessary political, legal, financial and administrative infrastructure is inadequate. In these situations, the group agreed that work may be required on those elements first and the skills required to undertake this work (e.g. legal and financial experts) are generally different than those needed to develop a fisheries strategy.

A brief overview of the generic steps that may be followed in developing a fisheries strategy is presented below, although the group noted that this is not exhaustive and is context dependent.

- A key element in developing a fisheries sector strategy entails seeking political support;
- Ideally, a highly skilled individual should be identified to play a lead role in developing a fisheries sector strategy for the country. This individual would need a good understanding of overall government priorities, the fisheries sector and fisheries stakeholder perspectives;
- In addition, an independent technical expert or institution could be identified to assist in the strategy development process. This expert would have experience in fisheries management and international assistance (e.g. organizations and programmes that may support the fisheries sector);
- A proposal to develop a national fisheries sector strategy should be developed with the assistance of the individual(s) and/or institutions identified above in conjunction with political leaders, government officials and stakeholders in the country concerned. The proposal should identify key problems and opportunities associated with the fishery. To be effective, the proposal should clearly articulate the following:

[5] 1982 United Nations Convention on the Law of the Sea of December 1982

- general policy context for the country;
- existing policy, legal and organizational framework;
- current state of the fishery and past management performance;
- the outlook under the current fisheries management regime, including most serious problems;
- opportunities to improve the performance of the fishery to meet policy objectives;
- options to address the problems and take advantage of opportunities, including an impact analysis for each option; and
- recommendations on developing a national fisheries strategy and the main elements of the proposed strategy.

If there is political support to proceed, then work should begin on the development of a fisheries sector strategy, as follows.

- A small team should be formed to draft the fisheries sector strategy. In addition to the experts identified above, the team should include such other specialists as necessary, depending on the apparent problems.
- The strategy for the fisheries sector should include objectives, priorities and desired outcomes and be developed in conjunction with stakeholders.
- If necessary, a broad consultative process should be launched to establish a common vision of a sustainable and efficient fisheries regime is and how it can be achieved. Examples of successful fisheries management should be provided to help focus the discussion.
- Where possible, agreement should be sought on the main objectives that should be pursued in managing fisheries.
- The draft comprehensive strategy should include the main building blocks to underpin successful fisheries management and a transitional pathway to achieve this outcome.
- Political endorsement for the draft strategy is vital even if this necessitates subsequent modifications as necessary.

The overall approach adopted involves developing a clear plan and utilising scarce resources to support implementation of the plan. In this way funding decisions will be linked to objectives, priorities and desired outcomes. The strategy will serve as an overall guide for the fisheries sector and serve as a basis for engaging funding partners and fisheries stakeholders (including government) in its implementation.

Transition considerations

The group noted that, despite international principles, laws, guidelines and information on the performance of various fisheries management approaches, many fisheries worldwide are not sustainable and/or economically viable.

This situation persists, in part, due to constraints and difficulties with moving from one fisheries management regime to another. The transition usually entails significant impacts on those associated with the fishery (e.g. on fishermen, processors, fish traders). As a result, quite often changes to fisheries management are vigorously resisted, particularly if fishing is a critical activity, if change devalues investments or where fish is a vital source of protein in the community.

Given these challenges, the group identified a range of factors to be considered when developing a plan for transitioning to successful fisheries management:

- The state of the political and economic environment. Countries that have weak or poorly developed institutional frameworks will require different transitional strategies than those with more developed frameworks.
- Supporting institutions and the capacity for implementation. It is important that appropriate institutional arrangements, administrative systems, and skills are present to support and implement change.

- Continuity and commitment in leadership. Strong leadership and commitment of all parties involved are needed as part of implementing a transition plan because the process can be lengthy and challenging.
- Appropriate and ongoing participation of stakeholders. Providing stakeholders with the opportunity to engage in the process and to influence the outcome is essential to increase the legitimacy of the process and to raise the level of acceptance of the final outcome.
- Recognition of extensive commitment and time. Successful implementation will take time, and international experience has shown that implementation may occur over as much as 15 to 20 years.
- Consideration of livelihood impacts resulting from management change. There are significant safety net issues, and it is important to mitigate the impacts on those negatively affected by changes, especially those with few alternatives for self-reliance.
- Conflict resolution. Given that many individuals have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate, conflict resolution mechanisms need to be in place.
- Funding. Funding is vital for supporting both the process, (e.g. consultations), and consequences of change (e.g. vessel capacity reductions and alternative livelihood training).

The group agreed that, given both their complexity and their importance for realising the goals of a strategy, these factors would need further elaboration.

ADOPTION OF THE REPORT OF THE EXPERT CONSULTATION

The Report was adopted on 7 September 2007.

CLOSING SESSION OF THE EXPERT CONSULTATION

During the last day of the Expert Consultation, the experts adopted the *Recommendations and guidance* (found in Part I of this report).

The Chair thanked the participants for their hard work and inputs over the 4 days of the Expert Consultation and noted that the complete final report would be circulated for their approval and adoptions.

Mr M. Arbuckle closed the Expert Consultation on Friday, 7 September 2007 at 18.00 hours.

APPENDIX A

Agenda and timetable

Tuesday, 4 September 2007

Morning: 9.30–12.00 hours

1. Opening of the Consultation

2. Appointment of Chairperson

3. Adoption of the agenda and timetable

4. Overview presentation
    - Objective of the Expert Consultation
    - Key issues and specific questions to be addressed

Afternoon, 14.00–17.30 hours

5. Successful fisheries management regimes
    - Presentation of the main components found in successful fisheries management regimes and selected examples of best practices
    - Group discussion to further elaborate definition of a successful fisheries management regime and identify additional best practices
    - Summarize main findings

Wednesday, 5 September 2007

Morning: 9.30–12.00 hours

6. Fisheries management funding arrangements
    - Presentation of alternative funding arrangements and best practices
    - Group discussion, including cost recovery, co-management and donor assistance
    - Summarize main findings

Afternoon: 14.00–17.30 hours

7. Delivery of fisheries management services
    - Presentation of alternative delivery arrangements and best practices
    - Group discussion, including potential delegation of certain fisheries management responsibilities to the private sector
    - Summarize main findings

Thursday, 6 September 2007

Morning: 9.00–12.00 hours

8. Transition considerations
    - Presentation of potential steps leading to the adoption of successful fisheries management practices
    - Group discussion, including participant's experience in implementing fisheries management reforms
    - Summarize main findings

Afternoon: 14.00–17.30 hours

9. Strategy development
    - Presentation of potential elements of a strategy to promote improvements in fisheries management particularly in lifdcs
    - Group discussion, including identifying low cost approaches to meeting fisheries management requirements
    - Summarize main findings

Friday, September 2007

Morning: 10.30 hours

10. Adoption of the report
    - Presentation of draft report of the expert consultation
    - Group discussion
    - Adoption of the report

APPENDIX B

List of participants

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APPENDIX C

List of documents

EC LCFM/2007/1	Provisional agenda
EC LCFM/2007/2	Best practices in sustainable, effective and cost effective fisheries management
EC LCFM/2007/3	Financing fisheries management in LIFDCs
EC LCFM/2007/Inf. 1	Provisional list of documents
EC LCFM/2007/Inf. 2	Financing fisheries management – The case of Sweden
EC LCFM/2007/Inf. 3	Financing fisheries management – The case of Nicaragua
EC LCFM/2007/Inf. 4	Funding fisheries management – The case of New Zealand (1985–2004)
EC LCFM/2007/Inf. 5	Financing fisheries management – The case of India (in preparation)
EC LCFM/2007/Inf. 6	Financing fisheries management – The case of Ghana (in preparation)

APPENDIX D

Prospectus

Background

Fisheries management agencies are typically mandated to achieve a broad range of objectives related to resource conservation, sustainable use and the distribution of benefits derived from fisheries. Achieving these objectives involves a number of activities such as scientific research (surveys, data analysis, stock assessment), operational management (consultation, preparing fishing plans, licensing) and enforcement (surveillance, prosecutions). The costs associated with establishing a comprehensive fisheries management regime can be considerable and often exceed the funding available to fisheries management agencies. This situation is particularly significant in Low-Income Food-Deficit Countries (LIFDCs) where there is little public funding provided to support the management of fisheries.

In addition to the normal fisheries management activities described above, there are a number of emerging initiatives that have the potential to increase the funding pressures faced by fisheries management agencies, including:

Ecosystem management – Many jurisdictions are attempting to put into operation the concept of ecosystem management. Adopting an ecosystem approach to fisheries management can require a significant shift in the allocation of funds among activities and/or an increase in overall funding levels (e.g. research on species interactions).

International Plans of Action – The Code of Conduct for Responsible Fisheries (CCRF) was adopted by FAO member countries in 1995. Subsequently, international plans of action (IPOAs) were established as voluntary instruments within the framework of the CCRF. Four IPOAs have been developed to date, dealing with seabirds, sharks, capacity and IUU. Member States are encouraged to develop and implement national plans of action to further achieve the objectives of the IPOAs and make these plans an integral part of their fisheries management programmes and budgets.

Ecolabelling – The introduction of certification and fish tracking requirements linked to fish market access (e.g. Marine Stewardship Council Certification) is becoming a key issue in many jurisdictions. Not only are there considerable costs associated with certification and tracking processes, in many instances, changes in the fisheries management regime (and additional costs) are required to meet the standards.

Endangered species legislation – Some countries have committed to providing a high level of protection to endangered species and as a result face significant incremental costs (e.g. monitoring stock status, developing recovery plans and enforcing harvesting restrictions).

There is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities. For example, the overall performance of a fisheries management programme can be enhanced by making informed decisions concerning the allocation of funds to alternative fisheries management activities, securing stable funding for fisheries management expenditures and considering who can most efficiently provide fisheries management services (government or private sector). Where funding is extremely limited, it is particularly important to identify low cost approaches to meeting the most important fisheries management priorities.

A detailed examination of the funding issues described above can help address one of the most fundamental problems faced by fisheries management agencies worldwide - the lack of adequate funding and many competing uses for the funds that are available.

Objective of the Expert Consultation

The primary objective of the Expert Consultation is to provide practical information and tools that will be useful to agencies interested in examining their fisheries management funding arrangements. It is important to stress that the intent is not to instruct governments and fisheries management agencies on how to allocate their budgets but rather to make available information that can facilitate more informed choices when faced with funding options.

Three key questions will be addressed:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

Inputs and outcomes associated with the Expert Consultation

For the Expert Consultation the following reports will be prepared:

A number of case studies in effective fisheries management – Case studies will illustrate practices being utilized by selected fisheries management agencies. Each case study will outline funding issues, including the budget allocation process, expenditures grouped according to common categories, source of funding, service provider, and actions that have resulted in efficiency gains. The case studies will include countries that have introduced cost recovery programme where participants in a fishery (those that derive benefits from access to a public resource) are required to pay a portion of fisheries management costs.

Best practices in sustainable, effective and cost-effective fisheries management in LIFDCs – A significant challenge faced by LIFDCs is the extremely limited public funding available to support fisheries management activities. This report will focus on identifying best practices being employed by fisheries management agencies in LIFDCs and assess the potential to use these approaches elsewhere.

Financing fisheries management in LIFDCs – Given constraints on public funding in LIFDCs, it is important to explore innovative ways to pay for the most essential fisheries management activities. This report will explore a range of possible financing options that might be pursued by LIFDCs.

The Expert Consultation will produce a final report highlighting key findings and conclusions, as well as recommendations for further work, if warranted. The intent to focus on practical information that will be useful to agencies interested in examining their fisheries management funding arrangements with a view to improving overall performance. In addition, the reference material prepared for the Expert Consultation will be published.

Participants

A small number of experts (8 to 10) will be invited in an individual capacity from different regions. The selection process will target individuals experienced in fisheries management planning and operational activities. In addition, a regional balance in participation will be achieved with emphasis on ensuring that LIFDCs are appropriately represented.

Language

Subject to the concurrence of invited participants, the Expert Consultation will be conducted in English.

Venue and date

The Expert Consultation will be held in Georgetown, Guyana, during the period 4 to 7 September 2007.

Further information

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PART III –- BACKGROUND PAPERS

BEST PRACTICES IN SUSTAINABLE, EFFECTIVE AND COST-EFFECTIVE FISHERIES MANAGEMENT

Paul Macgillivray[1]

Macgillivray, P. 2008. Best practices in sustainable, effective and cost-effective fisheries management. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 23–54.

CONTENTS

TABLE

BOXES

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[1] This document was prepared in 2006 based on the substantive contribution of Mr Paul Macgillivray during his stay in FAO headquarters, Rome, as a Visiting Scientist. The opinions expressed in this document belong to the author(s) and do not reflect necessarily the views of the Food and Agriculture Organization of the United Nations. Current address: Mr Paul Macgillivray, Associate Regional Director General, Fisheries and Oceans Canada – Pacific Region, Vancouver, B.C., Canada.

ACRONYMS/ABBREVIATIONS

AFMA	Australian Fisheries Management Authority
CPUE	catch per unit effort
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
ITQ	individual transferable quota
IUU Fishing	illegal, unreported and unregulated fishing
LIFDC	Low-income food-deficit country
MCS	monitoring, control and surveillance
OECD	Organization for Economic Co-operation and Development
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea
VMS	vessel monitoring system

1. INTRODUCTION

1.1 Purpose

Fisheries worldwide are becoming increasingly characterized by an unfortunate paradox. The oceans contain valuable fish resources that are capable of yielding significant economic and social benefits on a sustainable basis; yet many fish stocks are in decline and quite often the conduct of fisheries places a burden on taxpayers rather than making a positive contribution to national economies.

At the same time, throughout the world there are examples of sustainable fisheries that generate significant benefits. The extent to which fisheries are able to operate on a sustainable basis, producing social and economic benefits, is directly linked to the fisheries management arrangements that govern the particular fishery. Accordingly, this report identifies best practices in meeting fisheries management requirements and assesses the potential to use these practices more broadly.

The approach is to examine in detail the conditions and actions that have produced positive fisheries management results, thereby drawing on the experience of some countries to learn about what might work elsewhere. Particular attention is paid to the significant challenge faced by Low-Income Food-Deficit Countries (LIFDCs)[2] where there is extremely limited public funding available to support fisheries management activities.

1.2 Background

This report was written in preparation for an FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery. The consultation was designed to address the following three key questions:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

The FAO Code of Conduct for Responsible Fisheries (the Code) provides a comprehensive description of fisheries management requirements, including the legal and institutional framework for responsible fisheries. Thus, the Code is an extremely useful reference for governments and fisheries management agencies in designing their fisheries programmes.

It is recognized that full implementation of the Code is a long-term objective for many LIFDCs due to funding constraints. This point is noted in the Code, which states:

> *"5.1 The capacity of developing countries to implement the recommendations of this Code should be duly taken into account.*
>
> *5.2 In order to achieve the objectives of this Code and to support its effective implementation, countries, relevant international organizations, whether governmental or non-governmental, and financial institutions should give full recognition to the special circumstances and requirements of developing countries, including in particular the least-developed among them, and small island developing countries. States, relevant intergovernmental and non-governmental organizations and financial institutions should work for the adoption of measures to address the needs of developing countries, especially in the areas of financial and technical assistance, technology transfer, training and scientific cooperation and in enhancing their ability to develop their own fisheries as well as to participate in high seas fisheries, including access to such fisheries."*

Similarly, challenges faced by developing countries in meeting new market related requirements have been recognized. For example, the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries states:

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[2] Refer to Annex 1 for a list of Low-Income Food-Deficit Countries.

"6. In accordance with Article 5 of the Code of Conduct for Responsible Fisheries, and recognizing that all countries should have the same opportunities, and in view of the special conditions applying to developing countries and countries in transition and their important contribution to international fish trade, it is acknowledged that in order to benefit from applying ecolabelling schemes, states, relevant intergovernmental and non-governmental organizations and financial institutions should provide developing countries and countries in transition with financial and technical assistance to develop and maintain appropriate management arrangements that will allow them to participate in such schemes. Such assistance should also consider direct support towards the often high costs of accreditation and certification. Development agencies and donor institutions are encouraged to support FAO in facilitating financial and technical assistance to developing countries and countries in transition."

While it is generally recognized that developing countries require assistance in establishing sustainable and effective fisheries management regimes, the challenge is to identify the most essential fisheries management requirements and how they can be met most effectively. Thus, this report examines the features associated with effective fisheries management and identifies best practices currently in use.

2. OVERVIEW: FISHERIES MANAGEMENT REQUIREMENTS

This section describes the key elements of a responsible fisheries management regime. Managing fisheries effectively involves a number of elements that are grouped under five headings. The intent is to outline a basic fisheries management framework that generally underpins effective and responsible fisheries regime. The framework is structured as follows:

- Objectives and policy
- Legislation and regulations
- Institutional arrangements and capacity
- Decision-making process
- Applied fisheries management activities (research, administration and management, compliance and enforcement)

A brief overview of each of the elements follows.

2.1 Objectives and policy

Effective fisheries management regimes have a clear sense of purpose, typically articulated through a policy statement that includes objectives for the fisheries sector. The objectives and policy provide overall direction on the purpose of fisheries management and how it will be conducted. Where appropriate, a country's fisheries sector policy should be aligned with other areas of national policy (e.g. food security). In addition, national policy must be consistent with international laws and obligations (e.g. UNCLOS, CITES, etc.).

Having a comprehensive fisheries policy can be very helpful in drawing attention to fisheries sector priorities within the broad national context and can form the basis for international assistance (e.g. technical assistance, grants, loans, etc.).

In developing policy objectives, the following factors should be considered:

- Policy objectives should be realistic, attainable and have the support of the political leadership to effectively provide guidance to fisheries managers. Potential problems include having a list of "motherhood" objectives that provide little real direction or having policy objectives that are unlikely to enjoy political support when challenged.
- Operational policy plays a valuable role in guiding how general policy objectives will be attained. For example, general policy objectives typically refer to conservation and sustainable use. Operational policy provides guidance on how to achieve these objectives (e.g. biological reference points such as maximum sustainable yield [MSY] or maximum economic yield [MEY]).
- Recognize potential trade-offs between objectives and, in those instances, the policy framework should provide direction on priorities – i.e. is one objective more important than another or should there be a balanced approach to pursuing competing objectives. For example, there may be a conflict

between the objective of generating economic returns from the fishery and that of providing employment opportunities in rural areas. Direction on policy objectives is typically based on political and social factors in a given country.

- Typically, policy objectives are common to an entire jurisdiction. However, in some instances, regional or community policies may be developed within the national context or provision may be made for differences in regional or community application of the policy objectives. When this happens, it is important to be clear and transparent regarding differences.

Box 1

Common components of fisheries management policy frameworks

Conservation

- Conservation involves protecting fish, fish habitat, biodiversity and ecosystems by controlling fishing and related activities.
- Biologically-based conservation objectives do not stand alone but rather represent a necessary underpinning for the attainment of other objectives described below.

Sustainable use

- Refers to extracting harvestable surpluses of fish in a manner that ensures fish are available for future generations (target and incidentally-caught fish) and that the fish habitat remains productive.

Economic and social benefits

- Fisheries are conducted to generate benefits, including food, income (private and public), employment, foreign exchange, recreational experience, etc.
- The benefits associated with fisheries can be linked to broader national objectives such as food security and poverty alleviation as well as other activities, including post harvest value added.

Distribution of benefits

- Equitable sharing of the benefits derived from public resources such as fish is a major issue in most jurisdictions.
- The distribution of benefits is determined by fish access and allocation arrangements that can be based on many factors, including the recognition of aboriginal rights, encouraging domestic fishing rather than foreign, favouring small-scale fisheries and fishing communities over industrial operations, etc.

Health and safety

- Controls may be put in place to establish proper working conditions for those involved in the fishery sector and to protect the health of those eating fish/fish products.

This overview is not intended to be exhaustive but rather to highlight key policy topics. It is important to note that effective policy tends to evolve over time in response to issues that requires clarification or changing conditions affecting the fishery. Increasingly, fisheries management is being integrated into a broader context, taking into account ecosystem considerations, biodiversity and oceans governance.

The policy topics identified above focus on what fisheries management may be expected to achieve. Examples of policy objectives currently in use and specific policy statements are presented in Section 3.

2.2 Legislation and regulations

Fisheries legislation and regulations provide the legal foundation for all formal activities associated with fisheries management. This legal foundation includes both international and domestic aspects of fisheries management. In fact, international instruments (e.g. treaties and conventions) and domestic legislation do not exist in isolation but rather operate as complementary tools. For example, the 1982 United Nations Convention on the Law of the Sea (the 1982 Convention) established the legal regime that enables costal states to declare 200-mile exclusive economic zones. In turn, the coastal state is bound to implement provisions of the 1982 Convention within its national legislation, including duties and obligations in relation to their EEZs.

Fisheries management world-wide is founded on a number of internationally recognized legal agreements and treaties, most notably the following.

- The 1982 UN Convention on the Law of the Sea.

- The 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (the Compliance Agreement).
- The 1995 UN Fish Stocks Agreement.
- Agreements and conventions establishing Regional Fisheries Bodies.

In addition, to the "hard law" instruments (legally-binding treaties) described above, a number of "soft law" instruments (non-binding declarations and resolutions) have emerged and currently play a significant role in fisheries management. These include:

- The 1995 FAO Code of Conduct for Responsible Fisheries.
- International Plans of Action elaborated under the Code of Conduct (Management of Fishing Capacity, Conservation and Management of Sharks, Reduction of Incidental Catch of Seabirds in Longline Fisheries, and Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing).
- Ministerial Declarations (made in Rome).
- UN General Assembly resolutions (e.g. on large scale pelagic drift nets).

As noted above, national fisheries legislation should address not only domestic needs but also the duties and obligations at the regional and international levels. Since the specific fisheries management arrangements vary from country to country, so too will the legal and regulatory requirements. That said, there are a number of key elements that are typically found in national fisheries legislation which are described below in Box 2.

Box 2

Main features of fisheries legislation

Definitions – Explain the terms used, including "fishing".

Institutional arrangements – Includes the objective of the fisheries authority (e.g. Ministry, Department, Statutory Authority) and assigns responsibilities (e.g. Minister and senior officials).

Fisheries conservation, management and development – Includes objectives and principles upon which all management decisions are based.

Requirements for fishing and other activities – Includes control of vessels and nationals both domestically and in areas beyond national jurisdiction as well as reporting requirements.

Licensing – Includes the process and requirements for licensing of all activities under the Act, such as fishing, transhipment and processing.

Monitoring, control and surveillance (MCS) – Includes the appointment procedures and powers of officers with MCS responsibilities under the Act and can include enforcement officers, observers, inspectors, auditors and others.

***Jurisdiction, procedure, fines, liabilities etc*. –** Includes a clear description of the jurisdiction of a court both domestically and extending to events and requirements outside the country and its maritime zones in accordance with provisions in international instruments.

Summary administrative proceedings – Includes a system where offences can be dealt with by administrative procedure if a person wishes to plead guilty, pay the penalty and return to fishing or other activity without lengthy court proceedings.

Evidence – Includes evidentiary requirements to facilitate effective and efficient legal proceedings, relating to areas such as the onus of proof, presumptions and certificates of evidence.

Regulations – Empowers the Minister to make regulations covering specific subjects related to the Act.

Summary

- Fisheries legislation provides the legal mechanism (authority) for the implementation and enforcement of fisheries management objectives and obligations.
- Legislation in support of fisheries management is broad in scope, covering local, national and international activities and thus particular attention must be paid to coordinating various acts, including those dealing with post harvesting activities and trade.

- Outdated or ineffective legislation can seriously constrain the actions of a fisheries management authority, limit the potential benefits derived from the fisheries resource and, in some instances, increase the risk of successful legal challenge.

2.3 Institutional arrangements and capacity

The term "institutional arrangements" is used here to describe the framework of rules that apply to a fishery, the processes that are used to achieve the desired outcomes and the organizations mandated to carry out fisheries management functions (e.g. government departments, statutory authorities and other relevant agencies). Institutional arrangements include legislative frameworks, policy processes, decision rules, organizations conducting research and analysis, and so forth. This section describes the somewhat unique challenges fisheries management presents and the type of institutional arrangements and skills that are needed to operate effectively in this environment.

The rationale for government intervention in fisheries and the specific role played by fisheries management organizations is directly related to the common property nature of fisheries resources. That is, the absence of property rights for fish results in a market failure characterized by excess fishing capacity, stock depletion, and the loss of resource rents. The absence of property rights for fish before they are harvested is an important factor influencing the institutional arrangements used by governments to discharge their fisheries management responsibilities. In particular, the common property nature of fisheries resources means that dealing with access and allocation arrangements is a major preoccupation in many fisheries. In addition, there are other characteristics that affect the institutional requirements including the following:

- Uncertainty – Fisheries management is conducted in an environment of uncertainty since basic information such as fish stock abundance, productivity and the impact of fishing is often not understood with a high degree of confidence.
- Risk – Fishing involves taking risks related to the future sustainability of fisheries resources (target and incidentally-caught species). Fisheries management agencies operate on behalf of the public and decisions affecting the sustainability of fisheries resources should reflect societal choices. In addition to the uncertainty noted above, there is a wide range of public views on the appropriate degree of risk that is acceptable.
- Multiple Objectives – Fisheries management agencies often face multiple objectives some of which may be contradictory.
- Conflict among users – Since access and allocation arrangements continue to evolve and there is generally relatively little security of tenure, conflicts among resource users is common.

In describing institutional arrangements it is important to distinguish between what the arrangements are designed to accomplish and who actually carries out the activities. For example, it is argued below that having an understanding of the impact of fishing on fishery resources is a key feature of fisheries management. However, the research and analysis supporting this understanding can be carried out by government or non-government organizations. In fact, despite that fact that government scientists tend to dominate the field of stock assessment, there are compelling reasons to move towards alternative approaches involving fishery participants and other private sector businesses.

A brief overview of the key considerations associated with institutional arrangements is provided in Box 3.

In addition to the institutional arrangements described above, the appropriate capacity to carry out fisheries management functions is critical to success. In this context, institutional capacity includes people and funding. Specifically, it is necessary to have a critical number of skilled staff (or the services of "outside specialists") representing various disciples (e.g. lawyers, biologists, economists, enforcement specialists). The availability of a stable source of funds combined with cooperative working arrangements such as government-industry partnerships, is also critical.

Institutional arrangements will differ depending on whether the fishery being managed is exclusively domestic or has an international aspect. With respect to international fisheries matters, institutional arrangements centre on Regional Fisheries Management Organizations (RFMOs).

Box 3

Institutional arrangements – Key considerations

Organizations

- Fisheries management responsibilities are generally assigned in legislation to one or more government department or a statutory authority.
- Organizational units are commonly formed according to major functions (e.g. science, policy, resource management, enforcement, etc.)
- Collaboration among various organizational units, whether reporting to the same Minister, or not, is essential to achieve the level of integration required to manage fisheries effectively.

Processes and decision rules

- Given that fisheries management deals with the use of public resources, consultation with those directly involved in the fishery (e.g. harvesters, processors) and other interests (e.g. community and environmental groups) is essential.
- The participants and the method used to consult should be tailored to the subject matter. That is, the provision of scientific advice, policy development, determining access and allocation arrangement, establishing fishing plans, etc. may each warrant a different type of consultation.
- The institutional arrangements supporting both policy and operational functions need to be able to reconcile opposing views and lead to timely decisions rather than stalling in the absence of consensus.
- The use of decision-rules can be very effective in reducing the level of conflict and controversy associated with ongoing fisheries management decisions. For example, the basis for establishing annual harvest levels is less prone to resistance in fisheries where decision rules are in place.

Skills

- Effective fisheries management is a multidisciplinary operation requiring input from a variety of specialists including legal advisors, biologists, economists, enforcement officers, etc.
- The ability to communicate effectively, engage in meaningful consultations and resolve conflicts are particularly valuable skills.

Funding

- Fisheries management funding arrangements vary considerably from country to county or in many cases from fishery to fishery within the same country, including the amount of funding available, the source of funds, how it is allocated among different management functions, etc.

Since public funds allocated are rarely enough to meet all the demands placed on fisheries management organizations, it is important to identify alternative funding arrangements such as cost recovery, partnerships involving non-government organizations, co-management, etc.

Summary

- Institutional arrangements must bring together various disciplines (lawyers, biologists, economists, enforcement specialists, etc.)
- Fisheries management processes should involve stakeholders (harvesters, processors, community groups, environmentalists, etc.).
- Mechanisms should be in place to deal with conflicts in a timely and effective manner.
- While a government department or statutory authority usually delivers the fisheries management services, it is important to minimize bureaucracy and find innovative ways to get the job done, including identifying services the private sector can deliver.

2.4 Decision-making process

Effective fisheries management requires timely decisions on many issues, ranging from the establishment of key policy parameters to the approval of annual fisheries management plans. As described above, fisheries management decisions are often controversial and involve a high degree of uncertainty (e.g. lack of definitive information on stock size). In some instances the decisions involve trade-offs among several well-intentioned but contradictory objectives, thus making many important decisions subjective in nature. As a result, it is very important to clearly identify the issues that require decisions, the process that will be followed to reach decisions and how those affected will be informed once decisions have been made.

Issues requiring decisions can be grouped into two categories -- first, those that set the long term direction for fisheries management (e.g. the policy framework) and, secondly, the operational decisions that are made annually or in-season.

Long-term direction

Several major long-term fisheries management issues are highlighted below.

- **Biological management objectives** – It is helpful to establish the basis for setting annual (or multi-year) harvest levels as well as the approach that will be taken to rebuild a stock in the event that it has fallen to an unacceptably low level. For example, a fixed exploitation rate can be established to calculate the annual allowable harvest of a stock and the rebuilding schedule that will come into effect in the stock drops to a certain level (including target level and time frames to reach it).
- **Access and allocation arrangements** – Determining who is eligible to participate in a given fishery and controlling the amount of fish caught by individuals or groups of harvesters is a critical aspect of fisheries management. Much has been written on the "race for the fish" and the advantages of introducing stable fish allocations. Establishing long-term fish access and allocation arrangements tends to involve controversial but necessary decisions that ultimately affect the overall performance of a fisheries management regime.
- **Cost sharing** – It is common for governments to charge fees to those who participate in a fishery. In some cases the fees are directly linked to offsetting part of the cost of providing fisheries management services. Deciding the degree to which fisheries management costs are shared by government and participants in a fishery is becoming an increasingly important issue in many countries.
- **Public involvement in fisheries management** – Public involvement is fisheries management can take many forms ranging for providing advice on specific topics to co-management. It is important to decide what role the public should play and establish the appropriate institutional arrangements (e.g. advisory processes, partnership agreements, joint project agreements).

Operational decisions

- On an annual basis, there are many operational decisions that must be taken – e.g. setting the harvest level, determining fishing times and areas, etc.
- Ideally, many operational decisions are made by taking current information and applying it to a pre-established decision rule. A management decision rule involves specifying the management action that will be followed when specific criteria are met. For example, setting harvest levels using a biological management framework and making fish harvest allocations based on a long-term allocation policy.
- However, in the absence of long-term policies and decision rules, operational decisions can be very difficult – the annual process can be similar to making major policy decisions on the same issues year after year.

The decision-making process should be tailored to the type of decision being made and what is best suited to the specific situation. For example, the process used to decide on a major policy issue is likely to be very different from that used to make an operational decision. A key feature of the decision-making process is that of public participation. Given that fisheries resources are managed on behalf of the public and the absence of property rights, there is a large role for the public.

Following a decision, it is important to communicate to those affected both the decision and the basis for the decision.

Box 4

Principles to guide the decision-making process

Effective and efficient –The decision-making process should be designed to be cost effective and able to produce decisions that are supported by a solid rationale and, to the extent possible, supported by those affected by the decisions.

Transparent – Those affected by decisions, should ideally be involved in the decision-making process and where that does not happen, at a minimum understand the basis for decisions and process that was followed.

Timely – Decisions should be made on a timely basis to allow for proper planning.

Accountable – The process should clearly identify who is accountable for the decision and the role of all those involved (e.g. governments – national and regional, harvesters, environmental organizations, etc)

Information and analysis – Ensure that the best information and analysis available is used to support decisions. In most instances, information will be limited and decisions will be taken without perfect knowledge.

Public participation – Effective public involvement in planning and management is essential to ensure sound decision making and to build public understanding and support for necessary management actions.

2.5 Applied fisheries management activities

While the information presented above has focused on the structure and process of an effective fisheries management regime, we turn now to specific applied fisheries management activities – research, administration and management, and compliance and enforcement. A brief description of each activity follows.

2.5.1 Research

Research activities in support of fisheries management should focus on two fields – biological information (e.g. stock assessments, related ecosystem considerations, biodiversity, etc) and socio-economic information (e.g. income and employment).

Biological research – Sustainability of fisheries resources usually requires some knowledge of the abundance and productivity of fish stocks as the basis to determine that a certain level of removal is sustainable. To be most useful scientific advice should:

- provide the type of information that fisheries managers can use (i.e. supports decision-making) and that stakeholders can understand;
- be timely and in step with the management planning cycle; and
- be perceived to be unbiased and based on science conducted according to high scientific standards.

While many developed countries employ highly quantitative and data-demanding approaches to stock assessment, there are low cost ways in which stock status and trends in stock abundance may be evaluated. Specific examples are presented in Section 4 of this paper.

Socio-economic research – As noted above, economic and social objectives (e.g. generating foreign exchange earnings, income and employment) are important aspects of fisheries management. Thus, understanding the impact of alternative fisheries management arrangements on the economic and social objectives is essential. This is particularly important when considering changes to the fisheries management regime that affect the distribution of benefits – e.g. establishing a total allowable catch (TAC), changing the fishing season, regulating the minimum size of fish to be harvested, limiting the number of participants in a fishery, etc.

While generally more emphasis is placed on biological research in support of fisheries management, the extent to which socio-economic objectives are met is directly related to understanding the impact of alternative approaches.

> "Without an understanding of the social dimension of fisheries management, government is unlikely to structure policy to promote fisheries management in a way that is ecologically sound, socially acceptable and politically supported."[3]

2.5.2 Administration and management

Fisheries management plans set out the specific arrangement under which a fishery is conducted. The FAO Technical Guidelines on Fisheries Management (FAO, 1997) describe a management plan as:

> *" a formal or informal arrangement between a fisheries management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives for the fishery and specifies the management rules and regulations which apply to it and provides details about the fishery which are relevant to the task of the management authority."*

In the fisheries management plan, long-term objectives are translated into management actions. The specific actions that are taken to implement a management plan and the associated accountabilities vary from fishery-to-fishery. Depending on the fishery, the following actions may be taken:

- licensing individuals or companies to participant in the fishery;
- ensuring that only those eligible to participate in the fishery do so;
- ensuring that participants use authorized gear (mesh size, hook size);
- ensuring that fishing takes place in authorized areas and times;
- limit the catch to the total allowable catch (TAC) or in the case of individual quota fisheries, limit the catch consistent with individual entitlements; and,
- record of the details of the catch (both target catch and incidental catch).

2.5.3 Compliance and enforcement

The ultimate success or failure of a fisheries management regime depends on the level of compliance with the rules that are established and described in the management plan. The aim of a compliance strategy is to have people obey the rules that underpin the management system. For compliance to be effective, there must be a reasonable deterrence – a significant probability of being caught combined with a penalty that acts as an incentive to follow the rules. Activities such as monitoring, control and surveillance are designed to detect violations and therefore create a deterrent by enhancing the probability of being caught. Penalties, either established through the courts or through an administrative sanctions process, also create a deterrent.

Experience has also shown that people are more likely to accept and participate in a fisheries management regime when they see it as having legitimacy in terms of both process and outcome. This can achieved through stakeholder participation in various aspects of fisheries management, including the design of the compliance and enforcement programme. The rules of the management system and the services that support them should be operated in collaboration with the regulated community and other stakeholders.

3. BEST PRACTICES IN SELECTED JURISDICTIONS

While a great deal of attention is often focused on the failures of fisheries management (e.g. overfishing, the collapse of fish stocks, poor economic returns) there are many examples of effective fisheries management practices throughout the world. This section highlights examples of effective fisheries management regimes currently in place.

One useful approach to examining best practices is to focus on specific fisheries that are viewed as successful. For example, Hilborn *et al.*[4] identify the following fisheries as "Examples of Success" and go on to explore the relationship between success and the management regime.

- New Zealand lobster fishery

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[3] Harte, M., Fisher Participation in Rights-based Fisheries Management: The New Zealand Experience, in FAO Fisheries Technical Paper 404/1 Use of Property Rights in Fisheries Management (R. Shotton editor), 2000.

[4] Ray Hilborn, J.M. (Lobo) Orensanz and Ana M. Parma "Institutions, incentives and the future of fisheries", 2005, published in Philosophical Transactions of the Royal Society.

- Chilean artisanal fisheries
- Canadian sablefish fishery (Pacific coast)
- West Australian rock lobster fishery
- Australia Gulf of Carpentaria prawn fishery
- Tasmanian abalone fishery
- New Zealand Northeast Chatham Rise orange roughy fishery
- Canada and the US Pacific halibut fishery
- US hake and pollock cooperatives
- Geoduck clam fisheries Canada (British Columbia) and the USA (Puget Sound Washington State)

The authors conclude that a better fisheries management outcome is more likely with the right incentives, increasingly restrictive access, simpler institutions and appropriate management scales.

This section explores in greater detail the underlying fisheries management regime in two countries noted for their success in managing fisheries – Australia and Namibia.

3.1 Australia's Commonwealth Fisheries

3.1.1 Objectives and policy

In 1989, Australia's Commonwealth Government released a comprehensive policy statement, New Directions for Commonwealth Fisheries Management in the 1990s (New Directions). The policy statement contained explicit objectives relating to fisheries management expectations.

> "The three overriding objectives of the management controls outlined in this policy statement are:
>
> - to ensure the conservation of fisheries resources and the environment which sustains those resources;
> - to maximize economic efficiency in the exploitation of those resources; and,
> - to collect an appropriate charge from individual fishermen exploiting a community resource for private gain."

The New Directions policy was instrumental in reforming the overall approach to managing Commonwealth fisheries. Specifically, the following actions arose from the New Directions policy statement:

- A comprehensive policy framework was developed, including legislated fisheries management objectives for Australia's Commonwealth fisheries. Refer to the box below for details.
- New legislation was enacted, including the *Fisheries Management Act 1991* and the *Fisheries Administration Act 1991*.
- New institutions were established, in particular the creation of The Australian Fisheries Management Authority (AFMA) as a statutory authority, governed by an independent board, to manage Commonwealth fisheries.

The New Directions policy is an excellent example of clear objections and guidance being provided to the fisheries management authority and stakeholders. This degree of guidance in a policy statement was very helpful in designing the specific elements of the fisheries management regime throughout the 1990s.

In 2000, Australia's Commonwealth government initiated a review of the Commonwealth Fisheries Policy. Its aim was to recommend future arrangements for delivering Commonwealth fisheries policy into the new millennium. This review led to a number of important conclusions and strategies that reflect changing circumstances since the New Directions Policy was established and potential improvements.[5]

[5] Refer to "Looking to the Future, A Review of Commonwealth Fisheries Policy", 2003 for details.

Box 5

Commonwealth Fisheries Management Objectives

The Fisheries Management Act 1991 states that the following objectives must be pursued by the Minister in the administration of this Act and by AFMA in the performance of its functions:

- implementing efficient and cost-effective fisheries management on behalf of the Commonwealth;
- ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development and the exercise of the precautionary principle, in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment;
- maximising economic efficiency in the exploitation of fisheries resources;
- ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources; and,
- achieving government targets in relation to the recovery of the costs of AFMA.

3.1.2 Legislation and regulations

Australia's 1989 New Directions policy statement led to the development of various bills that provide the basis for current management of Commonwealth fisheries.

The Fisheries Administration Act 1991 - This Act established the Australian Fisheries Management Authority, the Fishing Industry Policy Council and Management Advisory Committees (MACs).

The Fisheries Management Act 1991 – This Act contains objectives for the Minister and AFMA as well as setting out key features of the fisheries management regime, including the development and provision of fishery management plans based on the principles of ecologically sustainable development; the establishment of statutory fishing rights, mechanisms for allocation of permits and licences; arrangements for management under joint authorities; and, surveillance and enforcement including specification of specific offences. The Act also establishes machinery for collection of levies imposed by other, related, legislation. For example, The *Fishing Levy Act* 1991 gives effect to cost recovery arrangements by imposing a levy on statutory fishing rights and permits.

Other legislation includes the *Fisheries Agreements (Payments) Act* 1991; *Fishing Legislation (Consequential Provisions) Act* 1991; *Fishing Levy Act* 1991; *Foreign Fishing Licences Act* 1991 and the *Statutory Fishing Charge Act* 1991.

More recently, the *Fisheries Legislation Amendment Act 1999* was enacted to give effect to the UN Fish Stocks Agreement on management of straddling and highly migratory fish stocks. This Act also provides the base for Australian action against illegal foreign fishing in Australian waters. This legislation gives Australia new tools to address illegal, unregulated and unreported (IUU) fishing both internationally and within the Australian EEZ.

3.1.3 Institutional arrangements and capacity

Commonwealth fisheries in Australia are administered by three bodies with separate responsibilities for management, policy and research and development. A brief description of the organizations responsible for each function follows.

Fisheries management – The Australian Fisheries Management Authority was established in 1992 as a statutory authority, governed by an independent board, to manage Commonwealth fisheries. AFMA pursues a cooperative management approach to enable relevant stakeholders to take part in management processes alongside fisheries managers, but with management decision-making powers vested in the AFMA board.

Policy – While AFMA is responsible for the day-to-day management of Commonwealth fisheries, policy functions are undertaken by the Fisheries and Aquaculture Branch of the Australian Government Department of Agriculture, Fisheries and Forestry. The Department's functions include responsibility for fisheries policy development; international negotiations to ensure the management of, and continued Australian industry access to, high seas resources; engagement in international and regional fisheries and aquaculture processes; and the development of competitive and sustainable fisheries industries.

Research – The principal responsibility for investing in biological fisheries research and development lies with the Fisheries Research and Development Corporation (FRDC). The FRDC is a statutory authority funded jointly by the Australian Government and industry. Additional research in support of fisheries management is provided through a number of government research agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Bureau of Rural Sciences (BRS).

Australia's capacity to manage commonwealth fisheries effectively is linked to both the people (highly-skilled individuals representing a variety of disciplines) involved in all aspects of fisheries management and the funding arrangements.

Commonwealth fisheries management activities are funded by a combination of government appropriations and cost recovery. Under government policy, the costs associated with many commercial sector management services are recovered from commercial fishers. Cost recovery levies are recovered on a fisheries-by-fisheries basis, which in turn necessitates that AFMA calculates management costs for each fishery on a detailed basis.

The federal government does not attempt to capture resource rent by charging commercial fishers access fees. The 2003 fisheries policy states:

> "… resource rents will not be sought for developed fisheries, as the Government recognizes the need to protect the interests of commercial operators, who have made significant financial investments in establishing fishing businesses based on an expectation of ongoing access rights to Commonwealth fisheries resources."
>
> ("Looking to the Future, A Review of Commonwealth Fisheries Policy", 2003 page 29)

The Government policy on cost recovery for fisheries management is consistent with the general philosophy that the beneficiaries of Government services should meet the cost of those services in accordance with the concept of user pays. Along with the move to implement cost recovery was a recognition that fishing operators were entitled to have a significant input to fisheries management decisions, including those which directly affect management costs.

Cost recovery in Australia has resulted in greater transparency and accountability concerning the cost and provision of management services due to the explicit identification and recovery of management costs.

3.1.4 Decision-making process

The main elements of the decision-making process for Commonwealth fisheries are outlined below. The description focuses on the decision-making role of the Australian Fisheries Management Authority, the Minister and management advisory committees.

Australian Fisheries Management Authority (AFMA) – The establishment of AFMA as a statutory authority resulted in the day-to-day decisions on fisheries management being made at arm's length from the Minister with portfolio responsibility for fisheries. The AFMA Board of Directors is responsible for overseeing AFMA's operations and making high-level decisions on fisheries management matters. The Board includes a Chairperson, Government Director, Managing Director, and 5 nominated Directors.

Ministerial involvement – While AFMA operates at arm's length from the Minister, the Fisheries Administration Act 1991 allows the Minister to give AFMA directions under exceptional circumstances and the Minister must approve AFMA's Corporate Plan, Annual Operating Plan and all statutory fisheries management plans.

Management advisory committees (MACs) – There is a strong emphasis on a cooperative partnership approach among key stakeholders, including fisheries managers, researchers, fishing operators, environment/conservation and recreational fishing interests (where appropriate) and other stakeholders, in the process of developing and implementing fisheries management arrangements. Central to this approach is the establishment and operation of Management Advisory Committees for each major Commonwealth fishery. Refer to the box below for more information on the role of MACs.

Box 6

Management Advisory Committees

Management Advisory Committees undertake a number of specific management-related activities for AFMA, including:

- being a liaison body between AFMA and persons engaged in a fishery;
- developing recommendations on the preferred management regime - such as whether a fishery should be managed under effort controls or individual transferable quotas;
- providing advice to AFMA in relation to the preparation and operation of management plans;
- annual evaluation of and advice on management expenditures for each fishery;
- monitoring, and reporting in relation to scientific, economic and other information relating to a fishery, including
- establishing a 5-year strategic research programme
- coordinating stock assessment activities
- developing bycatch recommendations; and
- providing advice on enforcement and compliance programmes.

3.1.5 Applied fisheries management activities

Research

Three features of Australia's approach to providing research in support of Commonwealth fisheries are noteworthy.

Scope of research – AFMA is required to ensure that the biological and economic state of each Commonwealth managed fishery is assessed on a continuing basis and that important gaps in knowledge are identified and overcome through research projects.

Cost recovery -– For most major fisheries, a system of 'cost-recovery' is in place where fishers pay, through their license fees, the full cost of research (as well as other services such as compliance, administration etc) in support of their fishery.

Stakeholder involvement – There is a formal process whereby stakeholders provide scientific and economic advice to help co-ordinate research. Priorities for research carried out under such 'cost-recovery' arrangements are set by joint Government/Industry management advisory committees. Research priorities are identified both as part of fisheries-specific management plans and also as more strategic, long-term Commonwealth priorities.

Administration and management

Australia has a well-developed system of fisheries management and all major Commonwealth fisheries are under formal management plans. Each management plan must state its management objectives, measures by which the objectives are to be attained, and performance criteria against which management measures may be assessed.

Management tools in use are fishery-specific, however, over the past 10 years, there has been a trend towards the use of output controls in commercial fisheries in preference to input controls. In particular, individual transferable quotas (ITQs) are being increasingly used as a management tool.

Ecosystem effects of fishing are increasingly being addressed as part of fisheries management planning. This process is being driven by national environmental legislation that requires management processes will ensure ecological sustainability of fisheries. As a result, issues such as ecosystem impacts of fishing activities, bycatch assessment and minimization and marine conservation (often through Marine Protected Areas) are an increasingly important component of fisheries management processes and policies.

Compliance and enforcement

AFMA has a responsibility to enforce the provisions of fisheries legislation through the detection and investigation of illegal activities by both domestic and foreign fishing boats in the Australian fishing zone (AFZ) and Commonwealth managed fisheries.

AFMA undertakes this function in conjunction with other relevant Commonwealth agencies, with specific compliance functions in the field being undertaken by officers from state fisheries and Northern Territory authorities on an agency basis. Through these arrangements, State agencies provide the manpower and expertise while AFMA provides overall coordination, policy direction and technical advice.

AFMA undertakes several compliance monitoring programmes to obtain information for use in routine surveillance, including vessel monitoring system (VMS) position reports, prior-to-landing reports, catch disposal records for product landed in port and fish receiver reports.

Australia's National Fisheries Compliance Strategy 2005–2010 was developed by the National Fisheries Compliance Committee. The Strategy outlines the strategic objectives that Australian fisheries agencies will pursue to promote voluntary compliance and create effective deterrence to illegal fishing activity. It also outlines the principles that agencies will use when planning cost-effective and efficient fisheries compliance programmes.

> "To achieve optimal levels of compliance with fisheries laws by maximising voluntary compliance and creating an effective deterrent against illegal activity.
>
> Strategic objectives critical to achieving this mission include:
>
> - Maintaining productive working relationships with stakeholders and developing a partnership approach to fisheries management where possible;
> - Pursuing cooperation with fisheries stakeholders to develop and implement fisheries policies and laws that identify potential risks and strategies to lessen them;
> - Pursuing cooperation across jurisdictions to form effective alliances between related agencies;
> - Integrating compliance strategies into fishery management arrangements at the initial planning stage;
> - Monitoring and acting quickly to combat opportunistic as well as organized criminal involvement in fisheries;
> - Ensuring that fisheries laws are administered and enforced fairly, reasonably and cost effectively for both fishers and compliance agencies, and
> - Maintaining the effectiveness and integrity of compliance staff through advanced training, processes and accountable decision making."

3.2 Namibia

3.2.1 Objectives and policy

Following independence in 1990, Namibia took decisive action to address problems in its fisheries, including the depletion of fish stocks. The role of fisheries policy and objectives in guiding the development of the fisheries sector is noteworthy.

In 1991, the policy framework for Namibia's marine fisheries sector was set out in a White Paper title "Towards Responsible Development of the Fisheries Sector". The White Paper established the following goal of fisheries management and development:

> "To utilize the country's fisheries resources on a sustainable basis and to develop industries based on them in a way that ensures their lasting contribution to the economy and overall development objectives."

This goal was to be pursued through the following main strategies:

- rebuilding fish stocks through the implementation of sound research as a basis to formulating optimal utilization strategies;
- building a national fishing and fish processing industry;
- Namibianization to counter pre-independence foreign domination of the sector through taxes and levies whereby increased Namibian participation is rewarded; and,
- empowerment of previously disadvantaged Namibians by preferential granting of fishing rights.

Once the policy environment had been established, it provided the basis for the legislative framework that was put in place – the 1992 Sea Fisheries Act. Details of the new fisheries management system, based on long-term access rights and vessel quotas, were further elaborated in the 1993 "Policy Statement on the Granting of Rights of Exploitation to Utilize Marine Resources and on the Allocation of Fishing Quotas". This policy statement focused on the following key issues – maintaining stock recovery, compliance control, industrial development, Namibianisation, advancement of socially or educationally disadvantaged persons, and improving the services of the Ministry of Fisheries and Marine Resources.

The role of policy and objectives in Namibia is similar to the Australian example described above in that the policy framework represented a clear statement of the government's intent in managing the fisheries and the policy statement was used as the basis for drafting legislation and designing institutional arrangements.

> "*Namibia's policy and legal framework for the marine fisheries sector has allowed the application of management strategies that are appropriate to Namibia's specific circumstances. The result has been the development of a business environment that has facilitated the growth of a healthy fishing and processing industry that pays a fair price for the privilege of utilizing Namibia's marine resources.*"[6]

3.2.2 Legislation and regulations

Following independence, one of the first acts of Parliament was the Territorial Sea and Exclusive Economic Zone of Namibia Act of 1990, highlighting the importance placed on the fisheries sector. In 1992, Parliament passed the Sea Fisheries Act based on the 1991 fisheries policy paper. During the 1990s, Namibia signed on to a number of international fisheries conventions and agreements, including:

- The 1995 UN Fish Stocks Agreement;
- The 1993 FAO Compliance Agreement; and,
- The 1995 FAO Code of Conduct for Responsible Fisheries.

These new international obligations led to a revision of the 1992 Sea Fisheries Act which was replaced in by the Marine Resources Act in 2001. The new Act incorporates international best practices for fisheries management and incorporates the key elements of the international fisheries management instruments mentioned above. For any fisheries or international agreements entered into by Namibia, the Minister is empowered to make regulations necessary to give effect to such agreements. Texts of all conservation and management measures adopted under any international agreement to which Namibia is a party are published in the national Gazette, and thus such measures are then deemed to be a regulation as prescribed under the Act. Various regulations have been promulgated under the Act which establish the terms and conditions for all vessels and fishers operating within Namibia's EEZ.[7]

3.2.3 Institutional arrangements and capacity

Namibia's key fisheries institution is the Ministry of Fisheries and Marine Resources (MFMR). Established in 1991, it had from its inception a very clear fisheries management focus. Until 1998 the Ministry consisted of two Directorates: the Directorate of Resource Management, responsible for scientific research and advice; and the Directorate of Operations, responsible for monitoring, control and surveillance, and also initially responsible for administration and a range of other functions including economics.

A third Directorate, the Directorate of Policy Planning and Economics, was established in 1998 to strengthen the policy and planning functions of the Ministry. Specific objectives of the Directorate of Policy Planning and Economics are to ensure that fisheries activity contributes Namibia's socio-economic development goals; create a conducive environment in which the fisheries sector can grow to its full potential; ensure that Namibia is properly represented internationally and that national fishery interests are protected; administer fisheries legislation and regulations; administer the collection of fees and levies generated by fishing activity; and, manage the collection and preparation of information and fishery statistics.

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[6] Paul Nichols, Marine Fisheries Management In Namibia: Has It Worked? In Namibia's Fisheries: Ecological, economic and social aspects pp 330-31.

[7] FAO Country Profile

In addition to the three Directorates, a specialized division coordinates fisheries cooperation with states within the Southern African development Community (SADC) and a General Services Division is responsible for matters relating to finance, personnel, transport and other auxiliary services.

The Ministry of Fisheries and Marine Resources places very high emphasis on the development of human resources, including the fishermen, vessel skippers, research scientists, observers, inspectors and managers.

Apart from normal company and personal income tax, there are three main components to Namibia's funding arrangements for the fisheries sectors – rent recovery, cost recovery and donor funding. Each is described briefly below.

Rent recovery[8] – Namibia's fee structure is based, in part, on the principle that the broader society has a right to benefit from the productivity of the natural capital that belongs to the country and that management of fishing activities is part of the cost of fishing.

Cost recovery – Two levies are charged to offset specific fisheries management costs -- the Marine Resources Fund levies which funds fisheries research and the Fisheries Observer Fund levies which is applied to the cost of providing 100 percent observer coverage.

Donor funding – In addition to the budget provided by the Government of Namibia, the Ministry receives technical and financial assistance for various countries and organizations. The main donor support received in 2003 is presented in the table below.

Table: Donors and assistance provided

Donor	Type of assistance provided
Norwegian Agency for Development Cooperation (NORAD)	Marine fisheries research, technical staff, staff training, monitoring, control and surveillance, Namibia Maritime and Fisheries Institute (NAMFI).
Iceland International Development Agency (ICEIDA)	Technical assistance and human resources development to the Minister and NAMFI.
Food and Agriculture Organization of the United Nations (FAO)	Technical assistance in the development of aquaculture legislation.
Germany – GTZ (Gesellschaft fur Technische Zusammenarbeit)	Capacity building through staff training; procurement of equipment.
Department for International Development (DFID)	Technical assistance for improvement of Fisheries Information Management System (FIMS) has been completed.
European Union (EU)	Financial support for Traditional Fishing Development project, technical assistance for Omahenene/Onavivi Island Aquaculture Centre, Omusati region, NAMFI and Vision 2030.
Government of Malawi	Technical assistance (aquaculture development projects).
World Life Fund	Shared resources management on the Zambezi/Chobe Systems.
Government of Cuba	Technical assistance (aquaculture development projects).

Government revenue is collected through the following fees and levies.

Quota fees – Quota fees are charged to the holders of rights to exploit certain commercial fisheries. Once right holders have accepted their quota allocation, they become liable for the payment of a quota fee, whether the fish is caught or not. Quota fees give incentives to use Namibian labour, both on vessels and by landing the fish for onshore processing. Also, the use of Namibian-owned vessels is encouraged through preferential rates. Quota fees form a significant revenue component for the government.

Bycatch fees – Namibian vessels are required to bring all catches to shore. To prevent them from targeting species that they do not have a licence for, a by-catch fee is charged. By-catch fees are set at rates designed to deter right holders from targeting species for which they do not have a quota, but to still make it profitable to land truly incidental by-catch. By-catch fees avoid the complications associated

[8] Resource rents are the profits earned on a natural resource in excess of what would be considered a normal return.

with setting quotas for more than one species in a fishery. The ban on discarding also makes it easier to monitor all catches taken by quota holders.

Licence fees – Fishing companies pay a nominal licensing fee for vessels. Fishing vessels must have a license issued by MFMR to be able to catch fish in Namibian waters. Each year between 300 and 350 vessels are licensed by MFMR. In addition, under the Marine Resources Act, Namibian flagged vessels may not harvest fish outside the Namibian EEZ unless they have a license from MFMR. This is to ensure that Namibian fishing vessels do not participate in any illegal, unreported and unregulated (IUU) fishing activities.

Marine Resources Fund levies – The Marine Resources Fund (MRF) finances the research activities of the Ministry as well as a number of training initiatives. A small fee is charged on all landings and that fee goes to this fund. While the Ministry controls the expenditures of the MRF, the quota and bycatch fees go directly to the public coffers and are not under the control of MFMR.

Fisheries Observer Fund levies – Fishing rights holders must pay an Observer Fund levy which is used to fund the Fisheries Observer Agency which was established to run the fisheries observer function.

Namibia has been very successful in both the generation of rent and in collecting sufficient revenue to cover management costs. Accordingly, the fishery in Namibia provides a net contribution to the national purse. Few other fisheries management authorities have achieved this.

3.2.4 Applied fisheries management activities

Research

Fisheries research focuses on the collection and analysis of oceanographic data and information derived from systematic surveys conducted by the Ministry research staff. Catch and effort data from the fishing industry are used in the assessment of stocks. This is done in an effort to better understand the impact of environmental fluctuations on fish stocks. Industry socio-economic information together with stock biomass estimates are used in determining the TAC to be allocated to the fishing industry.9

Biological research is carried out by the Directorate Of Resource Management which has the following objectives – to provide scientific advice to enable total allowable catches (TACs) to be determined; to provide advice so that policy on harvesting activity and techniques can be formulated; and, to provide advice on the inter-relationship of the environment and the impact this has on fish stocks.

The Directorate has two research centres:

- The National Marine Information and Research Centre, which undertakes applied fisheries and environmental research, physical, biological and chemical oceanography, stock surveys and stock assessment research. The principle role of the research centre is the provision of advice to MFMR on TACs for commercial stocks and other management measures. It also houses and coordinates regional research programmes and applied research into aquaculture and inland fisheries.

- Hardap Freshwater Research Institute, focuses on freshwater fish and invertebrate research, migrations of freshwater fishes using radio tagging methods, and the development of freshwater aquaculture techniques and assessment of candidate species.

Administration and management

The Directorate of Operations regulates the fisheries sector activity within the EEZ. This involves the following objectives of the Directorate - restrict fishing activity to those entitled to do so; ensure that fishing activity is conducted within the legal and administrative guidelines; ensure that revenue from landings are correctly calculated; and, ensure that landings of species caught outside Namibia's EZZ - are done in accordance with provisions of international fisheries organizations of which Namibia is a member.

The Namibian management regime for marine capture fisheries consists of a number of components that each plays a part in contributing to the fisheries management goals. Key features include: limited access

[9] Republic of Namibia, Ministry of Fisheries and Marine Resources, Annual Report 2003.

through the setting fishing rights, establishing TACs for all major commercial species, allocation of individual quotas, and a system of fees. Key elements of the system are outlined below.

Fishing rights are granted for a period of 7, 10, 15 or 20 years depending on various factors, in particular the level of investment and the level of Namibian ownership. The term of fishing rights has recently been expanded from 4, 7 and 10 years, mainly to promote stability of the sector. Fishing rights are not freely transferable in Namibia. The main reason is the possibility that transfers of rights might seriously threaten the progress made in the goals of Namibianisation and empowerment.

Compliance and Enforcement

An integrated programme of inspection and patrols at sea, on land, and in the air ensures continuing compliance with Namibia's fisheries laws. The major features of the programme are described below:

- Virtually complete coverage of larger vessels by onboard observers serves both to ensure compliance and collection of scientific data.
- Systematic sea patrols, largely directed at ensuring compliance with fishing conditions by licensed vessels through regular at-sea inspections. Air patrols detect and deter unlicensed fishing vessels and monitor the movement and operations of the licensed fleet. Shore patrols ensure compliance by both recreational and commercial fishers with conservation measures for inshore resources.
- Complete monitoring of all landings at the two commercial fishing ports, Walvis Bay and Luderitz, by onshore inspectors ensure compliance with quota limits and fee payments.
- All vessels are required to supply EEZ exit and entry reports as well as daily catch and effort reports in the form of vessel log-sheets.
- Namibia is well advanced in implementing a national satellite-based vessel monitoring system (VMS). Once fully operational the system will benefit fisheries management in real-time monitoring of vessel movement and activities. The system that has been chosen is already in use in the United Kingdom, Germany, United States, Morocco, and, closer to home, South Africa and Mozambique. Namibia is fully supportive of collaborating in the development of a cost-effective, regional VMS.

4. SELECTED PRACTICES IN OTHER JURISDICTIONS

4.1 Policy and objectives: the Philippines

The fisheries objectives and policies are contained in the Philippine Fisheries Code of 1998. Key elements of the policy framework are as follows:

- To achieve food security as the overriding consideration in the utilization, management, development, conservation and protection of fishery resources in order to provide the food needs of the population.
- To limit access to the fishery and aquatic resources of the Philippines for the exclusive use and enjoyment of Filipino citizens;
- To ensure the rational and sustainable development, management and conservation of the fishery and aquatic resources in Philippine waters including the EEZ) and in the adjacent high seas, consistent with the primordial objective of maintaining a sound ecological balance, protecting and enhancing the quality of the environment;
- To protect the rights of fisherfolk, especially of the local communities with priority to municipal fisherfolk, in the preferential use of the municipal waters. Such preferential use, shall be based on, but not limited to, maximum sustainable yield (MSY) or total allowable catch (TAC) on the basis of resources and ecological conditions, and shall be consistent with our commitments under international treaties and agreements;
- To provide support to the fishery sector, primarily to the municipal fisherfolk, including women and youth sectors, through appropriate technology and research, adequate financial, production, construction of post-harvest facilities, marketing assistance, and other services.

- To manage fishery and aquatic resources, in a manner consistent with the concept of an integrated coastal area management in specific natural fishery management areas, appropriately supported by research, technical services and guidance provided by the State, and
- To grant the private sector the privilege to utilize fishery resources under the basic concept that the grantee, licensee or permittee thereof shall not only be a privileged beneficiary of the State but also an active participant and partner of the government in the sustainable development, management, conservation and protection of the fishery and aquatic resources of the country.

An important feature of the policy direction for the fisheries sector in the Philippines is the move to community management. The policy framework is part of a larger governmental mandate to lead in the sustainable management through co-management, which involves participation of key stakeholders.

4.2 Legislation and regulations: Mauritius

The basic legal instrument for the management of fisheries in the waters of Mauritius is the Fisheries and Marine Resources Act of 1998 (FMRA). The purpose of this Act is to provide for the management, conservation, protection of fisheries and marine resources, and protection of the marine ecosystem in the waters of Mauritius.

The FMRA is divided into ten parts. The most important parts concerning fisheries management are as follows:

Part II (Management of fisheries and marine resources)

- lays down the basic management functions relating to both coastal and offshore fisheries including registration of fishers, collection of basic data on fisheries (catch, effort, area of fishing, species of fish caught, fishing boats) and other biological information.

Part IV (Control of fishing activities)

- provides for prohibited fishing methods e.g. with poisonous substances, spears or explosives and artificial light, closed periods, prohibition of underwater fishing and for fishing undersized fish, turtles, mammals, sale of toxic fish and fish products unfit for human consumption, and obligations on fishers to land their catch only at prescribed fish landing stations.
- makes provisions for licenses issued to local and foreign fishing boats (defined as not exceeding 20 m in length) and vessels (exceeding 20 m in length). This sub-part also provides for the Government of Mauritius to enter into agreement with other countries, intergovernmental organizations or fishing associations to allow their vessels to fish in Mauritian waters.

Part VII (Obligations relating to boats and vessels)

- Owners of fishing boats and vessels should have them registered with the Fisheries service. Fishing boats should properly display identification marks. Landings of fish catches should be done in Mauritius unless otherwise authorized.

Part X (Miscellaneous)

- The Minister is empowered to make regulations generally for the implementation of the Act.

Among the non-fisheries legislations that impact on fisheries management are:

- The Merchant Shipping Act 1986
- The Ports Act (1998)
- Immigration Act
- The Custom Tariff Act
- Investment laws such as the Investment Promotion Act
- The Food Act (1998)
- The Environment Protection Act (2002)
- The Maritime Zones Act (1977) and the Maritime Zones (EEZ) Regulations 1984

- The National Coast Guard Act (1988).

4.3 Institutional arrangements and capacity: Iceland

Appropriate institutional arrangements and capacity are needed to develop and effectively implement fisheries management regimes.

The Ministry of Fisheries is responsible for the management of fisheries in Iceland, including research on fish stocks, the conservation and utilization of these stocks together with other living marine and sea bed resources, as well as managing the areas where they are utilisable. The work of this Ministry is intended in particular to ensure and maintain long-term ocean health and maximum yields for the Icelandic nation from sustainable utilization of the living marine resources.

The Ministry of Fisheries is supported by the Directorate of Fisheries, the Marine Research Institute and the Icelandic Fisheries Laboratory. A brief description follows.

Directorate of Fisheries – The Directorate of Fisheries is responsible for a variety of matters concerning fisheries management, supervision of production of marine products and supervision of imports and exports of fish and fish products. The Directorate of Fisheries oversees implementation of the Fisheries Management Act and related Acts concerning, for instance, the issuing of licenses for fishing and fish processing, allocation of quotas and data collection. The Directorate of Fisheries is also responsible for ensuring compliance with laws and regulations, and imposes penalties for violations. In addition to enforcing the laws on fisheries management, the Directorate of Fisheries ensures compliance with Acts and Regulations on the handling, processing and distribution of marine products, and is responsible for collecting and disseminating information on fishing and processing of catches.

Marine Research Institute (MRI) – The Marine Research Institute (MRI), established in 1965, is a government institute under the auspices of the Ministry of Fisheries. The MRI has three main roles: to carry out research on the ocean and marine life; to advise the government on sustainable utilization of marine resources; and to provide information to the authorities, interested parties in fisheries and the general public. In addition to its own research programmes, the Institute works in collaboration with international organizations such as ICES. This includes the TAC setting process in which ICES reviews results and makes joint recommendations on TAC levels.

Icelandic Fisheries Laboratory (IFL) – The IFL is entrusted with carrying out research, providing advice and disseminating information in matters concerning the processing and consumption of marine products. The IFL aims to increase the value, quality and safety of marine catches with research into development and dissemination of knowledge. Their areas of research are mainly the processing and aquaculture sector. The IFL also runs training courses for industry and Universities.

The Fisheries Association of Iceland represents the fishery sector's interests domestically and internationally. The areas of discussion include environmental issues and responsible resource utilization.

4.4 Decision-making processes

4.4.1 United States of America – Regional Fishery Management Councils

The Magnuson-Stevens Fishery Conservation and Management Act is the primary US law dealing with domestic marine fisheries resources and fishing activity within federal waters.[10] Under the Act, the lead federal agency responsible for fisheries management is identified as the National Marine Fisheries Service (NMFS) which is part of the National Oceanic and Atmospheric Administration (NOAA) within the Department of Commerce.

To balance national and regional concerns in the development of conservation and management measures, the Act created eight Regional Fishery Management Councils (Councils). Under the Act, these eight Regional Fishery Management Councils are charged with preparing Fishery Management Plans (FMPs), using the best scientific information available, for the fisheries within their areas of authority. A brief overview of the decision-making process follows.

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[10] Those waters extending seaward from the edge of the coastal state waters (usually out to three miles off their coats) to the 200-mile limit.

The eight Councils develop Federal fishing plans and regulations through a process involving technical teams, independent scientific committees, constituent advisory panels, enforcement officials, lawyers, management agencies, and the public. Council members are nominated by state governors in each region and appointed by the Secretary of Commerce. On each council are each state's director of marine fisheries; a person knowledgeable of fisheries or marine conservation from each state; and some at-large members from any of the states in the region. Councils have Scientific and Statistical Committees (of scientists and other technical persons) and Advisory Panels (of people knowledgeable in fisheries or conservation). The plans and their concomitant regulations are submitted to NMFS for approval and implementation.

NMFS coordinates and approves fishery management plans, implements and enforces regulations, and conducts other fisheries conservation and service programmes. All Council-prepared FMPs must be reviewed for approval by the Secretary of Commerce and then implemented by NMFS through Federal regulations. The FMPs are amended by the Councils and the amendments are submitted for approval under the same Secretarial review process as new FMPs. Most of the FMPs have been amended since initial implementation.

One of the keys to successful fishery management is incorporating diverse views into decision making through a transparent public process. The Council system was designed so that fisheries management decisions were made at the regional level to allow input from affected stakeholders. Council meetings are open, and public testimony – both written and oral – is taken on each and every issue prior to deliberations and final decisions. Public comments are also taken at all Advisory Panel and Scientific and Statistical Committee meetings.

Each Council decision is made by recorded vote in public forum after public comment. Final decisions then go to NMFS for a second review, public comment, and final approval. Decisions must conform with the Magnuson-Stevens Act, the National Environmental Policy Act, Endangered Species Act, Marine Mammal Protection Act, and other applicable law including several executive orders. Regulatory changes may take up to a year or longer to implement, particularly if complex or contentious.

Management of US fishery resources is an extremely complex process, requiring the integration of basic and applied research, outputs of sophisticated stock assessment models, socioeconomic factors, and allocations among user groups to maximize the benefits of the resource to the Nation. At the very foundation of that process, however, are fishery resource data that lead to credible, high-quality information that minimizes risk in management decision-making.[11]

4.4.2 Decision rules in New Zealand and Canada

Management of the New Zealand rock lobster fishery involves a mixture of stock assessments, decision rules and management procedures. Formal stock assessments are conducted annually, however, given the time and complexity of these activities only one or two areas are assessed each year and thus each area is assessed only once every three or four years. As a result, greater reliance has been placed on decision rules and management procedures.

Decision rules and management procedures used in the New Zealand rock lobster fishery specify how fishery management changes will be made in response to fishery data. The decision rules specify what data will be examined, what will "trigger" the rule, and what management actions will result.

- For the northern and central substocks, a simple decision rule is used that mandates a stock assessment when catch per unit effort (CPUE) falls below a specified base level.
- A more sophisticated approach is followed to ensure that the stock will rebuild to a target biomass level in a reasonable period.

The management of Canada's Pacific Herring Fishery also utilizes decision rules for many fisheries management decisions, thus facilitating the development of annual fishing plans. For example, the determination of annual harvest levels, the allocation of herring among various user groups and the timing of specific fisheries are all governed by decision rules.

A brief description of the rules used to determine the annual harvest level follows.

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[11] FAO Country Profile

- Harvest rate – Harvest limits are established to ensure that sufficient biomass is available to replenish the stocks on an ongoing basis. A harvest rate of 20 per cent for Pacific herring was introduced in 1983 and is applied to each of the five herring stock areas. The 20 percent harvest rate is based on an analysis of stock dynamics, which indicates this level will stabilize both catch and spawning biomass while foregoing minimum yield over the long term.
- Cut-off level – If the stock is in a given area is substantially below a predetermined "cut-off level" then commercial fishing is curtailed. Cut-off levels were introduced in 1986 and have been revised from time to time but have generally remained fixed since 1996.
- Reduced catch level – For those stocks which are marginally above cut off the following reduced catch level is recommended: catch = forecast run – cut off. This provides for smaller fisheries in areas where the 20 percent harvest rate would bring the escapement down to levels below the cut off.

4.5 Applied fisheries management activities

This section provides examples of best practices in the delivery of applied fisheries management activities organized according to three categories – research, administration and management, and compliance and enforcement.

4.5.1 Research

In effective fisheries management regimes, decision-makers are informed by research on both the biological management considerations (e.g. stock assessment) and the socio-economic considerations. Generally, the major focus is on the biological management considerations and in industrial fisheries the costs of research can be significant. For example, an OECD report showed that member countries dedicated on average 34 per cent of their total fisheries management expenditures to research. The types of research expenditures include data collection, at-sea surveys, data analysis and stock assessment.

Even developed countries can not afford to do a high level of assessment on all stocks – the high value stocks tend to get the most funding. While the approach to providing research to decision-makers is often expensive in developed countries, there are examples of low cost approaches. One such approach is described in Box 7.

Box 7

Participatory Fisheries Stock Assessment (ParFish)[12]

ParFish is a recently-developed approach to fisheries stock assessment and adaptive management that involves fishers in the management process. It combines quantitative techniques with resource users knowledge to generate control measures for a fishery. ParFish differs from traditional stock assessments:

- It can provide management recommendations rapidly for fisheries with no existing data, in contrast to other stock assessment methods which require long time-series data to model the fishery.
- A preliminary assessment can be carried out quickly and cost-effectively to provide a starting point for adaptive management.
- Input from fishers an other stakeholders is a critical aspect of the approach.

The ParFish process was tested in Zanzibar with three fishing communities in Kizimkazi.

- Information was collected through fisher interviews and fishing experiments.
- The output of the software suggested that fishing effort should be reduced by 10–20 percent to reduce the probability of over-fishing and provide catch rates preferred by fishers.
- The results were presented to fishers and provided the basis for a multi-stakeholder workshop to discuss fisheries management options.

[12] ParFish was developed with support from the UK Department for Development through its Fisheries Management Science programme.

4.5.2 Administration and Management

One approach to improving the cost effectiveness of fisheries administration and management activities is to identify services that the private sector is well-suited to deliver. One such example, that of New Zealand, is described in Box 8.

Box 8

Devolution of Fisheries Services: A New Zealand Example

Various functions associated with the operation of the quota management system have been devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC). Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name 'FishServe'. Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Catch balancing.

In addition devolved services, FishServe provides services under contract to the Ministry of Fisheries:

- Delivery of catch effort services, including issuing return books and the returns management process.
- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

The annual cost of the above services to the industry has decreased annually from NZ$8.65 million in 2000/01 to NZ$5.76 million in 2003/04. During this period, the volume of data transferred electronically has increased. Devolution has allowed FishServe to be a lot more innovative and less bureaucratic. The industry has been prepared to invest in FishServe given that they own it, and consequently FishServe has been able to invest .in new technology that brought about major efficiencies.

4.5.3 Compliance and enforcement

A key issue in the operation of many fisheries compliance systems is their enforceability and the effectiveness of the judicial proceedings. Judicial processes are often criticized as being unduly lengthy, and strict insistence on high standards of proof can lead to too few successful prosecutions to curb illegal fishing.

Box 9

Restorative Justice: A Canadian Example

On Canada's Pacific coast, the federal government and an Aboriginal band (Seabird Island First Nation) have entered into a protocol that enables band members charged with offences to have their cases diverted from the traditional legal system to an out-of-court local justice committee for alternative community-based enforcement.

This approach is a form of restorative justice that approaches crime as an injury or wrong done to another person or community, rather than solely as a crime of interest only to the accused and the state.

Having fisheries offences diverted to a restorative justice process under the Protocol is consensual. If the accused, the community, the fisheries management agency or the Crown (after charges have been laid) do not consent, the matter remains in the traditional court system. Likewise, if the accused does not agree to the disposition reached through the traditional circle, the matter is referred back to the Crown.

Here an accused in a criminal trial has the right to remain silent, a person who agrees to the restorative justice process must engage in dialogue with his community, the fishery officer and others. At the end of the process, rather than having to pay a fine or being sent to jail, the person will usually be asked to undertake some positive activity, such as teaching youth about the harm done by poaching, doing community service work for elders or perhaps catching fish for those in need.

Several countries have addressed this situation by introducing a system of administrative penalties for dealing with fisheries offences, which enables the tribunal to apply a lower standard of proof than is possible in a full criminal trial (proof on the civil standard of balance of possibilities rather than on the criminal standard of beyond a reasonable doubt). This system facilitates expedited hearings, and can include the possibility of a negotiated settlement. Despite the fact that administrative penalties involve a possible diminution of their legal rights, it is often popular with fishers because it enables a speedy resolution of their cases.

5. POTENTIAL TO USE BEST PRACTICES MORE BROADLY

The best practices described above are intended to illustrate approaches that have been used successfully in some countries and may be applicable elsewhere. Generally, the practices described are the basic "building blocks" of a sustainable fisheries management regime and can be pursued over time in any country. However, a variety of factors will influence a country's ability to adopt a given practice and the time frame associated with implementing these practices.

The challenges are greatest in countries that dedicate very limited effort to actively managing fisheries and have no adequate institutional arrangements to resolve differences among fisheries stakeholders. In these situations, the move to adopting best practices should be made over an extended time period and involve a series of sequential steps. In effect, the issue is how a country can establish an effective fisheries management regime where little management capacity exists. A brief overview of the steps that may be followed in these countries follows.

5.1 Step 1 – Seek political support to develop a fisheries sector strategy

- A highly skilled individual should be identified to play a lead role in developing a fisheries sector strategy for the country. Ideally, this individual would be a senior government official with a good understanding of overall government priorities, the fisheries sector and fisheries stakeholder perspectives.
- If necessary, a technical expert from outside the county should be identified to work with the senior government official. The technical expert must have experience in fisheries management and international assistance (e.g. organizations and programmes that may support the fisheries sector). In Namibia, non-national advisors have played a key role in the design and implementation of the fisheries management regime.
- A proposal to develop a national fisheries sector strategy should be developed by the individual(s) identified above with input from political leaders, government officials and stakeholders. The purpose of the proposal would be to seek political support for the development of a national fisheries sector strategy and the main elements of the strategy. The proposal should identify key problems and opportunities associated with the fishery and should be submitted to the Minister responsible for fisheries.
- To be effective, the proposal should clearly articulate the following:
    - current state of the fishery, including trends in fish stock abundance for the most important species, number of people dependant on the fishery and the economic benefits generated;
    - the outlook under the current fisheries management regime, including most serious problems that should be addressed (e.g. if no changes are made fish stocks are expected to decline);
    - opportunities to improve the performance of the fishery and thereby achieve a more stable flow of benefits from the fishery – food, employment, income, etc.;
    - options to address the problems and take advantage of opportunities. The options should be supported by a review of the main impacts anticipated if that option was pursued;
    - a recommendation to develop a national fisheries strategy and the main elements of the proposed strategy.
- If there is political support to proceed, then work should begin on the development of a fisheries sector strategy.

5.2 Step 2 – Draft Fisheries Sector Strategy

- A small team should be formed to draft the fisheries sector strategy. The team should consist of the senior government official and the external technical expert (if one is being utilized) and other skilled individuals, including those affiliated with international organizations (e.g. FAO, World Bank, WWF, etc.
- The strategy for the fisheries sector should include objectives, priorities and desired outcomes and be developed in conjunction with stakeholders.
- Prepare for consultations with stakeholders by designing a consultative process and presentation materials.
- Launch a consultative process to establish a common vision of what a sustainable and efficient fisheries regime is and how it can be achieved. It is critical that all the major stakeholder groups are represented and leaders within the stakeholder community play prominent roles in this consultative process.
- Begin consultations by describing the current state of the fishery and the outlook under the existing fisheries management approach. This will form the basis of a joint definition of the problems that should be addressed.
- Provide some guiding principles to help focus the discussion, including broad government priorities related to national or regional economic development as well as government priorities for the fisheries sector.
- Seek agreement on the main objectives that should be pursued in managing fisheries.
- Draft a comprehensive strategy, incorporating where appropriate components developed during consultations.
- The strategy should include the main building blocks that underpin successful fisheries management regimes – a clear articulation of objectives and policy, a plan to develop legislation and regulations where required, a plan to establish appropriate institutional arrangements and capacity, as well as design an effective decision-making processes.
- Seek political support for the draft strategy and modify as necessary.
- Provide an explanation when recommendations coming out of Stage 2 could not be incorporated into the strategy.
- Present the strategy to stakeholders and modify as necessary.

5.3 Step 3 – Move towards implementation of best practices

- The strategy will serve as an overall guide for the fisheries sector.
- Engage funding partners and fisheries stakeholders in the development of an implementation plan.
- Formalize the fisheries management strategy and implementation plan by:
    - articulating the policy, objectives, legislation and regulations;
    - establishing the appropriate institutional arrangements and ensure there is sufficient capacity (skilled individuals and funding) to meet the requirements defined; and,
    - engaging stakeholders in the decision-making process.

The approach outlined above is generic and must be tailored to the specific circumstances in a given country. However, the fundamental approach remains the same – develop a clear plan and utilize scarce resources to support implementation of the plan. In this way funding decisions are linked to objectives, priorities and desired outcomes.

Box 10

Minimum fisheries management requirements

People and accountabilities – A critical mass of appropriate staff is required to carry out the core functions associated with managing fisheries. To be effective, reporting relationships must be clearly defined, each staff member must have specific accountabilities, and there must be funding for essential elements such as communication, transportation, etc. The number of staff will vary depending on the circumstances, including the extent to which stakeholders assume some responsibilities through co-management agreements.

Information – Information is needed to support decisions, including a basic understanding of the resource status for the main species harvested, a record of who is involved in the fishery and their operations (where they fish, when, method of fishing) and a record of fish landings.

Decision-making process – A transparent process for making decisions is needed. The process should be timely, capable of reaching decisions on controversial issues and provide for public participation. For example, when faced with a situation of declining fisheries resources, the decision-making process should be capable of bringing key interests together and result in a series of actions that respond to the concern before it is too late.

Rules – The rules that govern a fishery must be well-understood by those involved in the fishery. The rules can be clearly articulated through policy, objectives, legislation and regulation. In many fisheries, the rules centre on access and allocation arrangements – who can fish and under what conditions (when, where, how, etc.).

Compliance – To be effective, it is essential that there be a way to promote compliance with the rules once they are established. This involves creating incentives for those involved in the fishery to follow the rules - a significant probability of being caught if one breaks the rules and a penalty that acts as a deterrence.

6. TRANSITION CONSIDERATIONS

> *"Despite considerable progress, (such as collaborative efforts to implement the Code of Conduct for Responsible Fishing [CCRF] for the Asian Region made by the Southeast Asian Fisheries Development Centre [SEAFDEC] and FAO), commitments made in these instruments have not been fulfilled. While the instruments identify most of the actions required to restore and maintain the health of the world's fisheries, the lack of resources required to reduce fishing capacity, the many interests involved, and the lack of political will at the national level to implement tough fleet reduction programs, have severely hampered their effectiveness."*[13]

Much of this paper has been dedicated to describing the main features of effective fisheries management regimes and providing examples of best practices in use throughout the world. Indeed, over the past thirty years many papers have been written about fisheries problems, their implications and management actions that can provide solutions. Our experience with fisheries management tools (input controls, output controls, etc.) has provided valuable insights into how various management approaches perform. In addition, international laws, principles and guidelines combined with domestic legislation provide the legal authority to adopt fisheries management approaches that have been successfully applied. Why then, are so few fisheries in the world considered effectively managed?

Part of the answer can be attributed to the difficulties associated with moving from one management regime to another. The move to effective and sustainable fisheries usually entails significant impacts on those associated with the fishery – harvesters, processors, marketers, equipments suppliers, boat builders, etc. For example, it is difficult to curtail fishing when it represents a critical food source for the community. As a result, quite often fisheries management changes are introduced only when conditions in the fishery become intolerable (e.g. stock failure) and something must be done to finally address the situation.

In some instances, fisheries management reforms are driven by the opportunity to derive greater benefits from the fishery rather than an impending disaster. In these situations, the impetus can come from government or the private sector. For example, in Namibia, it was the government that launched fisheries management reforms in the early 1990s, in part, to meet economic and national development objectives. Similarly, the move to individual quotas in many fisheries has occurred as a result of fishing industry representatives proposing such a change to government officials to improve the financial returns generated in the fishery.

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[13] The World Bank, Agriculture and Rural Development Department, *Saving Fish and Fishers – Towards Sustainable and Equitable Governance of the Global Fishing Sector* (Report No. 29090), May 2004, p4.

This section draws on the experience of several countries to highlight key considerations associated with the transition from one management regime to another.

- Making fundamental fisheries management changes should be guided by a clear and comprehensive plan for the fisheries sector and ideally this plan should be aligned with a broader socio-economic strategy.
- Providing stakeholders an opportunity to participate in the change process and influence the ultimate outcome is essential.
- The level of support for key features of a management regime will ultimately determine its success or failure. If the majority of participants do not believe in and support the management regime, it will be very difficult to gain compliance.
- Given that many individuals have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate (based on the anticipated impacts on them), there must be an effective way to deal with conflicts.
- Assistance should be provided to those negatively affected by changes especially those with few alternatives for self-reliance. Just because there will be individuals negatively affected by a move to sustainable fisheries is not a reason to maintain the status quo. Instead, assistance such as licence retirement, vessel buy-back and community adjustment funding should be considered.
- To support developing countries in establishing sustainable fisheries management regimes, governments and other donors should help create mechanisms to resolve conflict and assist individuals negatively affected.
- When "negotiating" fisheries management reforms with stakeholders, ensure that the proper linkages are made – e.g. if fisheries management changes will improve the economic performance of a fishery, it is important that features such as rent recovery or cost sharing arrangements are clarified at the same time and incorporated into a comprehensive strategy.
- Change will not happen without strong leadership from the major sources of influence – political (e.g. the Minister of Fisheries), the fisheries management agency and the stakeholder community.

7. SUMMARY AND CONCLUSION

This report contains many examples of best practices in fisheries management and identifies the potential to use these practices more broadly. A brief summary of the main findings follows.

- Managing fisheries in a sustainable and efficient manner is difficult not because we do not know how but rather because it involves making changes that may have a profound impact on the lives of those involved in the fishery by altering the flow and distribution of benefits derived from the fishery.
- There is no such thing as a perfect fisheries management regime. The examples of best practices in this report simply highlight fisheries management reforms that have resulted in improvements in meeting the most important objectives for a particular fishery.
- Many best practices are transferable – that is, the benefits of a particular approach can achieve similar benefits when applied in different jurisdictions. That said, fisheries management regimes should be designed to meet specific circumstances, needs and objectives.
- The job of managing fisheries involves many interrelated functions and activities. To be effective, a fisheries management regime needs to be credible in all five of the key areas identified:
    - Policy and objectives
    - Legislation and regulations
    - Institutional arrangements and capacity
    - Decision-making process
    - Applied fisheries management activities (research, administration and management, compliance and enforcement)

For example, great policy and legislation will not go far without the institutional capacity to implement it and strong institutional capacity will not be effective without policy and legislative tools.

- Effective fisheries management requires integration across disciplines – biological sciences, social sciences, operations, legal services, communications, etc.
- Effective fisheries management can not be imposed without enormous human and financial costs. Fisheries management is essentially about managing people and requires the active involvement and support of those involved.
- Involving individuals or communities in fisheries management requires an appropriate governance structure.
- People respond to incentives and therefore management regimes can encourage efficiency or inefficiency. Sustainable fishing occurs when the governance structure encourages individuals to behave in a way that is socially desirable.
- Making the transition to an efficient and sustainable fisheries management regime requires an number of elements, including a comprehensive strategy, strong leadership, stakeholder involvement and assistance for those negatively affected.
- In particular, developing countries need help in establishing sustainable fisheries management regimes and therefore governments and other donors should provide assistance (financial and technical).

To conclude, there is much to be learned from examining best practices presented in this paper. Perhaps the main lesson is that sustainable and efficient management of fisheries is possible but requires a high level of commitment to make the necessary changes.

8. REFERENCES

Arnason, R.A. 2002. Review of International Experiences with ITQs, Annex to Future Options for UK Fish Quota Management, June 2002.

Australian Government. 1999. New Directions for Commonwealth Fisheries Management in ihe 1990s, A Government Policy Statement.

Australian Government. 2003. Looking to the Future, A Review of Commonwealth Fisheries Policy.

Bentley, N., Breen, P., Kim, S. & Starr, P. 2005. Can additional abundance indicies improve harvest control rules for New Zealand rock lobster (Jasus edwardii) fisheries? New Zealand Journal of Marine and Freshwater Research, 39: 629-644.

Doulman, D.J., South, R., Swan, J. & Wright, A. 2002. Responsible Fisheries in the Pacific Islands Region: The Implementation of Post-UNCED International Instruments, Train-Sea-Coast Program, Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations. Published by University Extension, The University of the South Pacific, Suva, Fiji.

FAO. 1995. Code of Conduct for Responsible Fisheries.

FAO. 1997. Technical Guidelines on Fisheries Management.

FAO. 2005. Fishery Country Profiles.

FAO. 2005. International Guidelines for the Ecolabelling of Fish and Fish Products from Marine Capture Fisheries, 2005.

Harte, M. 2000. Fisher Participation in Rights-based Fisheries Management: The New Zealand Experience. In Use of Property Rights in Fisheries Management (R. Shotton, ed.). FAO Fisheries Technical Paper 404/1. Rome.

Harte, M. 2005. Funding Fisheries Management: The Case of New Zealand 1985-2004.

Haward, M., Bache S., Tsamenyi, M. & Rose,G. 2001. Integrated Oceans Management: Issues in Implementing Australia's Oceans Policy, Cooperative Research Centre for Antarctica and the Southern Ocean, Research Report 26 May 2001, Hobart, Australia.

Hilborn, R., Orensanz, J.M. & Parma, A.M. 2005. Institutions, incentives and the future of fisheries, 2005.

Kaufmann, B. 2002. The Australian Fisheries Co-management Model, Prepared for the BC Seafood Alliance Conference on Sustainability through Co-management: Managing for a Sustainable, Profitable Fishery.

Nichols, P. 2004. Marine Fisheries Management In Namibia: Has It Worked? In Namibia's Fisheries: Ecological, Economic and Social Aspects.

OECD. 2003. The Costs of Managing Fisheries.

OECD. 2005. Fisheries Management Systems in OECD Countries.

Republic of Namibia. 2004. Ministry of Fisheries and Marine Resources, Annual Report 2003.

The World Bank. 2004. Agriculture and Rural Development Department, Saving Fish and Fishers – Towards Sustainable and Equitable Governance of the Global Fishing Sector (Report No. 29090).

ANNEX 1: LOW-INCOME FOOD-DEFICIT COUNTRIES

This annex lists the Low-Income Food-Deficit Countries (LIFDC) as of September 2004. The list stands at 84 countries.

Africa

Angola
Benin
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Morocco
Mozambique
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Swaziland
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Asia

Bangladesh
Belarus
Bhutan
Cambodia
China
Democratic People's Republic of Korea
India
Indonesia
Kiribati
Lao People's Democratic Republic
Maldives
Mongolia
Nepal
Pakistan
Papua New Guinea
Philippines
Samoa
Solomon Islands
Sri Lanka
Timor-Leste
Tonga
Tuvalu
Uzbekistan
Vanuatu

Europe

Albania
Armenia
Azerbaijan
Bosnia and Herzegovina
Georgia

Latin America and the Caribbean

Ecuador
Haiti
Honduras
Nicaragua

Near East

Afghanistan
Djibouti
Egypt
Iran (Islamic Republic of)
Kyrgyzstan
Somalia
Sudan
Syrian Arab Republic
Tajikistan
Turkmenistan
Yemen

FINANCING FISHERIES MANAGEMENT IN LIFDCs

Paul Macgillivray[1]

Macgillivray, P. 2008. Financing fisheries management in LIFDCS. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 55–75.

CONTENTS

TABLE

[1] Note: This document has been prepared based on the substantive contribution of Mr Paul Macgillivray during his stay in FAO headquarters Rome as a Visiting Scientist. The opinions expressed in this document belong to the author and do not reflect necessarily the views of the Food and Agriculture Organization of the United Nations. Current address: Mr. Paul Macgillivray, Associate Regional Director General, Fisheries and Oceans Canada – Pacific Region, Vancouver, B.C., Canada.

ACRONYMS/ABBREVIATIONS

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEZ	exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
ITQ	individual transferable quota
LIFDC	Low-Income Food-Deficit Country
OECD	Organization for Economic Co-operation and Development
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea

1. INTRODUCTION

1.1 Purpose

There is a growing recognition among fisheries managers and resource economists of the importance of addressing issues associated with the cost of fisheries management activities.

The level of funding available for managing fisheries is an important consideration, particularly in Low-Income Food-Deficit Countries (LIFDCs)[2] where public funding is extremely limited. In addition, the ability of fisheries management agencies to meet their objectives is affected by several other financial factors such as the source of the funding, what activities are funded, who delivers the fisheries management services and what role stakeholders play in the decision-making process.

The purpose of this report is to explore funding arrangements that have the potential to support fisheries management activities in LIFDCs. Funding issues are examined in detail to gain an insight into the potential to realize greater benefits from fisheries resources through the application of appropriate funding arrangements to support essential fisheries management activities.

1.2 Background

This report was written in preparation for an FAO Expert Consultation on Low Cost Fisheries Management Strategies and Cost Recovery. The consultation was designed to address the following three key questions:

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

According to standard economic theory, the primary rationale for government intervention in regulating fisheries is to address inefficiencies associated with common property resource extraction. That is, the absence of property rights for fish typically results in a market failure characterized by excess fishing capacity, stock depletion, and the loss of resource rents.

Over the past fifty years, there has been a great deal of attention paid to addressing the negative externalities associated with common property by introducing government regulation and control over fisheries. The use of total allowable catches, limited entry, restrictions on fishing vessels and gear, and individual catch quotas have become common in many jurisdictions.

By contrast, the considerable expenditures dedicated to fisheries management activities have received less attention until recently. However, it is becoming increasingly apparent that more research is required in this area. A recent OECD report states:

> *"The inability to properly identify, track and report on costs may compromise the capacity to make appropriate and well founded decisions about changes in fisheries management policies and systems, and to evaluate the effectiveness of management decisions. Transparency helps to improve the accountability of management and informs and assists policy makers in ensuring an appropriate understanding of the cost implications (and potential benefits) of policy changes."* (OECD, *The Costs of Managing Fisheries*, 2003)

In addition, many fisheries management agencies are confronted with escalating demands for fisheries management activities and declining budgets. This situation has raised the profile of fisheries management funding in recent years.

This report examines major fisheries management funding issues and provides examples of funding arrangements from several countries. Particular attention is paid to developing countries where the challenges are greatest and it is widely recognized that help is needed to achieve sustainable fisheries objectives. For example, the World Summit on Sustainable Development (WSSD) called on the international

[2] Refer to Annex 1 for a list of LIFDCs.

community to take specific actions to maintain and restore the world's fish stocks by the year 2015. The goals include:

> *"Assist developing countries in coordinating policies and programs at the regional level aimed at the conservation and sustainable management of fishery resources.*
>
> *"Strengthen donor coordination and partnerships among international financial institutions, bilateral agencies, and other relevant stakeholders to enable developing countries to develop their national, regional, and subregional capacities for infrastructure and integrated management and the sustainable use of fisheries."*

Similarly, the challenges faced by developing countries in funding fisheries management activities are noted in the Code of Conduct for Responsible Fisheries which states:

> *"5.1 The capacity of developing countries to implement the recommendations of this Code should be duly taken into account.*
>
> *5.2 In order to achieve the objectives of this Code and to support its effective implementation, countries, relevant international organizations, whether governmental or non-governmental, and financial institutions should give full recognition to the special circumstances and requirements of developing countries, including in particular the least-developed among them, and small island developing countries. States, relevant intergovernmental and non-governmental organizations and financial institutions should work for the adoption of measures to address the needs of developing countries, especially in the areas of financial and technical assistance, technology transfer, training and scientific cooperation and in enhancing their ability to develop their own fisheries as well as to participate in high seas fisheries, including access to such fisheries."*

Section 2 of this report contains an overview of fisheries management funding arrangements. Section 3 presents selected examples of funding arrangements from a variety of countries. Section 4 provides an analysis of the funding arrangements with a view to identifying practices that may be applied more broadly. A summary and conclusions are presented in Section 5.

2. OVERVIEW OF FISHERIES MANAGEMENT FUNDING

This section provides an overview of fisheries management funding arrangements. Specifically, the following issues are covered:

- Level of Funding Dedicated to Fisheries Management Activities
- Funding Arrangements
- Delivery of Fisheries Management Services
- Role of Stakeholders in the Decision-Making Process

2.1 Level of funding dedicated to fisheries management activities

While information is generally available on the annual quantity and value of fish landings on a country-by-country basis (e.g. FAO Fishery Country Profiles), information on the cost of managing fisheries is more difficult to access. However, there is a growing recognition that analysis of fisheries management costs can lead to more informed decisions and efficiency gains in the fisheries sector.

For the purposes of this report, fisheries management expenditures are grouped into the following categories – research, administration and management, and, compliance and enforcement.

> *Research* –- Research is conducted to inform fisheries management decisions. Research activities in support of fisheries management tend to focus on two fields – biological information (e.g. stock assessments, related ecosystem considerations, biodiversity, etc) and socio-economic information (e.g. income and employment). For example, when a harvest strategy is being developed biological research is generally sought to gain an understanding of the likely impact of alternative harvest levels on the size of the fish stock biomass. Socio-economic research can be very helpful in informing decisions on alternative fisheries management measures by estimating the associated costs and benefits.

Administration and management – This aspect of fisheries management involves developing fisheries management plans and administering ongoing arrangements (e.g. issuing fishing licences, monitoring fishing, recording catches, etc.). In addition, administration and management includes developing recommendations to change fisheries management approaches (e.g. limiting entry to the fishery, establishing a fish allocation policy among various user groups, etc.).

Compliance and enforcement – Compliance involves creating a reasonable deterrence for individuals who might be inclined to operate outside the established fisheries management rules. Deterrence is created by ensuring that there is a significant probability of being caught if operating illegally combined with a penalty that acts as an incentive to follow the rules. Activities such as monitoring, surveillance and control are designed to detect violations while penalties can be either established through the courts or through an administrative sanctions process.

Many governments also dedicate public resources to developing and supporting their domestic fisheries. Such support involves assisting citizens acquire fishing boats as well as providing access to fish landing and fish processing facilities. Government expenditures on these types of activities have been phased out in many countries. For example, in countries that provided public funding for functions such as fishing gear and vessel design, fish product and quality development, marketing, etc, the private sector is now expected to carry out these activities.

2.2 Existing types of funding arrangements

In addition to understanding the overall cost of fisheries management activities, it is important to consider how fisheries management activities are funded and who provides fisheries management services (government or private sector).

> "… how we finance fishery management matters: who pays and how they pay for management services influences the performance of a fishery… Management costs are sometimes acknowledged, but not systematically accounted for in the analysis of policy. We rarely analyse behavior of individuals and agencies in the public sector by applying the common tools of economic analysis, to ask whether the underlying conditions promote government failure or success."
>
> (Andersen, P., J.G. Sutinen and K. Cochran, "*Paying for Fisheries Management: Economic Implications of Alternative Methods of Financing Fisheries Management*", 1998)

This section describes four arrangements associated with fisheries management funding.

- Direct Government Funding
- Cost Recovery for Specific Activities and Fees That Generate Revenue for Government (e.g. rent recovery)
- Delegation of Certain Responsibilities
- Donor Assistance

2.2.1 Direct government funding

Worldwide, it is common for governments to directly fund fisheries management activities through normal appropriations. Funding decisions are influenced by the overall availability of public resources to the government, the level of priority assigned to the fisheries sector, and the specific demands associated with fisheries management regime.

In addition to funding through normal government appropriations, there are provisions in many countries direct revenue from specific sources to fisheries management activities. For example, a portion of licence fee revenue may be automatically allocated to the fisheries management agency or revenue from certain violations (fines) may be used to fund specific fisheries-related management activities (e.g. fish habitat restoration and enforcement).

2.2.2 Cost recovery and fees providing revenue to government

Frequently, in addition to direct government funding some countries have a policy of cost recovery where a portion of the fisheries management costs are recouped from specific user groups (e.g. domestic commercial fishers, foreign fishers, recreational anglers).

The rationale for such cost recovery is that those who benefit from fisheries management activities should contribute to their funding. Under such arrangements, there is a distinction between expenditures that produce benefits for a specific user group versus expenditures that produce benefits for the broader community. For example, the provision of stock assessment advice to determine the appropriate level of harvest for a specific fishery produces private benefits for the participants in that fishery. In contrast, patrolling a 200-mile EEZ may be viewed a national security issue which benefits the broader community.

Separate from cost recovery, government may charge for access to fisheries resources. The rationale for these types of fees is linked to the granting of privileged access to public resources - that is, those who benefit from a public resource should pay a fee reflecting the value of the fishing privilege. Underlying access fees is the concept of resource rent which, in effect, recognizes that fish stocks have value and the public should receive a reasonable return for granting privileged access to public resources.

2.2.3 Delegation of certain responsibilities

In many countries, the delivery of fisheries management services is seen as the responsibility of government and service delivery is largely undertaken by the public sector. For example, government agencies typically are responsible for activities such as gathering data on catch, fishing effort, biological characteristics of the harvest as well as conducting stock assessment analysis, developing annual fisheries management plans and carrying out enforcement activities.

While some aspects of fisheries management are considered the exclusive prevue of governments (e.g. setting policy), there are many fisheries management services that can be effectively delegated by government to non-government groups (e.g. conducting research). In some countries, arrangements have been established whereby certain responsibilities are formally delegated by government to a non-government organization.

2.2.4 Donor assistance

Donor assistance related to fisheries is very common in many parts of the world. There are numerous donors, including global organizations such as the UN and World Bank, regional organizations such as the Asia Development Bank, national government assistance agencies such as the Japan International Cooperation Agency and , and non-government organizations such as WWF and private foundations.

An OECD report - "Impacts of Development Assistance: Lessons Learned For Better Fisheries And Aquaculture Governance (March 2006) - notes that:

> *"The multilateral assistance has been directed for a long time towards the development of industrial fishing capacity, the construction of harbour infrastructures or processing plants. For the last few years, one has noted a reorientation towards the institutional support and the integrated ecosystem or fisheries management, …"*

Similarly, changes in fisheries-related donor assistance over time were characterized as phases in a recent presentation at the PROFISH Forum (March 2007):

- "*Phase 1: Direct production inputs; boats, gear, motors, ice-making machinery, etc*
- *Phase 2: Technical training; technical experts, local training institutions, training abroad*
- *Phase 3: Framework and management; laws, fisheries regulations, management training, management experts*
- *Phase 4: Monitoring, control and surveillance; (boats, planes, software, training)*
- *Phase 5: Co-management, institution building; setting up new institutions, modify old ones*
- *Phase 6: Regional programmes, rights-based management (licences, IQs, IVQs, ITQs, community* quotas, etc.) …"

2.3 Delivery of fisheries management services

Given the common property nature of fisheries resources, governments tend to play a prominent role in all aspects of fisheries management. This generally involves establishing formal organizational structures to ensure mandated objectives are achieved (e.g. a fisheries department), hiring skilled staff and carrying out

specific activities such as those described above - research; administration and management; and, compliance and enforcement. The nature and extent of the services provided is influenced by national policy.

In recent years, some governments have sought to improve the cost effectiveness of fisheries management by allowing the private sector to delivery many of the services traditionally provided by government agencies. This has involved identifying those services that are well-suited to private sector delivery versus functions that should remain in government. For example, developing national fisheries policy, establishing allowable harvest levels and meeting legal obligations to consult with specific groups are all functions that governments should retain. Alternatively, whether fisheries services are paid for by government or stakeholders, the private sector is well-positioned to deliver many fisheries management services including research, on-vessel observer coverage, dockside catch monitoring, to name a few. There are numerous examples of private sector delivery of fisheries management services described later in this paper.

2.4 Role of stakeholders in the decision-making process

It is common for stakeholders to be involved in fisheries management in an advisory capacity, often through formal consultative arrangements established by fisheries management agencies. The relationship between government and stakeholders is sometimes influenced by funding arrangements. In particular, where cost recovery provisions are in place stakeholders tend to be more active in the design and delivery of those particular services (e.g. seeking greater efficiency in service delivery).

However, cost recovery arrangements and the delegation of responsibility for the provision of specific fisheries management service should not be confused with devolution of decision making authority. Delivering a management service, such as dockside monitoring, is very different from making decisions regarding conservation of the fisheries resource, opening and closing of the fishery and approval of management plans. Decision-making authority for fundamental aspects of fisheries management generally rests with government and standards are often established by government for those services that are paid for and/or delivered by the private sector. Non-government participants have flexibility with respect to how the service is delivered to meet the standard.

3. EXAMPLES OF CURRENT FUNDING ARRANGEMENTS

This section provides examples of fisheries management funding arrangements used in a variety of countries.

3.1 Level of funding dedicated to fisheries management activities

The overall level of funding dedicated to fisheries management varies considerably from country-to-country as does the allocation of funds among the major fisheries management activities.

In 1999, it is estimated that OECD countries spent a total of $2.5 billion (US$) on managing marine fisheries. Among the OECD member countries there was a considerable variance in expenditures with Mexico and Turkey spending less than $1 million each while the EU and the USA each spent more than $600 million. Likewise, there was considerable variance among countries in the proportion of funding dedicated to specific fisheries management activities. On average enforcement accounted for the largest share of expenditures (39.6 percent) followed by research (34 percent) and management (26.4 percent). Refer to Table 1 below for details.

Comparing the cost of fisheries management to the value of fish production in OECD countries highlights some interesting differences among countries.

> “Canada and the United States have relatively high unit costs in terms of both the volume and value of production. In contrast, Iceland has one of the lowest costs relative to both the value and volume of production, compared to other OECD countries.” (The Costs of Managing Fisheries, OECD, 2003, pg. 30).

Aside from the information presented above, comprehensive data on fisheries management expenditures are not readily available. In many instances, government agencies are responsible for more than fisheries management and budgets are not reported in a way that allows identification of fisheries management expenditures. In addition, many agencies are involved in fisheries development, operating a government fishing enterprise or government service (e.g. subsidized boat building, ice making, etc.) and some agencies are responsible for indigenous business development.

Table: Costs of managing fisheries in OECD Countries – 1999 (US$ million)

Country	Research costs	Management costs	Enforcement costs	Total costs	Total cost relative to value of production (%)
Australia	45.7	16.8	30.8	93.3	8.5
Canada	52.4	60.4	50.3	163.2	14.1
European Union	232.1	118.2	265.0	615.4	10.0
Iceland	13.5	2.0	11.9	27.4	3.3
Japan*	219.9	140.7	105.6	466.2	2.9
Korea	28.3	47.9	246.1	322.3	9.5
Mexico	0.3	0.4	0.01	0.7	0.1
New Zealand	7.9	11.1	9.0	28.0	…
Norway	30.2	9.6	82.8	122.6	9.7
Turkey**	0.1	0.3	na	0.4	38.5
USA***	202.5	240.5	170.5	613.5	17
Total OECD	**832.9**	**647.9**	**972.0**	**2452.8**	

* Data are for 2000.
** Management and enforcement costs are combined.
*** Data relate to appropriations for fiscal year 2000.
(Source: The Costs of Managing Fisheries, OECD, 2003)

In some instances, funding for fisheries management is linked to the value of fish production. For example, in Mozambique the fisheries Master Plan established parameters for government expenditures based on an index of 2.5 percent of the fish production value. The Master Plan estimated that the fish production value would be between US$182M in 2000 to US$209M in 2005. However, the actual production value was lower than estimated (e.g. US$132M in 2002) and the public sector budget was limited to US$1.5M to US$2.2M in the early 2000s (corresponding to 1.15 percent to 2 percent of the fish production value).

3.2 Funding arrangements

This section presents examples of various fisheries management funding arrangements currently in use throughout the world.

3.2.1 Direct Government funding

Worldwide, fisheries management costs are funded predominately by governments with agencies responsible for fisheries management receiving annual budgets as part of the normal appropriations.

Some countries, such as Japan and Korea, have stated that the provision of fisheries management services is a public function and should be entirely financed by the government. In many other countries, there is no such policy but in practice fisheries management costs are paid by government (general revenues or special budget allocations) and donor assistance.

Examples of direct government funding for fisheries management are presented below.

> *Republic of Mauritius* –- The work of the Ministry of Fisheries (administration, research, monitoring and control) is geared towards the management and development of fisheries and conservation of the marine living resources. All the services provided are covered from public funding with only minor inputs from other sources such as bilateral assistance in research programmes and consultancies. All fees collected go to general government revenues and therefore are not directly linked to the provision of fisheries management activities.
>
> *Maldives* – The principle funding source for management of fisheries resources is the general government budget and there is no monetary contribution from the private sector.
>
> *Malaysia* –- The Government of Malaysia provides funding for fisheries management activities. Revenues from fisheries licensing and penalties flow directly to central government revenues and are not linked to departmental management costs or budgets.

3.2.2 Cost Recovery and fees that generate revenue for government

Some countries have introduced cost recovery programmes for specific fisheries management activities. Generally, cost recovery provisions have been applied in industrial fisheries but not to subsistence, artisanal and recreational fisheries.

In several countries, comprehensive national approaches to cost recovery have been put in place with explicit guidelines that dictate which costs are to be recouped from the fishery. Several examples are presented below.

Australia

- Since the mid-1980s, Australia has moved progressively toward applying cost recovery principles in Commonwealth fisheries.
- The commercial fishing industry pays for costs directly related to the fishing activity while the Commonwealth pays for management activities that benefit the broader community.
- A two-stage process is used to determine who pays for fisheries management costs. First, costs are assessed to determine if the activity is "attributable" to a specific user group or to the community at large. Second, activities attributed to a specific user group are examined to determine if the costs should be recovered from these groups. Factors considered in determining whether costs are recoverable or non-recoverable include the extent to which a user group benefits from the activity, the existence of extenuating socio-economic considerations and the cost-effectiveness of recovering the costs of a particular activity.
- It is estimated that about one-quarter of total Commonwealth fisheries management costs are recovered.

New Zealand

- Since 1994, New Zealand has recovered a portion of the costs associated with managing commercial fisheries.
- Initially, the approach to cost recovery was based on the "avoidable cost" principle where, as a matter of administrative practice, the government attempted to recover all costs incurred by the Government due to the existence of the commercial fishing industry. This approach was very unpopular with the fishing industry.
- Following a review of the Fisheries Act in 1999, there was agreement to change the approach to cost recovery. The current Fisheries Act contains the following principles: persons who request a service must pay for that service; costs of services "provided in the general public interest, rather than in the interest of an identifiable person or class of person" cannot be recovered and are borne by the Crown; costs must, so far as practicable, be "attributed" to the persons who benefit from the expenditure; and, persons who cause risk to or an adverse effect on the aquatic environment must, as far as practicable, pay the costs of services required to manage those risks or adverse effects.

Tanzania

- The National Fisheries Sector Policy and Strategy Statement (1997) defines the main fiscal objective for the fisheries sector as follows – "finance administrative, management and development programmes from its own sources".
- Revenue generation from the fisheries sector not only finances fisheries programmes but also provides revenue for the national treasury to fund other government priorities.
- The main instruments used to generate revenue are licensing industrial vessels, export licences and export royalties.

Namibia

- In Namibia, the total fees extracted from the fishing industry, amount to a significant fraction of the industry's total revenues. From 1994 to 1999 these fees averaged almost 9 percent of the industry revenues on average.

- Of this income, about 3/4 is accounted for by the quota fees. Moreover, this income substantially exceeded the fisheries management costs (research, administration and enforcement) which averaged about 5 percent of industry revenues during the same period.
- Thus, Namibia is one of the very few if not the only country in the world where the treasury directly collects a positive net income from the fisheries. (Arnason, 2002)

In a number of other countries, while there is no comprehensive policy on cost recovery, there are various arrangements by which fisheries management costs are recouped. Several examples of activity-specific or fishery-specific cost recovery arrangements are presented below.

Papua New Guinea (PNG)

- In the mid-1990s, PNG established a National Fisheries Authority (NFA) to replace the former Department of Fisheries and Marine Resources. The NFA has a more commercial orientation than its predecessor and a degree of fiscal autonomy.
- The NFA is able to maintain and finance its operation from revenue it raises. Most of the revenue comes from access fees paid by foreign fleets while other sources include, assistance from donor agencies, fines from successful prosecutions of fisheries-related violations and a number of other fees (e.g. application fees, mandatory licence fees, foreign fishermen fees, national crew fees, buyers licence fees, storage licence fees, factory licence fees, export licence fees).
- Any surplus profit declared by the NFA goes to the national treasury to fund broader government priorities.

South Africa

- Industry taxes and levies are paid into a "Marine Living Resources Fund" (MLRF).
- In recent years, a policy change was introduced that sees these revenues recovered from the fishing industry allocated to the MLRF and the fisheries management agency was given greater autonomy to administer these funds for research and compliance.
- There are other sources of funding for fisheries management including International donor funds and alternative research funding through the National Research Foundation.

Mozambique

- Government revenue generated directly from the fisheries sector were US$3.8M in 2002.
- Revenues available to Government as a result of fishing activities are clearly ear-marked, with 40 percent going to the Ministry of Finance, 50 percent to a Fishery Investment Fund, which provides credit to fishers and allows for capacity-building and 10 percent to the Ministry of Fisheries.

Namibia

- In Namibia, there are two levies that are used to fund specific activities. The Marine Resources Fund Levies finances the research activities of the Ministry as well as a number of training initiatives while the Fisheries Observer Fund Levies are used to fund the Fisheries Observer Agency.

Canada

- In some fisheries, commercial harvesters pay for various fisheries management activities including, research, on-vessel fishery observers and dockside catch monitors.
- In some fisheries, a portion of the total allowable catch is allocated to a fishers association as part of a co-management agreement that includes the fishers paying for specific fisheries management activities (e.g. Pacific Halibut).

3.2.3 Mechanisms used to collect fees

The four most common mechanisms used to collect fisheries-related fees are described below.

Access fees/licence fees – Many countries charge a fee for access to their fishing grounds. Generally, the fees charged to foreign fishing fleets is considerably higher than the fees for domestic vessels

and in some instances, foreign vessel access fees represent a significant source of government revenue.

Auction – Although not widely used, access to fisheries is granted in some instances through an auction whereby the highest bidders are granted harvesting licences.

Fish landings charges – A fee based on fish landings is used in many countries whereby a fixed price per kg is charged on commercial fish landings.

Export licences and royalties on fish exports – Fees on fish and fish products that are exported are common in many countries.

A wide range of other fees are in use, including mandatory payments for vessel registration, fisher registration, industrial fish processing licences, health inspection certificates, etc.

Examples of specific fee arrangements in various countries are presented below.

Pacific Island countries – Example of access fees

- In some Pacific Island countries, the generation of national government revenue from foreign fishing activity is a major objective of fisheries management. In the Federated States of Micronesia the generation of national government revenue from licensing foreign fishing activity is a major objective of fisheries management. In 1999, access fees represented an estimated 39 percent of non-tax revenue and 22 percent of total domestic revenue for the government.

Canada – Example of access fees

- In Canada, charging domestic harvesters access fees is a significant source of revenue for government. In 1996, Canada introduced a new fee structure that requires commercial harvesters to pay access fees based on a percentage of the average landed value in the fishery (up to 5 percent of the landed value in some fisheries).

United States of America – Example of auction

- Management of the Washington State geoduck fishery involves auctioning of quotas available for harvest in defined areas.
- The auction process has the following features:
  - Open to all interested and responsible bidders
  - Geoducks are auctioned as quotas of pounds available to harvest from specifically-defined tracts
  - Typically, 10–15 quotas are auctioned with each quota ranging in size from 10 000 pounds to 70 000 pounds
  - A plan of operations must be submitted by highest bidder prior to harvest contract being awarded.
  - Annual revenue generated from auctions ranged from about US$4 million to over US$10 million during the period 1993 to 2004.
  - Revenue from auction funds management and protection of state aquatic resources.

Chile – Example of auction

- In Chile, there are four fisheries using ITQ management where the quota is allocated by auction. Each year 10 percent of the outstanding quota is auctioned off. This means that each company's holdings are reduced by 10 percent every year. But the companies can replenish their holdings by successful bids in the annual auctions.

Tanzania – Example of export fees

- In Tanzania, the key fiscal objective for the fisheries sector is defined in the National Fisheries Sector Policy and Strategy Statement as to "finance administrative, management and development programmes from its own sources." An export royalty is charged on principle fish exports on a per kg basis (about 6 percent FOB).

- The royalty is collected by the Fisheries Department, and export documentation requires the inclusion of a receipt showing payment of royalty. Charges are made on a per kilo basis in all cases except for seashells and aquarium fish, which are charged ad valorem.

Denmark – Example of landings charges

- " … all Danish vessels pay 0.3 percent of the value of their catches to the Danish Fishing Landing Fund. The purpose of the fund is to improve the development of the fishing industry by supporting various actions such as: stock assessment, improvement and adjustment of the structure of the fishing sector …" (Source: Andersen, P., J.G. Sutinen and K. Cochran, "Paying for Fisheries Management: Economic Implications of Alternative Methods of Financing Fisheries *Management*", 1998)

Iceland – Example of multiple fees

- Taxes and levies are payable by the industry to the government. This includes a fishing inspection fee and quota transfer fees when trading ITQs.
- An additional chapter to The Fisheries Act (No. 38, 15 May 1990) adopted in 2002 introduced a levy on fishing rights allocation for Icelandic vessels, also called a resource fee, operating both in and outside the EEZ. The levy is payable by fishing companies from the 1 September 2004 onwards.
- The resource fee is levied on gross profit, based on the EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) system. The fee is based on the total value of landings minus labour costs, fuel costs, and other operating costs. Initially the tax is set at six per cent, but will rise to 9.5 per cent after seven years.

3.2.4 Delegation of certain responsibilities

There are a limited number of examples where governments have formally delegated fisheries management responsibilities to the private sector. One such example is the administration of the quota registry in New Zealand.

In New Zealand, the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then become responsible for ensuring the provision of the services, with the agreement of the Minister of Fisheries. In these instances, the Chief Executive of the Ministry of Fisheries is no longer accountable for provision of the service. Once functions, duties and powers are devolved to an external organization the specific related services become the sole responsibility of the organization to deliver. Failure to comply with the statute and standards and specifications can lead to civil sanctions imposed on the organization.

Many registry-based Quota Management System (QMS) services have been devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC).[3] Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name 'FishServe'.

Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Catch balancing.

[3] SeaFIC is an industry owned limited liability company that represents the interests fishers, harvesters, the marine farming sector, processors, retailers and exporters. It provides professional advice to Government and the industry on fisheries management policies and practices and scientific issues.

In addition devolved services, FishServe provides services under contract to MFish. Contracted services include:

- Delivery of catch effort services, including issuing return books and the returns management process.
- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

The government has retained a small core of staff to set standards and specifications and monitor the function. This happened because the government acknowledged its core competency was not managing an administrative system, and the industry wished to have direct control over the function to achieve cost and service efficiencies.

3.2.4 Donor assistance

Donor assistance is a critical aspect of fisheries management in many countries. A brief review of the assistance received by several countries follows.

Tonga

- Tonga has received substantial assistance with fisheries development programmes from a wide variety of sources, including FAO. Projects have variously been concerned with the provision of shore-based plant and equipment (buildings, ice plant, aquaculture centre, fisheries stations), fishing vessel construction, research, fisheries harbours, marketing and training.
- Presently the largest aid-supported fisheries project is the Australian Tonga Fisheries Project. The project will cost about US$2.6 million over a four year period and focuses on inshore fisheries management, development of offshore tuna fishing, small-scale fisheries development, and strengthening of the Ministry of Fisheries.

Namibia

- Considerable assistance has been received in fisheries development, management and training through external economic and technical assistance. All have been donor supported usually with a significant contribution in cash or in kind from the Namibian Government. Bi-lateral assistance has been provided, and many cases continues to be provided, by Norwegian Agency for Development Co-operation (NORAD), Australian International Development Assistance Bureau (AIDAB), Danish International Development Agency (DANIDA), Department for International Development (DFID) UK, Gesellschaft fur Technische Zusammenarbeit (GTZ), Germany, Centrum fur Internationale Migration und Entwicklung (CIM), Germany, Icelandic International Development Agency (ICEIDA), Iceland, Government of Spain, International Centre for Ocean Development (ICOD), Japanese International Cooperation Agency (JICA), and Fonds d'Aide et de Coopération (France).
- Multi-lateral assistance has been provided by: Food and Agriculture Organization (FAO), United Nations Industrial Development Organization (UNIDO), Commonwealth Fund for Technical Cooperation (CFTC), Global Environment Facility (GEF), and the European Union (EU).

Philippines

- In the Philippines, foreign assistance in the form of loans and grants shifted more to conservation and resource management after the late 1980s.
- An ongoing major fisheries project, Fisheries Improved for Sustainable Harvest (FISH) Project, builds upon the foundation and lessons learned from the USAID-funded Coastal Resource Management Project (CRMP) and other projects to achieve the next crucial benchmark in managing fisheries and coastal resources in the Philippines. This benchmark calls for integrated fisheries management driven by informed, disciplined and cooperative stakeholders at national and local levels of engagement.

3.3 Who delivers the fisheries management services

In most countries, the delivery of fisheries management services is undertaken by the public sector. However, there are many examples of specific services being contracted out to universities and the private sector.

> "*A large amount of research is undertaken on a contract and/or partnership basis in many OECD countries. This involves the central fisheries management agency contracting out research to universities, marine research laboratories and government marine research organizations, sometimes on a competitive basis*…"
>
> *"A number of OECD countries have also instituted the private provision of some enforcement services. In Norway, for example, the Sales Organizations play a prominent role in enforcement through the auditing of catch returns against quotas and licences and inspection of landing sites and processing plants."* (Source: The Costs of Managing Fisheries, OECD, 2003, page 49)

Several examples of non-government delivery of fishing services in Canada are presented below.

Canada

- Stock assessment research in support of the Sablefish fishery on the Pacific coast of Canada is conducted by non-government scientists and paid for by the commercial fishing sector. Stock assessment papers are peer reviewed and are used in the government decision-making process in the same manner as research papers prepared by government scientists.
- A Dockside Monitoring Programme (DMP) was established on the Atlantic coast of Canada in 1989-90 to provide accurate and timely third-party monitoring of fish landings. At its inception, the DMP was introduced in fisheries that were adopting individual quota management. By the mid-1990s, DMP operated under full cost recovery and service delivery was turned over to private sector companies operating on a commercial basis.
- An At-Sea Observer Programme has been used in some Canadian fisheries for many years. Under this programme, services rendered by registered private sector observers onboard vessels while at sea. The at-sea observer fee programme in the Atlantic fisheries, initiated in 1977, was originally sponsored by the provincial government and then by DFO in 1978. The programme was turned over to third party contractors in 1980.

3.4 What role do stakeholders play in the decision-making process?

In many countries, stakeholder consultations are part of the fisheries management decision-making process. In practice, this means that there are committees comprised of various stakeholders that facilitate a two-way discussion on key issues. The outcome of these meetings informs decisions but typically the decision-making authority rests with the government.

In some instance, governments enter into co-management or partnership agreements with fishery stakeholders. These agreements often involve a sharing of responsibilities between government and the participants in a fishery.

In isolated instances, stakeholders are granted a prominent role in the decision-making process. In particular this occurs when a community leader (or a community group) is granted specific fisheries management authorities.

Examples of such arrangements are presented below.

Australia

- The Australian Fisheries Management Authority (AFMA) was established in 1992 as a statutory authority, governed by an independent board, to manage Commonwealth fisheries.
- There is a strong emphasis on a co-operative partnership approach among key stakeholders, including fisheries managers, researchers, fishing operators, environment/conservation and recreational fishing interests (where appropriate) and other stakeholders, in the process of developing and implementing fisheries management arrangements.

- While AFMA pursues a cooperative management approach to enable relevant stakeholders to take part in management processes alongside fisheries managers, management decision-making powers are vested in the AFMA board.

United States of America

- The Magnuson Fishery Conservation and Management Act of 1976, created eight regional fishery councils to manage the living marine resources within that area. The Act was passed principally to address heavy foreign fishing, promote the development of a domestic fleet and link the fishing community more directly to the management process.
- "The councils' membership is a balance of commercial and recreational fisherman, marine scientists and state and federal fisheries managers, who combine their knowledge to prepare Fishery Management Plans (FMPs) for stocks of finfish, shellfish and crustaceans.
- In developing these FMPs the Councils use the most recent scientific assessments of the ecosystems involved with special consideration of the requirements of marine mammals, sea turtles and other protected resources. The FMPS are prepared through a planning process that includes the public comments provided by fishers and other persons concerned with the management of these resources. (Source: http://www.nmfs.noaa.gov/councils)

4. ANALYSIS AND FUTURE DIRECTIONS

4.1 Main constraints to improving fisheries management performance

Throughout the world, there are considerable challenges in establishing and operating sustainable fisheries management regimes. A short description of the main challenges follows.

Vested interests - The move to effective and sustainable fisheries often impacts the distribution of benefits derived by those associated with the fishery - harvesters, processors, marketers, equipments suppliers, boat builders, etc. As a result, fisheries management changes that could produce long-term benefits for the majority are often successfully resisted by individuals who have a strong vested interest in the status quo or hold opposing views on what changes might be appropriate (based on the anticipated impacts on them). Often, changes are introduced only when conditions in the fishery become intolerable (e.g. stock failure).

Governance – Over the past 50 years, one key observation has emerged from worldwide experience with managing fisheries open access to common property fisheries resources results in overfishing and stock decline. Yet, throughout the world governments commonly fail to introduce effective governance arrangements to address this situation. Two aspects of governance are particularly important. First, effective governance requires establishing appropriate access and allocation arrangements. Without security of access, fishery participants have little incentive to conserve the resource and harvest in an ecologically and economically sustainable manner. However, governments have a poor record in establishing such arrangements. Second, the nature of fisheries management results in conflicts among various interests as described above. Here too governments have a poor record of establishing governance arrangement that can reconcile conflicts between users (e.g. industrial vs. small-scale fishing fleets, commercial vs. recreational fishers, etc.)

Institutional capacity – Effective fisheries management is a multi-disciplinary operation requiring input from a variety of specialists including legal advisors, biologists, economists and enforcement officers. The ability to communicate effectively, engage in meaningful consultations and resolve conflicts are particularly valuable skills for everyone involved in fisheries management. The shortage of skilled individuals to work in fisheries management agencies is a critical issue in many parts of the world. In some instances, a great deal of effort is dedicated to providing training to individuals employed in fisheries management agencies. However, once trained these individuals have broader career opportunities and may be offered alternative employment outside the fisheries management agency. Without an ongoing focus on the development of skills, fisheries management agencies can be very fragile (e.g. risk a high turn-over of staff).

Lack of funding – Public funds allocated for fisheries management activities are rarely enough to meet all the demands. Therefore, it is important to identify alternative funding arrangements such as cost recovery, partnerships involving non-government organizations, co-management, etc. However, pursuing these types of arrangements usually require the fisheries management agency to become more transparent and accountable which many agencies are reluctant to do.

4.2 Key funding questions

As noted above, the FAO expert consultation is intended to focus on the following three questions.

- How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?
- Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?
- Who is best situated to provide specific fisheries management services (government or private sector)?

Each of these questions is addressed below.

Question 1 - How can scarce financial resources be allocated most effectively in support of sustainable and efficient fisheries management, particularly in LIFDCs?

The allocation of scarce financial resources for fisheries management should done in the context of a clear strategy, including objectives, priorities and desired outcomes. Such a strategy should be developed by the fisheries management authority in conjunction with stakeholders. A multi-stage process can be effective in developing the strategy.

Stage 1

- Assign responsibility for the development of the strategy to a senior fisheries management agency person and compile a support team.
- Seek political support and leadership to pursue fisheries management reforms. At the outset, political direction from the responsible Minister on priorities and the political appetite for reforms are essential considerations.
- Prepare for consultations with stakeholders by designing a consultative process and presentation materials.
- Launch a consultative process to establish a common vision of what a sustainable and efficient fisheries regime is and how it can be achieved. It is critical that all the major stakeholder groups are represented and leaders within the stakeholder community play prominent roles in this consultative process.
- Begin consultations by describing the current state of the fishery and the outlook under the existing fisheries management approach. This will form the basis of a joint definition of the problems that should be addressed.
- Provide some guiding principles to help focus the discussion, including broad government priorities related to national or regional economic development as well as government priorities for the fisheries sector.
- Seek agreement on the main objectives that should be pursued in managing fisheries.

Stage 2

- Jointly identify fisheries management options that may be considered to achieve the objectives identified in stage 1.
- Systematically analyse each option relative to achieve key objectives and other considerations – e.g. biological management objectives, economic and social objectives, distributional impacts and net cost to government. In addition, ensure the analysis includes political considerations identified (e.g. those of the responsible Minister).
- Report findings of the analysis and seek consensus on a course of action that will best achieve the stated objectives. Clearly articulate major constraints that may limit the utility of a given option (e.g. government funding).

Stage 3

- Draft a comprehensive strategy, incorporating where appropriate components developed in Stage 2.

- The strategy should include the main building blocks that underpin successful fisheries management regimes – a clear articulation of objectives and policy, a plan to develop legislation and regulations where required, a plan to secure the appropriate institutional arrangements and capacity, and design an effective decision-making process.
- Seek political support for the draft strategy and modify as necessary.
- Provide an explanation when recommendations coming out of Stage 2 could not be incorporated into the strategy.
- Present the strategy to stakeholders and modify as necessary.
- Engage stakeholders in the implementation.

The approach outlined above is generic and must be tailored to the specific circumstances in a given country. However, the fundamental approach remains the same – develop a clear plan and utilize scarce resources to support implementation of the plan. In this way funding decisions are linked to objectives, priorities and desired outcomes.

Question 2 - Given limited access to public funds, particularly in LIFDCs, how can fisheries management costs be funded (e.g. cost recovery)?

Potential sources of funding for fisheries management activities include government appropriations, contributions from participants in the fishery and donor assistance. Each is described briefly below.

4.2.1 Government funding

Governments generally contribute funding to fisheries management activities, although in many instances, the level of funding is very low.

Having a comprehensive fisheries strategy (as described above) can be very helpful in drawing attention to fisheries sector priorities within the broad national context and can form the basis for domestic budget allocations as well as international assistance (e.g. technical assistance, grants, loans, etc.).

Recognizing that public funding is limited, identify opportunities to earmark funds such as directing court-imposed fines to specific activities such as surveillance and enforcement.

4.2.3 Contribution from participants in the fishery

Fisheries management requirements can be accomplished more effectively if governments work in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack any structured way to contribute. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc. However, it is essential that government take the lead in formally defining the role of stakeholders and reflect that role in the institutional arrangements associated with fisheries management.

The contribution of stakeholders is likely to vary form one country to another and among fisheries within a given country. For example, in industrial fisheries stakeholders can be expected to contribute financially towards achieving fisheries management objectives. In contrast, in artisanal fisheries, stakeholders are more likely to become involved in management by participating in the delivery of management activities rather than providing funding.

Where it is used, cost recovery has generally been introduced as part of a broader package of fisheries management reforms. In instances where user groups have assumed responsibility for funding specific fisheries management activities, strong incentives were created to improve the effectiveness and cost-efficiency in delivering those activities.

There are a variety of ways that funds can be raised and these were described in Section 3. Given the potential for a “fee rider” problem, government can play an instrumental role in facilitating the collection of fees from stakeholders (i.e. stakeholders generally do not have the authority to establish mandatory fees).

Experience has shown that where stakeholders contribute to the management of fisheries (financially or in kind services), they seek a greater voice in the design and implementation of the fisheries management

regime. This is referred to the user pay – user say, although decision-making authorities generally remained unchanged.

4.2.3 Donor assistance

Financial and technical assistance from donors can play an important role in establishing an effective and sustainable fisheries management regime.

To get the most out of donor assistance care must be taken to match the priorities of the donor and the recipient, coordinate the efforts of various donors operating in a given location and avoid establishing an ongoing dependence on certain types of assistance.

A promising concept for cooperation between developing and industrial countries is the twinning of institutions. This could be a relationship between an institute in a developing country and a partner in an industrial country, or it could involve several institutes from both developing and industrial countries. The advantages of twinning lay in the extensive, well-organized and potentially long-lasting exchange of information and personnel and in the sharing of facilities that the concept envisions.

In some instances, countries can become very dependent on donor funding. An article “Aid has failed the Pacific”, by Helen Hughes highlighted the development problems that result from allowing countries to become almost totally dependent on donor funding to augment and run their programmes. Agencies sometimes include donor funding as part of annual budgeting, either directly, or indirectly. This phenomenon has resulted in the economic collapse of governments and limited the possibility of achieving a self-sustaining fisheries management regime.

Question 3 - Who is best situated to provide specific fisheries management services (government or private sector)?

There has been a move in many countries towards privatization of services that were for many years delivered by governments (e.g. the privatization of crown corporations such public electrical utilities and government-owned airlines). Likewise, the provision of some fisheries management services by the private sector is becoming increasingly common in many countries. Several examples were described in Section 3.

Although there are few evaluations of these experiences, it appears that there is a significant potential to achieve efficiency gains through private sector delivery of specific services.

5. SUMMARY AND CONCLUSIONS

There is a growing recognition of the importance of addressing issues associated with the cost of fisheries management activities. The level of funding available for managing fisheries is a major consideration, particularly in LIFDCs where public funding is extremely limited. Other important financial considerations include the potential for non-government funding, determining which fisheries management activities are funded, who delivers the fisheries management services and what role stakeholders play in the decision-making process.

Managing fisheries resources is a very demanding job and in most countries funding is provided by government. Typically, the level of funding provided by government falls far short of requests (from the fisheries management agency and stakeholders) and in many LIFDCs minimal direct government is available. Currently, many governments are under pressure to increase fisheries management funding. In addition to requests for more scientific research, fishery monitoring and enforcement, governments are facing an escalation in litigation and are asked to engage in stakeholder conflict resolution efforts.

The allocation of scarce financial resources for fisheries management should be carried out in the context of a clear strategy, including objectives, priorities and desired outcomes. Such a strategy should be developed by the fisheries management authority in conjunction with stakeholders. In addition, it is important to systematically track fisheries management expenditures and conduct ex-post analysis of to evaluate value for money spent, although few countries actually do this.

The delivery of fisheries management services can be accomplished more effectively if governments work in cooperation with stakeholders. Stakeholders are generally well-positioned to assist with many aspects of fisheries management but often lack any structured way to contribute. Stakeholder contributions to fisheries management can take many forms – provide advice on some aspects, play an active role in service delivery, assume specific responsibilities, provide funding, etc. However, it is essential that government take the lead

in formally defining the role of stakeholders and reflecting that role in the institutional arrangements associated with fisheries management. In addition, governments must establish appropriate access and allocation arrangements. Without security of access, fishery participants have little incentive to conserve the resource and harvest in an ecologically and economically sustainable manner.

A variety of tools are available for governments to generate revenue from fisheries and share the financial responsibility of providing fisheries management services. These tools include access fees, fish landings charges, cost recovery fees and the delegation of some fisheries management responsibilities. It is important to be clear about the rationale for new fees (e.g. rent recovery vs. cost recovery).

In instances where user groups have assumed responsibility for funding specific fisheries management activities or direct delivery, strong incentives were created to improve the effectiveness and cost-efficiency in delivering those activities. That is, the stakeholders shift from simply asking government to provide more services to focusing on how best to get the job done. Stakeholders can not be expected to accept a shift to cost recovery in isolation of other changes. In particular, where it is used, cost recovery has generally been introduced as part of a broader package of fisheries management reforms that were designed, in part, to improve the overall financial performance of the fishery. In addition, stakeholders expect a greater voice in the management of the fishery to accompany accepting financial responsibility.

To get the most out of donor assistance care must be taken to match the priorities of the donor and the recipient, coordinate the efforts of various donors operating in a given location and avoid establishing an ongoing dependence on certain types of assistance. A promising concept for cooperation between developing and industrial countries is the twinning of institutions.

Increasingly, the private sector (including fishery participants), are becoming involved in the delivery of fisheries management services. In some instance, governments enter into co-management or partnership agreements with fishery stakeholders. These agreements often involve a sharing of responsibilities between government and the participants in a fishery.

Finally, it is generally acknowledged that stakeholders can play a valuable role in the fisheries management decision-making process. To be effective, this requires a clear definition of roles (government vs. non-government) and strong leadership both within fisheries management agencies and stakeholder groups.

6. REFERENCES

Andersen, P., Sutinen, J.G. and Cochrane, K. 1998. “Paying for Fisheries Management: Economic Implications of Alternative Methods of Financing Fisheries Management”. In Proceeding of the IXth Conference of the International Institute of Fishery Economics and Trade. Tromso, Norway. pp. 439–454.

Arnason, R. 2002. A Review of International Experiences with ITQs, Annex to Future Options for UK Fish Quota Management, June.

Australian Government. 1999. New Directions for Commonwealth Fisheries Management in the 1990s, A Government Policy Statement, December.

Australian Government. 2003. Looking to the Future, A Review of Commonwealth Fisheries Policy.

FAO. 1995. Code of Conduct for Responsible Fisheries. Rome, FAO. 41p.

FAO. 2005. Fishery Country Profiles.

FAO. 2005. Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. Rome, FAO. 90p. (Trilingual version).

Haward, M., Bache, S., Tsamenyi, M. and G. Rose. 2001. Integrated Oceans Management: Issues in Implementing Australia’s Oceans Policy, Cooperative Research Centre for Antarctica and the Southern Ocean, Research Report, 26 May. Hobart, Australia.

Hersoug, B. 2007. Evolution of Fisheries Development Assistance. Presentation made to the PROFISH Forum 9 March 2007, Rome, Italy. <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:21292852~pagePK:210058~piPK:210062~theSitePK:336682,00.html>.

Hilborn, R., Orensanz, J.M., and A.M. Parma. 2005. Institutions, incentives and the future of fisheries. Philos. Trans. R. Soc. Lond. B. Biol. Sci.. January 29; 360(1453): 47–57.

Kaufmann, B. 2002. The Australian Fisheries Co-management Model, Prepared for the BC Seafood Alliance Conference on Sustainability through Co-management: Managing for a Sustainable, Profitable Fishery.

Nichols, P. 2004. Marine fisheries management in Namibia: Has it worked? In Namibia's Fisheries: Ecological, economic and social aspects. Sumaila, U.R., Boyer, D., Skogen, M.D. & S.I. Steinshamn (Eds). Delft: Eburon Academic Publishers: pp. 319–332.

OECD. 2003. The costs of managing fisheries. Organization for Economic Cooperation and Development. Study Report, Paris. 173 pp.

OECD. 2005. Fisheries Management Systems in OECD Countries. <http://www.oecd.org/document/15/0,3343,en_2649_33901_34427151_1_1_1_1,00&&en-USS_01DBC.html.>

OECD. 2006. Impacts of Development Assistance: Lessons Learned For Better Fisheries And Aquaculture Governance (Prepared by M. Jean-Yves Weigel for a Workshop on Policy Coherence for Development in Fisheries). Organization for Economic Cooperation and Development Agriculture & Food, Paris. 2006(14). p. 519-561(43)

World Summit on Sustainable Development. 2002.

ANNEX 1: LOW-INCOME FOOD-DEFICIT COUNTRIES

This annex lists the Low-Income Food-Deficit Countries (LIFDC) as of September 2004. The list stands at 84 countries.

Africa
Angola
Benin
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Congo
Côte d'Ivoire
Democratic Republic of the Congo
Equatorial Guinea
Eritrea
Ethiopia
Gambia
Ghana
Guinea
Guinea-Bissau
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Morocco
Mozambique
Niger
Nigeria
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Swaziland
Togo
Uganda
United Republic of Tanzania
Zambia
Zimbabwe

Asia
Bangladesh
Belarus
Bhutan
Cambodia
China
Democratic People's Republic of Korea
India
Indonesia
Kiribati
Lao People's Democratic Republic
Maldives
Mongolia
Nepal
Pakistan
Papua New Guinea
Philippines
Samoa
Solomon Islands
Sri Lanka
Timor-Leste
Tonga
Tuvalu
Uzbekistan
Vanuatu

Europe
Albania
Armenia
Azerbaijan
Bosnia and Herzegovina
Georgia

Latin America and the Caribbean
Ecuador
Haiti
Honduras
Nicaragua

Near East
Afghanistan
Djibouti
Egypt
Iran (Islamic Republic of)
Kyrgyzstan
Somalia
Sudan
Syrian Arab Republic
Tajikistan
Turkmenistan
Yemen

FINANCING FISHERIES MANAGEMENT: THE CASE OF SWEDEN

Gunilla Greig[1]

Greig, G. 2008. Financing fisheries management: the case of Sweden. In R. Metzner (comp.). Report of the Expert Consultation on Low-cost Fisheries Management Strategies and Cost Recovery. Georgetown, Guyana, 4–7 September 2007. *FAO Fisheries and Aquaculture Report*. No. 853. Rome, FAO. pp. 77–107.

CONTENTS

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TABLES

FIGURES

SUMMARY

Sweden is a member of the European Union (EU) and so Swedish fisheries policy and management come under the umbrella of the Common Fisheries Policy (CFP) of the EU. The CFP regulates 'living aquatic resources' which is defined as available and accessible living marine aquatic species, including anadromous and catadromous species during their marine life. Further, when dealing with the exploitation of fishery resources, the CFP concerns only commercial activities. Consequently, the Member States have to manage all inland fishery and certain fisheries along the coastline, as well as non-commercial fishing activities in marine waters. Professional fisheries in Sweden include marine (offshore and inshore) and inland fisheries.

The management of Sweden's fishery and fisheries resources is primarily the responsibility of the Swedish Board of Fisheries, which operates within the framework and guidelines set by the Government and the European Union. The two other main management agencies involved are the Swedish Coast Guard and the County Administrative Boards. In addition, estimates on expenditure on scientific research outside the remit of these authorities have been included. Management services delivered by fishery participants are limited.

Total expenditure for Swedish fisheries management has been estimated at US$51.1 million, divided into sub-categories as follows:

- Scientific research 19.1 (37.3 percent)
- Policy development & operational management 7.9 (15.5 percent)
- Enforcement 17.1 (33.5 percent)
- Corporate and administrative support 7.0 (13.7 percent)

Expenditure is related not only to fisheries, but also to the value of maintaining fish stocks for biodiversity purposes. In addition, fisheries include fishing for both professional and recreational purposes, and fisheries management also includes the aquaculture and processing sectors.

Ninety percent (90 percent) of fisheries management expenditure included in this study is financed – directly or indirectly – by government funding. The level of funding for each authority is decided by the Parliament, and at the end of each year the relevant ministry issues a budget document for each of the authorities under its auspices. The ministries govern the authorities through a model of setting objectives as well as requirements for reportng on their fulfilment.

No funding stems directly from the industry. The Swedish Board of Fisheries has been authorized by the Government to apply a fee to cover the cost of handling application and permit issues. The Board has decided to charge a fee in very few matters, mainly relating to professional fishing licences. The Board of Fisheries is not, however, empowered to have the fees collected at their disposal. Moreover, the Board is empowered to charge for the monitoring of the Common Fisheries Policy, an authority which it has so far not utilized.

The effectiveness and efficiency of fisheries management expenditure is primarily evaluated by the relevant ministry, on the basis of the authorities' annual reports, and through Governmental Commissions of Inquiry, where specific areas are assessed from time to time.

1. INTRODUCTION

Sweden has a tradition of a privately-owned production sector and a very large public sector supplying public goods, services and infrastructure. From this it follows that fishing vessels are privately owned and run, but certain services and infrastructure (port facilities) are public. The aquaculture, processing, wholesale, export and service facilities are all privately owned, but thoroughly regulated to counteract externalities such as health hazards to consumers and employees, environmental degradation, tax evasion, etc. Structural changes are often aided by public subsidies, and education and other labour market services facilitate structural adjustment.

Sweden has been a member of the European Union since 1995 and so Swedish fisheries policy and management come under the umbrella of the Common Fisheries Policy (CFP) of the EU. The primary aim of the EU fisheries management policy is to ensure exploitation of living aquatic resources that provides sustainable economic, environmental and social conditions. To this end, the precautionary approach shall apply, i.e. in minimizing the impact of fishing activities on marine eco-systems. Management is primarily based on regulating the quantities of fish caught through a system of Total Allowable Catches (TACs), complemented by technical conservation measures. Effort restrictions are also being increasingly used within the framework of management and recovery plans.

The Common Fisheries Policy regulates 'living aquatic resources' which is defined as available and accessible living marine aquatic species, including anadromous and catadromous species during their marine life. Further, when dealing with the exploitation of fishery resources, the CFP concerns only commercial activities. Consequently, the Member States have to manage all inland fishery and certain fisheries along the coastline, as well as non-commercial fishing activities in marine waters. Most of the commercially important fisheries are regulated through quotas set by the EU.

The fishery sector (catching and processing) in Sweden plays a very small economic role in relative terms, and in 2003 the sector contributed by 0.2 per cent to the national Gross Domestic Product (GDP). However, the importance to some local economies is high. A few statistics on the country are given below.

Table 1: General data on the Kingdom of Sweden

Area	449 750 km^2
Shelf area (to 200 m)	165 295 km^2
Length of coastline	2 862 km
Population (2003)	9 million
GDP at producer price (2003)	US$300.8 billion

2. OVERVIEW OF KEY FISHERIES AND THE MANAGEMENT AGENCIES

2.1 Characteristics of the fisheries

2.1.1 Commercial fishery

Professional fisheries in Sweden include marine (offshore and inshore) and inland fisheries. Vessels used in marine, commercial fishing have to be issued with a vessel permit and at least one fisherman per vessel must hold a personal professional fishing license.

Although there is no formal definition of inshore and offshore fishing activities, the term small-scale fishing generally refers to those fishing activities where the vessel is out of port for less than 24 hours. At the end of 2004, the Swedish fishing fleet consisted of 1 608 vessels with a total GT of 45 000. More than half of these were inshore vessels using the above definition. Marine vessels under 5 metres in length and freshwater vessels do not have to be issued with a vessel permit.

The number of fishermen issued with a professional fishing licence amounted to 1 913 in 2004. Of these, 182 operated in fresh-water and 1 731 in marine waters, and a total of 17 were women. Those fishing in private waters do not need to hold a professional fishing licence.

The Swedish fishing fleet operates within an area stretching from the north-east Atlantic to the northern Gulf of Bothnia. Sweden also has a large number of inland waters, with around 90 000 lakes over 1 hectare, and 300 000 km of watercourses, providing significant potential for inland fisheries. Four major lakes in the south of Sweden account for the majority of the freshwater catch: lakes Vänern, Hjälmaren, Mälaren and Vättern.

Total marine professional catches in 2004 amounted to 269 000 tonnes in live weight. Expressed in landed weight, the total catch was 262 000 tonnes.[2] The value of these landings amounted to US$112.2 million[3].

The main fishing areas of the Swedish fleet are the Baltic Sea and the Kattegat/Skagerrak. In the table below, total catches are presented according to catch area as defined by the International Council for the Exploration of the Seas (ICES).

Table 2: Catches in 2004 according to ICES division

Area	ICES division	Catch	
		Tonnes, live weight	Percentage
Atlantic	IIa	24 504	9.1
North Sea	IVa, IVb	47 227	17.6
Skagerrak & Kattegatt	IIIa	49 941	18.6
Baltic Sea	IIIb, c & d	146 860	54.7
Total		268 532	

Of the total number of Swedish vessels with vessel permits, less than half had registered landings of more than US$10 640. In the table below, these vessels have been categorized according to their main fishery by value (more than 50 percent of their income).

Table 3: Vessels with registered catches over US$10 640 in 2004 classified by gear/target species

Vessel category	Vessel size (metres)	No.
Demersal trawlers	<24	74
Demersal trawlers	>24	13
Nephrops trawlers	<12	22
Nephrops trawlers s	>12	45
Passive gears, cod and salmon in the Baltic	>12	37
Pelagic trawlers, vendace in the Baltic	<24	22
Pelagic trawlerss, other species	<24	27
Pelagic trawlers	>24	55
Prawn trawlers		53
Passive gears, cod in the Baltic	<12	168
Passive gears , eel on the west coast	<12	42
Passive gears, eel in the Baltic	<12	47
Passive gears, other species on the west coast	<12	101
Passive gears, other species in the Baltic	<12	70
Passive gears, vendace in the Baltic	<12	14
Total		790

There are a large number of landing sites in Sweden. Several Danish harbours are also important for landing Swedish catches. The table below gives an indication of the geographical importance of the main coastal areas of Sweden. It should be stressed that a large proportion of the catch is landed directly in other jurisdictions, especially that catch which is intended for reduction to fishmeal and fish oil.

[2] Figures categorized according to catch area are presented in live weight and according to landing area in landed weight.

[3] US$1.00 = 7.40524 SEK (mid-market rate as of 5 September 2005)

Table 4: Landings in 2004 by Swedish vessels, landed weight, tonnes

	For human consumption				For reduction	Total
Coastal district	Herring	Cod	Other fish	Crustaceans & molluscs		
West coast	20 556	1 098	6 554	3 250	24 893	56 351
South coast	10 412	11 472	3 554	1	6 255	31 694
East coast	3 506	1 265	9 450	0	9 558	23 779
Total Sweden	34 474	13 835	19 558	3 251	40 706	111 824
Abroad	19 350	462	10 309	13	120 313	150 447
Total	53 824	14 297	29 867	3 264	161 019	262 271

The most important species by value landed for consumption are by far cod and herring, which in 2004 accounted for almost 40 percent of the total value of marine landings. Another very important fishery is fish landed for reduction, mainly sprat, herring, sand eel and blue whiting, which accounted for 20 percent of sea fishery landings by value the same year.

The table below outlines Swedish marine landings by species. The first four columns show catches by catch area and the fifth column total catches, all recorded in live weight. The two columns to the right outline total landings, recorded in landed weight and the total value of landings.

As the purpose of the catch is not known until it has been landed, the first five columns show catches, regardless of its purpose. The two columns to the right, however, outline landings for consumption by species, and all fish landed for reduction as one item. Hence, the first columns show, for example, all sprat landed, while in the right-most columns, sprat for consumption is shown under “sprat” and sprat landed for reduction is included in “fish for reduction”. Likewise, prawns is shown as one post in the first columns, and separated into raw and cooked when landed.

Further, up until 1 January 2005, there was no obligation to draw up a sales note for volumes of less than 50 kilos; the equivalent limit is now 10 kilos. Thus, in 2004 catches landed and sold in lots of less than 50 kilos are not included in the table below. This explains why for certain species, for example trout, catches are considerably higher than recorded landings.

Table 5: Catches and landings in sea fisheries during 2004 - weight and value

Species	Atlantic (tonnes)	North Sea (tonnes)	Skagerrak & Kattegatt (tonnes)	The Baltic & Öresund (tonnes)	Total tonnes (live weight)	Total tonnes (landed weight)	Total US ’000
Eel	-	-	220	242	462	450	3 117.1
Salmon	-	-	3	675	678	431	1 344.5
Trout	-	-	1	32	33	8	22.4
Vendace	-	-	-	1 821	1 821	16	18.5
Whitefish	-	-	0	294	295	82	204.6
Other fresh-water fish	-	-	0	190	190	77	183.0
Halibut	-	0	6	0	6	6	80.9
Plaice	-	1	317	78	396	359	1 018.9
Witch	-	3	549	-	552	516	2 293.4
Dab	-	-	3	1	4	3	2.2
Lemon sole	-	3	29	2	33	29	133.0
Flounder	-	-	14	198	212	105	77.5
Sole	-	-	16	0	16	15	167.7
Brill	-	-	17	1	18	12	97.8
Turbot	-	0	7	26	33	25	151.1
Other flatfish	-	1	1	-	1	0	0.1
Cod	-	240	1 004	15 200	16 244	14 297	26 947.0
Haddock	-	187	158	0	345	298	585.0
Saithe	-	1 527	721	0	2 248	1 902	1 687.5
Pollack	-	16	34	1	51	45	131.5

Species	Atlantic (tonnes)	North Sea (tonnes)	Skagerrak & Kattegatt (tonnes)	The Baltic & Öresund (tonnes)	Total tonnes (live weight)	Total tonnes (landed weight)	Total US '000
Ling	-	3	34	0	37	34	84.7
Tusk	-	0	6	-	6	5	20.4
Norway pout	-	88	-	-	88	-	-
Blue whiting	16 517	585	2 856	-	19 957	-	-
Whiting	-	2	75	52	129	120	201.7
Hake	-	17	56	-	72	65	252.8
Other groundfish	-	3	6	-	9	-	-
Weever	-	-	8	-	8	7	20.5
Catfish	-	17	48	2	67	57	291.6
Sandeel	-	34 477	131	-	34 607	-	-
Gunard	-	3	2	0	5	2	1.8
Lumpfish	-	0	115	83	198	25	41.9
Monkfish	-	7	73	-	81	36	449.5
Garfish	-	-	46	2	47	5	5.4
Herring	7 986	5 692	31 431	43 922	89 031	53 833	15 901.2
Sprat	-	57	6 719	83 948	90 724	18 076	5 181.9
Mackerel	-	3 987	585	2	4 574	4 423	5 750.7
Porbeagle	-	5	0	-	5	-	-
Dogfish	-	0	244	-	244	241	510.0
Other marine fish	1	156	1 034	85	1 276	2 076	858.9
Fish for reduction						161 020	22 206.0
Liver						104	107.2
Roe						204	1 014.7
Crab	-	-	170	0	170	98	257.3
Lobster	-	-	31	-	31	14	532.9
Norway lobster	-	1	904	1	906	863	8 379.5
Prawns, raw	-	151	2 160	-	2 312	1 111	1 735.1
Prawns, cooked						1 175	10 099.5
Oysters	-	-	2	-	2	-	-
Blue mussels	-	-	101	-	101	-	-
Other crustaceans, shellfish & molluscs	-	0	6	-	6	5	9.5
TOTAL	**24 504**	**47 227**	**49 941**	**146 860**	**268 532**	**262 272**	**112 178.4**

Catches in inland waters by commercial fishermen amounted to 1 395 metric tonnes in 2004. The total value was US$6.6 million. The most important species by value are pike, crayfish and vendace, which in 2004 accounted for 70 percent of total landings. Vendace is fished primarily for its roe. Lake Vänern has the most important landing site. Statistics on the freshwater fishery is based on data from fishermen with a professional licence. The table below summarizes information on the professional inland fishery.

Table 6: Catches in inland waters by commercial fishermen (2004)

Species	Tonnes	US$ '000
Salmon	19	89.0
Trout	10	52.7
Char	12	93.3
Whitefish	106	359.3
Vendace	291	970.7
- of which vendace roe	18	926.4
Pike	123	254.3
Pikeperch	421	2 714.2
Perch	118	227.7
Eel	106	793.1
Crayfish	59	986.1
Other	128	67.4
Total	**1 395**	**6 607.8**

2.1.2 Recreational fishery

Recreational fishing is defined as subsistence fishing on the one hand and sport-fishing on the other. Following this definition, sport-fishing implies fishing with rod, hook and line for recreational purposes, and the catch is intended for use in the household. Subsistence fishing is normally carried out with multi-catch equipment, such as creels and nets, and the catch is primarily consumed within the household. Neither subsistence fishing nor sport-fishing (hand-gear) are included in the Swedish right of public access. However, sport-fishing is freely permitted along the marine coastline and in Sweden's five largest lakes – Vänern, Vättern, Mälaren, Hjälmaren and Storsjön. In other waters, sport-fishing is not allowed without a licence or some other form of authorisation. Foreign citizens have a right to sport-fishing to the same extent as Swedish citizens. Subsistence fishing with multi-catch equipment is permitted, to varying degrees, on the west coast, the south coast and along the northern parts of the east coast.

Traditionally, fisheries management in Sweden has focused on the commercial side, with less attention being directed to recreational fishing. Hence, less is known about recreational fishing and its impact on stocks. The figures below are collected form a postal survey, which is carried out every five years by Statistics Sweden[4]. The figures presented should, however, be regarded with great care considering the response rate which in this latest survey amounted to about 60 percent; a non-response survey shows that those responding were considerably more active in fishing for recreational purposes than the non-respondents, which will over-estimate all figures when extrapolating the results. The Swedish Board of Fisheries is developing methods for an elaborated collection of recreational data, such as catch, effort, costs and benefits. Bearing this in mind, the following figures can be presented from the survey.

- Of the about 6.4 million people aged between 16 to 74 living in Sweden, 1.7 million (28 percent) claim to have engaged in recreational fishing at least once in the year 2004. Of these, about 1.2 million are men and 0.6 million women and 80 percent of the total categorize themselves as sport-fishers, i.e. most recreational fishing takes place using hand-gear. The total number of days spent fishing[5] was estimated at almost 29 million.
- Total catch was estimated at 46 000 tonnes of which 62 percent was caught using hand-gear and 38 percent using multi-catch equipment (e.g. nets). Around 40 percent of the catch comes from fishing in marine, coastal areas with 10 percent from the five great lakes and about half of the catch from other lakes and rivers. Thus, the lion's share of recreational catches comes from fresh-water fishing. Catch-and-release fishing is not included in the above.

[4] Fiske 2005 – en undersökning om svenskarnas fritidsfiske. Published on 22 June 2005 on the home pages of the National Board of Fisheries (www.fiskeriverket.se) and Statistics Sweden (www.scb.se) but not yet printed.

[5] A day spent fishing is defined as a day regardless of how many hours were dedicated to fishing

- The species most caught are perch, pike, herring, brown trout and mackerel. These species account for over half of total catches. Even if the figures above are assumed to be over-estimated, the statistics suggest that fishing is a very important recreational activity for Swedes.

2.1.3 Indigenous fishery

The Sami population in the northern parts of Sweden have special fishing rights within the reindeer husbandry areas. The right to fish is divided between the landowners – which include both private owners and the State - and the Sami villages. The division is not clear in that there are differing judicial views on the State's right to allow other than the Sami population to fish in certain areas. A Governmental Commission of Inquiry is currently working on this and will report on 1 December 2005.

Special rules apply for fishing on the State's water above the limit of cultivation and these rules do not form a part of the Fisheries Act[6], but is included in the Reindeer husbandry Act[7] and the ordinances following from that. These rules form the basis for the County Administrative Boards' (see below) mandate to manage fisheries in the areas concerned.

2.2 The management agencies

2.2.1 The Swedish Board of Fisheries

The management of Sweden's fisheries resources is mainly the responsibility of the Swedish Board of Fisheries (SBF), 'Fiskeriverket', which operates within the framework and guidelines set by the Government and the European Union (EU).

Since 1 January 1995, when Sweden joined the EU, its resource management policies have been harmonized with the Common Fisheries Policy (CFP). However, Sweden has sole responsibility for regulating freshwater fisheries and for certain fisheries along the Swedish coastline. Apart from resource management policy, the CFP comprises three key strands: structural policy; the common organization of the markets; and international relations. The EU also regulates the Member States' monitoring and enforcement activities.

The Swedish Board of Fisheries is responsible for all marine fishery. In this capacity, the authority issues regulations needed to implement Common Fisheries Policy, as well regulations on marine issues not covered by the CFP. Moreover, the SBF regulates freshwater fisheries in the four great lakes and in watercourses connected to the sea. In all other waters, the owner of the water has sole responsibility – water owners often join to set up fishery conservation areas within which they manage stocks and regulate access.

The Swedish Board of Fisheries was established in 1948 and falls under the auspices of the Ministry of Agriculture, Food and Consumer Affairs, and is headed by a Director General who also chairs the Management Board. Swedish government authorities are regulated through a Government Regulation[8] specifying the general mandate and tasks of authorities.

It is the responsibility of the General Director to economize on the State's financial resources and through cooperation with other agencies take advantage of gains to be made for the State as a whole. It is also the responsibility of the General Director to organize the authority in such a way that the management of financial and other resources, as well as the activities of the authority, are monitored in an adequate way. The Management Board shall, among other things, examine whether the operations of the authority are carried out effectively and are consistent with its purposes. The Management Board shall also decide on the authority's annual report and auditing plans. Within this framework, each authority decides on its own structure and organization.

Further, the relevant ministry issues a regulation for each authority specifying its particular objectives and responsibilities. The relevant regulation for the SBF[9] states that the Swedish Board of Fisheries is the central management authority for the conservation and use of fish resources. In line with its sectoral responsibility

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[6] Fiskelag (1993:787)

[7] Rennäringslag (1971:437)

[8] Verksförordning (1995:1322)

[9] Förordning (1996:145) med instruktion för Fiskeriverket

for the environment, the SBF shall act towards diverse and abundant fish stocks and an ecologically sustainable management of fish resources. In doing so, the Swedish Board of Fisheries shall, inter alia:

- within the framework of the Common Fisheries Policy, assist in Sweden's endeavours to obtain an ecologically and financially sustainable fishery,
- contribute to a viable and environmentally adjusted food production for the benefit of the consumers,
- monitor, analyse and keep the Government informed on the status of fish stocks and the development within the fisheries sector,
- assist the Government and take part in international fishery issues and negotiations,
- contribute to creating conditions for ecologically sustainable and environmentally adjusted fishery and aquaculture sectors,
- contribute to increasing the possibilities for the public to fish,
- promote and undertake research within the field of fishery,
- assist in the implementation of the policy for regional development, and
- have the overall responsibility for fishery control.

Each year, the Ministry (in this case the Ministry of Agriculture, Food and Consumer Affairs), issues a budget document, where the specific objectives for that year are outlined. For each objective is specified on what the Ministry wants the authority to report. In addition, the Ministry instructs the authority to carry out a number of specific tasks, normally in the form of studies on certain topics. The role of the budget document is discussed further in the following sections.

The Swedish Board of Fisheries is organized in four departments:

- Research and Development Department
- Resource Management Department
- Fisheries Control Department
- Department of Administration

The Research and Development Department has three research units: the Institute of Marine Research based on the west coast, the Institute of Coastal Research on the Baltic coast, and the Institute of Freshwater Research, close to Stockholm. It also includes two Fisheries Research Stations, dealing with aquaculture (mainly for stocking purposes), and three Regional Fisheries Research Offices, which are primarily involved in investigations within the framework of the Environmental Code[10].

In addition to the Swedish Board of Fisheries, two other bodies are primarily involved in fisheries management: monitoring and enforcement activities are shared responsibilities with the Swedish Coast Guard and the 21 regional County Administrative Boards are engaged in a number of fishery issues.

2.2.2 The Swedish Coast Guard

The Swedish coastguard has long been a part of the Swedish Customs Service. In 1988, the Swedish Coast Guard was established as an independent authority, in order to reduce the sectoral division of State operations at sea. The Coast Guard is a civilian law enforcement authority under the auspices of the Ministry of Defence and its activities cover seven policy-areas; fisheries monitoring and control is included in two of these: Food policy and Judicial policy. According to the Government Regulation specifying the particular objectives and responsibilities of the Coast Guard[11], it shall co-ordinate all civil needs for monitoring and surveillance at sea.

The Swedish Coast Guard's tasks within fisheries cover both professional fishing in marine water and in two of the major lakes as well as recreational fishery in public marine waters and in some of the major lakes. The

[10] Miljöbalk (1998:808)

[11] Förordning (1988:256) med instruktion för Kustbevakningen

surveillance of professional fisheries takes place both at sea and in connection with landings in Swedish ports.

The Coast Guard consists of its Head Quarters, four Coast Guard regions and a flight division. Each region has its own regional management with a command centre, and each regional management is responsible for the operational activities in its area. The flight division's status is much like the Coast Guard regions, the difference being that the Flight Division operates along the entire coastline instead of in only one region.

The Coast Guard is led by a Director General. However, neither the Director General, nor anybody else at HQ, has any operational mandate or competence. HQ directs the Coast Guard regions by issuing policies, developing methodology, allocating budgets and monitoring the fulfilment of objectives set.

Apart from fisheries control, the Coast Guard performs customs controls, sea traffic surveillance, environment control, search and rescue, combats oil and chemical pollution, and carries out Police duties. Many of these activities vary in intensity according to the season and so the Coast Guard is involved in other areas of activity when fishing activities are less intense. It is also possible to work on several different policy areas simultaneously, which is an efficient way of using State funding.

As the Coast Guard has all these different duties, of which several can be performed at the same time, its principal, i.e. the Government, obtains a synergy effect that is estimated to be 300 percent.

2.2.3 The County Administrative Boards

Sweden is divided into 21 counties, each of which has a County Administrative Board and a County Governor. The County Administrative Board (CAB) is a Government agency under the auspices of the Ministry of Finance that represents the Government in the county.

According to the Government Regulation specifying the tasks and responsibilities of the County Administrative Boards[12], they shall coordinate different public interests from a Government perspective. In doing so, they shall ensure that national objectives and decisions have the best possible effect in the county, while taking regional conditions and circumstances into account.

Most of the tasks of the County Administrative Boards in the field of fisheries are specified in various Government Regulations or in the yearly budget document from the Ministry of Finance. They are involved in the national administration of issuing professional fishing licenses and the granting of EU-subsidies to the fisheries sector. Further, they issue permits to use fixed gear in public waters, to stock fish, and they decide on dispensations from technical regulations. Three northern county boards are involved in the administration of fishing on the State's water above the limit of cultivation. The CABs also have an important role as regards the aquaculture sector as a permit from this authority is needed in order to run a fish farm and also to transfer fish from one water-area to another.

In addition, the County Administrative Boards handle national grants for fishery conservation. They also decide on the establishment of, and keep a register over, fishery conservation areas. These involve member groups of private water owners who come together in order to promote tourism, co-operate on stock enhancement activities, and regulate access to their waters.

Some of the CABs deal almost exclusively with recreational fishery and aquaculture, as well as indigenous fishery. This is particularly true for the northern-most counties.

2.2.4 Other agencies

Other agencies engaged in fisheries management include the Swedish Customs Service, the Swedish Maritime Administration, the National Food Administration, the Swedish Board of Agriculture, and the Legal, Financial and Administrative Services Agency.

The Swedish Customs Service is responsible for the monitoring of imports of fish and fishery products from third countries, i.e. from outside the European Union. The Swedish Maritime Administration shall ensure that Swedish fishing vessels are measured and registered. The National Food Administration is involved in the monitoring of fish products intended for human consumption, e.g. for hygiene on-board fishing vessels, at fish landings and in connection with the import and transportation of fish. The Swedish Board of Agriculture's involvement in fishery issues includes inter alia fishing on the State's waters above the limit of

[12] Förordning (2002:864) med länsstyrelseinstruktion

cultivation, and animal feed. The Legal, Financial and Administrative Services Agency represents the public fishery interest in environmental court cases.

In addition, several universities undertake research in relation to the marine environment as a whole and also to fish and fisheries. The Swedish Environmental Protection Agency has the overall responsibility for environmental conservation and biodiversity issues and as such for non-commercial fish species. As far as enforcement, and more specifically, prosecution, is concerned, the Regional Public Prosecution Offices and the District Courts are involved. The County Administrative Courts handle administrative cases.

3. ALLOCATION OF FUNDS TO FISHERIES MANAGEMENT ACTIVITIES

3.1 Budget allocation process

3.1.1 The basis for allocating available funds

The Swedish Board of Fisheries is primarily financed with government funding. The level of funding is decided by the Parliament along with the funding for all other agencies, such as the Swedish Coast Guard and the County Administrative Boards, and at the end of each year the relevant ministry issues a budget document for each of the authorities under its auspices. The Ministries are governing the authorities through a model of setting objectives and requirements for reporting on their fulfilment.

The budget document for the Swedish Board of Fisheries is currently divided into three main areas: Research and development, Resource management and Fisheries control. Within each of these areas, specific objectives are outlined for the coming year, of which some are more long-term. The Ministry also defines how it wants the SBF to report on in what way the work of the authority has contributed to achieving the goals. In addition to the three main areas, objectives are set on more general issues, such as socio-economic analyses, equality between sexes, global development, regional considerations and public service. Each of these objectives also comes with specific requirements on how to report on their fulfilment.

Apart from the objectives outlined and the requirements for reporting, in the budget document the Ministry commissions the authority to undertake specific analyses on different subjects of special interest to the Government for the coming year.

For the last decade, the funding that comes with the budget document has been grouped under four appropriations: a general appropriation for the use of the SBF, one for the national co-funding of EU-grants to the fisheries sector, one which constitutes the EU-contribution towards these grants[13], and one appropriation for fishery conservation measures. Each of these appropriations is associated with certain conditions for its use. Some of these conditions take the form of specifying the minimum amount that should go towards a specific purpose, for example that no less than SEK “x” should be spent on a certain environmental objective.

On the basis of the budget document - its objectives and reporting requirements, the specific projects commissioned and the funding that comes with the document - the Swedish Board of Fisheries decides on how to best allocate the available funding to comply with these requirements.

The Coast Guard receives its budget document from the Ministry of Defence but the funding is rarely allocated between the different areas of activity or to a specified task. Yearly dialogues with the co-operating authorities, for example the Board of Fisheries or the Customs Service, lead to a general conclusion on what areas the Coast Guard should give high or low priority. Fisheries control is a common area of activity for which the Board of Fisheries and the Coast Guard are assigned different tasks.

3.1.2 Factors that determine the level of expenditure for a given fishery

On the basis of the budget document, other on-going long-term processes, planned activities within the framework of the European Union and activities funded by other than Government means (see section 6 below), the Swedish Board of Fisheries decides on how to allocate available resources. The budgeting process is an integral part of the SBF’s yearly planning process which results in a planning document finalized in December each year, where the work for the coming year is outlined along with an indication of what resources will be used for each area of work.

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[13] The Financial Instrument for Fisheries Guidance

The planning document (and indeed since a re-organization in 2003, the SBF) is structured in line with the budget document provided by the Ministry, i.e. the long-term objectives are based on the over-arching objectives set by the Ministry. These long-term objectives are broken down by the respective department into several more defined and operational objectives which in turn are translated into specific activities. None of these objectives however, and very few of the activities, are outlined by fishery. The division is instead by subject area, such as fleet capacity, the marketing regime, regional development, consumer affairs, the development of gear, the evolutionary effects of fishing, marine protected areas, environmental changes on the fish fauna, data collection, the prevention of the violation of regulations etc.

On the basis of the objectives defined by the SBF, and the outline of which activities are needed to fulfil the objectives, available resources are allocated, by sub-objective. The structure of the planning document is outlined in the figure below.

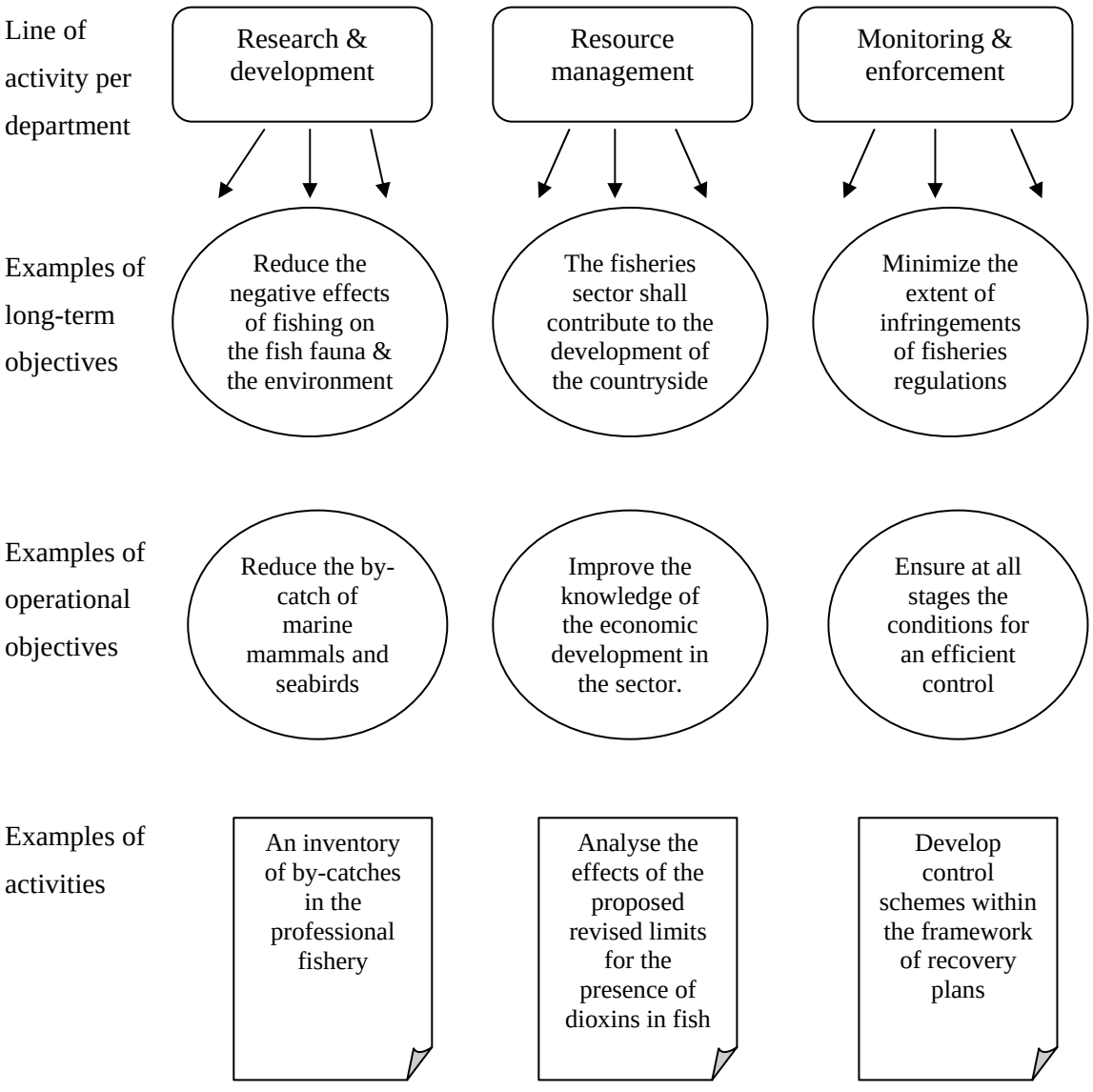

Figure 1: Structure of yearly planning document

The same structure applies for administrative objectives.

The budget is allocated at the level of operational objectives, based on the estimated time and other resources needed for each of the activities, and is decided by the General Director.

As mentioned earlier, the budget is allocated by area of work (operational objectives), rather than fishery. That said, the SBF has recently attempted to also estimate the level of expenditure, not by fishery but by geographical area, species, and purpose/recipient of activities. This has been done for the Research and

Development Department, which makes up 60 percent of the total budget of the SBF for 2005 and is discussed further in section 5.2.

3.1.3 The role played by individuals outside the fisheries management agency

Formally, on the basis of the budget document issued by the Ministry of Agriculture, Food and Consumer Affairs, the Swedish Board of Fisheries has the sole right to decide on how available resources should be allocated. However, there are factors that have an indirect impact on the planning process. The main ones are the SBF's dialogue with stakeholders, and its contacts with other authorities.

The Swedish Board of Fisheries co-operates extensively with stakeholders, primarily with the industry but also with environmental and other lobby organizations. Some of these contacts are formalized, others of a more ad hoc nature. The formalized networks include:

- advisory committees on resource management, aquaculture, processing and recreational fishery respectively,
- consultative groups with the catching sector on: structural issues (fleet structure, the issuing of professional fishing licenses, financial grants etc.), and technical and biological issues (the development of gear, areas closed to trawling etc.), as well as
- an expert panel on consumer issues.

There are also several local co-management projects ongoing, in which a wide range of interests are involved, and which the SBF co-ordinates. All of these contacts and what they bring forward as important issues to work on have a bearing on the priorities of activities and the budget allocation process of the Swedish Board of Fisheries.

The other main indirect influential factor is co-operation with other agencies. For example, the Swedish Board of Fisheries and the Swedish Coast Guard have elaborated a system for fisheries control at sea and in ports, based on risk analysis. In this process, co-ordination and adjustment of the authorities' routines for administrative as well as operational activities have been discussed, as well as the level and direction of the monitoring and surveillance. The outcome of course has an impact on how the SBF allocates its own resources.

3.1.4 Formal evaluations of expenditure and process for budget adjustments

As mentioned earlier, the Management Board decides on the annual report, including the financial report, before it is submitted to the Ministry. A formal evaluation of the annual report is undertaken by the Swedish National Audit Office. This, however, is concentrated on the reporting format, whether all information requested in the budget document is included, how well the financial information corresponds to the Ministry's budget document, routines for tracking all financial transactions, administrative routines in general and whether all information in the report can be verified. It does not generally evaluate whether or not the resources have been put to effective use.

A more in-depth evaluation as regards the use of means is included in the continuous dialogue on objectives and results between the Swedish Board of Fisheries and the Ministry of Agriculture Food and Consumer Affairs. The Ministry writes an evaluation report on the basis of the SBF's annual report. This report is then used in the dialogue in view of the annual report for the current year and the budget document for the coming year. This is discussed further in section 5.1.

In addition, the internal auditor may evaluate expenditure. The internal auditor establishes a risk analysis in view of each year and may or may not choose to include an evaluation of the annual report including expenditure.

As regards budget adjustments in the course of a year, after each four-month period, the Board of Fisheries itself evaluates its progress with each of the objectives laid down in the planning document as well as expenditure and income, and decides on any budget adjustments required. Decisions on the reallocation of resources within a department are taken by the head of this department, while decisions on reallocations between departments are made by the General Director. These decisions are documented.

4. SUMMARY OF EXPENDITURE

4.1 Categorization of expenditure

In addition to the Swedish Board of Fisheries, mainly two other authorities are involved in fisheries management as described in section 2: the Swedish Coast Guard and the regional County Administrative Boards. In addition to this, estimates on expenditure on scientific fisheries research outside the SBF have been made.

The general groups of expenditure as outlined in the headings below are very much consistent with the way the Swedish Board of Fisheries is organized with its departments for Research and Development, Resource Management, Fisheries Control, and Administrative issues. The total budget for the SBF for 2005 amounts to US$29.7 million. Some adjustments have been made from the Departments' budgets, however, to suit the categorisation of activities below. All figures for the Board of Fisheries below regarding Scientific Research, Policy Development as well as Enforcement are presented net of overhead costs, which are included in Corporate and Administrative Support.

Total expenditure for the Swedish Coast Guard amounted to US$86.8 m in 2004. Each authority is obliged to present its expenditure according to main areas of activity, and US$13.4 m was referred to as fisheries control in the Coast Guard's annual report. However, this is only one way of categorizing its expenditure. As the nature of its operations enables several tasks to be carried out at the same time, difficulties arise when time and costs shall be assigned to various areas of activity. An alternative method has therefore been elaborated in consultation with the National Audit Office, where time is registered several times when several areas of activity are being surveyed simultaneously. The number of hours is then used as weights when allocating actual costs as per its financial report to the various areas of activity.

An effect of using this method, however, is that if you take out an area of activity, the saving will not be proportionate to the cost shown, as a great share of the Coast Guard's costs are semi-fixed. Instead, time spent surveying would then simply have to be assigned to fewer areas of activity, and the same would apply for the costs for its vessels and aircraft etc.

A third way of calculating the costs for fisheries control, which has been developed for the purpose of a Governmental Commission of Inquiry (see section 5.1.2), is to only include time spent exclusively surveying fishing activities, thus excluding the basic costs for running a coastguard at all. However, the figure that will be used in the following is the official figure appearing in the annual report, i.e. US$13.4 m.

Total expenditure for the year 2003 for fishery and aquaculture related matters for all of the 21 County Administrative Boards was US$5.2 million. This figure includes both Scientific Research and Policy Development & Operational Management, as well as Enforcement, as shown below.

It should be borne in mind that expenditure on aquaculture is included in the budgets for both the Swedish Board of Fisheries and the County Administrative Boards. Aquaculture, however, is a relatively small sector in Sweden.

In addition to the above, research and development in relation to fish and fishery takes place at 14 universities, of which the main ones are Göteborg, Uppsala, Lund and Stockholm universities, as well as at the Swedish University of Agricultural Sciences.

4.1.1 Scientific research

Scientific research relating to fisheries management takes place mainly at the Swedish Board of Fisheries and at a number of universities. However, the County Administrative Boards are also engaged when it comes to stock enhancement.

As far as the Swedish Board of Fisheries is concerned, "Assessment" includes genetic studies and research on methods for analysing stocks. It also includes assessment within the framework of co-management projects, and so parts of this (US$0.51 m) could, alternatively, have been referred to the sub-category Consultation below. The category "Other" refers to various tasks carried out on behalf the Swedish Environmental Protection Agency. It is estimated that about US$2.7 million of the expenditure of the Board of Fisheries relates to applied research relating to fish and fishery.

The dominating financier of research relating to fish and fishery from which funding can be applied for, is The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, which annually

allocates about US$2.7 million for both basic and applied research activities. It has not been possible to classify this funding according to sub-categories but the following areas are being prioritized when allocating grants: biodiversity, the dynamics and structure of fish stocks, sustainable management strategies, possibilities and risks related to aquaculture, fish diseases as well as the importance and development potential of fisheries.

It should be emphasized that the research activities funded by the Swedish Research Council include both fish and fishery as well as aquaculture, and so is not in its entirety related to fisheries management.

In addition, the universities have limited budgets of their own for the financing of research fellows and PhD students within the field of fish, fishery and aquaculture. This however, has not been included in the table below.

Table 7: Expenditure per sub-category for scientific research (US$ million)

Category / Authority	Assessment	Surveys & Data analysis	Stock enhancement	Fishery techniques & selective gear	Aquaculture	Other	Total
Swedish Board of Fisheries	4.91	5.72	1.15	0.76	2.06	0.61	15.20
County Admin. Boards	-	-	1.17	-	-	-	1.17
Swedish Research Council							2.70
Total							19.07

4.1.2 Policy development and operational management

Total estimated expenditure for Policy Development & Operational Management amounts to US$7.9 million, divided per sub-category as shown in the table below. The main authorities engaged in this area of activities are the Swedish Board of Fisheries and the County Administrative Boards.

"Consultation" includes advisory committees and consultative groups, co-management projects as well as other general contacts with and information to stakeholders and the public, including consumer issues. Consultation also includes advice to institutions in other countries within the framework of so-called "twinning projects" with EU candidate countries and new Member States, as well as other international development co-operation. Veterinary issues in relation to fish stocking has also been referred to this category.

"Preparing fishing plans" includes activities in relation to the setting of total allowable quotas, the elaboration of management and recovery plans, technical regulations etc. This category also includes socio-economic analyses and the elaboration of strategic plans for the fisheries sector.

"Licensing" includes the issuing of personal professional fishing licences and vessel permits, including licensing as a regional policy instrument and a means to reduce fishing capacity, as well as the issuing of special fishing permits for certain fisheries.

"Financial aid" includes the handling of structural aid from the EU structural fund the Financial Instrument for Fisheries Guidance and, to a smaller extent, national grants.

"Marketing regime" refers to work related to the EU organization of the common markets for fish and aquaculture products.

"Environmental code and water rights" mainly includes the work of the Swedish Board of Fisheries' three Regional Fisheries Research Offices: the handling of matters related to the Environmental Code, investigations on behalf of Environmental Courts as well as reviews of water rights' decrees on behalf of the Legal, Financial and Administrative Services Agency. The County Administrative Boards are also involved in these issues to a certain extent.

Table 8: Expenditure per sub-category for policy development & operational management (US$ million)

Category / Authority	Consultation	Preparing fishing plans	Licensing	Financial aid	Marketing regime	Environ-mental Code & Water Rights	Total
Swedish Board of Fisheries	1.65	1.46	0.57	0.80	010	1.87	6.45
County Admin. Boards	0.23	0.23	0.12	0.59	-	0.23	1.41
Total	1.89	1.70	0.68	1.39	0.10	2.10	7.86

4.1.2 Enforcement

Enforcement engages the Swedish Board of Fisheries, the Swedish Coast Guard and the County Administrative Boards. Bearing in mind what was said above about different ways of calculating the Coast Guard's expenditure on fisheries, total expenditure has been estimated to US$17.1 million, divided into sub-categories as outlined in the table below.

"Monitoring", "Control" and "Surveillance" have been interpreted according to the definitions used in the FAO Guide to monitoring, control and surveillance systems for coastal and offshore capture fisheries[14], i.e.:

- monitoring – the continuous requirement for the measurement of fishing effort characteristics and resource yields;
- control – the regulatory conditions under which the exploitation of the resource may be conducted; and
- surveillance – the degree and types of observations required to maintain compliance with the regulatory controls imposed on fishing activities.

For the National Board of Fisheries, monitoring activities relate to both fishing effort and quotas, including the collection and registration of data from logbooks, vessel-monitoring systems etc., as well as reporting and statistics. Control relates to ensuring the conditions for efficient enforcement, and surveillance refers to the follow-up of fisheries control regulations and measures taken against infringements.

The Fisheries Control Department within the Swedish Board of Fisheries handles not only resource control but also, to a certain extent, enforcement of the EU Marketing Regime and the EU structural aid (the Financial Instrument for Fisheries Guidance). These activities are included in the figures in the table below.

Table 9: Expenditure per sub-category for enforcement (US$ million)

Category / Authority	Monitoring	Control	Surveillance	Prosecutions	Total
Swedish Board of Fisheries	2.02	0.42	0.42	0.11	2.97
Swedish Coast Guard	-	-	13.44	-	13.44
County Admin. Boards	0.35	0.23	0.12	0.93	0.73
Total	2.37	0.65	13.98	0.14	17.14

As regards the involvement of the Regional Public Prosecution Offices and the District Courts as well as the County Administrative Courts, their expenditure is not specified for fishery-related matters. The only information obtained is the number of cases handled at the County Administrative Courts which (in 2004) amounted to 54: 42 referred to the Fisheries Act, two referred to the Fishery Conservation Areas Act[15]; and 10 referred to Government Regulations.

[14] FAO Fisheries Technical Paper 415; ISSN 0429-9345

[15] Lag (1981:533) om fiskevårdsområden

4.1.3 Corporate and Administrative Support

Information about Corporate and Administrative Support is presented only for the National Board of Fisheries and the County Administrative Boards, as shown in the table below.

The item "Other" at the Swedish Board of Fisheries includes expenditure for its General Director and Management Board, rent for HQ premises, the personnel unit, registry etc. For the County Administrative Boards, all internal overhead costs have been referred to this column.

Table 10: Expenditure per sub-category for Corporate and Administrative Support (US$ million)

Category / Authority	Legal services	Education	Publicity	IT	Finances & Internal auditing	Other	Total
Swedish Board of Fisheries	0.09	Not specified	0.37	1.43	0.84	2.33	5.05
County Admin. Boards	0.34	0.04	0.09	Not specified	Not specified	1.49	1.96
Total	0.43	0.04	0.45	1.43	0.84	3.82	7.01

4.2 Approaches used to track expenditure

4.2.1 The Swedish Board of Fisheries

All of the SBF's expenditure is grouped into salaries, travel expenses, consultant fees, the purchase of material etc. as well overhead costs such as rent, depreciation and financial costs. All expenditure is also assigned to each of the units within a department and in parallel allocated to each of the main areas outlined in the Ministry's budget document.

Further, for the lion's share of the SBF's activities, the members of staff record how much time is devoted to each activity. Other costs, such as travel expenses, the use of material etc, are also assigned to the different activities. In this manner, a record is kept of how much each activity and, when aggregated, each operational objective costs.

The system of time logging is most developed within the Research and Development Department, which is explained by the fact that they have traditionally had several other sources of income than government funding (see section 6 below) and carry out projects on behalf of many different principals. Expenditure of the other three departments is not divided between the different activities to the same extent and not all members of staff assign their time between all the activities they are involved in. Therefore, for some of the operational objectives, information on their respective costs is still based on an estimate. A time-logging system for the whole of the SBF is, however, under way.

4.2.2 The Swedish Coast Guard

Similar to what has been described for the Board of Fisheries above, the Coast Guard's expenditure is grouped according to salaries, travel expenses, consultant fees, the purchase of material etc. as well overhead costs, which for 2004 amounted to 35 percent of the total budget. All expenditure is also assigned to each of the units within a department and allocated in parallel to each of the main areas outlined in the Ministry's budget document.

In contrast to the SBF, the Coast Guard does not follow up how much time is devoted to each activity on an individual basis. However, time for inspections is recorded as well as all units' patrol time directed towards monitoring and law enforcement in the various policy areas, for example fisheries.

4.2.3 The County Administrative Boards

The County Administrative Boards have a time-logging system whereby time is allocated to different tasks. As salaries is by far the most important cost for the CABs, time logging is the determining control mechanism. The cost (time) allocated to each task is checked against the current year's planning document.

5. ANALYSIS OF FINANCIAL INFORMATION AND PRESENTATION OF INDICATORS

5.1 Effectiveness and efficiency of expenditure on key management activities

5.1.1 Dialogue between Ministry and Authority

As explained in section 3, the Government monitors its authorities by: setting objectives for their operations; giving them specific projects each year; requiring that each authority reports on in what way their work has contributed to achieving the objectives; and to present the studies requested. The two main instruments are the yearly budget document for each authority and the authorities' annual reports.

In addition to this, as far as the National Board of Fisheries is concerned, the authority and the Ministry of Food, Agriculture and Consumer Affairs have a continuous dialogue on objectives and results throughout the year, as mentioned in section 3.1.4.

The Ministry writes an evaluation report in the spring, on the basis of the SBF's annual report which is presented in February each year. This report is used in the dialogue in view of the budget document for the coming year and the annual report for the current year. Items discussed in the report are inter alia the quality of the annual report, the financial follow-up, whether the operations are carried out efficiently, financial outcome as compared with budget, external reviews, assessment of results obtained and fulfilment of objectives set. However, no analysis in terms of value for money in relation to specific activities is carried out in this context.

In brief, the Ministry's evaluation report for the year 2004 presented the following findings:

- *Quality of annual-report*: All the information requested in the budget document for 2004 is included in the annual report. However, as the report is very descriptive in character, it is difficult to assess whether the SBF has fulfilled its obligations in relation to the objectives set.
- *Financial follow-up*: The SBF is to a large extent financed via external grants, which implies that the authority is financially vulnerable and to a high degree dependent on other authorities.
- *Efficiency of operations*: a lack of ratios results in difficulties to assess how efficient operations are carried out. However, low operating costs per employee, despite a geographically diverse operation, give an indication.
- *External reviews*: In 2004, the Ministry commissioned the National Financial Management Authority to assess the annual report of the Swedish Board of Fisheries. They conclude, among other things, that the SBF presents very well what has been done in order to achieve their objectives, but that not enough is said about whether this has in fact contributed to the fulfilment of the objectives.
- *Assessment of results and fulfilment of objectives*: A general view is that the reporting requirements outlined in the budget document are complied with. The Ministry also concludes, however, that there is not enough emphasis on analysing whether or not the results of the operations have contributed to the fulfilment of their objectives. Nor does the annual report contain an assessment of the results in relation to expenditure, that is expenditure per area of activity in relation to the objectives set.

The dialogue between the Ministry of Agriculture, Food and Consumer Affairs and the Swedish Board of Fisheries will continue in order to improve the annual report so that it better reflects the efficiency and effectiveness of the authority's operations.

5.1.2 Governmental Commissions of Inquiry

Apart from the Ministry's evaluation report, specific areas of the Swedish Board of Fisheries' activities are assessed from time to time through Governmental Commissions of Inquiry. In 2005, a Commission of Inquiry presented its evaluation of the Swedish fisheries control[16].

The report concludes that it was not possible to fully assess the effectiveness of the fisheries control activities, as not enough information on illegal fishing operations and their impact on fishery resources was available. Nevertheless, the Commission of Inquiry elaborated efficiency indicators for certain parts of the reported fishery and evaluated the efficiency of the authorities involved, primarily the Swedish Coast Guard

[16] Den svenska fiskerikontrollen – en utvärdering. SOU 2005:27. ISBN 91-38-22331-7

and the Swedish Board of Fisheries, and, to a certain extent, the County Administrative Boards. Its main findings touched upon the division of labour between authorities; co-operation and co-ordination between authorities; Government monitoring and follow-up, and plausible efficiency gains.

Division of Labour: The Inquiry found that the division of labour for fisheries control activities between different authorities is not well enough specified and proposes certain changes in order to remedy this and also to simplify the monitoring and follow-up of the authorities involved.

Co-operation and co-ordination: The Inquiry identified a need for further developing the co-operation and co-ordination between the parties involved – authorities, the fisheries sector and the Chancery, and also an extended exchange of experiences between the authorities involved in fisheries control on the one hand, and the judicial system on the other.

A more effective fisheries control: The Inquiry proposes that the objectives in the authorities' budget documents be more effect-orientated and also that the Board of Fisheries and the Coast Guard are given the task of jointly elaborating a system of indicators for measuring and following illegal fishing activities. The Inquiry also requests a process-flow mapping and analysis.

Efficiency gains: The Inquiry is of the view that there is scope for trying internal monitoring systems for fish quality control, in order to save resources. The Inquiry also suggests certain changes in the direction towards an intensified control of the distribution and processing parts of the production chain.

5.1.3 Independent evaluations

Certain areas of activity, primarily those governed by EU regulations, require independent evaluations. One such area is the Financial Instrument for Fisheries Guidance: the EU financial grants. All EU Structural Funds are administered within multi-annual programmes; the current ones run from 2000 – 2006 and three programmes involve the Swedish fisheries sector.

According to Council Regulation (EC) No. 1260/1999 laying down general provisions on the Structural Funds, various evaluations shall be undertaken. For example, a mid-term evaluation shall examine, in the light of the ex-ante evaluation, the initial results of the assistance, their relevance and the extent to which the targets in the programmes have been attained. It shall also assess the use made of financial resources and the operations of monitoring and implementation. An independent mid-term evaluation was carried out on behalf of the Swedish Board of Fisheries during 2003[17].

The evaluation primarily attempts to assess the impact of the financial grants paid to the final beneficiaries and the relevance of the programmes' objectives, and not how well resources within the Swedish Board of Fisheries and the County Administrative Boards have been used to administer the grants. The evaluation does assess whether the programming organization was deemed functional, and whether enough staff had been assigned to these tasks for a grant application to be processed within a relevant period of time and so to ensure that the administrative conditions are in place to enable the objectives of the programmes to be achieved; this did not, however, include an analysis of whether the programme administration was efficient.

5.2 Findings on expenditure ratios, etc.

As mentioned earlier, the budget of the Research and Development Department of the Swedish Board of Fisheries accounts for 60 percent of the authority's total budget for 2005. This is also the Department where the most efforts have been made to classify expenditure by, for example, geographical area, species, and purpose/recipient of information.

The Department includes the Institute of Marine Research, the Institute of Coastal Research and the Institute of Freshwater Research as well as two Fisheries Research Stations, dealing with aquaculture (mainly for stocking purposes), and three Regional Fisheries Research Offices, which, as mentioned earlier, are involved mainly in investigations within the framework of the Environmental Code. The Department's budgeted resource use for 2005 is shown by type of water in Table 11.

[17] Gemenskapens strukturåtgärder inom fiskerisektorn 2000-2006 – halvtidsutvärdering. Inregia AB.

Table 11 Expenditure classified by type of water (2005)

Water	Share
Marine	28.7%
Coastal	21.6%
Inland	25.5%
All types	24.2%

About half of the Department's budget is specified per species. From this information, the relative importance in terms of budgeted spending for 2005 and the value of landings from the professional as well as the recreational fishery has been calculated as shown in the figure below.

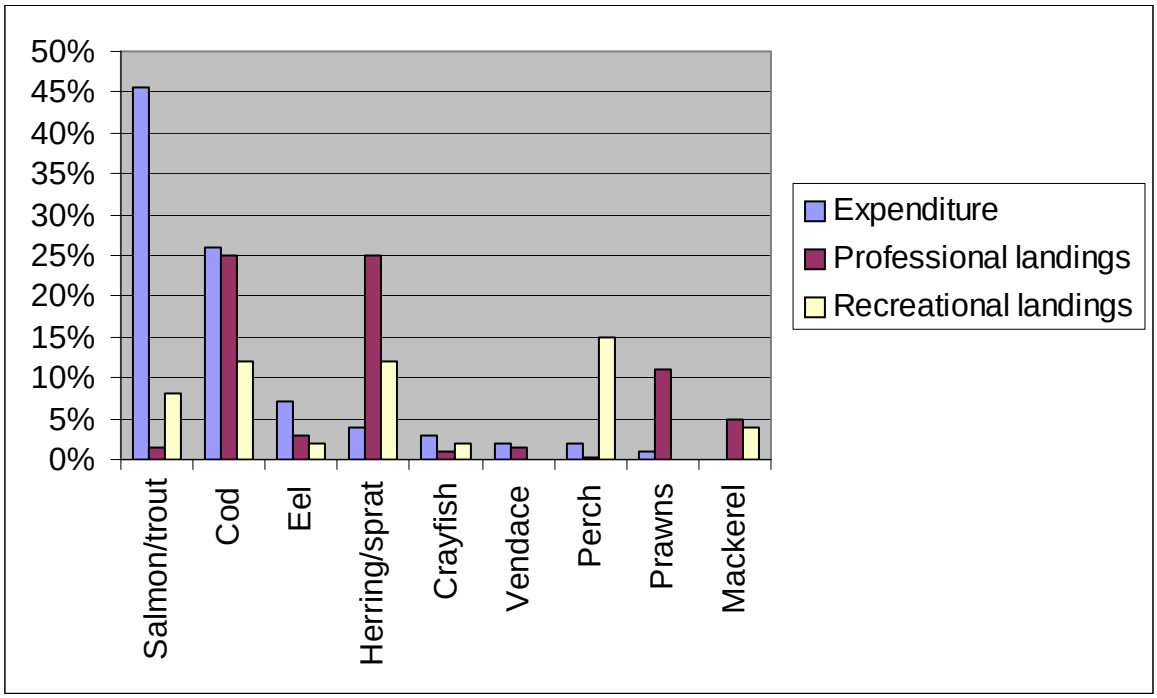

Figure 2: Relative importance of selected species

Value of professional marine/coastal landings is based on logbooks for 2004 and of professional inland landings for 2002; value of recreational landings is based on estimates from 2000.

When studying the diagram, it becomes apparent that expenditure on research activities often does not correlate with their relative importance in terms of landings. While this may indeed reflect a skewed prioritisation, it should be borne in mind that some species may motivate greater expenditure for biodiversity/environmental reasons than is indicated by landings. Similarly, a stock in good health may not need as much attention as its relative importance for the fishery would indicate.

As regards salmon/trout, salmonids have always attracted the interest of fish biologists, and are often used as model species for general ecological issues. As regards Sweden, there are two additional reasons for its great share of the SBF:s expenditure. Firstly, several Swedish rivers have been exploited for hydropower, which has had a significant impact on fish stocks and water areas. As a consequence, the hydropower companies have, in water rights' decrees, been charged to set aside a certain amount of money each year for compensatory measures. Some of this money is under the disposition of the Swedish Board of Fisheries and as it is mainly a question of salmon/trout in these rivers, the money has to be used for stock enhancement measures for these species. Secondly, salmon and trout used to play a greater role for the Swedish professional fishery, before salmon was farmed in large quantities, and so there is an element of tradition involved.

The figure below is an attempt to categorize the Department's expenditure according to its purpose or the information's recipient.

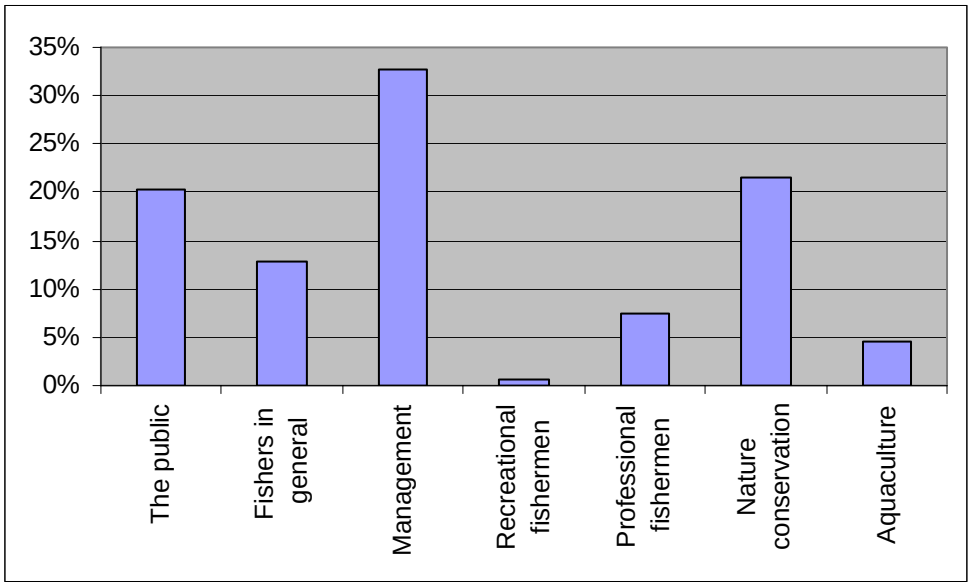

Figure 3: Share of budgeted expenditure for 2005 per primary target group

As is shown by the figure, the primary target of the work of the Research and Development Department is management, i.e. advice for management decisions.

6. SOURCES OF FUNDING

6.1 Level of government and non-government funding for fisheries management activities

The lion's share of fisheries management in Sweden is financed via the Government; this is valid for the Swedish Board of Fisheries as well as the Swedish Coast Guard and the County Administrative Boards and the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning.

Although the categories of expenditure outlined in section 4 do not wholly correspond with the departmental division within the Swedish Board of Fisheries, sources of funding is presented by department in the table below.

The Swedish Coast Guard is financed via Government appropriations almost in its entirety – the remaining share as far as fisheries control is concerned being EU-funding.

The County Administrative Boards are almost exclusively (99 percent) financed via Government funding. A minor share is made up of a number of fees that the County Administrative Boards have at their disposal. None of these, however, is related to fishing.

The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning has Government funding only.

The table below outlines the different sources of funding in more detail.

Table 12 Type of funding (US$ million)

Authority / Type of funding	Swedish Board of Fisheries				Swedish Coast Guard	County Admin Boards	Swedish Research Council	Total
	R & D Dept.	Resource Management Dept.	Fisheries Control Dept.	Dept of Adm. & other corp. services				
Direct Government funding	8.64	3.02	2.63	4.84	13.35	5.27	2.70	40.45
EU	1.70	0.11	0.56	0.11	0.09	-	-	2.57
In-direct Government funding	2.42	0.67	-	0.05	-	-	-	3.13
Hydropower compensatory funding	3.37	0.01	-	0.09	-	-	-	3.46
Companies etc.	1.36	-	-	-	-	-	-	3.36
Other	0.11	-	-	-		-	-	0.11
Total	17.60	3.81	3.19	5.09	13.44	5.27	2.70	51.08

As far as the Swedish Board of Fisheries is concerned, direct Government appropriations are allocated through the yearly budget document. Indirect Government funding is means that the authority receives from other authorities in return for work commissioned; the Resource Management Department, for example, receives funding from the Swedish International Development Cooperation Agency, and the Research and Development Department carries out work on behalf of the Swedish Environmental Protection Agency.

EU-funding includes money for the collection of biological as well as economic data, and for development projects for the monitoring and control of fisheries. EU-funding is also made up of structural grants from the Financial Instrument for Fisheries Guidance (FIFG) in order to undertake studies, pilot projects and training measures, as well as expenditure for the preparation, implementation, monitoring and evaluation of the structural programmes. The bulk of the EU funding goes towards the collection of biological data within the Research and Development Department, and towards studies and pilot projects financed via the FIFG, within the same department.

As mentioned in section 5.2, several Swedish rivers have been exploited for hydropower and the hydropower companies are obliged to finance compensatory measures. About half of the funding allocated to the Swedish Board of Fisheries is directed towards measures in specific rivers, such as stock enhancement and the building of salmon ladders. The other half is used for general research on the effects of exploiting rivers for hydro-power purposes.

Funding from companies refers to specific tasks assigned to the SBF by individual companies or consortiums. These tasks concern, for example, studies on the effects on commercial fish stocks relating to nuclear power stations, the building of a bridge, the laying of a cable at sea etc.

As the table shows, the most important source of funding, by far, is central Government; if including direct and indirect Government funding as well as EU-funding, the share is 90 percent. The fishing industry does not pay any levies or other specific fees for the management of commercial fishery or fish stocks. The only fee that each fisherman has to pay directly, is a fee of US$68 when applying for a personal, professional fishing license for the first time. This amount is reduced to US$40 when applying for the renewal of a license, as these are issued for a maximum of five years. This money, however, is not marked for the financing of fisheries management, but goes into the general treasury.

6.2 The use of non-government funds

As mentioned above, no funding for fisheries management stems directly from the industry. The only private funds involved, are the specific appropriations stemming from the exploitation of rivers for hydropower

purposes, the use of which is strictly regulated, and funding from individual companies or consortiums. The latter is regulated in contracts for each specific task.

6.3 Cost recovery mechanisms

The Swedish Board of Fisheries has been authorized by the Government, which in turn has been authorized by the Parliament, to apply a fee to cover the cost of handling application and permit issues, such as applications for professional fishing licences, vessel permits, special, permits for specific fisheries (for example in third country waters), permits to run a fish farm or to move or stock fish. Moreover, the SBF is empowered to charge for the monitoring of the Common Fisheries Policy. However, the Board of Fisheries has decided to charge a fee only in matters relating to professional fishing licences, permits to use fixed gears in public waters – which are handled by the County Administrative Boards – and for the control of common marketing standards when third country vessels land fish in Swedish ports during certain hours.

The Board of Fisheries is not, however, empowered to have the fees collected at their disposal. Instead, as mentioned above, this money goes into the general treasury.

6.4 Issues associated with ability to pay

As already mentioned, there are currently very few cost recovery mechanisms within Swedish fisheries management. As the management systems become all the more complicated, however, a discussion has started to emerge as to whether it may be reasonable for vessel owners to pay for some of the services carried out by government institutions. This relates primarily to various kinds of fishing permits, for example to fish in certain areas or for certain species. To apply for, and receive, all of these permits, is presently a free service provided by the Swedish Board of Fisheries or the County Administrative Board. A potential fee would, at least initially, probably not be set so as to cover the authorities' actual expenditure, but would be symbolic and possibly contribute to reducing the number of applications submitted per vessel.

A more radical discussion, which has not yet fully evolved in Sweden, concerns the introduction of some form of resource rent, i.e. to absorb supernormal profits deriving from the exploitation of fish resources. The resource rent currently rests with the fishing sector in Sweden, as the fish is a free resource within the framework of quotas, rations and other effort systems, and no levy upon landing or other purpose-built tax is in place.

Assessing the level of any supernormal profits is a difficult issue, especially as they vary over time. In order to take into account the fact that profitability varies, the management authority could assess and collect the resource rent by auctioning the most important species – pelagics, for example – in view of each fishing year. In this way, the management authority, i.e. the Swedish Board of Fisheries, would still control the fish resource, as opposed to a system of Individual Transferable Quotas (ITQs) whereby quotas or effort are sold or in any other way handed out once and for all. In a system with ITQs, the resource rent stays within the sector and is manifested in the price of quota when transferred.

Collecting at least parts of the resource rent may in fact be favourable even for the catching sector in the long term. Sweden has traditionally experienced problems as a result of the fleet having been too profitable in times when stocks and/or prices have been advantageous, in that the management authorities have not been able to resist pressure to expand the fleet. The current administrative tools in the form of licenses and vessel permits have proven not to be sufficient when profits are there to be collected and indeed, there has even been political pressure to increase the number of fishermen. An economic tool, to collect the resource rent and thus to keep companies' profits down, might have helped to avoid the current overcapacity within the fleet.

Overcapacity is currently particularly apparent within the Swedish pelagic fleet, which depends on large quantities of fish and is very sensitive to price fluctuations. As both stocks and prices vary substantially within short cycles, this is a segment where supernormal profits are accumulating quickly. One way of measuring these historically, is to look at investment.

A system of tax deductions for investments is applied in Sweden; the reason behind this is that society wants to stimulate economic growth. However, this may be counterproductive when applied to activities based on common resources, such as fisheries. As tax pressure is relatively high in Sweden, companies are eager to re-invest their profits and so avoid paying tax. The abolition of tax on re-invested profits is a form of stimuli, or subsidy, which encourages investment and so the capitalisation of the fleet. In addition, since joining the

European Union in 1995, Sweden has subsidized investments directly through EU structural support schemes (the Financial Instrument for Fisheries Guidance).

A study has been undertaken which looks specifically into the development of a Swedish pelagic segment in the context of EU structural support schemes for the period 1995 – 2002[18]. By analysing the level of investment, the general development within the segment, the possible impact of subsidies on the volume of investments and in turn on catches, profitability, fishing capacity and fishing effort, an attempt to assess the resource rent can be made. Subsidies in various forms tend to capitalize any resource rent, thus contributing to overcapacity and fuelling a development of inefficiency. Investment as a result of supernatural profits should be not encouraged but discouraged, in order to reduce the risk of an overcapitalized fleet.

7. FISHERIES MANAGEMENT SERVICE PROVIDERS

7.1 Types and levels of services provided by non-government sources

No non-government service providers are formally involved in Swedish fisheries management and, as mentioned in section 6, there is no non-government funding involved in fisheries management in a strict sense. However, there are non-government parties who are actively involved in an advisory capacity. One example is the advisory and consultative groups under the auspices of the Swedish Board of Fisheries where, for example, the World Wildlife Fund, the National Processing Federation and the Swedish Fishermen's Federation, are represented, and where various fisheries management issues are discussed and debated, such as areas closed to trawling, national management plans, the structure of the Swedish fishing fleet etc.

Apart from the various federations (processing, catching sector, aquaculture etc.) and other individual non-governmental organizations, in 2003, a Fisheries Secretariat was set up jointly by three NGOs: the Swedish Society for Nature Conservation, WWF Sweden and the Swedish Anglers' Association. The Fisheries Secretariat works towards more sustainable fisheries through information, international co-operation, and lobbying at the international level, but focussing mainly on the European Union. The Secretariat is, however, the result of Government funding.

Further, as outlined in section 3.1.3, there are several local co-management projects ongoing. These are the result of a Governmental Bill on small-scale coastal and freshwater fishing (and aquaculture)[19], whereby the Government instructed the Swedish Board of Fisheries to co-ordinate at least five local fisheries management initiatives. Six initiatives have developed during 2005 and the SBF is to report on their function and results before the end of 2006. The role of these projects, and its participants, vary, but they all include a broad range of stakeholders and deal with various issues related to professional as well as recreational fisheries, and are to take other water-users as well as environmental interests into account. If successful, they may prove a way forward in other areas in order to increase the involvement in, and legitimacy for, fisheries management decisions.

7.2 Management services delivered by fishery participants

Two examples can be found whereby the catching sector itself delivers management services, a voluntary rationing system, run by the Fishermen's Federation, and the work of Producer Organisations.

7.2.1 Voluntary Rationing System

The Swedish Fishermen's Federation operates a rationing system for certain commercially important species. These include saithe, haddock, whiting, plaice, sole and cod in western waters. The Federation has various committees under its auspices, which, where applicable, decide on the size of the ration per week or month; the ration is altered throughout the year according to fishing patterns and how much quota remains. The number of rations per vessel depends on a combination of vessel length and tonnage. A specific system is in place for northern prawn, for which, in addition to a rationing system, fishing is only allowed three days per week.

The Swedish Fishermen's Federation also used to regulate fishing for pelagic species. However, as the economic conditions for these fisheries hardened due inter alia to lower prices, some members either

[18] Johannesson J. and Gustavsson T. (2004) *The Development of a Swedish Pelagic Segment in the context of EU Structural Support Schemes 1995 – 2002*, National Board of Fisheries, Sweden.

[19] Regeringens proposition 2003/04:51 Kust- och insjöfiske samt vattenbruk

dropped out of the federation or started to ignore these voluntary systems. As a consequence, the Federation asked that the Swedish Board of Fisheries formally regulate the rationing systems for these species, which it has done since 2001. For the single most important fishery in Sweden, cod in the Baltic, the Swedish Board of Fisheries has had a rationing system in place since the mid-nineties, and since 2002 the SBF allocates certain fisheries per vessel.

7.2.2 Producer Organisations

The European Union operates a common organization of the markets in fishery and aquaculture products, whereby market stability is encouraged. Amongst other regulations, a system of withdrawal prices is operated for the most important commercial species. A necessary condition is that the fishermen themselves establish producer organizations which, within the framework set up by the Union, administer this system.

Each year, the EU establishes central withdrawal prices for each of these species, on the basis of sales prices the previous years. The Producer Organisation establishes a minimum price for its members, which can deviate to a certain extent from the central price. If the price at, for example, an auction does not reach the minimum price, the Producer Organisation (PO) buys out the fish and pays a withdrawal price to the fisherman. The fish bought by the PO must be destroyed.

The compensation from the EU to the Producer Organisation decreases as the volume withdrawn increases, but on average pays about 90 percent of the withdrawal prices paid to the fishermen. The remaining share, and some of the administration costs, must be paid for by the PO members themselves, and is covered by a fee upon landings.

Further, at the beginning of the fishing year, each Producer Organisation shall draw up an operational programme, including inter alia a marketing strategy to be followed by the organization to match the quantity and quality of supply to market requirements. Again, the European Union pays the PO:s for establishing these programmes.

Sweden has four POs, covering different areas and species, of which one is nationwide.

8. CHANGES IN EXPENDITURE FOR FISHERIES MANAGEMENT

The following discussion will primarily relate to the main fisheries management agency, the Swedish Board of Fisheries. It has not been possible, however, to categorize expenditure over time. The categorisation made in section 4 for the year 2005 was based on information per management objective as outlined in the yearly planning document. Categorisation per objective is not possible for previous years as the planning documents were not sufficiently detailed. Neither has it been possible to obtain a comparable categorisation per department, as the Swedish Board of Fisheries has undergone several reorganizations within the last ten years. The roughest division would have been to use the main areas of activity, as outlined in the budget document from the Ministry, but their disposition have varied considerably over time and they are therefore not at all comparable. Instead, total expenditure for the Swedish Board of Fisheries in selected years is shown in the table below and commented on in the following paragraphs.

Table 13: Total expenditure of the Swedish Board of Fisheries

Year	1993/94[20]	1998	2000	2002	2004	2005 (budgeted)
US$ million	23.1	24.8	22.2	23.4	30.2	29.7

In 1993/94, more than 30 percent of the expenditure of the Swedish Board of Fisheries referred to international development co-operation. The SBF had an extensive consultative operation, mainly financed by the Swedish International Development Cooperation Agency. However, the lion's share of expenditure referred to direct project aid. European co-operation was limited as Sweden had not yet joined the European Union and amounted to only 3 percent of total expenditure. The remainder was referred to stock enhancement and other measures to secure healthy fish stocks in Swedish waters (58 percent), and responsible use of these resources (7 percent).

[20] The budget year previously run from 1 July – 30 June.

In 1995, Sweden joined the European Union and considerable resources were devoted to adjusting the Swedish management system to suit the framework of the Common Fisheries Policy (CFP). Requirements increased considerably in the area of fisheries control, and in 1997, a specific department for fisheries control was established. In addition, the level of investment aid and other grants to the fisheries sector – and expenditure for administering these - increased substantially as a consequence of access to the Structural Funds.

After a Governmental Commission of Inquiry on fisheries administration from an EU-perspective[21], the Board of Fisheries reorganized further, and a department for marine (CFP) issues, and one for coastal and freshwater (national) issues were established, so as to better suit the delimitation of the CFP. In 1998, the Swedish Board of Fisheries was given sectoral responsibility for the environment, implying that it had specific environmental responsibilities within the fisheries sector.

Total expenditure in 1998 amounted to US$24.8 million, a modest increase compared to 1993/94, considering all new tasks that had followed from EU-membership. However, the level of international development co-operation had been more than halved in absolute terms and only accounted for 13 percent of expenditure in 1998. The other main categories of expenditure in 1998 were Fisheries sector, 10 percent; Recreational fisheries, less than 1 percent; Fish resources, 72 percent, and Promotion of fish, 4 percent. The promotion of fish was a task that the SBF was temporarily assigned by the Government and given specific resources for, as a levy-/withdrawal system run by the industry which had previously financed these activities, had been deemed incompatible with the EEA Agreement[22] signed in 1992.

In 1999, 15 environmental quality objectives were adopted by Parliament. They define the state of environment which environmental policy aims to achieve, and provide a coherent framework for environmental programmes and initiatives at national, regional and local level. This was about to give the Swedish Board of Fisheries' sectoral responsibility for the environment another dimension.

Total expenditure for the year 2000 amounted to US$22.2 m. The reduction as compared with 1998 was mainly due to the winding up of the Board's responsibility for the promotion of fish, again taken over by the industry, and a further reduction in the field of international development co-operation.

At the end of 2001, the Board was given considerable resources in order to work with the environmental quality objectives. The authority's involvement lies principally with the following two of the 15 objectives:

- A Balanced Marine Environment & Flourishing Coastal Areas and Archipelagos
- Flourishing Lakes and Streams

Careful planning and the employment of staff took considerable time and so not all the funding assigned for one year for this purpose was used. Total expenditure for 2002 amounted to US$23.4 million, of which 90 percent was used under the heading fishing resources and 10 percent for the development of the fishery sector. Work with the environmental objectives developed further over the coming two years and in 2004 expenditure amounted to US$30.2 m, of which 91 percent was devoted to fishing resources, where practically all of the environmental funding was used, and 9 percent to the development of the sector.

The most important drivers by far behind changes in the magnitude and composition of expenditure, are Sweden's membership of the European Union and the adoption of the environmental quality objectives. EU membership has particularly increased expenditure devoted to monitoring and enforcement, the collection of data - both biological and economic – as well as the granting of financial aid to the fishery sector. It may be worth pointing out that the structural funding that the SBF manages for the fisheries sector – which includes both EU and national funding – is not a part of the Board's expenditure as outlined above, other than if the Board itself receives funding for specific projects.

The Swedish Coast Guard has only recently started to present its expenditure by area of activity and so the equivalent comparison over time for one area of activity, fisheries, has not been feasible within the timeframe of this study.

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[21] Fiskeriadministrationen i ett EU-perspektiv – Översyn av fiskeriadministrationen m.m. SOU 1998:24. ISBN 91-38-20841-5.

[22] European Economic Area - creating a Single Market covering not only the European Community but also the countries of the European Free Trade Area (EFTA).

As far as the County Administrative Boards are concerned, no critical changes in expenditure have occurred over the last 10 years; salaries is the by far the most important cost and the number of staff is basically unchanged.

9. ACTIONS THAT HAVE IMPROVED THE CAPABILITY TO MEET FISHERIES MANAGEMENT OBJECTIVES

As was pointed out in section 8, EU-membership and the environmental quality objectives are the two factors that have influenced the Swedish Board of Fisheries, and overall fisheries management, the most over the last decade. A few other recent factors that have played an important part in improving the conditions for good governance are outlined below.

A commitment to an ecosystem approach to management

Sweden shall adopt the ecosystem approach in fisheries management as defined in the Rio declaration. This is also an ongoing process within the Common Fisheries Policy and within the framework of the International Council for the Exploration of the Seas.

The ecosystem approach is expected to help achieve fisheries management objectives, for example through the use of marine protected areas as a management tool, a shift to fleet-based assessment of fishing mortality (replacing single-stock assessment), and a transition towards effort regulation replacing, or as a complement to, quotas.

Additional members within the European Union

As fisheries policy is a common policy within the European Union, the entry of new Member States means that larger water areas come under EU management. In 2004, the Baltic States and Poland joined the European Union, which meant that the Baltic Sea practically became an EU-water; in principle only a small enclave of Russia (Kaliningrad) which borders to the Baltic Sea remains outwith EU jurisdiction.

The EU has withdrawn from the regional fisheries management organization for the Baltic Sea (The International Baltic Sea Fisheries Commission) and will instead establish a bilateral agreement with Russia. The fact that practically the whole of the Baltic Sea is now under the jurisdiction of the European Union, means that fishery operations come under one regulatory umbrella, of which management and recovery plans including common rules for monitoring and enforcement plays an important part.

The development of new management regimes

In 2003, the Fisheries Act was altered so as to empower the Swedish Board of Fisheries to allocate fishing opportunities between different categories of professional fishermen, for example through the use of regional quotas, quotas to various groups of fishermen or individual quotas.

At present, the Board of Fisheries, the Processing Federation, the Fishermen's Federation, the Pelagic Producer Organization and the Administrative County Boards are discussing a proposal for a new regime within the pelagic fishery. This regime includes individual transferable fishing opportunities.

The reasoning behind an introduction of individual transferable fishing opportunities for the pelagic fishery, is based on the fact that the problems within this fishery are not mainly biological, but related to a highly international market, and the fact the Swedish vessels' main competitors, for example Norway, Iceland, Denmark and the Netherlands, have introduced some form of vessel-based yearly quotas.

The pelagic segment is over-capitalized and so reducing fleet capacity is necessary in order to increase profitability for this fishery; the maximum scrapping premiums available within the EU structural funds have proven not high enough to buy out pelagic capacity.

A system involving individual transferable fishing opportunities would enable fishing companies to better plan their fishery and to reduce capacity, but also involves restrictions on these companies' possibilities of fishing for other species. Another element in this regime is to protect a small-scale local pelagic fishery.

Increased cooperation between fishermen, researchers and administrators

When the Common Fisheries Policy within the European Union was reformed as from 2003, it included the establishment of Regional Advisory Councils (RACs). RACs were to be set up to advise the Commission on fisheries management matters in respect of certain sea areas.

The Regional Advisory Councils shall be composed principally of fishermen and other stakeholders affected by the Common Fisheries Policy, such as representatives of the aquaculture and processing sectors, environment and consumer interests and scientific experts, from Member States having fisheries interests in the sea area concerned. Representatives of national and regional administrations have a right to participate in the RACs as members or observers.

The RACs may submit recommendations and suggestions of their own accord or at the request of the Commission or a Member State. To date, two Regional Advisory Council have been established, one for the North Sea and one for all pelagic fishery. Five more are expected.

At a national level, the Swedish Government has instructed the Swedish Board of Fisheries to investigate the scope for further regional co-management, in view of continued and increased work with new forms of fisheries management in coastal and inland waters. Regional development is the focus of this work, which should include ecological as well as social and economic aspects. The initiative is inspired by the Regional Advisory Councils mentioned above as well as integrated coastal zone management.

The Board of Fisheries has included six pilot projects of different characters, which involve professional fishermen as well as other stakeholders which locally have an impact on the fish resource, such as recreational fishermen, environment groups, the processing industry and universities. Part of the work is to define local and regional co-management, in order to develop co-operation and decision-making processes.

10. CONCLUSIONS

The conclusions below are either general, or specified for the main management agency, the Swedish Board of Fisheries.

Total expenditure for Swedish fisheries management, including scientific research, has been estimated at US$51.1 million, divided into the sub-categories outlined in section 4 as follows:

- Scientific research 19.1 (37.3 percent)
- Policy development & operational management 7.9 (15.5 percent)
- Enforcement 17.1 (33.5 percent)
- Corporate and administrative support 7.0 (13.7 percent)

First, it should be borne in mind that expenditure is related not only to fisheries, but also to the value of maintaining fish stocks for biodiversity purposes; some of the scientific research included relates to fish rather than fisheries. In addition, fisheries include fishing for both professional and recreational purposes – recreational fishing is a major leisure pursuit in Sweden – and fisheries management also includes the aquaculture and processing sectors.

Scientific Research is the biggest item. International co-operation, primarily within the International Council for the Exploration of the Seas, requires extensive data collection and analysis, including the operation of research vessels. Further, the sectoral responsibility for the environment, which the Board of Fisheries was given in 1998, has implied a broader remit for the Board's research and development activities; environmental and fisheries policy shall be integrated, and the Board of Fisheries has received earmarked funding for this work, amounting to about 10 percent of its total budget.

As for Policy Development and Enforcement, fisheries policy is a common policy within the European Union and so Swedish fisheries management is part of a 25-country fisheries policy, with the exception of some coastal fisheries as well as inland waters. This implies that the fisheries administration is obliged to implement a number of rules which may not necessarily suit Swedish conditions, or would have been deemed unnecessary had it been up to the national administration to decide. Expenditure for fisheries management, net of international development co-operation, has increased since Sweden's joining the EU. However, fisheries management is also likely to be more successful when involving all countries that fish in a certain water area, where common rules apply to all parties involved and when administrations can co-operate on the collection of data etc.

As was outlined in section 6, almost 80 percent of total expenditure is financed via direct Government funding. If EU and indirect Government funding is included, the figure is 90 percent. The remaining share stems mainly from hydropower and other companies. Hence, there is very little cost recovery from the Swedish fishery sector. It is worth pointing out that the Board of Fisheries is empowered by the Government

to charge for the monitoring of the Common Fisheries Policy, a potentially important power which the Board has so far not utilized.

Another observation is that formally, fisheries management is almost exclusively delivered by authorities at different levels; the exceptions being the fishermen's rationing systems and the limited work carried out by Producer Organizations. It can be noted that in other EU Member States, the Producer Organisations play a more active role in fisheries management than is the case in Sweden. However, the system of advisory committees and consultative groups is evolving, as are co-management initiatives.

As for budget and evaluation systems, although it has been possible to estimate expenditure per main management category, partly based on a relatively detailed yearly planning document for the Swedish Board of Fisheries, follow-up on how much is spent in relation to different kinds of fisheries activities need to be further developed to enable a more detailed analysis. A more widespread use of time logging within the SBF will be an important tool in this process.

Also, there is little analysis of the effectiveness of expenditure. The Ministry of Agriculture, Food and Consumer affairs is requesting better focus in the Swedish Board of Fisheries' Annual Report on what the effects have been in different areas; the report currently tends to focus on what work has been carried out, rather than what this work has achieved.

Finally, it is worth noting that fisheries management is becoming increasingly complex, as environmental issues play a more prominent role and several other stakeholders than the fishery sector are involved. This is manifested in a more complex network of authorities and organizations working on fisheries management, but it is also providing scope for efficiency gains and a more effective management as information is shared and cooperation is enhanced.

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FINANCING FISHERIES MANAGEMENT: THE CASE OF NICARAGUA

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TABLES

FIGURES

ACRONYMS AND SYMBOLS

ADPESCA	National Fisheries and Aquaculture Administration
AECI	Spanish Agency for International Cooperation
CAFTA	Central American Free Trade Agreement
ABC	allowable biological catch
AGCQ	annual global catch quota (see also TAC)
DAF	General Administrative and Finance Division of the MIFIC
CIPA	Center for Fisheries and Aquaculture Research (CIPA/ADPESCA)
DANIDA	Danish Agency for International Development
DGI	General Internal Revenue Department
DGRN	General Directorate of Natural Resources
DIPARAAN	Integrated Artisanal Fisheries Development Project in the North Atlantic Autonomous Region
F	fishing mortality rate
FAO	Food and Agriculture Organization of the United Nations
GBR	General Budget of the Republic
GDP	gross domestic product
IATTC	Inter-American Tropical Tuna Commission
IMF	International Monetary Fund
INFONAC	National Development Institute
INPESCA	Nicaraguan Fisheries Institute
JICA	Japanese International Cooperation Agency
MARENA	Ministry of Natural Resources and the Environment
MCS	Monitoring, control and surveillance
MEDEPESCA	Fisheries Development and Promotion Directorate
MHCP	Ministry of Finance and Public Credit
MIFIC	Ministry of Development, Industry and Trade
PASMA	Environmental Sector Support Programme
TAC	total allowable catch
TED	turtle excluder device
UN	United Nations

1. BACKGROUND ON NICARAGUA

Nicaragua is the largest country in Central America with a total of 129 494 km^2 (Figure 1). It has borders with Honduras and Costa Rica and the Pacific Ocean and the Caribbean Sea. Over the past 30 years, the country has endured devastating political upheaval and natural disasters that have caused enormous human suffering and social impact. An earthquake in 1972 killed 10 000 people and nearly destroyed the country's capital. The 1979 overthrow of the Somoza government and the subsequent civil war during the 1980s killed tens of thousand of people, and crippled the national economy. In 1998, Hurricane Mitch shattered the country's infrastructure and killed other thousands of people. Nicaragua's economy suffered severe economic decline during the 1984–1993 period that resulted in negative GDP growth which was 40 percent of that observed in 1977 and similar to the one in 1966. The income per capita in the same period had fallen to a level similar to 1945 and inflation reached an astonishing 33 500 percent in 1988.

Figure 1: Map of Nicaragua

Nicaragua has a population of about 5.4 million (2004) with a recent growth rate of about 3 percent per annum which is considered one of the highest in Latin America. This rapid population growth puts great pressure on the natural resources of the country, which calls for effective management in order to ensure their sustainable use.

Since 1990, after a democratically elected government, the country embarked on policies of economic liberalization, privatizations, fiscal discipline and broad public sector reform programmes Nicaragua started implementing some of the economic reform programmes proposed by the International Monetary Fund (IMF) and the World Bank. While progress was made toward macroeconomic stability over the past few years, Nicaragua still has one of the lowest per capita incomes in the world[2] and its economy is also one of

[2] GDP per capita is about 740 US dollars (2003). GDP in 2003 was US$4 148 million.

the weakest. The country has achieved a positive sustained GDP annual growth in the order of 2 to 3 percent since 1994 but it has been far too low to meet the country's needs.

The Nicaraguan Government changed its economic course and several reforms of the public sector, financial, trade and prices and public administration reforms were carried out. The Governmental institutions were drastically downsized with the consequent reductions in institutional budgets, premises and facilities available. The implementation of the law regarding the organization of the Executive Branch that was approved in 1998 by the National Assembly reduced the number of ministries from 15 to 12, and the number of decentralized institutions from 25 to 22. Armed Forces defence outlays alone fell from about 14 percent of the GDP in the 1980s to less than 3 percent in the last few years. As a result, public sector employment was reduced from 290 000 employees (24 percent of the economically active population) in 1990 to 80 000 in 2000.

Unemployment is officially around 22 percent, and another 36 percent are underemployed. The country suffers from persistent trade and budget deficits (Exports in 2004 were US$750 million while Imports were US$1.7 billion) and a high debt to service burden leaving it highly dependent on foreign assistance, as much as 25 percent of GDP. With historic massive foreign debt, chronic infrastructure issues and high unemployment, Nicaragua continues to be dependent on foreign aid and debt relief. Nicaragua also depends heavily on remittances from Nicaraguans living abroad, i.e. in the order of US$1.2 billion in 2004. The foreign debt was in the order of US$4 000 million until recently but because of Nicaragua being a beneficiary of the Heavily Indebted Poor Countries (HIPC) initiative, a significant fraction of the foreign debt was written off, but it remains a significant drain on the economy. Under these circumstances, the government of Nicaragua finds it very difficult to locate the necessary funds to invest in civil infrastructure and will remain greatly dependent on foreign economic aid and assistance, in the form of grants and loans.

The country is primarily agricultural but construction, mining, fisheries, and general commerce also has expanded during the last few years. Nicaragua has some of the most varied and abundant natural resources in Central America. Nicaragua’s volcanoes are potential sources of geothermal energy and the rich volcanic soil they have created is ideal for producing coffee – the country’s largest export. The country has rich forests of commercial timber in addition to mineral reserves, including gold. One of the key engines of economic growth has been production of commodities for export. However, traditional products such as coffee, meat, seafood and sugar continue to lead the list of Nicaraguan exports, while the fastest growth is now in tourism, in maquila goods (apparel), gold, and new agricultural products such as peanuts, sesame, melons, and onions.

Although the reorganization of the foreign debt and the resulting economic programme negotiated between the Executive and the IMF has guaranteed a government budget and has kept inflation under control, authorities are concerned about how little this programme has impacted economic growth and development, making it impossible to meet the targets of the poverty reduction strategy – one of the cornerstones in the Government’s economic development and planning programme during 2003–2007.

According to the Nicaraguan Government (PND, 2004) as long as the economy does not grow at a sustainable higher rate, fiscal sustainability over the medium and long term will not be achievable. Given this situation, all the economic sectors are seeking protection in terms of dollarization. A large portion of the transactions in the country are indexed to the dollar or made in that currency. However, salaries and other consumption transactions are not, which create the coexistence of three currencies[3] and unbalance in the purchasing power of the people.

In the United Nations Human Development Index (HDI), Nicaragua is in position 118 out of 177 countries in the world (UNDP, 2004). Total labor force participation in 2004 was only 38.8 percent of the total population. The urban population is 54 percent of the total population compared to 76 percent in developed countries. Total life expectancy at birth is 69 years while infant mortality rate (per 1 000) was 31.7 in 2001.

Despite some progress in recent years in the industrialization process, the pillar of economic activity remains the primary sector and exports of traditional products. However, with the current international trend towards

[3] Although the Córdoba is still legal tender, the informal dollarization of the economy has generated the use of other two currencies: the Córdoba with maintenance of value and the US dollar. Except for salaries and other lesser transactions, most market operations are made in terms of these two currencies. Nonetheless, most dollars entering the economy come from family remittances and international donors and loans, which poses the risk of unsustainability given that the domestic economy is not generating enough foreign exchange.

globalization, which the Nicaraguan government supports, Nicaraguan products face stiff competition on the local and international markets and in many instances is unable to compete successfully because of price and quality reasons, while its volume of production is generally insufficient to become a determining provider. At the time of this writing a free trade agreement (CAFTA) was approved in the USA with Central American countries which will probably facilitate exports but may result in an increase in imports of goods from the USA market. However, the approval in Nicaragua is still pending.

The Nicaraguan fisheries[4] play an important role in the earnings of foreign currency in the country. The total export of Nicaragua in 2004 was valued at US$755.6 million to which the fisheries sector contributed US$96.7 million (13 percent of the total exports). The sector also plays a significant role as a source of employment and food for coastal communities, mainly in the east coast (Caribbean) of the country. The Nicaraguan fishery sector still has an important potential for growth in terms of fishery resources, product added value, employment opportunities and investments in infrastructure. In spite of its recognized importance the management of fisheries still needs to be strengthened.

On environmental issues and responsibilities, Nicaragua has signed a large number of international treaties on issues such as biodiversity, climate change, desertification, endangered species and hazardous wastes, among others. In marine and fishery matters, it is important to note that the country is a signatory to the Law of the Sea and the UN FAO Code of Conduct for Responsible Fisheries conventions. The basic concepts of these conventions have been incorporated in the fishery legislation and resulting policies. Environmental degradation through such activities as deforestation and inadequate traditional agricultural practices is a major issue of concern and can be primarily blamed on the significant levels of extreme poverty throughout the country.

2. INTRODUCTION

The importance of fisheries management to achieve and maintain fisheries sustainable is well recognized worldwide. However, financing fishery management is costly and not too many countries have the possibility to finance it in a proper way. Many developing countries fall in this group.

With national economies in the verge of bankruptcy and higher priorities in other areas such as in health and education it seems difficult for poor countries to allocate enough funds for fishery services: fisheries research, management and monitoring, control and surveillance (OECD, 2003). At the same time fisheries authorities have not properly figured it out the way on how to secure appropriate revenues from fishing by setting an adequate economic value of the fish resources and a subsequent cost recovery system to elucidate the cost of fishery management.

Presently, although many fishery management systems in developing countries could be partly funded with revenues from fishery activities a great deal is funded from public tax revenues that not always are generated from fishing.

As Keizire (2001) points out there are a number of reasons why cost recovery in fisheries is considered important:

- Well managed fisheries usually yield economic surplus that can be extracted from the fishery while the fishing industry continues to operate efficiently. Financing such fisheries is like subsidizing an industry that would otherwise finance itself. It is not economically justifiable to collect money by distortionary taxation to subsidize a profitable industry. This argument for cost recovery is based on the premise that financing fisheries management from public revenues increases the financial burden of the tax payers who may not be benefiting from the fishing industry
- Cost recovery can generate a stronger incentive for those who pay to demand better services to the fisheries agency in charge of fisheries management. It may also contribute to more efficiency in the provision of these services and fisheries management in general. If the fishermen or fishing firms pay for the costs of fisheries management, the management service providers will come under more pressure to deliver these services at the time and of the quality required.

[4] Unless otherwise indicated, the term “fisheries” is in this document designated to include marine and freshwater aquaculture.

- Cost recovery reduces the need to finance fisheries management from public tax revenues. Economic theory reveals that taxes are generally distorting. In principle, cost recovery means that non-distorting taxation is substituted for distorting taxation.

The present document is an analysis of the way fishery management is financed in Nicaragua. This case study report is arranged in 9 main sections. Before this introduction Section 1 provides a general economic background on Nicaragua and following, Section 3 provides an overview of key fisheries and the management agencies. The same section provides a summary of the characteristics of the Nicaraguan fisheries and the management agency. The last part of this section describes an evolution and status of the current fisheries management regime.

The fourth section opens by developing on the budget allocation process to fisheries management activities; Section 5 categorizes the expenditures and identifies approaches to track expenditures. Analyses of financial information and presentation of financial indicators is in Section 6, while in Section 7 the sources of funding are identified. Section 8 presents an overview of the incentive systems to the fishery sector in Nicaragua and a discussion on cost recovery mechanisms; use of non government funds and other issues is done in section 9. Section 10 provides information on fisheries management service providers and actions or options to meet fisheries management objectives. Section 11 draws some conclusions and recommendations.

3. OVERVIEW OF KEY FISHERIES AND THE MANAGEMENT AGENCY

3.1 Characteristics of the fisheries

Nicaragua is the largest country in Central America with 129 494 km^2. The country has a total of 1 231 km of continental boundaries, of which 309 km are with Costa Rica and 922 km with Honduras while it also borders indirectly with El Salvador through the Gulf of Fonseca. The country has 940 linear km of coastline, of which 530 km are on the Atlantic and 410 km on the Pacific coast. The continental shelf in the Caribbean is the largest in Central America with approximately 42 734 km^2 while the shelf in the Pacific Ocean is of 13 856 km^2.

In addition, Nicaragua has important inland waters as the Lake Nicaragua or Cocibolca (8 264 km^2) and Lake Xolotlan or Managua (1 064 km^2).The latter is by the capital city Managua. Nicaragua's climate is tropical with two clearly distinguishable seasons: a dry season from October to April, and a rainy season from May to September. Average air temperature is around 32°C. The occurrence of El Niño Southern Oscillation cycle plays a major role in the weather patterns, mostly related to longer and more intense dry season conditions and significant changes on oceanographic regimes that affect fisheries, mainly along the Pacific Coast.

Nicaragua maintains territorial disputes with Colombia, Honduras, Costa Rica and El Salvador. With Colombia the issue concerns the Archipelago of San Andres and Providencia, and the Quita Sueño Bank. The maritime boundary question in the Gulf of Fonseca continues to be the reason of (diplomatic) conflict with El Salvador and Honduras. More recently, the issues of the extension and appropriation of a substantial part of country's Caribbean continental shelf through a joint action by Honduras and Colombia, as well as the legal dispute over navigational rights on the San Juan River on the border with Costa Rica, have taken on major relevance.

Until the 1950s Nicaraguan fisheries were artisanal, however, starting in that decade industrial fisheries started to develop and by the end of the 1970s earnings from shrimp and lobster exports to United States provided major inputs to the national economy. By the 1980s the fishing effort decreased substantially, mainly due to the lack of fishing vessels during the wartime and because of the economic blockade of the US Government. Both occurrences caused a dramatic decline in fishery landings. A positive effect was that populations of the target capture fisheries species could recover from rather intensive levels of fishing.

With the return of the democratically elected government in 1990, matters changed dramatically. The fishing industry was considered a prime sector for obtaining foreign exchange, as a source of food for local populations and as a source of employment. During this period the government abandoned the direct State control over the sector and looked for greater involvement of the private industry regarding fishery development.

Several measures were taken to promote the rapid expansion of the fishing capacity, particularly in the shrimp and lobster sub-sectors. These recursive actions meant that foreign vessels were allowed access to Nicaraguan fishery resources under favourable conditions while national producers and processors were granted certain benefits to lower operating costs to promote exports. Because of the lack of surveillance, a

considerable illegal high sea fisheries as well as transhipment of fishery products at sea took place. This practice is reportedly still going on, although at a minor scale, but is by many considered a major factor in the problems related to the decreasing economic growth of the sector and issues related to resource utilization and depletion.

On the other hand, artisanal fisheries have developed rapidly and widely over the past 20 years and their contribution to the national production has been recognized. Several government programmes, as well as various development projects financed through bilateral agreements and through external independent organizations, were initiated to assist the artisanal sector in the productive as well as the socioeconomic aspects of their activities.

Initially, the artisanal fisheries on the Caribbean coast were primarily focused on the exploitation of spiny lobster through diving operations and on dried seabob shrimp from the various estuarine systems. With the increase in the number of fishers, the opening of export markets for products other than shrimp and lobster, and the availability of more and different fishing gear, types and technologies, made it possible to diversify into other products, particularly finfish.

The contribution of the fishery and aquaculture sectors to the GDP increased rapidly from 1993 to 1996 (Table 1) mainly as a result of the governmental incentives; thereafter, it has grown at a more reduced rate, although overall yearly export earnings continued to increase.

Table 1: Fishery sector participation in GDP (million 1980 Córdobas)

Year	GDP	Primary Sector	Fisheries	Fisheries/GDP
1990	18 142	4 495	49.6	0.27
1991	18 107	4 320	72.1	0.40
1992	18 178	4 452	91.1	0.50
1993	18 106	4 533	148.2	0.82
1994	18 710	5 028	218.3	1.17
1995	19 518	5 278	325.8	1.67
1996	20 449	5 654	332.8	1.63
1997	21 494	6 125	352.8	1.64
1998	22 367	6 337	396.5	1.77
1999	24 031	6 848	403.0	1.68
2000	25 448	7 705	458.9	1.80
2001	26 251	7 945	414.5	1.58
2002	26 526	7 714	402.2	1.52

Source: Central Bank of Nicaragua & AdPesca

3.1.1 Target species and annual landings

The Nicaraguan fishery resources base is mainly oriented toward the export market and, to a lesser extent, towards domestic consumption. The Caribbean spiny lobster and the coastal shrimps are the most important target species which make up the bulk of the foreign exchange earnings by seafood products. The main export markets include the United States (about 90 percent of the exports), France, Spain, Japan and Germany. Most of the exported fish commodities are frozen with low added value.

According to the Nicaraguan Fishery Law fish resources are classified in:

- *Unexploited*: resources are not exploited.
- *Sub or underexploited*: Surplus of biomass is available and the fisheries are open access.
- *Fully exploited*: No surplus of biomass is available. The fishery is under a limited access mode through fishing licenses and permits. An Annual Global Catch Quota or Total Allowable Catch (AGCQ) is set each year. The AGCQ derives from an Allowable Biological Catch (ABC) estimated under a constant reference fishing mortality (F0.1) strategy.
- *Overexploited*: the biomass is below critical levels. The fishery is closed for recuperation of the stock.

According to the type of fishery resources exploited by industrial and artisanal[5] fleets, these can be classified in four groups:

1. Caribbean and Pacific Coastal shrimp
2. Caribbean spiny lobster
3. Finfishes and sharks in both coasts (Caribbean and Pacific) and inland waters (lakes and lagoons)
4. Miscellaneous (not included in any of the preceding three categories)

Finfish fisheries are the most important in terms of volumes landed and exported while crustacean fisheries are the most economically important. Miscellaneous fisheries comprise resources that have been sub exploited (e.g. green spiny lobster in the Pacific, Pacific deep water shrimps, Caribbean queen conch) or that little information is available about them (e.g. sea cucumbers, Kermit crabs or black clams)

Shrimp resources

The shrimp fisheries are the oldest industrial fishing activity in the country which started in the 1960s and has contributed significantly in the earning of foreign exchange. At the same time, the resource is also an important source of income for the artisanal fishers. The most important shrimp fishery is found in the Caribbean where it extends over the entire continental shelf, while some artisanal fishery takes place in the shallow coastal lagoons.

The industrial fishing fleets use Florida-type shrimp trawlers of 19 to 23 m in overall length made out of fiberglass or metal hull, powered with diesel inboard motors with 200 to 400 HP. Shrimp trawling systems can consist of single or twins trawls. The use of TEDs is compulsory and a three nautical mile strip along the coast for the exclusive use of artisanal fishers has been defined. The artisanal shrimp fishers use cast nets, gillnets and small trawls, depending on the target species and area.

The shrimp fishery in the Pacific Coast of Nicaragua targets three main commercial species, red shrimp (*Farfantepenaeus brevirostris*), white shrimp (*Litopenaeus vannamei* and *L. stylirostris*), and brown shrimp (*L. californiensis*). However, for the past ten years the landings of seabob shrimp (*Xiphopenaeus riveti* and *Trachypenaeus byrdi*), locally called “chacalín”, are occupying an increasingly important role, on occasions making up 40 to 60 percent of the total shrimp landings.

The abundance of shrimp in this area appears to be related to the extraordinary changes that occur with El Niño–Southern Oscillation events, but an overall declining trend in the abundance is observed since the mid 1970s. This fishery is less important than the Caribbean shrimp fishery and it was greatly affected in 1998 due to the hurricane Mitch. The white shrimp is also important as the source of shrimp larvae for the culture industry that is principally located on the Pacific coast.

The industrial Pacific coast shrimp fishery is managed under an Annual Global Catch Quota (AGCQ) and access is limited by fishing licences and annual permits. At present 16 fishing licenses (for the same number of vessels) has been issued but in practice an average of 8 to 10 shrimp boats have been operating. The AGCQ for the 2005–2006 fishing season has been set at 227 tonnes. There is a 2 month closed season (April and May each year). The white shrimp *L. vannamei* is the main component of the ever growing shrimp culture industry in the northern west coast. The post larvae of this species are also fished by artisanal fishers to supply shrimp farms with natural seed. This latter activity has been declining for the growth in the use of laboratory reared larvae.

The industrial shrimp fishery in the Caribbean is supported by two species mainly, red shrimp (*Farfantepenaeus duorarum*), the most important due to its abundance, and the white shrimp (*Litopenaeus schmitti*). Artisanal fisheries take place in the numerous coastal lagoons along the coast for the latter but also for the sea bob *Xiphopenaeus kroyeri*. The fleet consists of national (including Korean nationalized) and foreign shrimpers (US fleet). The fishery is also managed under an Annual Global Catch Quota (AGCQ) and access is limited by licences and annual permits. At present 55 fishing licences (for the same number of vessels) have been issued but in practice an average of 45 boats have been operating. The AGCQ for the 2005–2006 fishing season has been set at 1 818 tonne. In 2005 there was a one month closed season (15 April–15 May).

[5] By legal definition an artisanal boat is a fishing craft with 15 or less m in length. Fishing boats greater than 15 m in length are considered industrial irrespective of the level of mechanization.

A deep water trawl fishery (over 100 fathoms deep) for the nylon shrimp *Heterocarpus* spp. in the Pacific coast is presently being developed. Currently, eight Florida-type shrimp vessels are deployed in this fishery. It has also been assessed that a large stock of the squat lobster *Pleuroncodes planipes* is available along the Pacific coast which still remains unexploited. In the Caribbean coast some deep water crustaceans have been also identified (nylon shrimp, deep water crabs and deep sea lobsters), but no fisheries have been developed for these potential resources.

Lobster resources

In economic terms, Caribbean spiny lobster, *Panulirus argus*, fishery is the most economically important, despite the fact that shrimp landings are larger in weight. It accounts for almost 50 percent of the total exports of fisheries and aquaculture products.

The species is caught with lobster wooden traps and by scuba diving in coastal shallow waters up to 50 m in depth. The industrial fleet is national (mainly nationalized Honduran vessels) although this fishery is undergoing a process of "artisanalization", with artisanal landings steadily increasing and, at present, comprising more than 50 percent of the Caribbean spiny lobster landings. Nearly the entire production is exported. Although there is also a lobster fishery in the Pacific Ocean (*P. gracilis*), catch is relatively low (on the order of 36 ton tail-weight in 2004).

The Caribbean fishery is managed under an AGCQ and has limited access through licenses and annual permits. At present 87 fishing licenses (61 for trap vessels and 26 for divers' vessels) are issued, but in practice an average of 74 to 76 vessels have been operating. The AGCQ for the 2005–2006 fishing season has been set at 1 818 tonnes. Other management regulations are a 3 month closed season (April to June), a minimum size limit of 5 ounces of tail weight, the regulation of the dimensions of the traps and escapement gaps, as well as the number of traps that can be used per vessel. However, it has proven to be a fishery which is difficult to manage because of the harvesting methods used (traps and diving), the heterogeneous fleet involved (artisanal and industrial), and the fact that the fleet operates over wide areas on the Continental shelf.

Finfish fisheries

The finfish resources support the most important fisheries in terms of weight landed. They are also important from a social stand point due to the amount of labor force involved and because they provide a large supply of fish to coastal communities. There are no species specific fisheries; however, the largest catches landed by species group are made up of snappers (*Lutjanus* spp.), snooks (*Centropomus* spp.), sharks (several Carcharhinidae species) and croakers (*Cynoscion* spp.). The fisheries in the Pacific coast are relatively more important than those in the Caribbean coast. In general, a large fraction of the artisanal boats are made of fiberglass with overall lengths of 5 to 10 m, and equipped with outboards motors of up to 75 HP. The crew consists of 3 to 5 fishers and they can use several fishing gears such as gillnets, trammel nets, hand lines or bottom longline.

The larger pelagic fish fishery in the Pacific coast is relatively new and has increased in importance since 1995. The fishing fleet is artisanal with longliners in an operational range of up to 100 miles away from the coast. This fleet consists of 27 fishing boats with less than 15 m in length and powered with 100–150HP inboard engines. Longlines can be up to 25 nautical miles long. Target species are the dolphin fish or mahi-mahi *Coryphaena hippurus*, thresher shark *Alopias vulpinu*s and the silky shark *Carcharhinus falciformis*. The commercial fishery of small pelagics is almost non existent in Nicaragua.

The tuna fishery is not fully developed with only three Nicaraguan licensed long-range purse seiners with a total well capacity of 3926 m3 operated in 2004 in the eastern Pacific Ocean. Nicaragua is member of the IATTC and holds a carrying capacity quota of 4500 t. No tuna processing facilities or ports are available for this type of industry in the country.

In inland waters the tilapia (*Oreochromis* spp.) is one of the main species exploited along with snooks. The largest fishery takes place in the Lake Nicaragua, although there is also an important inland/estuarine fishery on the Caribbean Coast.

The finfish fisheries are considered mainly artisanal in character and of free unlimited access, and where with the exception of a few species, no regulations apply. There is hardly any current information on the state of exploitation of the fish resources, which is of particular importance for these fisheries where the situation appears critical in view of the falling yields and the uncontrolled increase in the number of fishers.

Aquaculture

In aquaculture the major component is shrimp culture in the northwest of Nicaragua. Its development started in the early 1990s, predominantly in the estuarine areas associated with the Gulf of Fonseca and the Estero Real.

This industry experienced an explosive growth from 322 ton in 1993 reaching over US$30 million in exports in 1998. Effects of Hurricane Mitch in the late 1990s impacted production, and production peaked at 7 849 tonnes in 2004. The farmed shrimp are produced on approximately 30 privately owned farms and 152 farms operated by cooperatives. Private farms operate around 6 000 hectares of ponds, while the small and medium size producers organized in cooperatives operate 2 000–2 500 hectares. No shrimp culture takes place in the Caribbean coast.

The level of shrimp production from aquaculture has exceeded both in weight and value that from the marine shrimp fisheries. Shrimp culture is therefore an important economic activity in Nicaragua. At present the shrimp culture industry system (farms, laboratories and natural post larvae production and storing centers, and seafood processing plants) generates around 14 000 permanent and temporary jobs. In Nicaragua there are also five shrimp post larvae laboratories producing from 10 to 300 million of post larvae. The Nauplii is imported from El Salvador and Panama. The levels of production are growing because now some 70 percent of the shrimp farms are using laboratory reared post larvae. In the early 1990s almost all farms were using natural post larvae collected in mangrove areas.

There are some 9 000 hectares in production of the white shrimp *Litopenaeus schmitti* and *L. stylirostris*. However, the arrival of the white spot viral disease and the Taura Syndrome in the late 1990s, and the flooding of many of the shrimp farms as a result of Hurricane Mitch in October of 1998, raised questions regarding the sustainability and further growth of this subsector. Overall, Nicaragua lost 25 to 30 percent of its 1998 harvest due to above mentioned flooding and diseases, much of this from the cooperative shrimp farms. The industry suffered a overall loss of approximately US$8 million.

Current production methods in Nicaragua utilize large acreage ponds, with low stocking density rates and constant water exchange to maintain oxygen levels, thus protecting production from diseases and contamination.

Fish farming is much less developed in spite of the land and water available in the country. The main fish farming project is the tilapia, *Oreochromis niloticus*, cage culture carried out by one company in Lake Nicaragua. The culture operation uses sex reversed all male tilapia fingerlings. The Tilapia culture in Lake Nicaragua could represent a thriving business with an estimated annual production of 3 000 tonnes; however, the operation has not been successful for various reasons – including claims of the environmental risks to the lake that such activity might have – but no claims have been scientifically substantiated thus far. It should be noted that tilapia was accidentally introduced in Lake Nicaragua long before the culture activities started, and an artisanal fishery for wild tilapia has existed for some time in the lake.

In 2004, total Nicaraguan exports of fishery and aquaculture products were valued at US$96.7 million of which US$11.6 million were trawled shrimp, US$25.7 million were cultured shrimps, US$42.6 million were lobster tails, US$12.1 million from finfish, US$0.26 million from lobster meat (small quantities of meat taken from the head), and US$4.2 millions were others products, e.g. crabs, Caribbean queen conch, oysters, black clams, shark fins, dried fish. The Nicaraguan fishery exports are presented in Table 2.

Table 2: Nicaraguan fisheries exports from 1999 to 2004 (tonnes, millions US$)

	Tonnes						**US$ x 1000**					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
Caribbean coast	3 938	4 957	3 828	4 238	3 969	4 092	59 984	78 818	54 064	62 689	53 285	56 535
Shrimp (capture)	1 657	2 097	1 750	1 998	1 957	1 838	14 649	18 047	13 548	14 165	12 134	11 032
Lobster tails	1 517	1 971	1 224	1 336	1 171	1 289	41 552	56 288	35 947	43 970	37 146	41 449
Fish	714	818	811	862	799	862	2 950	3 436	3 293	3 579	3 238	3 230
Lobster meat	50	71	44	42	43	46	302	550	311	294	261	465
Other products						57	530	497	965	682	506	558
Pacific Coast and freshwater	5 709	5 687	5 866	5 672	7 073	8 923	37 457	45 309	36 338	31 629	32 781	40 193

	Tonnes						US$ x 1000					
	1999	2000	2001	2002	2003	2004	1999	2000	2001	2002	2003	2004
Shrimp (capture)	945	338	377	230	291	134	8 278	3 751	3 329	1 849	1 788	654
Shrimp (culture)	2 879	3 530	3 368	3 047	4 270	5 716	21 263	32 484	21 741	17 081	20 089	25 798
Lobster tails	33	45	85	53	34	39	680	1 163	2 177	1 495	945	1 156
Fish	1 852	1 766	2 031	2 339	2 478	2 658	6 858	7 101	8 217	8 602	8 289	8 886
Lobster meat	1	8	5	2			29	150	43	24	3	
Other products						376	349	659	830	2 578	3 455	3 698
TOTAL	9 647	10 645	9 695	9 910	11 042	13 015	97 441	124 126	90 402	94 318	87 854	96 728
Shrimp (capture)	2 602	2 435	2 127	2 229	2 248	1 972	22 928	21 798	16 878	16 014	13 922	11 686
Shrimp (culture)	2 879	3 530	3 368	3 047	4 270	5 716	21 263	32 484	21 741	17 081	20 089	25 798
Lobster tails	1 550	2 016	1 308	1 389	1 205	1 328	42 232	57 451	38 124	45 464	38 091	42 605
Fish	2 566	2 584	2 843	3 202	3 277	3 520	9 808	10 537	11 510	12 181	11 527	12 116
Lobster meat	51	80	49	44	43	46	331	700	354	319	264	266
Other products						433	879	1 156	1 795	3 260	3 961	4 256

3.1.2 Number and type of harvesters

In 2000 the fishery sector was the 10th most important source of employment in Nicaragua. However, it should be mentioned that besides from being an important productive and commercial activity, many people seek fishing as an important part of their subsistence way of life, particularly those living in coastal areas.

Data available from the Central Bank of Nicaragua up to year 2002 on the economic occupation of the population show that a total of 30 000 people were employed in the fisheries and aquaculture subsectors, which would indicate that an estimated average of 150 000 people depended on the sector for a living. These figures also include the industrial fisheries (Table 3).

Table 3: Workforce employed in fisheries sector in relation to the national labor force (1995–2002, ´000 persons)

Year	National Labour Force	Fisheries	Aquaculture	Fisheries & Aquaculture vs. National Labor Force (%)
1995	1 228.2	9.1	n.a.	0.74
1996	1 291.8	9.3	n.a.	0.72
1997	1 369.9	10.2	n.a.	0.74
1998	1 441.8	17.4	20.0	2.59
1999	1 544.2	18.1	23.5	2.69
2000	1 637.1	18.3	23.5	2.55
2001	1 697.6	17.6	n.a	1.03
2002	1 720.0	19.7	11	1.14

Source: Central Bank of Nicaragua & Adpesca.
n.a. = not available
Note: Includes plant personnel, service personnel and fishers.

The subsistence aspect of fishing and the open access in many of the fisheries complicates the enumeration of the official number of people directly involved in fisheries as a considerable number of artisanal fishers are only active in the fisheries:

1. when they have nothing else to do
2. when a major fishing season is open
3. depending on the profitability of the various employment opportunities at hand
4. when the other (mainly agricultural) activities do not require their presence

In addition, there is no official national or provincial register of artisanal fishers yet implemented, but this is a problem that will be minimized as a result of the process that was initiated in 2004 to decentralize management of artisanal fisheries to local governments in places in which there are fishery activities. Thus far and in a few areas, attempts have been made by the pertinent government agencies and special interest groups to establish a register of artisanal fishers in order to monitor their fishing effort, but these have been discontinued as formal governmental assistance or funding aspects have hindered follow up work.

In recent years, various censuses have been conducted and although they have taken place in different areas at different times, the methodologies used were virtually identical, which facilitates comparisons and joint calculations. In 1995, a census was conducted with the support of PRADEPESCA (PRADEPESCA, 1995), a regional fisheries development programme financed by the European Union. Although other local census took place previously, it appears that the PRADEPESCA fishery census effort was the first attempt to conduct an integral account of the fisheries sector which covered the entire national territory. Table 4 shows the overall data obtained.

Table 4: Nicaraguan fishing communities and fishers, 1995

	Caribbean coast	Pacific coast	Inland water fisheries	Total
Communities	45	38	24	107
Fishers	6 762	3 772	730	11 264

Source: PRADEPESCA/MEDEPESCA, 1996

In the period 1999–2002 a second census with national coverage took place (ADPESCA, 2002). With funding from The Netherlands and Spain, through their respective development agencies, the census focused on the artisanal fisheries sector. The census also contains substantial information on demographic and socioeconomic aspects of the artisanal fisheries population.

According to the overall combined census results, a total of 112 fishing communities existed in year 2000 with a total population directly active in fisheries of 18 335 persons. This number consists of fishers, middlemen (intermediaries) and persons involved in aquaculture. Of those, 11 650 people were directly involved in artisanal fishing activities, 2 300 in services related to the artisanal fisheries, 2 852 on board industrial fishing vessels (mainly spiny lobster) and 1 533 in fish processing plants. Aquaculture activities showed important growth and accounted for 23 500 jobs in year 2000, of which 15 000 work directly on the farms, some 8 000 were shrimp larvae fishers (“larveros”) and 500 persons found work in sector-related activities. The available figures, subdivided by specific economic activity within the fisheries are shown in Table 5.

Table 5: Distribution of exiting employment according to major activity (2000)

Activity	**Caribbean coast**	**Pacific coast**	**Total**
Industrial: shrimp	315	270	585
Industrial: Lobster	2 128		2 128
Industrial: finfish	53	86	139
Artisanal: shrimp	n.a.	n.a	
Artisanal: lobster	450		450
Artisanal: finfish	7 400	3 800	11 200
Services	600	1 700	2 300

n.a.= not available

An interesting statistic is that 76 percent of the artisanal fishers interviewed indicated that they combine their fishing operations with another productive activity, mostly agriculture and commercialization, in order to supplement their income from fisheries (which is considered insufficient to make ends meet). Of the artisanal fishers, about 63 percent indicated that they initiated primary education, but 73 percent was unable to finish it for a variety of reasons. Some 32 percent had some degree of secondary education and the remainder had attended schools of higher learning, although only 84 individuals indicated that they had a university degree.

In view of the fact that fish consumption in Nicaragua is generally low (some 5 lb per person per annum), it can be assumed that nearly all industrial fishing and aquaculture operations are exclusively for exports. This is also confirmed by the production and export statistics. It is not known which proportion of the artisanal fisheries is involved in subsistence fishing, but from interviews with representatives of the sector it can be inferred that this percentage could be around 15 percent of the total artisanal population of fishers. However, it should also be noted that many fishers only fish commercially when conditions are appropriate.

As far as the gender component of the fishers is concerned, the latest census indicates that 9 out of every 100 persons directly involved in harvesting are women. It also showed that even 17 out of every 100 persons are women, but this includes women who are active as "middlewomen" (intermediaries). There remains the suspicion that the proportion of women might be even higher as many women might not have been enumerated as their involvement is considered an extension of the husband's activity or simply not reported. On the Pacific coast women are apparently more directly involved in fishing, while on the Caribbean coast they are mainly active in trade-related activities.

The overall working conditions for those active within the harvesting activities of the fishery sector are very much determined by the overall low profitability levels, the limited means of the competent authorities to assure on the compliance of existing fishery regulations, and the open access situation that still applies in the artisanal fisheries. In general, working conditions on the industrial fishing boats are rather basic and little attention is paid to safety standards. In the artisanal activities no standards apply, and – if they exist – they are not enforced, and it is up to each individual to consider what is best. Very few workers are covered by social security or any other kind of insurance. In general terms, there is more and accurate information of the number of fishers in the industrial fleet than in the artisanal fisheries.

Table 6 shows other estimates of ADPESCA on persons working in the sector. This information is based on different sources of information (processing plants data, personal interviews, etc.), than the data for the current number of fishers. According to Table 6, there are some 16 000 fishers currently working in Nicaragua. Table 6 also shows that 82 percent are artisanal fishers and that 64 percent are working in the Caribbean coast. It is important to note that on the Caribbean coast more than 90 percent of the fishers are of indigenous origins belonging to the Miskito ethnic group followed by mestizos and creoles.

Table 6: Number of fishers in the industrial and artisanal fleet: Main fisheries: coastal shrimp (trawling), spiny lobster (diving and pots) and finfish (longline, gillnets)

	Caribbean coast				**Pacific coast**				**Inland waters**		**TOTAL**			
	2000	**2001**	**2002**	**2004**	**2000**	**2001**	**2002**	**2004**	**2002**	**2004**	**2000**	**2001**	**2002**	**2004**
TOTAL	10 393	9 899	9 940	10 642	4 109	4 156	4 479	4 448	1 351	1 351	14 502	14 055	15 769	16 441
Industrial	2 543	2 049	1 841	2 543	309	356	376	345	n.a.	n.a.	2 852	2 405	2 216	2 888
Shrimp boats	315	316	318	336	270	94	75	73	n.a.	n.a.	585	410	393	409
Crew lobster boats (pots)	448	417	348	636	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	448	417	348	636
Crew lobster boats (diving)	280	228	144	276	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	280	228	144	276
Divers (lobster)	1 400	988	936	1 196	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1 400	988	936	1 196
Longliners (fish)	20	20	15	24	24	250	288	260	n.a.	n.a.	44	308	303	284
Artisanal (fish and lobster mainly)	7 850	7 850	8 099	8 099	3 800	3 800	4 103	4 103	1 351	1 351	11 650	11 650	13 553	13 553
Fishers	7 850	7 850	8 099	8 099	3 800	3 800	4 103	4 103	1 351	1 351	11 650	11 650	13 553	13 553

Source: ADPESCA.
n.a. = not applicable

In spite of the marine and freshwater resources available, sport fisheries are not well developed, and there is a large potential for growth of this sector. At present eight sports fishing tournaments take place, two of them international, but the number of sport fishers is unknown. The main organization is the Nicaraguan Sport Fisheries Association which has 60 members. Sport fishing is primarily carried out on an individual basis.

3.1.3 Locations of fisheries

Most of the fisheries operate on the continental shelf, coastal lagoons and estuarine areas of the Pacific and Caribbean coasts, as well as in inland freshwater lakes and lagoons. Offshore fisheries can be considered those for larger pelagics as mahi mahi, sharks, and deep water shrimps, both in the Pacific coast. Long range fisheries are those carried out by Nicaraguan flagged purse seiners that are not based in the country, i.e. tuna fishing is carried out in the Eastern Tropical Ocean and landings are reported outside Nicaragua.

3.1.4 Method of harvesting

Trawling for coastal shrimp demersal resources and trap/diving for the Caribbean spiny lobster are the main industrial fishing techniques, while the inshore small scale fisheries use mostly gillnets, cast nets and lines. Caribbean spiny lobster is caught by diving and lobster traps (wooden traps) in mechanized or non-mechanized vessels and boats in the industrial and artisanal fisheries. Currently, there is a fleet of 61 industrial Caribbean spiny lobster trap licensed vessels and 26 licensed industrial Caribbean spiny lobster diving vessels. Estimates of the total numbers of lobster traps in Nicaraguan Caribbean waters vary widely, ranging up to 500 000 traps.

Approximately 800 artisanal and unregulated smallscale boats are engaged in commercial spiny lobster exploitation, generating more than 50 percent of the spiny lobster annual landings. The Pacific coast spiny lobster is caught by diving or with gillnets (known locally as “lobster trammel nets”), and it is an artisanal fishery. No data on the number of divers or nets are available.

Shrimp fisheries are carried out by industrial trawlers, both in the Caribbean and Pacific coasts. Some artisanal fishers in coastal lagoons use cast nets and small scale trawling. In the Pacific coast fishing for shrimp larvae is carried out by artisanal fishers using a gear known locally as “chayo” and a fishing bag in estuarine waters. Finfish are caught with gillnets and longlines in artisanal fisheries. (An exception is the long range tuna industrial fishery with purse seiners.)

At present, all fisheries and fishing related operations in Nicaragua, except for noncommercial self-supporting activities, have to be licensed. In the commercial shrimp and lobster fisheries this functions as a limited entry regulation. In the artisanal fishery the license is a fishing fee. Subsistence fisheries are exempted from fees. Licenses are issued annually, are nontransferable and can be revoked by the fisheries authorities.

Industrial fisheries are carried out by intermediate size (16–25 m) vessels, mainly involved in shrimp trawling and lobster fishing. In total, 173 and 59 industrial fishing vessels operate in respectively Nicaragua’s Caribbean and Pacific coast. They land their catches at three harbours in the Caribbean Coast (Puerto Cabezas, Corn Island and El Bluff) and at two harbours on the Pacific coast (Corinto and San Juan del Sur). Artisanal fishers land their products in the above mentioned places and also in many scattered sites along the coast, making these landings difficult to control and monitor.

3.2 The Management Agency

3.2.1 Evolution of fisheries management

Before 1980 fisheries management in Nicaragua was almost non existent. Fisheries were under the National Development Institute (INFONAC) and the fishery legal framework consisted of the General Law on Exploitation of the Natural Assets, published in The Gazette, Official Newspaper 83 of April 17 1958 which was modified in 1961 by the Special Law on Exploitation of Fisheries and its bylaws. These laws contained general guidelines for the conservation of the fishing resources. However, none of them contained strategic objectives for fisheries management.

After the Revolution and the advent of a centralized political and economic system (1979–1990), fishery management was carried out by the Nicaraguan Institute of Fisheries (INPESCA) which was, in fact, a Ministry of Fisheries. The former fishery legal framework was not used but fishery management was run by Executives Orders instead. These orders were of diverse nature depending on the requirements for adapting

property rights and access to the fish resources according to the new nature of the economy of Nicaragua. It must be underlined that during this period a comprehensive institutional and organizational development process for fisheries management was carried out with the support of the former socialist countries and northern European countries.This proceess settled down the foundations that are still the basis of the current fisheries management in the country. At the end of the 1980s the INPESCA was transformed in the Nicaraguan Fisheries Corporation but the organizational arrangement remained the same.

With the change of the political and economic system starting in 1990, the legal fishery management framework underwent a series of dispersed rules and regulations, some confusing and even contradictory, in the form of executive or ministerial orders and official statements which were very easily amended or changed by the government authorities in command. Fisheries management started to be very much influenced by the emerging privately owned fishing industry and the organizational structure also changed. The INPESCA was downsized and transformed into a General Directorate under the Ministry of Economy, loosing its financial independence. Additionally during this period, the first attempts at passing a new fishery law were made.

From 1993 to 2004 several government bills were worked out in order to have a new fishery law in place instead of the several (and ever changing) ministerial decrees and orders. At the same time a legal strategy was developed for the establishment of the new fisheries management system where clear rules, standards and objectives were defined. Finally, the new fishery law was passed in December of 2004, and its bylaws were passed in February of 2005.

3.2.3 The current fisheries management regime

At present, the fisheries services are provided by the national government through the National Fisheries and Aquaculture Administration (ADPESCA, the old INPESCA) and the Directorate of Natural Resources (DGRN), both under the Ministry of Development, Industry and Trade (MIFIC) that was renamed from the Ministry of Economy in 1998. The number of people employed in these two governmental offices is less than 50, and the annual budgets are on the order of **US$**400 thousand. Figure 2 shows the organizational chart of the MIFIC.

The DGRN is the policy and planning directorate dealing with the management of the State-owned natural resources, i.e. mining, fisheries and aquaculture, and forest in national lands. ADPESCA is the executive governmental organization responsible for research, development of fisheries, and monitoring, control and surveillance (MCS). ADPESCA is organized in three units: Fisheries Research (the Center for Fisheries and Aquaculture Research –CIPA), Fisheries and Aquaculture Development, and MCS. Both DGRN and ADPESCA report to the Secretary General of the MIFIC who is in charge of the fishery sector in the upper levels of the ministerial authority (Figure 2).

The new Nicaraguan Fishery Law mandates (Article. 13) that the Ministry of Development, Industry and Trade (MIFIC) is the authority in charge of the management of the fishery resources, which according to the Constitution, belong to the Nicaraguan State. It also gives the authority to enforce the law and the regulations through the National Fisheries and Aquaculture Administration (ADPESCA) and the General Directorate of Natural Resources (DGRN) without prejudice on the authority granted to other institutions of the Executive Branch.

Furthermore, in the new law the Fisheries National Commission has also been created as an advisory forum for consultation and agreement regarding fisheries and aquaculture issues with the participation of delegates of all stakeholders. Main issues cover legal, policies and planning aspects. At present the Commission has 14 members and their corresponding alternates delegates from all over the country (Caribbean and Pacific coasts). The stakeholders represented range from industrial and artisanal fishers, to seafood processing plants representatives, local and regional governments, the Police and the Navy, Sport fisheries and other authorities from the national government.

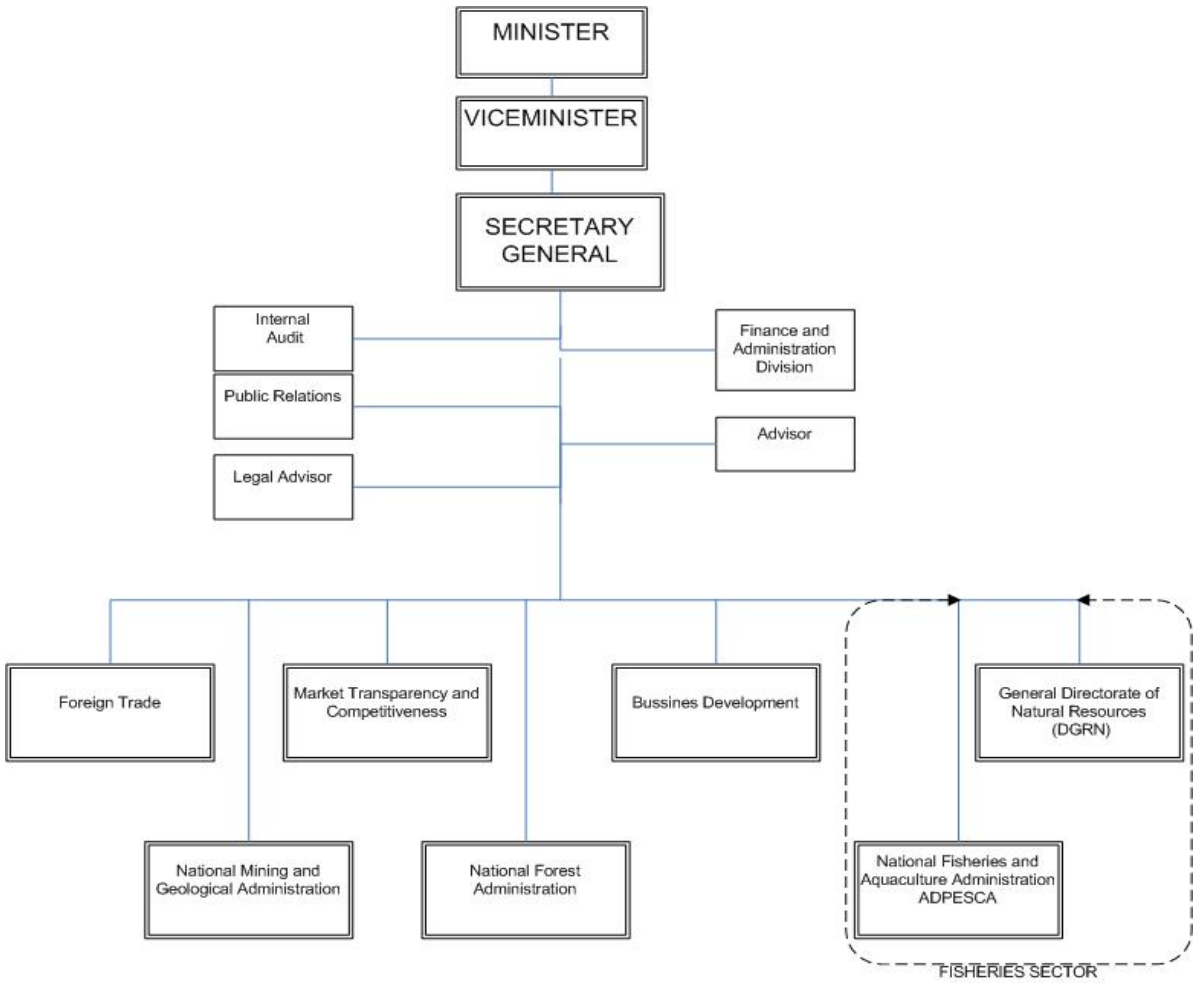

Figure 2: Current Organizational Chart of the Ministry of Development, Industry and Trade (MIFIC) of Nicaragua

The MIFIC, in coordination with the Ministry of Natural Resources and the Environment (MARENA) and consultation with the CONAPESCA, has also been mandated the development and publication of the Management Standards for Fisheries and Aquaculture. These standards describe all the technical standards and management tools with reference to harvesting methods, fishing gears, vessels, legal sizes, closed seasons and procedures and conduct codes.

According to Article 14 of the Fishery Law, fisheries research is carried out by ADPESCA, and ADPESCA has to draw a Fisheries and Aquaculture Research Plan, the result of which are to be the basis for technical recommendations and decision making in the fisheries management process. The law also mandates ADPESCA to gather all the necessary information and data to carry out stock assessments; to recommend management rules such as annual catch quotas, areas and time for closed seasons; fishing seasons; fishing areas; and the characteristics of fishing gears. The purpose is to assure that fisheries management is based on the best scientific evidence available and that the fishery resources are utilized in a sustainable way. Figure 3 shows a scheme of the organizational arrangements for fishery management in Nicaragua.

At present, fishery regulations in Nicaragua are set by the DGRN with the technical support and advice from ADPESCA. The rules are agreed upon with the stakeholders in the CONAPESCA meetings which are usually held 4 times a year. In the case of fully exploited Caribbean fisheries (e.g. Caribbean spiny lobster fishery), the rules concerning quotas and fishing effort levels must first be agreed upon with the Regional Autonomous Councils and Governments; then they can be submitted for consultation in the CONAPESCA meetings. After this process has finished, the proposed rule is sent by the DGRN to the MIFIC´s Ministry where the ministerial order is signed. Once the rules are published in the Official Gazette, the ADPESCA MCS Unit is in charge of enforcement, and implementation is carried out by the fisheries inspectors of the MCS Unit.

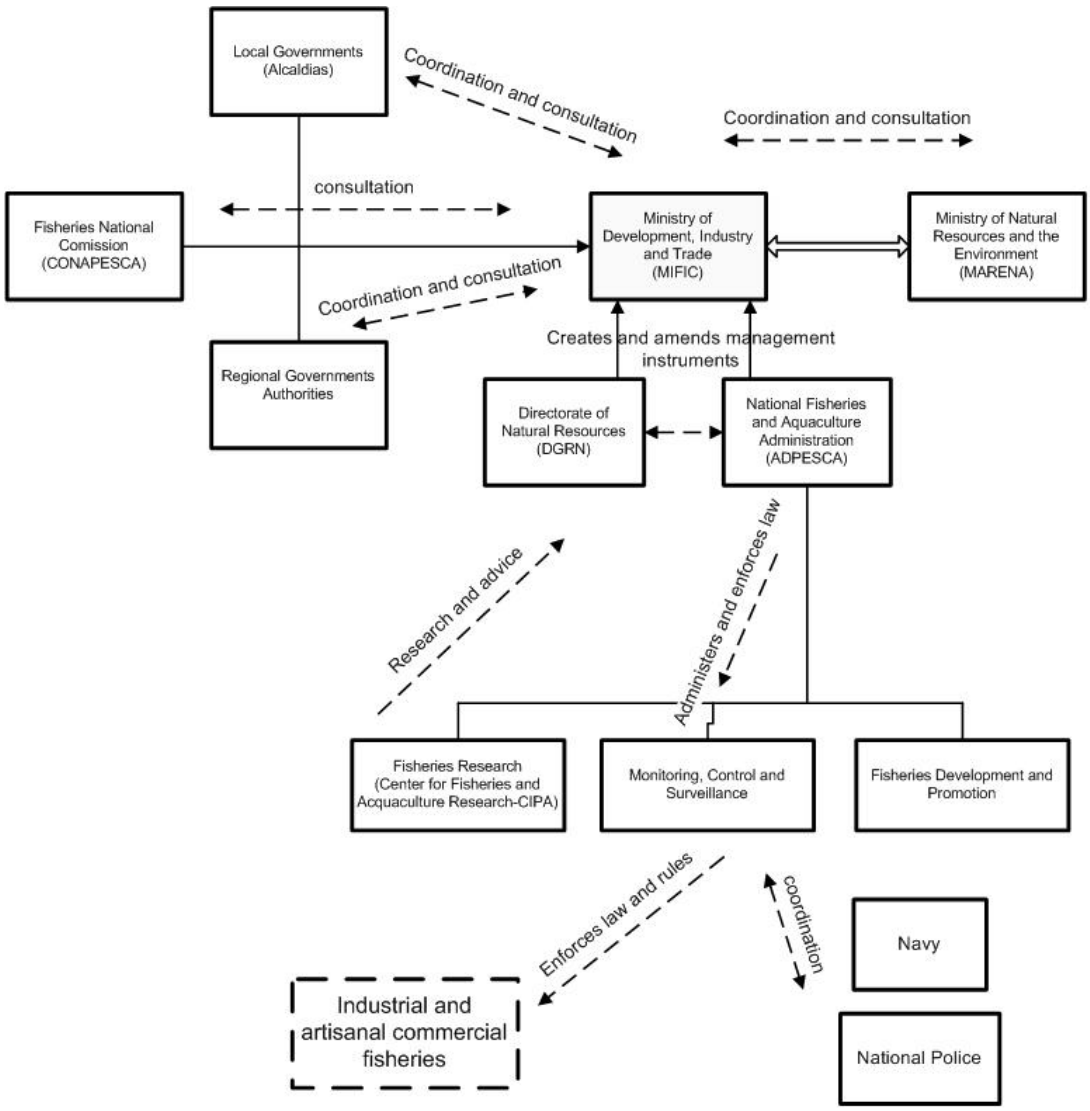

Figure 3: Schematic overview and organizational arrangements of the fishery management system in Nicaragua

Another important feature in the Fishery Law (Article 16) is that ADPESCA has to estimate an Allowable Biological Catch (ABC) based on the constant reference fishing mortality (F0.1) strategy throughout the different fishing seasons and for the fisheries declared as fully exploited. ABC is the basis for the technical recommendation of the AGCQ for the limited access fisheries (Caribbean spiny lobster and coastal shrimps) and the corresponding number of industrial vessels allowed to operate in each fishery. ADPESCA also has to monitor and make public the catch statistics related to the AGCQ, because a decision has to be made to determine when the AGCQ is attained and whether closing the fishery is necessary.

ADPESCA is also in charge of the monitoring, control and surveillance (MCS) of fisheries coordinated with MARENA, the Regional Governments in the Autonomous Regions (North Atlantic and South Atlantic Regional Governments in the Caribbean coast) and in collaboration with the National Police, the Navy, Customs, local Governments (Municipal Government) and any other required institutions.

As mentioned, in addition to ADPESCA´s authority, the Fishery Law confers authority to the General Directorate of Natural Resources (DGRN) of the MIFIC to coordinate the planning and development of the fishery policy as well as the development of the standards and rules for the appropriate management of the Nicaraguan fisheries in close cooperation with ADPESCA. The DRGN also creates, implements and administers fisheries management systems, adjusts management settings; and recommends amendments or additions to existing management systems. The DGRN is also in charge of the recording process and procedures for the licenses, permits and concessions in fisheries and aquaculture and the administration of the National Fisheries and Aquaculture Registry. Finally, the DGRN is not only in charge of administering

the management of the fisheries and aquaculture, but also in charge of the management of the State owned mining resources, water and forests.

Other organizations that should coordinate with the MIFIC for the enforcement of the fishery law and the implementation of the fisheries management system include:

- The Navy: control and surveillance of Nicaraguan waters and marine territories, monitoring and control of the fishing fleets during closed seasons, control of the use of TEDs in the shrimp trawls, illegal fishing and transhipments;
- The Ministry of Natural Resources and the Environment: drawing up management plans in protected areas with fishery and aquaculture opportunities and the definition of closed seasons;
- The National Police: transport and terrestrial surveillance of illegal fishery products, support to fisheries inspectors when needed;
- Local governments (Municipalities or Alcaldías): decentralization of functions from the National Government regarding artisanal fisheries management: monitoring and control, artisanal fishery registry, issuing licences and permits, collection of fees;
- Regional Governments/Councils in the Caribbean Autonomous Regions: procedures for issuing fishing licences in the industrial fishery, coordination for research and setting rules;
- Ministry of Transport: safety regulations, navigational permits;
- Customs and General Internal Revenue Department;
- Labour Organizations;
- Ministry of Agriculture and Forestry: sanitation procedures and inspections; and
- Nicaraguan Institute of Tourism: sport fisheries

Although aquaculture is included in the mandates and functions of the MIFIC, in practice aquaculture research is not carried out by ADPESCA; rather it is carried out by local universities, e.g. the Agricultural University, the Central American University and the Ave Maria College.

4. ALLOCATION OF FUNDS TO FISHERY MANAGEMENT: THE BUDGET ALLOCATION PROCESS

4.1 Factors that determine the overall level of expenditures dedicated to a given fishery

The level of expenditures dedicated to any given Nicaraguan fishery is largely determined by the allocation and administration of the ADPESCA and DGRN budget in the MIFIC

The Executive Branch is responsible for developing and implementing the General Budget of the Republic (GBR) while the National Assembly (Legislative Branch) is responsible for the amendment and approval of the GBR. If the GBR is not approved, prior to the budget year in which it is to be implemented, the budget proposed by the Executive Branch is put into effect. The MIFIC budget is presented at the end of each year in a proposal to the Ministry of Finance[6]. The GBR does not, in practice, cover all central government expenditures, and earmarking is high. A portion of the foreign grants is not part of the GBR.

However, what it is reported by the MHCP does not necessarily represent what was spent in practice by the fishery institutions, and the actual expenditure from national treasury funds can be much less than the official figures reported as executed. In line with this, the level of expenditures also depends on the allocation and administration of the ADPESCA and DGRN budgets in the MIFIC by the General Administrative and Finance Division (DAF).

In general, there is no feedback and track of the expenditures by the ADPESCA and DGRN and the DAF. An International Monetary Fund report (IMF, 2002) pointed out that the organizational classification in the GBR at the ministerial level does not identify the different administrative units, within the ministries,

[6] Budget allocation for each institution is disaggregated by program. For each program information is provided on aggregate current spending and aggregate capital spending, physical goals and investment projects indicating in each one, its source of financing: the treasury, foreign donations/loans.

responsible for implementing the different spending programmes. This obviously hinders the process of assigning responsibility for the collection and use of public funds.

ADPESCA develops annual work plans with budgets which are never fully allocated by the DAF, thus making it difficult to implement and accomplish activities as planned. An exception occurs if there is funding available from donor or international projects for specific programmes.

4.1.1 The importance of the fishery and status of the resources

Most of the budget allocated by the DAF goes to the management services of the most important fisheries under limited access and which are regarded as fully exploited, i.e. the industrial Caribbean spiny lobster and coastal shrimp fisheries. The stock assessment relies on fishery dependent data. Updated fishery independent data is difficult to obtain due to the lack of funds and staff available. Open access fisheries are not given appropriate fisheries management services, and very little research is carried out on the status of the stocks in order to provide management recommendations.

4.1.2 Staff available in the ADPESCA and DGRN

The level of expenditures defines also the staff available given that budget reductions through the 1990s and 2000s resulted in the reduction of personnel. At present, only 38 people are working for ADPESCA and 12 people in the DGRN (Table 7).

For example, there are only 14 fishery inspectors in the country, thus making the tasks associated with an efficient service on monitoring, control and surveillance of the different fisheries essentially impossible. Also the 9 fishery researchers ascribed at the CIPA cannot cope with the research needs and responsibilities regarding fishery management.

4.1.3 Unplanned activities

Part of the fisheries management budget is used for unforeseen activities such as research programmes on new fish resources of potential importance, sudden fishery issues raised by the same fishing industry or new investors, pressures from other government institutions and even the general public and nongovernmental organizations.

Table 7: Number of employees in the National Fisheries and Aquaculture Administration (ADPESCA) and the General Directorate of Natural Resources (DGRN) in 2004

ADPESCA Unit	Technical Staff	Support staff	Total	DGRN Unit	Technical Staff	Support Staff	Total
General Manager	2	2	4	General Manager	2	2	4
Monitoring, control and surveillance	14	1	15	Policies and Standards	2		2
Fisheries development and Promotion	7	1	8	Administration of Concessions	1		1
Fisheries Research	9	2	11	Official Register	3		3
				Documents and procedures	2		2
Total	**32**	**6**	**38**		**10**	**2**	**12**

4.2 Role played by individuals outside the fisheries management agency in the budget allocation process

There are no individuals, belonging or related to the fisheries sector, outside the fisheries management agencies in the budget allocation process. However, some direct funding from private companies and entrepreneurs is provided for some specific activities, e.g. research programmes on new fisheries.

4.3 Formal evaluations of expenditures and process for budget adjustments

Budget adjustments and evaluations are usually carried out without the participation of the fisheries management agencies. In general the DAF of the MIFIC carries out the administration of the funds available according to its own criteria. As mentioned, no feedback and detailed information on the execution of the budget is provided to the ADPESCA and the DGRN on a regular basis.

5. SUMMARY OF EXPENDITURES

The organizational classification in the General Budget of the Republic at the ministerial level does not identify the different administrative units within the ministries responsible for implementing the different spending programmes and the amount of money allocated. Control of the expenditures of the different MIFIC administrative units is carried out by the General Financial and Administrative Division (DAF). However, in practice there are no financial statements of the MIFIC available for public consultation. The only way to have a rough idea of what is spent each year by the different administrative units in the MIFIC is to look up in the final statements made by the Ministry of Finance on the execution of the GBR. Furthermore, this has only become available recently (i.e. as of 2002); before 2002 the final financial statements were very general. Nonetheless, it was possible to obtain financial data from the DAF of the MIFIC to categorize the expenditures of the ADPESCA and the DGRN by administrative units in the period 2002–2004. Table 8 shows a summary of the general expenditures, including funding from foreign aid projects.

According to Table 8 the MIFIC has spent a total of about **US$**8 million per annum from 2002 to 2004; however, the DGRN and ADPESCA budgets from the national treasury have been in the order of US$170–200 thousand and **US$**400–500 thousand respectively. (The DGRN budget has always been less than that of the ADPESCA.) These budget are about 0.5 percent of the value of the fishery exports.

Foreign aid funds have been important in the overall expenditures for fishery management, and they represented about 30 percent of the total in 2003 and 2004, and the amount spent is equivalent to the DGRN budget (Figure 4). From the total budget of the MIFIC, less than 10 percent is spent by ADPESCA and the DGRN (Figure 5).

Table 8: Final expenditures (US$) from National Treasury funds of the MIFIC, ADPESCA and the DGRN by administrative units and from foreign aid funds, with total exports in US$ and tonnes, 2002–2004.

	2002	**2003**	**2004**
MIFIC (total)	7 797 534	6 752 436	8 044 023
DGRN	194 105	211 275	169 991
Policies and Standards	123 351	131 189	97 325
Administration of concessions	70 753	80 086	72 666
ADPESCA	517 991	435 248	512 069
Monitoring, control and surveillance	216 050	188 123	192 840
Fisheries Development	114 091	42 400	45 040
Fisheries Research	187 850	204 725	274 189
FOREIGN FUNDS	128 923	286 484	244 616
PASMA–DANIDA (Denmark)	38 875	93 845	125 390
AECI (Spain)	51 620	65 049	89 226
DIPARAAN–JICA (Japan)	16 428	103 420	
Other (Spain, Sweden)	22 000	24 169	30 000
FISHERY EXPORTS in US$	94 318 000	87 854 000	96 728 000
FISHERY EXPORTS in tonnes	9 910	11 042	13 015

Source: DAF–MIFIC, DGRN and APDESCA

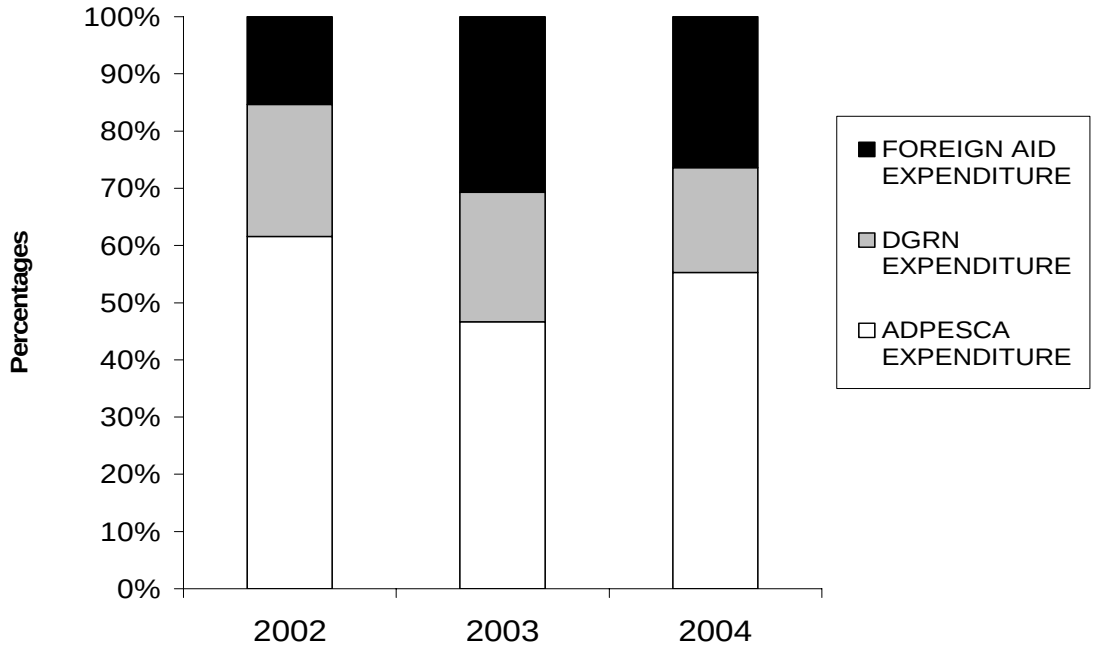

Figure 4: Expenditures in percentages of ADPESCA, DGRN and foreign aid in fishery management

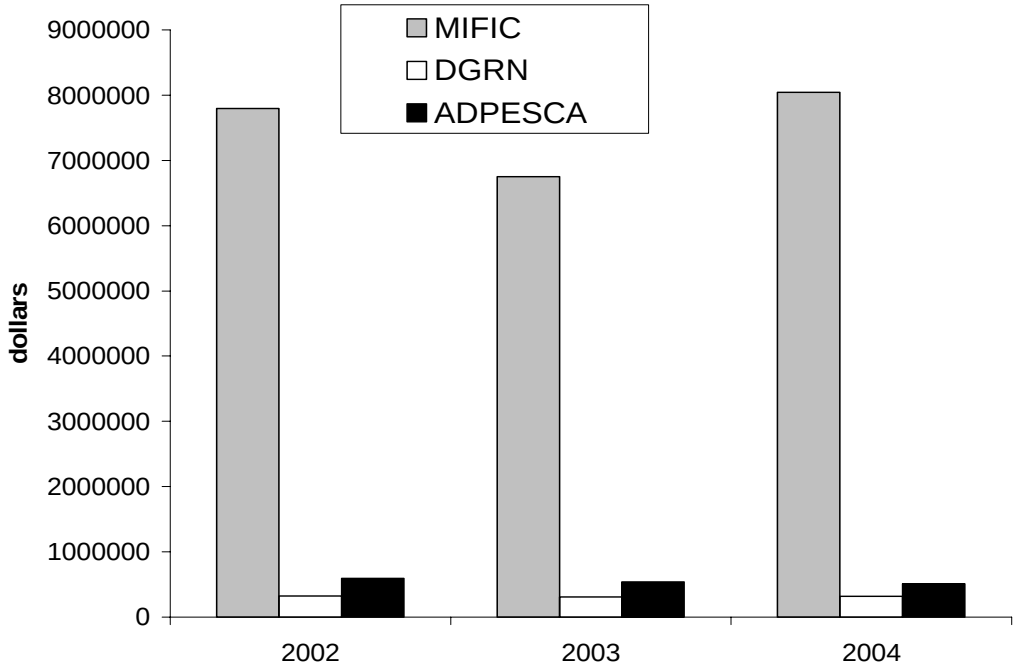

Figure 5: Comparison of the ADPESCA and DGRN budgets in US dollars in relation to the MIFIC budget in 2002 to 2004.

Using the data presented in Table 8, Figure 6 shows the proportion of the expenditures by administrative units in ADPESCA and the DGRN. In the case of the DGRN there is an important and growing contribution from the Danish funded programme (PASMA–DANIDA) which totalled almost 50 percent of the budget spent at the DGRN in 2004. In the case of ADPESCA it is significant to point out that the Fisheries Development and Promotion unit is the one with the smallest level of expenditure and budget.

5.1 Expenditures categorization

5.1.1 Scientific research

This is carried out by the Center for Fisheries and Aquaculture Research (CIPA) under the ADPESCA. At present all the scientific research (data analysis and stock assessment) relies on fishery-dependent data (i.e. reported landings by commercial categories and processing data from seafood processing plants, biological data describing the animals landed). These data are used to carry out stock assessments and computation of the ABC for the Caribbean spiny lobster and coastal shrimps through tuned length cohort analysis and catch projections. At present 100 percent of the budget for CIPA comes from the National Treasury. However, research on particular fisheries has been carried out with the support of foreign aid projects in cooperation with the Fisheries and Aquaculture Development and Promotion Unit of the ADPESCA. There are negotiations with international donors to develop further support to research programmes as of 2006.

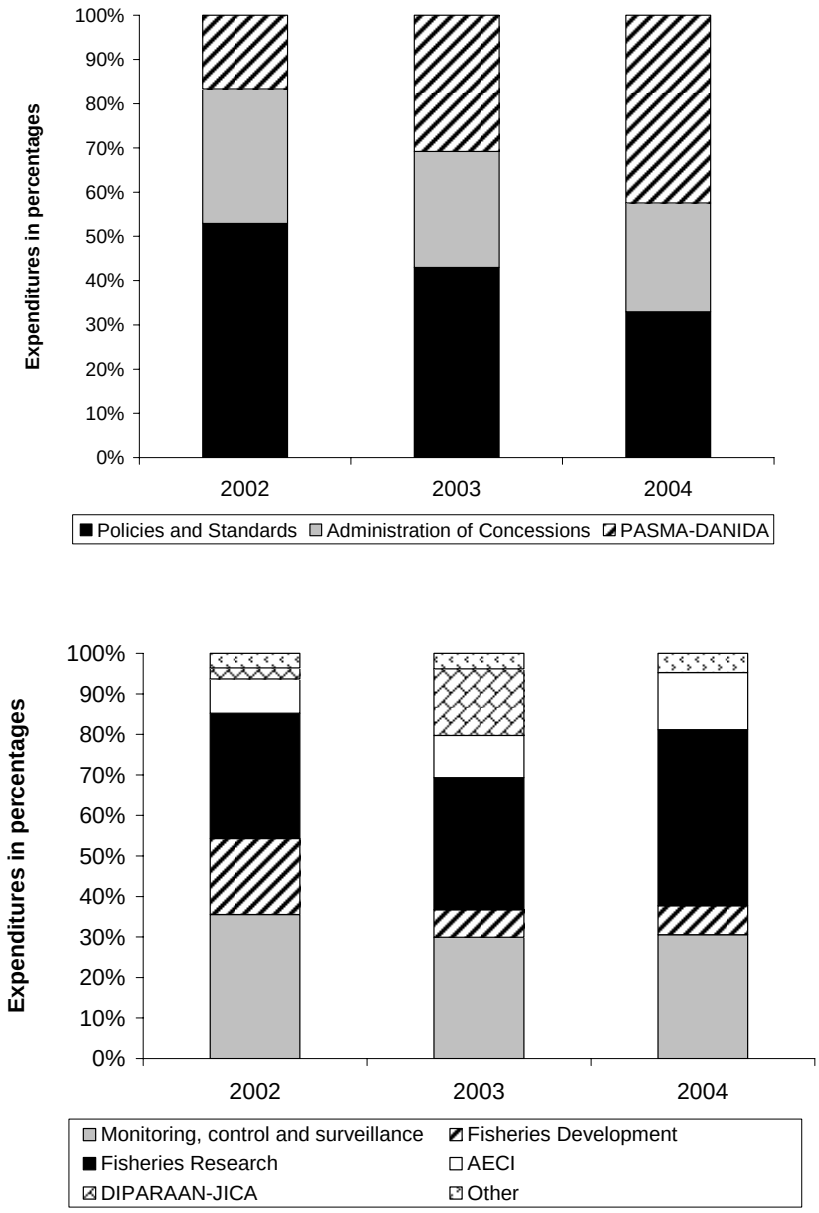

Figure 6: Expenditures (percentages) of the DGRN (upper) and ADPESCA (lower) by administrative units and foreign aid funded projects/programmes

5.1.2 Policy Development and Operational Management

The DGRN is in charge of policy development and operational management. (As mentioned previously, in addition to fisheries this administrative unit of the MIFIC is also in charge of these issues for mining, water and forests in national lands management.) The DGRN has a Policies and Standards Directorate where all fisheries and aquaculture policies are developed with the cooperation of ADPESCA. Another Directorate (Concessions) is in charge of issuing licenses, permits and concessions and the National Fisheries and Aquaculture Register.

The DGRN operates with funds from the National Treasury but the main source of funding is becoming the Danish supported programme named PASMA–DANIDA (Environmental Sector Support Programme) which is shared with other 2 governmental organizations (the Ministry of the Environment and Natural Resources, and the Nicaraguan Institute for Territorial Studies).

5.1.3 Enforcement

Enforcement of the rules is in charge of ADPESCA through de Monitoring, Control and Surveillance (MCS) Unit. Fisheries inspectors carry out the MCS activities on land (seafood processing plants, markets, airports, and customs). Cooperation agreements exist with the National Police and the Navy in supporting some MCS procedures, especially surveillance at sea regarding the use of TEDs and the implementation of closed seasons. However, this is the weakest fishery service provided by ADPESCA since there are 10 fisheries inspectors located at the main landing sites: Corn Island, Bluefields and Puerto Cabezas in the Caribbean coast; and San Juan del Sur and Chinandega in the Pacific coast. The other three inspectors are located in Managua, the capital city, one at the International Airport and two in the central offices of ADPESCA.

Surveillance at sea is carried out by the Navy but is an activity that is not done on a regular basis due to the Navy scarce budgets. No aerial surveillance is carried out. The fishery law mandates the implementation of a satellite based vessel tracking and monitoring system to be implemented on an annual basis (since December 2004) for all industrial vessels operating in the Caribbean spiny lobster and shrimp fisheries.

5.1.4 Corporate and Administrative Support

Cross cutting issues in ADPESCA and the DGRN are handled by the one legal advisor in the DGRN who is also in charge of all legal issues concerning fisheries, mining and water management. ADPESCA has no legal department. Educational- and publicity-related matters are usually financed by foreign programmes/projects.

Table 9 shows the expenditures by fishery services in Nicaragua: research, management, and monitoring, control and surveillance from the data available for year 2002, 2003 and 2004 reported in the DAF financial statements on the expenditures in the MIFIC budget. The expenditure data for each fishery management service was aggregated according to the administrative units in ADPESCA and the DGRN.

Total costs of the fisheries management services each year have been in the order of US$600 thousand in the period 2002–2004 with a small level of increase since 2002 (Table 9). This amount is in contrast with the value of the fishery exports shown in the last row of Table 9.

Table 9: Estimated costs (in US$) of the fishery management services in Nicaragua from ADPESCA and DGRN budgets (foreign programmes/funds excluded in the analysis) 2002–2004.

Category of Expenditure	2002	2003	2004
Research	187 850	204 725	274 189
Monitoring, control and surveillance	216 050	188 123	192 840
Management	194 105	211 275	169 991
Total fisheries management services	598 005	604 123	637 021
Catch value[7]	9 4318 000	87 854 000	96 728 000

[7] In the Nicaraguan context the landed catch value has been assumed to be the value of the fish exports as about 90 percent of the main fisheries landings are exported.

On average research expenditures account for 37 percent of the total fishery management service expenditures, followed by monitoring, control and surveillance with 32 percent. Management expenditures amount to 31 percent (Figure 7).

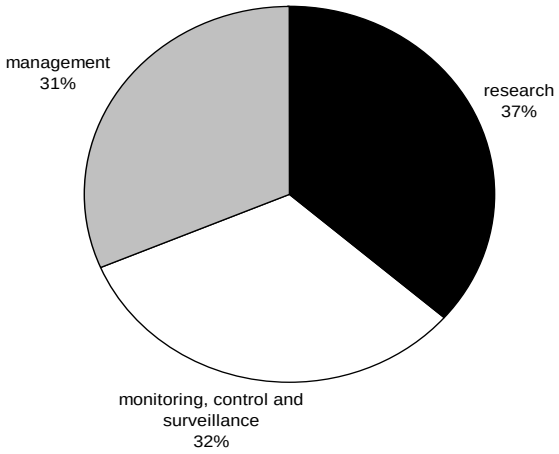

Figure 7: Proportion of the fishery management services expenditures in Nicaragua as an average for the period 2002–2004. (Funds from international donors/programmes excluded from the analysis.)

5.2 Approaches used by the agency to track expenditures

The administration of the MIFIC budget is centralized under the Financial and Administrative Division. In general, there is no formal process to track down expenditures as long as there are no regular and year-end accounting reports on the execution of the annual budget. Statistics presented on expenditures are not always reliable. Even the annual budget allocated is not available to the public. The current general manager of this Division is sending regular reports on the expenditures of each administrative unit of the MIFIC via electronic mail. However, the statements only refer to the amount paid in salaries and other general items. The reports are not categorized according to the fishery management services delivered and no comparison with initial planned budget predictions can be made. No information is submitted on the implementation of budget programmes by administrative units or on the extent to which their objectives have been achieved. In some cases foreign technical assistance agencies channel and control their financial resources by their own procedures outside the GBR or the MIFIC budget.

6. ANALYSIS OF FINANCIAL INFORMATION AND PRESENTATION OF FINANCIAL INDICATORS

6.1 Effectiveness and efficiency of expenditures on key fisheries management activities

For the case of Nicaragua, the ratio of expenditures of fisheries management costs versus the value of the exports is extremely low reaching on average 0.66 percent of the fishery exports (Table 10). The level of expenditures in each fishery service is about 0.2 percent.

These indicators show that the Government investment, excluding foreign aid programmes/projects, is not enough to carry out fishery management services in an effective and efficient way. Most of the funds allocated are to pay salaries and per diems, and running costs such as water, electricity and telephone bills, maintenance of the premises, etc. At present most of the expenditures on key fishery management activities are being done through budget provided by foreign aid programmes.

All the values presented in Table 10 are low if compared with the estimates for other fisheries in the world. For example, Willmann *et al.* (2000) pointed out that total government expenditures for fisheries management in Thailand fisheries amounted to just above 1.6 percent of the total gross revenues of marine