FISHERIES POST-HARVEST OVERVIEW MANUAL (FishPHOM)

Linking the Poor to Policy in the Post-Harvest Fisheries Sector

An output from the DFID-funded PHFRP projects R7799 and R8111

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POST HARVEST FISHERIES RESEARCH PROGRAMME

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The Post-Harvest Fisheries Research Programme

The **Post-Harvest Fisheries Research Programme (PHFRP)** is one of a number of natural resources research programmes funded by the UK Government's Department for International Development (DFID) and is managed by NR International. The central aim of DFID is to **eliminate poverty** by **improving the livelihoods** of poor people in developing countries. One of the means by which DFID addresses this aim is through its strategy for research in renewable natural resources. The purpose of the strategy is to create benefits for poor people by generating and promoting the use of new knowledge in natural resources management.

Fisheries play an important part in the social and economic lives of large numbers of people around the world, many of whom are amongst the poorest and most marginalised people in rural communities. In many cases fish harvesting, processing and trade is seen as the employment of last resort when other economic opportunities have run out. There are no accurate figures for the number of people involved in fisheries but it is estimated that, globally, there are tens of millions of people dependent on fisheries for their main source of income for at least some of each year – and this number is thought to be rapidly increasing.

The PHFRP programme **purpose** is a statement of how the programme will contribute to the broader goals of DFID's Research Strategy:

- To produce benefits for poor producers, processors, traders and consumers through the application of new knowledge to the improved utilisation of fish from fisheries in South Asia and East and West Africa.

Two programme **outputs** have been identified to ensure the delivery of this purpose:

- Relevant new knowledge (strategies, management systems, methodologies and tools) developed, which will improve the post-harvest utilisation of fish and which are appropriate to poor producers, processors, traders and consumers

- New knowledge successfully disseminated and promoted to the point where it is taken-up and used by key institutions and other stakeholders within targeted fisheries and wider geographical regions

The **strategy** of the programme is therefore based on the phased implementation of research projects that address the three core elements of the Programme's logframe. These are to:

1. Develop improved methods to assess the magnitude and source of post-harvest losses in capture fisheries and promote their use by key institutions within target fisheries

2. Generate knowledge of the impact on the poor of changes in the utilisation of fish and disseminate this knowledge to key policy makers and stakeholders within target fisheries

3. Develop and promote appropriate value-adding and loss reduction processes and technologies applicable to major poor stakeholder groups in target regions.

Two Post Harvest Fisheries Research Programme Projects specifically contributed to the development of the Fisheries Post Harvest Overview Manual (FishPHOM). These were the Changes in Fish Utilisation in India Project (R7799) and the Poverty and Post Harvest Fish Utilisation in Ghana Project (R8111).

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Mr Duncan King, the then manager of the Bay of Bengal Post Harvest Fisheries Project, provided support in the early development of the manual. Mr Krishan George of IMM worked on the early version in India in 1994.

More recently Mr Venkatesh Salagrama and his team at ICM in Kakinada, India, have piloted a much revised version of the manual working with Dr. Ramachandra Bhatta (College of Fisheries, University of Agricultural Sciences, Mangalore, Karnataka), Mr Karthikeyan and Mr V. Vivekanandan (South Indian Federation of Fishermen Societies, Trivandrum, Kerala), Dr.S.Basu, Dr Sen and Dr Chakraborti (Central Institute of Fisheries Education, Mumbai, Maharashtra) and Mr K. Karunaharan.

The manual has subsequently been applied with IMM's assistance at the national level by Mr Alabi Bortey, of the Directorate of Fisheries in Ghana, and by Mr Sem Viryak of the Department of Fisheries in Cambodia. In the process of using the manual many other people, too numerous to mention, have contributed to its development.

CONTENTS

ABBREVIATIONS USED

CCRF	Code of Conduct for Responsible Fisheries
DAC	Development Assistance Committee of OECD
DFID	Department for International Development (UK Government)
EU	European Union
FAO	Food and Agriculture Organisation (of the United Nations)
GDP	Gross Domestic Product
HACCP	Hazard Analysis Critical Control Point
HIV/AIDS	Human immunodeficiency virus / Acquired immunodeficiency syndrome
ICM	Integrated Coastal Management
ICSF	International Collective in Support of Fishworkers
IFAD	International Fund for Agriculture Development
ILO	International Labour Organisation
IMM	Integrated Marine Management Ltd
IMPEDA	Indian Marine Product Export Development Agency
MDG	Millennium Development Goals
NGO	Non Governmental Organisation
ODA	Overseas Development Administration
OECD	Organisation for Economic Cooperation and Development
PHFRP	Post-Harvest Fisheries Research Programme
PHO	Post-Harvest Overview
PRS	Poverty Reduction Strategy
SWOT	Strengths Weaknesses Opportunities and Threats
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNIFEM	United Nations Development Fund for Women
US	United States
USA	United States of America
WTO	World Trade Organisation

STRUCTURE AND ORGANISATION OF THE MANUAL

The Fisheries Post-Harvest Overview Manual (FishPHOM) is designed to help those involved in post-harvest fisheries to understand what is currently happening in the sector, how this is changing, what the implications for change are, what is currently being done to addresses these changes, and what needs to be done in the future.

The Manual aims to guide practitioners through a process of researching and writing a country overview that will inform policy, plans and strategies for the sector. The Manual has six key areas of investigation:

- Fisheries Post-Harvest and Wider Policy
- Assessing the Current Situation in the Sector
- Key Changes in the Sector and their Cause
- The Impact of Change
- Current Interventions in the Sector
- Developing an Intervention Strategy

Fisheries Post-Harvest and Wider Policy

This section describes the post-harvest fisheries sector in the wider policy context. It places the post-harvest sector in the country in the wider context of its global importance and especially its relationship to the Code of Conduct for Responsible Fisheries (CCRF). It also introduces poverty in both a national context and in relation to the post-harvest sector. It then discusses the importance of the post-harvest sector to wider national development goals.

This is an important part of the Post-Harvest Overview because the Overview needs to be placed in this wider context if it is going to affect and integrate with policies outside of fisheries, such as poverty reduction strategies and decentralised planning processes. It is also necessary to include this section in the PHO because by placing the post-harvest sector in the wider context the importance of the sector is better understood, a factor which is often forgotten or overlooked.

Assessing the Current Situation in the Sector

This section of the Manual assesses the current situation in the sector from the perspective of three key components: supply, transformation and consumption. Dividing the sector into these three components is one way of looking at the sector that increases the ease of analysing it. The supply of fish includes its origins (e.g. marine or inland capture, aquaculture and imports) the variability or seasonality of supply, and the forms of supply. Transformation includes the way fish is changed in terms of its processing, transportation, price and the way it is perceived. Consumption includes all ways in which fish is finally used whether it be eaten by people, by other fish or used as fertiliser.

Key Changes in the Sector and their Cause

Change is happening across the fisheries sector and the effects on the post-harvest sector are very pronounced. These changes are affecting different people in different ways and these differences need to be understood if future interventions are to have maximum impact. Many of these changes are linked to changes in wider society and to changes in policy. Perhaps one of the biggest changes in most societies is demographic change: increases in population, changes in the age structure of the population and the distribution of people between urban and rural areas is affecting fish supply, transformation and consumption.

This section outlines the sort of changes that could occur and what their causes might be.

The Impact of Change

This section looks at the impact of change. It is important that the implications of changes are fully understood in relation to the contribution that the sector makes to the achievement of national development objectives, so that suitable policy responses can be identified, balanced against each other and coalesced into development strategies.

Current Interventions in the Sector

As one of the first stages of developing the Overview it is likely that an institutional and stakeholder analysis will have been carried out. This will have identified key people who are directly involved in the sector. It would also have identified a range of institutions that are involved in understanding the sector, developing it, regulating it, or commercially participating in it. This section looks at these institutions in more detail and identifies what interventions are currently being undertaken in the sector.

Developing an Intervention Strategy

On the basis of the preceding section this part of the Manual helps to define the priorities that require intervention in the sector it also provides some generic principles for guiding the way we address those priorities. These principles can be adapted to suit the local conditions in the country concerned and provide a valuable framework for uniting those who work in the sector to more towards common goals.

The following section introduces the Manual and outlines how it should be used.

SECTION 1: INTRODUCTION

INTRODUCTION TO SECTION 1

The aim of Section 1 is to introduce the manual, to explain its origins, what it is used for, who the audience is, how to use it and what it is aimed to produce.

THE ORIGINS OF THE MANUAL

The Fisheries Post-Harvest Overview Manual has its origins in the early 1990's in South Asia. The UK government under the auspices of the ODA and then DFID, funded the post-harvest component of the FAO-implemented Bay of Bengal Programme with the aim of improving the post-harvest utilisation of fish. In order to understand the current situation and the need for possible interventions it was decided that an overview of the sector should be carried out. An overview methodology was subsequently developed by Jock Campbell of IMM in Sri Lanka in 1993, this was further refined in India in 1994 by Jock Campbell and Krishan George, then used by BOBP in Bangladesh in 1995.

This early Post-Harvest Overview (PHO) was quite technically focussed and somewhat simplistic in its structure. It was designed to be progressively developed as more knowledge of the sector became available. However, the tool remained largely unchanged until 2000 when its further development was promoted by the UK Government's Department for International Development (DFID) under its Post-Harvest Fisheries Research Programme (PHFRP) (See Box 1).

Box 1: The Post-Harvest Fisheries Research Programme

The Post-Harvest Fisheries Research Programme (PHFRP) is one of three DFID strategic fisheries research programmes. The others carry out research in the areas of aquaculture and genetics, and fisheries management.

The aim of the PHFRP is to produce benefits for poor producers, processors, traders and consumers through the application of new knowledge to the improved utilisation of fish from fisheries in South Asia and East and West Africa.

Its targets for success are that by 2005:

- *The level of post harvest losses have been identified and reduced by 50% in two target fisheries.*
- *The net incomes of poor producers, processors and traders have been sustainably increased in two target fisheries.*
- *Food security amongst poor consumers has been maintained or improved through the availability of affordable fish on local markets.*

The PHFRP commissioned IMM Ltd to carryout a research project on the changes in fish utilisation in India (project R7799). This was implemented in partnership with ICM, Kakinada, India. The research was designed as a component of the poverty reduction framework within which DFID operates. The India Fish Utilisation Project aimed to understand the changes in the post-harvest sector and the implications of those changes for poor processors, traders and consumers. One element of the research was to take the PHO and develop its structure, content and application to become a practical tool for policy-makers and planners that incorporated an understanding of change within the fisheries sector and the implications of that change for both the poor and for wider policies.

During 2000 and 2001 the PHO tool was developed, tested and refined and post-harvest overviews were implemented in six coastal states in India. The results of those studies have allowed further development of the PHO tool to the point where it has evolved into a practical manual. The manual was then generalised for global application and was tested by the Directorate of Fisheries in Ghana and IMM under the Poverty and Post Harvest Fish Utilisation in Ghana Project (R8111). The outcome of that work has been to link the manual much more closely to the Code of Conduct for Responsible Fisheries. It has subsequently been successfully used in Cambodia under the Cambodia Post Harvest Fisheries Livelihoods Project and is now a generic tool which is built on a wide range of experience from all parts of the world.

AIM OF THE MANUAL

The manual allows the post-harvest sector to be systematically analysed and understood in terms of its importance and the changes that are occurring within it. It also points practitioners in the direction of how to respond to those changes to maximise the contribution of the sector to policy objectives. Emphasis is continuously placed on the poor and on poverty reduction throughout the Manual because this is one of the key global policy objectives and the motivation behind the Manual.

By the post-harvest sector we mean those activities that occur from the time the fish is caught, trapped or harvested up to consumption or final use. This therefore includes the supply of fish, in part because fishermen engage in post-harvest activities onboard their boats, but also because the supply (in terms of how much fish, in what form, when, how often etc.) determines much of what can happen in the processing, trade, transportation and consumption of fish.

This manual specifically addresses the following areas:

- The significance of the sector to national policies and to the livelihoods of different stakeholder groups in the sector;
- The current situation in the supply, transformation and consumption of fish;
- The changes that are occurring in the sector;
- The cause of those changes;
- The impact of those changes on policies and the livelihoods of different stakeholder groups;
- Current interventions in the sector;
- Developing an intervention strategy.

Change is an important feature of post-harvest activities. Many activities and stakeholders are in a state of flux. The manual will help identify key changes, the cause of these changes and the impact they are having on the poor.

The output from using the manual is a Post-Harvest Overview (PHO) of the fisheries sector that can guide policy makers and planners in how best to address the needs of the sector especially the needs of the poor. This is designed to feed into such policy processes as Poverty Reduction Strategies. The structure will broadly follow the headings in the Manual and a suggested outline for the Overview is given in Section 8.

The focus on the livelihoods of the poor ensures that the policy options encourage linkages between the needs and aspirations of the weakest members of the sector with

the wider goals of society. This reflects international development targets and Millennium Development Goals (MDGs).

The Post-Harvest Overview that emerges from the use of the manual should be seen as the beginning of an on-going process and the understanding developed should be updated on a regular basis as new information appears.

THE AUDIENCE OF THE MANUAL

The Manual is a policy informing and planning tool for use by government as well as the private sector and other institutions and organisations active in the post-harvest sector, such as NGOs and community organisations. Many of these people will be informed and influenced by participating in the Overview process. They will attend workshops and training courses, contribute to group discussions and actively participate in field work. Many will also benefit from having access to the resultant Overview document which will be a major source of information and guidance. The Post-Harvest Overview (PHO) that the Manual helps produce, is used to assist:

- Building capacity to understand and respond to the sector;
- Creating an understanding of what is happening in the sector and how to respond to it;
- Formulating policy for the sector;
- Identifying and targeting pro-poor interventions;
- Guiding choices with regard to strategies which distribute benefits between social and economic groups in different ways;
- Strengthening the ability of NGOs and fisherfolk associations to assist in the sustainable development of the sector;
- Identifying information gaps that can be later filled;
- Designing and implementing projects and development programmes.

HOW TO USE THE MANUAL

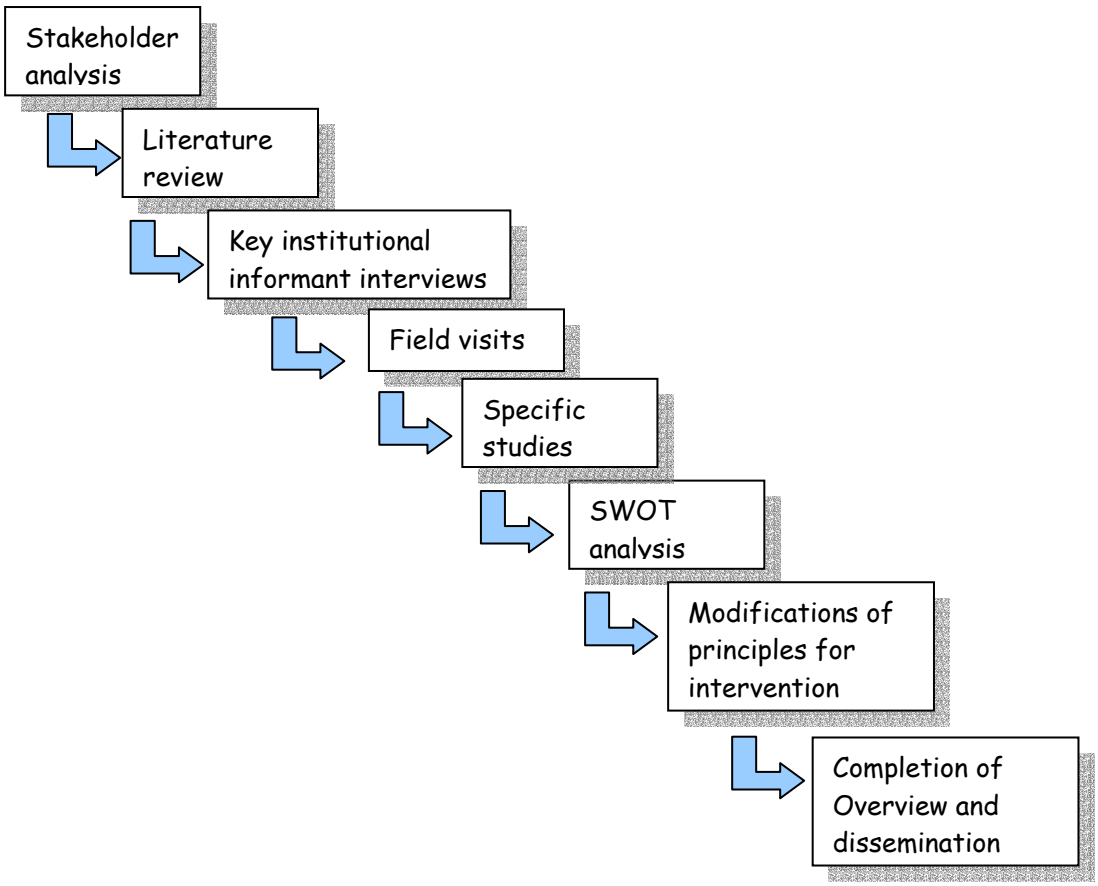
Application of the Manual involves several stages: secondary data collection and review, followed by primary research, analysis and validation at the institutional and community levels. The aim is to develop an overview of the sector by stakeholders from within and at all levels. Making the process inclusive and participatory and fostering ownership by the sector as a whole.

The Manual provides a narrative breakdown of the component parts of the post-harvest sector with examples to illustrate the different elements of it. It also provides a hierarchy of questions that can be used to guide analysis of a particular situation.

The hierarchy of questions is designed to take researchers to different levels of understanding. Policy-makers and planners may find the higher-level questions (Policy Check questions) a useful guide to directing researchers towards important information that is required for policy formulation and planning. Researchers and development workers may find that the lower level questions (Planning Check questions) suggest ways of looking in more depth at the sector.

By working through the narrative and the examples, and using the questions to guide areas of enquiry, users of the manual can systematically uncover much of what is happening in their own post-harvest sector. An outline of how the Overview process might be implemented is shown below.

Suggested stages of implementing the Overview Process



It is not envisaged that all the questions should be answered, the manual tries to be complete but that does not mean that it has to be used in its entirety before useful information is generated. Parts of the Manual can be used to address specific knowledge gaps. However, the Manual is designed such that if information is gathered for each of the headings and sub-headings in the manual then the resulting document will provide a fairly comprehensive description of the sector.

The methods for generating the information for the Overview include the following:

1. An institutional and stakeholder group analysis;
2. Literature scoping, gathering and reviewing;
3. Interviews with key informants in the government, private sector, NGO and post-harvest communities;
4. Workshops to brainstorm with key partners in the government, private sector, NGO and post-harvest communities;

5. Commissioning specific studies to address information gaps.

The Manual will guide the information that needs to be collected and it will be up to the individual researchers to develop their own approach to how this will be done. A suggested set of stages are shown below.

At each stage the Manual will be used to guide the information that needs to be collected and can act as a checklist for preparing for field visits and interviews. In the process of working through the Manual, information gaps should be noted after each stage so that information gathering can be planned for the next stage.

Institutional and Stakeholder Analysis

A useful starting point for implementing an overview is to understand who is involved in the sector and what they do. This is associated with Section 6 of the Overview. An institutional and stakeholder analysis of the sector will provide an understanding of the different institutions and individuals in government, private sector, academia and civil society and can give a good overview of how the sector is structured and where the best places are to look for key informants to help to build up a picture of the sector. Private sector institutions such as associations, will also involve community-level operators such as fishers, traders, processors, carriers, and others. Various sources of information can be used to develop a list of the different institutions and stakeholders and what they do. These include telephone directories, key informant interviews and workshops (see below).

The term "stakeholder" covers a wide range of people from a multitude of different organisations, backgrounds and occupations at the national, regional, local and community levels. They may be people you already know or people you don't.

Literature Review

The Post-Harvest Overview (PHO) produced by the manual, is as the name suggests, an overview or a review of the sector from existing information and knowledge. Thus, a great deal of the information for the Overview can be obtained from secondary sources. Good sources of information that can be used to answer the Overview questions include reports, scientific papers, PhD thesis, newspaper articles, and books which focus on poverty, the macro economy, fisheries, trade and export. Such information may be available from:

- Internet
- Libraries
- Development agency offices (FAO, EU, World Bank etc)
- NGOs
- Universities
- Research institutes

A literature review can help lay the foundation for the Overview and can provide information for all sections of the Overview. It also helps identify where there are knowledge gaps for which literature is not readily available. Attempts to address these gaps can be made in workshops and stakeholder interviews, and through specific studies as identified below.

The way in which the Overview is developed using a literature review will depend on the sort of information which is available. But it should be possible to relate different sources of information to different sections of the manual and Overview. The heirachy

of questions in the particular section in the manual should be used to help guide the review of the relevant secondary sources of information.

Other approaches and tools are available for more in-depth studies, which will generate new knowledge of specific aspects of the sector. In time it may be possible to commission specific areas of research to complement existing data and these can feed into later editions of an Overview.

Key Informant Interviews

Another approach to generating information for the Overview is to interview key stakeholders. Identifying who to interview about what, can be much easier once you have identified the sort of information that is required (see the questions in the main part of the manual) and once an institutional stakeholder analysis has been completed as this will tell you who does what and where. Key informant interviews might therefore involve visiting local development agencies in government and NGO sectors; visiting development projects or talking to village elders in specific locations. Key informant interviews can be used to provide qualitative information for all sections of the Overview.

Once a literature review has been conducted and an early draft Overview has been produced it can be useful to go through the draft and compare it with the manual to see which of the hierarchical questions have been answered and which haven't to identify knowledge gaps. Then to identify who or which institutions may be able to answer the questions that haven't yet been addressed. Try to draw up a list of questions that need to be asked and/or a checklist of issues to discuss with the particular individual or institution. It may be that a key individual may have knowledge on a wide range of issues or they may have quite specialised knowledge on only one knowledge gap. Semi-structured interview techniques can help conduct key informant interviews.

Another way in which to capture key information is to use a postal questionnaire survey approach. This can be useful in situations where resources do not permit extensive travel to different locations within a country and instead a questionnaire can be mailed to key informants for them to complete.

Workshops

Workshops can be useful for discussing and answering questions or sections of the Manual. They can also be useful mechanisms to fill knowledge gaps, cross-check and validate the Overview once it has been developed and to help identify intervention principles and strategies. Workshop results are used to develop and amend the evolving Overview. Workshops will be particularly important during the SWOT analysis of the Overview carried out in Section 7. This helps clarify the strengths, weaknesses, opportunities and threats associated with the post-harvest fisheries sector. They can also be used to develop other sections of the Overview and address knowledge gaps.

Workshop activities can include brainstorming sessions of major aspects of the PHO (supply, transformation, consumption, stakeholders, poverty, interventions) which help develop an understanding of current key issues. They may also include working group sessions to discuss specific issues, and presentations and open discussions. Working group tasks are useful ways of stimulating discussion, information and ideas.

Workshops may be held at the national level or regional level depending on the type of information required. For example, in some circumstances there may be a shortage of current information on particular issues in certain areas of a country. One way of trying

to quickly generate an understanding of these issues would be to hold a regional level workshop with relevant stakeholders from the particular area. Workshops could be held at the beginning, during and at the end of the development of an Overview. Typical stakeholders for an Overview workshop would be drawn from the public, private, NGO and academic sectors, as identified by the institutional and stakeholder analysis.

Specific Studies

When working through the manual and compiling information under each of the headings it will become clear that for some areas no information exists at all. Under these circumstances it may be desirable to commission specific studies. These should be carefully defined in terms of what is the required output, how it should be written up, the way the information should be structured etc., this will help with incorporating it into the Post-Harvest Overview.

SECTION 2: POST-HARVEST FISHERIES AND WIDER POLICY

INTRODUCTION TO SECTION 2

Section 2 of the Manual describes the post-harvest fisheries sector in the wider policy context. This section places the post-harvest sector in the country in the wider context of its global importance and especially its relationship to the Code of Conduct for Responsible Fisheries (CCRF). It also introduces poverty in both a national context and in relation to the post-harvest sector. It then discusses the importance of the post-harvest sector to wider national development goals.

This is an important part of the Post-Harvest Overview because the Overview needs to be placed in this wider context if it is going to affect and integrate with policies outside of fisheries, such as poverty reduction strategies and decentralised planning processes. It is also necessary to include this section in the PHO because by placing the post-harvest sector in the wider context the importance of the sector is better understood, a factor which is often forgotten or overlooked.

POST-HARVEST IN THE GLOBAL CONTEXT

The Code of Conduct for Responsible Fisheries

In recent years, world fisheries have become a market-driven, dynamically developing sector of the food industry and coastal States have taken advantage of new opportunities by investing in modern technologies in the harvesting and processing of fish in response to growing international demand for fish and fishery products. However, by the late 1980s it had become clear that fisheries resources could no longer sustain such rapid and often uncontrolled exploitation and development, and that new approaches to fisheries development, that incorporated the sustainable use of resources, were urgently needed. The situation was further worsened by the realisation that many in the sector were being marginalized by these changes.

Noting these and other important developments in world fisheries, the FAO Governing Bodies recommended the formulation of a global Code of Conduct for Responsible Fisheries which would, in a non-mandatory manner, establish principles and standards applicable to the conservation, management and development of all fisheries. The Code, was unanimously adopted on 31st October 1995. It provides a framework for national and international efforts to ensure sustainable exploitation and use of aquatic living resources in harmony with the environment and consistent with the need to enhance the livelihoods of those people dependent on the sector. This emphasis on both sustainable use and the needs of people dependent on the sector underlies the structure and content of the PHO Manual.

The Code provides principles and standards applicable to all aspects of fisheries. It also covers the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries into coastal area management. The CCRF is very specific concerning the post-harvest sector, it says:

"States should give due consideration to the economic and social role of the post-harvest fisheries sector when formulating national policies for the sustainable development and utilization of fishery resources".

POLICY CHECK:

- To what extent has the CCRF been incorporated into national policies?
- What are the explicit policy commitments to the CCRF in national policies?
- In what ways has the post-harvest sector been specifically dealt with in relation to the CCRF?

Planning Check:

- When was the CCRF adopted nationally?
- How has it been incorporated into development plans?
- Have research plans been adapted to cater for the CCRF's information needs?
- How has it affected plans/activities and legislation in fish processing, quality control, domestic trade and export?
- How has the CCRF been used to inform national guidelines for the development of fisheries?
- Which aspects of the CCRF are particularly relevant to the present and future of the post-harvest sector?
- What level of understanding of the CCRF is there amongst different stakeholders, e.g. government staff, NGOs etc?

The Importance of the Post-Harvest Sector

There are approximately 40 million people engaged in the fisheries sector world wide, of these some 20 million are involved in fish processing and trade. Taking into account ancillary workers and families of people working in the sector there are around 200 million people who are dependent on fisheries for their livelihoods (McGoodwin, 2001).

Perhaps one of the most important contributions of the post-harvest sector is its contribution to poverty reduction. FAO estimates that there are some 5.8 million fishers earning less than one US$/day globally and a further 17.3 million in upstream and downstream activities such as fish processing, trade and boat building (FAO, 2002). As such the poor probably directly depend much more on the post-harvest side of fisheries than on the capture side.

Table 1: The percentage of people employed in fishing and aquaculture by region

CONTINENT	PERCENTAGE OF PERSONS EMPLOYED GLOBALY IN EACH REGION
ASIA	85.0
AFRICA	6.5
N.AMERICA	3.0
S. AMERICA	2.8
EUROPE	1.4
FORMER USSR	0.9
OCEANIA	0.5

source: FAO 2002.

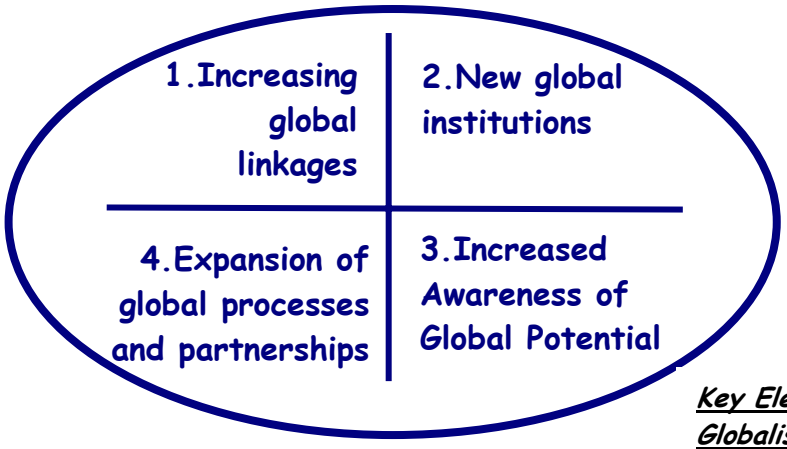
The distribution of those involved in harvesting fish (and by implication those involved in shore-based activities) is shown in Table 1.

Worldwide over a billion people depend on fish to supply at least 30% of their animal protein. About 56% of the world's population derives at least 20% of its animal protein from fish. In 2000 the global production of fish was in the order of 130 million tonnes of which about 73% was from capture fisheries and 27% from aquaculture. Of this production 74% was used for direct human consumption giving a global average annual food fish supply of 16kg per person (FAO, 2002).

In addition to the contribution to employment, poverty reduction and food security fish is also a major contributor to foreign exchange earnings through exports. The contribution to the wider economy is often overlooked when the importance of the sector is considered.

Globalisation

The CCRF is, in part, a response to global changes in the fisheries sector. Globalisation can be thought of as consisting of a wide network of linkages joining aspects of the sector together that existed in isolation before. In order to cope with such linkages, new global institutions have developed that have created new ways of doing things and a new awareness of the potential for change. The different elements of globalisation are illustrated below:



Key Elements of Globalisation

Linkages in global fisheries exist, for example, because the seas are joined together and the pollution, habitat degradation, over-exploitation and biodiversity loss in one country's waters affects the supply of fish in another's. Markets are also linked and trade flows have increased dramatically in recent years with more than 40% of the world's fish production by weight now entering international trade making it the most international form of food production. The majority of this is imported by developed countries and developing countries have substantially increased their net receipts of foreign exchange from fisheries over the

Box 2: Telecommunications in the Globalisation Process

An obvious role of telecommunications in globalising the post-harvest sector is the use of the internet to buy and sell fish. But even fishermen are realising the potential benefits of improved market knowledge. Small-scale fishermen in Kerala, South India, are using mobile phones to sell their fish in advance of it arriving at the beach.

last 15 years. The global growth of telecommunications has played an important role in the globalisation of fish trade (see Box 2) as has the developments in freight technology. Associated with these increased market linkages are new institutions. The World Trade Organisation (WTO) is the agency that is most commonly linked to globalisation and provides guidance that affects the international trade in fish and fishery products. FAO has institutions such as GLOBEFISH, INFOFISH, INFOPECHE, INFOPESCA, INFOSAMAK, EASTFISH and INFOYU operating as independent intergovernmental organisations in the field of fish trade and information dissemination. They also provide a strong networking function linking suppliers to buyers and consumers. The United Nations itself is a significant part of the institutional framework of globalisation. Fish workers are also increasing their networking through global forums and organisations such as the International Collective in Support of Fishworkers (ICSF).

There are also a wide range of international processes that have developed in parallel with these institutions and linkages. As mentioned above the CCRF is a response to an awareness of the international nature of fisheries and the problems that the sector faces globally. This builds on earlier global initiatives such as UNCLOS that establishes a framework for the sustainable use of resources, and Agenda 21 that provides the basis for equitable and sustainable development. Within the post-harvest context, the Codex Alimentarius is an international process, responding to the need for improved fish quality and safety, as are Hazard Analysis and Critical Control Point (HACCP) systems. These in turn are responses to the increased global awareness of the importance of fish to the diet. Of particular importance to this Manual is the growing global awareness of the problems of poverty around the world and the global commitment to its elimination.

POLICY CHECK:	• To what extent has globalisation affected the fishery nationally and the post-harvest sector in particular?
Planning Check:	• What linkages are there with global fish trading and marketing institutions? • To what extent have global marketing links for fisheries products developed in recent years and how important are they? • What inputs (fish imports, ice boxes, freezer technology etc.) to the post-harvest sector come from overseas? • What joint ventures have developed to exploit, process, transport and trade fisheries products?

POST-HARVEST FISHERIES IN THE WIDER NATIONAL CONTEXT

The physical, demographic and economic structure of the country is an important influence on the way the post-harvest sector operates and can be interacted with. It is important to describe these aspects so their importance is understood and related to in the Overview.

Physical Structure of the Country

The physical structure of the country often determines the source of supply of fish, how it needs to be moved to reach markets and users of fish, and what resources are available for processing fish.

Sea coast, lakes and rivers all contribute to fish supply, as do areas suitable for fish farming. Floodplains can also be important sources of fish and these are often affected by a high degree of seasonality impacting supply.

Mountains and densely forested areas often limit population distribution and can affect distribution patterns of fish. The availability and access to forest resources are also important from the perspective of fish smoking and access to coastal areas can be important for fish salting activities.

The proximity to other countries has a key role to play in access to markets both to sell fish and to access additional or different sources of supply.

Policy Check:

- What are the key physical features of the country that could impact upon the post-harvest fisheries sector?

Planning Check:

- Where are the main water bodies that will supply the fish?
- How are these divided between marine and freshwater?
- How important are floodplain fisheries? Do these change in size and importance during the year?
- Do mountains and forests affect population distribution and the movement of fish?
- How do other neighbouring countries affect fisheries activities and potential?

Population

The total population, its growth rate, composition and distribution all affect the post-harvest sector. The size of the population will give indications of the fish requirement to ensure food security. The age structure and growth rate will indicate future demands for fish. The distribution of the population will be important from the perspective of the storage and movement of fish from supply points to consumption. It will also be important from the perspective of planning interventions in the sector, i.e. those areas with higher concentrations of people will have a different development potential from those with low population densities. The composition of the population (e.g. the religious or ethnic mix) will affect fish consumption patterns.

Policy Check:

- What are the main characteristics of the population?

Planning Check:

- What is the total population size and how is this changing?
- What is the age and gender composition?
- How is the population distributed through the country? How is this changing?
- What are the important characteristics of the population that may affect fish use?

Economic Development

A description of the wider economy of the country creates a framework to set the development of the post-harvest fisheries sector in. The importance of primary industries (such as agriculture, fish harvesting, forestry and mining) compared to secondary processing and manufacturing industries or tertiary service industries will give important indicators of the stage of economic development of the country. The rates of growth of these different sectors and current productivity levels will give indications of the potential of these sectors in the future.

Export linkages in a diversity of sectors will provide useful indicators for the potential of export growth of fisheries related products. Likewise export marketing strategies of other industries (such as niche marketing, sales to particular countries, and transportation methods) may provide guidelines for the development of export growth in fisheries.

Policy Check:	• What are the key characteristics of the economy?
Planning Check:	• What are the main sectors in terms of employment, contribution to GDP, and export earnings? Which sectors are growing? • Which sectors are urban based or rural based? • In what way do the main sectors favour particular segments of the workforce such as the poor, the educated, the young, the mobile, or women? • Which industries are export focussed? What are the comparative advantages of the successful industries?

POVERTY AND THE POST-HARVEST SECTOR

What Do We Mean by Poverty?

There are as many definitions of poverty as there are agencies that have tried to measure it. But there is a growing consensus around what we are talking about. It is now widely accepted that a lack of money is an inadequate indicator of poverty although measures such as US$1 a day are still used to give broad international comparisons between countries (UNDP, 2000). Most development agencies now agree that poverty is multi-dimensional, see Box 3.

Some agencies have tried to establish a standardised way of measuring those different elements. In 1997, UNDP introduced the concept of human poverty (as opposed to income poverty) to measure what people ***can do*** in their lives rather than what ***they have***.

Box 3: The Dimensions of Poverty

Poverty has many dimensions, not just income deprivation. Often the best people to judge which of those dimensions are most important are the poor themselves. But the poor are not a homogeneous group, different groups of the poor will place different values on different dimensions of poverty, and these values may change in response to seasons and to the changing vulnerability of the poor.

Some key dimensions might include:

- Life expectancy
- Household size and composition
- Nutrition and wider health
- Access to water
- Income
- The level of marginalization from the political process
- Access to knowledge through literacy
- Exposure to risk

Indicators include life expectancy, literacy, access to health services, access to safe water, and child malnutrition (UNDP, 1997).

Such definitions help us to visualise the size of the problem that we face in addressing national poverty. However, such measures rarely if ever reflect the reality of how the poor see poverty.

Other approaches to poverty place a greater emphasis on the individuals' perceptions of their own poverty and they may try to measure how the poor perceive changes in the outcome of their livelihood strategies. Experience over many decades has provided us with a wide range of participatory methods for gathering such information.

These two approaches, the use of objective indicators or the use of subjective indicators, represent two poles in a process where many intermediate approaches have been used. No one system is necessarily better than the other, they merely tell different things about how poverty operates in a society. Perhaps more important than which approach is adopted, is how **consistent** we are in the indicators we use to measure poverty. Trying to measure change in poverty levels by comparing indicators from different systems across times is likely to be difficult if not impossible, but different systems may be complementary.

Two key elements of poverty are:

- That it may mean different things to different people
- There are different degrees of poverty

When analysing poverty at the sector, community or household level it is particularly important to differentiate groups of the poor and to understand how poverty differs between them. The old, the young, women, the disabled, people from certain tribal/caste/class groups are exposed to different dimensions of poverty. It is important to understand who these different stakeholders are and how they differ from each other. Some people live in extreme poverty and others are just below a poverty line (as defined by local, national or international criteria). They are both poor but the quality of their lives is markedly different. In other cases people may be above the poverty line but may be susceptible or vulnerable to falling below it. These we might call the "vulnerable, and future poor" (see Box 4).

Box 4: The Poor, the Vulnerable and Future Poor

For many people around the world being involved in the post-harvest fisheries sector means being vulnerable to poverty. Whether they are the fish smoker in The Gambia faced with the risk of their smokehouse burning down with the loss of stored fish, the fish drier in India whose drying fish rots in unexpectedly persistent monsoon rains, the Mozambican petty fish trader whose stored fish is lost in an unexpected flood, the labourer in an urban fish market whose daily income depends on the often uncertain availability of fish, or the wife who faces the risk of losing her husband at sea on a fishing trip, these are the people who so often live in poverty or on the edge of poverty and are so easily pushed into it.

There may also be variations between poor people in different parts of the country and men and women may also experience poverty in different ways.

The Importance of Poverty Reduction

Over a billion people live in poverty around the world. Most of these are in rural communities that depend on the natural resource base for their food, shelter and income. The international community has stated that this situation cannot continue and has acknowledged that the approaches to poverty reduction of the last few decades have been less than successful. Reducing poverty through economic growth and safety nets for the poor has not worked. New approaches are required that tie the poor much more into the policy process through pro-poor policies and through empowerment.

Policy Check:

- How is poverty defined nationally and what are its characteristics?

Planning Check:

- What indicators are used to measure poverty? To what extent do they reflect the different dimensions of poverty noted in Box 3?
- Which institutions are involved in researching poverty and in co-ordinating poverty reduction strategies?
- How does poverty vary geographically?
- How is poverty changing?
- What are the gender dimensions of poverty?
- What information is there on poverty in the post-harvest sector?
- Which specific post-harvest fishery stakeholders have been identified as being poor?

The 1995 World Summit for Social Development set broad targets for reducing global poverty. The 2000 Millennium Declaration set forward the Millennium Development Goals recognise both the position of the poor in society and their potential. The Goals call for the international community to reach the following targets by 2015: reducing the proportion of people living on less than $1 a day to half the 1990 level, from 28.3% of all people in low and middle income economies to 14.2%; for halving the proportion of people who suffer from hunger from 1990 levels; for the eradication of extreme hunger; the achievement of universal primary education; the promotion of gender equality and empowerment of women; the reduction of child mortality; improvement in maternal health; combating HIV/AIDs, malaria and other diseases; ensuring environmental sustainability, and developing global partnerships for development.

In 1992 the International Fund for Agriculture Development (IFAD) identified small-scale fishers as one of the poorest groups globally (Jazairy et al, 1992). This was clearly a broad generalisation that does not reflect the significant variation in poverty in the sector globally. It did, however, cast an important light on the often forgotten people in small-scale fisheries who make up the bulk of the fisheries sector and who contribute significantly to local food security. Since 1992 the profile of the poor in fisheries has been raised and poverty in fisheries is generally better understood, certainly on the capture side of the sector. However, poverty in the post-harvest sector is typically less well understood. The CCRF specifically addresses poverty as a key element of the context in which it should operate (CCRF, Article 6).

POLICY CHECK:	• How important is poverty reduction in national development policies?
Planning Check:	• What are the key sectors in which poverty reduction strategies are focussed? • How does the post-harvest fisheries sector fit into poverty reduction strategies?

POST-HARVEST IN THE NATIONAL POLICY CONTEXT

The Importance of the Post-Harvest Sector to the Achievement of National Development Objectives

The post-harvest sector can contribute to national development objectives in a variety of ways. These include:

- Poverty reduction
- Food security
- Employment
- Foreign exchange balance
- GDP
- Protection of biodiversity and enhancement of sustainable resource use

Contribution to Poverty Reduction

The contribution of the fisheries sector to national development objectives is usually measured in production terms. But the sector also has a major social policy role in reducing poverty in rural communities. It may also provide vital food security to poor consumers (see below). Importantly the sector may provide benefits to the poor at crucial times of their lives e.g. when no other food/work is available. Such benefits may be difficult to quantify or they may be small in economic terms, but from the perspective of the poor these benefits may be vital.

FAO (2002) estimates that there are some 5.8 million fishers earning less than one US$/day globally and a further 17.3 million in upstream and downstream activities such as fish processing, trade and boat building. As such the poor probably directly depend much more on the post-harvest side of fisheries than on the capture side.

Post-harvest fisheries is an easy sector to enter with few barriers to stop the unskilled entering into at least some parts such as labouring or petty trading. Inward migration is common in some areas with people attracted in by rising prices of fish. As such it often becomes a source of employment of last resort for many. On the other hand there are some activities in the fisheries post-harvest sector that are highly skilled and require considerable investment to enter. These might include fish processing, chilled ice transportation or freezing. These are often the most visible sides of the sector and can sometimes lead the casual observer to believe that there is limited poverty in the post-harvest side of fisheries.

However there are many people in the sector, who live in poverty, are vulnerable and live on the margins of society. There are the many porters who carry fish around from place to place. There are the women who peel shrimp, or sort by-catch from trawlers. There are the people who dry small quantities of fish on the ground and sell them to other poor consumers. There are also the petty traders who buy a few fish here and sell them there for just enough to keep themselves alive from one day to the next. These often make up the majority of people in the post-harvest sector.

Many of the poor in the post-harvest sector operate through small businesses that provide a source of livelihood for them and their families. These micro-enterprises also provide livelihoods for people who help transport, process and pack fish. Poor labourers are also employed by larger enterprises that are engaged in large scale processing and trading activities supplying fish to either the domestic or export market. In some parts of the world the post-harvest sector is seen as a safety net when employment as wage labour in other sectors is not available. Some women enter the post-harvest sector because they find themselves as the single head of a household and the relatively low entry cost of fish trading allows a woman with a family at least some opportunity to provide for her children.

It is these people, and the many others that make up the bottom rung of the wealth ladder in rural communities that are the least advantaged and who need the most help. These people are also the most vulnerable to change because they have the least capacity, in terms of human, social and financial resources, to adapt and respond to the inherent risk of that change. And for most fisheries around the world change is an important factor. The livelihoods of all the people involved in fisheries are on the verge of, or are involved in, substantial change. This change takes the form of changes in technology, in access to global markets, in access to resources, in capital ownership, location of landings, transportation processes and consumer demand.

Fish has also traditionally been the main animal protein for many low-income people around the world. With increasing demand for fish globally and with the arrival of improved transportation and storage systems fish are now able to reach distant urban and international markets, where higher prices can be realised. As a consequence the amount, type and cost of fish available to the poor is rapidly changing. Large-scale investments in the post-harvest sector are becoming more common and life for the small-scale operator is becoming less stable.

This is not to say that all the people in the post-harvest sector are poor small-scale operators. Much of the fish passes through large companies for the export trade where good prices prevail and demand is high. The amount of fish entering international trade is increasing each year as demand for fish increases at a rate that is faster than the increase in supply. There are also small-scale traders who deal in specialist products or who sell to local markets who make a good living from fisheries products. In some parts of the world, these are often women who enter the post-harvest sector because their husbands are involved in fish harvesting. Their businesses may grow to be very significant and they may end up owning the boats that fish for them and employing a number people.

POLICY CHECK:	• In what ways does post-harvest fisheries sector policy reflect national goals on poverty eradication? How is that measured? • How high a priority is poverty eradication in post-harvest fisheries policy? How does that prioritisation manifest itself?

Planning Check:	• How many poor people are involved in the sector? • What roles do they play? • In what ways does the sector contribute to poverty reduction in terms of the livelihoods of the poor? • How many poor consumers depend on fish for their food security?

Contribution to Food Security

The role of fish in food security may take many forms. The most common way of measuring it is the average quantity of fish consumed by each individual each year, the amount of fish as a % of total protein consumed, or as a % of total animal protein consumed. However, such figures often conceal more important aspects of food security. For example, a diversity of species of fish can contribute a wide range of vital nutrients to the diet even if the total amount consumed is small. This may be particularly important to very vulnerable groups such as the old, the very young, the sick and pregnant women. Fish can also be vitally important to remote rural communities where few other sources of protein are available. Whilst fresh fish is highly perishable in processed forms fish can be stored for long periods of time and can be consumed at times of year when other protein sources may be scarce thus evening out fluctuations in food supplies. In order to meet national food requirements fish may be imported to compensate for a shortfall in domestic production. Sometimes low value fish is imported and higher value species are exported because of the greater opportunity to generate foreign exchange.

Often fish consumption is linked to special ceremonies or feasts and these vary through the year. In some situations different groups in societies have preferences for certain species or there may be national favourites/preferences. Fish also enters the food-chain indirectly by being fed as fishmeal or even more remotely by being used as fertilisers for crops.

POLICY CHECK:	• How important is fish in national food security? How is this measured?

Planning Check:	• What is the extent of dependence of particular marginalized or vulnerable groups on fish as a vital part of their diets? • Who are these people? Is their dependence recorded at the policy-level?

Contribution to Employment

The post-harvest sector employs many people globally and that employment involves a wide diversity of livelihood strategies. Some people are employed full-time, some are part-time, others are seasonal. Amongst these there may be different levels of under-employment, where people are not fully engaged in the work they do. There is also a wide diversity of job types (see Box 5).

There are also different reasons why people enter the post-harvest sector. Some people enter the post-harvest sector because it is part of the social/cultural tradition of their community, tribe, clan or caste. Some enter at an early age as

children. Others enter the sector opportunistically, when sources of work elsewhere are denied them. Some join because the sector periodically offers the opportunity to make large sums of cash.

There are also significant differences in the way people are employed, some are self-employed through micro-enterprises, and others are employed by someone else on a wage, or on a piece-work basis. Some work in the formal sector others in the informal sector.

There are often significant gender differences in employment in the sector. In many traditional fishing communities around the world the men catch fish and the women process and sell fish. Children are also often involved in post-harvest fishery activities in some countries. Linked to the quantity and form of employment is also the quality of that employment. Some people work in high risk, or dangerous jobs. In many cases the work is low paid.

Box 5: The Diversity of Jobs in the Post-Harvest Sector

There are many different jobs available to people in the post-harvest sector these include:

- Fishermen (on board handling and processing)
- Processors (sorters, smokers, salters, driers, picklers)
- Factory workers (in sorting, gutting, filleting, scaling)
- Porters (beach headloaders, cycle transporters, box carriers)
- Traders (wholesalers, retailers, commission agents)
- Ice sellers, salt sellers
- Basket weavers, ice box makers

Understanding this diversity is important for designing interventions to support the different stakeholders.

POLICY CHECK:

- How important is employment in the sector to national employment? How many people are involved?
- To what extent are those employed particularly poor or vulnerable?

Planning Check:

- To what extent is employment full-time, part-time, seasonal or opportunistic? Is there under-employment in the sector?
- What different types of activities are people involved in? How many people are involved in different activities? How does this vary geographically?
- How many are self-employed and how many are wage earners?
- Why do these different groups enter the sector? Are there particular driving forces?
- What role does gender/religion play in the employment process?
- How important are the formal and informal sectors?
- Are there certain groups leaving the sector and if so why?
- What is the relationship between employment and migration?

Contribution to Foreign Exchange Balance

The rapid expansion of international trade in fish and fisheries products has meant that the sector now contributes very significantly to foreign exchange in many countries. Important in this trade is the number and location of markets, their stability and sustainability, their vulnerability to change, and the cost of entering those markets.

It is important to understand foreign exchange generation in the wider economy and to understand the relative importance of foreign exchange generated from fisheries as opposed to other exported commodities.

Whilst foreign exchange generation may be important, the form and use of that foreign exchange may be more important. In some cases the foreign exchange contributes significantly to government finance through taxes etc. In other cases it may contribute mainly to local industries or to foreign companies based locally.

Another important aspect of foreign exchange is the extent to which the post-harvest sector contributes to reducing the need to import animal protein from other countries and thus reducing the need for foreign exchange to purchase this fish.

POLICY CHECK:	• What is the contribution of the sector to foreign exchange balance? What is the annual value of exports? • What are the trends in terms of export quantities, value, products and markets?
Planning Check:	• How do exports of fisheries products compare with imports of fisheries products? • What are the main products that are exported? • To what extent do fish produced locally substitute for imported fish? • Where are the main export markets? • What can effect the stability of these markets? • What affects access to markets?

Contribution to Gross Domestic Product

A key economic indicator used by governments as an indicator of the overall value of the sector to the economy is the contribution of the post-harvest sector to Gross Domestic Product (GDP). This can be represented in monetary form or, often more usefully, as a percentage of total GDP. In some cases the contribution will be skewed towards a few high priced products such as shrimp or tuna.

POLICY CHECK:	• What contribution (in monetary and % terms) to the economy does the post-harvest sector provide to GDP?
Planning Check:	• How does this compare with other commodities/activities? • How do the different products make up this contribution?

Protection of Biodiversity and Enhancement of Sustainable Resource Use

Many of the world's fisheries resources are at or near the point where maximum sustainable yields can be harvested. For increases in supply the emphasis will have to be placed on resources that are currently under-exploited, such as offshore resources, on aquaculture, on wild resource enhancement, and on better management of existing over-exploited resources. Whilst the potential in these areas is high there is also considerable potential to reduce pressure on existing supplies of fish by using those supplies more effectively, in other words through improving the efficiency of post-harvest activities and reducing post-harvest losses. Much of the fish that is currently landed is landed in poor condition or it deteriorates quickly between the supplier and the consumer. There is much that can be done to ensure that the quality and value of these resources are maintained throughout the food chain thus ensuring that higher levels of benefits flow back to suppliers, traders, and processors.

Estimates of millions of tonnes of catch being discarded indicate that much valuable protein is lost each year from the fisheries of the world (Clucas & Teutscher 1999). Although major steps forward have been taken with the use of by-catch there is still potential for more effective use of these smaller, lower value species for poorer consumers.

POLICY CHECK:	• How does the post-harvest sector contribute to the protection of biodiversity and the enhancement of sustainable resource-use nationally?
Planning Check:	• Which resources are at or beyond their maximum sustainable yield levels of exploitation? • How does the post-harvest sector contribute to reducing exploitation of these resources? • How could this contribution be improved in the future?

Post-Harvest in the Wider Policy Context

Whilst the post-harvest sector may be important to the lives of the poor this level of importance is not always reflected in national policy.

The reduced emphasis in the policy process often results in the post-harvest sector being poorly represented in policy documents, even in fisheries sector policy documents. As a consequence the sector often receives a small portion of the development budget and its full potential is rarely achieved.

Globally the post-harvest sector has tended to be considered as less important that the capture side of the sector or aquaculture. This is changing as the value of fish exports are increasing and the global role of fish trade is being understood.

Given the role of the post-harvest sector globally in poverty reduction it is surprising that the post-harvest sector does not appear more prominently in Poverty Reduction Strategies (PRS) of many countries. If the sector is going to achieve its full potential in terms of its contribution to national development objectives it is important that it is well represented in national policy documents.

POLICY CHECK:	• What role does the post-harvest fisheries sector play in national policy?
Planning Check:	• How important is the post-harvest sector in wider fisheries policy nationally? • To what extent is poverty in the post-harvest sector discussed in the national fisheries policy? • To what extent is the post-harvest fisheries sector mentioned in wider policy documents such as PRSs and decentralisation policy documents?

KEY KNOWLEDGE GAPS

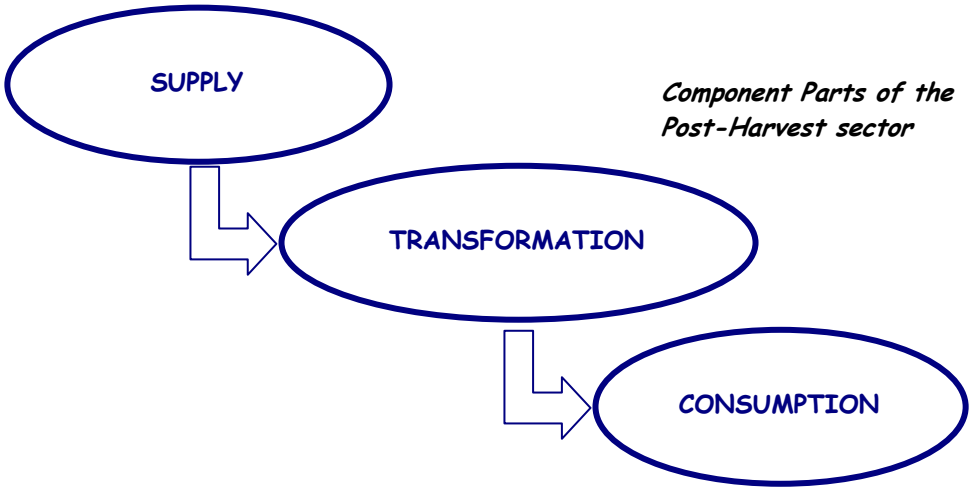
A key part of the PHO process is to identify knowledge gaps, that is areas where we do not have enough knowledge to answer the questions in the manual. Where these knowledge gaps are considered particularly important they should be noted down. They may be able to be addressed through more focussed studies or they may need to go on to the nation's research agenda.

POLICY CHECK:	• What are the key knowledge gaps resulting from completion of this section of the Manual?
Planning Check:	• What gaps exist in the implementation of the CCRF? • What gaps exist in our understanding of the importance of the post-harvest sector? • What gaps exist in our understanding of the global linkages within the sector? • What gaps exist in the way the sector fits in with wider policy concerns, especially poverty reduction concerns?

SECTION 3: ASSESSING THE CURRENT SITUATION IN THE SECTOR

INTRODUCTION TO SECTION 3

Section 3 of the Manual assesses the current situation in the sector from the perspective of three key components as shown below:

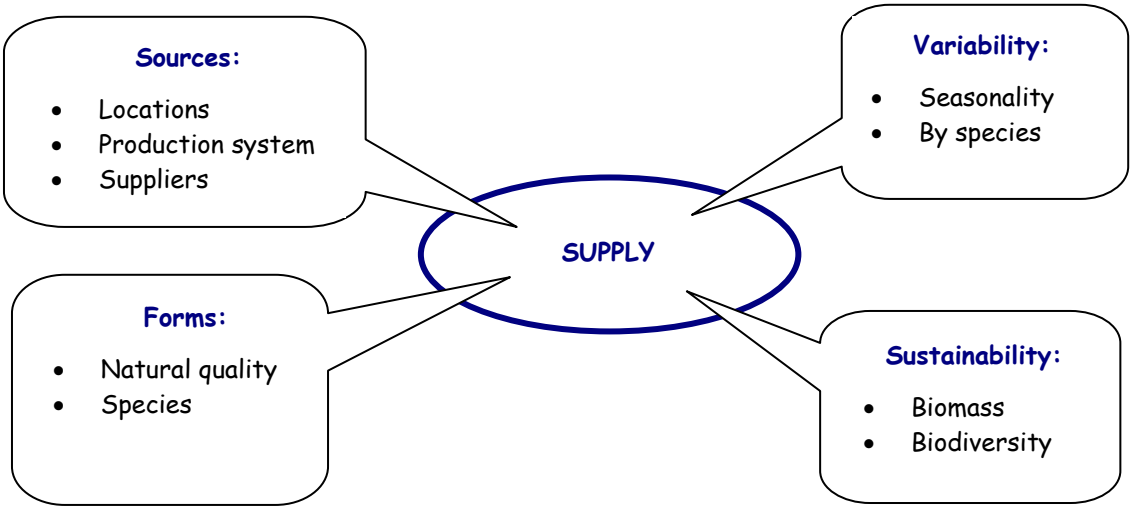


Component Parts of the Post-Harvest sector

Dividing the sector into these three components is one way of looking at the sector that increases the ease of analysing it. These three components are discussed in more detail below.

SUPPLY

The supply side of the post-harvest sector in many ways defines what happens in the rest of the sector and it is important to understand this fully. The supply side has various sub-components:



Sources of Supply

There are two key elements of the source of supply:

- Location
- Production system

Fish enters the post-harvest sector from many different geographical locations around the country. From the marine and from inland, but also from other countries as imports. Globally two thirds of the supply of fish comes from capture fisheries and one third from aquaculture.

It is also supplied from a diversity of production systems. These might include industrial, semi-industrial or artisanal fisheries, or aquaculture. Rice-fish culture is becoming an important production system. Within these categories different vessel/gears may be used, further complicating the supply side.

POLICY CHECK:	• Where are the main sources of supply, e.g. marine, inland, aquaculture or imports? • What are the key production systems?
Planning Check:	• What is the breakdown of supply by quantity and species for each coastal and inland landing site? • How much fish comes in as imports? Where does it come from? Where does it enter the country? • What are the different production systems in terms of level (industrial, artisanal etc.) and type of technology (gear, vessel, farming systems)? • How is the supply divided between these different production systems?

Forms of Supply

The form of supply concerns the species that are landed, and their natural quality. The species mix will have significant importance in terms of demand and prices. It will be important to know the different quantities of the different species entering the sector. It is important to understand the diversity of species groups involved e.g. fish, mammals, crustaceans, echinoderms, molluscs, and seaweeds. By-catch from shrimp trawling and other fisheries is also an important source of supply of different species.

Natural quality involves not only the age and physical state of the fish but also its physical form and size. The environment in which the fish lives will also affect its quality. Highly polluted waters will affect the quality of the fish produced. Poisons and dynamite used in harvesting the fish are also likely to adversely affect its quality. Also affecting quality is the reproductive cycle of the fish, the food the fish has fed on and the type of fishing gear used.

POLICY CHECK:	• What are the major types of fish that enter the post-harvest sector?
Planning	• What species are landed and where? • What species/products come from aquaculture and where are they

Check:	produced? • What types and amounts of species are imported? • In what form do imports arrive? • Does by-catch feature in landings and how important is this? • Does by-catch feature in landings? • What grades of quality are landed at different locations? • In what way has the harvesting method affected the quality of the fish?

Variability of Supply

There are often variations in the quantities and quality of fish landed during the year. Sometimes fishermen do not fish on certain days of the week, due to local traditions, religious customs or taboos. In some cases fishing is restricted to certain phases of the moon. Weather conditions can also influence fishing patterns and whole seasons may have limited landings or gluts of landings. The latter can force prices down and bottlenecks in terms of distribution can mean fish quality deteriorates or fish remains unsold leading to post-harvest losses. In some countries (e.g. Bangladesh and Cambodia) annual flooding patterns change the area that can be fished and floods are major components affecting productivity of the fishery. In addition fish abundance in the wild may vary both in species and quantity, as may the quality of the fish due to reproductive cycles (e.g. the fat content at different times of the breeding cycle). There may also be legislation that governs when and how much fish is imported. Fishermen's access to supply may also be influenced by the availability of inputs such as fuel.

POLICY CHECK:	• How does fish supply, composition and quality vary throughout the year and why?
Planning Check:	• What form do annual/monthly/weekly variations in supply take? • Are there seasonal gluts or shortages of fish in the wild and what are the results of these? • How does supply vary according to the different sources? • What effect does climatic and weather change have on the quantity and quality of fish landed? • Are there seasonal flooding/drought conditions that affect supplies? • How does the quality of certain species vary in the wild? • How does aquaculture production vary with time? • How do imports vary with time?

Sustainability of Supply

Only 25% of the world's fish stocks remain under-exploited (FAOI, 2002). The majority are fully exploited and 18% are thought to be over-exploited. The percentage of stocks over-exploited is increasing annually reflecting the increasing pressure on these resources.

The sustainability of wild fish supplies can be considered in terms of biodiversity and biomass – how much fish of what species? Exploitation levels, natural mortality (through disease and predation), aquatic habitat condition and pollution influence

these. The sustainability of aquaculture supplies is more under the direct control of the producer. However, the same factors (of exploitation, natural mortality and pollution) apply along with the influence of inputs to the system and the stocking regime, with highly stocked intensive systems more prone to uncertainty and collapse than extensive low stocked systems.

The sustainability of supply will greatly affect the whole post-harvest sector and needs to be well understood. An unsustainable supply will create uncertainty amongst fishermen, processors, traders and consumers as the availability of fish becomes uncertain. Less fish can mean more competition, higher input costs, greater risk of not having access to fish and rising prices of fish itself. All of these can have adverse effects on post-harvest fishery stakeholders and consumers. Making more of the fish that is landed by maintaining its quality better and reducing any wastage is one strategy that can be used to cope.

POLICY CHECK:	• How sustainable are current supply systems? • How does policy, legislation and management systems influence the sustainability of supply?
Planning Check:	• What are the main trends in biomass and biodiversity of different species? • What evidence is there of habitat destruction and pollution? • How much fish is currently wasted through poor handling practices (including discards at sea)?

Stakeholders in Supply

A key part of the supply side of the sector is the stakeholders who are involved and it is important to know who the different stakeholders are. Each different stakeholder may have different needs and aspirations that may influence policy, or they may influence the supply of fish to the sector in different ways. Fishermen may need new and low cost fishing gear and access to fuel for engines requiring policy decisions. Poor labourers may aspire to provide better education for their children. Fish processors are likely to be concerned about the availability and cost of inputs such as fuel wood, salt and electricity which are linked to policy decisions. Consumer demand for a particular species or product can drive the activities of fishermen and processors. These stakeholders will be markedly different from each other. Some will be wealthier boat or fish farm owners, and others will be poor labourers onboard small craft. Increasingly around the world traders are becoming involved in the supply side of the sector, as they take over ownership of vessels because of indebtedness of fishermen-owners or to ensure continuity of supply.

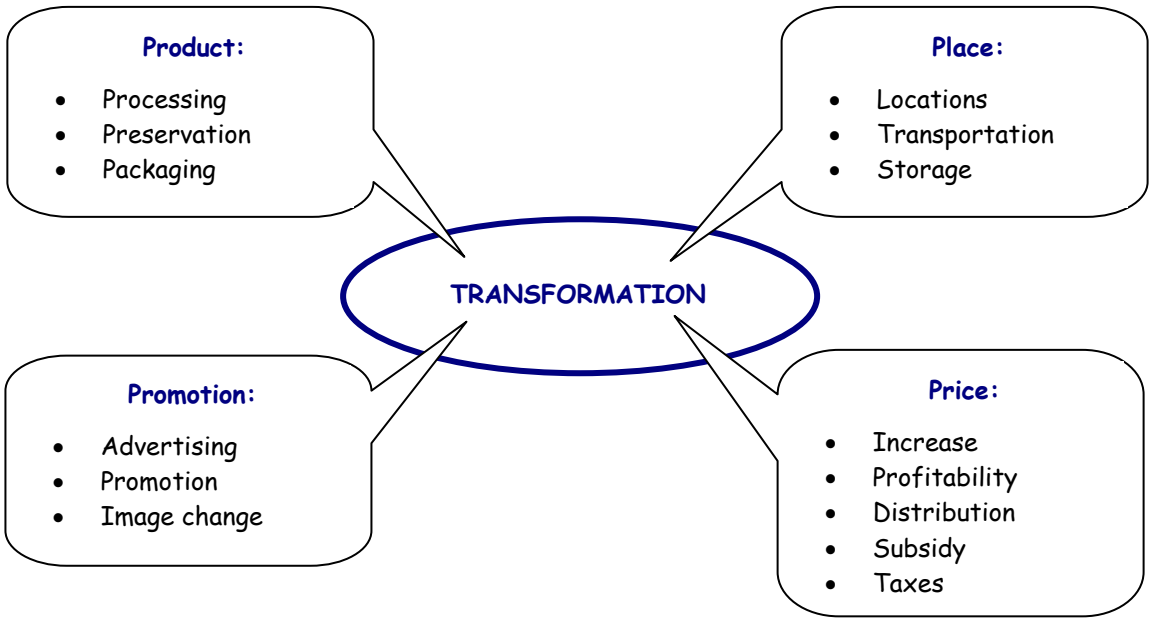
.Most of the people on the supply side will be men but women also fish in some parts of the world and so do small children. There may be distinct ethnic groups or nationalities involved in specific types of fishing. In some fisheries the harvesting will be highly seasonal and people may join the fishery on a temporary basis or migrate to the areas where the fish are.

POLICY CHECK:	• Who are the major stakeholders in the supply side of the sector?
Planning	• Which stakeholders are involved in the industrial fishery supply?

Check:	• Which stakeholders are involved in the artisanal fishery supply? • Who is involved in onboard handling and storage? • What role do women and children play? • What role do different ethnic groups play in different fishing methods/areas? • How does seasonality affect employment in different fisheries? • What are the overlaps between the people on the shore-side and the boat-side of the fishery? • Who owns most of the boats? • Which stakeholders in supply are recognised as being poor and vulnerable?

TRANSFORMATION

After fish enters the post-harvest sector it undergoes a series of changes i.e. the fish are transformed. Transformation is the term used for these different changes. It can take many forms and these can be grouped under four headings (as shown in the diagram below):



Product Transformation

This section deals with how fish are physically changed, mainly through processing or preservation. Of the 95 million or so tonnes of fish (live weight equivalent) used for human consumption annually, nearly 70% is processed in some way. Sometimes it is just gutted, sometimes it is scaled and filleted, sometimes shellfish may be shelled. Low value fish may be put through a meat-bone separator and the meat used to form new products e.g. surimi (washed and cleaned white fish mince with high gel content used as a base for other processed products). Larger fish may be cut into steaks either to be sold fresh or processed for canning.

Fish may also be preserved through smoking, sun-drying or salting, or through a mix of these processes. Pickling and cooking are also used to preserve fish and to add flavours. Perhaps two of the most common forms of product transformation are icing

and freezing. Icing is often done onboard vessels as well as after landing. On larger vessels, as well as in shore-based establishments, freezing may be an option. Sometimes this provides an individually blast frozen product, in other situations the fish are frozen as a block.

The technologies used in these different processing and preservation methods are important in the overall economics of the sector, in the way they add value to the sector and the way they influence how fish is distributed and sold. Even slight differences, for instance, in the fish smoking technology used can change the product quality, influencing its acceptability to different markets and degrading fuelwood resources at different rates.

Dried fish take many forms. Under some circumstances dried or smoked fish is susceptible to insect infestation which can lead to physical and financial losses. In some situations insecticides are used to combat this problem. These insecticides are generally illegal and potentially dangerous to consumers, but their use is common in some countries (See Box 6).

Box 6: Use of Insecticides

There are many reports of inappropriate, potentially harmful agricultural insecticides being used to prevent insect infestation in drying and dried or smoked fish products. Many reports are related to practices in Asia and Africa. Insecticide preparations are used in various ways and pose a health risk not only to the consumer but also to the people who apply these chemicals.

Some fish is used for making animal feed (some of which may go to feed other fish in aquaculture) and some go as fertilisers. Other industrial product transformations include fish oil production.

In addition to the way the product is transformed directly, there are also changes to its appearance through packaging. The most obvious packaging forms are cans, pouches, and boxes. But the movement and protection of fish often requires them to be stored in ice boxes, baskets and other containers. In some parts of the world the construction of these containers provides a source of employment for many people.

In some countries product transformation of fish is done in specific locations, for example; fish smoking may be done in forest areas or fish salting may only be done near the coast. It is important to understand the distribution of specific activities as it will affect the supply and distribution of products.

All too often product transformation of fish is not carried out in the best way. Poor handling, preservation and processing result in fish wastage or quality loss. There is increasing awareness of these losses as new methods are developed to identify and quantify them (see Ward & Jeffries 2000) and to overcome/reduce them.

POLICY CHECK:	• What are the main forms of product transformation that fish undergo?
Planning Check:	• What are the different forms of product transformation in different parts of the country for different species? • How widely used is icing, smoking, drying, frying, boiling, salting and pickling? What technologies are used? Where are they located? • How widely used is freezing, canning and mincing? What technologies are used? • What types of products are made such as surimi, fish sausage, pastes, crackers, beche de mer, fish jerky, fish cakes, soups etc.? • Which are the most important methods in terms of the number of people involved and the quantity of product used? • How many different processing plants exist? What do they do, and where are they located? What is their throughput? • What by-products are produced from product transformation and traded? • How much fish is used for non-human consumption and what form does it take? • Is insecticide-use an issue in the fishery, what are the health implications? • What different types of packaging are used and who are involved in making/providing the equipment? • Where do the different forms of product transformation take place in the country? • To what extent is loss (physical, quality or monetary loss) occurring in handling, processing and storage? Why is it occurring? Where is it occurring? What are the implications for food security?

Place Transformation

In some countries fish is mainly consumed where it is landed, but in most countries it is moved to new locations to be processed or consumed. Sometimes the distance between landing and consumption is thousands of miles and the fish may pass through several countries on the way. About 37% by weight of fishery products are now exported, and of these 50% by value come from developing countries. The EU, the USA and Japan are the major importers. The change in location of the fish has important implications for who is involved and where the benefits flow. The very process of moving it has employment, cost and technology implications. It is important to understand where the product enters the post-harvest sector, which places it passes through and where it is finally consumed.

In some cases the primary reason for moving it is to aggregate the product. This may be through a processing plant (such as a cannery), through a storage facility (such as freezer plant or dried fish store), through a transhipment point (where product is brought together to bulk it), or through a market, where large quantities of product attracts more buyers.

Another aspect of place transformation is the mode of movement. Some fish are moved only short distances on foot or trolley, by head-loaders or cycle traders, some

is carried on buses, pick-ups or on the backs of motorcycles. Others are loaded in trucks and trains, packed in refrigerated containers, or taken by aircraft to distant markets. These modes of transport will each have different people associated with them and their livelihoods may be distinctly different from each other.

POLICY CHECK:	• What are the main flows of fish within the country from landing to consumption? • Why do these flows occur?
Planning Check:	• Where are the main flows of different fisheries products from landing to consumption? How much fish flows along them? • How is the product moved from one place to another? Why is it moved? • Where do the main trading, processing and marketing activities take place? • Where is fish exported from and to where?

Promotion Transformation

Promotion transformation refers to how the appearance of the products is changed in the minds of consumers in between capture and consumption. Product transformation (see above) plays an important role in the promotion process. The appearance and packaging of the product can do much to promote it. But the type and form of promotion starts with the perceptions of the consumers. Different people in different parts of the world have very distinct and different perceptions of fish. People's perceptions of fish can also influence how fish are transformed and used.

Class, caste, religion and ethnic origin can all affect the way people perceive fish. Such perceptions are also changing over time as a result of a range of influences. As mentioned above, some people regard iced fish with suspicion "it must be old if it has been iced". Smell, appearance, species and the level of processing may radically affect people's perceptions. In many parts of the world fish has always been the preferred source of animal protein, in others it may be seen as the food of the poor.

Globally there is an increasing awareness of the health benefits of eating fish and this has had a significant influence on the demand for fish, particularly in developed countries. Advertising campaigns and general awareness from the media and as a result of education have informed the public of these benefits and encouraged consumption. In some countries the state has established export promotion organisations and the FAO has established a number of regional organisations to provide information on the availability, form and price of fish. In some cases the fish sellers have organised themselves into groups to collaborate on the promotion of their products (See Box 7).

Box 7: Ecolabelling

Ecolabelling is a market based economic instrument that seeks to direct consumers purchasing behaviour so that they take account of product attributes other than price. Such attributes can relate to economic and social objectives (fair trade, support to small-scale fishers, discouragement of child labour) in addition to environmental and ecological ones.

Fair trade initiatives aim at improving the living and working conditions of artisanal fisheries workers in an environmentally and socially conscious way. In one initiative in south India fish was exported to Europe and in order to qualify for a fair trade label the process and activities adhered to the International Labour Organisation's (ILO) core labour standards; were small-scale; labour intensive; environmentally friendly; and had no effect on local fish supplies and traditional processing and marketing practices.

In some areas of the world certain species of fish are considered a health risk (such as those which are known to generate ciguatera poisoning) or are not eaten because of a taboo (e.g. in some parts of the world sharks are considered unfit for human consumption). In addition the labelling of products can promote them in the market place and give the consumer confidence in what they are buying. Product origin labels can influence appearance as can eco-labels that promote the environmentally-friendly mode of harvesting (Box 7). Labels that indicate that the fish has gone through a HACCP (Hazard Analysis and Critical Control Point) process may create the impression of improved quality and safety (See Box 8).

Box 8: What is HACCP?

Hazard Analysis Critical Control Point (HACCP) is a tool used by the food industry to ensure that all food consumed is safe to eat. It is a systematic approach to hazard identification, assessment of risk and control. The concept of HACCP was first introduced during the mid 1960s, when a reliable method for manufacturing pathogen-free food was required by the US space programme. It has been successfully applied in the control of safety in low-acid canned foods in the USA and many food companies in Europe and the rest of the world have adopted the approach. Increasingly, regulatory bodies have recognized the usefulness of this tool and it has been incorporated into legislative requirements by the EU, and countries such as the USA, Canada and Australia. HACCP systems are based on seven principles:

1. Analysis of current system and assess hazards and risk
2. Identify critical control points
3. Set target levels and critical limits
4. Develop a monitoring system
5. Decide what corrective action is required
6. Establish a means of verification
7. Develop a documentation process

POLICY CHECK:	• How is fish promoted nationally and globally by the Government, international agencies and by the private sector?
Planning Check:	• How are the various fish and fish products perceived by the population at large? • Why do people consume fish? Why do people not consume fish? • What efforts are being made to change people's perceptions of fish? • What public, NGO or private sector initiatives are promoting fish - e.g. through trade fairs, publicity campaigns, education and training? • What examples are there of how fish trading and processing businesses market or promote their products – e.g. market research, advertising, packaging? • What are the taboos related to fish? Is fish a cause or perceived to be a cause of ailments or health problems? • Is labelling used to promote the image of the fish and in what form does it take? • How do different social, caste, class or ethnic groups view fish in the diets? How is this changing? • What health benefits are perceived to arise from fish consumption in traditional society – e.g. is it used to cure certain ailments?

Price Transformation

The price of fish changes along the marketing chain from producer to consumer. This change generates opportunities for income and employment for a wide range of people. Subsidies may also be applied by the Government that help to promote or enhance such benefits. Taxes may also be applied. Gaining an understanding of the way that price changes, why it changes, and who benefits from the change can help to guide economic policies for the sector.

Price changes occur from producer to consumer and there will be many variations that arise. Seasonal changes in supply and demand are very common, as are daily fluctuations at different locations resulting from the amount, quality and species offered for sale and the number and purchasing power of the buyers. The local availability of alternative sources of animal protein may also influence price, as does the form of buying and selling. Supplies of fish from aquaculture may smooth out seasonal price fluctuations. Trading through long-term buyer-seller relationships may also smooth out price fluctuations. Auctions may increase the variability and cartels may strongly influence who benefits most from the sale.

Price is greatly influenced by the species of the fish and its size. The quality, processing method and the appearance of the fish at the point of sale are also important. How far it has travelled and what other sources it has to compete with will also affect price, as will the time it arrives at the market: small quantities of fish arriving early at the market when buyers are in competition will increase selling prices, while fish arriving when large quantities are already present may reduce prices. The relationship between buyer and seller also influences the price - in some cases there are hidden trade, obligation or debt arrangements that distort the price actually paid.

POLICY CHECK:	• What is the broad national framework of price change for key species that occurs from producer to consumer?
Planning Check:	• How does price change for different products along the chain? Who gains from these changes and by how much? • How is price generally determined at the different stages of the chain? What sort of long-term buyer-seller relationships exist? • What are the main factors which affect the price of fish? • How do seasonal changes in supply and/or demand affect prices? • How does competition from other sources of protein affect prices? • What role has aquaculture played in affecting price? • What role do subsidies play in price changes along the chain? Who benefits from them?

Stakeholders Involved in Transformation

Different methods of product transformation are often associated with different stakeholders such as fish smokers, salters and dryers. Who can be considered to be quite different from people who simply trade in fresh or processed fish. Although roles do overlap and a processor may also be a trader. Many people define their livelihoods by their role e.g. fish smoker, wholesale trader etc. Place transformation is often associated with traders and those involved in transportation which can be either on foot e.g. porters and carriers or by vehicle e.g. drivers and transport owners. Traders and buyers are key stakeholders in price transformation. Not forgetting the consumer, who ultimately pays the price, in-order to eat fish. Promotion of fish can involve anyone who has fish to sell – from the itinerant door to door retailer to the sophisticated export processing company.

In many countries women play an important role in the transformation process, particularly in processing and trade. This is changing in many locations as men become more involved in these activities.

Ethnic communities or nationalities are often closely linked to particular processing methods and they may migrate between countries as they do their work.

There is also considerable variation in the skill and wealth of different stakeholders in the transformation side of the sector. Often the very poor are involved in transporting fish from the beach to the market; others are involved in sorting fish into species, grades and sizes. Shrimp peeling is a growing area of employment in some areas, where women and children are often employed – sometimes in poor working conditions with little job security. The health of the poorer workers generally in fish processing is a major concern in some countries. A growing number of people involved in transformation are working in factories and these are often overlooked.

Petty traders are also often poor and they frequently provide a valuable local link to poorer consumers. These may operate on foot, using local buses, bicycles or motorbikes, or moving between villages by boat.

There are also many people around the world who are engaged in making packaging materials for fish. Traditionally these materials would have consisted of baskets woven from bamboo or other natural materials or locally made ice boxes. Many of

these roles are being displaced by modern technologies. Salt producers are also important ancillary workers that provide vital supplies to fish processors.

POLICY CHECK:	• Who are the main stakeholders involved in the transformation aspects of the post-harvest sector? • How many different people are involved?
Planning Check:	• Who is involved in product processing, storage and handling? • Who is involved in trading and distributing the fish? • Who is involved in promoting the fish? • How do these groups differ in terms of wealth, gender and ethnicity? • Where are they physically located? Are there special regions of the country where they are distributed?

CONSUMPTION

Globally the average fish supply per person is 16kg per year. The actually supply varies enormously between global regions, between countries and within countries. The contribution which fish makes to animal protein consumption is around 16%. [+ref?]

There are important variations in local consumption patterns with variations occurring in the quantity/species consumed by different groups, in different locations and at different times for a range of reasons. In many countries fish remains a vital source of food for the poor and for vulnerable groups (such as the very young, the sick, the old and pregnant women). In such cases the quantity of fish consumed may be much less important than the frequency or diversity of species consumed. A small quantity of fish from a range of species consumed regularly may provide a vital source of vitamins. Unfortunately fish are also associated with harmful effects or food poisoning. Box 9 gives some examples.

Box 9: Food Poisoning and fish

Ciguatera poisoning

A common form of poisoning caused by toxins from marine algae (*Gambierdiscus toxicus*) which can accumulate in some tropical reef species. The toxin is not destroyed by cooking and symptoms of poisoning include diarrhoea, nausea, vomiting and tingling sensations.

Scombroid histamine poisoning

Associated with the consumption of warm water pelagic fish, the toxin is formed from the breakdown of amino acids in fish flesh after death. Although rarely fatal, fish are screened for this toxin by importers in certain countries. Symptoms of poisoning include itching, headache, nausea, cramps, diarrhoea, vomiting, swelling of the lips and sore throat.

Clupeid poisoning

Sometimes caused by eating pelagic fish from waters in certain parts of the world, little is known about this often fatal toxin.

Pufferfish poisoning

Reported mainly in Japan this often fatal poisoning is caused by the tetrodotoxin present in certain parts of pufferfish, a fish which is a delicacy in Japan.

The consumption of fish may also be in response to certain festivals or ceremonies. If there is a special time of year for these events this can result in a significant unevenness of consumption.

Different products may also be eaten by different groups of people. The poor or people in remote areas may depend on dried fish. Dried fish are also sometimes exported for consumption by expatriates from the area where the fish are produced. Some communities have traditionally eaten freshwater fish and prefer these to marine fish. Some religions do not allow the consumption of fish with certain characteristics.

Processed fish is also a major means of getting salt into the diet, which can have both positive and negative implications for the diet.

There is also demand for fish for feeding to other fish in the aquaculture sector, to feed to livestock and to act as a fertiliser when gluts occur. Some fish are used as bait in certain fishing methods.

POLICY CHECK:	• What are the main patterns of consumption of fish domestically, in the export market and between different groups of consumers? • How do these factors affect national food security?
Planning Check:	• Who are the main consumers of each type of product? • What variation is there in demand between groups, at different times and in different locations? • How does fish demand change throughout the year, e.g. particular times of year, festivals or celebrations? • What are the main consumer perceptions and preferences for different products? • How do specific vulnerable groups differ in their access to and use of fish? • What is the trade in by-products from processing activities? • What is the trade in products for non-human consumption?

Stakeholders Involved in Consumption

Many people throughout the world consume fish. And fish is also used for a variety of non-food purposes such as in animal feeds, fertilizers and in the pharmaceutical industry. Consumers of fish come from all walks of life and include the rich and the poor, the old and the young, men and women. Some consumers may prefer certain types of product. And as a result of the export trade of fish, consumers can eat fish produced in other countries.

POLICY CHECK:	• Who are the main consumers or end-users of fish and where are they located?
Planning Check:	• Who are the key consumer groups and how do they differ from each other? • What are the non-food consumers of fish e.g. fish meal plants, animal feed manufacturers, pharmaceutical companies, traditional medicine producers, farmers?

- Describe who the poor and vulnerable consumers are?
- Who is not able to eat fish and why?

KEY KNOWLEDGE GAPS

It is possible that once reports and studies have been reviewed and key informant interviews undertaken and other data collection methods have been used to develop the Overview for a particular country that gaps in knowledge still remain. The following checklists help in identifying what, if any gaps may exist.

POLICY CHECK:

- What are the key knowledge gaps resulting from completion of this section of the Manual?

Planning Check:

- What gaps exist in our knowledge of the transformation and consumption side of the sector?
- What gaps exist in our knowledge of the transformation of products?
- What gaps exist in our knowledge of price transformation?
- What gaps exist in our knowledge of place transformation?
- What gaps exist in our knowledge of promotion?
- What gaps exist in our knowledge of the stakeholders involved in transformation?
- What gaps exist in our knowledge of consumers and their respective needs and wants?

SECTION 4: KEY CHANGES IN THE SECTOR AND THEIR CAUSE

INTRODUCTION TO SECTION 4

Change is happening across the fisheries sector and the effects on the post-harvest sector are very pronounced. These changes are affecting different people in different ways and these differences need to be understood if future interventions are to have maximum impact. Many of these changes are linked to changes in wider society and to changes in policy. Perhaps one of the biggest changes in most societies is demographic change: increases in population, changes in the age structure of the population and the distribution of people between urban and rural areas is affecting fish supply, transformation and consumption.

Section 4 outlines the sort of changes that could occur and what their causes might be.

CHANGES IN THE WIDER SITUATION

It is useful to review some of the broad macro-level changes that might impact upon the sector in order to provide a background national context to the more detailed changes discussed in following sections - as causes of changes in supply, transformation and consumption.

Wider situation or context changes may include changes in the physical, demographic and economic development of the country that affect the fishery. In highly seasonal fisheries, changes in flooding or drought conditions can affect the supply of fish and the employment opportunities for people. The size and distribution of the population will also affect the sector quite strongly in terms of competition for fish, market opportunities and concentration of services. A growth in the economy may stimulate expansion of the buying power of the population, or a change in the exchange rate may increase or decrease export/import potential.

There may also be changes in wider policy issues that could affect the post-harvest sector. An increased focus on export orientation of the economy may encourage greater emphasis on the role of fish in foreign exchange earning. A drive towards greater employment in manufacturing industries may pull people out of the supply, processing and trade aspects of the sector. An increased focus on livestock production may increase the availability of protein sources other than fish. There are many ways in which wider policy may affect the fisheries sector and these need to be taken into account.

POLICY CHECK:	• What are the major changes in the country and the economy that could have affected the post-harvest sector in recent years?

Planning Check:	• How have physical aspects of the country changed such as rainfall, flooding, forest cover, or drought? • What major population changes have occurred in recent years? • What major economic changes have occurred? • What major policy changes have occurred?

CHANGES IN SUPPLY

Changes in supply are perhaps the most controversial of the changes affecting the sector. It is often difficult to get reliable data on landings and fishing effort to know to what extent catches are changing and why. However, in general for many fisheries fishing effort is at or beyond the level that can produce the maximum harvest on a sustainable basis. In addition, increasing habitat destruction, pollution, changes in water use and increasing siltation in rivers and sedimentation in coastal waters (associated with deforestation) means that carrying capacities of many fishing waters are declining. Poaching of resources by illegal foreign fishing vessels further reduce local availability of fish. The increasing use of dams for electricity generation, water supplies to cities and industry, and removal for irrigation is leading to international conflicts over access to water resources and is resulting in changes (mainly adverse) in down stream fisheries.

Species composition of wild caught fish has also changed. As fishing pressure has increased so the species composition of the catches has changed, in some cases certain species have all but gone from the catch. In some cases fishing gear has been modified to be more species specific. In some cases quality has also become more variable; in order to fill their holds, some vessels are spending more time at sea with the resultant variability in the quality of the fish landed.

In addition to changes in catch, there are also localised changes in landings. With increasing competition for fish resources, fish harvesting units (both craft and gear) have tended to increase in sophistication and complexity. This has often necessitated greater investment in boats and gear and changes in ownership have often resulted. Bigger boats, owned by fewer people, with increased need for more stable market outlets have encouraged vessels to abandon smaller landing centres and to congregate in larger centres with more facilities, better shelter and access to bigger markets for their catch. Such changes have not only influenced where fish enters the market but also who has access to it and thus has changed the livelihoods of many people in the sector.

Globally more fish has also progressively entered export markets and so more of the fish available does not necessarily originate locally. Furthermore, the expansion of aquaculture (both marine and freshwater) has meant that the species composition of supply has changed and many of the supply fluctuations have decreased. The ability to define in advance the size of the harvest from aquaculture also means that the suppliers can make use of changes in demand in the market place to maximise price.

As the price of fish has increased, reflecting both declining supply and increasing demand, so the value of previously discarded fish has increased and more by-catch that was considered as waste fish is now being landed.

The sustainability of such changes is difficult to determine for many fisheries and only after some time will it be possible to determine if such changes are permanent, temporary fluctuations, or intermediate steps to further changes in the future.

POLICY CHECK:	• How have supplies of fish changed in recent years and what have been the major reasons for such changes?
Planning Check:	• How have landings changed in terms of species and total landings? • How have these changes occurred across the seasons? • What are the reasons for these changes? • How has the distribution of landings changed across different landing sites? Why has this occurred? • What are the links between landings and different classes of vessels/gears? • How is the ownership of catching capacity changing? Why has this occurred? • What role has the expansion of aquaculture and increased fish imports played in increasing supplies? • How has the role of by-catch in supplies changed? • How is the technology of catching capacity changing and what effect is this having on fish supply and those involved in supply?

TRANSFORMATION

In many parts of the world changes in demand, in technology and in skills have led to major changes in the transformation of products. The increasing demand for fresh fish products, improved availability of ice and ice boxes, and improved access roads have significantly shifted the emphasis of product transformation away from traditional processing and preservation methods towards iced fish. The concentration of fish supply into fewer landing sites has also promoted the development of more cost-effective ice plants, freezers and cold storage facilities further encouraging a move away from traditional processing and products.

Where fish has been traditionally smoked there is often increasing pressure on timber resources for smoking especially where fuelwood resources are limited and efforts have not been successfully made to replant and create a sustainable fuelwood resource. Traditionally preferred tree species are generally less available and fuelwood generally is more expensive. In some areas where salt production was widespread, many of the saltpan areas have been converted for use in aquaculture and the cost of salt has risen making the cost of the final product more than traditional consumers are willing to pay.

The increasing demand for fish has meant that more by-catch is now landed. In addition, the use of low value fish is also changing, with less is going to low value use such as fertiliser and cattle feed and more is going for human consumption.

These changes are also affecting the access that different stakeholders in the post-harvest sector have to fish and the relationship between the different stakeholders. In many traditional fishing villages, the wives of fishermen had preferential access to their husbands' landings. Where larger, more sophisticated, higher cost vessels

begin to replace many of the traditional craft, so the ownership patterns are changing and women find it more difficult to guarantee access to the fish. Where fish are now landed at larger fishing centres, away from the villages, the village traders and processors must travel to the larger landing sites and may have to compete in a market they little understand and have few social connections with. Access to fish under such conditions usually pushes up the transaction costs adding to the price at which they must sell their fish. Even when they are able to access these markets the price of fish may be such that their purchasing power for traditional processing or preservation methods is too low to compete with buyers wishing to store fish on ice for consumers willing to pay more.

In addition, the makers of traditional packaging for fish, such as woven baskets, are under threat from plastic or fibreglass boxes. Livelihoods of more traditional transporters of fish, such as head-loaders and cycle traders, are also threatened with insulated vehicles or large ice-box deliveries to urban retail stores and more sophisticated market outlets, replacing demand for their services or labour.

The demand for fish for overseas markets is pushing up the quality requirements for the processing, handling and storage of fish. Quality assurance standards may be non-tariff barriers to trade in some situations; in others they are a reflection of a growing demand for quality produce and a concern for the safety of the consumer. Such standards demand that products are handled and processed under certain conditions that may mean that the some stakeholders, unable to meet the required standards, are excluded from the processing chain. Tariff and non-tariff barriers to trade have also affected the access which fishery products from developing countries have had to some export markets. Environmental damage is often used as a factor in banning imports e.g. the USA banned imports of shrimp from India, Malaysia, Pakistan and Thailand because of the alleged lack of enforcement of the use of Turtle Excluding Devices on their shrimp trawlers. All of these changes have affected the price of fish, the general trend of which is upwards, affecting the costs associated with transformation, which have also increased.

POLICY CHECK:

- How has the way fish are preserved and processed changed and why?
- How have the prices of fish relative to other protein sources changed?
- What major changes in the destination of fish have occurred and why?

Planning Check:

- To what extent has ice production, freezer and cold storage facilities increased in capacity and distribution throughout the country?
- What impact has this had on traditional processing activities?
- It what ways has the concentration of fleets on fewer landing sites affected traditional processing and trading practices? [assuming that concentration of fleets into fewer landing sites has taken place]
- How have changing access to markets through infrastructure development affected traditional processing and trading activities?
- How have changes in fuelwood and salt supplies affected processing?

- How has the role of by-catch changed in the market?
- How have these changes affected the different stakeholders in processing and trading? Why have they been affected?
- How have the different roles and responsibilities of men and women in the sector changed? How has this affected the household?
- How have these changes affected the makers of traditional packaging materials?
- How has demand for product from overseas changed processing, packaging, storage and handling procedures?
- How have foreign safety, environmental, and hygiene regulations impacted upon the sector?

CONSUMPTION

As discussed above, the changes in supply, transformation and demand are affecting consumption patterns (Box 10.). Changes in the places where fish is landed, especially the greater focus on larger landing centres, has meant that for many fishing villages less fish is available in the household. The increased cost of investing in catching power (vessels, gear and motorised propulsion), the need to use ice for longer fishing trips, and the cost of accessing centralised landing facilities and increasing demand from both rising local populations and from global demand, all mean that fish prices have gone up.

Box 10: Changes in Utilization

Fish is a very important component in the diet of the population of Asia and there are many traditional products made from fish. Products such as fish sauces, fish pastes, fishballs and fish crackers, which do not retain the main characteristics of the fish from which they are made. Increase in demand and reduction of traditional sources of raw material for manufacture of these types of product have created a market for bycatch fish for the manufacture of these products. In Vietnam an estimated 150,000 tonnes of bycatch are used for making fish sauce and in Thailand and other South Eastern Asian nations selected bycatch species with the correct gelling properties are used for making fishballs and other comminuted (minced) fish products. Before the 1980s these species had been considered trash fish and either thrown away or used as raw material for fish meal production.

Where there is a strong emphasis on the export market, even urban consumers may find it difficult to access fish. Poorer consumers are finding it progressively more difficult to find traditionally processed products (such as dried, salted and smoked fish) and the cost of these has gone up. Fish is moving away from being the "poor man's food"; more and more of it is part of rich people's diets. And as supply composition has changed, people are now also eating species that they formerly did not eat.

POLICY CHECK:

- How have changes in fish supply and transformation affected national food security and how are the poor specifically affected?

Planning Check:

- How have macro-level consumption patterns changed?
- Does a greater percentage of fish now enter the international

markets? If so, which ones?

- How has the consumption of fish in fishing villages changed and why?
- How have changes in the price of fish affected access to fish by different consumers?
- How have the poor been affected by change? How have they adapted or coped?
- What is the response to any domestic shortfall in supply – e.g. by increased imports or fish from aquaculture?

KEY KNOWLEDGE GAPS

Understanding key changes in the post-harvest sector is often the most difficult part of the Overview. Much of the required information will not exist. Where there are clear gaps it is important to note these.

POLICY CHECK:

- What are the key knowledge gaps resulting from completion of this section of the Manual?

Planning Check:

- What are the knowledge gaps in changes occurring in the wider physical, social, economic and policy environment?
- What are the knowledge gaps in changes occurring in the supply side of the sector?
- What are the knowledge gaps in changes occurring in the transformation side of the sector?
- What are the knowledge gaps in changes occurring in the consumption side of the sector?

SECTION 5: THE IMPACT OF CHANGE

INTRODUCTION TO SECTION 5

The impact of these different changes has been partially discussed in Section 4 above. However, it is important that the implications of changes are fully understood in relation to the contribution that the sector makes to the achievement of national development objectives, so that suitable policy responses can be identified, balanced against each other and coalesced into development strategies.

IMPACT ON POVERTY REDUCTION

A key part of the Post-Harvest Overview Manual is to link poverty to policy in line with the CCRF, the international development targets and the development frameworks of many of the countries that will use this document.

The major changes in the sector will affect the poor in two ways:

- A change in livelihood opportunities;
- A change in food security.

Both of these may also have follow-on effects on other aspects of livelihoods, e.g. well being, income security, vulnerability etc.

Changes in livelihood opportunities include both positive and negative changes. In the main these will be changes in employment, income or risk. Employment may become more uncertain, levels of under-employment may rise or fall, there may be a need to diversify into other livelihoods, and incomes may go up but so may costs. In addition to changes in individual incomes/risk there are also household changes to consider. These may be particularly important where both the husband and the wife are involved in the fisheries sector. In some countries, declining fishing opportunities locally have encouraged fishermen to migrate to other areas. This has sometimes led to a fall in household income security with women being left behind to fend for themselves and their children.

As discussed above the poor's access to fish for food is changing and in many parts of the world fish availability to the poor is falling. This may not affect their condition adversely if alternative sources of protein and essential minerals are available. However, there is growing concern that the food security of poor people dependent on fish is declining.

POLICY CHECK:	• How many poor people are adversely or positively affected by the changes in the sector? • What are the implications of these changes for national poverty reduction policies?
Planning Check:	• How have employment opportunities for the poor in the sector changed? Have these changes been positive or negative? • How have income levels of the poor changed? • How has food security of the poor changed?

- How have individual changes affected the households of the poor?
- What livelihood strategy changes have the poor adopted to adapt to or cope with these changes?

IMPACT ON NATIONAL FOOD SECURITY

The implications of change for national food security is poorly documented in most countries. The implications for the households of the poor and vulnerable is even less understood. As mentioned above, there is growing concern that food security is declining, in some cases the role of fish in the diet of the poor may be being replaced by other protein sources or the poor may be eating smaller amounts of fish less frequently.

In addition to the food security of the poor there may also be concerns for food security in wider society. Fish is an important part of the healthy diets of many people. Adverse changes in diet can affect their health and thus their ability to happily and usefully contribute to wider society. Adverse changes in food security can also affect the ability of the workforce to contribute as effectively to the development of the economy.

It is likely that any changes in food security will be unevenly spread through society. Differences will occur between urban and rural consumers, between coastal and inland villages, between the rich and the poor, between men and women, the old and young, and between tribal/caste/religious groups. Food security needs to be considered from a variety of perspectives, these are outlined in Box 11.

Box 11: Food Security Considerations

Food security aspects of fish need to be considered from several perspectives:

- The quantity of fish available per individual
- The impact of price on access which individuals have to fish
- Its seasonal availability and the impact on food security
- The intrinsic quality of the fish in terms of its contribution to the diet
- The quality of the fish as a result of the environment in which it has lived (e.g. the water pollution levels)
- The quality of the fish as a result of its transformation (e.g. perished product or the use of pesticides on fish)

POLICY CHECK:

- How has food security changed as a result of changes in the post-harvest sector?
- What are the implications of these changes for national food security policies?

Planning Check:

- How has the role of fish in food security of different groups of poor people changed? How has this affected the most vulnerable groups (e.g. those with no alternatives, the old, sick, very young and pregnant women?
- How have changes in the contribution of fish to food security affected the ability of the population to contribute happily and usefully to society?
- Have these changes affected the effectiveness of the workforce?
- What differences in food security have occurred across society?
- How has access to fish for different groups changed?
- How has seasonal availability of fish changed?

- Has environmental degradation affected the quality of the fish?
- Have inappropriate practices in the transformation process adversely affected the quality of fish?

IMPACT ON EMPLOYMENT

As mentioned under the impact on poverty section, changes in the post-harvest fisheries sector are also affecting employment. In some situations the number of people involved in the sector has increased, with more people entering labouring and petty trading activities. This is often the response to a decline in livelihood opportunities in other sectors, fish trading is frequently seen as a low skill, low investment opportunity. This may result in increasing competition between workers resulting in falling wages, increased conflict, and under-employment.

In some fisheries the shift in emphasis away from traditional processing and traditional markets towards more centralised processing for exports, has meant that the work opportunities in the traditional sector have declined but have increased in the formal sector. This may also be accompanied by a shift in employment opportunities from rural landing sites to urban landing sites. The implications for such shifts are different for different people. Women in particular may find it difficult to travel far from their homes and so work opportunities for them may be disproportionately changed.

POLICY CHECK:

- How has employment in the sector changed? How has this affected particular groups?

Planning Check:

- How has the number of people employed in the sector changed?
- How has the balance between different forms of work in the sector changed (e.g. a shift from processing to trading)?
- How have changes in employment opportunities for men and women differed?
- How have wages changed for different groups? Has conflict increased? Has under-employment increased?
- How have changes in employment affected migration patterns?
- How have people in the sector coped or adapted to change in employment opportunities?
- Have people in the sector diversified their livelihood strategies and in what ways?
- How have changes in the export market affected employment opportunities and work quality?

IMPACT ON FOREIGN EXCHANGE GENERATION

Perhaps one of the most significant changes in the post-harvest sector in developing countries has been the increase in contribution of the fisheries sector to the generation of foreign exchange. In part this has come from the sale of fishing licences to foreign vessels, but a large part has come from the massive expansion of exports.

POLICY CHECK:	• How has foreign exchange from the fisheries sector changed in recent years?
Planning Check:	• What is driving the change in foreign exchange earnings from fisheries? • Has this change resulted from changes in the export of product? • What are the major markets for export products? • What is the foreign exchange generated from the fisheries sector used for?

IMPACT ON GROSS DOMESTIC PRODUCT

The contribution of the sector to GDP is a good indicator of the changes in the sector as a whole. Increases in contribution to GDP in real terms are likely to reflect a growth in the sector. This may be in line with growth of the economy generally but changes in the percentage contribution of the sector to GDP compared with other sectors will reflect relative differences in balance within the overall economy. A static GDP figure can misrepresent the degree of change within the sector. If parts of the sector have increased and others declined, the overall contribution of the sector to the economy may have remained static. It is important to try to understand change in GDP beneath the surface and consider more closely the component causes of this change.

POLICY CHECK:	• What has been the change in the contribution of the post-harvest fisheries sector to GDP over recent years?
Planning Check:	• How have these changes manifested themselves? • How do changes in GDP vary in different parts of the sector (e.g. traditional, small-scale, export, industrial, marine, inland etc)?

KEY KNOWLEDGE GAPS

Understanding the impact of changes in the post-harvest sector is also often difficult and may require the use of specific micro-level analysis tools such as the ***Post-Harvest Livelihoods Analysis Tool (PHLAT)***. Defining the information gaps will help to focus the use of micro-level tools.

POLICY CHECK:	• What are the key knowledge gaps resulting from completion of this section of the Manual?
Planning Check:	• What are the knowledge gaps in terms of impact on poverty reduction? • What are the knowledge gaps in terms of impact on food security? • What are the knowledge gaps in terms of impact on employment? • What are the knowledge gaps in terms of impact on foreign exchange generation? • What are the knowledge gaps in terms of impact on GDP?

SECTION 6: CURRENT INTERVENTIONS IN THE SECTOR

INTRODUCTION TO SECTION 6

As one of the first stages of developing the Overview it is likely that you will have carried out an institutional and stakeholder analysis. This will have identified key people who are directly involved in the sector. It would also have identified a range of institutions that are involved in understanding the sector, developing it, regulating it, or commercially participating in it. This section looks at these institutions in more detail and identifies what interventions are currently being undertaken in the sector.

INSTITUTIONS PROVIDING SUPPORT TO THE SECTOR

There are a number of public, academic and civil society institutions which have an influence on the post-harvest fishery sector and the livelihoods of stakeholders. There may also be externally funded agencies and projects. These are outlined below.

Government

Perhaps the most obvious government institution is that of the **Fisheries Department** which may be part of a stand-alone ministry or subsumed by a ministry with a broader remit such as the **Ministry of Agriculture**. Sometimes a Ministry of Food may be the responsible agency. The Fisheries Department is usually responsible for the collection of statistics; creating policy for the sector; implementing that policy through legislation; financing support activities; providing information and training; establishing standards; and monitoring the progress of the sector toward the achievement of national development objectives. As such it may well involve a range of sub-departments that cover these different aspects. One particularly important area will be the research arm.

There may also be government bodies that are concerned with specific areas of the sector such as **standards** of food quality or export standards. **Export bodies** may also be concerned with the promotion of export of fisheries products and **Customs and Excise** may be concerned with the flow of the products across borders. Where resources are being exploited there may be involvement of an **Environmental Protection Agency** that controls fish and fuelwood exploitation, or pollution from factories. The **Department of Forests** may also be a key institution where fuelwood for fish smoking is important.

The **Police**, **Navy**, **Coast Guard**, **Ports Authorities** and **Department of Transport** are concerned with activities associated with boats and the movement of fish on land and sea. **Revenue Collectors** may also have information that shows the movement of fish.

Where poverty alleviation or reduction is an important component of policy, there may be a ministry concerned specifically with the implementation of a **Poverty Reduction Strategy**. The Overview can be an important contribution to informing the

poverty reduction strategy and linking the implementation of the Overview to the strategy can support uptake of the Overview's findings. Closely linked to these are likely to be the **National Planning Office** and the **Ministry of Finance**.

In many countries there will be a process of decentralisation and a **Department of Local/Regional Government** may be able to provide useful regional statistics and contacts that can provide specific local information.

As the sector provides much employment, the **Department of Employment** or of **Rural Affairs** might be important to contact for specific employment information. For specific key stakeholders such as women there may be a **Department of Women's Affairs** that may be concerned with aspects of gender differentiation and gender roles. A **Cooperative Department** may be involved in the organisation of community groups within the fisheries sector and an **Enterprise Development Department** may be involved in developing small-scale enterprises covering different parts of the sector. There may also be **Training Institutions** within government that are concerned with providing technical training to rural people.

Academic

Academic institutions include **Universities**, that may have sector-specific departments or social science departments that deal with specific issues concerning the people who work in the sector. They may also have departments dealing with Food Science, Economics, Trade, Rural Development, or Environment.

Research Institutes may be attached to government departments or they may be stand alone. Some may be responsible for compiling and analysing catch data and other resource related data and providing policy advice. Others may be involved in developing improved processing methods and product development. There are also be important research institutes associated with water, forests, policy, socio-economics and poverty reduction.

Civil Society

Community-level institutions may be involved in the management of aquatic resources or in interventions that affect how and when people can engage in post-harvest activities. **Local religious institutions** can also play an important role in providing development support to adherents of their faith.

There are very often **representative agencies** of men and women involved in the sector. These might be associations of particular gear/boat owners, processors, traders, exporters or others.

There are likely also to be a range of **Non-Governmental Organisations** (both national and international) concerned with poverty alleviation, rural development, human rights or environmental issues, specific locations or particular stakeholders in the sector (e.g. children, women, the elderly etc).

External Funders of Interventions

Government may also work through a range of externally funded **development projects** that are designed to specifically intervene in the fisheries post-harvest sector. There may be others that have their focus elsewhere but contain a post-harvest component.

These may be **bilateral** collaborations between the government and a foreign government. They may also be implemented through a regional or international body such as the **European Union** or the **United Nations**.

POLICY CHECK:	• What type of government, academic, civil society or externally funded agencies are involved in the sector?
Planning Check:	• What are their aims? • In what ways are they involved? What are they doing? • Who are they working with? Where are they working? • What resources do they have available to do their work? • In what ways can they contribute to our knowledge of the sector?

CURRENT INTERVENTIONS

The potential to positively improve the livelihoods of the poor dependent on the post-harvest sector and increase the contribution of the sector to wider national development objectives is, in many countries, considerable. This potential is often overlooked because of the emphasis that has traditionally been placed on catching more fish, rather than more effectively using what has already been landed.

An important part of deciding what interventions may be possible (see Section 7) is to define what is currently being done in the sector. This will provide an insight into the strategies of the private sector, and the support provided by government and NGO agencies.

The following sections review possible interventions in the supply, transformation and consumption parts of the sector. These should be compared with the actual interventions locally and possible changes in strategy identified. Of particular importance in this process will be understanding what the current policies are that support or obstruct such interventions and what policy instruments (such as plans, projects, laws, service delivery mechanisms, information flows, networks, agreements, partnerships etc) are available to support their use.

POLICY CHECK:	• What position does the post-harvest sector have in development policy? To what extent is it seen as a key sector? • What policy instruments are in place to support the sector?
Planning Check:	• To what extent do donor-funded fisheries projects address post-harvest issues? • How developed is the legislative environment surrounding the sector? • What networks, agreements or partnerships exist which include the sector or aspects of the sector – e.g. trade agreements? • What government and academic institutions are funded to study and work with the post-harvest sector and what sort of work are they doing? • What percentage of the government fisheries budget applies to post-harvest aspects? • What is the extent and role of participation of post-harvest

fishery stakeholders in decision-making in the sector?

Supply-Side Interventions

The major aims of supply-side interventions are to conserve the productivity and diversity of supply. Such interventions should also consider when and where supplies are made.

The main interventions include developing programmes of resource conservation that target the sustainable harvesting of the resources. This may require partnerships with other countries where shared stocks are considered. The involvement of the community in resource management interventions is likely to improve their acceptability and their uptake. Interventions in the area of habitat conservation/restoration will also be important to ensure the carrying capacity of the aquatic environment. Such options will necessitate inter-sectoral co-operation and co-ordination. In some cases it will be possible to enhance supplies through access to under-utilised resources, stock enhancement, investing in sustainable aquaculture and importing fish from other countries.

The post-harvest sector also has a contribution to make to environmental sustainability through the sound disposal of wastes from the sector, particularly refrigerants and waste processing water. Also through efforts to decrease fish loss associated with supply and increase efficiency

An important option available to governments is to provide support to enable different stakeholders to differentially benefit from the available resources. In many cases, increased pressure on the resource leads to greater marginalisation of the poor, in favour of those with sufficient assets to access distant resources, new technology or overcome increasing transactions costs related to fishing regulations. Support to the development of the small-scale fleet, preferential access to resources for traditional fishing communities, enforced use-rights for the small-scale fishers, improved infrastructure at smaller landing sites, support for small-scale aquaculture, support for enhancing existing livelihood diversification, creating alternative income generating activities can all help. As can efforts to support the evening out of seasonal fluctuations in supply and demand and improvements at locations where fish are landed. Such options need to be formulated within a cohesive pro-poor policy framework that understands and takes account of the needs and aspirations of the poor producers, their capacity to respond to such interventions, and their current strategies to cope with, or adapt to, change.

POLICY CHECK:	• What are current policies of government to conserve, sustainably use and enhance the productivity of, fisheries production? • What the key policy instruments are there to achieve this?

Planning Check:

- What are the main interventions options envisaged by such policies?
- What resource conservation/sustainable-use policies are in place? What instruments are available for their uptake and use? How have the poor been involved in designing and implementing these approaches?
- What measures are in place to ensure the biological diversity of supply?
- What options are in place for protecting the environment at the inter-sectoral and international levels? What measures are in place for protecting the environment from activities within the sector such as fuelwood degradation, pollution from waste-water and release of damaging refrigerants?
- What options are in use for enhancing the supply through aquaculture, stock enhancement, habitat rehabilitation, reduction of discards and importing increased supplies?
- What measures are in place for maintaining/improving the quality of the supply of fish from different sources?
- What measures are in place to enhance the location of landings and to link seasonal fluctuations in supply to demand?
- What institutions are involved in the processes?
- To what extent, and how, are these options targeted at different stakeholders, particularly the poor?
- To what extent have the needs, aspirations and capacities of the poor been taken into account in developing these options?
- To what extent have coping and adaptive strategies of the poor been taken into consideration?
- What measures have been taken to identify and promote alternative income opportunities for those people who have been displaced from the sector?

Interventions in Transformation

Interventions in transformation are reviewed separately as product interventions, place interventions, promotion interventions and price interventions.

Product interventions

Many of the interventions aimed at improving product transformation are concerned with maintaining the quality of the product. Improvements in fish processing technologies are widespread such as improved fish smoking and drying methods. However, such technological interventions have a variable success rate and it is important to understand why some have succeeded and others have failed. The Bay of Bengal Post-Harvest Fisheries Project spent much of the early years of its work promoting technological improvements with few sustainable successes. It was only after technology was closely

Box 12: Fuelwood Plots in the Gambia

In an attempt to keep up with the demand for fuelwood for fish smoking in The Gambia the Fisheries and Forestry Departments worked together to provide a forestry resource capable of supplying local fish processors with fuelwood on a sustainable basis.

linked to the social, economic and cultural aspects of the livelihoods of the processors and traders that major positive changes were observed. Linked to such processing changes have been efforts to improve input supplies such as salt and fuelwood (see Box 12).

Where major technological changes have been introduced these have often created opportunities for more educated and better off stakeholders to capture such opportunities. In some cases such interventions have promoted inward migration of people not traditionally involved in the sector but wishing to take up the newly generated opportunities. Building upon traditional skills and technologies, rather than introducing new ones, can create opportunities for those already in the sector to evolve their practices more easily (see Box 13). Perhaps one of the most important developments to occur recently has been that of facilitating the greater involvement of the processors and traders in developing their own solutions to perceived problems. Assisting such people to form self-help groups to access credit, achieve economies of scale in purchasing, transporting and selling products, or lobbying for change in the sector have been beneficial interventions.

Box 13: Wet Season Losses in India

Loss of processed fish during the wet season in India is high as weather conditions change resulting in high spoilage.

A project funded by DFID's Post-Harvest Fisheries Research Programme worked with local women to identify their own solutions to these problems, to share different solutions, test them in different locations and to modify them to their specific needs.

Not all changes in practices have been beneficial. For example, the increase in the use of pesticides on dried fish has been a major concern. This is often outlawed but legal restrictions are often poorly enforced. Interventions seeking to raise awareness about the adverse effects of such practices has helped where alternative and viable strategies have also been made available.

An important intervention that has occurred in product transformation has been the growth of private sector ice plants. Often the uptake of ice from such plants has resulted from improved road access to remote landing sites linked to both increased demand for better quality fresh fish and improved awareness of the benefits to processors/traders of preserving their fish with ice. In many situations, however, the quality of the icing process is poor and government programmes to improve such practices have been implemented. Linked to this has been the growth in programmes in product quality, safety and hygiene, some of these have been linked to export requirements. Interventions have sometimes focussed on systematic approaches such as HACCP (see Box 14) or have been linked into international quality standards such as

Box 14: Systematic Approaches to Traditional Fish Processing

Systematic approaches to fish quality control, such as HACCP, tend to be thought of as practices that mainly apply to commercial operations involving high technology processing plants. A project funded by DFID's Post-Harvest Fisheries Research Programme has developed a systematic approach that can apply to traditional fisheries and help to identify critical points for change in practices.

the Codex Alimentarius which was set up in 1962 under the joint auspices of the FAO and World Trade Organization to develop food standards agreed and adopted on a worldwide, regional or country group basis.

Where people have been displaced from the processing and preservation sector, interventions to help people seek appropriate alternative livelihoods have been used although the success has been very variable.

POLICY CHECK:	• What policies exist for promoting product transformation? • What measures are available and in use for implementation of these policies?
Planning Check:	• What interventions have been implemented to improve the efficiency and sustainability of post-harvest technologies in processing and preservation? How have these been linked to the social, economic and cultural needs and capacities of the different stakeholders? How have these been adapted to address the specific needs of the poor, especially women? • To what extent have traditional skills and technologies been built upon and developed? • In what ways has support been provided to develop or improve self-help groups? • How successful have programmes been to reduce the use of insecticides in fish preservation? • To what extent have fish loss assessment studies been carried out to understand how, where and in what form loss occurs? What measures have been taken to reduce such losses? How successful have these been? • What regulations are in place to ensure fish quality and safety? How are they enforced? • To what extent are the sanitary/quality assurance standards of international instruments, such as the Codex Alimentarius, encouraged/enforced locally in the processing and handling of fish? • To what extent are systematic approaches to quality assurance and food safety (such as HACCP) used? Which institutions are involved? • To what extent are national processing and trade policies guided by the policies of regional/ international trade organisations? • To what extent have efforts been made to harmonise regional standards on quality control? • In what ways have the different stakeholder holder groups in product transformation been involved in the decision-making processes about possible interventions? • What participant groups exist and how effective are they?

Place Interventions

A key intervention in "place transformation" has been the development of feeder roads to remote locations that have allowed fish to be traded with greater ease. In many situations that has facilitated year-round access to markets where only dry season access was possible before. In some communities increased access has been a mixed blessing for the poor. Where such change has been accompanied by the

development of social structures in the communities to allow the poor to access credit for taking up the additional costs of entering new trade opportunities, such opportunities have helped the poor. In some situations, however, improved road access has created opportunities for wealthier traders from outside to enter communities and displace local processors. Increased road access can also be associated with the emergence of social problems or issues, e.g. increasing theft, HIV/AIDs etc.

Another place-related intervention has been that of providing points of aggregation for products. Private sector processing/storage plants have created opportunities for processors and traders to trade their products. The construction of public fish markets has also created opportunities for traders and consumers to interact.

Policies to allow fish to be moved across national borders can also promote place transformation. Where these are supported by changes in the way officials deal with traders seeking to benefit from such policies, the movement across borders is greatly facilitated.

Such changes in the way product movement is developed and promoted can have profound effects on the livelihoods of the many people who are involved in traditional transportation systems such as head-loaders, cycle traders etc.

POLICY CHECK:	• How have fisheries policies and transport policies been linked to improve market access for remote communities?
Planning Check:	• How has feeder road access to remote communities been enhanced? • To what extent have feeder road developments been linked to increasing the capacity of the poor to access the opportunities created by improved access? • How has the ease of movement of products across international borders been facilitated? How has this impacted upon the livelihoods of the poorer processors and traders?

Promotion Interventions

Promoting awareness in the general population about the benefits of fish in the diet can contribute significantly to improved health. This becomes more important when the benefits of fish for vulnerable groups are promoted. In addition to the inherent health benefits, the benefits of good quality handling, storage and processing can be sold to consumers who assume they are buying a more quality assured and safe product. The promotion of new species of fish from imports, aquaculture or previously underutilised resources can also open up new opportunities on the domestic market. Promotion of products internationally has enabled some countries to increase their access to lucrative international markets and foreign exchange.

POLICY CHECK:	• How has fish been promoted domestically and internationally?
Planning Check:	• What institutions (private sector and government) are involved in the promotion of fish domestically and internationally? • How successful has this been? Are there opportunities for increasing this role? • Has promotion been used to encourage the consumption of fish by

vulnerable groups?

- In what ways have fish markets been provided or improved to encourage the better appearance of fish?

Price Interventions

The extent of involvement of the state in prices of fish is a contentious issue. Subsidies of the sector are frowned upon by many economists and taxes by government are frowned upon by the private sector. Establishing fixed prices for fish can also distort the market. The government can play an important role in ensuring that the transaction costs of the sector are kept low through efficient operation of the market, the promotion of policies to support the sector, improved efficiency of regulation, the elimination of corruption, effective competition in the market place and transparency of market practices.

POLICY CHECK:

- In what ways do government policies incorporate concern for fish prices?

Planning Check:

- In what ways are subsidies applied to the sector?
- What taxes are applied to the sector?
- How are market prices for fish controlled by the government?
- What measures are in place to promote low transaction costs in the sector?
- What regulations govern fish processing and trade?
- How has the efficiency of operation of regulations governing fish processing and trade been improved?
- How does corruption affect the efficiency of the market and how is it currently being dealt with?

Interventions in Consumption

The main interventions on the consumption side of the sector are indirect and covered under supply and transformation. Direct interventions include using fish to target specific audiences e.g. in school meals provided by the state, in hospitals, or as food aid.

Other interventions may involve improving the access which specific groups have to fish through development of access channels or closing some channels off e.g. there could be a ban on the export of certain types fish to encourage its use for domestic consumption. Improving market access for products to reach specific groups may also affect uptake.

POLICY CHECK:

- What current interventions are in place to influence fish consumption nationally?

Planning Check:

- How is fish used in a targeted manner to address specific needs of particular groups, e.g. such as school children, or in food aid?
- Are specific measures used to increase access of fish to specific groups? How are these applied and to whom?

KEY KNOWLEDGE GAPS

There may still be gaps in the understanding of interventions after developing this section of the Overview.

POLICY CHECK:	• What are the key knowledge gaps resulting from completion of this section of the Manual?
Planning Check:	• What are the key knowledge gaps in terms of the government, academic, civil society, and donor institutions operating in the sector? • What are the key knowledge gaps in terms of the type of interventions being made? • Is the impact of different interventions clearly understood?

SECTION 7: DEVELOPING AN INTERVENTION STRATEGY

INTRODUCTION TO SECTION 7

The PHO Manual so far has helped to identify the following information:

- The contribution of the sector to national development objectives
- How the sector makes that contribution
- The changes that are occurring in the sector
- The implications of those changes for the wider economy
- The sorts of interventions that are being made in the sector

Section 7 uses that information to begin to develop a way forwards for enhancing the development of the sector. Firstly it helps to develop priority areas for intervention, what become the aims of development. Then it provides a set of principles for intervention which can be adapted to suit local conditions to provide a way forward for addressing those priorities.

DEFINING PRIORITY AREAS FOR INTERVENTION USING A SWOT ANALYSIS

Given the information generated in previous sections, it should be possible to identify the priority areas within the sector that need intervention in order to maximise the contribution of the sector to national development targets. Identifying such priorities requires comparing the current contribution of the sector with the likely future contribution as a result of the changes in the sector.

Section 6 gives an indication of the current interventions and may suggest ways that might be used in the future. These can help to suggest ways of overcoming the sorts of problems identified in this section. Analysis of the sector using a SWOT analysis provides a way forward.

The SWOT analysis identifies key issues facing the sector which could be the focus of intervention. SWOT analysis can be simply understood as the examination of the post-harvest sectors current strengths and weaknesses, and the potential opportunities and threats that it faces in the future. SWOT can also be used to prioritise issues and to move towards identifying strategies to overcome weaknesses and threats, and to build on strengths to make best use of opportunities. It is a general tool designed to be used in the preliminary stages of decision-making. Carrying out an analysis using the SWOT framework helps to focus activities into areas where the sector has most strength and where the greatest opportunities lie.

A SWOT analysis looks at future possibilities for the sector through a systematic approach of introspection into both positive and negative concerns.

The SWOT analysis will achieve the following:

- Take people through the whole decision making process in an orderly way allowing complex ideas to be presented systematically;
- Help decision makers share and compare ideas;
- Assess a situation and provide a clear formulation of the problem;
- Analyse issues that have led to failure in the past;
- Organise the important factors linked to success and failure in a given situation and prioritises issues;
- Allow a comparison of alternatives;
- Identify opportunities which can be 'maximised' to make the most of the organisations resources; and
- Bring about a clearer common purpose and understanding of factors for success;

It cannot find the solution to all the problems facing the sector, but it will ensure that issues are identified, classified and prioritised clearly, showing the problem in terms of key underlying issues. Decision makers can then begin to see how to broadly address key issues.

It should be recognized that opportunities and threats are not absolute. What might at first seem to be an opportunity, may not emerge as such when considered against the resources of the organisation or the expectations of society.

The SWOT analysis involves the following key steps:

1. **Prepare a framework**

The first stage is to make a framework as shown below.

SWOT FRAMEWORK	
STRENGTHS • • • • •	**OPPORTUNITIES** • • • • •
WEAKNESSES • • • • •	**THREATS** • • • • •

2. **List issues within the framework**

The next step is to list specific issues related to strengths, weaknesses, opportunities and threats, under the appropriate heading in the framework.

Strengths are positive aspects about the sector and the people in it (either the direct stakeholders or institutional stakeholders who interact with the traders, processors and consumers). They relate to all aspects of the sector including the supply, transformation, consumption, institutions and policies. The **weaknesses** are concerned with the internal problems facing the sector. Again this may address the poor themselves, other stakeholders in the sector, institutional stakeholders. Weaknesses relate to all aspects of the sector including the supply side, transformation, consumption, institutions and policies.

Opportunities are those elements of the sector that offer future benefits that are not being used at present. They may include future market opportunities or the potential to increase fish supplies from aquaculture. Some of these potential benefits may be accessible in the near future; others may be benefits that are flowing from change that will occur in the distant future. Likewise **threats** are elements of the sector or the wider policy environment that could be a problem to the development of the sector in the future, both in the short and longer term.

An example of a SWOT analysis of the post-harvest sector in Ghana is shown below.

Example SWOT Diagram of the Ghanaian Post-Harvest Fisheries Sector

STRENGTHS

- Provides a diversity of employment opportunities for many people including the poor
- Low barriers to entry, low skill and labour intensive thus providing opportunities for the poor
- Provides livelihood options for women
- Major contributor to food security in all parts of the country
- Significant contributor to foreign exchange and GDP
- Diversity of species providing many employment options in harvesting, processing and trade
- Diversity of species and harvesting methods provide alternative harvesting strategies
- Numerous sources of supply reducing supply risks
- Diversity of processing methods to meet market needs and reduce supply fluctuations
- Efficient marketing and distribution system, and entrepreneurial professionalism in the post-harvest sector
- Innovative approaches to sector difficulties
- Post-harvest work promotes networking and partnerships for efficient work
- High demand for fish locally, regionally and internationally
- Dried pelagics provide all-year cheap food for poor consumers
- Good institutional support for the sector in research and development
- Multitude of governance mechanisms for the sector

OPPORTUNITIES

- A diversity of academic and civil society skills to understand poverty in the post-harvest sector
- The potential of the post-harvest sector to contribute more to poverty reduction by being more fully and explicitly incorporated into the Poverty Reduction Strategy
- Stabilised fish supplies could maintain current employment, income and food security for many poor people
- Fish supplies can be increased through improved resource management, expanded exploitation of under-utilised stocks, habitat restoration, aquaculture expansion, stocking and increased imports of cheap fish
- The potential to benefit from existing infrastructure policy on feeder road development by raising the profile of post-harvest needs
- Considerable experience in sustainable fuelwood production that can be tapped for fish smoking
- Considerable local, regional and global experience in improving fish processing, handling and storage methods to improve fish quality and working conditions that can be considered for wider use locally
- Emerging local, regional and global knowledge and experience in alternative income opportunities that could be applied to the post-harvest sector
- Expanding local, regional and global markets for fish products with varying access requirements willing to pay good prices
- The potential to capture greater fiscal benefits from exports
- Good experience of representative bodies in fisheries that could be translated into similar mechanisms for increasing the involvement of the poor in the sector

WEAKNESSES

- Involvement of the poor as workers and consumers in the sector not well understood
- Employment tends to be seasonal
- Employment for many is low paid and unhealthy
- Much of the work is outside the formal sector
- Not all forex is repatriated, imported production inputs are increasing in cost
- Fish supply static due to over-exploitation of resources, and habitat destruction and pollution of aquatic environment
- Unpredictability of supply due to fluctuations in some fish stocks and seasonality of supply not matched to demand
- Limited representation of poorer post-harvest workers in the decision making processes
- Local government support to the sector is weak in some areas
- Poor road access to some sites
- Some processing, storage and handing practices generate losses in product and product value
- Fish smoking contributes to deforestation and tree biodiversity loss
- Increasing price of fish for poor consumers
- Institutional capacity to deal with poverty in the post-harvest sector is low
- Vulnerability of export products to foreign quality controls

From: Directorate of Fisheries (2003) Ghana: Post-harvest fisheries overview. Ministry of Food and Agriculture, Ghana.

THREATS

- Future decline in supplies of fish as a result of over-exploitation, habitat destruction and pollution
- Downward spiral of resource degradation leading to greater poverty among resource dependent
- Increasing migration into the post-harvest sector further reducing incomes
- Poor people forced to remain in the sector due to a lack of viable alternative livelihood options for people wishing to leave or diversify incomes
- Food security of the poor decreasing as fish prices rise
- Forex loss if fish quality and quantities fall
- Income [and forex] loss due to the vagaries of world fish prices
- Supply shortages reducing the ability of exporters to satisfy continuity of supply requirements of foreign markets
- Fish smoking becoming more difficult and expensive if fuelwood supplies decline
- Changes in demand for certain types of processed fish may threaten livelihoods of traditional processors
- Increased imports and fish from aquaculture decreasing price of domestic caught fish

3. Prioritise the points

The next step is to prioritise the points under each of the four headings. This needs to be done against specific criteria These criteria might relate to the issues that are affecting (in the case of strengths and weaknesses) or are going to affect (in the case of opportunities and threats) the **most poor people** to the **greatest degree**. The issue of time-scale may also be important i.e. is this going to happen in the **short-term** (urgent) or the **long-term** (not urgent). Thus, a high priority issue is one that is likely to affect many poor people very severely in the near future. A low priority one is likely to affect few poor people and only to a limited degree and not for some time. It is best to limit the prioritised list to 10 or fewer points per heading and to avoid over-generalisations.

The table below provides a way of prioritising the importance of different issues.

A.	B. Issue	C. Stakeholders affected	D. Approximate numbers of stakeholders	E. Approximate numbers of poor stakeholders	F. Time scale of impact	G. Degree affected	H. Relative Priority
Strengths	Issue 1						
	Issue 2						
	Issue 3						
	Etc.						
Weaknesses	Issue						
	Issue						
	Issue						
	Etc.						
Opportunities	Issue						
	Issue						
	Issue						
	Etc.						
Threats	Issue						
	Issue						
	Issue						
	Etc.						

Column A lists the four main categories. In **column B** are listed the issues identified in the SWOT analysis. This can include all the issues or a shortlist of the most important issues. In **column C**, against each of these issues the broad categories of stakeholders who are affected by this issue are noted. If different stakeholders are affected in different ways separate rows should be used for each stakeholder. **Column D** gives the approximate number of people affected by the issue. This may be an actual figure, however, more likely it will be a relative term such as a lot of people, few people etc. In **column E** the approximate percentage/number of this group who are poor should be recorded, again this may be relative abundance rather than exact number. **Column F** records the approximate time –scale for the issue to affect people. For some this will be "current", for others it may be "short-term", or

"medium term" or "long-term". These are all subjective terms but will give some indication of the urgency of response required. **Column G** indicates the degree to which the stakeholders are currently or are likely to be affected. This might be as simple as high, medium or low indicating whether the effect is positive or negative. **Column H** allows for a priority to be set for the specific issue. This will require some agreement on the relative importance of the factors in the different columns.

This process, whilst very subjective, will give some indication of how many poor people are going to be affected by how much by an issue in what sort of time scale. This does not necessarily suggest that these issues are the most important but the table will help to justify why some interventions are needed and other are less important. As outlined below, the prioritisation of issues need to feed into a wider set of principles for the working with the sector.

PRINCIPLES FOR GUIDING INTERVENTIONS IN THE SECTOR

From a macro-level perspective interventions should feed into a common objective for the post-harvest fishery sector. A guiding objective for the sector should be sufficiently broad to allow for the needs of any intervention but link such interventions to national development policy. Such an objective would be:

To maximise the contribution of the fisheries post-harvest sector to the achievement of national development objectives in terms of poverty reduction, food security, employment, foreign exchange balance and economic growth.

In order to sustain, develop and enhance the strengths of the sector, capitalise on the opportunities that exist, address the weaknesses and counteract the threats so that this objective is achieved, a set of principles for guiding intervention within the post-harvest sector have been developed. The principles are designed to broadly guide those institutions wishing to become involved in the development of the sector. They have been based on the FAO Code of Conduct for Responsible Fisheries (CCRF) and the understanding of the post-harvest sector gained from the Overview.

The principles are centred on 10 key themes: enhancing livelihoods, promoting the needs of the poor; ensuring stable and sustainable supplies; enhancing supplies; improving utilisation; reducing negative environmental impact; promoting sound international trade; regulating international trade; improving food security; and promoting institutional support.

These principles need to be adapted to suit the particular needs of the country concerned. Some will be less applicable than others. Some will need to be re-worded to suit local conditions. Some may be largely irrelevant and some themes may require additional principles to be added. When modified to suit local circumstances these principles will be provide the basis upon which all interventions will be made by government, the private sector, NGOs, academics and donors. In so doing they will provide a framework for communication and coordination which will allow interventions to be monitored and progress towards the overall goal of the sector to be assessed.

The themes are shown below, each with a set of generic guiding principles.

1. **Enhancing the livelihoods of those involved in the sector through:**
    a. Giving due consideration to the economic and social role of the post-harvest fisheries sector when formulating national policies for the sustainable development and utilization of fishery resources.
    b. Ensuring that participants in the sector are well represented in the decision-making processes.
    c. Building on the social and commercial linkages within the sector to ensure stronger networks, collaboration and organisation within the sector.
    d. Recognising the dynamic nature of the livelihoods of those in the sector and reflecting this in the policy-making and service delivery processes.
    e. Recognising that those involved in post-harvest activities are also dependent on the services of other sectors such as agriculture, health and education.
    f. Recognising the holistic nature of the livelihoods of the poor, better understanding those livelihoods, integrating fisheries into wider coastal area management, planning and development, and working in cross-sectoral, multi-agency, partnerships to achieve this.
    g. Designing and promoting credit mechanisms to specifically suit the sector.
    h. Promoting safe, healthy and fair working and living conditions and ensure they meet international standards.
    i. Promoting the development and uptake of safe technologies for the sector.
    j. Protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access to traditional fishing grounds and resources.

2. **Promoting the specific needs of poor workers in the sector through:**
    a. Recognising the needs of traditional and resource dependent communities in those management measures, and providing local communities with preferential access to traditional fishing grounds and resources where appropriate.
    b. Collaborating with the poor in the research process to understand the needs, aspirations and capacities of the poor who work in and depend for their livelihood on the sector.
    c. Recognising the value of, and using, indigenous knowledge in the research and development process.
    d. Actively involving the poor in the decision-making process of the sector.
    e. Raising the awareness and the capacities of the poor in the sector to their potential to contribute to the sound management and development of the sector.
    f. Focussing on the most vulnerable people in the post-harvest sector, especially women, those in ill health, old people, and especially small-scale processors and traders; recognising their rights to a secure and just livelihood, and mainstreaming concerns for them in policy support.

g. Recognising the importance of safety nets for the poor but also the need to help them to deal with change in the future, and recognising the value of appropriate credit/finance sources and self-help groups as mechanisms to allow the poor to better access service delivery and to become empowered.
h. Recognising that change within the sector, whilst driven by similar forces across the country, is having different effects and impacts on different stakeholder groups in different locations; and understanding the consequences of change on the livelihoods of these different groups and responding accordingly.
i. Understanding the importance of increased migration and mobility to the livelihoods of the poor in the post-harvest sector and mainstreaming these issues in the policy process.
j. Understanding existing coping strategies of the poor to the changes they face in the sector and where it is necessary for people to leave the sector, developing alternative livelihoods options, through systematic and participatory approaches, that specifically address the needs, aspirations and capacities of the poor.
k. Working with the poor to develop specific credit facilities that deal directly with the needs, aspirations and capacities of the poor.
l. Facilitating the organisation, empowerment and mobilisation of the poor to allow their more effective participation in all aspects of the sector.

3. Ensuring stable and sustainable supplies of fish through:

a. Balancing fishing effort with the sustainable use of resources where possible.
b. Conserving aquatic resources where necessary.
c. Adopting a precautionary approach to resource-use.
d. Ensuring compliance with, and enforcement of, management measures, and monitoring and controlling fishing.
e. Recognising the importance of the potential role of the community in resource management and supporting involvement of the community in co-management efforts.
f. Basing management decisions on scientific evidence and taking account of traditional knowledge.
g. Developing and applying selective and environmentally safe gear and fishing practices.
h. Co-operating bilaterally, regionally and globally in research and management efforts.
i. Recognising the needs of traditional and resource dependent communities in those management measures, and providing local communities with preferential access to traditional fishing grounds and resources where appropriate.

4. Enhancing supplies of fish through:

a. Protecting and rehabilitating critical aquatic habitats.
b. Developing fisheries based on under-exploited resources.

c. Considering sustainable aquaculture, and culture-based fisheries, as a means to promote diversification of income and diet and to minimise adverse effects on the environment and local communities.
d. Selectively importing low cost fish from sustainable sources when catches are low.

5. Improving the utilisation of fish through:

a. Promoting research in fish technology and quality assurance and support projects to improve post-harvest handling of fish, taking into account the economic, social, environmental and nutritional impact of such projects.
b. Promoting cooperation and facilitating the development and transfer of appropriate technologies to ensure that processing, transporting and storage methods are environmentally sound and in so doing learning lessons from other parts of the world and from past experiences.
c. Promoting and enforcing guidelines, laws, regulations and practices that improve sanitation and hygiene at all stages of the post-harvest sector from harvest to consumption.
d. Raising local quality standards to progressively meet those of the highest international level.
e. Understanding the losses in products that are occurring in the sector and promoting loss reduction.
f. Encouraging and supporting those in the sector to harvest, handle, process and distribute fish to maintain its nutritional value, quality and safety and to minimise waste and environmental damage.
g. Promoting the incorporation of appropriate HACCP processes throughout the sector down to the community level.
h. Promoting the cooperation between institutions in order to facilitate the production of value-added products by the sector.

6. Reducing negative environmental impacts through:

a. Ensuring that environmental effects of post- harvest activities are considered in the development of related laws, regulations and policies without creating any market distortions.
b. Promoting the use of resources, especially water and energy, and in particular wood, in an environmentally sound manner.
c. Linking fuelwood-use for post-harvest activities to wider forestry conservation policies.
d. Encouraging, where appropriate, the development of community fuelwood lots linked to processing activities.
e. Investigating, learning lessons from elsewhere and seeking international guidance on, alternatives energy efficient processing approaches.
f. Ensuring that international and domestic trade in fish and fishery products accords with sound conservation and management practices through improving the identification of the origin of fish and fishery products traded.

g. Cooperating with other States in complying with relevant international agreements regulating trade in endangered species.
h. Working with other States to develop international agreements for trade in live specimens where there is a risk of environmental damage in importing or exporting States.

7. Promoting sound international trade through:

a. Observing the principles, rights and obligations established in the World Trade Organization (WTO) Agreement and striving to cooperate with other States to develop internationally acceptable rules or standards for trade in fish and fishery products in accordance with those principles, rights, and obligations.
b. Ensuring that international trade in fish and fishery products does not compromise the sustainable development of fisheries and responsible utilization of living aquatic resources.
c. Striving to ensure that measures affecting international trade in fish and fishery products are transparent, based, when applicable, on scientific evidence, and are in accordance with internationally agreed rules.
d. Ensuring that fish trade measures adopted to protect human or animal life or health, the interests of consumers or the environment, should not be discriminatory and should be in accordance with internationally agreed trade rules, in particular the principles, rights and obligations established in the Agreement on the Application of Sanitary and Phytosanitary Measures and the Agreement on Technical Barriers to Trade of the WTO.
e. Avoiding directly or indirectly creating unnecessary or hidden barriers to trade which limit the consumer's freedom of choice of supplier or that restrict market access.
f. Cooperating with other States to review the appropriateness of standards applicable to international trade; and promote adherence to, and effective implementation of, relevant international standards for trade in fish and fishery products and living aquatic resource conservation.
g. Not undermining conservation measures for living aquatic resources in order to gain trade or investment benefits.

8. Regulating international trade through:

a. Ensuring that the laws, regulations and administrative procedures applicable to international trade in fish and fishery products should be transparent, as simple as possible, comprehensible and, when appropriate, based on scientific evidence.
b. Facilitating, in accordance with their national laws, appropriate consultation with and participation of industry as well as environmental and consumer groups in the development and implementation of laws and regulations related to trade in fish and fishery products.

c. Simplifying the laws, regulations and administrative procedures applicable to trade in fish and fishery products without jeopardizing their effectiveness.
d. Ensuring that, when changes to legal requirements affecting trade in fish and fishery products with other States are necessary, sufficient information and time is given to allow the States and producers affected to introduce, as appropriate, the changes needed in their processes and procedures.
e. Periodically reviewing the laws and regulations applicable to international trade in fish and fishery products.
f. Collaborating with other States in the region, to review the appropriateness of harmonising as far the standards applicable to international trade in fish and fishery products in accordance with relevant internationally recognized provisions.
g. Collecting, disseminating and exchanging timely, accurate and pertinent statistical information on international trade in fish and fishery products through relevant national institutions and international organizations.
h. Promptly notifying interested States, WTO and other appropriate international organizations on the development of and changes to laws, regulations and administrative procedures applicable to international trade in fish and fishery products.

9. Improving food security, especially of poor consumers, through:

a. Better understanding consumption patterns of the poor and promoting their food security.
b. Balancing the needs for fish export with promoting the contribution of the fisheries sector to domestic food security, and giving priority to the nutritional needs of local communities.
c. Ensuring that appropriate measures are adopted to guarantee the right of consumers to safe, wholesome and unadulterated fish and fishery products.
d. Closely linking food security in fish to the supply, availability and cost of other protein sources.
e. Actively discouraging, through guidelines, awareness, laws and regulations, all unhealthy chemical introductions into the supply chain.
f. Working with the industry to ensure that set minimum standards for safety and quality assurance are effectively applied throughout the industry. Where possible the implementation of quality standards agreed within the context of the FAO/WHO Codex Alimentarius Commission and other relevant organizations or arrangements should be promoted.
g. Working with the industry to establish and maintain effective national safety and quality assurance systems to protect consumer health.
h. Supporting cooperation between states in the region to achieve harmonization, or mutual recognition, or both, of national sanitary measures and certification programmes as appropriate and explore

possibilities for the establishment of mutually recognized control and certification agencies.

i. Assessing the potential and appropriateness of evening out supply fluctuation through fish storage.
j. Encouraging the use of fish for human consumption, rather than for other purposes, and promote consumption of fish whenever appropriate.
k. Conducting international trade in accordance with the principles, rights and obligations of relevant international agreements and develop policies and practices in ways which do not obstruct trade, cause environmental damage or generate negative social impacts.

10. Promoting sound Institutional Support to the sector through:

a. Raising the profile of the post-harvest sector on the national policy agenda.
b. Building capacity for both understanding the post-harvest sector and intervention in the sector at national, district and community levels.
c. Ensuring that adequate funding and priority is given to post-harvest research.
d. Adopting multi-disciplinary and multi-agency approaches to interventions in the sector and forming partnerships between agencies to ensure coordination and increased effectiveness.
e. Recognising the importance of statistics related to the livelihoods of people and ensuring that adequate and appropriate information on these aspects of the sector is generated for policy processes.
f. Ensure transparency of, and the participation of fishworkers, industry and environmental organisations in, decision-making related to laws and policies.
g. Working with aid agencies, multilateral development banks and other relevant international organizations to ensure that policies and practices related to the promotion of international fish trade and export production do not result in environmental degradation or adversely impact the nutritional rights and needs of people for whom fish is critical to their health and well being and for whom other comparable sources of food are not readily available or affordable.
h. Working with those involved in the sector to avoid conflict and where necessary to resolve it.
i. Ensuring that the livelihoods of those in the sector are taken into consideration in wider planning processes, especially those linked to coastal area management.
j. Recognising the holistic nature of the livelihoods of people in the post-harvest sector and striving to promote more integrated planning and service delivery.
k. Ensuring that the infrastructural needs of the sector, especially roads linking landing sites to markets, are incorporated into wider infrastructural development policies.

These principles can be adapted and modified based on findings from the SWOT analysis carried out as described above so that they become specific to the country

for which the overview is being prepared. These in turn will lead to guidance that can inform and influence fisheries post-harvest policy. They will also provide the guiding framework to help those wishing to address the priorities established through the SWOT process to coordinate their work.

NEXT STEPS

What the Overview does not provide are the specific strategies or options that institutions and stakeholders may wish to consider in relation to applying a particular principle. For practical purposes it makes good sense to leave these decisions to the intervener as they will know best their objectives, mandates, skills, experience, networks and resources which would need to be mobilised for a particular intervention strategy. The detail of any intervention is also likely to require further information gathering and consultation, beyond what has taken place during the development of the Overview. In broad terms, though, inspiration for strategies may be derived from the following:

- FAO guidance documents on implementing the CCRF
- What has worked well in fisheries in other countries
- What has worked previously in fisheries in the country concerned
- What has worked well in other sectors
- The coping and adaptive strategies of the people in the sector

Considered in conjunction with the SWOT analysis and the set of principles developed above should be the various knowledge gaps which have been identified at the end of several sections of the Overview.

Using the Overview to inform and influence key institutions and stakeholders in the sector will be crucial to its success. It may be necessary to hold workshops and discussion groups to make people aware of its existence and value. It should also be distributed widely to key decision makers in central and local government, NGOs and private sector to both gain a working consensus on the way forward for the sector and to begin to identify how to build on and add to the Overview. It is not a static document but a step towards a continuous process of better understanding and better responses.

SECTION 8: OVERVIEW STRUCTURE

As a rough guide the Post-Harvest Overview should have the following main headings:

- **Contents**
- **Acknowledgements**
- **Abbreviations used in the text**
- **Forward** (explaining how the report came about and why it is important)
- **Introduction** (explaining the importance of the sector)
- **Post-Harvest Fisheries and Wider Policy**
  - **-Introduction**
  - **-The Post-Harvest Sector and the CCRF**
  - **-The Importance of the Post-Harvest Sector Nationally**
  - **-The Post-Harvest Sector and Global Connections**
  - **- Post-Harvest Fisheries in the Wider Context**
  - **-Poverty and the Post-Harvest Sector**
  - **-Post-Harvest in the National Context**
  - **-Key Knowledge Gaps**
- **The Current Situation in the Sector**
  - **-Introduction**
  - **-Supply**
  - **-Transformation**
  - **-Consumption**
  - **-Key Knowledge Gaps**
- **Key Changes in the Sector and their Cause**
  - **-Introduction**
  - **-Changes in the Wider Situation**
  - **-Changes in Supply**
  - **-Changes in Transformation**
  - **-Changes in Consumption**
  - **-Key Knowledge Gaps**
- **The Impact of Change**
  - **-Introduction**
  - **-Impact on Poverty Reduction**

SECTION 9: USEFUL WEB LINKS

DFID's Post Harvest Fisheries Research Programme	http://www.nrinternational.co.uk/
Sustainable Livelihoods	http://www.livelihoods.org/
FAO	http://www.fao.org/
The Codex Alimentarius	http://www.codexalimentarius.net/
The Codex Alimentarius (fish components)	http://www.codexalimentarius.net/STANDARD/volume9/vol9_e.htm
The Code of Conduct for Responsible Fisheries	http://www.fao.org/fi/agreem/codecond/codecon.asp
Globefish	http://www.globefish.org/
INFOFISH	http://www.infofish.org/
INFOPECHE	http://www.globefish.org/entry_infopeche.htm
INFOPESCA	http://www.infopesca.org/
INFOSAMAK	http://www.globefish.org/entry_infosamak.htm
EASTFISH	http://www.eastfish.org/english.htm
INFOYU	http://www.globefish.org/entry_infoyu.htm
World Trade Organisation	http://www.wto.org
Agenda 21	http://www.unep.org/unep/partners/un/unced/agenda21.htm
UNCLOS	http://www.unclos.com/
UNDP	http://www.undp.org/
OECD	http://www.oecd.org/EN/home/
UNIFEM and fish processing	http://www.unifem-eseasia.org/Projects/Haiphong.html
Kyoto and food security	http://www.fao.org/fi/agreem/kyoto/H12F.asp
Fishbase	http://fishbase.org

SECTION 10: USEFUL DOCUMENTS

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