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ACRONYMS AND ABBREVIATIONS

ADB	- Asian Development Bank
AFMA	- Agriculture and Fisheries Modernization Act
AFMP	- Agriculture and Fisheries Modernization Plan
AFS	- Asian Fisheries Society
AG	- Asid Gulf
AIG	- Albay Gulf
ALS	- automatic locator system
APEC	- Asia Pacific Economic Cooperation
AQ	- aquaculture
AQD	- Aquaculture Department
ARMM	- Autonomous Region for Muslim Mindanao
ASEAN	- Association of Southeast Asian Nations
BAP	- best aquaculture practices
BAR	- Bureau of Agricultural Research
BAS	- Bureau of Agricultural Statistics
BC	- Babuyan Channel
BFAD	- Bureau of Food and Drugs
BFAR	- Bureau of Fisheries and Aquatic Resources
BOI	- Board of Investments
BP	- Burias Pass
BS	- Bohol Sea
BuB	- Butuan Bay
CAR	- Cordillera Administrative Region
CBD	- Convention on Biological Diversity
CCRF	- Code of Conduct for Responsible Fisheries
CENRO	- Community Environment and Natural Resources Office
CF	- commercial fisheries
CFV	- commercial fishing vessel
CHED	- Commission on Higher Education
CITES	- Convention on International Trade in Endangered Species of Wild Fauna and Flora
cm	- centimeter
CMMO	- Coastal and Marine Management Office
CNFIDP	- Comprehensive National Fisheries Industry Development Plan
CRM	- coastal resource management
CS	- Camotes Sea
CSO	- civil society organization
CSt	- Cebu Strait
DA	- Department of Agriculture
DAO	- Department Administrative Order
DAP	- Development Academy of the Philippines
DENR	- Department of Environment and Natural Resources
DepEd	- Department of Education
DG	- Davao Gulf
DOH	- Department of Health

DTI	- Department of Trade and Industry
EBFM	- ecosystem-based fisheries management
ECC	- Environmental Compliance Certificate
EEZ	- exclusive economic zone
EIA	- Environmental Impact Assessment
EIS	- Environmental Impact Statement
EMB	- Environmental Management Bureau
ESS	- East Sulu Sea
FAB	- Fisheries and Aquaculture Board
FAD	- fish aggregating device
FAO	- Food and Agriculture Organization; also Fisheries Administrative Order
FARMC	- Fisheries and Aquatic Resource Management Council
FIQS	- Fish Inspection and Quarantine Section
FISH Project	- Fisheries Improved for Sustainable Harvest Project
FLET	- Fishery Law Enforcement Team
FPE	- fish processing establishment
FPED	- Fisheries Policy and Economics Division
FRMP	- Fisheries Resource Management Project
GDP	- gross domestic product
GHP	- Good Hygienic Practices
GIFT	- Genetically Improved Farmed Tilapia
GIS	- geographic information system
GLP	- Good Laboratory Practices
GMP	- Good Manufacturing Practices
GMT	- Genetically Modified Tilapia
GT	- gross tonnage
GTZ	- German Technical Cooperation
GVA	- gross value added
ha	- hectare
HAB	- harmful algal bloom
HACCP	- Hazard Analysis Critical Control Points
IB	- Iligan Bay
ID	- Institutional Development and Policy Support
IEC	- information, education and communication
IFARMC	- Integrated Fisheries and Aquatic Resource Management Council
IIB	- Illana Bay
ImB	- Imuruan Bay
IPOA	- International Plan of Action
ISt	- Iloilo Strait
IUU	- illegal, unreported and unregulated
JC	- Jintotolo Channel
kg	- kilogram
km	- kilometer
km ²	- square kilometer
LaG	- Lagonoy Gulf

LB	- Lamon Bay
LG	- Leyte Gulf
LGC	- Local Government Code
LGU	- local government unit
LiG	- Lingayen Gulf
LM	- linear meter
LTO	- License to Operate
m	- meter
m ²	- square meter
M&E	- monitoring and evaluation
MARINA	- Maritime Industry Authority
MB	- Manila Bay
MC	- Maqueda Channel
MCS	- monitoring, control and surveillance
MDG	- Millennium Development Goals
MF	- municipal fisheries
MFDP	- Municipal Fisheries Development Plan
MG	- Moro Gulf
MLP	- mariculture livelihood parks
MOA	- Memorandum of Agreement
MOU	- Memorandum of Understanding
MPA	- marine protected area
MSt	- Mindoro Strait
MSY	- maximum sustainable yield
MTP	- Medium-term Period
MTPDP	- Medium-term Philippine Development Plan
NARRDS	- National Aquatic Resources Research and Development System
NCR	- National Capital Region
NFRDI	- National Fisheries Research and Development Institute
NGAs	- national government agencies
NGO	- nongovernment organization
NIPAS	- National Integrated Protected Areas System
NPOA	- National Plan of Action
NQS	- National Quality Standards
NSAP	- National Stock Assessment Program
NSO	- National Statistics Office
PA 21	- Philippine Agenda 21
PAMB	- Protected Area Management Board
PAWB	- Protected Areas and Wildlife Bureau
PCAMRD	- Philippine Council for Aquatic and Marine Research and Development
PCG	- Philippine Coast Guard
PD	- Presidential Decree
PENRO	- Provincial Environment and Natural Resources Office
PFDA	- Philippine Fisheries Development Authority
PG	- Panay Gulf

PhP	- Philippine Peso
PNP	- Philippine National Police
POC	- Planning Oversight Committee
PPA	- Philippine Port Authority
PTI	- Philippine Tilapia, Inc.
RA	- Republic Act
R&D	- research and development
RD&E	- research, development and extension
RG	- Ragay Gulf
RP	- resource person
SAFDZ	- Strategic Agricultural Fisheries Development Zones
SaS	- Samar Sea
SB	- Sibugay Bay
SEA	- Southeast Asia
SEAFDEC	- Southeast Asian Fisheries Development Center
SEZ	- Special Economic Zone
SMB	- San Miguel Bay
SOLAS	- Safety of Life at Sea
SRS	- satellite-based radar system
SS	- Sibuyan Sea
SSOP	- Sanitation Standards Operating Procedure
SSS	- South Sulu Sea
t	- ton
TAC	- total allowable catch
TaSt	- Tablas Strait
TB	- Tayabas Bay
TESDA	- Technical Education and Skills Development Authority
TNA	- training needs analysis
TOR	- terms of reference
TP	- Ticao Pass
TSt	- Tañon Strait
TwB	- Tawi-Tawi Bay
TWG	- Technical Working Group
UN	- United Nations
UNCED	- United Nations Conference on Environment and Development
UNCLOS	- United Nations Convention on the Law of the Sea
UP AQUASOC	- University of the Philippines – Aquaculture Society
UPV	- University of the Philippines in the Visayas
USA	- United States of America
USAID	- United States Agency for International Development
USFDA	- United States Food and Drug Administration
VS	- Visayan Sea
WCPO	- Western and Pacific Ocean
WHO	- World Health Organization
WSS	- West Sulu Sea
WSSD	- World Summit on Sustainable Development

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This CNFIDP is unique, having gained political endorsement even from top government leaders. Pres. Gloria Macapagal- Arroyo herself endorsed the plan during the National Aquaculture Congress held on 27 October 2005 in Quezon City. Former House Speaker Jose de Venecia Jr. and Representative Luis Villafuerte (Chair, Committee on Aquaculture and Fisheries Resources) of the House of Representatives actively participated in developing CNFIDP. Since September 2004 until December 2005, 28 major consultations were undertaken to develop the plan. The list of the 74 institutions/agencies and 226 stakeholders who have participated are duly acknowledged in Appendices 2 and 3. It is hoped that CNFIDP will provide the comprehensive framework for promoting the optimal development and long-term sustainability of benefits derived by the nation from its fisheries. Consistent with this overall purpose, CNFIDP shall likewise provide the strategic directions for Philippine fisheries over the next 20 years (2006-2025), as well as the priority projects for implementation over the first 5-year medium-term period (2006-2010).

EXECUTIVE SUMMARY

The significance of the fisheries sector to the Philippine economy cannot be overstated. The country is endowed with rich fishery resources that supply a major part of the dietary requirements of Filipinos and provide substantial employment and contribute significantly to export earnings. Despite institutional reforms and many project interventions, however, the fisheries sector has not been yet effectively managed in an integrated and holistic manner. At present, the sector is still confronted with these nine key and interlinked problems/issues: (1) depleted fishery resources largely brought about by excessive fishing effort and open access regimes; (2) degraded fishery habitats due to destructive fishing methods, conversion of fishery habitats into economic uses and negative impacts from land-based activities; (3) intensified resource use competition and conflict, among fisher groups and other economic sectors; (4) unrealized full potential of aquaculture and commercial fisheries, as there are still underutilized areas for industry development; (5) uncompetitive products due to inferior quality and safety standards; (6) post-harvest losses in terms of physical, nutritional and value losses; (7) limited institutional capabilities, from the local up to the national levels of governance; (8) inadequate/inconsistent fisheries policies that promote conducive environment for sustainable development; (9) weak institutional partnership among government agencies, civil society organizations and private sector; and (10) lack of recognition of the roles and contribution of women fisherfolk in fisheries development.

In view of the above problems/issues, this CNFIDP has been developed to provide the comprehensive framework for promoting the optimal development and long-term sustainability of benefits derived by the nation from its fisheries. The CNFIDP, consistent with this overall purpose, provides strategic directions for the Philippine fisheries over the next 20 years (2006-2025), as well as priority projects for implementation over the first 5-year medium-term period (2006-2010). The Fisheries Code of 1998 specifically requires the formulation of a CNFIDP. This plan builds on the gains of the previous national fisheries plans over the last three decades, starting with the Fisheries Industry Production Plan (1972-1986), and currently with the fisheries sector concerns that are subsumed within Chapter 2 (Agribusiness) Component of the Medium-term Philippine Development Plan (MTPDP) for 2004-2010. Aside from being a product of extensive consultations at all levels of governance, CNFIDP is likewise science-based, taking into account the best available scientific/technical information. Structurally, the plan is divided into five chapters.

Chapter 1 (Introduction) provides a general introductory and background elements to CNFIDP. Consisting of four sections, it describes plan's purpose, the planning process and analytical framework utilized, and the contents and

structure. **Section 1.1 (Purpose of the Plan)** describes the aim of CNFIDP, which is to provide long-term development and management framework of the Philippine fisheries sector. **Section 1.2 (Planning Approach and Process)** highlights the highly participatory and interactive planning process used in developing CNFIDP that formally started with the first consultative meeting in Subic, Zambales, on 21-23 September 2004. The process included 28 key consultations involving the direct participation of 74 agencies/organizations and 226 individual experts/stakeholders. **Section 1.3 (Analytical Framework for CNFIDP)** describes the analytical framework, presenting the holistic view of the “fisheries management system” that was used during the planning process. The human and natural resource components of the fisheries sector are contextualized within the broader context of the Philippine society and the world at large. **Section 1.4 (Contents and Structure of the Plan)** outlines the structure of the plan, including the linkages of its various elements.

Chapter 2 (Overview of Philippine Fisheries) provides an analysis of the fisheries sector situation, highlighting the main sectoral benefits/values, critical issues/problems and key opportunities. Eight sections provide a characterization of past and present situations, covering biophysical, socioeconomic and institutional dimensions. **Section 2.1 (Geographic Setting)** describes the fisheries' landscape in general and the spatial context of the water resource base (coastal/marine and inland waters), highlighting the archipelagic nature of the country. **Section 2.2 (Fisheries Resources)** describes three components: capture fisheries resources; aquaculture resources; and critical fisheries habitats, such as estuaries, mangroves, coral reefs, seagrasses, rivers and lakes. **Section 2.3 (Economic Performance of the Fisheries Sector)** highlights the macroeconomic performance of the fisheries sector in relation to the national economy. **Section 2.4 (The Socioeconomic Situation in Coastal Areas)** presents, among others, the population trends, key demographic features, labor force, employment and income patterns. **Section 2.5 (The Institutional Environment)** includes a synopsis of the policy and regulatory framework, institutional arrangements and mechanisms, coordination across agencies and private sector participation. **Section 2.6 (The Sectors of Fisheries in Focus)** characterizes the capture fisheries, aquaculture, marketing, post-harvest and ancillary industries. **Section 2.7 (Key Development Challenges)** describes the earlier mentioned nine key problems/issues confronting the sector, that include resource use problems (e.g., depleted fishery resources, degraded habitats, etc.) as well as institutional issues (e.g., limited capability of management agencies, weak institutional partnership, etc.). **Section 2.8 (Key Development Opportunities)** pertains to potential development areas, such as delineation of property rights, utilization of offshore exclusive economic zone (EEZ), aquaculture expansion, improved post harvest, export potential and natural resource pricing.

Chapter 3 (Fisheries Sector Development Framework) provides a synopsis of the long-term sectoral development framework that covers four intricately related sections. It presents a prognosis of the future of the Philippine fisheries sector – as well as the strategic directions to be pursued in terms of overall goal and associated objectives – over a 20-year (2006-2025) time frame. It also serves as the conceptual link between Chapter 2 (Overview of Philippine Fisheries) and Chapter 4 (Medium-term Priority Programs and Projects). **Section 3.1 (Development Philosophy)** describes the internationally accepted philosophy concerning sustainable development that becomes the basis of CNFIDP. Pertinent concepts and/or relevant guiding principles specific to the fisheries sector are given emphasis, such as inter and intragenerational equity, holistic development, integrated management, precautionary principle, and ecosystem-based management and decentralized administration. **Section 3.2 (Strategic Development Factors/Trends and Scenarios)** examines the relevant factors, trends and/or drivers – at the national, regional and international levels – that influence the fisheries sector. It includes the relevant macroglobal and regional items (e.g., globalization, climate change and population growth, etc.), as well as fisheries-specific concerns (e.g., increasing demand for fishery products, excess capacity, technological advances and biodiversity, etc.). A prognosis for the Philippine fisheries sector is presented, taking into account the impacts of various factors/trends in optimizing and sustaining the direct and indirect socioeconomic benefits derived from fisheries. These benefits include food, employment, export earnings and economic contribution; emphasis is given to the national supply and demand for food fish. While capture fisheries are expected to still contribute significantly to food fish supply in the future, environment-friendly aquaculture is anticipated to meet the increasing demand for food fish.

Against the above backdrop, **Section 3.3 (Strategic Vision, Mission, Goal and Objectives)** defines the desired state for the sector. The vision – over a 20-year period – is “a sustainable and competitive fisheries industry that contributes to food security and provides optimum socioeconomic benefits to Filipinos”. The long-term goal is “to optimize and sustain the socioeconomic benefits from fisheries without jeopardizing the fishery resources and the associated habitats in the most administratively efficient and cost-effective manner.” Such goal has nine associated objectives, namely: (1) rationalize utilization of fishery resources; (2) protect fishery habitats; (3) reduce resource use competition and conflict; (4) develop full potential of aquaculture and commercial fishing; (5) promote competitiveness of fishery products; (6) minimize post-harvest losses; (7) enhance institutional capabilities; (8) promote appropriate fisheries policies; and (9) strengthen institutional partnerships. These nine objectives directly relate with the nine critical problems/issues earlier described. **Section 3.4 (Program Components and Indicative Phasing)** wraps up the chapter whereby the five program components (Municipal Fisheries, Commercial Fisheries, Aquaculture, Post

Harvest, and Institutional Development and Policy Support) are initially described. In terms of phasing, the nine objectives (strategic directions) to be pursued are provided with relevant indicators. Some targets are to be achieved within the first medium-term period (2006–2010) implementation, which will lay out the foundation for optimization and sustainable growth of the Philippine fisheries sector. Likewise, certain targets are expected to be achieved by the end of the 20-year (2025) CNFIDP planning period. These indicative targets are linked with the set of indicators given in the monitoring and evaluation (M&E) component of Chapter 5.

Chapter 4 (Medium-term Priority Programs and Projects) details the action agenda for the first medium-term period (2006-2010) consistent with the long-term, strategic directions given in Chapter 3. Such action agenda are expressed in terms of program components and project interventions to address the key issues and opportunities given in Chapter 2. Each project (described as concept proposals or project briefs in 7-point elements) has an implementation period of between 1 and 5 years. In total, 41 priority projects have been developed for 5 program components: (1) Municipal Fisheries, (2) Commercial Fisheries, (3) Aquaculture, (4) Post Harvest and (5) Institutional Development and Policy Support.

There are eight projects for the ***Municipal Fisheries Component*** to address its identified key problems. *Project 1 (Comprehensive Education Program for Fisheries and Aquatic Resource Management Council [FARMC] and Fisherfolk Organizations)* shall enhance the capabilities of local government units (LGUs) and local communities in various facets of fisheries management. *Project 2 (Validation of Priority Use Rights through Municipal Registration and Licensing)* is proposed to minimize resource use conflicts. *Project 3 (Enhancement of Locally Managed Marine Areas)* and *Project 4 (Rehabilitation and Regeneration of Coastal and Inland Ecosystems)* both relate to the issue of habitat degradation. *Project 5 (Sustainable Fisheries Livelihoods Support)* shall help resolve the livelihood-related concerns. *Project 6 (Infrastructure and Post-harvest Facilities Development for Municipal Fisheries)* addresses the need for inadequate infrastructure support, particularly cold storage facilities and fish landing centers. *Project 7 (Enhancement of Fishery Law Enforcement)* shall mitigate the concern for weak law enforcement. *Project 8 (Rationalization of Municipal Fishing Effort)* addresses the overfishing concern. Collectively, these eight project interventions are anticipated to result in the alleviation of poverty among municipal fishers.

Ten priority projects are developed for the ***Commercial Fisheries Component***. *Project 1 (Rationalization of Fishing Effort in Overfished Commercial Fishing Areas)* addresses the issue of excessive fishing effort in major traditional fishing grounds. *Project 2 (Development and Implementation of a Monitoring, Control and Surveillance [MCS] System for Commercial Fisheries)* deals with the continued poaching/intrusion in prohibited fishing areas and the absence

of monitoring system. *Project 3 (Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gear and Practices)* relates to the issue of degraded/critical fishery habitats. *Project 4 (Exploratory Fishing in the Exclusive Economic Zone [EEZ] and Beyond, and in Underexploited Commercial Fishing Grounds)* tackles the concern for limited access to regional/international resources/grounds, as well as the issue of underexploited resources in nontraditional commercial fishing grounds. *Project 5 (Studies on the Biology and Culture of the Pacific Bluefin Tuna, Thunnus orientalis)* addresses the issue of cage production of bluefin tuna and other offshore species for domestic and offshore markets.

Project 6 (Establishment of Cold Storage with Blast Freezer Facilities) focuses on the concern for lack of infrastructure facilities. *Project 7 (Information, Education and Communication [IEC] for Commercial Fishers/Fishing Vessel Operators)* shall help resolve the issue of lack of information system on commercial fisheries subsector requirements. *Project 8 (Rationalization of Fishing Vessel Designs and Fish Handling Systems)* deals with the problem of lack of appropriate boats/technology. *Project 9 (Implementation of the National Tuna Management Plan)* relates both to the issue of excessive fishing effort and resource use competition. *Project 10 (Legitimization and Implementation of the National Plan of Action [NPOA] to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated [IUU] Fishing)* is an initiative to address weak law enforcement. All these project interventions are geared towards the rational exploitation, sustainable development and conservation of fisheries and aquatic resources in Philippine commercial waters, including EEZ and the adjacent high seas.

For **Aquaculture Component**, eight projects are proposed to address in a more integrated manner the issues besetting the industry. *Project 1 (Development of a Focused, United and Strategic Vision and Road Map for the Industry)* deals with the crucial issue of the lack of strategic direction and aims to create a more focused aquaculture industry. *Project 2 (Enhancement of Research, Development and Extension [RD&E] Programs and Prioritization based on Immediate Needs of Industry)* aims to respond to the issue of inadequate programs on RD&E and to promote investment in research from other sectors. *Project 3 (Promotion of Investments in the Hatchery Industry)* deals with the issue of limited species variety and reliance on wild seed stock by strengthening the hatchery industry. *Project 4 (Development of Domestic Supply Chain and Expansion of Export Markets)* is a response to the concern on low prices of aquaculture products by improving the distribution and marketing of fishery products. *Project 5 (Institutionalization of Best Aquaculture Practices [BAP], Quality Standards and Farm-based Hazard Analysis Critical Control Points [HACCP])* seeks to address unsustainable aquaculture practices and to reduce environmental degradation and improve quality of aquaculture products. *Project 6 (Increasing Aquaculture Productivity*

through Intensification and Use of Domesticated Strains) is an attempt to provide a solution to the problem of underproductivity through improved growth of cultured stock and tolerance to diseases. *Project 7 (Increasing Export Competitiveness through Special Economic Zones [SEZ])* addresses the undeveloped mariculture practices by establishing special economic zones in the mariculture of species of high market potential. *Project 8 (Promotion of Aquaculture as Livelihood for Fishers and Smallholders)* is a response to the issue on lack of opportunities for fisherfolks and aims to uplift the socioeconomic status of fishers by reducing their dependence on fish capture through promotion and adoption of low-input aquaculture activities. Implementation of these projects shall increase contribution of the aquaculture industry in national development through the adoption of progressive and economically competitive technology under a framework of social equity and environmental sustainability.

For the ***Post Harvest Component***, seven priority projects are proposed to mitigate the core problems of lack of competitiveness of Philippine fish and fishery products and post-harvest losses. Five projects collectively address the issue of lack of competitiveness. *Project 1 (Strengthening of the Fish Inspection System in the Philippines)* addresses the issue of unsafe products. *Project 2 (Development of National Quality Standards [NQS] for Fish and Fishery Products)* relates to poor product quality, while the concern for weak marketing strategies is covered by *Project 3 (Marketing and Promotion of Philippine Fish and Other Aquatic Products)*. *Project 4 (Development of New Value Added Fishery Products)* and *Project 5 (Characterization of Marine Natural Products)* specifically deal with limited product development activities. Two projects directly address the issue of post-harvest losses. *Project 6 (Reduction of Fisheries Post-harvest Losses via "Cold Chain System")* shall establish the necessary infrastructure facilities, as well as institute the standardization of fish processing methodologies to reduce post-harvest losses and maintain high-quality products. *Project 7 (Model Villages for Philippine Fisheries Post-harvest)* aims to develop model villages for fisheries post harvest through combined research, technology development/adaption and community-based fisheries management. All these projects will support the development of comprehensive programs on product safety and quality systems and of market and marketing systems for Philippine fish and other aquatic products, and lead to the eventual reduction of post-harvest losses.

Concerning the ***Institutional Development and Policy Support Component***, eight projects are geared towards achieving fully functional fisheries management systems and structures. *Project 1 (Strengthening the Bureau of Fisheries and Aquatic Resources' [BFAR's] Institutional Capacity)* is meant to enhance the capability of BFAR as the premier fisheries management agency. *Project 2 (Building Fisheries Management Capacity through Effective Multisectoral Partnerships)*, *Project 3 (Networks of Local Fisherfolk and*

Aquaculture Communities) and *Project 4 (Alliances for the Integrated Co-management of Fisheries Ecosystems)* address the issue of weak institutional partnerships. *Project 5 (Strengthening Business Sector Capability)* is aimed at building the capacity of the business sector, recognizing that its contribution to the development of the industry is paramount. *Project 6 (Improving the Policy and Regulatory Framework for Fisheries)* addresses the issue of inadequate/inconsistent fisheries policies. *Project 7 (Enhancing Fisheries Education and Training for a Sustainable Industry);* and *Project 8 (Enhancing Gender Responsiveness in Philippine Fisheries Industry Development Program)* addresses the issue of limited institutional capabilities, particularly the provision of trained and competent human resource. These projects aim to address the critical capacity gaps of the institutional system, as well as develop the management capacity and institutional partnerships for effective management of the fisheries sector.

Chapter 5 (Medium-term Implementation Scheme) describes the recommended implementation arrangements, schedule, costs and monitoring scheme for CNFIDP's first medium-term period. These elements are described in general terms, and expressed in a form intended to be expanded and detailed by BFAR during the operational programming stage that immediately follows after the formal CNFIDP adoption. **Section 5.1 (Institutional Arrangements)** describes the general elements of the proposed organizational structure for plan implementation, as well as mechanisms to enhance the participation of relevant fisheries agencies and stakeholders. The BFAR shall take the lead role and responsibility for CNFIDP implementation. Moreover, it shall engage industry groups and appropriate multi-agency and multistakeholder fora to facilitate and enhance sectoral consultations, collaboration and participation which are essential to successful plan implementation. Contingent on operational realities and evident needs during plan implementation, appropriate partnerships shall be established to effect participation and consolidation of resources and strengths across relevant fisheries agencies/stakeholders, as well as support implementation of projects under CNFIDP. **Section 5.2 (Implementation Schedule and Indicative Costs)** provides the implementation schedule and indicative costs of the 41 projects comprising the 5 medium-term program components of CNFIDP. Most of the projects (35 out of 41) constitute activities to be implemented over the entire 5-year medium-term period (2006-2010). The indicative total cost for implementing the 41 projects is about PhP 6.7 billion for the entire 5-year period (2006-2010) or roughly PhP 1.33 billion annually. Distribution of this total cost across the 5 medium-term program components of CNFIDP is as follows: (1) Municipal Fisheries – 36%; (2) Commercial Fisheries – 23%; (3) Aquaculture – 11%; (4) Post Harvest – 20%; and (5) Institutional Development and Policy Support – 10%. External financing schemes will be explored given the limited capability of the national government, such as the private sector and international funding institutions. **Section 5.3 (Monitoring**

and Evaluation Scheme) describes the key elements needed for effective assessment of CNFIDP's implementation. Inputs for development of performance indicators are provided, and general elements of the M&E implementing mechanism are briefly described. The M&E scheme should be able to track progress in achieving the overall goal and objectives of the plan; provide accurate and timely feedback to implementing groups and partners; and clearly define responsibility and accountability for implementation performance and achievement of plan objectives. Overall, the judicious implementation of the above 41 priority projects across five program components is anticipated to strengthen the foundation towards sustainable development of Philippine fisheries.

CHAPTER 1

INTRODUCTION

This chapter provides a general introduction to the Comprehensive National Fisheries Industry Development Plan (CNFIDP). *Section 1.1 (Purpose of the Plan)* describes the objectives of CNFIDP, which is to provide the comprehensive framework for promoting the optimal development and long-term sustainability of benefits derived by the nation from its fisheries. The CNFIDP, consistent with this overall purpose, provides strategic directions for Philippine fisheries over the next 20 years (2006-2025), as well as priority projects for implementation over the first 5-year medium-term period (2006-2010). *Section 1.2 (Planning Approach and Process)* highlights the highly participatory and interactive planning process that was used in developing CNFIDP. The process included 28 key consultations involving the direct participation of 74 agencies/organizations and 226 individual experts/stakeholders. *Section 1.3 (Analytical Framework for CNFIDP)* describes the analytical framework, presenting the holistic view of the "fisheries management system" that was used during the planning process. *Section 1.4 (Contents and Structure of the Plan)* outlines the contents and structure of the plan (viz.: Chapter 1 describes the CNFIDP's purpose, the planning process utilized, and the contents and structure of the plan; Chapter 2 provides an analysis of the fisheries sector situation, highlighting the main sectoral benefits/values, critical issues/threats and key opportunities; Chapter 3 provides a synopsis of the long-term sectoral development framework; Chapter 4 details the first medium-term (2006-2010) action agenda consistent with the long-term, strategic directions given in Chapter 3; and Chapter 5 describes the recommended medium-term implementation arrangements, schedule, costs and monitoring scheme for CNFIDP).

1.1 Purpose of the Plan

The Philippines is naturally endowed with rich fishery resources and associated ecosystems. The fisheries sector is a significant component of the national economy, and many poor coastal dwellers derive substantial employment and income from fishing and aquaculture. The fisheries sector contributes substantially to food security and social stability in many poor, rural communities in the country. Moreover, the sector contributes to export earnings and provides a major part of the dietary requirements of the population. Despite the numerous benefits they generate, Philippine fisheries evidently require improved and integrated development and management in order to optimize and sustain the multiple benefits derived by the nation from the sector. Currently, the sector is confronted with a host of interconnected issues and challenges, which negatively affect the magnitude and sustainability of benefits derived from fishing and aquaculture.

This CNFIDP (covering the period 2006-2025) is designed to provide the comprehensive framework for promoting optimal development and long-term sustainability of benefits derived by the Philippines from its fisheries. The Fisheries Code of 1998 (Republic Act [RA] 8550) specifically requires the formulation and implementation of such a comprehensive development and management plan for the sector. This CNFIDP provides the strategic priorities and directions for the fisheries sector over the next 20 years (2006-2025) in response to current (as well as potential) issues and challenges affecting the sector. In addition, it lays out the key program and project interventions for implementation over the first 5-year medium-term period (2006-2010) consistent with the long-term strategic priorities and directions. The CNFIDP contains both development (e.g., physical infrastructure support, expansion activities, marketing assistance) and conservation (e.g., resource rehabilitation, habitat restoration) elements. Moreover, it supports programmatic implementation of the "six critical actions" for improving capture fisheries as recommended by national experts (Luna *et al.* 2004), namely: reduction and rationalization of fishing effort, protection/rehabilitation of fisheries habitats, improved utilization of harvests, enhanced local stewardship and management of resources, supplemental/alternative livelihood for fishers, and capacity-building and institutional strengthening.

The CNFIDP builds on various national fisheries plans over the last three decades (Table 1.1.a). These national plans varied in their objectives, scope and areas of emphasis. The first plan covered the period 1972-1986 and largely focused on production expansion and extension services. The second plan resulted from the National Conference on Fisheries Policy and Planning held in Baguio City in March 1987. It consisted of three volumes, namely: (1) Main Report; (2) Technical and Policy Formulation; and (3) Conference

Papers. The third plan derived from the National Workshop on Fisheries Policy Planning and Industry Development held in Puerto Azul, Cavite, in February 1996. The second and third plans identified long-term (10-year) strategic development thrusts for fisheries and corresponding action programs for the various subsectors (i.e., municipal fisheries, commercial fisheries and aquaculture) and special concerns (e.g., post harvest, policy, institutions). The subsequent plans (fourth through seventh plans in Table 1.1.a) were part and parcel of the medium-term agricultural/development plans of the Ramos, Estrada and Macapagal-Arroyo administrations, respectively. In the latest Medium-term Philippine Development Plan (MTPDP), the fisheries elements and concerns are subsumed within the Chapter 2 (Agribusiness) component of the plan.

Table 1.1.a. National plans pertaining to Philippine fisheries, 1972-2010.

1. Fisheries Industry Production Plan, 1972-1986
2. National Fisheries Policy and Plan, 1987
3. National Fisheries Policy and Plan for Industry, 1996
4. Medium-term Fisheries Management and Development Program: a Component of the Medium-term Agricultural Development Plan, 1993-1998
5. President Erap's Agrikulturang Maka-masa (Fisheries), 1999-2004
6. Ginintuang Masaganang Ani for Fisheries Program, 2002-2004
7. Chapter 2 (Agribusiness) Component of the Medium-term Philippine Development Plan, 2004-2010

The CNFIDP satisfies three main requisites of a national fisheries plan. First, it contains all the critical planning elements, including comprehensive situational assessments, exhaustive problems/solutions diagnoses, projections of benefits, prognoses of the future and likely development scenarios, programmatic interventions, institutional arrangements and monitoring scheme. Second, CNFIDP is a product of extensive and participatory consultations at all levels, involving various concerned agencies and stakeholders. Third, the plan is science-based, taking into account the best available scientific/technical information and best practices consistent with existing international fisheries instruments and guidelines.

1.2 Planning Approach and Process

The general planning process adopted for formulation of CNFIDP follows the generic planning cycle widely used in sectoral planning exercises (Figure 1.2.a). This general planning process consists of five closely related and overlapping steps, namely: (1) sector analysis; (2) plan formulation; (3) plan endorsement and adoption; (4) action/operational planning; and (5) plan implementation, monitoring and evaluation (M&E). The planning process was undertaken over a period of about 15 months (from September 2004 to

December 2005); and completely covered steps 1-3 (inclusive), as well as elaborated key elements for use in steps 4 and 5.

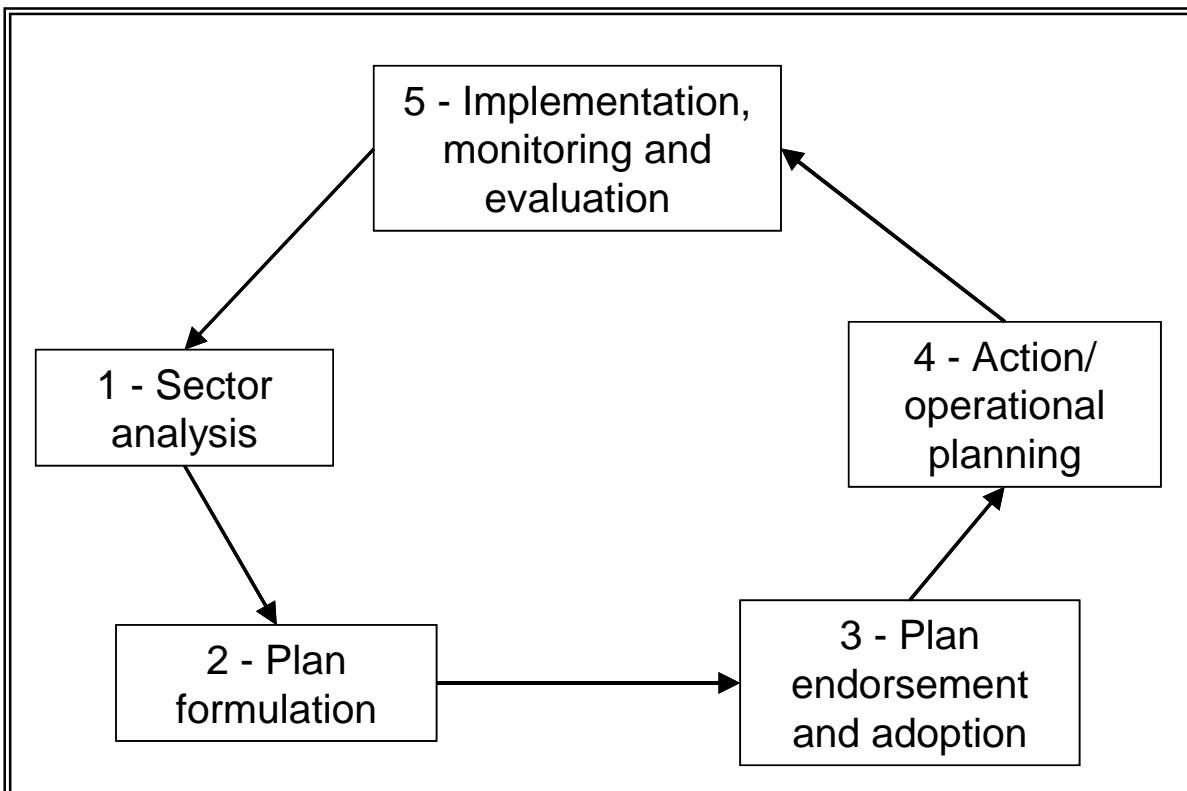


Figure 1.2.a. General planning process used for the formulation of CNFIDP.

The first step in the planning process (sector analysis¹) mainly involved an evaluation of the key current and future issues, problems and opportunities confronting the fisheries sector. This involved rigorous assessments of existing literature and information, as well as a series of expert and multistakeholder consultations to establish consensus. Problems and issues were structured into cause-effect relationships to facilitate logical identification of feasible interventions. Step 2 (plan formulation) mainly involved an evaluation of alternative development scenarios, sectoral visioning exercises and identification of interventions (in the form of appropriate strategies and actions which were subsequently packaged into discrete projects). These led to elaboration of strategic priorities/objectives and directions for the sector over the long term (2006-2025), as well as identification of projects for implementation over the first medium-term period (2006-2010) of the 20-year strategic time horizon. The project interventions were grouped into 5 program components corresponding to major problems/objectives that they address. Each project was packaged in a 7-point format (viz., project title, site/coverage, rationale/background, goal and

¹ This phase formally started with the first Consultative Meeting in Subic, Zambales, on 21-23 September 2004 (see Appendix 1).

objectives, key activities, schedule of activities and indicative budget) to facilitate their communication and subsequent operational programming by implementing agencies/groups. Steps 1 and 2 of the CNFIDP planning process took roughly 10 months to complete (September 2004 - July 2005), including several rounds of enhancement exercises involving various expert/stakeholder groups.

Step 3 of the planning process (plan endorsement and adoption) consisted mainly of CNFIDP draft presentation, assessment and refinement exercises involving various officials of the Department of Agriculture (DA)-Bureau of Fisheries and Aquatic Resources (BFAR), other fisheries agencies/organizations, experts and selected stakeholder groups. This step in the process formally lasted about five months (July - December 2005), although endorsement of various plan elements was a continuous undertaking since the commencement of the planning process in September 2004. This was done through the active involvement of various stakeholders and experts from BFAR and other relevant agencies/organizations in Steps 1 and 2 as described above. Establishment of a viable constituency for CNFIDP was an underlying or overarching theme during the course of the planning process. This was to facilitate "ownership", uptake and implementation of the plan by relevant implementing actors and stakeholders.

Step 4 (action/operational planning) and Step 5 (implementation, M&E) represent the implementation phases after formal adoption of CNFIDP. Step 4 mainly entails operational programming of CNFIDP projects into detailed tasks and/or activities by the designated implementing groups or agencies. Step 5 mainly involves actual ground execution of programmed tasks/activities and the tracking of their performance and impacts, as well as the overall progress in achieving the objectives of the entire plan. The CNFIDP provides key inputs for these subsequent implementation steps. For instance, the medium-term project prescriptions, implementation arrangements and monitoring scheme elements are essential inputs to facilitate operational planning, implementation, and M&E of CNFIDP. It is envisioned that necessary revisions to CNFIDP may be made after one round through the planning/implementation cycle; and a revised CNFIDP should emerge together with the next medium-term period (2011-2015).

The general structure of the "composite" planning team involved in orchestration of the planning process and the development of CNFIDP is illustrated in Figure 1.2.b. The Planning Oversight Committee (POC) was mainly responsible for overall design and supervision of the planning process and the drafting and finalization of CNFIDP based on process inputs. The POC was created by the Director of DA-BFAR and composed of five senior staff from DA-BFAR and the Fisheries Improved for Sustainable Harvest (FISH) Project (a project of the Government of the Philippines executed through DA-

BFAR and selected local government units [LGUs]) with funding from the USAID). The POC was chaired by the Assistant Director for Technical Services of DA-BFAR. Five Technical Working Groups (TWGs) were created by the Director of DA-BFAR based on recommendations of POC, namely: (1) Municipal Fisheries TWG; (2) Commercial Fisheries TWG; (3) Aquaculture TWG; (4) Post Harvest TWG; and (5) Institutional Development and Policy Support TWG. The TWGs provided the technical expertise for their respective themes at each step of the planning process and generated the necessary inputs to various elements of the plan. The TWGs also undertook the necessary consultations with relevant stakeholders and/or subsector representatives for their respective subject or thematic areas. The number of members for each of the five TWGs varied between 8 and 24 persons who came from relevant government agencies (local and national), academic/research institutions, civil society groups and the private sector. Some representatives are involved in more than 1 TWG. Each TWG was co-chaired by a senior staff from DA-BFAR and a representative from relevant stakeholder groups. The FISH Project also provided a vice-chair for each TWG to assist the TWG co-chairs in process and technical matters. Each TWG also commissioned experts or resource persons (RPs) to join the TWG at various stages of the planning process to help supplement group expertise and/or deliver key reviews and outputs. A Secretariat, consisting of staff from DA-BFAR and the FISH Project, provided technical and administrative support to the POC and the five TWGs during various stages of the planning process.

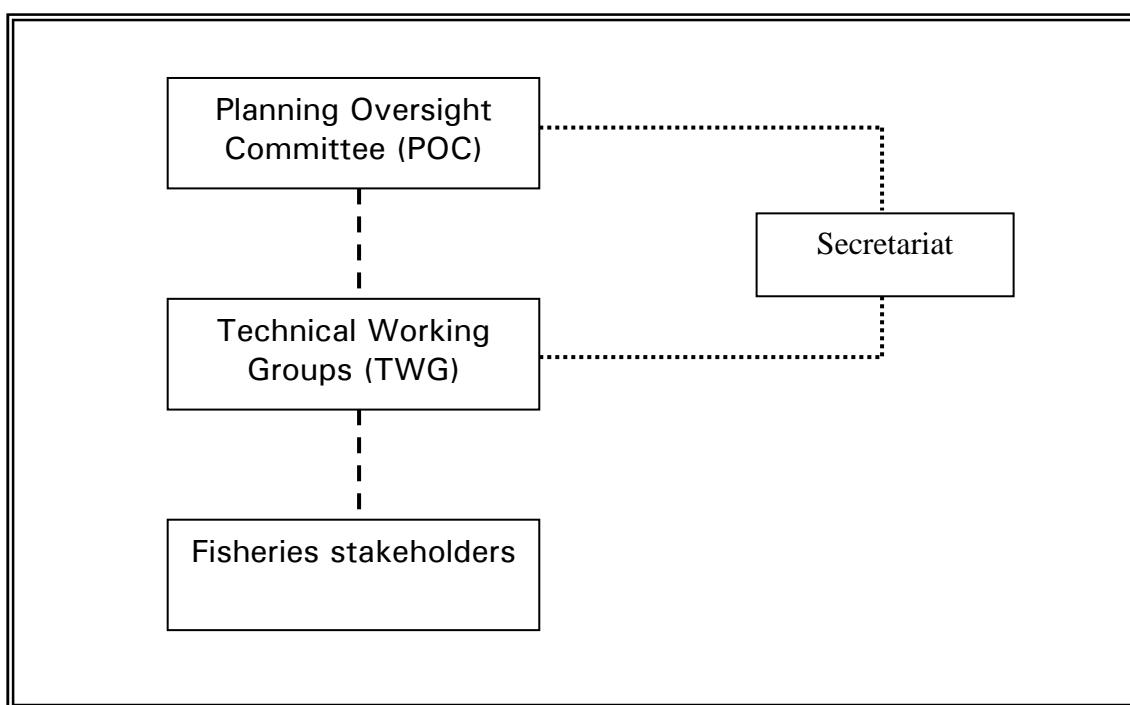


Figure 1.2.b. Organizational structure of CNFIDP planning team.

Overall, a total of 28 major meetings and consultations were conducted by the planning team during the course of the planning process (Appendix 1) to elaborate various elements of CNFIDP. This excludes numerous small-group expert meetings and *ad hoc* consultations with various stakeholder/industry groups. A total of 226 individual experts/stakeholders belonging to about 74 agencies/organizations were involved in the major meetings and consultations (see Appendices 2 and 3). The general flow of inputs for formulation of various elements of CNFIDP is given in Figure 1.2.c. It illustrates schematically the roles and responsibilities of various groups comprising the planning team, as well as the overall flow of input generation, consultations and packaging of CNFIDP elements during the course of the planning process.

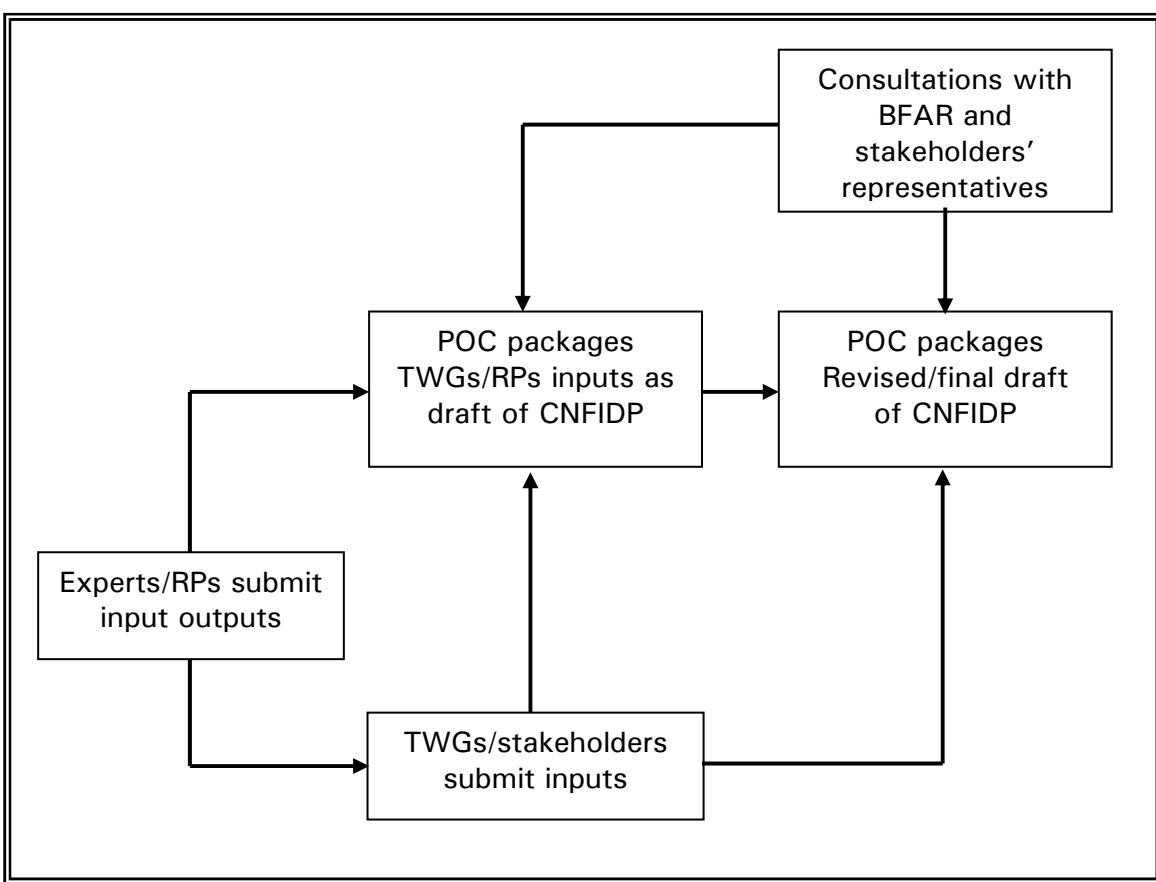


Figure 1.2.c. General flow of inputs for formulation of CNFIDP.

The civil society, particularly women groups, conducted independent consultations with organized women fishers at the national level on the working drafts of the CNFIDP. The aim of these consultations, which was started in September 2006 and led by BUDYONG-Pinagbuklod na Lakas ng Kababaihan sa Pangisdaan and NGOs for Fisheries Reform, was to assess the gender responsiveness aspect of the draft plan. Continuing reviews and consultations were organized by the Pambansang Koalisyon ng Kababaihan sa Kanayunan (PKKK) which is a

national network of women from the different rural sectors in the country, through its Fisheries Cluster (FC). BFAR, FISH Project and the National Commission on the Role of the Filipino Women (NCRFW), were invited to these consultations for their inputs on the draft and presentation of the government's gender mainstreaming process and framework. The outputs of the consultations were submitted to BFAR for consideration. A dialogue with BFAR GAD Focal System was held in July 2007 to present the consolidated outputs. Upon the suggestion of BFAR, PKKK submitted the proposed amendments to the draft CNFIDP for consideration in the preparation of the final draft of the plan.

1.3 Analytical Framework for CNFIDP

The analytical framework is based on the premise that a fisheries management system is composed of two broad facets: (1) human dimension and (2) natural dimension (Figure 1.3.a). These twin aspects, which interact dynamically, explain the essential inter-relationships and interdependence of human and natural dimensions within a fisheries system. The human dimension is composed of two parts: the socioeconomic component and the institutional environment. Among others, the legal and policy frameworks, implementing mechanisms and pertinent plans/programs are contained in such institutional environment. Given this setup, the institutional environment determines the types of socioeconomic activities that can be undertaken pertaining to the fisheries sector. Human activities/actions determine the flow of fishery resources over time. In the Philippines, the relevant human activities pertaining to municipal fisheries, commercial fisheries, aquaculture and post harvest have impacts on the state of the fisheries. The human dimension, including the socio-economic component and institutional environment, can further be understood as having a gender dimension where roles, responsibilities and policies on the utilization and management of the resources differ between men and women.

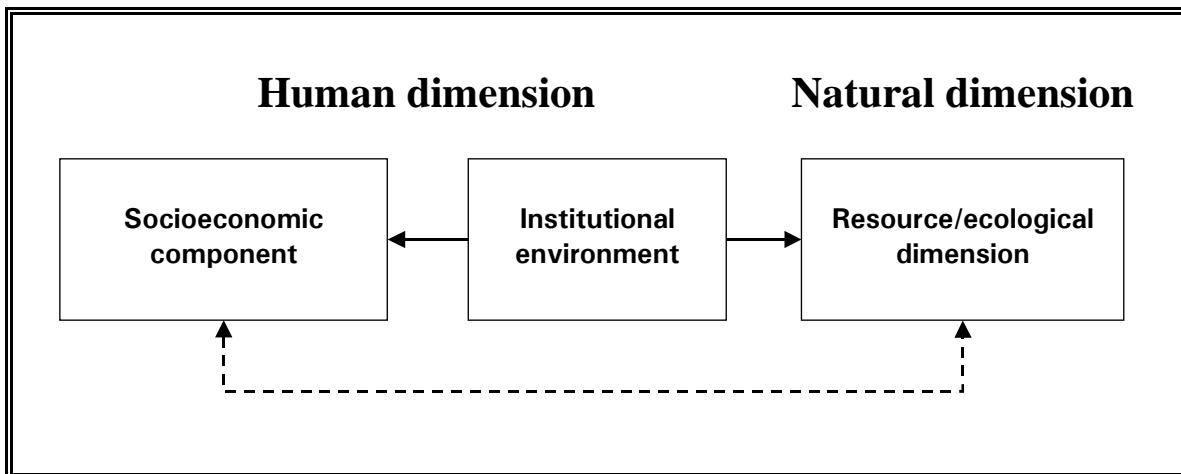


Figure 1.3.a. General analytical framework for viewing the fisheries management system (modified from Silvestre 1996).

The natural dimension sustains the flow of goods and services that are derived from the fishery resources. Examples of goods are the fishery products captured from the wild or harvested from aquaculture. The benefits, on the other hand, are expressed in terms of nutrition, incomes, employment and export earnings. The framework recognizes that the fishery resources emanate from, and are sustained by the natural ecological processes and health of the relevant fishery habitats. The institutional environment, however, influences the state of the natural dimension. These may take the forms of policies and regulations that affect the resource use patterns and utilization of the fisheries.

Generally, the sustainability of a fisheries system can be characterized by the interplay of human and natural dimensions. However, traditional planning techniques do not integrate socioeconomic, institutional and resource/ecological factors altogether. Development planners and decision makers are now expected to integrate socioeconomic, institutional and ecological/natural resource factors at all levels of planning as espoused in the 1992 United Nations Conference on Environment and Development (**which also recognizes women's roles in sustainable development**). Hence, a broad conceptual framework as reflected in Figure 1.3.a. is needed for CNFIDP. Such framework is modified from the paradigm earlier developed in Bicol Region's San Miguel Bay Fisheries Sector Project (Silvestre 1996), and used as a guide in the DA-BFAR book entitled "*In turbulent seas: the status of Philippine marine fisheries*" (Luna *et al.* 2004).

Based on the basic premise, Figure 1.3.b acknowledges the need to contextualize the sustainability of the fisheries through an integrated analysis of human dimension (socioeconomic component and institutional environment) and natural dimension (resource/ecological factors). It elaborates that institutional, socioeconomic, gender and natural resource considerations should

be integrated to provide a more comprehensive or holistic assessment of the fisheries sector using a multidisciplinary approach. The institutional environment is pivotal, as it contains the legal and policy framework, as well as the institutional arrangements/mechanisms. Without any effective legal and policy framework, it is likely that both the wild stocks and cultured species will not be sustainably managed. In capture fisheries, for example, policy and regulation affect fishing fleets in terms of fleet size and composition. Policy instruments for fisheries management exist at the international level, such as the UN's Agreement relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks and the Food and Agriculture Organization's Code of Conduct for Responsible Fisheries (CCRF). These provide guidelines for the development of fisheries policy instruments at the national and local levels. Policy and regulatory actions will result in changes to the ecological/fishery resource base and the socioeconomic well-being in terms of the: (1) goods and services that are available from the use of the fishery resources and (2) factors of production used to produce those goods and services.

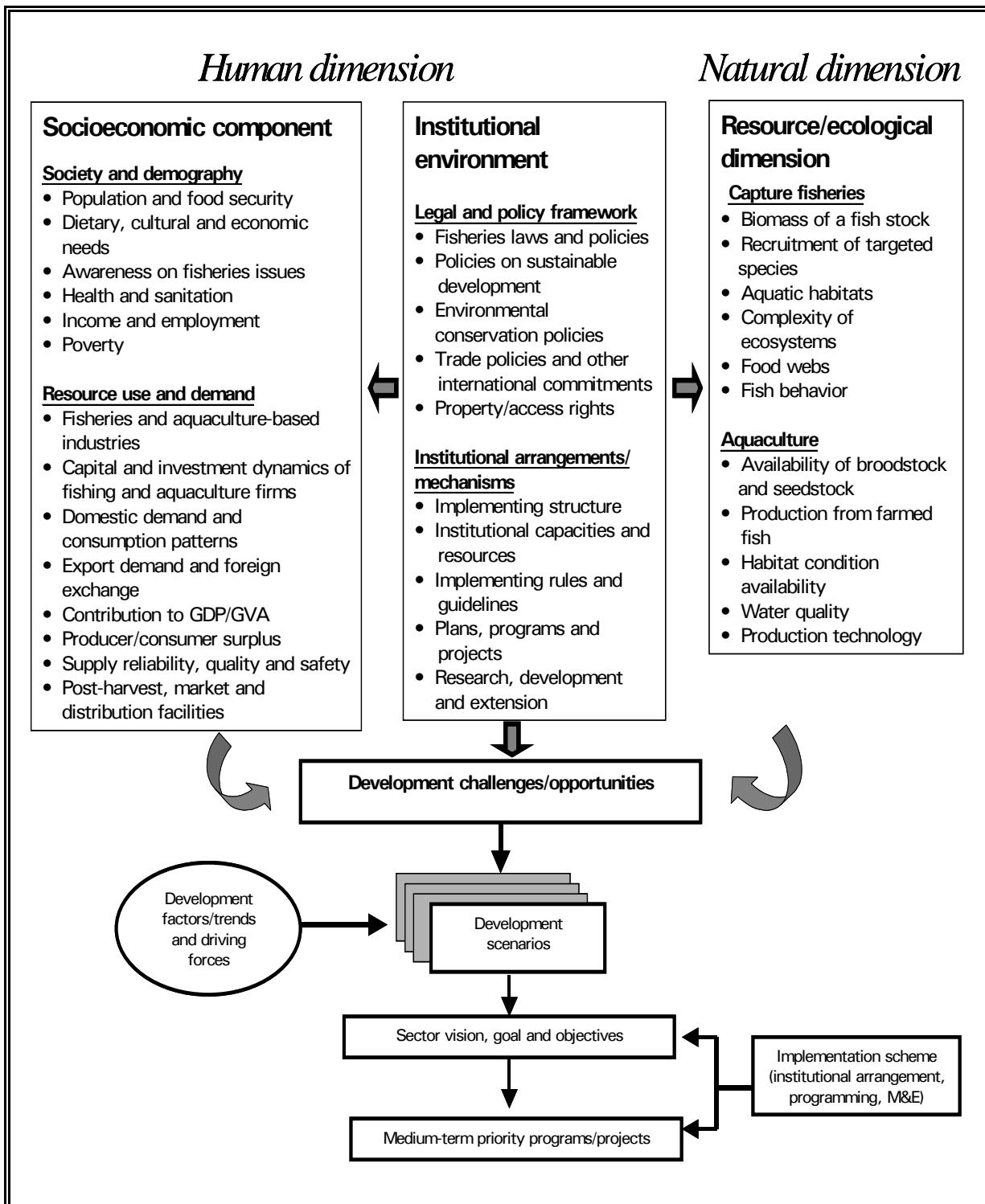


Figure 1.3.b. Expanded analytical framework of CNFIDP.

Legal and policy frameworks influence the institutional arrangements/mechanisms. The main national laws are the 1998 Fisheries Code, the 1997 Agriculture and Fisheries Modernization Act (AFMA) and the 1991 Local Government Code. These laws in turn define the roles of the institutions and responsibilities of other stakeholder groups involved. The basic institutional arrangements for fisheries management are through LGUs for municipal waters and DA-BFAR for all fisheries and aquatic resources other than municipal waters. The Fisheries and Aquatic Resource Management Councils (FARMCs) provide advisory role from the village up to the national levels. Currently, BFAR is the lead national agency for fisheries management; however, most of the local-level fisheries management functions have been delegated to LGUs. The partnerships and coordination operate at the various levels of organizational hierarchy. Institutional capacities and resources vary among individual organizational entities. In general, the human resource support of LGUs that are devoted to the fisheries sector has been fairly limited. The resources allocated for research, development and extension (RD&E) are limited compared to those provided by the counterpart agencies in other Southeast Asian countries. National fisheries plans contain specific programs, projects and activities for the sector. As described earlier in Section 1.1, the last national fisheries plan was the Ginintuang Masaganang Ani for Fisheries Program (2002-2004), while the current national programs and projects for the fisheries are contained in the Agribusiness Component of the Medium-term Philippine Development Plan, 2004-2010. Associated with CNFIDP are the municipal fisheries development plans, comprehensive post-harvest and ancillary industries plan, as well as national commodity (road map) plans. Although BFAR is taking the lead, other national government agencies, such as the Department of Environment and Natural Resources (DENR), as well as nongovernment organizations (NGOs) and the private sector, are likewise involved in developing and implementing some fisheries initiatives.

The socioeconomic component consists of items broadly related with society and demography, as well as resource use and demand. In the Philippines, the fisheries provide a host of socioeconomic benefits in terms of food, employment, recreation, trade and socioeconomic well-being for the Filipinos. Domestic food security issues are at the core of the fisheries sector's relevance to the national economy. The Philippines has been a fish-eating nation, and its population growth of 2.36% per annum has implications in terms of food security. The sector employs directly more than 1.5 million people, many of whom are living beyond the poverty line. Many women depend on the fisheries for subsistence and livelihood as users, but gender disaggregated information remains a challenge for policy formulation and programming. The prevalent notion that women are merely fisher's wives and that they do not contribute productively and economically to the sector still has to be addressed. FAO (2002) states that continued levels of poverty

in small-scale fishing communities and those in many inland waters contribute to failures in management and policymaking directed at preventing overexploitation, stock decline and exacerbation to rural food insecurity.

Several domestic laws and policies as well as international treaties and conferences recognize women's rights to sustainable development. The essence of this recognition of gender equality and women's participation in development is stated in the Constitution, and other enabling laws, such as Women in Nation-Building Act (RA7192) and its Implementing Rules, Local Government Code (RA 7160), Agriculture and Fisheries Modernization Act (RA 8435) and the Fisheries Code. Executive Orders have been issued on the GAD mainstreaming. International conferences and agreements since the 1975 International Women's Year Conference have recognized women's equal rights to development. In the decades that followed, women's participation in the development process has been underscored in the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), UN Conference on Environment and Development (UNCED), Beijing Platform for Action, and Millennium Development Goals, to name a few.

Regulatory actions affect some socioeconomic elements, such as demand for fishery products, capture fishing opportunities, aquaculture, supply of fish and fish products, post harvest, market and distribution interactions. These, in turn, affect fishing decisions and the conditions of the fisheries resources and their habitats. Competitive fishing firms base their decisions on deployable capital, necessary efforts (e.g., fishing trips) and observed state of the target species. Socioeconomic considerations include changes in net benefits; changes in distribution of benefits and costs; and changes in employment and income in fishing communities. In addition, as a result of conditions in the marketplace (e.g., changes in prices), the quantities of fish and fish products that are produced (supply) or consumed (demand) will vary. The importance of the fisheries industry is also being realized through its contribution to international trade and the resultant foreign exchange that this trade generates.

Central to the socioeconomic component of the analytical framework is the concept of supply and demand. In every market, there are both buyers and sellers. The buyers' willingness to buy fish/fish products at various prices reflects the changes in the prices of related goods, income and consumer preferences. The sellers' willingness to supply fish in turn is affected by the changes in the price of other goods, changes in the prices of inputs and changes in technology. The demand for fisheries is expanding because of increasing population. Thus, domestic demand and consumption patterns of fishery products shape capture fisheries and aquaculture-based industries. Trade policies in turn, have an influence on export products, which contribute to the country's foreign exchange earnings. The continued supply of high-

quality and safe fishery products is dependent on the ecological and resource base conditions.

The components of the resource/ecological dimension are arbitrarily categorized into two: capture fisheries and aquaculture. Broadly, the capture fishery resources may be classified into demersals and pelagics from the marine environment, and freshwater species from rivers and lakes. For capture fisheries, reductions in the fish stock due to mortality or outmigration would be offset by increases in the fish stock due to births, growth of the fish in the remaining stock and inmigration. The natural equilibrium size of a fish population is the population size, which would persist in the absence of outside influences. Catch is commonly used as an estimator for the abundance of biomass. This situation changes when a management authority introduces measures imposing restrictions on the fishery (e.g., gear type, allowable catches, amount of effort, etc.). Such limitations change the decisions made by fishing firms. Restrictions are perceived as constraining economic opportunities. Fishing mortality is a function of effort levels that are determined by market and biological conditions, as well as by fishery regulations.

The dynamics for aquaculture species is quite different, given that many environmental factors/parameters can be controlled or manipulated through technology. Thus, the production from farmed fish is reliant on habitat condition, water quality and the availability of brood stock/seed stock. Ecosystem processes are the driving forces in the health and productivity of marine and freshwater resources. Their maintenance is the key to protecting fisheries biodiversity. Factors that affect biological diversity include ecosystem integrity, condition of critical habitats, endangered species and nontarget fish species. Water quality is particularly important in the case of aquaculture.

Because of the interplay of the institutional, socioeconomic and resource/ecological components, certain development challenges and opportunities happen in the sector. Development challenges pertain to the problems/issues while opportunities refer to the positive conditions in the Philippine fisheries. Such development challenges and opportunities, in turn, are affected by the development factors/trends and driving forces – both within and outside the sector – from local, national, regional and international levels. The scenarios for the sector shall then vary depending on the interplay of the various variables. Against this backdrop, the sector's vision, goal and objectives over the long term (2006-2025), as well as the medium-term programs/projects are set. The implementation scheme will provide the mechanism on how the plan will be implemented and evaluated through time.

The analytical framework is further operationalized into specific chapter elements of CNFIDP (Figure 1.3.c). The framework is conveniently divided into three parts. The uppermost part contains Chapter 2 (Overview of Philippine Fisheries). This provides a characterization of the past and present sectoral issues and opportunities. The middle part highlights Chapter 3 (Fisheries Sector Development Framework) which provides a prognosis of the Philippine fisheries sector's future – as well as the strategic directions to be pursued in terms of overall goal and associated objectives – within the context of a 20-year (2006-2025) timeframe. The lowest rung contains CNFIDP's last two chapters. Chapter 4 (Medium-term Priority Programs and Projects) provides the project interventions to achieve the targets for the first Medium-term Period (MTP) (2006-2010), consistent with the long-term strategic directions. Chapter 5 (Medium-term Implementation Scheme) provides the institutional arrangements, implementation schedule and indicative costs, and M&E scheme.

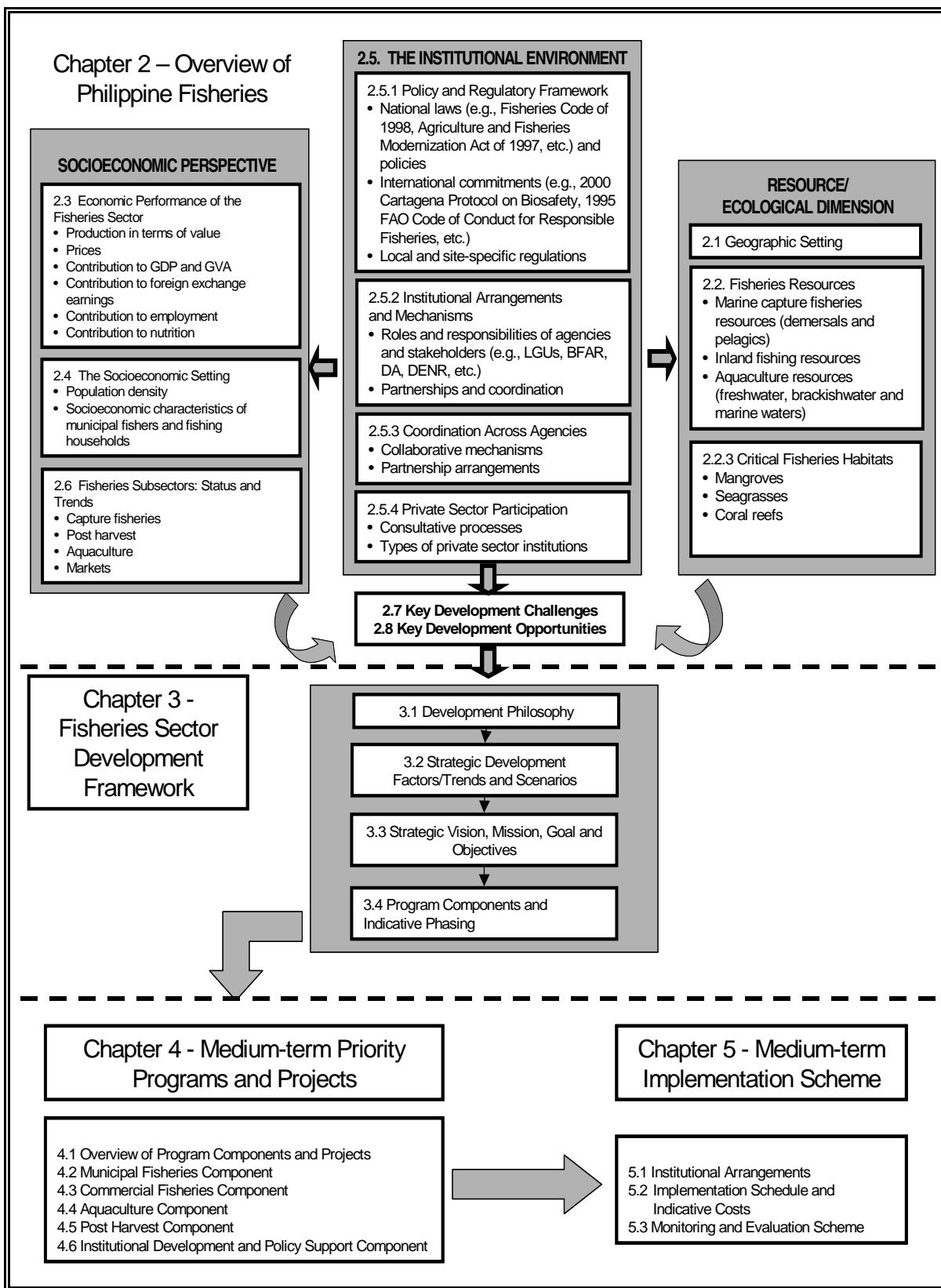


Figure 1.3.c. Analytical framework in relation to CNFIDP chapter elements.

Overall, the analytical framework identifies/describes the linkages among the institutional, socioeconomic and ecological aspects of the fisheries sector. Aside from looking at the direct beneficiaries and other stakeholders, the framework provides an understanding of the linkages between the activities undertaken by the stakeholders and the wider influences of society, culture, political structures and process, and economic processes. The result is a comprehensive assessment of the critical problems to be addressed, of strengths in the fisheries sector on which to build, and of opportunities for development in the fisheries industry. Finally, the framework provides a venue for evaluating partnerships among stakeholders and the role of institutions in identifying development options and strategies for intervention.

1.4 Contents and Structure of the Plan

Structurally, CNFIDP is divided into five core chapters. **Chapter 1 (Introduction)** provides the general introduction and the contextual background materials. Among others, it describes the purpose of CNFIDP, which is to provide the comprehensive framework for promoting the optimal development and long-term sustainability of benefits derived by the country from its fisheries. It underscores the highly participatory and interactive planning process involving the direct participation of 74 agencies/organizations and 226 individual experts/stakeholders. This chapter likewise contains the analytical framework, presenting the holistic view of the “fisheries management system”. Lastly, it outlines the contents and structure of the entire plan.

Chapter 2 (Overview of Philippine Fisheries) is technically a profile that provides a description of the Philippine fisheries industry. It is a situationer of the sector’s past and present, highlighting the main sectoral benefits/values, critical issues/threats and key opportunities. It includes an assessment of the ecological health of the fishery resources and all threats and impacts to be addressed; a comprehensive inventory and assessment of the fisheries industry in terms of socioeconomic interests; and an inventory and gap analysis of existing legal, jurisdictional and management approaches and structures. Key development challenges and opportunities are identified based on secondary literature and a series of consultations.

Chapter 3 (Fisheries Sector Development Framework) provides the strategic direction to be followed from 2006 to 2025. It begins by describing the development philosophy and guiding principles, as well as the relevant global factor/trends that have bearing on the fisheries, such as trade globalization, climate change, habitat destruction, increasing demand for fishery products and biodiversity concerns. It provides a prognosis for the sector in terms of the socioeconomic benefits, focusing on the national food fish security. The

plan is hinged on a shared vision of seeing a sustainable fishery over the long term. The CNFIDP has one goal and nine objectives that represent the strategic directions to be pursued for the sector. Lastly, the five program components – covering Municipal Fisheries, Commercial Fisheries, Aquaculture, Post Harvest and Institutional Development – and the suggested indicators and targets for the relevant medium-term plans are emphasized.

Chapter 4 (Medium-term Priority Programs and Projects) tackles the specific measures and/or interventions proposed to address the various management problems and issues identified over the first MTP (2006-2010). These action agenda are consistent with the long-term, strategic directions given in Chapter 3. Relevant interventions are expressed in project briefs, each consisting of seven elements. Specific projects are developed along the five program components, namely: Municipal Fisheries, Commercial Fisheries, Aquaculture, Post Harvest, and Institutional Development and Policy Support. Project briefs are prepared for a total of 41 priority projects.

Chapter 5 (Medium-term Implementation Scheme) describes the recommended medium-term implementation arrangements, schedule, costs and monitoring scheme for CNFIDP. Institutional arrangements cover the roles/responsibilities of the relevant agencies and stakeholders, including the relevant organizational structure in a collaborative mode. BFAR shall lead CNFIDP's implementation with support from the Fisheries Industry Consultative Forum. Most projects will start on the first year. The indicative costs of the projects are then described, including the potential funding sources. External financing schemes will be explored given the limited capability of the national government. The M&E component includes the mechanism to monitor progress of plan implementation based on indicators and targets, and the protocol for re-assessing the efficiency or effectiveness of the plan.

CHAPTER 2

OVERVIEW OF PHILIPPINE FISHERIES

This chapter provides an analysis of the fisheries situation in the country, both past and present. In eight sections, such characterizations cover the biophysical, socioeconomic and institutional dimensions. *Section 2.1 (Geographic Setting)* describes the landscape in general and the spatial context of the water resource base (coastal/marine and inland waters) for fisheries highlighting the archipelagic nature of the Philippines. *Section 2.2 (Fisheries Resources)* covers the capture fisheries resources, aquaculture resources and critical fisheries habitats, such as estuaries, mangroves, coral reefs, seagrass beds, rivers, lakes and small islands. *Section 2.3 (Economic Performance of the Fisheries Sector)* includes macroeconomic performance of the fisheries sector in relation to the national economy. *Section 2.4 (The Socioeconomic Setting)* highlights, among others, the population trends, key demographic features, labor force, employment and income patterns. This is followed by *Section 2.5 (The Institutional Environment)* that provides a synopsis of the policy and regulatory framework, institutional arrangements and mechanisms, coordination across agencies and private sector participation. *Section 2.6 (Fisheries Subsectors: Status and Trends)* describes four concerns: capture fisheries, aquaculture, post harvest and markets. *Section 2.7 (Key Development Challenges)* characterizes these nine key issues and/or problems confronting the sector: (1) depleted fishery resources; (2) degraded fishery habitats; (3) intensified resource use competition and conflict; (4) unrealized full potential of aquaculture and commercial fisheries; (5) uncompetitive products; (6) post-harvest losses; (7) limited institutional capabilities; (8) inadequate/inconsistent fisheries policies; (9) weak institutional partnerships; and (10) lack of recognition of women's roles and contribution in fisheries development. *Section 2.8 (Key Development Opportunities)* explains some positive conditions, such as the delineation of property rights, utilization of offshore exclusive economic zone (EEZ), aquaculture expansion, improved post harvest, export potential and natural resource pricing.

2.1 Geographic Setting

The Philippines is an archipelago of more than 7,100 islands that are located in Southeast Asia between the latitudes of $4^{\circ}05'N$ and $21^{\circ}25'N$ and between the longitudes of $112^{\circ}20'E$ and $127^{\circ}00'E$ (Figure 2.1.a). It extends some 2,000 km in a south-north direction from the territorial limit off Borneo up to 150 km off Taiwan. The Philippines has a coastline of 17,460 km and a total land area of $300,000 \text{ km}^2$. The larger islands are mostly mountainous with narrow to extensive coastal lowlands.

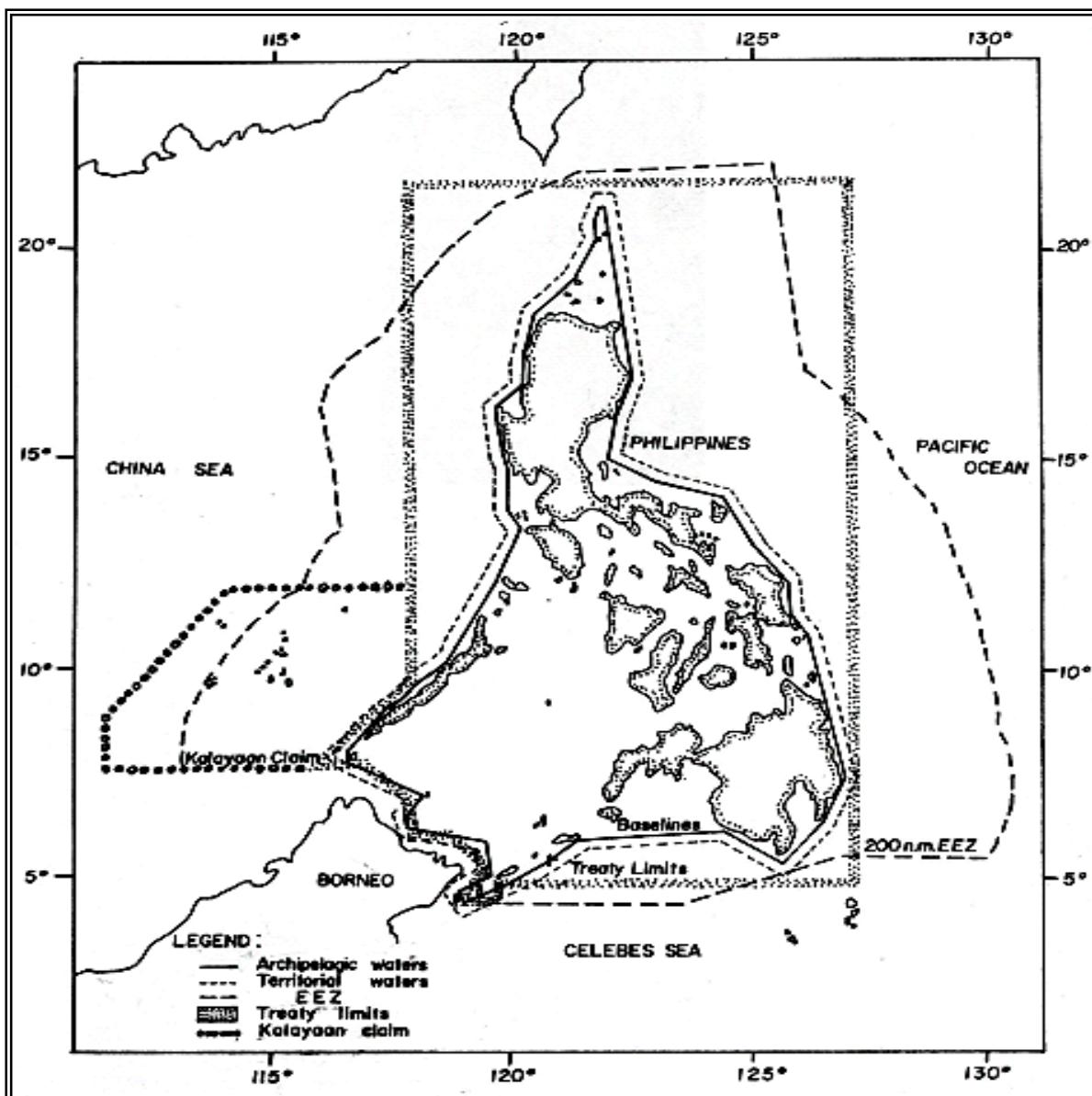


Figure 2.1.a. Map of the Philippines showing the limits of archipelagic waters, territorial waters, treaty limits (200 nautical miles EEZ) and Kalayaan Claim.

The territorial waters of the Philippines including EEZ total 2.2 million km², of which 226,000 km² are considered coastal while the rest are oceanic. The shelf area or the area within depths of 200 m (Figure 2.1.b) measures 184,600 km².

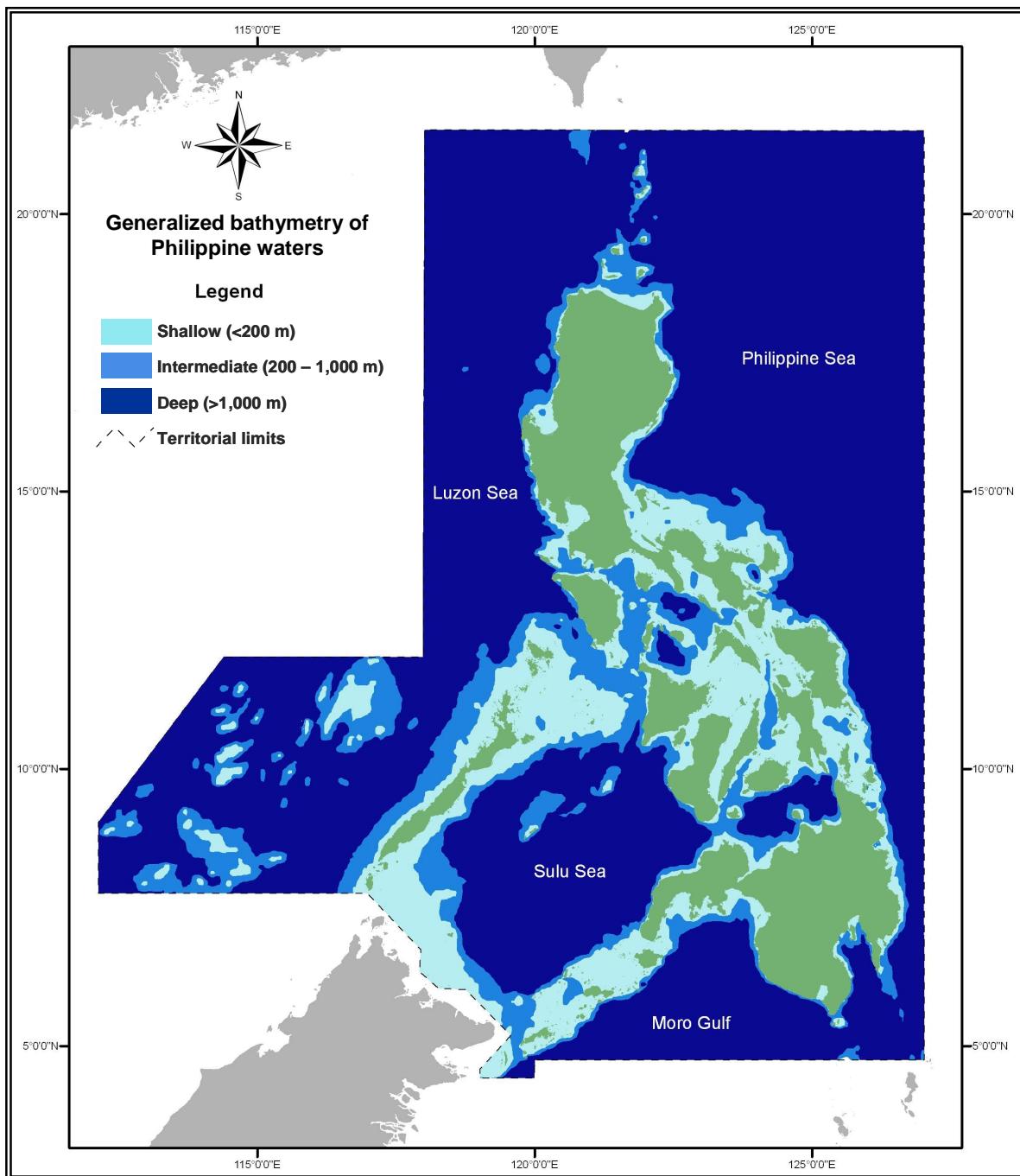


Figure 2.1.b. Generalized bathymetry of Philippine waters.

The Philippines is under a tropical maritime climate, which is characterized by relatively high temperature, high humidity and abundant rainfall. Two major seasons occur: the rainy season from June to November, and the dry season from December to May. The dry season is further divided into the cool dry season from December to February and the hot dry season from March to May.

The main weather systems that affect the country are the Southwest Monsoon, the Northeast Monsoon, the North Pacific Trade Winds and the Intertropical Convergence Zone. The Southwest Monsoon or the *habagat* blows from June to November, carrying moisture that produces the rainy season. The dry winds of the Northeast Monsoon or the *amihan* blow from December to May. During the transition between monsoons, the influence of the North Pacific Trade Winds is felt. On the other hand, the Intertropical Convergence Zone, a belt of low pressure formed where the Northeast Trade Winds meet the Southeast Trade Winds, oscillates throughout the country, bringing rains and thunderstorms. The Philippines lies at the world's typhoon belt and is on average affected by 15 typhoons and struck by 5-6 tropical cyclones per year. Tropical cyclones typically advance in a northwesterly direction and often do not directly hit Mindanao.

The eastern side of the country is influenced by the North Equatorial Current coming from the Pacific Ocean. Upon reaching the Philippines, the North Equatorial Current divides into a northward current flowing along eastern Luzon and Visayas and a southward current flowing along the eastern coast of Mindanao. The northward current exits the country as the Kuroshio Current and heads towards Taiwan and Japan. The southward current, known as the Mindanao Current, veers east to join the Equatorial Counter Current with a weaker branch flowing along the east coast of Mindanao. On the western side of the country, currents generated by seasonal monsoon winds are the dominant influence.

2.2 Fisheries Resources

Fisheries may be broadly categorized into capture fisheries and aquaculture. Capture fisheries involve catching or collecting fish and other aquatic animals from the natural environment while aquaculture is the husbandry or farming of aquatic plants and animals. Capture fisheries in the Philippines are divided into two subsectors: commercial or large-scale and municipal or small-scale. Legally, the Philippine Fisheries Code of 1998 defines municipal fishing as fishing without using vessels or with vessels of 3 GT or less and commercial fishing as fishing with vessels of more than 3 GT. In 2003, the aquaculture sector contributed 40% of the volume of fisheries production while the rest was split almost evenly between commercial and municipal fisheries

subsectors (Figure 2.2.a). The fisheries resources that maintain capture fisheries and aquaculture include the exploited species as well as the habitats that support these species.

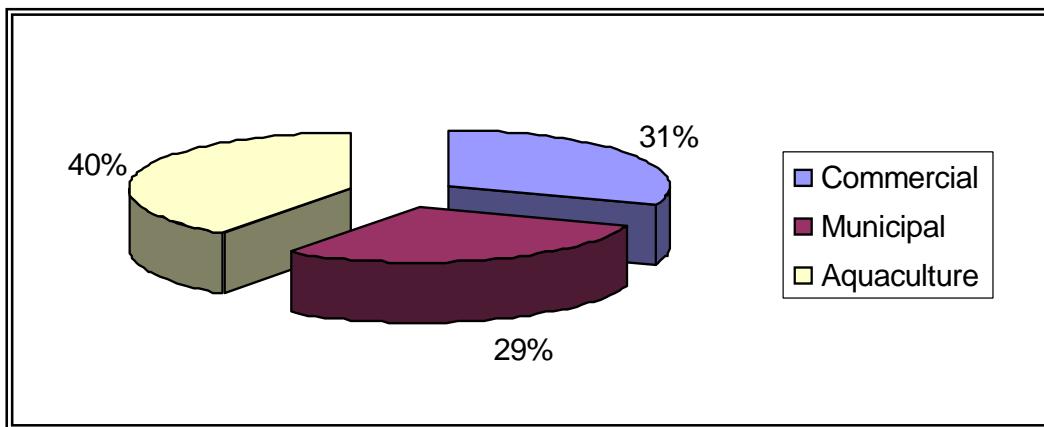


Figure 2.2.a. Percent contribution of fishery sectors to total volume of fish production, Philippines, 2003. Source: BAS (2005).

2.2.1 Capture Fisheries Resources

Fish capture is conducted in marine or inland waters, such as lakes and rivers. Ninety-four percent of capture fisheries production is caught from marine waters while the rest is taken from inland waters. Figure 2.2.1.a and Table 2.2.1.a show the location of major fishing grounds of the country.

2.2.2.1 Marine capture fisheries resources

Marine capture fisheries resources may be categorized into demersal and pelagic resources. Demersal resources reside near the bottom of the sea and consist of finfish and commercially important invertebrates, such as squids, shrimps and crabs. Pelagic resources, on the other hand, consist of finfish that are found near the sea surface.

Table 2.2.2.1.a lists the production of demersal species from 2001 to 2003. Demersal species comprise 16-18% of the total landings of marine capture fisheries while pelagic species account for the rest. At present, the most common demersal resources harvested are ponyfish, squids, threadfin bream and blue crab. About 21-29% of the demersal production consists of reef-associated species, or species that primarily reside in coral reefs (e.g., parrotfish) or frequently visit reefs (e.g., Cavalla). The majority of demersals, which are listed as nonreef demersals in Table 2.2.2.1.a, are mainly found in soft-bottom areas (sandy or muddy substrates).

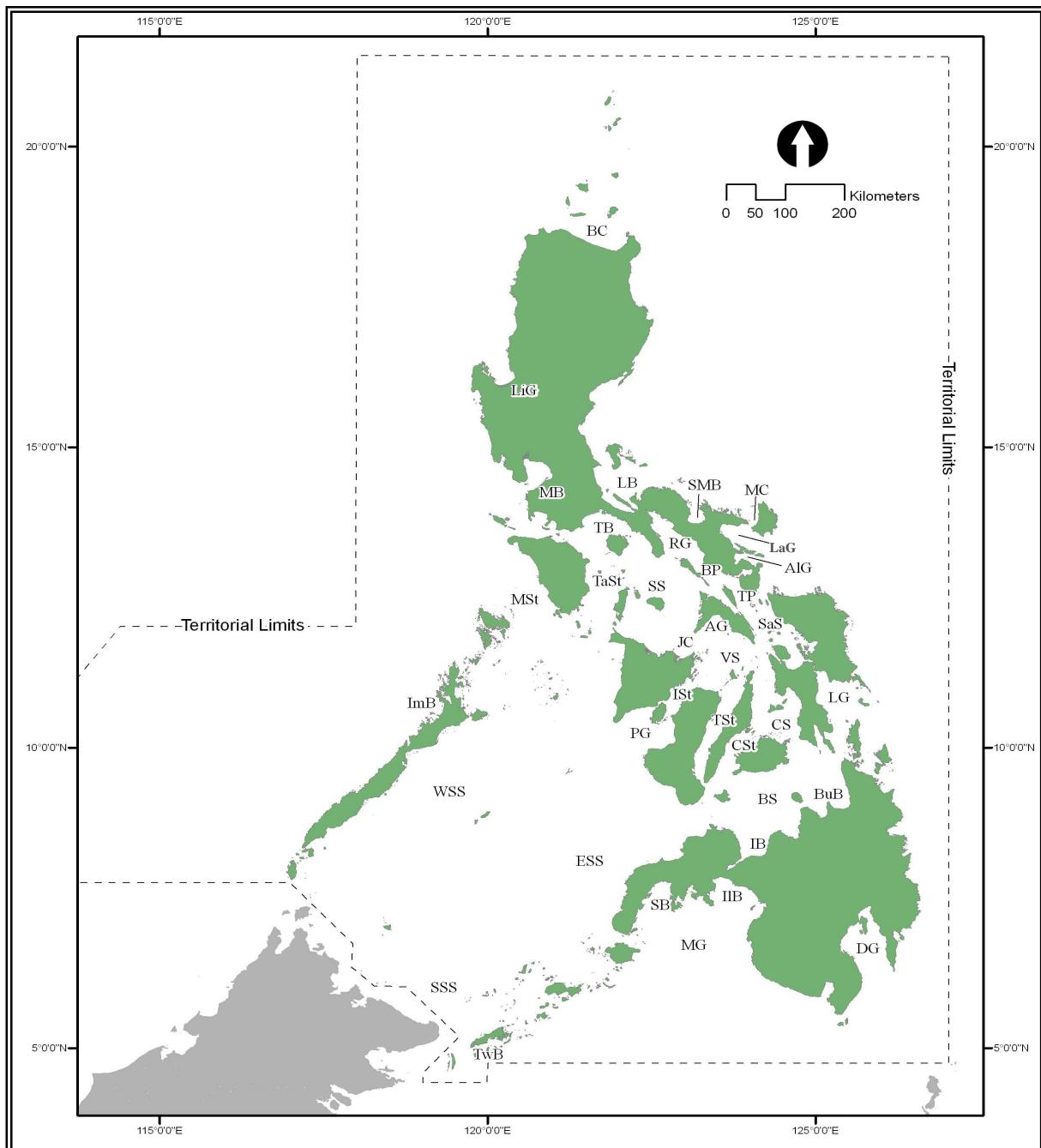


Figure 2.2.1.a. Major fishing grounds in the Philippines. See Table 2.2.1.a for key to abbreviations and area of fishing grounds. Source: BAS (2005).

Table 2.2.1.a. Area and location of major fishing grounds in the Philippines.
For a map of these fishing grounds, see Figure 2.2.1.a. Source: BAS (2005).

Fishing ground	Abbre-viation	Area (km ²)	Location
Seas			
1. West Sulu Sea	WSS	29,992.50	Palawan
2. South Sulu Sea	SSS	12,642.00	Zamboanga del Sur/Sulu/Tawi-Tawi
3. East Sulu Sea	ESS	9,288.00	Zamboanga del Norte/Negros
4. Sibuyan Sea	SS	8,127.00	Aklan/Masbate/Romblon
5. Bohol Sea	BS	7,946.00	Bohol
6. Samar Sea	SaS	3,870.00	Samar/Masbate/Leyte
7. Visayan Sea	VS	3,096.00	Panay/Negros/Cebu/Masbate
8. Camotes Sea	CS	2,476.80	Cebu/Leyte/Bohol
Bays			
1. Lamon Bay	LB	2,838.00	Quezon/Camarines Norte
2. Tayabas Bay	TB	2,213.00	Quezon
3. Illana Bay	IIB	2,128.50	Lanao del Sur/Maguindanao
4. Manila Bay	MB	1,935.00	Manila/Bataan/Cavite
5. Sibugay Bay	SB	1,935.00	Zamboanga del Sur
6. Iligan Bay	IB	1,811.16	Misamis Occidental/Lanao del Norte
7. Imuruan Bay	ImB	1,087.80	Palawan
8. San Miguel Bay	SMB	774	Camarines Sur
9. Tawi-Tawi Bay	TwB	592.4	Tawi-Tawi
10. Butuan Bay	BuB	516	Agusan del Norte
Gulfs			
1. Moro Gulf	MG	12,900.00	Zamboanga del Sur/Maguindanao/Sultan Kudarat
2. Davao Gulf	DG	4,024.00	Davao del Sur/Davao del Norte/Davao Oriental
3. Ragay Gulf	RG	3,225.00	Camarines Sur/Quezon
4. Leyte Gulf	LG	2,724.00	Leyte Island/Samar Island
5. Panay Gulf	PG	2,311.00	Iloilo/Negros Occidental
6. Lingayen Gulf	LiG	2,064.00	Pangasinan
7. Lagonoy Gulf	LaG	1,935.00	Albay/Camarines Sur/Catanduanes
8. Asid Gulf	AG	619	Masbate
9. Albay Gulf	AIG	412.8	Albay
Channels			
1. Babuyan Channel	BC	3,612.00	Cagayan/Babuyan Island
2. Jintotolo Channel	JC	280	Capiz/Masbate
3. Maqueda Channel	MC	129	Camarines Sur/Catanduanes
Straits			
1. Tablas Strait	TaSt	3,870.00	Tablas Island/Mindoro Oriental
2. Mindoro Strait	MSt	3,426.24	Palawan/Mindoro Occidental

3. Tañon Strait	TSt	2,786.40	Cebu/Negros
4. Cebu Strait	CSt	1,818.90	Cebu/Bohol
5. Iloilo Strait	ISt	1,006.00	Iloilo/Guimaras
Passages			
1. Burias Pass	BP	1,393.20	Burias Island/Camarines Sur
2. Ticao Pass	TP	804.75	Ticao Island/Sorsogon

Table 2.2.2.1.a. Volume (t) of the top demersal species landed by commercial and municipal sectors from 2001 to 2003. Sources: production figures from BAS (2005). Habitat classification based on Froese and Pauly (2006).

	2001			2002			2003		
	Com.	Mun.	Total	Com.	Mun.	Total	Com.	Mun.	Total
Nonreef demersals									
Slipmouth (<i>sapsap</i>)	38,722	26,285	65,007	37,768	28,048	65,816	36,313	33,528	69,841
Squid (<i>pusit</i>)	14,177	27,787	41,964	16,616	33,996	50,612	15,365	37,735	53,100
Threadfin bream (<i>bisugo</i>)	6,931	20,148	27,079	12,834	36,423	49,257	13,817	26,697	40,514
Blue crab (<i>alimasag</i>)	1,053	37,030	38,083	1,444	31,503	32,947	1,587	31,433	33,020
Acetes (<i>alamang</i>)	9,031	10,915	19,946	7,907	5,713	13,620	5,890	7,197	13,087
Mullet (<i>kapak, banak</i>)	1,992	13,344	15,336	1,954	12,642	14,596	2,179	11,456	13,635
Porgies (<i>pango</i>)	259	6,405	6,664	2,565	5,472	8,037	2,358	5,703	8,061
Subtotal (nonreef species)	72,165	141,914	214,079	81,088	153,797	234,885	77,509	153,749	231,258
Percentage of demersal production	23.9	47.0	70.8	24.9	47.1	72.0	23.9	47.4	71.2
Percentage of capture fisheries production	4.0	7.8	11.8	4.3	8.1	12.4	3.8	7.6	11.4
Reef-associated demersals									
Goatfish (<i>saramulyete</i>)	5,992	8,299	14,291	11,262	13,178	24,440	10,389	14,855	25,244
Siganid (<i>samaral</i>)	1,194	19,142	20,336	947	16,634	17,581	1,103	17,424	18,527
Cavalla (<i>talakitok</i>)	3,098	11,981	15,079	2,370	12,383	14,753	3,150	12,290	15,440
Snapper (<i>maya-maya</i>)	1,202	13,169	14,371	2,132	11,498	13,630	2,067	9,772	11,839
Grouper (<i>lapu-lapu</i>)	1,746	9,593	11,339	3,441	10,472	13,913	3,359	10,450	13,809
Parrotfish (<i>loro</i>)	395	12,269	12,664	620	6,486	7,106	656	7,893	8,549
Subtotal (reef-associated species)	13,627	74,453	88,080	20,772	70,651	91,423	20,724	72,684	93,408
Percentage of demersal production	4.5	24.6	29.2	6.4	21.7	28.0	6.4	22.4	28.8
Percentage of capture fisheries production	0.8	4.1	4.9	1.1	3.7	4.8	1.0	3.6	4.6
Combined total (reef-associated and nonreef species)	85,792	216,367	302,159	101,860	224,448	326,308	98,233	226,433	324,666
Percentage of capture fisheries production	4.7	12.0	16.7	5.4	11.8	17.2	4.8	11.1	16.0

Fishing for demersal resources is typically conducted at depths of 40 m or less. Figure 2.2.2.1.a shows the location of the traditional demersal fishing grounds in the country.

Pelagic resources are further subdivided into small pelagics and large pelagics. Common small pelagic species include roundscad (*galunggong*), Indian sardines (*tamban*) and frigate tuna (*tulingan*) (Table 2.2.2.1.b). Most small pelagic fisheries occur in water less than 200 m deep (Zaragoza *et al.* 2004). Small pelagics account for about 56% of the total production of marine capture fisheries.

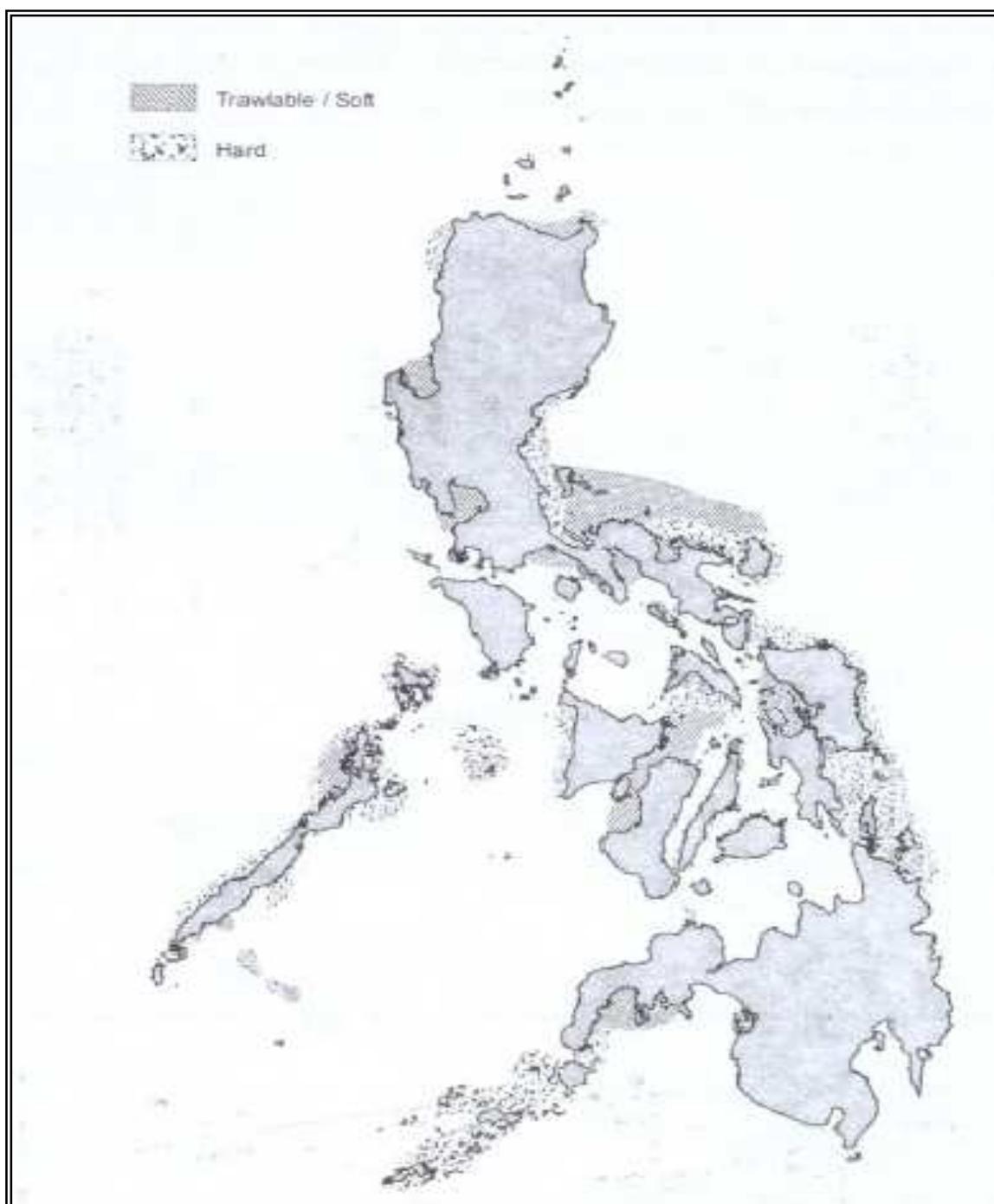


Figure 2.2.2.1.a. Traditional demersal fishing grounds of the Philippines.
Source: Armada (2004).

Table 2.2.2.1.b Volume (t) of the top small pelagic species landed by commercial and municipal sectors from 2001 to 2003. Sources: production figures from BAS (2005). Habitat classification based on Froese and Pauly (2006).

	2001			2002			2003		
	Com.	Mun.	Total	Com.	Mun.	Total	Com.	Mun.	Total
Nonreef small pelagics									
Roundscad (<i>galunggong</i>)	250,679	35,525	286,204	234,230	43,273	277,503	254,659	55,980	310,639
Indian sardines (<i>tamban</i>)	153,741	31,630	185,371	145,879	30,547	176,426	130,024	40,051	170,075
Frigate tuna (<i>tulingan</i>)	60,032	51,687	111,719	100,958	62,174	163,132	114,760	64,326	179,086
Anchovies (<i>dilis</i>)	39,191	61,708	100,899	33,706	40,389	74,095	28,654	42,447	71,101
Fimbriated sardines (<i>tunsoy</i>)	50,935	39,806	90,741	35,110	25,161	60,271	36,358	28,863	65,221
Indian mackerel (<i>alumahan</i>)	31,804	28,905	60,709	30,846	39,433	70,279	32,037	45,083	77,120
Flyingfish (<i>bolador</i>)	7,060	26,152	33,212	12,539	22,111	34,650	14,678	22,893	37,571
Indo-Pacific mackerel (<i>hasa-hasa</i>)	15,605	12,486	28,091	18,389	14,268	32,657	20,502	17,792	38,294
Round herring (<i>tulis</i>)	10,785	6,117	16,902	7,655	846	8,501	7,973	2,515	10,488
Hairtail (<i>balila</i>)	2,640	5,675	8,315	3,319	5,868	9,187	3,427	6,750	10,177
Subtotal (nonreef species)	622,472	299,691	922,163	622,631	284,070	906,701	643,072	326,700	969,772
Percentage of small pelagic production	59.6	28.7	88.3	58.8	26.8	85.6	57.1	29.0	86.0
Percentage of capture fisheries production	34.4	16.6	51.0	32.8	15.0	47.7	31.7	16.1	47.7
Reef-associated small pelagics									
Big-eyed scad (<i>matang-baka</i>)	36,596	44,262	80,858	38,889	61,897	100,786	39,621	64,354	103,975
Crevalle (<i>salay-salay</i>)	11,128	16,235	27,363	14,628	24,638	39,266	14,077	26,576	40,653
Caesio (<i>dalagang-bukid</i>)	6,047	7,630	13,677	5,841	6,321	12,162	6,062	6,636	12,698
Subtotal (reef-associated species)	53,771	68,127	121,898	59,358	92,856	152,214	59,760	97,566	157,326
Percentage of small pelagic production	5.2	6.5	11.7	5.6	8.8	14.4	5.3	8.7	14.0
Percentage of capture fisheries production	3.0	3.8	6.7	3.1	4.9	8.0	2.9	4.8	7.7
Combined total (reef-associated and nonreef species)	676,243	367,818	1,044,061	681,989	376,926	1,058,915	702,832	424,266	1,127,098
Percentage of capture fisheries production	37.4	20.3	57.7	35.9	19.8	55.7	34.6	20.9	55.5

Table 2.2.2.1.c lists the production of the common large pelagics, which account for 12-15% of the total production of the marine capture fisheries sector. The largest among these is the yellowfin tuna (*Thunnus albacares*), which attains a maximum length of 239 cm (fork length) and has a maximum published weight of 200 kg. Next largest is the Spanish mackerel (*Scomberomorus commerson*) followed by the skipjack (*Katsuwonus pelamis*) and the eastern little tuna (*Euthynnus affinis*). These species have respective maximum fork lengths of 240 cm, 108 cm and 100 cm, and respective maximum published weights of 70.0 kg, 34.5 kg and 14.0 kg. In contrast, the frigate tuna (*Auxis thazard*), though considered a large pelagic by some, attains

a maximum length of only 65 cm and has a maximum published weight of 1.7 kg (Froese and Pauly 2006).

Table 2.2.2.1.c. Volume (t) of the top large pelagic species landed by commercial and municipal sectors from 2001 to 2003. Sources: production figures from BAS (2005).

	2001			2002			2003		
	Com.	Mun.	Total	Com.	Mun.	Total	Com.	Mun.	Total
Skipjack (<i>gulyasan</i>)	80,766	24,718	105,484	83,385	26,592	109,977	114,077	24,242	138,319
Yellowfin tuna (<i>tambakol</i>)	49,055	34,505	83,560	63,051	36,743	99,794	87,473	39,767	127,240
Eastern little tuna (<i>katchorita</i>)	20,634	6,646	27,280	26,811	7,870	34,681	27,036	11,639	38,675
Spanish mackerel (<i>tanigue</i>)	1,735	7,350	9,085	2,429	6,601	9,030	2,790	6,641	9,431
Total	152,190	73,219	225,409	175,676	77,806	253,482	231,376	82,289	313,665
Percentage of capture fisheries production	8.4	4.0	12.5	9.2	4.1	13.3	11.4	4.1	15.4

Yellowfin tuna, skipjack and eastern little tuna are highly migratory species that cross territorial boundaries of several nations. In the Philippines, tunas are caught mainly from the Sulu Sea, Moro Gulf and north Celebes Sea, although considerable tuna fisheries also exist in waters off Western Negros, Northwestern Luzon and Southern Luzon (Zaragoza *et al.* 2004).

2.2.1.2 Inland fishing resources

The country's inland water resources include 200,000 ha of lakes, 31,000 ha of rivers, 19,000 ha of reservoirs, 106,328 ha of freshwater swamplands and 139,735 ha of brackishwater swamplands (BAS 2005). With a combined area of 496,063 ha, these water bodies can potentially support inland fishing, although aquaculture activities (e.g., fishponds, fishpens and fishcages) also utilize these resources.

Most inland fishing occurs in lakes. By far, Laguna Lake is the biggest (90,000 ha), followed by Lanao Lake (34,700 ha) and Taal Lake (23,400 ha) (BAS 2005). Together these three lakes account for 74% of the country's total area of lakes.

In 2003, the total landings from inland fishing amounted to 133,292 metric tons (t) valued at PhP 3.58 billion, of which 57% by volume were finfish, 37% were mollusks and 5% were crustaceans. The total finfish catch consisted of tilapia species (42% by volume), snakehead (*dalag*, 10%), carp (*carpa*, 10%), goby (*biya*, 8%), grunter or tigerperch (*ayungin*, 6%), catfish (*kanduli*, 6%), and other species. Shrimps (*hipon*) dominated the crustacean catch at 66% by volume, followed by freshwater crabs (*talangka*, 7%), white shrimps (*hipong puti*, 7%), mud crabs (*alimango*, 6%) and giant freshwater shrimps (*ulang*,

6%). Ninety-five percent of the mollusks caught were snails (*suso*) (BAS 2005).

2.2.2 Aquaculture Resources

Aquaculture is conducted in freshwater, brackishwater and marine waters. Fishcages and fishpens are employed in all three environments while fishponds are confined to freshwater and brackishwater areas. In marine waters, aquaculture also includes mariculture or the farming of aquatic organisms, mostly consisting of oysters, mussels and seaweeds.

Seaweeds, milkfish and tilapia are the top three commodities produced by the country's aquaculture sector, accounting for more than 90% of total aquaculture production (Table 2.2.2.a). Seaweeds are farmed in shallow coastal waters that are protected from strong wave action. The top seaweed-producing regions are ARMM (producing about 40% of total volume), Region IV-B (27%) and Region IX (10%). Milkfish is cultured mostly in brackishwater fishponds, which are concentrated mainly in Regions III, VI, IV and I, in the descending order of milkfish production and total area of brackishwater fishponds. Tilapia is produced mostly in freshwater fishponds and freshwater fishcages. Region III, which produces most of its tilapia in freshwater fishponds, leads the country in tilapia production. It is followed by Region IV, where tilapias are mostly cultured in freshwater fishcages.

Table 2.2.2.a. Aquaculture production (t) of major species from 2001 to 2003. Source: BAS (2005).

Species	2001		2002		2003	
	(t)	(%)	(t)	(%)	(t)	(%)
Seaweed	785,795	64.5	894,857	67.0	988,888	68.1
Milkfish (<i>bangus</i>)	225,337	18.5	232,162	17.4	246,505	17.0
Tilapia	106,746	8.8	122,399	9.2	135,996	9.4
Tiger prawn (<i>sugpo</i>)	40,698	3.3	35,493	2.7	34,998	2.4
Carp (<i>carpa</i>)	19,568	1.6	18,151	1.4	8,895	0.6
Oyster (<i>talaba</i>)	19,042	1.6	12,570	0.9	14,510	1.0
Mussel (<i>tahong</i>)	13,513	1.1	11,646	0.9	13,490	0.9
Mud crab (<i>alimango</i>)	4,608	0.4	4,747	0.4	4,809	0.3
Catfish (<i>hito</i>)	1,525	0.1	2,634	0.2	2,163	0.1
White shrimp (<i>hipong puti</i>)	1,276	0.1	1,541	0.1	1,517	0.1
Other species	2,348	0.2	2,193	0.2	2,733	0.2
Total	1,218,108	100.0	1,336,200	100.0	1,451,771	100.0
Total minus seaweeds	432,313		441,343		462,883	

Table 2.2.2.a lists other major cultured species other than seaweeds, milkfish and tilapia. In addition to the culture of the species in Table 2.2.2.a, less common forms of aquaculture include the culture of groupers, snappers,

seabass, catfish, mudfish, carp, Pompano, Cobia, freshwater prawn (*Macrobrachium*), eel, spiny lobsters, pearl oysters, abalone, rabbitfish, spadefish and ornamental aquarium fish.

Table 2.2.2.b presents a summary of aquaculture production in 2003 by culture environment and region. Mariculture in marine waters registered the highest production figures, mainly due to seaweed production. Next to seaweed-growing areas, brackishwater fishponds are the second biggest contributor to aquaculture production. The country has 239,323 ha of brackishwater fishponds (both operational and nonoperational). The next important culture environment are the freshwater fishponds. With a total area of 14,531 ha, these account for about 6% of the total area of fishponds (brackishwater and freshwater) yet contribute 22% to the combined output of all fishponds.

Table 2.2.2.b. Aquaculture production (t) by culture environment and region.
Source: BFAR (2003).

Region	Total production	Brackish water				Fresh water				Marine waters			
		Fishpond	Fish-cage	Fish-pen	Total	Fish-pond	Fish-cage	Fish-pen	Total	Fish-cage	Fish-pen	Mari-culture*	Total
	3,429	474			474		456	2,499	2,955				0
CAR	12,074				0	463	11,611		12,074				0
I	46,594	19,063	2,403	4,375	25,841	3,061	29		3,090	8,185	7,097	2,381	17,663
II	5,447	921	147		1,068	2,180	1,376		3,556	9		814	823
III	148,926	80,913	74		80,987	61,282	69		61,351	1,368	3	5,217	6,588
IV-A	112,725	14,524			14,524	810	37,885	25,646	64,341	103	414	33,343	33,860
IV-B	39,805	4,258	1,077	7	5,342	518			518			33,945	33,945
V	37,687	8,663			8,663	314	5,454		5,768	76		23,180	23,256
VI	118,209	57,123			57,123	295			295	22	1,268	59,501	60,791
VII	84,440	8,751			8,751	31	0		31	11	12	75,635	75,658
VIII	18,441	2,529			2,529	128	12	9	149	53		15,710	15,763
IX	120,999	19,180			19,180	94			94		19	101,706	101,725
X	31,406	11,829			11,829	641			641	37	23	18,876	18,936
XI	11,255	7,179	4		7,183	602	3		605	1,200	1,202	1,065	3,467
XII	23,010	7,785			7,785	1,255	5,647	7,688	14,590	635			635
XIII	22,595	3,836	1,658		5,494	150	169		319	47	33	16,702	16,782
ARMM	400,570	2,454			2,454	165	104	33	302		3	397,811	397,814
Total	1,237,612	249,482	5,363	4,382	259,227	71,989	62,815	35,875	170,679	11,746	10,074	785,886	807,706

* Mariculture of oysters, mussels and seaweeds.

2.2.3 Critical Fisheries Habitats

Mangroves, seagrasses, algal beds and coral reefs are critical fisheries habitats because they perform vital ecological functions that sustain fisheries. In addition, they are sites of important fisheries.

2.2.3.1 Mangroves

Mangroves are communities of woody trees that can tolerate salt water and thrive in tidal muddy areas. The trees continuously shed leaves that decompose in the mud into soluble nutrients and organic detritus, which form the foundation of complex food webs. Thus, mangrove areas are nutrient and food-rich environments that support abundant marine life and function as nurseries for a variety of marine organisms, particularly reef fish. Though not conclusive, evidence suggests that the biomass of several commercially important reef fish species may be doubled in the coral reefs used by such species as adult habitat, if the reefs are connected to mangroves. This may be due to the increased survival of juveniles resulting from abundant food and sheltering from predators provided by mangroves (Mumby *et al.* 2004). Because mangroves function as nurseries and breeding grounds for fish and prawns, they are said to be the foundation of major fisheries (Primavera 2000).

Fisheries exist in mangrove areas. Finfish, penaeid shrimps, crabs, lobsters, gastropods, bivalves and other invertebrates are collected from mangroves. Other harvestable materials include wood for fishing poles, firewood and charcoal making, among others (Primavera 2000). In addition to providing harvestable resources, mangroves provide ecological services. They trap sediment and pollutants from the land, absorbing the latter and thus helping maintain water quality. Mangroves also shield coastal areas from the damaging effects of waves, tidal currents, storm surges and typhoons (UNEP-WCMC 2006).

In 1994, the total cover of mangroves in the country was estimated at 120,500 ha, most of which was concentrated in Western Mindanao (44.9%), Southern Tagalog (24.4%) and Northern Mindanao (16.8%). The present total cover of mangroves is less than a third of the 450,000 ha of mangroves reported in 1918, when mangroves were first assessed nationally. Conversion to other uses, particularly to fishponds, is the main cause of mangrove loss (Primavera 2000 citing DENR 1996).

2.2.3.2 Seagrasses

Seagrasses are flowering plants that thrive in shallow marine waters, anchored to bottom substrates by roots and horizontal stems called rhizomes. They are typically found in the intertidal areas of bays, estuaries and coastal waters. Although capable of attaching to hard substrates, seagrasses tend to spread extensively on sandy or muddy substrates. Like mangroves, seagrasses provide habitat, nursery areas and feeding grounds to a variety of marine organisms. Seagrasses support fisheries by sheltering juvenile fish and prawns. Siganids or rabbitfish spawn in seagrass areas and are typically caught there. The diet of the green sea turtle (*Chelonia mydas*) and the dugong (*Dugong dugon*), which are endangered species, consists mainly of seagrass.

Seagrass leaves slow water movement, which promotes settling of sediment, while their roots and rhizomes stabilize sediment and hold these to the bottom. Thus, seagrasses help decrease turbidity and help minimize the sedimentation of nearby coral reefs. There are no estimates of the total area of seagrass beds in the Philippines because the country's extensive coastline has yet to be adequately assessed. Most seagrass areas assessed so far are heavily stressed, based on estimates of biomass per square meter and shoot density (BFAR-NFRDI-PAWB 2005). Among several identified factors causing seagrass degradation, their general overuse resulting from increasing human population is apparently the most significant factor (Fortes and Santos 2004).

2.2.3.3 Coral reefs

Coral reefs are among the most productive and diverse of ecosystems, rivaling tropical rain forests in terms of variety of organisms contained and supported. The foundation of coral reefs are colonies of coral polyps, which secretion of limestone slowly creates massive reefs over geologic time scales.

Coral reefs are substantial resource base. Reef-associated species accounted for 12-13% of the total annual landings of the capture fisheries sector from 2001 to 2003 (Tables 2.2.2.1.a and 2.2.2.1.b). This is comparable to the often-quoted figure provided by Carpenter (1977), who estimated that 15% of the country's fish yield is derived from coral reefs. The live reef food fish trade, based mainly on groupers, as well as the aquarium or ornamental fish trade is based on reef fisheries known for their lucrativeness and export earnings. In addition to finfish, coral reefs contain commercially valuable seaweeds and invertebrates, such as mollusks, sea cucumbers and sea urchins. It has been estimated that over a million small-scale fishers in the Philippines derive their livelihood from coral reefs (UNEP-WCMC 2006). The country has 27,000 km² of coral reefs. About 70% of the country's reefs are in a poor state, based on estimates of coral cover (Gomez *et al.* 1994).

2.3 Economic Performance of the Fisheries Sector

2.3.1 Fisheries Production in Terms of Value

Fisheries production in terms of value has been growing from 2002 to 2004 (Table 2.3.1.a) wherein all subsectors of the fisheries recorded notable increases in gross receipts. The biggest growth was recorded in the aquaculture industry, which posted an increase of 20.90% more in 2004 because of higher production and prices obtained during the period. The same could be said for commercial fisheries with 15.30% and municipal fisheries with 12.32% growth in gross earnings.

At constant prices, the fisheries sector exceeded the 2003 performance with the 9.45% growth recorded in 2004 (Table 2.3.1.b). Aquaculture was credited with a remarkable output gain of 17.90%. Production of commercial fisheries moved up by 1.86% and that of municipal fisheries by 2.43%.

Table 2.3.1.a. Value of production at current prices. Source: BAS (2006).

Subsector	In millions (PhP)			Growth rates	
	2002	2003	2004	2002-2003	2003-2004
Commercial	39,681.17	42,002.91	48,427.90	5.85	15.30
Municipal	38,158.88	40,664.30	45,674.85	6.57	12.32
Aquaculture	35,418.18	37,199.13	44,972.57	5.03	20.90
Total	113,258.23	119,866.34	139,075.32	5.83	16.03

Table 2.3.1.b. Value of production at constant prices. Source: BAS (2006).

Subsector	In millions (PhP)			Growth rates	
	2002	2003	2004	2002-2003	2003-2004
Commercial	16,487.60	17,554.35	17,881.35	6.47	1.86
Municipal	14,329.74	15,289.12	15,660.36	6.70	2.43
Aquaculture	26,178.91	28,450.22	33,542.66	8.68	17.90
Total	56,996.25	61,293.69	67,084.36	7.54	9.45

2.3.2 Prices of Fish and Fishery Products

Prices in the fisheries sector grew by 6.01% in 2004 (Table 2.3.2.a). Commercial and municipal fisheries recovered from 2003's negative growth rates. These subsectors registered price increases of 13.19% and 9.66%, respectively. Meanwhile, prices of aquaculture products were higher by an average of 2.54%.

Table 2.3.2.a. Weighted average of farmgate prices. Source: BAS (2006).

Subsector	Price/kg (PhP)			Growth rates	
	2002	2003	2004	2002-2003	2003-2004
Commercial	38.07	37.85	42.85	-0.58	13.19
Municipal	38.59	38.54	42.26	-0.12	9.66
Aquaculture	26.46	25.58	26.23	-3.36	2.54
All subsectors				-1.59	6.01

2.3.3 Contribution of the Fisheries Sector to GDP and GVA

In 2003, the fisheries sector contributed 2.2% (PhP95.49 billion) to the country's gross domestic product (GDP) of PhP4,359 billion at current prices, or 4.1% (PhP44.86 billion) of GDP amounting to PhP1,093 billion at constant prices (BFAR-FPED 2003). It accounted for 15.1% (PhP95.5 billion) of the

gross value added (GVA) in agriculture, fishery and forestry group amounting to PhP632 billion at current prices, or 20.9% (PhP44.9 billion) of the GVA of PhP214.3 billion at constant prices. As of the third quarter of 2004, the sector's contribution to GVA in the agricultural group (PhP158.3 billion at constant prices) was 22.3%, the second largest share next to that of agricultural crops.

2.3.4 Contribution of the Fisheries Sector to Foreign Exchange Earnings

Since 1977, foreign trade of fishery products has generated a surplus balance of trade, which means earnings from exports have exceeded payments for imports (Figure 2.3.4.a). Currently, the top fishery exports of the Philippines are tuna, shrimps and prawns, seaweeds, octopus, and crab and crab fat. Altogether, these commodities account for about 82% of total fishery exports (Table 2.3.4.a). The major destinations of Philippine fish and fishery products are Japan, USA, Hong Kong, Taiwan and Korea (BAS 2005).

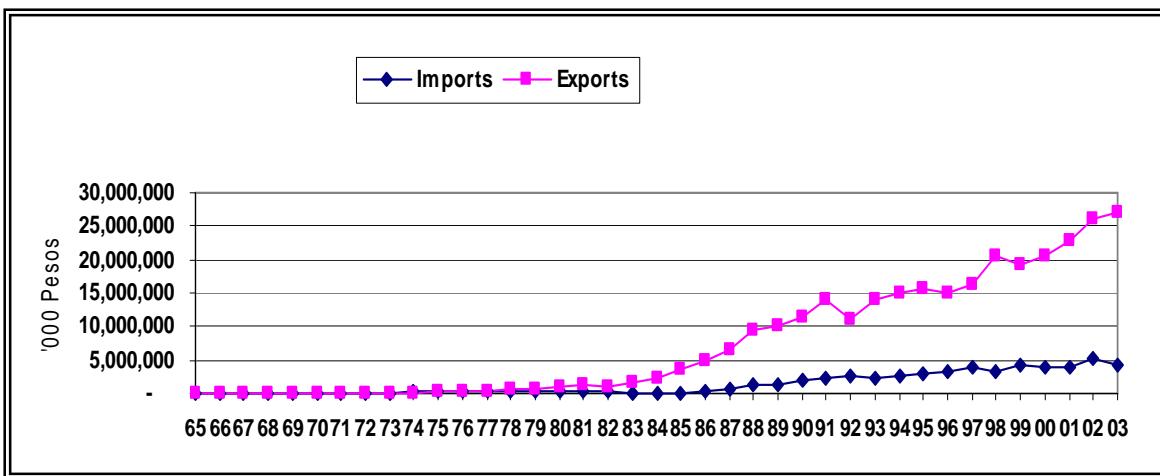


Figure 2.3.4.a. Value of Philippine fish exports and imports.

Source: FAOSTAT (2003).

Table 2.3.4.a. Value of top exports of fish and fishery products. Source: BAS (2005).

	2001		2002		2003	
	Value	%	Value	%	Value	%
Tuna	5,707,428	25.1	7,194,216	27.5	7,921,002	29.2
Shrimps and prawns	6,226,503	27.4	7,287,333	27.8	6,490,951	23.9
Seaweeds	3,540,460	15.6	3,759,618	14.4	4,182,926	15.4
Octopus	1,430,478	6.3	1,664,988	6.4	1,911,417	7.0
Crab and crab fat	1,524,925	6.7	1,555,145	5.9	1,695,005	6.2
Grouper, live	574,978	2.5	549,427	2.1	471,280	1.7
Squid and cuttlefish	437,859	1.9	447,786	1.7	578,642	2.1
Ornamental fish, live	320,500	1.4	333,130	1.3	348,169	1.3
Roundscad	325,052	1.4	204,178	0.8	235,361	0.9
Sea cucumber, dried	284,949	1.3	228,701	0.9	168,897	0.6
Others	2,350,076	10.3	2,953,238	11.3	3,123,433	11.5
Total	22,723,208	100.0	26,177,760	100.0	27,127,083	100.0

Note: value in PHP x 1,000.

2.3.5 Contribution of the Fishing Industry to Income and Employment

The fisheries sector provides employment to over 1 million people. This is roughly about 12% of the entire agriculture, fishery and forestry sector labor force, and about 5% of the country's total labor force. Of this total, 9.2% (74,537) are fishfarmers engaged in aquaculture as reflected in Ginintuang Masaganang Ani (2002-2004) document. Also, ancillary activities such as fish marketing, fish processing and boat building generate additional employment. Women's subsistence activities and work in the fisheries are not yet quantified, aggregated and included employment data on the sector since women's work in the fish production process is still considered to be an extension of their reproductive or household work, which is not typically understood as "work". However, in a study done by Center for Empowerment and Resource Development (CERD) in four barangay in Calbayog, Western Samar, the work performed and value of work by men and women reveal interesting findings including:

- In sea cucumber gathering and processing, actual gathering is done by men as this activity entails collecting the produce underwater while women secure the boat and collect the sea cucumber. Processing (which involves cleaning and sun drying) and marketing of the produce are mostly done by women. For an income of P500, the value of women's contribution to this economic activity is P300 while men contribute P200.

- In the use of multiple hook and line (locally known as paundak), women perform 100% of food preparation for the fishing trip, 75% of gear preparation and 50% of marketing. In certain instances when the produce is not sold out, women do most of the work in fish processing by drying, smoking or making fish paste. As men perform almost exclusively actual fishing, the total valuation of women's work using hook and line is 45% and men 55%.
- In the operations of a small-scale commercial fishing locally known as toboggan, women are involved in sorting and packing the fish catch (Rodriguez, 2003).

In these examples, women's work are unpaid and the valuation process through focused group discussion helped surface the quantitative and qualitative contribution of women to household income and local fishing economy.

2.3.6 Contribution of the Fisheries Sector to Nutrition

In the diet of the average Filipino, fish contributes 12.3% to total food intake, 22.4% to total protein intake and 56% to total animal protein intake. Fish is the main source of animal protein among Filipinos. In 2001, the per capita consumption of fish was estimated at 26.8 kg/year (Espejo-Hermes 2004 citing FNRI/DOST 2003 and BAS 2002).

2.4 The Socioeconomic Setting

Conditions in coastal and fishing communities strongly influence the degree of dependence of resource users on local resources, which determines the intensity with which they utilize these resources. This section describes the increasing population density in coastal areas and summarizes the facts about living conditions in municipal fishing households.

2.4.1 Population Density in Coastal Areas

Human populations tend to concentrate in coastal areas for many reasons. These include the availability of relatively flat land for settlements and agriculture, access to maritime transportation that tends to spur trade and other economic activities, and access to coastal and fishery resources. In 2000, the population density in coastal areas was characteristically higher than the noncoastal population density and the national average, specifically by 57 and 31 persons/m², respectively (Table 2.4.1.a). The concentration of human populations in coastal areas is expected to continue into the near

future. By year 2020, the population density in coastal areas will be higher by 81 and 44 persons/m² compared with the noncoastal density and the national average, respectively.

For capture fisheries, increasing population density in coastal areas would translate to increasing pressure on harvestable fishery resources. Moreover, it implies additional pressure on the critical fisheries habitats that sustain these resources.

Table 2.4.1.a. Population density in coastal areas. Source: ArcDev (2004).

Parameter	2000	2005	2010	2015	2020
Population (persons)					
National	76,498,735	84,299,000	92,736,000	100,571,000	108,210,000
Coastal areas	39,007,905	42,992,490	47,295,360	51,291,210	55,187,100
Noncoastal areas	37,490,830	41,306,510	45,440,640	49,279,790	53,022,900
Land area (km²)					
National	300,000	300,000	300,000	300,000	300,000
Coastal areas	136,400	136,400	136,400	136,400	136,400
Noncoastal areas	163,600	163,600	163,600	163,600	163,600
Population density (person/km²)					
National	255	281	309	335	361
Coastal areas	286	315	347	376	405
Noncoastal areas	229	252	278	301	324

2.4.2 Socioeconomic Characteristics of Municipal Fishers and Fishing Households

Based on the data gathered from the 12 priority bays studied under the Fisheries Sector Program in the early 1990s, the average living conditions in municipal fisher households are as follows:

- Average household age was 41 years
- Average household size was 5.1 members
- Educational attainment was about 4-6 years of schooling
- Average annual household income was PhP25,426 (1992)
- Those who own their houses constituted 82% of surveyed respondents; however, only 40% owned their lots
- Housing type was nipa and bamboo for 41.1% and nipa and wood for 34%
- Most owned their fishing boats but only 27% were motorized
- Only 25% of the households were members of community organizations
- Only 20% availed of loans, of this 83% came from informal sources
- The main fishing gears used were hook and line, gillnet and beach seine (Saison 1999 citing PRIMEX-ANZDEC Report 1996).

The average income of fishing households listed above is way below the poverty threshold. Low educational attainment, use of simple housing materials, high proportion of nonmotorized boats and use of simple fishing gear are all consistent with low fishing incomes. These indicators suggest the pervasiveness of poverty in fishing communities.

2.4.3 Gender Issues in the Fisheries Sector

Gender is the differences in roles, responsibilities, privileges, status and conditions of men and women, and the relations between them. In the fisheries sector, gender inequality generally stems from the lack of recognition of the roles and contribution of women. The gender issues in the fisheries sector are linked to unequal property rights over the fisheries resources and entitlements to development. In a policy paper published by NGOs for Fisheries Reform, Tanyang (2003) discusses the implications of the absence of a gender perspective in fisheries development and a survey of the agenda of organized women in fisheries at the national level.

Recognition of the community's right to management and priority use of the fisheries resources, in particular, the municipal water, is an important legislative milestone under the Fisheries code. However, recognition of women's equal rights in the management and utilization of the fisheries is manifested in the following:

- Lack of gender-disaggregated statistical information and gender analysis useful for policy and program development
- Lack of a comprehensive and integrated program and budget allocation for women in fisheries
- Lack of supportive policies and policy environment for recognizing women in fisheries as a major stakeholder in fisheries development, e.g., deputation of women as fish wardens; registration of women involved in different fishing and fishery-related livelihoods
- Limited women's involvement in the formulation/planning and execution of fisheries policies at all levels (FARMCs, NAFC)

The realization of women's equal right to development is hindered by the following:

- Lack of access basic social services such as basic health, reproductive health, water, settlements, children's education
- Non-utilization of the GAD budget for improving women fishers' welfare and changing gender consciousness at the national to the local levels
- Violence and against women and children in coastal areas which are largely undocumented.

2.5 The Institutional Environment

2.5.1 Policy and Regulatory Framework

The Philippine legal and policy framework is hierarchical. At the apex is the Philippine Constitution followed by national laws and international agreements, then administrative issuances to implement national laws. At the lowest rung are the ordinances by the local government units (LGUs). The major Philippine laws that serve as the foundation for the current policy and regulatory framework for fisheries in the Philippines are the following: (1) Philippine Fisheries Code of 1998 (Republic Act [RA] 8550); (2) Agriculture and Fisheries Modernization Act (AFMA) of 1997 (RA 8435); (3) Local Government Code of 1991 (RA 7160); (4) National Integrated Protected Areas System (NIPAS) Act of 1992 (RA 7586); and (5) Environmental Impact Statement (EIS) System (Presidential Decree [PD] 1586) of 1978. There are also legal issuances at the local level, and international agreements at the global level.

2.5.1.1 The Philippine Fisheries Code of 1998

The Philippine Fisheries Code of 1998 provides a comprehensive legal framework that governs the development, management and conservation of the country's fisheries and aquatic resources. The code declares the state policy of achieving food security through a regulatory regime that provides mandates and guidelines for long-term sustainable use of resources, considering as well the welfare of those involved in the sector. Its objectives are poverty alleviation, social equity, food security, rational use of resources, people empowerment and sustainable development. Priorities of this national law include protection of fishery and aquatic resources, optimal utilization of existing resources, maintenance of ecological balance and quality of environment, and improving and rationalizing the domestic market.

2.5.1.2 The Agriculture and Fisheries Modernization Act (AFMA) of 1997

The AFMA of 1997 provides the appropriate budgetary and logistical requirements for modernization of the country's agricultural and fisheries base. Its priorities include sustained increases in production, industrialization and full employment. Another concern of this law is optimum production of goods, driven by a market-oriented approach within a highly competitive economic environment. The AFMA's objectives are poverty alleviation, social equity, food security, rational use of resources, people empowerment, sustainable development and global competitiveness. It operates through Strategic Agricultural and Fisheries Development Zones (SAFDZ) as identified by the

Department of Agriculture (DA); also through the agriculture and fisheries modernization programs of LGUs. The AFMA's planning systems are through the Agriculture and Fisheries Modernization Plan (AFMP) at the national and LGU levels and the SAFDZ Plans. The AFMA mandates the creation of a network of smallholder cooperatives to engage in marketing activities.

2.5.1.3 The combined implications of the Fisheries Code and AFMA

In 1998, the Fisheries Code was enacted only a few months after AFMA came into effect. Unfortunately, both laws did not have the benefit of policy integration. Although both laws deal with the fisheries sector and attempt to provide a policy framework for fisheries development, they were largely the result of independent legislative initiatives. Table 2.5.1.3.a lists the basic differences between the two laws based on a policy study undertaken by the Coastal Resource Management Project (CRMP) (Batongbakal 2000).

Table 2.5.1.3.a. Comparison of AFMA of 1997 and the Philippine Fisheries Code of 1998. Source: Batongbakal 2000.

	AFMA	Fisheries Code
Major concern	<ul style="list-style-type: none"> • To provide the appropriate budgetary and logistical requirements for modernization of the country's agricultural and fisheries base 	<ul style="list-style-type: none"> • Proper management/husbanding of the country's fisheries resources.
Priorities	<ul style="list-style-type: none"> • Sustained increases in production, industrialization and full employment • Optimum production of goods, driven by a market-oriented approach within a highly competitive economic environment 	<ul style="list-style-type: none"> • Management, conservation, protection of fishery and aquatic resources, optimal utilization of existing resources and maintenance of ecological balance and quality of the environment Improving and rationalizing the domestic market
Objectives	<ul style="list-style-type: none"> • Poverty alleviation, social equity, food security, rational use of resources, people empowerment, sustainable development and global competitiveness 	<ul style="list-style-type: none"> • Poverty alleviation, social equity, food security, rational use of resources, people empowerment and sustainable development
Expected benefits	Increased income and wealth, delivery of goods and services, and expansion of productivity	<ul style="list-style-type: none"> • Better distribution of benefits from limited resources and long-term sustainability of such resources
Operations	<ul style="list-style-type: none"> • Through SAFDZ as identified by DA • Through agriculture and fisheries modernization programs of LGUs 	<ul style="list-style-type: none"> • Through LGUs and FARMCs for municipal waters • DA-BFAR for all fisheries and aquatic resources other than municipal waters
Planning systems	<ul style="list-style-type: none"> • AFMP at national and LGU levels • SAFDZ Plans 	<ul style="list-style-type: none"> • Comprehensive National Fisheries Industry Development Plan • Municipal Fisheries Development Plans (MFDPs) • Comprehensive Post-harvest and

	AFMA	Fisheries Code
		Ancillary Industries Plan

In essence, the divergence of these two laws is a result of the traditional tug-of-war in fisheries management between production and resource management concerns. On one hand, fisheries are considered as a major source of food for the country's growing population with the corresponding management urge to maximize the socioeconomic benefits. On the other hand, it is widely recognized that fisheries resources are finite and that continued fishing at today's intensive rate will result in a decline in fish production.

Nevertheless, both laws provide policy frameworks to improve fisheries productivity and production and/or to effectively manage the fisheries resources. There are legitimate concerns over inconsistencies, overlapping responsibilities and potential conflicts in objectives. Any progress made (particularly by LGUs) in meeting the objectives of one or the other law, however, will result in benefits for the municipality or city and, eventually, for the entire country.

2.5.1.4 The Local Government Code

Consistent with the government policy to promote local autonomy and decentralization, the Local Government Code (LGC) of 1991 established LGU as the key manager of resources within its boundaries. In the process, the code also provided for the devolution of the responsibility to provide a number of basic services from national government agencies (NGAs) to LGUs. Responsibilities devolved to LGUs included: the enforcement of fishery laws in municipal waters; the provision of extension and on-site research services and facilities related to agriculture and fishery activities; the enforcement of environment and natural resources laws within the territory, water and soil resources utilization and conservation projects; and the improvement and development of local distribution channels.

Section 149 of LGC provides municipal governments with the authority to grant fishery privileges in municipal waters and to impose rentals, fees and charges. Fishery privileges include the erection of fish corrals and oyster, mussel and other aquatic beds, the collection of fry (e.g., *bangus*, prawn, *kawag-kawag*, etc.), and the catching of fish using nets, traps and other gear. The resource management responsibilities (taking into consideration food production, human settlements and industrial expansion) of LGUs are also exercised through the preparation of comprehensive land use plans and the enactment of zoning ordinances (Section 20).

2.5.1.5 The National Integrated Protected Areas System Act

RA 7586 otherwise known as the National Integrated Protected Areas System (NIPAS) Act of 1992 established a system for designating national parks and protected areas in order “to preserve genetic diversity, to ensure the sustainable use of resources therein, and to maintain their natural conditions to the greatest extent possible.” Under NIPAS, 209 sites with a total area of 2.5 million ha comprise an initial list of proposed protected areas that are to be assessed for possible inclusion in the national system of protected areas (PAWB 2003). Sites included in the systems are “outstanding remarkable areas and biologically important public lands that are habitats of rare and endangered species of plants and animals, biogeographic zones and related ecosystems, whether terrestrial, wetland or marine”.

Among the categories of protected areas relevant to fisheries management are marine reserves and protected seascapes. Table 2.5.1.6.a lists marine reserves and protected seascapes that have been proclaimed as protected areas under NIPAS as of 2003 as well as other examples of marine protected areas (MPAs). In addition, there are 18 landscapes/seascapes that have been proclaimed under NIPAS as of 2003, but these have been omitted in Table 2.5.1.6.a because the sizes of their land and marine components are not distinguished. In general, MPAs under NIPAS have large sizes. The Fisheries Code also contains provisions for establishing MPAs (called “fish sanctuaries” and “fish refuges” under the code), but these municipal-level MPAs are much smaller (usually less than 100 ha) than MPAs under NIPAS. Thus, NIPAS complements the Fisheries Code with regard to MPA establishment and provides a mechanism for establishing large MPAs. If these MPAs are effectively managed, they can contribute substantially to sustainable fisheries.

Table 2.5.1.5.a. Some MPAs under NIPAS. Source: PAWB (2003).

Region	MPA	Location	Year proclaimed	Area (ha)
2	Palaui Island Marine Reserve	Sta. Ana, Cagayan	1994	7,415
3	Masinloc and Oyon Bays Marine Reserve	Masinloc, Oyon, Zambales	1993	7,568
4B	Apo Reef National Park	Sablayan, Occidental Mindoro	1996	15,792
6	Sagay Marine Reserve	Sagay, Negros Occidental	1999	32,000
7	Tanon Strait Protected Seascapes	Cebu, Negros Occidental and Negros Oriental	1998	480
7	Panglao Island Protected Seascapes	Panglao Island, Bohol	2003	386
9	Turtle Islands Wildlife Sanctuary	Southwestern Sulu Sea, Tawi-Tawi	1999	242,967
12	Sarangani Bay Protected Seascapes	Maitm, Kiamba, Maasim, Sarangani	1996	215,950

2.5.1.6 Environmental impact assessment and related laws

Presidential Decree (PD) 1586 or the Environmental Impact Statement (EIS) System of 1978 and related laws can potentially influence fisheries management, including the allocation of resources to aquaculture, both at the national and local government levels. Under these laws, government agencies, government-owned or controlled corporations and private companies are required to prepare an environmental impact assessment (EIA) for any project or activity that significantly affects the quality of the environment. This set of laws also stipulates that any project defined as environmentally critical or located in an environmentally critical area is required to prepare an EIS to be reviewed by the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR). The detailed procedures for the handling of EIAs are outlined in various Department Administrative Orders (DAOs). The requirements for EIAs and Environmental Compliance Certificates (ECCs) were also subsequently incorporated in the Fisheries Code of 1998.

2.5.1.7 Gender in Fisheries Policy and Regulatory Framework

The mandate from which women fishers' participation and benefit in fisheries management and development is evoked in the Fisheries Code, AFMA and Local Government Code. In the declaration of policy, Fisheries Code, shall "provide support to the fishery sector, primarily to the municipal fisherfolk, including women and youth sectors, through appropriate technology and research, adequate financial, production, construction of post-harvest facilities, marketing assistance, and other services." The law mandates BFAR to coordinate with LGUs and other concerned agencies in order to "to enable women to engage in other fisheries/economics activities and contribute significantly to development efforts" (Art. 1, Sec. 65). The Code also provides for one women's representative from the eleven municipal fisheries representative (Art. II, Sec. 75, 78). However, representation of women at the National FARMC level is not explicitly stated in a similar manner.

The Agriculture and Fisheries Modernization Act stipulates that women's concerns shall be considered in the development of the Agriculture and Fisheries Modernization Plan (Ch. 2, Sec. 17o), access to credit (Ch. 3, Sec. 20), provision of timely, accurate, and responsive business information and efficient trading services (Ch. 5, Sec. 38), and provision of trainings (Ch. 4, Sec. 107).

In both the Fisheries Code and AFMA, information management are important aspects of the fisheries sector development, however, neither law provides

for the development of a gender perspective in information and data management.

The Local Government Code devolves to Local Government Units the provision of basic social services including the delivery of welfare services for women, and among others, defines the functions, roles and responsibilities of LGUs such as (1) creation of Women and Family Committee, and (2) election of 1 seat for women as Sectoral Representative, upon the promulgation by the Comelec of the rules and regulation for such purpose.

Overall, the above-mentioned laws highlight the importance of women's participation in development of local and national policies and programs. To an extent, specific interventions have been identified for women. However, a much more comprehensive and integrated perspective about gender equality and women's empowerment, consistent with the national plan of action such as the Philippine Plan for Gender and Development, still needs to be crafted.

2.5.1.8 From national laws to issue and site-specific regulations

Under the umbrella of these national laws and their implementing rules and regulations, the following sets of regulations complete the policy and regulatory framework for Philippine fisheries. First, there are DAOs issued by the different departments/national government agencies (e.g., DA, DENR, etc.). Second, there are Fisheries Administrative Orders (FAOs) issued by DA through BFAR. Third, there are municipal ordinances issued by the municipality or city government.

2.5.1.9 International treaties and agreements

There are several international treaties and agreements that have also bearing on the policy and regulatory framework for Philippine fisheries. These instruments, once ratified by the Senate, become part of the Philippine law. The key international agreements include the 2000 Cartagena Protocol on Biosafety, 1995 FAO Code of Conduct for Responsible Fisheries, 1992 Convention on Biological Diversity, 1992 Action Agenda for Sustainable Development (Earth Summit) and 1982 United Nations Convention on the Law of the Sea. These international accords are elaborated in Chapter 3's Section 3.1 (Development Philosophy).

The integration of gender in key international development conferences during the last three decades played a key role in pushing for greater responsibilities of the states to mainstream gender equality in the development agenda. Among the major international conferences which the Philippines signed as party include:

- UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), 1979, recognized women's rights as human rights, gender equality, and state obligations to eliminate discrimination against women;
- The UN World Commission on the Environment and Development (WCED) in its report "Our Common Future" known also as the Brundtland Report, recognized the right of people to choose their size of family and the means to do so, not only in the context of managing population growth, but also to assure, especially for women, the basic right to self-determination;
- Third UN World Conference on Women, also known as the Nairobi Forward-Looking Strategies For the Advancement of Women, 1985, which was the first international conference to recognize the interconnection between gender equality and sustainable development;
- The UN Conference on Environment and Development, held in 1992, and the resulting Agenda 21 of the Rio Conference, underscored the important role of women in managing the resources;
- The Fourth UN World Conference on Women held in 1995 agreed on the Beijing Platform for Action, among which is the consideration of gender differential impacts in addressing poverty, social injustice and environmental degradation, and emphasis on women's participation in environmental decision-making, integration of gender concerns in environmental policies and programs, and establishment of mechanisms to assess the impact of development and environmental issues on women;
- The Millennium Summit in 2000, which called for governments to meet the Millennium Development Goals, includes gender equality and environment as one of the eight MDGs.

2.5.2 Institutional Arrangements and Mechanisms

The management of the fishery resources is distributed among many government agencies or instrumentalities. The basic jurisdictional divisions are as follows: (1) municipal or city governments for "municipal waters" and resources within the territorial boundaries of these municipalities or cities; (2) DA-BFAR for commercial (e.g., outside municipal waters) fishing activities and public lands such as tidal swamps, mangroves, marshes and foreshore land and ponds; and (3) DENR for shoreline and foreshore areas and, through Protected Area Management Boards (PAMBs), for areas under the category of protected landscapes and seascapes (e.g., such as mangrove swamp forest reserves under the NIPAS Act). These are elaborated in the following sections.

2.5.2.1 Local government units

Municipal waters under the Fisheries Code include streams, lakes, inland bodies of water and tidal waters within the municipality, which are not included within the protected areas as defined under the NIPAS Act. These also include marine waters up to 15 km from the municipality's coastline. Local governments' interest in properly developing and managing fisheries resources is driven by the fact that these resources contribute directly and significantly to food production, livelihood opportunities and general well-being of their residents. Regulatory, management and development mechanisms are operationalized through ordinances, delivery of services and undertaking programs and projects. Options available to local governments include, among others, the following: authority to grant fishing privileges or license fishing operations in municipal waters; banning or restricting the use of certain fishing methods, techniques or gears; regulating the capture of certain species and/or sizes of fish; land/water use planning and zoning; habitat conservation and restoration (i.e., establishment and maintenance of MPAs, fish sanctuaries and refuges, mangrove reforestation, coral reef conservation, etc.); infrastructure and facilities (e.g., roads, cold storage, markets, etc.); credit; and agriculture and fishery extension services and livelihood training. Relative to fisheries and aquaculture, LGUs have the following responsibilities: enact a municipal ordinance delineating the boundaries of municipal waters and providing rules and regulations for licensing and permits; establish license fees for fishing in municipal waters; enact, in consultation with BFAR, special ordinances declaring special demarcated fisheries areas, closed seasons, environmentally critical areas and sanctuaries; maintain a registry of municipal fisherfolks; and enforce fishery laws, rules and regulations and municipal ordinances.

Recognizing that local governments would benefit from consultation with and the involvement of fisherfolk and their organizations, the Fisheries Code provides for the creation of Fisheries and Aquatic Resource Management Councils (FARMCs). The code encourages the formation of such councils at several levels – barangay, municipality/city, cross-municipalities and national. Membership in these councils includes representatives of government agencies and institutions, as well as fisherfolks, **women**, **youth**, fishworkers and other stakeholders. The LGUs and the NGAs are encouraged by the Fisheries Code to consult and coordinate with FARMCs as they carry out their regulatory, management and development functions over fisheries resources. At the municipal or city level, the FARMCs are expected to assist in the development of MFDP for submission to the Municipal Development Council; make recommendations for municipal fishery ordinances; assist in the

enforcement of fishery laws, rules and regulations in municipal waters; and provide advice, whenever necessary, to the municipal governments.

The standard organizational structure of local governments provides for the appointment of an “agriculturist” as a mandatory position for provincial governments and an optional position for municipal and city governments. The agriculturist shall be responsible for the Office for Agricultural Services and is expected to formulate measures for the approval of the provincial and municipal/city councils and to provide technical assistance and support to the governor or mayor. He or she is also expected to develop plans and strategies and, upon approval by the governor or mayor, to implement these. In the context of these responsibilities, the term “agriculture” includes traditional agricultural crops, as well as aquaculture. The list of responsibilities of the LGU agriculturist and even of the environment and natural resources officer, however, does not explicitly include responsibilities for capture fisheries and marine ecosystems.

There is an apparent gap between the organizational structure envisioned by the Fisheries Code and the organizational support that the municipal government is expected to provide as gleaned from LGC of 1991. The Fisheries Code expects municipalities and cities to prepare MFDPs as part of the overall municipal development plan. However, LGC declares it optional for municipalities or cities to maintain the position of an agriculturist, who is assumed to be responsible for fisheries in the absence of any other staff position.

2.5.2.2 Inter-LGU mechanisms

Very often, one or more municipalities share a bay, gulf, lake, river and/or dam. In such cases, the management of common water bodies and their fisheries resources needs to be shared among the affected municipalities or cities. The sharing of these fisheries resources provides opportunities for collective action and the sharing of effort, resources and costs among LGUs. Nevertheless, it also can serve to increase the complexities and difficulties of management efforts.

The Fisheries Code states that the management of contiguous fishery resources “shall be done in an integrated manner, and shall not be based on political subdivisions of municipal waters in order to facilitate their management as single resource systems.” Municipal or city governments are encouraged to group themselves and coordinate with each other to achieve the objectives of fishery resources management. In fact, the Fisheries Code envisions the formation of Integrated Fisheries and Aquatic Resource Management Councils (IFARMCs) as the venues for closer collaboration

between and among local governments in the management of shared resources. These IFARMCs have functions similar to that of the municipal FARMCs. IFARMCs, however, need to relate to all municipal or city governments they serve. The chairpersons of the Committees on Agriculture/Fisheries, the fisheries officers and the development officers of the relevant municipalities and/or cities are expected to serve on IFARMCs together with the representatives of NGOs, private sector and fisherfolk associations.

2.5.2.3 Bureau of Fisheries and Aquatic Resources

The BFAR is the country's premier fisheries management agency. In coordination/cooperation with other NGAs, BFAR has jurisdiction over management, conservation, development, protection, utilization and disposition of all fisheries and aquatic resources of the country, except those within municipal waters wherein BFAR is tasked to coordinate with and assist LGUs, FARMCs and other concerned agencies in undertaking the functions specified earlier.

The Fisheries Code of 1998 reconstituted BFAR as a line agency and specified its functions as follows:

- Policy and enforcement
 - a. enforce all laws, formulate and enforce all rules and regulations, except in municipal waters, and settle conflicts on resource use;
 - b. recommend measures for the protection/enhancement of the fishery industries;
 - c. formulate rules and regulations for the conservation, management, and protection of the fishery resources;
 - d. establish a corps of specialists in collaboration with the Department of National Defense (DND) and the Department of Foreign Affairs (DFA) for the efficient monitoring, control and surveillance (MCS) of fishing activities within Philippine waters; and
 - e. formulate rules and regulations for conservation and management of straddling fish stocks and highly migratory fish stocks.
- Industry development
 - a. prepare and implement a Comprehensive National Fisheries Industry Development Plan;
 - b. provide extensive development support services in all aspects of fisheries production, processing and marketing;
 - c. develop value-added fisheries products for domestic consumption and export;
 - d. provide advisory services and technical assistance on the improvement of quality of fish from the time it is caught;

- e. advise and coordinate with LGUs on the maintenance of proper sanitation and hygienic practices in fish markets and fish landing areas;
- f. coordinate with LGUs and other concerned agencies for the establishment of productivity-enhancing and market development programs in fishing communities; and
- g. assist LGUs in developing their technical capability in the development, management, regulation, conservation and protection of fishery resources.

- Regulation of commercial fishing
 - a. issue licenses for the operation of commercial fishing vessels;
 - b. issue identification cards to fishworkers engaged in commercial fishing; and
 - c. monitor and review fishing agreements between Filipinos and foreigners.
- Industry monitoring
 - a. establish and maintain a Comprehensive Fishery Information System;
 - b. coordinate efforts relating to fishery production undertaken by primary fishery producers, LGUs, FARMCs, fishery organizations/ cooperatives; and
 - c. implement an inspection system for import and export of fishery/aquatic products and fish processing establishments.
- Research
 - a. formulate and implement a Comprehensive Fishery Research and Development Program.

The BFAR is responsible for issuing licenses for commercial fishing (fishing activities outside municipal waters) as well as for issuing Fishpond Lease Agreements for public lands suitable for aquaculture. The BFAR is also responsible for regulating and monitoring the import and export of all fish and fishery products. It has the following organizational subdivisions: divisions, centers and regional offices. The ten divisions of the bureau include the: Fisheries Resources Management Division, Capture Fisheries Technology Division, Fisheries Post Harvest Technology Division, Fisheries Industry Development Support Division, Inland Fisheries and Aquaculture Division, Fisheries Policy and Economics Division, Fisheries Regulatory and Quarantine Division, Legal Division, Administrative Division and Finance Division. The BFAR also has eight national technology centers which are operated and maintained for activities related to technology generation, field testing of technologies, extension services, demonstration and training/seminars in support of policy formulation and project implementation on fisheries development and conservation in coordination with concerned agencies and

organizations. These national technology centers include the: Fisheries Biological Station Complex, Mindanao Freshwater Fisheries Technology Center, National Brackishwater Fisheries Technology Center, National Freshwater Fisheries Technology Center, National Inland Fisheries Technology Center, National Integrated Fisheries Technology Development Center, National Marine Fisheries Development Center and National Seaweeds Technology Center. Aside from the divisions and the national technology centers, BFAR maintains regional offices in all the administrative regions of the country with functions such as MCS, training and extension services. The regional offices also supervise the operations of the Provincial Fisheries Offices.

The BFAR, through its regional offices, maintains and operates seven Regional Fishermen's Training Centers. These centers aim to develop and upgrade individual skills and competencies of technical fisheries staff of LGUs and other agencies involved in fisheries implementation and, more specifically, of small-scale fisherfolks/organizations/cooperatives. The centers transfer relevant and appropriate technology to improve present practices and increase individual productivity and income. Each of the training centers is also expected to establish and operate feasible sectoral fishery projects to serve as support/demonstration facilities in target fishing communities for replication as source of fisherfolk's income or alternative livelihood.

2.5.2.4 Department of Agriculture

The DA takes charge of the overall planning and policymaking in the agriculture and fisheries sector at the national level. The Fisheries Code created within DA the position of Undersecretary for Fisheries and Aquatic Resources for the primary purpose of attending to the needs of the fishing industry. A number of divisions/bureaus within DA have responsibilities that also cover the fisheries sector, as indicated in AFMA. These are briefly described below.

The Planning and Budget Division, Public Investment Program Division, and Program Monitoring and Evaluation Division are responsible for DA's planning service. These divisions handle AFMA-related planning activities, as well as formulate the agriculture and fishery infrastructure plan. The Agribusiness and Marketing Assistance Division takes care of Agribusiness and Marketing Assistance Service. It provides direct assistance to the private sector, including concerned people's organizations and nongovernment organizations (NGOs), in marketing ventures and in the conduct of market analysis. Two key units are involved for information-related concerns: Bureau of Agricultural Statistics for data on agriculture and fisheries research; and Agricultural and Fisheries Information Service for dissemination of agriculture and fisheries

production market information. For post-harvest services and infrastructure, the Bureau of Post Harvest Research and Extension takes the lead.

The Bureau of Agriculture and Fisheries Product Standards is responsible for setting and implementing standards for fresh, primary and secondary-processed agriculture and fishery products. The Bureau of Agricultural Research (BAR) serves as the secretariat for research and development (R&D) of the Council on Extension, Research and Development in Agriculture and Fisheries, as well as develops the agriculture and fisheries R&D information system. The Agriculture Training Institute provides leadership in formulation of the national agriculture and fisheries extension agenda, as well as oversees the National Extension System in Agriculture and Fisheries.

2.5.2.5 Department of Environment and Natural Resources

The DENR administers environmental management, conservation and development on national and local levels. Its areas of responsibility that are relevant to fisheries management include the management of foreshore and shoreline areas, as well as protected areas.

Within the DENR are several natural resource management bureaus, such as the Environmental Management Bureau (EMB), the Forest Management Bureau and the Protected Areas and Wildlife Bureau (PAWB). It has also attached agencies, such as the National Mapping and Resource Information Authority and the Laguna Lake Development Authority (LLDA). The policies formulated by DENR and its bureaus are implemented by DENR Regional Offices, which are found in the 13 administrative regions of the country, the Provincial Environment and Natural Resources Offices (PENROs) within each province and the Community Environment and Natural Resources Offices (CENROs) within the municipalities. These PENROs and CENROs fall within the DENR apparatus, although some provincial governments and municipalities also run their own PENROs and CENROs, which are distinct from their counterparts under DENR.

Among the organizational units within DENR that are concerned with fisheries are the PAMBs and the Coastal and Marine Management Office (CMMO). The PAMB is a multisectoral body formed to manage an MPA established under the NIPAS Act. Local stakeholders and interest groups are represented in PAMB. In 2002, DENR's CMMO was established to coordinate and integrate all coastal management activities, especially in policy review and formulation, coordination and integration of development and implementation of coastal programs and projects, and establishment and maintenance of a coastal and marine information management system. Parallel CMMO-type units are now organized at the regional and community (CENRO) levels to respond to the

technical needs of LGUs in their efforts to implement coastal resource management programs and projects. In 1998, the Fisheries Code required all fisheries-related projects that have an impact on the environment to prepare an EIS and obtain an ECC from DENR. In fact, the implementing rules and regulations of the Fisheries Code require BFAR to establish an Environmental Unit to coordinate with concerned agencies in assisting project proponents to prepare and submit the required EIS.

2.5.2.6 Other government agencies

There are a host of other government agencies involved in various facets of fisheries management, particularly in the areas of law enforcement, fishing vessel registration and safety, credit provision, marketing, infrastructure administration and development, research and development, and education and training. The **Philippine National Police–Maritime Group** is the main agency that enforces fisheries and coastal management laws. Other agencies that provide law enforcement support include the **Philippine Navy** and the **Philippine Coast Guard (PCG)**. Fishing vessel registration and safety is administered by the **Department of Transportation and Communication (DOTC)** with attached agencies such as the PCG and the **Maritime Industry Authority (MARINA)**. The MARINA is responsible for the promotion and development of the maritime industry, including the registration of shipping vessels. It also regulates, in collaboration with PCG, shipping and maritime safety. In the past, MARINA was responsible for issuing commercial fishing licenses – a responsibility that was transferred to BFAR when the Fisheries Code was enacted in 1998.

Government lending institutions such as the **Land Bank** and the **Quedancor** provide credit for fisheries ventures, with the bulk supporting aquaculture in fishponds. Other formal credit institutions include private commercial banks, private development banks, savings and loan associations, rural banks and thrift banks. These institutions provide credit mainly to commercial fisheries and large aquaculture enterprises. Local governments sometimes provide microcredit for small fisheries projects. With regards to marketing of fisheries products, the **Department of Trade and Industry (DTI)** and its **Board of Investments** provide support and incentives (networking, enterprise development, investment incentives, market matching services) for investments in fisheries production and ancillary industries. The DTI also provides opportunities for the promotion of fishery products through domestic and international trade fairs and exhibits.

The responsibility for developing and operating fisheries infrastructure, such as fishports and fish landing facilities, lies with various government agencies. The DA, however, has the responsibility to formulate the agriculture and

fishery infrastructure plan and to monitor its implementation. This plan shall be the consolidation of all the infrastructure plans submitted by the various units within the DA and LGUs. The **Department of Public Works and Highways (DPWH)** executes the development of fishports and related infrastructure while the **Philippine Ports Authority (PPA)** and the **Philippine Fisheries Development Authority (PFDA)** operate and manage the larger ports and related infrastructure. The LGUs manage small ports and landing sites.

R&D, particularly on emerging aquaculture technologies and status of fishery resources, is vital to the management of the country's fisheries. Several institutions are involved in fisheries R&D. The Fisheries Code of 1998 established the **National Fisheries Research and Development Institute (NFRDI)** to function as the main DA unit for the conduct and coordination of fishery research and development in the country. The **Bureau of Agricultural Research**, also within the DA, complements the research activities of NFRDI. Within the **Department of Science and Technology (DOST)**, the **Philippine Council for Aquatic and Marine Research and Development (PCAMRD)** formulates and evaluates strategies, programs and R&D projects on aquatic resources including fisheries. The PCAMRD organized the National Aquatic Resources Research and Development System (NARRDS) to assist in the monitoring of R&D on aquatic resources. The NARRDS consists of state universities and colleges and regional units of DA and DENR with R&D functions. The NARRDS is organized into four national centers based on research themes and five zonal centers that cluster member-organizations in Northern Luzon, Southern Luzon, Visayas, Northern Mindanao and Southern Mindanao.

To modernize Philippine fisheries, the DA-BAR embarked on fostering partnerships and collaboration among the various fisheries research, development and extension (RD&E) institutions and agencies in the Philippines. Three RD&E networks (capture fisheries, aquaculture and fisheries, post harvest and marketing) in fisheries networks were conceptualized after a series of workshops and consultations with various stakeholders. These activities also gave birth to the National Integrated RD&E Agenda and Program for each of the three fisheries networks.

In the area of formal education and training in fisheries, the **Commission on Higher Education (CHED)**, the **Technical Education and Skills Development Authority (TESDA)** and the **Department of Education (DepEd)** supervise tertiary-level education (bachelors degree and higher), technical and skills courses (such as the three-year diploma course in fisheries) and secondary-level education (fisheries high schools), respectively.

2.5.2.7 Gender Mainstreaming

There are two important mechanisms where the fisheries sector can mainstream gender in the fisheries industry planning and development. The first mechanism towards mainstreaming gender in sectoral policy and program development is within the FARMC system. The Fisheries Code has provided for the participation of women as one of the eleven representatives of the municipal fishers in Municipal and Integrated FARMCs. However, the same provision is not clearly articulated in the National FARMC level, where five representatives sit in the Council for the municipal fisheries sector.

The second strategy for gender mainstreaming is the GAD Focal System, whereby all national government agencies, state universities, Government-Owned and Controlled Corporations (GOCCs) and LGUs identify key personnel to lead in the preparation, coordination, direction setting, monitoring of the implementation of the GAD Plan. The BFAR GAD Focal System consists of key personnel from the following units. BFAR regional offices have also formed their respective GAD Focal System.

The National Commission on the Role of the Filipino Women (NCRFW) is the government machinery for mainstreaming gender in the bureaucracy. The Philippine Plan for Gender-Responsive Development (PPGD), 1995-2025 adopted through Executive Order No. 273, serves as a framework for operationalizing the goals of gender mainstreaming throughout the bureaucracy and in national development.

Gender and Development Planning and Budgeting is the mechanism by which all government agencies and offices including state universities and GOCCs, as well as LGUs, are required to submit GAD plans and budgets in accordance with the General Appropriations Act provision on allocation of a 5 % minimum of the total agency budget for gender mainstreaming. Aside from the Implementing Rules and Regulation for the Women in Nation-Building Act and the General Appropriations Act, several memoranda from NCRFW, the Department of Budget and Management (DBM) and the Department of Interior and Local Government (DILG) were issued for the implementation of the GAD Planning and Budgeting, namely:

- Joint Memorandum Circular, DILG-DBM-NCRFW (2001-01) which served as guidelines on the formulation of the GAD plan and budget for the LGUs from barangay to regional agencies;
- General Appropriations Act 2000, which incorporated the formulation of a set of guidelines for the implementation of the GAD programs and activities by the NEDA and DBM in consultation with the NCRFW. The formulation of a GAD plan with the NCRFW of all departments, offices, bureaus, agencies, state universities and GOCCs, where the plan shall be at least 5% of the agency's total 2000 budget appropriation, also included the requirement of the submission of GAD plans for review

- Joint Circular DILG-NCRFW-DBM 2000 which required all government agencies to formulate their GAD plan (2002-2005) with corresponding fund;
- Local Budget Memorandum No. 32 (1999) Section 9.6 and Memorandum Circular 99-146 (1999) issued by DILG , which provide the mandate for local government units regarding GAD budget;
- Local Budget Memorandum 28 (1998) which mandated an allocation of a GAD budget should not be lower than 5% of the national budget
- Local Budget Memorandum No. 28 (1997), which instructed the governors, mayors, barangay chairs, Sanggunian Bayan and Sanggunian Panlalawigan members and other concerned local officials to set aside a minimum amount of 5%, out of the 1998 appropriation, for projects designed to address gender issues. (Cleofe 2003)

2.5.3 Coordination across Agencies

Collaboration and coordination across the many government bodies and agencies involved in fisheries have been accomplished through various modalities. These include nonpermanent mechanisms, such as the joint implementation of projects and programs, as well as the formation of multi-agency task forces and technical working groups. While the record of success of these various initiatives has been mixed, the inherent advantages of collaboration and coordination among agencies are widely recognized.

Accordingly, the AFMA and the Fisheries Code contain provisions that attempt to institutionalize such collaborative mechanisms. In law enforcement, the Fisheries Code tasks BFAR with establishing an MCS System for Philippine Seas in collaboration with LGUs and other government agencies (e.g., members of the Cabinet Committee on Marine and Ocean Affairs). In the area of fisheries research, the code calls for the representation of the DA, BFAR, PCAMRD and the academe in the governing board of the NFRDI. The code also specifies that NFRDI become part of the National Research and Development Network of DOST. To link research with extension, AFMA created the Council on Extension, Research and Development in Agriculture and Fisheries with representation from several government agencies involved in RD&E services. To promote information sharing, AFMA calls on DA to establish the National Information Network to progressively interlink its information networks with networks maintained by DENR, DOST, DTI, the state universities and colleges, and other agencies. To integrate disparate efforts in human resource development, CHED, TESDA, DepEd, and the state universities and colleges are called upon to jointly formulate the National Integrated Human Resources Development Plan in Agriculture and Fisheries. Unfortunately, in spite of all the mechanisms for collaboration in place, interagency coordination is often wanting. Reasons for limited institutional collaboration include: overlapping functions and mandates increase the need for coordination while decreasing the effectiveness

of coordination efforts; insufficient financial and human resources devoted to coordination and a general failure to recognize the burden and needs of the coordination activity; and plans of the various agencies are not integrated enough to encourage more effective coordination.

2.5.4 Private Sector Participation

Aside from an emphasis on interagency collaboration and coordination, both the AFMA and the Fisheries Code, as well as their implementing rules and regulations, highlight the need for consultative processes with the various stakeholders of the fisheries sector. The Fisheries Code establishes FARMCs as the primary mechanism for participation by the private sector in fisheries management. The FARMCs, as specified in the code, are composed not only of representatives of government agencies but also of NGOs, the private sector, municipal and commercial fisherfolks, fishworkers and processors. Under the code, FARMCs are to be formally consulted for the following: establishment of fishery refuges and sanctuaries; declaration within municipal waters of fishery reserves for special use; license fees for municipal fishers; establishing catch ceilings in municipal waters; declaration of a closed season for fishing in specific areas; operation of a MCS system in municipal waters; enactment of municipal fisheries ordinances; mechanisms for inclusion or exclusion of fisherfolk from outside the municipality; and establishment of mariculture (fishcages, fishpens, etc.) zones.

The government has also been encouraging communities to become more involved in area-specific resource management. For this reason, government agencies and NGOs have exerted efforts to organize communities. There also are a number of private sector institutions/organizations involved in fisheries. These include the following nonprofit organizations: NGOs; municipal fisherfolk associations and cooperatives; farmer associations and cooperatives; commercial fishing associations; professional associations and societies; and industry associations.

While all these organizations have specific mandates and purposes, they are private-sector institutions that are willing to partner with government for the benefit of their members and/or for the fisheries sector in general. Each of these organizations has its own special situations and specific challenges that have significant impact on its effectiveness and ability to carry out its respective missions. The challenges to these organizations are many and can include: lack of financial and other resources; ineffective governance; difficulties in increasing memberships; poor membership contributions to the organization; poor leadership; poor planning and implementation systems; and lack of recognition by government agencies. In recent years, government agencies have begun to appreciate the benefits to government that could

result from effective partnerships with such associations and organizations. Unfortunately, effective partnerships can only be built on effective organizations – on the side of the government, as well as on the side of the private sector.

2.6 Fisheries Subsectors: Status and Trends

This section provides a close examination of the main producing subsectors of fisheries, namely, capture fisheries and aquaculture. Afterwards, the section presents a host of subjects under the post-harvest domain, including landing sites, ice plants and cold storage facilities, fish processing and post-harvest losses. Finally, markets for fish and fishery products are described.

2.6.1 Capture Fisheries

This section begins by separately examining municipal and commercial fisheries, focusing on factors that determine the overall amount and intensity of fishing conducted by these two subsectors. Next, their production trends and their combined impacts on particular fishery resource groups – demersals, pelagics and invertebrates – are simultaneously examined.

2.6.1.1 Municipal fisheries

Population of municipal fishers

Municipal fisheries include capture operations using nonmotorized and motorized boats that weigh 3 GT or less, as well as fishing and gathering less mobile aquatic animals without using boats. In 2002, there were 1,781,000 municipal fishers, accounting for 87% of those employed in capture fisheries and aquaculture (Figure 2.6.1.1.a) (NSO 2002).

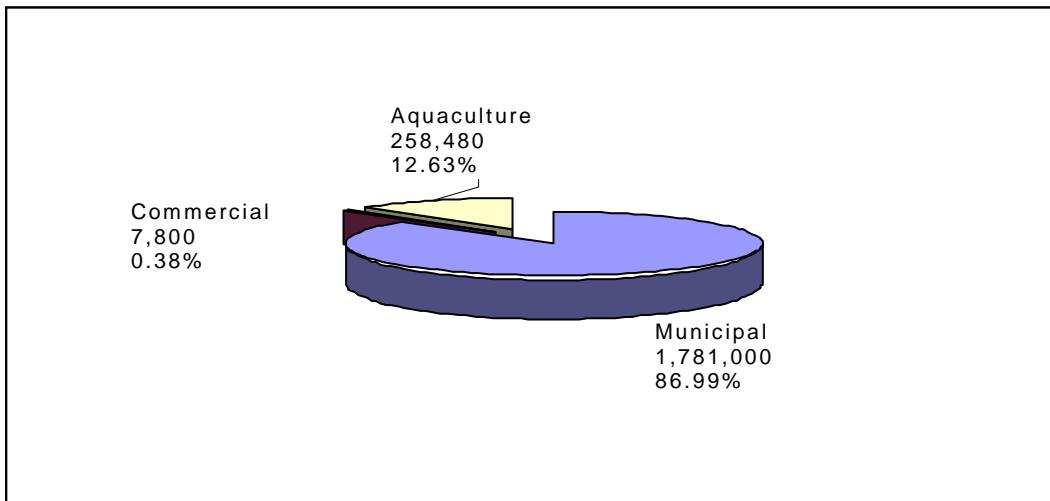


Figure 2.6.1.1.a. Number of persons employed in the municipal fisheries, commercial fisheries and aquaculture subsectors. Source: NSO (2002).

The changing population of municipal fishers within four decades is shown in Table 2.6.1.1.a and Figure 2.6.1.1.b. From 1970 to 1980, the total number of municipal fishers grew twice over.. This drastic increase, which was much higher than the rate of population growth, showed that fishing became an attractive source of livelihood, drawing labor away from other sectors. In the next decade, the increase in municipal fishers continued but at a much decelerated rate of 6.6%. From 1990 to 1995, the population of municipal fishers dropped by 29.9%, indicating that many had exited the municipal fisheries sector.

Table 2.6.1.1.a. Number of municipal fishers, 1970–1995.
Source: Tietze *et al.* (2000).

Major island group	Number of municipal fishers			
	1970	1980	1990	1995
Luzon	158,714	350,282	377,502	-
Visayas	138,442	296,056	291,384	-
Mindanao	102,786	257,666	294,453	-
Total	399,942	904,004	963,339	675,677

Note: - not reported.

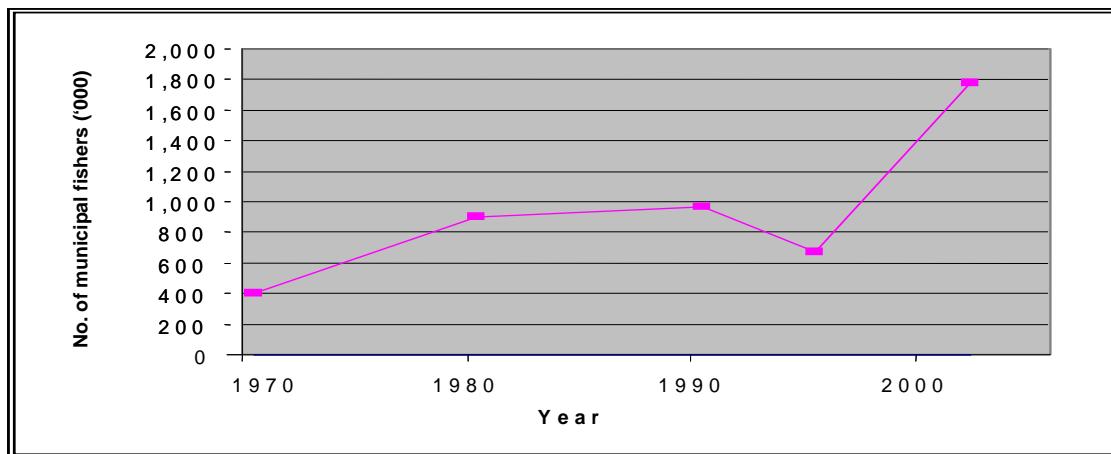


Figure 2.6.1.1.b. Population trend of municipal fishers, 1970-2002.

Source: Tietze *et al.* (2000) and NSO (2002).

From 1990 to 1995, while the population of municipal fishers declined, commercial fisheries and aquaculture expanded. By 1995, the commercial fisheries subsector was employing 56,715 fishers while the aquaculture subsector had 258,480 fishfarmers, which was more than twice the number in 1990. Apparently, in the first half of the 1990s, large numbers of municipal fishers sought employment in the commercial fisheries and aquaculture subsectors (Tietze *et al.* 2000). After 1995, the population of municipal fishers apparently rose to 1.78 million fishers in 2002. Thus, the population of municipal fishers from 1970 to the present has been generally — but not continuously — increasing. Like most economic agents, municipal fishers respond to changing opportunities within and outside their subsector.

Municipal fishing vessels and gears

By law, municipal fishing operators use fishing boats weighing 3 GT or less. In 2002, the number of municipal fishing boats stood at 777,700, doubling from 388,200 in 1980 or in just two decades. Municipal fishing boats are either motorized or nonmotorized. The number of motorized boats in 2002 was 351,000 units, representing a threefold increase from 110,600 motorized boats in 1980 (NSO 2002). In 1980, motorized boats comprised 28.5% of the municipal fishing fleet. By 2002, the percentage of motorized boats had increased to 45.1%. Thus, the sharp increase in municipal fishing boats from 1980 to 2002 has been accompanied by accelerated motorization.

The majority of motorized boats (40.1%) have engines with 5.0-9.9 horsepower, of which 83.0% have outriggers (NSO 2002). In 2002, the most common fishing gear used by municipal fishers was the hook and line with 9.45 million units, followed by the gill net with 1.19 million units. Other common gears included the cast net, cover pot and crab hook (NSO 2002).

2.6.1.2 Commercial fisheries

Fishing grounds of commercial fisheries

The Fisheries Code defines commercial fishing as fishing with the use of vessels weighing more than 3 GT. Commercial fishers may be classified into those that operate mainly in Philippine waters, and those that can operate beyond our territorial limits. An example of the latter is the country's distant-water fishing fleet, which conducts purse seine operations in Indonesia and Papua New Guinea. Within the country, the ten most important commercial fishing grounds are Moro Gulf, East Sulu Sea, South Sulu Sea, Davao Gulf, Visayan Sea, Bohol Sea, Cuyo Pass, Guimaras Strait, Manila Bay and Lingayen Gulf (Barut 1996) (see Figure 2.2.b and Table 2.2.a in Section 2.2).

Commercial fishing vessels

The Fisheries Code classifies commercial fisheries based on vessel tonnage as follows: (1) small-scale, using vessels of 3.1–20 GT; (2) medium-scale, using vessels of 20.1–150 GT; and (3) large-scale, using vessels of more than 150 GT. Small-scale boats have outriggers and motors that are generally second-hand diesel engines imported from Japan and converted for marine use. The medium-scale type includes liftnet boats (*basnig*), large Danish seiners (*super hulbot*), medium trawlers and old monohulls fitted with outriggers, some of which engage in ring net or baby purse seine operations. Large-scale commercial boats, which are mostly bought second-hand from Japan, USA and Taiwan, mainly engage in purse seining. Most of these catchers are after tuna or seasonal pelagic fish, such as mackerels and roundscads. Large commercial vessels fish all over the archipelago; their landings at the Navotas Fish Port may come from Celebes Sea, Sulu Sea or other areas of the country (Aguilar 2004).

Table 2.6.1.2.a shows the distribution of registered commercial fishing boats by region. The National Capital Region is home to the most number of commercial fishing vessels, which tend to be larger than vessels based in other regions (i.e., percent of total gross tonnage is greater than percent of total number). Region XI has the next highest number of commercial fishing vessels, followed by Regions VI and IX. The rest of the regions have less than 10% of the commercial fishing boats.

Table 2.6.1.2.a. Number and gross tonnage of commercial fishing vessels (catcher and accessory boat) by region, 1999. Source: BFAR-FPED (2003).

Region	Number	Percentage	Gross tonnage	Percentage
NCR	1,351	37.5	158,509.59	58.6
I	113	3.1	1,832.99	0.7

II	64	1.8	717.94	0.3
III	40	1.1	1,080.67	0.4
IV	221	6.1	3,857.38	1.4
V	160	4.4	4,385.85	1.6
VI	404	11.2	25,674.39	9.5
VII	94	2.6	2,053.81	0.8
VIII	124	3.4	1,740.27	0.6
IX	392	10.9	22,758.66	8.4
X	43	1.2	1,215.10	0.4
XI	555	15.4	45,893.86	17.0
XII	7	0.2	85.09	0.0
XIII	26	0.7	293.86	0.1
ARMM	7	0.2	181.94	0.1
Total	3,601	100.0	270,281.00	100

Note: NCR means National Capital Region; ARMM means Autonomous Region for Muslim Mindanao

In 2002, the entire fleet of the commercial sector consisted of 10,860 boats (Table 2.6.1.2.b) including both registered and unregistered boats, as well as boats weighing three GT or less but are used for commercial operations. Thus, 2.6.1.2.b cannot be compared with the figures in Table 2.6.1.2.a. As Table 2.6.1.2.b indicates, there was a three-fold increase in the total number of commercial fishing boats from 1980 to 2002. Boats were added to all size categories. Most of the additional boats were small-scale commercial fishing boats (3-20 GT), although a considerable number of boats in the 19.1-49.0 GT range (medium-scale) was added to the fleet.

Table 2.6.1.2.b. Number of commercial fishing vessels by tonnage categories in 1980 and 2002. Source: NSO (2002).

Vessel tonnage (GT)	1980		2002		Increase in no. of boats
	No. of boats	Percentage	No. of boats	Percentage	
3.0 or less	179	5.2	1,204	11.1	1,025
3.1 - 5.0	1,044	30.6	3,001	27.6	1,957
5.1 - 9.0	559	16.4	2,211	20.4	1,652
9.1 - 19.0	728	21.3	1,427	13.1	699
19.1 - 49.0	460	13.5	1,492	13.7	1,032
49.1 - 99.0	239	7.0	577	5.3	338
99.1 - 499.0	200	5.9	516	4.8	316
> 499.0	2	0.1	177	1.6	175
Not reported	-		255	2.3	
Total	3,411		10,860		7,194

Commercial fishing gear

NSO records as of August 2003 disclosed a total of 146.2 thousand fishing gear units used by commercial fishing operators, which represent a greater

than 20-fold increase from 1980 (Table 2.6.1.2.c). Over the 23-year period, all types of gears – except bag net – increased in number. The hook and line group of fishing gear, which includes the longline, handline and troll line (Munprasit *et al.* 1995), was the dominant gear in both periods and also accounted for most of the increase. The gill net, which also accounted for a large portion of the overall increase in gear numbers, is the second most dominant gear. Purse seine/ring net ranks third. All other gears accounted for less than 1% of the total in 2003. Among the latter are the trawl net and bag net, which accounted for 10.6% and 15.0% of the total number of gears in 1980, respectively. The decline in the relative importance (i.e., percentage of total) of these two gears, as well as other gears in 2003 seems to suggest an overall tendency for gear types in the sector to shift towards the hook and line group and the gill net. However, this tendency cannot be ascertained, as there was a large number of gears reported in the “others” category in 2003.

Table 2.6.1.2.c. Number of fishing gear (by type) used by commercial fishing operators, Philippines, 1980 and 2003. Source: NSO (2003).

Fishing gear	1980	Percentage Number	2003*	Percentage Number	No. of units added
	Number		Number		
Hook and line/longline/troll line/pole and line	2,655	38.6	54,883	37.5	52,228
Gill net	243	3.5	22,701	15.5	22,458
Purse seine/ring net	1,064	15.5	3,026	2.1	1,962
Trawl net	729	10.6	904	0.6	175
Bag net	1,031	15.0	751	0.5	-280
Beach seine	135	2.0	653	0.4	518
Muro-ami/drive-in net	61	0.9	466	0.3	405
Push net	154	2.2	344	0.2	190
Round haul seine	65	0.9	340	0.2	275
Others	742	10.8	50,622	34.6	49,880
Not reported	-		11,523	7.9	
Total	6,879	100.0	146,213	100.0	

* As of 31 August 2003.

Notable developments in commercial fishing technology

The application of the fish aggregating device (FAD) – locally called *payaw* – as an accessory to commercial fishing gear, has minimized fish scouting. Its use has thus reduced fuel costs and enhanced fish aggregation resulting in increased fish production, particularly for tuna and tuna-like species. Offshore or deep-sea FADs consist of four types, namely: bamboo, steel buoy, combination of bamboo and steel buoy, and galvanized drum. These floating FADs are anchored with concrete

weights, the number of which depends on the depth (1-5 drums); the anchor line also depends on depth, the ratio of which is 1:1.2 or 1: 5 (de Jesus 1996).

The country's commercial fisheries subsector has also benefited from advances in fishing technology. Such include innovative fishing methods, as well as larger and improved vessels that can fish for longer periods at distant fishing grounds. Progress in electronics and computer technology has also transformed the efficiency of commercial fishing, especially in purse seine fisheries (de Jesus 1996).

2.6.1.3 Capture fisheries resources: exploitation status

Production levels and trends in municipal and commercial fisheries

Figure 2.6.1.3.a shows the trend in the annual production of the municipal and commercial fisheries alongside the aquaculture production trend. Municipal landings increased from 1965 to its peak in 1983 at about 1.2 million t, after which it leveled off at 0.9 million t to 1.2 million t annually. On the other hand, commercial fisheries production matched municipal fisheries production from 1965 to 1968, and then increased slowly from about 400,000 t in 1969 to about 500,000 t in 1973. Commercial production then essentially remained constant at the level of about 500,000 t annually until 1985, which was followed by a steadily increasing annual production. It also reached a "plateau" a decade later in 1995. The year 1995 also marked the point at which commercial fisheries production caught up with municipal fisheries production. From 1995 to 2003, commercial production essentially matched municipal production at more or less 1 million t annually. From 1991 to 1995, although commercial production was increasing, municipal production was simultaneously decreasing. Overall, it can be discerned that capture fisheries production leveled off at the beginning of the 1990s.

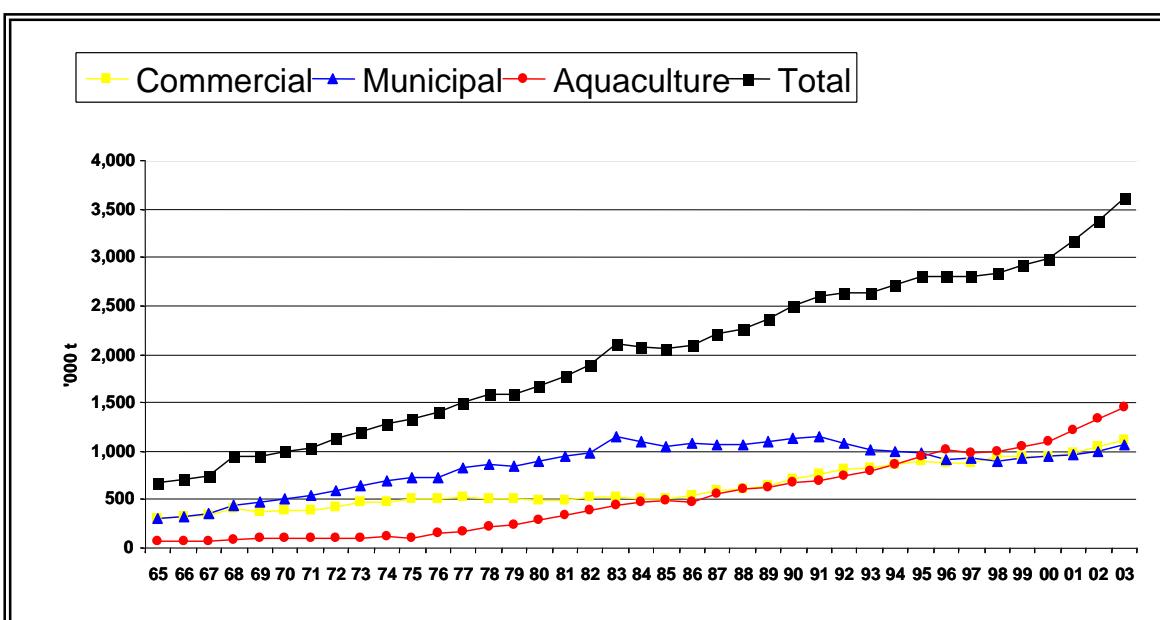


Figure 2.6.1.3.a. Fisheries production by subsector, 1965-2003.

Source: BFAR (2005).

Municipal fisheries production reached its peak in 1985. Meanwhile, commercial fisheries production experienced the same about a decade later in 1995. When viewed against the generally increasing numbers of fishers in the municipal sector and the dramatic increases in number of boats in both subsectors during the same periods, the more or less constant outputs imply progressively declining catch rates in both subsectors.

Status of demersal resources

At present, demersal fish species comprise 16% of capture fisheries production. Of these, 69-72% are landed by municipal fishers while the rest are caught by commercial fishers (see Table 1.2.b. in Section 1.2). Demersal stocks in almost all trawlable areas of the country are depleted. This conclusion is based on a review of various trawl surveys conducted throughout the country, particularly in major trawlable areas, such as Lingayen Gulf, Manila Bay and San Miguel Bay. This conclusion is supported by the observation that since the 1960s, annual demersal production has continuously declined relative to total capture fisheries production (BFAR-NFRDI-PAWB 2005). The country's demersal stocks were overfished as early as the 1970s (Silvestre and Pauly 1987). Demersal biomass levels are today estimated to be only 10-30% of the levels in the late 1940s. Annual rent dissipation as a result of overfishing has been estimated at US\$130 million (Silvestre *et al.* 1986).

The decline in demersal biomass has been accompanied by a shift in species composition, including the relative decline of larger-sized and commercially valuable species and the increase in shrimps and squids among the catch (BFAR-NFRDI-PAWB 2005). The change in species composition indicates that fishing has come to the point where it is changing fundamental characteristics of the marine ecosystem. The increase in number of fishers, as well as the number and power of boats described earlier, combined to increased aggregate fishing pressure, which results in the decline of demersal stocks. In addition, demersal fishing became more efficient with technological advances, such as the high-opening trawl (BFAR-NFRDI-PAWB 2005).

Status of small pelagic resources

About 56% of the present production of capture fisheries is composed of small pelagic species, most of which (62-65%) are landed by commercial fishing operators (see Table 2.2.c. in Section 2.2). For small pelagic stocks, maximum sustainable yield (MSY) was reached in the mid-1970s (BFAR-NFRDI-PAWB 2005). By the 1980s, the level of fishing effort was already twice the magnitude necessary to harvest MSY (Barut *et al.* 2004) while the

average catch rate during the same period was only 1/6 of the rate in the 1950s. Today, the biomass of small pelagics is only 17% of the levels in the early 1950s (Zaragosa 2004). Annual rent dissipation in the small pelagic fisheries has been estimated at US\$290 million (Silvestre *et al.* 1986).

Status of large pelagic resources

Large pelagics, which are mostly landed by the commercial fishing operators (68-74%), comprise 12-15% of the annual production of capture fisheries (see Table 2.2.2.1.c. in Section 2.2). Because most large pelagic species are highly migratory, studying their populations is difficult, and no definitive statements can be made about their biological status. Nevertheless, concern has been raised about the prevalent practice of catching of juvenile tunas in *payaw* (Babaran 2004). Also, decline in the catches of tunas has been observed.

2.6.2 Aquaculture

2.6.2.1 Aquaculture production

Figure 2.6.1.3.a also shows production trend of the aquaculture subsector from 1965 to 2003. Aquaculture production has been rising almost continuously since 1976. In 1995, aquaculture production equaled the production of municipal and commercial fisheries (i.e., the three subsectors had more or less equal production in 1995). Thereafter, aquaculture out-produced both subsectors of capture fisheries. While capture fisheries production reached a plateau in 1991 and thereafter remained more or less constant, aquaculture production continued rising. Thus, the continued rise of overall fisheries production from the 1990s to the present is the result of continued increases in annual aquaculture production.

As shown in Table 2.2.2.a in Section 2.2, seaweeds, milkfish and tilapia are the main products being farmed by the aquaculture subsector. The top seaweed-producing regions are the ARMM, Region IV-B and Region IX, which altogether account for 77% of seaweed production in the Philippines (Table 2.6.2.1.a). With regards to milkfish production, 82% is accounted for by the top producing regions, namely, Regions III, VI, I, IV and VII (Table 2.6.2.1.b). Tilapia production is concentrated in Regions III and IV, which produce 78% of total production (Table 2.6.2.1.c).

Table 2.6.2.1.a. Seaweed production (t) by culture environment and region in 2003. Source: BFAR (2003).

Region	Production (t)	Percentage
II	484	0.0
IV-A	29,977.50	3.0
IV-B	263,946.10	26.7
V	22,331.40	2.3
VI	48,270.90	4.9
VII	75,480.24	7.6
VIII	12,914.00	1.3
IX	101,458.50	10.3
X	18,876.14	1.9
XI	636.4	0.1
XIII	16,702.00	1.7
ARMM	397,811.00	40.2
Total	988,888.18	100.0

Table 2.6.2.1.b. Milkfish production by culture environment and region in 2003. Source: BFAR (2003).

Region	Total	Brackish water			Fresh water			Marine	
		Fishpond	Fishcage	Fishpen	Fishpond	Fishcage	Fishpen	Fishcage	Fishpen
NCR	2,917.60	411.30		7.00			2,499.30		
I	39,995.74	18,013.80	2,402.50	4,337.20				8,145.44	7,096.60
II	359.90	296.00	63.00					0.90	
III	59,599.40	59,200.40	28.00					1,368.00	3.00
IV	32,243.00	17,274.00	735.00			201.00	13,516.00	103.00	414.00
V	1,742.00	1,673.70				1.00		67.60	
VI	56,821.70	55,553.70							1,268.00
VII	7,406.10	6,992.70						401.70	11.60
VIII	2,178.40	2,178.40							
IX	9,722.40	9,722.40							
X	6,200.06	6,164.40						20.66	15.00
XI	9,445.45	7,083.10	3.70	0.30	3.05			1,164.68	1,190.62
XII	12,651.70	6,663.50				1,940.00	3,524.00	534.20	
XIII	3,306.90	1,607.00	1,658.00		27.00	2.70		8.10	4.10
ARMM	1,913.90	1,913.90							
Total	246,504.55	193,738.40	4,890.20	4,344.70	30.05	2,144.70	19,539.30	11,814.28	10,002.92

Table 2.6.2.1.c. Tilapia production by culture environment and region in 2003. Source: BFAR (2003).

Region	Total	Brackish water			Fresh water			Fishcage
		Fishpond	Fishcage	Fishpen	Fishpond	Fishcage	Fishpen	
NCR	460.90	62.60				398.30		
CAR	2,063.76				453.26	1,610.50		
I	3,743.40	715.30		36.30	2,959.20	28.50		4.10
II	3,959.90	459.00	81.00		2,037.00	1,375.50		7.40
III	64,168.90	5,169.00	46.00		58,885.40	68.50		
IV	42,574.80	22.50	7.00		1,301.20	37,243.10	4,001.00	
V	5,716.52	21.20			249.82	5,445.50		
VI	615.96	512.80			103.16			
VII	136.17	99.70			31.27	0.20		5.00
VIII	148.49				127.89	11.50	9.10	
IX	1,191.90	1,114.90			77.00			
X	631.30	300.00			331.20			0.10
XI	671.74	244.40			424.84	2.50		
XII	9,216.20	445.50			899.90	3,706.80	4,164.00	
XIII	317.77	15.70			115.57	186.50		
ARMM	378.10	183.50			59.80	101.50	33.30	
Total	135,995.81	9,366.10	134.00	36.30	68,056.51	50,178.90	8,207.40	16.60

2.6.2.2 Status of culture technologies

With regard to major farmed species, Table 2.6.2.2.a summarizes the status of their culture technologies in terms of availability of hatchery, source of seed stock and growout method. The extent of commercialization is also indicated. The table identifies cultured species which production could be boosted by the application of technology, whether existing in other countries or obtainable through R&D. This may be pursued through government assistance for further commercialization or other means.

Table 2.6.2.2.a. Status of culture technology and extent of commercialization of major farmed species.

Species	Hatchery	Source of seed stock	Growout	Extent commercialized
Fish				
Milkfish · <i>Chanos chanos</i>	Developed	Mainly wild-caught plus hatchery	Extensive to intensive Brackishwater ponds Freshwater pens/cages Marine pens/cages Deepwater cages	Growout industry highly developed but as of 1998 only one commercial hatchery Commercial feeds readily available
Tilapia · <i>Oreochromis niloticus</i> · <i>O. mossambicus</i>	Developed, already into genetic manipulation	Hatchery SRT, GMT, GIFT, saline hybrids	Extensive to intensive Freshwater ponds Brackishwater ponds Freshwater pens/cages	Both hatchery and growout industry highly developed Commercial feeds readily available

Species	Hatchery	Source of seed stock	Growout	Extent commercialized
			Concrete tank systems	
Carp · <i>Cyprinus carpio</i> · <i>Aristichthys nobilis</i> · others	Developed	Hatchery	Extensive to semi-intensive Freshwater ponds/cages/pens	Limited and not widespread Few private hatcheries mostly government
Catfish · <i>Clarias batrachus</i> · <i>C. gariepinus</i>	Developed <i>C. macrocephalus</i> still under R&D	Hatchery	Semi-intensive Freshwater ponds Some pens and cages	Limited, mostly small-scale, but more widespread than carps
Mudfish or snakehead · <i>Ophicephalus striatus</i>	Developed but not yet commercial	Wild-caught	Freshwater ponds Some cages	Very limited, mainly as secondary species
Gourami · <i>Oosphronemus gouramy</i>	No commercial hatchery	Natural spawns	Extensive Freshwater fishpond	Limited market
Seabass · <i>Lates calcarifer</i>	Developed	Hatchery	Extensive to semi-intensive Brackishwater ponds	Growth limited by low price and high production cost.
Grouper · <i>Epinephelus</i> spp.	R&D stage	Wild-caught	Extensive to semi-intensive Brackishwater ponds Marine cages	Growout limited only by supply of fingerlings Commercial feed available 1998
Rabbitfish · <i>Siganus guttatus</i> · <i>Siganus vermiculatus</i>	Developed but not commercialized	Wild-caught	Brackishwater ponds Marine pens/cages	Limited development; no steady market demand for fingerlings
Spadefish · <i>Scatophagus argus</i>	No work done even at R&D	Wild-caught	Brackishwater ponds Marine pens/cages	Limited development
Crustaceans				
Jumbo tiger shrimp · <i>Penaeus monodon</i>	Developed	Hatchery	Extensive to intensive Polyculture with milkfish Brackishwater ponds	Intensive farms in process of consolidation after production setbacks
Other penaeids · <i>P. indicus</i> · <i>P. merguiensis</i> · <i>Metapenaeus ensis</i>	Developed but not financially viable	Wild-caught	Extensive Polyculture with milkfish Brackishwater ponds	Growth limited by seasonality of wild fry and high cost of fry produced in hatcheries
Mud crab · <i>Scylla serrata</i> · <i>Scylla oceanica</i>	R&D stage under verification	Wild-caught	Extensive to semi-intensive Brackishwater ponds	Growth limited by uncertainty of seed stock supply
Giant freshwater prawn · <i>Macrobrachium rosenbergii</i>	Government hatchery only	Hatchery	Extensive Freshwater ponds	Growout technology in dissemination stage
Lobsters · <i>Panulirus</i> spp. · Family Scyllaridae	None	Wild-caught	Marine pens	Fattening
Mollusks				
Oysters · <i>Crassostrea iridalei</i> · <i>Saccostrea</i> spp.	R&D	Natural spatfall	Stakes Lines suspended from fixed racks or floating rafts	Widespread small-scale cultures Red tide, a constraint
Green mussel · <i>Perna viridis</i>	R&D	Natural spatfall	Stakes Raft Buoy and long line	Practiced in all areas with spawning stock Suffers from periodic red tide
Abalone · <i>Haliotis asinina</i>	R&D for <i>H. asinina</i>	Hatchery	R&D stage for <i>H. asinina</i> One company in Cebu	Not developed for <i>H. asinina</i>

Species	Hatchery	Source of seed stock	Growout	Extent commercialized
· <i>Haliotis</i> sp. (ex Taiwan)			growing Taiwan species	
Seaweeds				
Carageenophytes · <i>Eucheuma</i> spp. · <i>Kappaphycus alvarezii</i>	Seedling bank in R&D stage	Cuttings: ex wild or farm stock	Fixed bottom line, nets Floating lines May be grown in net cages	Highly developed industry
Agarophytes · <i>Gracilaria</i> spp. · <i>Gracilariaopsis baliniae</i>	n.a.	Cuttings: ex wild or farm stock	Brackishwater pond Fixed bottom line May be grown in net cages	Widespread but limited
Chlorophyceae · <i>Caulerpa lentillifera</i>	n.a.	Cuttings: ex wild or farm stock	Brackishwater pond	Mainly in Cebu and some farming in Batangas province

2.6.2.3 Mariculture parks: an integrated approach to sustainable mariculture

Recently, the Aquaculture Department of the Southeast Asian Fisheries Development Center and the BFAR have been promoting the establishment of mariculture parks or zones for the management of mariculture activities. In a mariculture park, the government regulates the number and sizes of cages, as well as the distances between cages, which are established by the location of the mooring buoys. In this manner, stocking densities can be regulated based on the carrying capacity of an area. Without mariculture parks, mariculture operators, responding to market forces alone, will tend to establish cages anywhere without regard for the overall sustainability of their industry.

2.6.3 Post Harvest

2.6.3.1 Landing sites

Fish catches all over the Philippines are typically landed in private, traditional or government-owned landing centers. The government-owned landing centers are fishports managed either by PFDA or by LGUs or jointly managed by both. Table 2.6.3.1.a indicates how commercial landings were distributed among various types of landing sites throughout the country in 2003. The Navotas Fish Port remains as the country's premier fish landing center, handling about 14% percent of the total commercial landings. About 56% of the commercial catch was landed in traditional landing sites, 22% in PFDA-managed major fishports, 20% in private landing facilities and the remaining 2% in ports managed by LGUs.

Table 2.6.3.1.a. Commercial fish production (t) by region and type of landing center. Source: BFAR-FPED (2003).

Region	Private	PFDA	LGU	Traditional	Total
NCR	-	149,834	-	3,411	153,245
I	-	771	-	3,366	4,137
II	-	-	-	16,019	16,019
III	-	-	-	11,067	11,067
IV-A	-	10,157	-	78,626	88,783
IV-B	-	-	-	42,128	42,128
V	10,851	-	-	31,085	41,936
VI	6,391	10,348	19,698	84,291	120,728
VII	-	-	-	58,143	58,143
VIII	-	-	-	46,015	46,015
IX	80,554	17,063	-	114,336	211,953
X	-	-	2,257	37,271	39,528
XI	133	5,463	-	6,819	12,415
XII	123,226	52,472	-	3,303	179,001
XIII	-	-	-	4,676	4,676
ARMM	-	-	-	79,862	79,862
Total	221,155	246,108	21,955	620,418	1,109,636

The tendency in the subsector to unload most catches in traditional landing sites, where the handling practices cannot be efficiently controlled, is partly due to the fact that there are only seven other major fishport complexes in the country besides the Navotas Fish Port. These are the fishport complexes in Lucena, Camaligan, Iloilo, Davao, Zamboanga, General Santos City and Sual. The government-owned major fishport complexes provide landing quays and market halls for fish traders and handlers. The capacities of the harbor and market facilities of the eight major fishport complexes considerably vary. The Navotas Fish Port Complex has the most number of piers and market halls, followed by the General Santos City Fish Port Complex. The Sual Fish Port Complex has the smallest landing quay, i.e., only 70 LM long. These major fishports basically cater to the commercial fisheries subsector. The major fishport complexes provide landing quays mainly to local fishing vessels, although the Davao and the General Santos Fish Port Complexes reported arrivals of foreign fishing vessels of a total of 7,619 (from 1995 to 2004) and 11 (from 2001 to 2004), respectively.

The catch from the municipal fisheries subsector is typically unloaded in the traditional landing sites or in municipal fishports. Data on the unloading in these sites are inadequate, although it is observed that most municipal fishers still utilize the traditional landing sites. However, the number of municipal

fishports is seemingly increasing, although it is still not enough to meet the needs of the subsector. As of 2004, there were only 47 PFDA-constructed municipal fishports located in 11 regions in the Philippines. In terms of regional distribution, Region IV (i.e., Regions IV-A and IV-B combined) has the highest number of these PFDA-constructed municipal fishports (10 ports or 21.28%), followed by Regions V, VI and III, with 7 (or 14.89%), 6 (or 12.77%) and 5 (or 10.64%) ports, respectively. The aquaculture subsector primarily uses the eight major fishports in the country for the auctioning of aquaculture produce in the domestic market.

2.6.3.2 Ice plants and cold storage facilities

The commercial fisheries subsector has access to the refrigeration facilities of the major fishport complexes, which have ice making, freezing and cold storage facilities that considerably vary in number and capacities. For the municipal fisheries subsector, the majority of the fishers have limited access to even simple ice making/plant facilities. To date, there are 23 government-owned ice making facilities that are being managed by LGUs all over the country. However, in December 2004, only 2 (both located in Casiguran and Dingalan, Aurora) of these facilities were reportedly operational. In addition to those ice making facilities under LGUs, there are 27 government-owned ice making facilities all over the country. However, only 11 of these remained operational in 2004. Nine are presently on lease to some private groups/individuals, while 2 operational facilities are now being managed by ARMM.

With regards to the ice storage facilities available to municipal fishers, 43 of such facilities are owned by the government. However, only 11 remained operational as of December 2004. Although there is also a significant number of privately owned ice making and ice storage facilities in almost all of the regions in the Philippines, the access of municipal fishers to these facilities might be limited by their buying capacity. Among aquaculture operators, a few avail of the refrigeration facilities at the major fishport complexes and other government-owned ice plants/ice making facilities. Most, however, procure ice from private ice plants/ice making facilities.

2.6.3.3 Fish processing methods

In the Philippines, several fish processing methods are employed to reduce spoilage and produce quality, safe and competitive fish and fishery products. These techniques typically involve any of the following: (1) temperature control via the use of either low temperature (i.e., chilling and freezing) or high temperature (i.e., thermal processing, boiling and smoking); (2) reduction of

moisture (i.e., salting, drying, smoking and fermentation); (3) other processing methodologies (e.g., mincing, surimi processing, seaweed processing, marinating/pickling, etc.); and (4) combination of different processing methodologies to produce value-added fishery products. The most common preservation technique in landing sites is still the reduction of temperature via chilling or the use of crushed ice. There are other chilling means available in the Philippines (e.g., ice in other forms, such as flaked, tube and blocks, refrigerated/chilled seawater, seawater ice and slushed ice). The choice of the medium to be used depends on their availability and affordability.

Overall, approximately 70% of the total fish consumption in the country is in fresh or chilled forms, while the remaining 30% is processed into either cured (i.e., salted, dried, smoked, fermented and pickled), canned or frozen products, or disposed of as live food (Abella and Baltazar 1995). Fish processors, more particularly in the coastal communities, generally rely on traditional knowledge in processing fish and other aquatic resources. Products processed are fish species that are caught in large quantities during certain seasons, such as sardines, siganids, mackerels/roundscads and anchovies. All are dried, but roundscads are also smoked. Siganids sometimes also undergo de-boning before drying. Besides drying and smoking, anchovies and siganid fry are processed into fish sauce known locally as *ginamos* and *padas*, respectively. More recently, milkfish (*bangus*) has been deboned and marinated and sold in plastic and styrofoam packs. According to DTI, the big majority of processors in the country are small-scale operators. Indeed, most of those who dry and smoke fish are the women fishers. Fish traders also engage in drying and smoking, usually of excess fish.

2.6.3.4 Fish processing establishments

Data on fish processing establishments (FPE) in the Philippines are scanty and generally limited to those that are registered, the majority of which are the big players in the industry. As of 2004, only 294 FPEs had licenses to operate (LTO) from BFAD (BFAR 2005). The other FPEs that operate as backyard activities and use traditional fish processing methodologies (e.g., salting, drying, smoking, fermentation, etc.) remain unaccounted. Most backyard processors do not have permits and are thus not regulated or regularly inspected by the authorities. Although some of these fish processors produce good fishery products, quality control can be problematic.

The big players in the industry, on the other hand, strive to meet the demands and specifications of the export market. Most of these big players have their own processing plants. Only two fishport complexes (Camaligan and Iloilo Fish Port Complexes) provide processing areas to entrepreneurs. While many succeed in exporting to the USA, Europe, Japan and other Asian countries,

there have been a number of shipments that were rejected or detained due to failure to comply with the standards of the importing nations.

2.6.3.5 Post-harvest losses

Approximately 25-40% of the total fish production in the Philippines is lost from the distribution chain. This is attributed to one or all of the following reasons: (1) actual physical or material losses, such as discards and by-catch in fishing vessels and spoiled/inedible fish in landing facilities; (2) nutritional losses or the decrease in the amount of nutrients a human body derives from eating fish that has lost its nutritional value; and (3) losses in value due to spoilage of wet fish, infestation of dried and smoked fish, weight loss and inferior finished products. Proper post-harvest handling practices, therefore, are prerequisites to maintaining fish quality.

Post-harvest handling must occur in aquaculture facilities, in commercial and municipal fishing vessels, in major and municipal fishports and other landing sites, and in FPEs. In particular, the limited access of fish handlers to refrigeration facilities on fishing vessels and in landing sites is a major factor contributing to reduced fish quality. For the commercial fisheries subsector, most fishers have to rely on private ice plants/ice making facilities. Although the government provides refrigeration facilities in major fishports and some municipal fishports, most of these facilities are nonoperational. For municipal fishers, the problem is exacerbated by their inability to buy ice for their catch.

In terms of storage and distribution of the processed products, the government-owned cold storage facilities are not sufficient to meet the demands of the industry. In fact, only 40% of the freezers and 28% of the cold storage facilities that are government-owned remained operational in 2004. In the distribution of fishery products in the local market, even some local supermarket chains do not handle the products well, especially the frozen products. In terms of packaging fish and fishery products, traditional packaging of fishery products still prevails, particularly for products sold in the wet market. This includes the use of banana leaves, old newspapers and thin plastic bags for retail packaging of fishery products, as well as the use of wooden trays and boxes for storage, transport and marketing of fishery products in wholesale quantities. Although relatively cheap, inferior packaging leads to problems that are related to quality, safety, sales appeal and shelf-stability. For fishery products in retail supermarkets, poor packaging and labeling of fishery products still predominates, despite the implementation of the Labeling Act of the Philippines (RA 3740, Commonwealth Act No. 46, as amended by RA 7394) that governs all consumer products sold in the Philippines.

2.6.4 Markets

In general, 20% of Philippine fish production is exported while 80% is consumed locally. Of the latter, 64% is sold fresh, 8% is dried and 8% is processed.

2.6.4.1 Markets for municipal catches

In the domestic market, fish is traditionally sold both in retail and wholesale trading centers. The majority of catches from the municipal fisheries subsector is marketed, mostly in retail quantities, directly in traditional landing sites. There are middlepersons who buy fish from fishers. **It is mostly women who vend fish caught in small volumes that are sold house-to-house in the village or surrounding communities.** They then either sell these products in the local wet market or process them into dried, smoked or fermented products. In some areas, the catch of the municipal fishers directly goes to big entrepreneurs of the area, as payment for debt that fishers incur during the lean seasons.

The municipal fishers' fish products are usually marketed locally within a few hours. Smaller fish are sold to village retailers or marketed directly to consumers. The majority of the products of municipal fishers are sold by retailers at the village-level market (*talipapa*) or at the town center's wet market. Frequently, fish are sold by women in villages. Marketing costs are low, although a 5-10%/kilo markup exists between sales to retailers and sales to consumers at the village level.

The larger and higher quality fish are sold to wholesalers, who sometimes bring them to bigger markets in major towns within a province. High-value products, such as mud crab and sea cucumber, are brought to city markets like Metro Manila. Markups at each stage of the marketing chain may range from a low of 10% up to a high of 50%. Thus, farm-gate prices are generally less than half of retail prices. Prices at source are not, however, always identical with prices received by fishers. This is especially true when fishers are hired help and do not own the boats and gears. In such cases, the return to the fisher is as low as 15% of the landed price. A system where the buyer provides capital for fishing for priority in fish landings – an arrangement called *suki* – is common among fishers. Fishers borrow for capital investments and operating expenses. The lender requires the borrower to sell the fish exclusively to the lender. No interest is charged, but loan repayment is made daily in the form of fish produce at reduced price terms.

2.6.4.2 Markets for commercial catches

Most commercial catches are landed and traded in wholesale qualities at traditional landing centers. In some cases, catches that have been landed in private and traditional landing sites are transported to major fishports for auctioning. Some fishing corporations have their own fish canneries and therefore transport their catches directly to these canneries (e.g., Ayala Seafoods Corporation and Universal Canning Corporation, etc.).

2.6.4.3 Markets for aquaculture produce

In the aquaculture subsector, most of the products is either auctioned on site or transported to major fishports for auctioning. Those who are engaged in on-site bidding are middlepersons and fish exporters. Meanwhile, bidding in fishports is typically done by middlepersons, fish vendors in the local wet markets and small fish processors. Some aquaculture farms have their own processing facilities (e.g., Alson's Aquaculture Corporation, Aklan's Boneless Bangus, etc.). Hence, most of their aquaculture products directly goes to their processing plants.

2.6.4.4 Markets for processed fishery products

Traditional processed fish products (e.g., smoked, dried, salted, fermented and marinated/pickled, etc.) are sold in wet markets throughout the country. Some products are sold in supermarkets, including canned/bottled fish, deboned milkfish, and specialty products (e.g., pasteurized fishpaste, crab fat, etc.).

2.6.4.5 Local consumption

Within the country, geographical variations in the consumption of fish and fishery products are determined by proximity to supply source (due to inadequacy of transport facilities), purchasing power and consumer preferences. These, in turn, are also influenced by the availability of substitutes. In 1999, Metro Manila had a per capita consumption of 34 kg, which was lower than the national average because the region has access to other protein foods and the retail prices of fish there are often higher. The Visayan provinces, where fishing is a major industry, had the highest per capita consumption of 49 kg. The national average per capita consumption further declined to 27 kg in 2001, which was attributed by BFAR to faster population growth relative to production growth.

2.6.4.6 Export markets

In terms of export, Japan and USA are the traditional export markets for Philippine fish and fishery products. Although these countries still remain as the top major destination, it is still necessary to tap other markets and create a niche for some of our fish and fishery products. Since the world market demands high-quality, safe and globally competitive products, development of new fishery products or improvement of existing ones are only part of the overall strategy. Compliance with existing regulations in the export market is necessary to stay competitive in the export market.

2.6.4.7 Government support for marketing systems

The AFMA mandates the creation of a network of smallholder cooperatives called “National Marketing Umbrella” to engage in marketing activities. In addition, Section 34 of the Fisheries Code of 1998 stipulates that at least 10% of government loans to the fisheries sector be allotted to post-harvest and marketing projects. More specifically, the Ginintuang Masaganang Ani Program for 2002-2004 aims to improve production-marketing systems in the fisheries sector so that it becomes “more efficient and effective”. Since the 1990s, the government has provided funding for the construction of more than 200 fish landing ports through its national municipal fishing ports program and the Fisheries Sector Program of the early 1990s. In addition, there was an ice supply program led by the private sector which built about 36 ice and cold storage facilities.

Problems in infrastructure support include the concentration of fishing ports in urban areas where there is potential for investment and growth, but far from where fisherfolk communities are found. These ports charge high fees and require quota supply from fishers in exchange for landing rights. Given such prohibitive fees, the municipal fishers cannot readily access these ports.

2.7 Key Development Challenges

The previous sections offered glimpses of the many challenges facing the country’s fisheries sector. In this section, we pull together the facts about these challenges and elucidate their interconnections. We will show that these challenges are intricately linked, and that the most effective way to address them is to implement a carefully planned and integrated program.

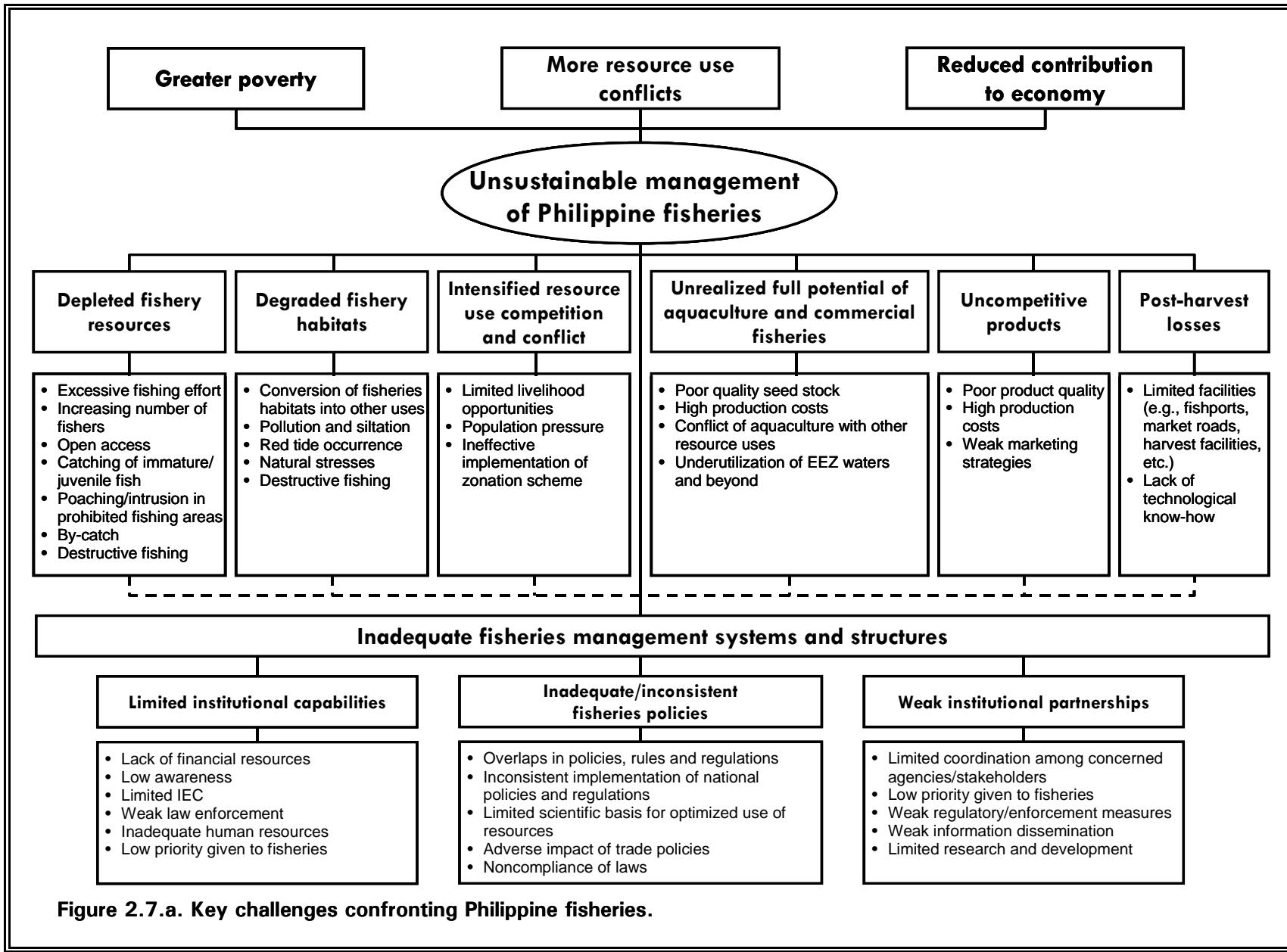
Figure 2.7.a. Key challenges confronting Philippine fisheries.**Figure 2.7.a. Key challenges confronting Philippine fisheries.**

Figure 2.7.a schematically illustrates the major issues confronting Philippine fisheries. If the problem of Philippine fisheries can be summarized in a single statement, it can be stated that, despite a long history of attempts, Philippine fisheries have yet to be sustainably managed. Unsustainable management results in greater poverty, more resource use conflicts, and reduced contributions of the fisheries sector to the economy. In specific terms, unsustainable management of fisheries means: (1) our fishery resources are depleted; (2) our fishery habitats are degraded; (3) we see intensified resource use competition and conflict; (4) we have yet to fully exploit the full potential of our aquaculture and commercial fishing grounds; (5) our fishery products are not competitive; and (6) we consistently endure post-harvest losses. The main cause of the above problems — or what prevents us from resolving them — is our inadequate management systems and structures. Hence, all these problems can be traced to an institutional system that is not yet fully effective. We examine these problems below.

2.7.1 Depleted Fishery Resources

The amount of fishing pressure exerted on Philippine capture fishery resources is simply more than what the resources can sustain. Consequently, in the case of demersal resources, biomass levels are down to 10-30% of levels in the late 1940s. In addition, changes in species composition, such as the disappearance of larger-sized demersal species, have begun to occur. The biomass of small pelagics today is only 17% of the levels in the early 1950s. Overfishing of both demersal and small pelagic resources probably started in the 1970s. In the case of large pelagics, their abundance is difficult to ascertain because they are highly migratory. However, scientific evidence suggests that the fishing pressure on these resources is likewise excessive. For tunas, in particular, juveniles now comprise a large portion of the typical catch, indicating that fewer individuals get the chance to grow to adult sizes.

Open access to our fishery resources is the main reason for their severe depletion. Under open access, practically anyone who wishes to fish may do it when and where they choose. In this situation, a fisher is motivated to fish as much as possible because the fish that he or she does not catch will most likely be caught by someone else. Such unregulated competition ensures that overall fishing pressure eventually becomes excessive. Despite the directive in the Fisheries Code calling for a shift from open to limited access through licensing, we have yet to implement a nationwide licensing in the municipal fisheries.

2.7.2 Degraded Fishery Habitats

The Philippines' critical fisheries habitats are degraded and their ability to sustain fisheries and provide ecological services is impaired. Conversion of mangroves into other uses, particularly into brackishwater fishponds, has wiped out two-thirds of the country's mangroves, which in 1918 was estimated at 450,000 ha. Moreover, about 95% of the remaining mangroves are secondary growths with thinner canopies, reduced litter fall, reduced food and consequently a diminished capacity to function as fish nurseries, among other things. In the case of seagrasses, most seagrass areas that have been surveyed thus far are stressed, as indicated by low shoot density and biomass per square meter. Siltation and destructive fishing have rendered 70% of the country's reefs in poor condition, as evidenced by low live coral cover. Catch rates reported in reefs throughout the country are among the lowest in the world. Destructive fishing practices and pollution likewise contribute to habitat degradation.

2.7.3 Intensified Resource Use Competition and Conflict

As resources dwindle, the race to harvest them intensifies. Among the consequences of intensified competition is the proliferation of destructive and illegal fishing practices. Fishers turn to such practices in desperation or in a bid to outcatch the competition. Intensified competition leads to resource use conflicts. Where commercial fishers operate within the vicinity of municipal fishers, conflict is the inevitable result. Conflicts also occur among municipal fishers using different gears, especially between those who use gears of highly unequal fishing power. Competition is aggravated by ineffective implementation of fisheries zonation scheme. There are also conflicts between fishers and other users of the fishery resources, such as divers and recreationists.

2.7.4 Unrealized Potential of Aquaculture and Commercial Fisheries

In the aquaculture subsector, a number of species are being cultured with less than adequate technology. For example, some culture activities are dependent on the wild for seed stocks because hatcheries are nonexistent. In such cases, production could be significantly increased if a hatchery could provide a stable supply of seed stock. The potential areas available for aquaculture expansion are nearly 285,500 ha. With regards to commercial fishing, most operations are conducted in the country's shelf area or within depths of 200 m. No serious attempt has been made to explore the largely untapped EEZ waters. Among the potential areas are the offshore areas of Palawan and the Sulu-Sulawesi Marine Eco-region.

2.7.5 Uncompetitive Products

In the export market, Philippine fishery products are not known for being competitive. Among other things, some products are of poor quality, have high production costs and are hampered by poor marketing strategies. Some of the shipments of the country's fishery products have been rejected by the importing nations because they failed to meet the required safety standards.

2.7.6 Post-harvest Losses

Approximately 25-40% of the country's total fish production is lost due to discards and improper post-harvest handling. Such losses can be attributed to one or a combination of physical, nutritional or value losses. About one-third of the harvested products are spoiled before they reach their market destinations. Lack of infrastructure facilities (e.g., fishports, market roads and dry/cold-storage facilities) and limited technological know-how contribute to post-harvest losses.

2.7.7 Limited Institutional Capabilities

The responsibility to manage fisheries is shared by NGAs, LGUs and local communities. Yet these groups have serious capability limitations that prevent them from fulfilling their responsibilities. The management agencies are hampered by the lack of financial resources, as well as inadequate human resources. Within the agriculture sector, low priority has always been given to fisheries when compared to crops and livestock components.

2.7.8 Inadequate/Inconsistent Fisheries Policies

Fisheries management is also hampered by inadequate and inconsistent policies. For example, while the Fisheries Code pursues food security essentially through management and conservation of fishery resources, AFMA promotes the full industrialization of the fisheries sector. Inadequate policies include cases in which some national policies and local regulations are promulgated with limited scientific basis. There are likewise international conventions/commitments that may have an adverse impact on the fisheries sector. For example, trade policies on import liberalization are putting the small-scale fishers at a disadvantage given the importation of cheap fishery products.

2.7.9 Weak Institutional Partnerships

Weak institutional partnerships result in limited coordination among concerned agencies and stakeholders, either horizontally or vertically. For example, national enforcement agencies (PNP Maritime Group and Philippine Navy)

should ideally work closely with the local law enforcement units. Yet more often, the collaboration is quite loose, resulting in weak enforcement of fisheries rules and regulations. Weak partnerships are also seen between management agencies and institutions involved with R&Ds. Hence, there is often limited use in management of relevant technical information.

2.7.10 Lack of Recognition of Women Fishers' Roles and Contribution to Fisheries Development

Women as stakeholders in fisheries industry development remain largely unrecognized, while their invisible roles contribute greatly to the subsistence of fishing households and maintenance of local fishing economies. Women are still viewed as subordinate to men in terms of management of fisheries resources and sector development as a result of prevailing cultural value system and social construction. Women's participation in relevant institutions, structures and mechanisms remain a challenge, such as in FARMCs due to the traditional view that women are best assigned as secretaries and treasurers, while men dominate resource management initiatives. In the same vein, relevant laws and policies are underutilized as tools to enhance women's participation and benefit in the fisheries development process because of low awareness on these affirmative policies for gender equality. Another hindrance to the development of gender responsive programs for women is the absence of data on women's roles and contribution in the different sectors of the fisheries industry that can be useful for policy formulation and program development. In summary, much needed reforms are in the area of developing gender-responsive fisheries programs, formulation of gender-aware fisheries policies, and institutional reforms to ensure the effective participation of women in decision-making and planning for fisheries industry development.

2.8 Key Development Opportunities

While the challenges confronting fisheries are daunting, we must not lose sight of existing opportunities or positive conditions in the sector. These include the vast water resources for increasing production; the tropical condition, which allows year-round fish culture; increasing demand for fish and fish products from primary markets, such as USA and China; and the strong domestic market. There are opportunities to delineate property rights to gradually replace the open access regime; utilize EEZ; sustainably expand aquaculture and mariculture; improve post-harvest practices and systems; tap export potentials; and extract substantive resource rents through policies based on natural resource pricing. Key opportunities are briefly described below.

2.8.1 Delineation of Property Rights

Traditionally, municipal fisheries are an open access subsector. Practically anyone may fish without limit and with little government interference. The result of this free-for-all regime is the overexploitation of capture fisheries. Establishing appropriate property rights, especially in municipal fisheries, is a step towards controlling and rationalizing access to fishery resources. When long-term rights of fishers and other users to marine resources are well defined and secure, they will tend to exploit them in a more sustainable manner. This is because they are assured that the ultimate benefits of their practices and activities will accrue to them.

The provisions in the Fisheries Code of granting fishery rights to local organizations provide a general basis to delineate property rights at the municipal level. The LGUs now have to appropriate these rights to fishers and users in a socially equitable and environmentally sustainable manner. In the distribution of rights, LGUs must put utmost importance on the ability of organizations to sustainably manage municipal fisheries resources. To do this, LGUs must require proposals from organizations wanting to manage resources to include an EIA, which will serve as an important basis in the granting of fishery rights. In addition, the Fisheries Code provides for the granting to municipal fishers, organizations and cooperatives of demarcated fishery areas for fish capture, mariculture and fish farming. Furthermore, resident fishers, organizations and cooperatives have priority in receiving fishery rights granted by LGUs and in exploiting demarcated fishery areas in their communities. Such property rights instruments should also take into consideration women's utilization of fisheries resources and that they should also be entitled to equal access to such instruments.

2.8.2 Utilization of Offshore Exclusive Economic Zone

Philippine fisheries essentially remain concentrated in the country's shelf area, which measures 184,600 km² in total. This means that there are more than 2 million km² within the Philippine EEZ that essentially remain unexplored and unexploited. Conceivably, there may be deep-sea resources in these areas that could support viable commercial fisheries. Candidate sites include the offshore hard bottoms around Palawan, southern Sulu Sea and central part of the Pacific coast.

2.8.3 Aquaculture Expansion

After capture fisheries production peaked in the early 1990s and essentially remained unchanged in subsequent years, the aquaculture subsector picked

up the slack. Aquaculture has been producing increasingly larger annual volumes to meet the growing demand for fish. Yet, though aquaculture production has been impressive, there is still room for expansion. As earlier described, the culture technologies for some species (e.g., grouper) are still in the stages of infancy (e.g., no hatchery, seed stock from the wild). The culture of such species could be expanded by applying technologies existing elsewhere or by developing them through R&D. Also, some less-known species are presently being cultured essentially by innovators in isolated endeavors. With proper support, the culture of these less-known species could be commercialized. By expanding aquaculture, the pressure on existing supplies of wild fish will be reduced. Some quarter of a million hectares may be developed for aquaculture expansion.

2.8.4 Improved Post Harvest

The post harvest sector contributes significantly to the economy and to the livelihood of coastal communities. Many, **especially women**, are involved in specific aspects of fisheries post-harvest activities including small-scale processing, marketing and trading, even if it is not their major livelihood. For the fisheries sector to fully develop, additional port and post-harvest facilities are necessary. As earlier mentioned, the post-harvest losses in fisheries are substantial and lowering these to a minimum will do a lot to improve productivity. The available data on fisheries facilities indicate that the country has a large number of ports and most of these are operating. However, several coastal regions do not have regional ports and many coastal municipalities do not have even simple ports. In addition, ice plants, freezers and cold storages are lacking in many areas. In some places where facilities are available, these are underutilized because of the reduced landed harvest by fishers due to stocks depletion.

2.8.5 Export Potential

Export earnings from fish and fisheries products constitute a major part of foreign exchange earnings. Global fish trade in 2000 was reported to be US\$55.2 billion and is growing at an annual rate of 4% (FAO 2002). Growing international trade provides great opportunity for the Philippine fisheries exports. As in most developing countries, the Philippine trade of fishery products is continuously undergoing a shift from merely exporting raw materials (for importing countries to process) to trading high-value live fish or value-added products. Foreign investments have come in to develop processing plants because of low labor costs. The majority of commodities produced through aquaculture undergo auction procedures, either on-site (farms) or at major trading centers (ports or the local *consignacion*). Many aquaculture products, particularly seaweeds, have competitive export potential.

2.8.6 Natural Resource Pricing

The commercial fisheries and aquaculture are the two subsectors where resource rents are potentially high, and where correct resource pricing could be exercised. The goal of sustainable development in the fisheries sector can be pursued through the use of market-based instruments. The Fisheries Code recognizes the importance of market-based instruments as tools in environmental management. For instance, Section 48 of the code stipulates that DA should formulate incentives and disincentives – such as effluent fees, user fees, negotiable permits and other market-based instruments – to encourage compliance to environmental standards and promote sustainable management practices in aquaculture. Charges for access to fishery resources should reflect the community interest, as well as short and long-term economic, environmental, social and cultural costs and benefits. Access to common fishing resources for private profit should be priced to give a reasonable rate of return to the community, consistent with government resource management policies.

The correct pricing of fishery resources by the national government is a useful tool for attaining a more sustainable form of development in fisheries. This is because correct resource pricing, largely done through the imposition of accurate fees that reflect resource rents, or above normal profits, will force users to be more efficient. Hence, their activities will produce higher outputs at lower effort levels. Such may eventually reduce overfishing without sacrificing production. In addition to economic and environmental gains of correct pricing, there are generated revenues from extraction of rents from users.

The current license fee rates in the commercial fisheries are very low and were set many years ago. For a 250 GT motorized boat, for instance, the annual boat license fee is only PhP1,000 which was set way back in 1983. In addition, the annual application fee is minimal (ranging from PhP400 to PhP2,000) which was determined back in 1993. In the aquaculture subsector, the situation is similar. The rental rates for using government-owned fishponds are minimal and were set decades ago. The annual rental fee per hectare of fishponds is only PhP50 since 1979, while the annual application fee is PhP1,000 since 1993.

2.8.7 Institutionalizing Gender Mainstreaming at All Levels

The Philippines is signatory to several international agreements that uphold and promote the equal rights of women to sustainable development. The principle of gender equality has been translated into enabling fisheries policies including the Fisheries Code, AFMA, Local Government Code, AFMA, to name a few. The government has also mandated all government agencies, local government units, government-owned and controlled corporations to

mainstream gender in their policy, programs and plans, and to allocate a minimum of 5% of the funds for gender and development interventions, known as the GAD budget.

Many women have been organized in coastal communities and some of whom have started to assert their rights within their respective FARMCs. Women fishers, through the capacity-building initiatives of NGOs, now occupy key positions from local to national level formations, and there remains a great potential for pooling women leaders from the sector to inform fisheries policies, programs and plans. Women fishers are also organized at the national level and are linked to the broader people's movement for development and women's empowerment. Within these organized groups are male fisherfolk leaders who are supportive of the gender equality agenda. Strengthening government and civil society partnerships to achieve gender equality should be considered as an important strategy to achieve the goals of sustainable development in the fisheries sector.

CHAPTER 3

FISHERIES SECTOR DEVELOPMENT FRAMEWORK

This chapter provides a prognosis of the future of the Philippine fisheries sector – as well as the strategic directions to be pursued in terms of overall goal and associated objectives – over a 20-year (2006-2025) time frame. It also serves as the conceptual link between Chapter 2 (Overview of Philippine Fisheries) and Chapter 4 (Medium-term Priority Programs and Projects). Chapter 2 describes key sectoral issues and opportunities, while Chapter 4 provides the project interventions to address these issues and opportunities during the first medium-term period (2006-2010) consistent with the long-term strategic directions.

Four intricately related sections are contained in this chapter. *Section 3.1 (Development Philosophy)* describes the internationally accepted philosophy concerning sustainable development that is the basis of CNFIDP. Pertinent concepts and/or relevant guiding principles specific to the fisheries sector are given emphasis. *Section 3.2 (Strategic Development Factors/Trends and Scenarios)* examines the relevant factors, trends and/or drivers – at the national, regional and international levels – that influence the fisheries sector. These include globalization, population pressure, climate change, increasing demand for fishery products, technological advances and biodiversity concerns. A prognosis for the Philippine fisheries sector is presented taking into account the impacts of various factors/trends in optimizing and sustaining the direct and indirect socioeconomic benefits derived from fisheries. These benefits include food, employment, export earnings and economic contribution; emphasis is given to the national supply and demand for food fish. While capture fisheries are expected to still contribute significantly to food fish supply in the future, environment-friendly aquaculture is anticipated to meet the increasing demand for food fish.

Against the above backdrop, *Section 3.3 (Strategic Vision, Mission, Goal and Objectives)* defines the desired state for the sector. The vision is “A sustainable and competitive fisheries industry that contributes to food security and provides optimum socio-economic benefits to Filipinos”. The long-term goal is “to optimize and sustain the socioeconomic benefits from fisheries without jeopardizing the fishery resources and the associated habitats in the most administratively efficient and cost-effective manner.” Such goal has nine associated objectives, namely: (1) rationalize utilization of fishery resources; (2) protect fishery habitats; (3) reduce resource use competition and conflict; (4) develop full potential of aquaculture and commercial fishing; (5) promote competitiveness of fishery products; (6) minimize post-harvest losses; (7) enhance institutional capabilities; (8) promote appropriate fisheries policies; and (9) strengthen institutional partnerships. *Section 3.4 (Program Components and Indicative Phasing)* wraps up the chapter and links it with the succeeding two chapters. The five program components are as follows: (1) Municipal Fisheries; (2) Commercial Fisheries; (3) Aquaculture; (4) Post Harvest; and (5) Institutional Development and Policy Support. In terms of phasing, the nine objectives (strategic directions) to be pursued are provided with relevant indicators. Some targets are to be achieved within the first medium-term implementation period (2006–2010), which will lay out the foundation for optimization and sustainable growth of the Philippine fisheries sector. Likewise, certain targets are expected to be achieved by the end the 20-year (2025) CNFIDP planning period. These targets are linked with the set of indicators given in the monitoring and evaluation (M&E) scheme in Chapter 5.

3.1 Development Philosophy

Sustainable development was used as the conceptual foundation in crafting this plan. As an integrative development-cum-management paradigm, it “involves the simultaneous pursuit of economic prosperity, environmental quality and social equity” (WBCSD 2005). Sustainable development is also called “ecologically sustainable development” (Commonwealth of Australia 1992) and “sustainability” (Slocombe 1991; O’Riordan 1999). The concept of sustainable development has evolved through major international events that include the: United Nations (UN) Stockholm Conference on Human Development in 1972, development of the World Conservation Strategy in 1980, report of the World Commission on Environment and Development in 1987, UN Conference on Environment and Development (UNCED) in 1992 and World Summit on Sustainable Development in 2002. Sustainable development has been defined in many ways and this plan shall deal more on its essence as it relates to fisheries development and management. These include sustainable development’s integrative element, key dimensions and associated principles/concepts (Table 3.1.a).

Table 3.1.a. Elements of sustainable development in the context of fisheries management.

Integrative element	Key dimensions	Associated principles/concepts
Holistic development	1. Environment	1. precautionary principle 2. ecosystem-based fisheries management 3. “polluter pays” principle 4. carrying capacity
	2. Social	1. inter and intragenerational equity 2. participatory management 3. partnership 4. decentralized administration 5. accountability
	3. Economic	1. profitability/efficiency

Holistic development is an integrative element of sustainable development. As such, it promotes integrated management taking into account all the relevant development factors, including human and natural resources dimensions. An outcome of UNCED in 1992 is the formulation of Agenda 21 and similar action agendas for individual countries, which contain national strategies to achieve sustainable development. The Philippine Agenda 21 (PA 21) signed on September 1997 clearly captures the holistic essence of sustainable development as “the harmonious integration of sound and viable economy, responsible governance, social cohesion/harmony and ecological integrity to ensure that development is a life enhancing process”. It is desirable to have an integrated policy and decisionmaking process that includes all sectors

involved in order to promote compatibility and a balance of resource uses. It recognizes that in most cases, multiple economic uses occur within the fisheries environments. These include agriculture, forestry, manufacturing industries, mining, navigation and tourism. Hence, it becomes necessary to identify existing and projected uses of fisheries areas and their interactions with the other sectors.

Generally, sustainable development can be characterized by three key interlocking dimensions: (1) environmental, (2) social (3) and economic. Munasinghe (1993) refers to it as a development that is ecologically sustainable, socially acceptable and economically feasible. Munro (1995) classifies these three-pronged dimensions as ecological sustainability, social sustainability and economic sustainability. There is no clear or definitive ascendancy among these three dimensions; rather, they must ideally be pursued simultaneously and complement one another. Environmental, social and economic aspirations should be evaluated and accommodated through integrated planning and management of fisheries. Hence, there is a need for closer, in-depth assessment of interactions between the human economy and the natural environment.

The environmental dimension has four associated principles/concepts. The first is the **precautionary principle**. Such approach must be considered in making fundamental decisions about the fisheries sector. The current overfished and degraded condition of many fishery resources in the Philippines requires that a precautionary approach be used in making fundamental decisions about their uses. Decisions should be planned using the best available scientific and technical information. In the event that such data/information are insufficient to fully characterize the risks or negative impacts to the fishery resources and their supporting natural environment, precautionary measures should be applied to prevent serious or irreversible harm. The higher the risks and uncertainty of unacceptable levels of change or serious damage to the fisheries, the more conservative should be the measures required to reduce or eliminate the risk. The precautionary principle is imbedded in the Code of Conduct for Responsible Fisheries (CCRF) developed by the Food and Agriculture Organization (FAO) and the Southeast Asian Fisheries Development Center (SEAFDEC).

The second principle pertains to **ecosystem-based fisheries management** (EBFM). The EBFM has been cited in international fora, such as the Conference on Responsible Fisheries in the Marine Ecosystem (Reykjavic, Iceland, 2001) and the International Council for the Exploration of the Sea/Scientific Committee on Oceanic Research Symposium on Ecosystem Effects of Fishing (Montpellier, France, 1999). The EBFM is defined as "managing fisheries in a manner that addresses multiple needs and desires of society, without jeopardizing options for future generations, to benefit from

the full-range of goods and services provided by marine ecosystems" (FAO 2003). This principle is closely allied with the precautionary principle and limiting fisheries impacts on the ecosystem.

The third principle is called the "**polluter pays**" principle. It espouses that the cost of environmental control and management must fall in the first place on the polluters or resource users. Hence, those who produce negative impacts to the fishery resources and/or environment must undertake the necessary compensatory activities or internalize the costs. Particularly for aquaculture, this shall ensure that those involved in the industry uses fishery resources and environments efficiently, eliminates pollution and reduces wastes. A component of this principle is the establishment of an appropriate user-fee system.

The fourth principle covers the broad concept of **carrying capacity**. It implies that renewable resources should be exploited only at or below their rates of renewal (Hodge 1995). In the context of fisheries, it means that resource extraction must not exceed the reproductive capability of the resources. It also advocates that development be pursued within the carrying capacity of the natural environment. Such principle is also referred to as development within the limits of acceptable change.

There are **six** associated principles/concepts for the social dimension. **First** is the principle of **inter and intragenerational equity**. Within the framework of sustainable development, this pertains to "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). The benefits from the use of fishery resources should be shared between present and future generations of Filipinos, especially among those whose livelihoods are highly dependent on these resources. Short-term economic gains should never be the basis for a decision that has adverse consequences for future users. Intergenerational equity requires that future generations be given the same opportunity as the present ones to decide on how to use the fishery resources.

The **second** concept relates to **participatory management**. The ultimate goal of sustainable fisheries management can only be achieved effectively through multisectoral and multi-institutional collaboration and participation of all relevant stakeholders. Hence, this CNFIDP's formulation has involved the participation of industry players coming from LGUs, NGAs, fishers associations, private sector and civil society groups. Relevant stakeholders must be given opportunities to actively participate in all aspects of fisheries management. The complex nature of institutional arrangements happening in Philippine fisheries requires the cooperation of many stakeholders and institutions at national and local levels. The principle of subsidiarity dictates

that the responsibility for resource management must be given to the stakeholders at the appropriate level.

The **third** concept is **gender equity**. In order to achieve gender equality, which is a vision of transformed conditions, relations and status between men and women on the basis of non-discrimination, the principle of gender equity gives consideration to the needs of women as a disadvantaged and marginalized sector within the fisheries industry. Gender equity as a principle requires that development planning should be responsive and appropriate to the conditions of women by addressing the sources of inequality, including unequal access and control over resources, unequal participation in decision-making and policy-making structures, and other socio-cultural factors that perpetuate the low status of women as fishers. Related to the principle of gender equity is the concept of affirmative action, defined as policies that address discrimination, such as access to education and employment. Also defined under CEDAW, is the so called “temporary special measures” aimed at accelerating de facto equality between men and women, which shall not be considered discrimination against men, and shall be discontinued when the objectives of equality of opportunity and treatment have been achieved.

The promotion of gender equity entails providing a favorable environment for the development of policies and programs that (1) ensure women’s equal access to natural resources, productive and economic resources, and political resources, (2) transform men and women’s consciousness towards recognizing gender equality, and (3) address other factors that discriminate against women.

Fourth, the concept of stakeholder and institutional **partnership** must be duly considered. There is a need to establish appropriate partnership arrangements. These include private-public partnership (government and industry collaboration), as well as innovative partnership schemes between civil society groups and local communities. Collaborative mechanisms must promote policy harmonization and consistency, information sharing and collective action to achieve sustainability in fisheries management. Knowledge-based management forms part of information sharing.

Fifth, and closely related to the above, is the concept of **decentralized administration**. Such philosophy is contained in the 1991 Local Government Code. Direct participation of local fishing communities – including indigenous peoples, women and children – must be incorporated in the identification, formulation, planning and implementation of fisheries plans and programs. Whenever possible, responsibilities and resources for fisheries management must be fully devolved to local level decisionmakers who are closest to the resources being managed. The LGUs and fishing communities are closest to the ground-level issues, problems and solutions. Devolution of responsibilities

is essential to rehabilitate and to sustain the benefits derived from fishery resources.

The **sixth** principle relates to **accountability**. It means the resource users must be held accountable for their actions. Municipal and commercial fishers are expected to shun away from the use of destructive fishing gears. Similarly, aquaculturists must promote environment-friendly husbandry techniques. Hence, all stakeholders must be responsible stewards of the fishery resources. Moreover, those responsible for implementation of various CNFIDP elements must be accountable for performance or lack thereof.

The economic dimension largely relates to profitability/efficiency. As an enterprise, the economic and/or financial benefits must outweigh the cost of management. It implies that those engaged in the fisheries industry obtain reasonable income or returns from their undertakings.

Sustainable development means improving and maintaining the well-being of people and ecosystems, and likewise entails integrating economic, social and environmental objectives (Carew-Reid *et al.* 1994). In the context of the fisheries sector, the economic, social and environmental objectives are contained – in various forms – within the international laws/norms and national laws (Table 3.1.b.). At times, though, these laws and policy instruments have varying focus and emphasis.

Table 3.1.b. Key international laws/norms and national laws that embody concepts/principles of sustainable fisheries development.

International laws/norms	National laws
1. UN Convention on the Law of the Sea (UNCLOS) (1982)	1. Presidential Decree (PD) 704 (1975) The Fisheries Decree of 1975
2. UN Conference on Environment and Development (UNCED) (1992)	2. Republic Act (RA) 7160 (1991) The Local Government Code (LGC) of 1991
3. UN Convention on Biological Diversity (CBD) (1992)	3. RA 7586 (1992) The National Integrated Protected Areas System (NIPAS) Act
4. Code of Conduct for Responsible Fisheries (1995)	4. RA 8435 (1997) The Agriculture and Fisheries Modernization (AFMA) Act
5. UN Agreement for the Implementation of the Provisions of the UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1995)	5. RA 8550 (1998) The Philippine Fisheries Code
6. International Plan of Action (IPOA) for the Management of Fishing Capacity (1998)	
7. Cartagena Protocol on Biosafety (2000)	
8. Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000	
9. UN Millennium Declaration (2000)	
10. International Plan of Action to Prevent,	

Deter and Eliminate Illegal, Unregulated and Unreported Fishing (IPOA-IUU) (2001)	
11. World Summit on Sustainable Development (WSSD) (2002)	

The **1982 UNCLOS'** preamble expressed the desirability of a "legal order for the seas and oceans which ... will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment." The instrument also defined the exclusive economic zone (EEZ). Article 51 stipulates that an archipelagic State, such as the Philippines, shall respect existing agreements with other States and shall recognize traditional fishing rights. Article 61(Conservation of the living resources) encourages the sharing of the available scientific information among States. Article 62 (Utilization of the living resources) describes the management measures for regulating seasons and areas of fishing; the types, sizes and amount of gear; and, the types, sizes and number of fishing vessels that may be used to promote fisheries conservation.

The **1992 UNCED** or "The Earth Summit" has resulted in the release of crucial documents that have bearing on the fisheries sector. These include: Agenda 21, Rio Declaration on Environment and Development and UN Framework Convention on Climate Change. Eco-efficiency has become a guiding principle for business and governments alike. Agenda 21's Chapter 17 espouses the protection of the oceans, all kinds of seas and coastal areas, as well as the rational use of their living resources, including fisheries. This is again pertinent to the Philippines given its archipelagic waters. The PA 21 signed on September 1997 contains the country's strategies to achieve sustainable development. Through this CNFIDP, economic, social, cultural and environmental aspirations are accommodated through integrated planning and management of fishery resources. Biodiversity concerns in fisheries have been highlighted since **CBD** was ratified in Rio de Janeiro in 1992. These include the international listing of fishery resource species as threatened or endangered. It has bearings on fisheries sustainability as well. The CBD defines "sustainable use" as the "use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations." Some management measures stipulated in CBD are applicable in the CNFIDP, such as establishing a system of protected areas and restoring degraded ecosystems.

The **CCRF** was approved in 1995 by FAO as a suitable basis for judging whether or not the living aquatic resources are being harvested in ways compatible with sustainable development. Reference is made in relation to the earlier UNCED (1992) and UNCLOS (1982). The CCRF is voluntary; however,

it contains provisions that may be legally binding, such as the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas. Containing 12 articles, the code deals with a range of technical subject matters, which include fisheries management, fishing operations, aquaculture development, integration of fisheries into coastal area development, post-harvest practices and trade, and fisheries research. The CCRF is global in scope, although it recognizes the special requirements of developing countries, such as the Philippines. It likewise provides principles and standards applicable to the conservation, management and development of all fisheries. For example, Section 6.2 stipulates that "fisheries management should promote the maintenance of the quality, diversity and availability of fishery resources". The **UN Agreement** for the Implementation of the Provisions of the UNCLOS relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks sets out principles for the conservation and management of those fish stocks. The agreement was adopted on 4 August 1995 by the UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks, and entered into force on 11 December 2001. This agreement seeks to lay down a comprehensive regime for the conservation and management of straddling and highly migratory fish stocks including measures for strengthening regional and subregional cooperation; measures for monitoring, surveillance and enforcement; and settlement of disputes. Covering straddling and highly migratory fish stocks, it applies both on the high seas and within EEZs of coastal/archipelagic States like the Philippines.

The **IPOA** for the management of fishing capacity (IPOA-Capacity) came out in 1998. Such IPOA was developed in the context of CCRF. As a global phenomenon, excessive fishing capacity contributes substantially to overfishing, the degradation of marine fisheries resources, and the decline of food production potential and significant economic waste. Excessive fishing capacity has been documented in the Philippines, both for municipal and commercial fisheries. The IPOA-Capacity constitutes an important element of fishery conservation and sustainable management. The immediate objective of the IPOA is for States and regional fisheries organizations, to achieve worldwide preferably by 2003, but not later than 2005, an efficient, equitable and transparent management of fishing capacity.

The **Cartagena Protocol on Biosafety** with reference to the CBD was adopted on 29 January 2000, and entered into force on 11 September 2003. The Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology. It establishes an advance agreement procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of modified organisms into their territory. This protocol reaffirms the precautionary approach contained in Principle 15 of the Rio Declaration on

Environment and Development. The protocol also establishes a Biosafety Clearing-house to facilitate the exchange of information on living modified organisms, and has particular relevance to Philippine aquaculture. In February 2000, some 540 participants from 66 countries (including the Philippines) attended the Conference on Aquaculture in the Third Millennium held in Bangkok, Thailand, that produced the **Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000**. This was an offshoot of the first major international Conference on Aquaculture organized by FAO that was held in 1976 in Kyoto, Japan. Such paved the way for the adoption of the Kyoto Declaration on Aquaculture. This declaration strongly encourages governments, the private sector and other stakeholders to incorporate into their aquaculture development plans key sustainable development strategy elements, such as improving food security and alleviating poverty, improving environmental sustainability, and promoting market development and trade. Key strategies of the Bangkok Declaration are being implemented in the Philippine aquaculture industry through the AFMA and the Fisheries Code.

In September 2000, 189 member-states of the UN adopted the **Millennium Declaration**. In the UN Millennium Development Goals (MDG), the fisheries sector forms part of the goal to eradicate extreme poverty and hunger, ensure environmental sustainability, promote gender equality and empower women, combat HIV/AIDS, malaria and other diseases, and develop a global partnership for development (WorldFish Center 2005). The Philippines is mandated to achieve quantifiable development goals and targets (the MDGs) until 2015 that will at least ensure that development initiatives are effectively eradicating poverty and promoting sustainable human development. In the Philippines, it is recognized that the fisheries sector is needed to provide nutrition and income particularly to the impoverished segment of the population. The fisheries have been acknowledged as a key instrument for ensuring food security, increasing productivity and improving market access, particularly for the rural poor. To achieve the MDG targets for the Philippines, the fisheries sector will remain a resource-based vehicle for sustained social and economic development. In terms of priority policies and programs, the Fisheries Code and the AFMA will provide major policies on the utilization and conservation of fishery resources in the country.

The **IPOA-IUU** was developed within the framework of FAO's CCRF, and was adopted in 2001. The Philippines' National Plan of Action to prevent, deter and eliminate illegal, unregulated and unreported fishing (NPOA-IUU) was developed in response to the challenges posed by IPOA-IUU. Though not quantified, IUU fishing in the Philippines is known to be widespread. The most common forms are poaching, cyanide fishing, blast fishing and the use of fine-meshed nets. Losses from poaching alone have been estimated to reach PhP 37 million annually (Aguilos 1998). The NPOA-IUU largely addresses environmental and ecological concerns. Several fisheries-related concerns

were identified during the **2002 WSSD** held in Johannesburg. A target specific to the fisheries is to “urgently develop and implement national and, where appropriate, regional plans of action, to put into effect the FAO international plans of action, in particular the international plan of action for the management of fishing capacity by 2005.” Another temporal target is to “maintain or restore (fish) stocks to levels that can produce the maximum sustainable yield (MSY) with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015.” This is particularly crucial for the Philippines, given that many stocks are already depleted.

The key national laws concerned with fisheries likewise espouse the principles and concepts behind sustainable development. **PD 704** (1975) gave jurisdiction and responsibility to BFAR in the management, development and protection of the country’s fisheries and aquatic resources. Prior to PD 704, the responsibility for managing fisheries resources belonged to the defunct Philippine Fisheries Commission. The municipal waters – from the shoreline up to 7 km limit – were under the jurisdiction of the respective municipal or city governments. This law supports the twin goals of fisheries: food production (socioeconomic) and resource management (environmental). **RA 7160** supports the achievement of economic, social and environmental objectives for the fisheries sector. It puts emphasis, though, on the local autonomy and decentralization by establishing the LGU as the key manager of resources within its boundaries. The social dimension is given priority by giving preferential access to municipal fishers within 15 km of the municipal waters. The code also provided for the devolution of responsibilities to LGUs that include fisheries law enforcement, research and extension services. The LGC also provides the municipal government with the authority to grant fishery privileges in municipal waters and to impose rentals, fees and charges that include the erection of fish corrals and collection of fry.

RA 7586 is another national-level complementary policy. Aliño *et al.* (2004) cite the NIPAS Act as an essential element of the policy framework for fisheries management, as it provides a common framework for national parks and protected areas system. Hence, the resources are duly protected in fisheries-rich areas like Apo Reef Marine National Park in Mindoro and the Malampaya Sound in Palawan. Following the processes involved in the establishment of marine protected areas (MPAs) at the national level, the LGC also empowered municipal or city legislative bodies to establish MPAs within municipal or city territories through municipal ordinances. Clearly, the emphasis of NIPAS are environmental and biodiversity concerns. The **AFMA** (1997) was promulgated ahead of the Fisheries Code. The AFMA is dedicated to the industrialization of the agricultural economy, and geared towards expanding production and maximum utilization (Batongbakal and Anda 2001). Hence, AFMA is more of market or economic in orientation. Its priorities

include sustained increases in production, industrialization and full employment. Another concern is optimum production of goods, driven by a market-oriented approach within a highly competitive economic environment. The AFMA's other objectives are poverty alleviation, social equity, food security, rational use of resources, people empowerment, sustainable development and global competitiveness. It operates through Strategic Agricultural and Fisheries Development Zone (SAFDZ) as identified by DA, and also through the agriculture and fisheries modernization programs of LGUs.

Finally, as the main fisheries law, the main concern of RA 8550 is the proper management of the country's fishery resources. Section 3 states that it covers: "(1) all Philippine waters including other waters over which the Philippines has sovereignty and jurisdiction and the country's 200-nautical mile Exclusive Economic Zone (EEZ) and continental shelf; (2) all aquatic and fishery resources whether inland, coastal or offshore fishing areas, including but not limited to fishponds, fish pens/cages; and (3) all lands devoted to aquaculture, or businesses relating to fishery, whether private or public lands." The Fisheries Code looks inward and is more concerned with moderation and limitation of resource-use at a level less than the maximum. Priorities include protection of fishery and aquatic resources, optimal utilization of existing resources, maintenance of ecological balance and the quality of the environment, and improving the domestic market. Its objectives are poverty alleviation, social equity, food security, rational use of resources, people empowerment and sustainable development. The Fisheries Code is also the legal basis for developing CNFIDP.

All of the above elements support sustainable fisheries development and management. The relevant sustainable development principles should be applied to all decisions and actions affecting fisheries development and management. The environmental integrity of territorial waters being used for fisheries must be maintained, while the benefits derived must be shared equitably among competing users. Cutting across all these principles is the need to develop effective plans for the fisheries sector, given its vulnerability to global, regional and national development trends and drivers.

3.2 Strategic Development Factors/Trends and Scenarios

There are key global, regional and national factors/trends that have implications in optimizing and sustaining the benefits derived from the fisheries sector. In developing CNFIDP, four clusters of factors/trends were considered: (1) politics and society, (2) economy, (3) science and technology, and (4) ecology/environment (Figure 3.2.a). Within each cluster are specific "driving" forces or components. These factors/trends were considered critical

because they do exert significant influences on the sector; however, these are by no means exhaustive. Moreover, their movements are highly uncertain, and are often beyond the control of the sector stakeholders. The scenarios developed – whether negative or positive – are more of qualitative assessments rather than precise mathematical projections due to limited quantitative data. The strategic directions (Section 3.3) and medium-term project interventions (Chapter 4) were chosen and designed such that they collectively optimize and sustain the benefits derived from the sector and make the directions/interventions robust to alternative development scenarios which may unfold over the strategic time horizon (2006–2025).

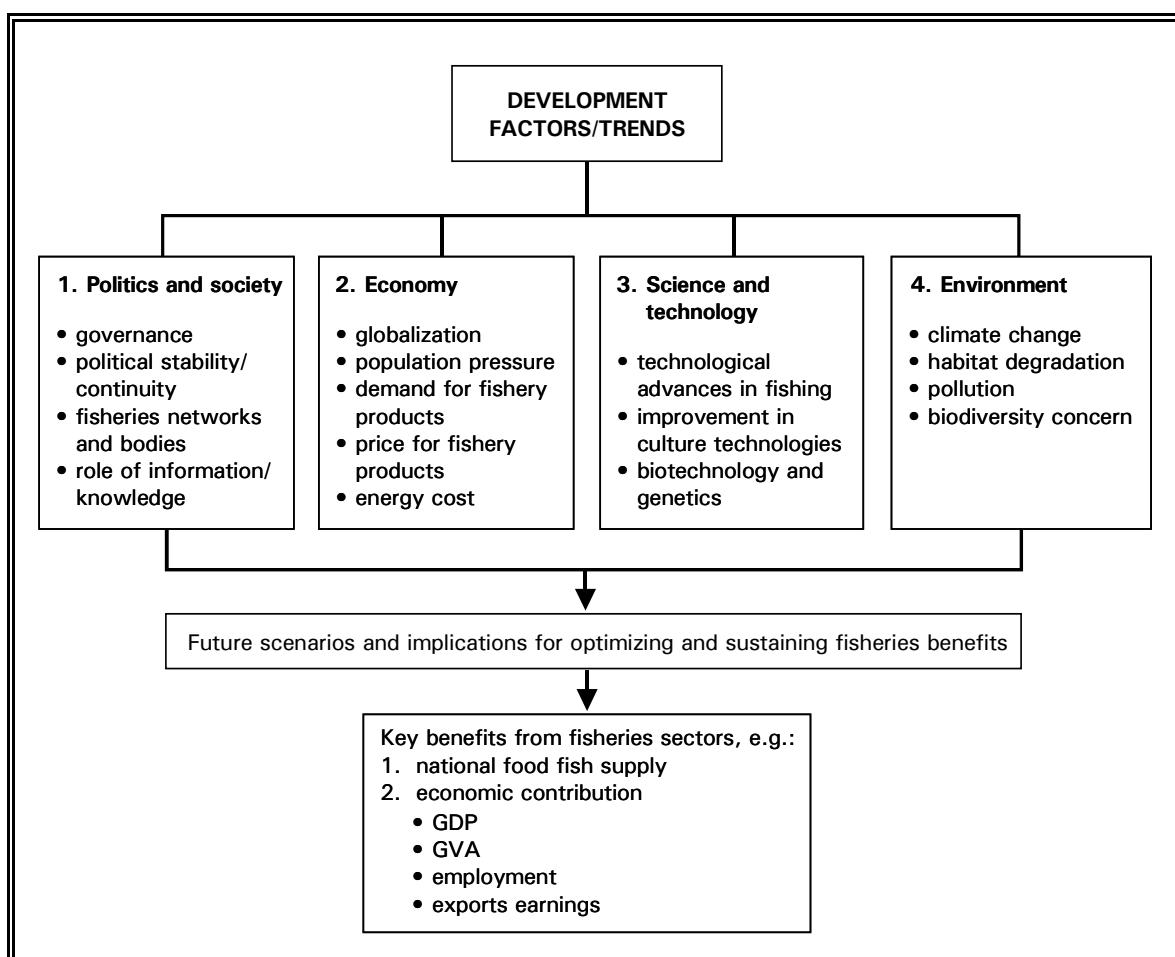


Figure 3.2.a. Development factors/trends and scenarios and their implications for optimizing and sustaining fisheries benefits.

For “politics and society,” four driving factors were considered. First, there will be an increasing decentralization in **governance**, following the provisions of the 1991 Local Government Code and the 1998 Fisheries Code. On the positive side, such decentralization can enhance on-the-ground interventions for fisheries management. Notwithstanding, decentralization may lead to management “fragmentation,” as fishing grounds are subdivided into

municipal jurisdiction and the links of LGUs with BFAR and other fisheries-related NGAs may become limited. The LGUs may be left on their own to manage their municipal fisheries without external assistance or support. Effective management of inland/nearshore fisheries may be beyond the current capabilities of LGUs, given greater dependence for government services by the local population. Second, **political stability/continuity** may pose a threat to effective fisheries management. The change in political administration/leadership – whereby there is a local election held every three years – may lead to a change in priorities or focus for the fisheries sector. Political changes are realities at the national and local levels. Third, more **fisheries networks and bodies** are being established that are supportive of the sector, such as the World Forum of Fishharvesters and Fishworkers. At the regional level, over 35 multilateral or regional fisheries organizations have been established with functions ranging from consultative and advisory bodies up to those with full powers for management, decisionmaking and enforcement (World Bank 2004). Some networks are habitat-specific in focus, such as the International Coral Reef Initiative supported by over 60 countries. A national-level entity that partly deals with fisheries is the Philippine Association for Marine Sciences. Fourth, the **role of information/knowledge** has become accentuated over the last two decades (and will increasingly be an important factor) as brought about by computer-based technologies. Hence, fisheries-related information should be more easily accessed, synthesized, consolidated and distributed. The generation of high-quality information is facilitated by the presence of fisheries-related institutions, such as the WorldFish Center; SEAFDEC and Southeast Asian Regional Center for Agriculture as regional bodies are engaged in fisheries RD&E; and the Asian Fisheries Society as a professional association dealing with capture fisheries and aquaculture. The Bureau of Agricultural Research, National Fisheries Research and Development Institute, Philippine Council for Aquatic and Marine Research and Development, University of the Philippines (UP)-Marine Science Institute and UP-Visayas are providing various services in information generation and interchange.

For the “economy,” there are five contributing driving forces that are projecting some pessimistic scenarios. First, **globalization**, unlike before, is making trade issues more relevant to fisheries. The 1997 Asia Pacific Economic Cooperation Conference held in Vancouver, Canada, initiated the process for addressing fisheries trade with a view towards further liberalization. There is an ongoing removal of tariff for movement of fishery products. With the opening of the Philippines to free trade, it is expected that any shortfall for domestic needs may increasingly be filled by imports. Aside from traditional concerns about trade barriers, there are new issues about nontariff barriers due to health and safety considerations. These include the prospects for ecolabeling. The increasing nontariff barrier among the importing countries may reduce the Philippine export volume of fishery

products. Second, **population pressure**, despite negative trends in many developed economies, remains a critical factor. The population living within 100 km of the coast has grown to 2.2 billion people (39% of the global population). The fisheries-rich coastal zone in Southeast Asia (SEA) supports some 380 million people (70% of the population) who live within 60 km of the coast. People also congregate in fisheries-rich inland waters, such as the periphery of lakes and riverine systems. The Philippine's Laguna Lake – the second largest lake in SEA – is home to millions of fisheries-dependent people. The country's population of some 82 million in 2004 is increasing at a very high rate of 2.36%, putting increasing pressure on the current food fish supply that can lead to lower per capita consumption for the entire population. Third, there is an overall increasing global **demand for fishery products**, particularly for high-valued species. The total demand for fish products will increase from 91.3 million t in 1997 to 127.8 million t in 2020 (Delgado *et al.* 2003). Worldwide, over the last 30 years, the per capita demand for food fish increased from 10.5 kg/year to almost 16 kg/year. Moreover, there is a shift towards consumption of fresh fish (including live fish). Currently, fresh fish accounts for 54% of global food fish consumption. It is expected that developing countries will continue to export high-value products and import low-value products, especially small pelagics. Based on recent trends and the most realistic stock assessments, it is unlikely that the global demand can be met by the stagnating production of capture (inland and marine) fisheries. Fourth and corollary with the above, the **price for fishery products** has been increasing. Fish is one of the few agricultural commodities that has shown a real increase in price over the last decades. Such rise in price may lead to greater insecurity for food fish among poor urban dwellers. Such trend is expected to continue. Real fish prices are estimated to rise by 4-16%, while meat prices will fall 3% by 2020 (Delgado *et al.* 2003). Fishmeal and fish oil prices would rise by 18%. Moreover, the use of fishmeal would increasingly be concentrated in aquaculture, particularly of high-value carnivorous species. Fifth, **energy cost** has recently become a more critical factor in fishing. Capture fisheries continue to be the most energy-intensive food production method currently in the world. They are almost completely relying on oil fuel-based internal combustion engines. Small-scale fisheries – despite being labor-intensive – are increasingly affected by energy costs. The trend in developing countries is towards mechanization. Energy cost affects not only consumer prices, but also the fishers' net incomes. If the levels of employment and cost-sharing systems are factored in, it becomes even more important from a social perspective to improve and maintain energy efficiency within small-scale fisheries (FAO 2002). Fisheries are the only major industry in the world becoming less energy-efficient. The sector consumes some 50 billion l of fuel to catch 80 million t of fish.

The overall scenario for "science and technology" though is quite optimistic within the next 20 years. Three key components were considered. First,

technological advances in fishing have been spectacular over the last few decades. In numerical terms, the global fishing fleet (1.3 million decked and 2.8 million undecked vessels) has remained relatively stable since its major expansion in the 1980s (World Bank 2004). Technological innovations, however, have maximized catching capacity as characterized by the size and power of the vessels, the selectivity of their gear, the navigation technology and the improving skills of skippers. There has been an estimated 270% increase in average fishing power between 1965 and 1995, essentially a 9% average annual growth rate (Garcia and Newton 1995). Such technological advances have led to overcapacity, which in turn contributes to resource use conflicts. For example, there are more than enough commercial and municipal fishers in the Visayan Sea competing practically over the same limited fishery resources. Second, there will be significant **improvement in culture technologies**. Two distinct technologies will evolve in mariculture: (1) offshore farming that will involve the use of vast tracts of submersible culture facilities for intensive production of high-volume crops (e.g., milkfish) and pelagics (e.g., tuna), with ship-based workers and floating processing plants; and (2) nearshore farming will evolve for the farming of high-value, low-volume reef species, many of which will be exported for the live fish trade. Through mariculture livelihood parks, many fishers will be empowered to venture into nearshore mariculture. The development of community-based information systems will play a valuable role in providing fishfarmers direct access to technology and market trends. The third contributing factor pertains to advances in **biotechnology and genetics**. To increase production, more genetically improved disease-resistant strains and high-yielding species will be used. Advances in biotechnology have resulted in the development of better strains of farmed animals, which are of better quality, fast-growing, high-yielding and sturdier. The latter two factors indicate that rapid aquaculture subsector expansion is becoming more imminent. The main source of growth in fisheries has been in the aquaculture subsector, and such trend will most likely continue. At a growth rate of 13% per year over the last 20 years in developing countries, this subsector has grown dramatically (World Bank 2004). The percentage of fishmeal consumed by aquaculture has risen dramatically over the last decade (from 10% of fishmeal produced in 1988 to an estimated 35% in 2000), reflecting the high growth of aquaculture (Delgado *et al.* 2003).

The scenario for the “environment” is likely to be gloomy in general. Three driving forces may collectively contribute to lower yield or productivity of fishery resources. First, **climate change** affects production in the wild. The condition of small pelagic fishery resources – such as anchovies, sardines and mackerel – is heavily dependent on climatic conditions, such as the El Niño phenomenon. About 16% of the world’s corals were destroyed by temperature-induced coral bleaching following the last El Niño. Cephalopod stocks tend to fluctuate in response to environmental conditions. It is

predicted that increasing average sea surface temperatures and year-to-year climate variability in the Western Pacific Ocean would affect the distribution, abundance and catchability of tuna in the region (World Bank 2004). Hence, global warming and subsequent climatic change impacts on ecosystems that support these fisheries are key driving forces that affect the sustainability of the world's fisheries. Second, **habitat degradation** continues to affect the fisheries sector, thereby impairing the functional integrity of coastal ecosystems. Much of this damage has occurred over the last 30 years in SEA, where 70% of mangroves (UNEP 1998) and more than 20% of seagrasses (Fortes 1994) have been destroyed. In this region, nearly 90% of coral reefs are threatened to varying degrees (Burke *et al.* 2002). About 98% of Philippine reefs are at risk from human activities, with 70% percent at high or very high risk. The country's aquaculture ponds cover about 2,539 km², mostly located in the coastal zone in what were originally mangrove areas (World Bank 2004). From 1918 to 1970, an average of 3,100 ha of mangroves was lost every year, increasing to about 8,200 ha annually from 1970 to 1988. Third, **pollution** has been a major contributor to the direct mortality of fish. Aside from constraining reproductive success, pollutants render fish more susceptible to diseases. Pollution likewise contributes to the destruction of critical fishery habitats; it is also linked to the advent of harmful algal blooms (HABs). Over 300 HAB events were recorded during the 1990s along China's coastal areas, affecting cage culture and cultivated mollusks (World Bank 2004). In the Philippines, some traditional fishing grounds are already polluted, such as Manila Bay. **Biodiversity concern** in fisheries, the fourth factor, offers some promising prospects. The need to safeguard biodiversity has been highlighted since CBD in 1992. These include the international listing of fish species that are considered as threatened or endangered. Both the International Union for the Conservation of Nature and Natural Resources and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have taken steps to include fishery resource species on the list. Commercially important species are now added to the CITES listings, such as the Napoleon wrasse (*Chelinus undulatus*) and the whale shark (*Rhincodon typus*). The CBD enshrines national sovereignty over biological diversity, including safeguards against negative impacts of fisheries and aquaculture. The most important impacts are in potential restriction of exchange of germplasm for aquaculture and bioprospecting, as well as attention to biosafety, especially in the creation and use of genetically modified organisms (FAO 1998). The Philippines is now developing its national biosafety guidelines.

In addition to the above four cluster of development factors/trends, there are a host of other societal drivers that are impacting on the fisheries sector. Poverty drives individuals and households to the coast and peripheries of inland water bodies where fishing is the "employer of last resort" and ultimate source of food. Unclear property rights and/or regimes are contributory

factors. Despite the enactment of RA 8550 and RA 7160, the Philippine fisheries sector is still characterized by a *de facto* open access system. The stream of societal benefits being provided by the fisheries sector, therefore, is being tempered by the interplay of these development factors/trends. Unfortunately, many of them are largely outside the influence of the fisheries sector.

The formulation of CNFIDP involved detailed assessment of the implications of the above development factors/trends in optimizing and sustaining the host of benefits derived from the Philippine fisheries sector. These assessments were used largely in choosing and designing the strategic directions (Section 3.3) and medium-term priority projects (Chapter 4) of CNFIDP. Due to lack of material space, these detailed analyses have been excluded from this document. To illustrate the detailed nature of these assessments, however, one example pertaining to analysis of future national food fish requirements is given below. The first focal point of this illustrative analysis is the anticipation of what will happen in the future to the contribution of fisheries in terms of national food supply.

Taking off from the latest population census of 2000, and an annual population growth of 2.36%², the Philippine population is projected to grow up to 95 million by 2010 and 135 million by 2025. Based on this, food fish demand in the Philippines is expected to increase to about 4.2 million t by 2025. This is based on a per capita consumption of 31.4 kg³.

The sustainability of fish supply is crucial for Philippine food security. Given that the demand for food fish increases faster than the supply, a deficit in food fish in the magnitude of 8.4 million t (accumulated over 2005-2025) or an annual average of 403,000 t is evident (Figure 3.2.b). The deficit of 205,159 t in 2005 will increase to 585,538 t in 2025.

The foregoing projections of Philippine fish production are restricted to food fish for human consumption, which is presently 2.7 million t. The supply of food fish is derived from aquaculture (18.8%, excluding seaweeds) and capture fisheries, which consist of municipal fisheries (39.7%) and commercial fisheries (41.5%). Current municipal fisheries production is recorded at 1.08 million t (BFAR 2004) with an average 5-year growth rate of 3.4%. Commercial fisheries are recorded at 1.13 million t (BFAR 2004) with an average 5-year growth rate of 4.5%. For aquaculture, average 3-year

² This growth rate of 2.36% from the National Statistics Office (NSO) is based on an average population growth rate from 1995 to 2000.

³ This is an average of 5-year (2000-2004) ratio of fisheries production and population. Hence, the total production divided by the total population is equal to per capita consumption. This is less than the per capita fish consumption in 1993 of 36 kg (BFAR 2003).

growth rate is 12.0%⁴ with production at 1.7 million t (BFAR, 2004). Given that the demand for food fish increases faster than the supply, a deficit in food fish in the magnitude of 8.4 million t (accumulated over 2005-2025) or an annual average of 403,000 t is evident (Figure 3.2.b). The deficit of 205,159 t in 2005 will increase to 585,538 t in 2025.

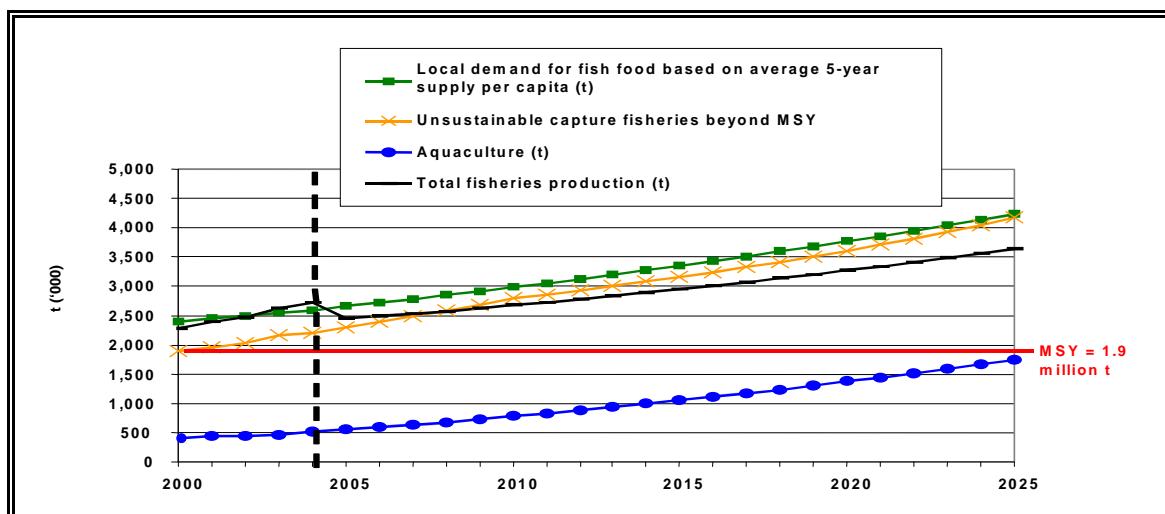


Figure 3.2.b. Food fish demand and supply projections based on five-year average growth (baseline).

The MSY for Philippine capture fisheries was estimated at 1.9 million t (Barut *et al.* 1997). This total consists of 900,000 t and 300,000 t of pelagics from shelf and nonshelf areas, respectively, and demersal stock of 700,000 t in shelf areas. The potential harvestable demersal in nonshelf areas is not well known. Moreover, the harvestable fishery resources beyond EEZ are likewise unknown. The projected growth rate for capture fisheries is constrained by the estimated MSY of 1.9 million t, and hence, not biologically sustainable. An increase in effort will not yield additional production in the wild. The baseline projection suggests that the current pattern of production/exploitation will not be enough to meet the domestic demand.

There is a need, therefore, for an approach to close the deficit or gap between domestic supply and demand for food fish. Eventually, the supply must be greater than the demand to cater to the needs of the export market. The approach represents a rationalized fishing effort for capture fisheries whereby harvesting shall not exceed MSY of 1.9 million t. This can be achieved in four ways. First, for municipal fisheries, the 1,080,764 t

⁴ Computed based on 2002-2004 average of 3-year growth rate of major aquaculture commodities. Except for shrimp, which registered a 26.4% decline in production for the same period, all other aquaculture commodities increased during the 2002-2004 period. Average growth rate for aquaculture commodities are as follows: seaweeds (16.2%), milkfish (8.6%), tilapia (9.3%), carp (1.9%), marine fish (46.9%) and others (3.6%).

production recorded in 2004 will be either maintained or will have sustained growth from the First MTP (2006-2010) until the Fourth MTP (2021-2025). Second, for commercial fisheries, the 2004 production of 1,128,382 t shall likewise be maintained from the traditional fishing grounds. Third, the development and expansion of commercial fisheries⁵ will be encouraged in the EEZ waters and beyond. Fourth, there will be integration of ecologically sound aquaculture.

Aquaculture is expected to expand⁶ to close the domestic fish food demand-supply gap (Figure 3.2.c). Moreover, this scenario assumes greater reduction in post-harvest losses, restoration of fisheries habitats and improvement in water quality, among others. Hence, based on the projected aquaculture production, this volume will be sufficient to meet the supply deficit even at the onset of 2006. After meeting the national demand for food fish consumption, export volume through the development of responsible aquaculture will be considered. The projected volume available for export is estimated to range from 91,700 to 1.6 million t over the 20-year period. The amount available for export will largely depend on the actual growth rate of the population, as well as the actual per capita demand for food fish. The greater the actual population growth rate and the actual per capita demand for food fish, the lesser will be the amount available for export. The per capita food fish consumption in the Philippines has fluctuated over the years: 41 kg in 1982 (FNRI 1982); 36 kg in 1993 (BFAR 2004); and 28.5 kg in 1994 (Barut *et al.* 1997).

⁵ This is at least from demersal species up to within the EEZ waters, as well as pelagics and probably demersals beyond EEZ waters.

⁶ The aquaculture growth projections (%) are given below:

Species	2006-2010	2011-2015	2016-2020	2021-2025
Seaweeds	4	6	8	8
Milkfish	8	7	6	5
Tilapia	8	7	6	5
Shrimp	20	15	10	8
Carp	6	8	10	12
Marine fish/mollusk	45	30	25	20
Others	5	5	5	5

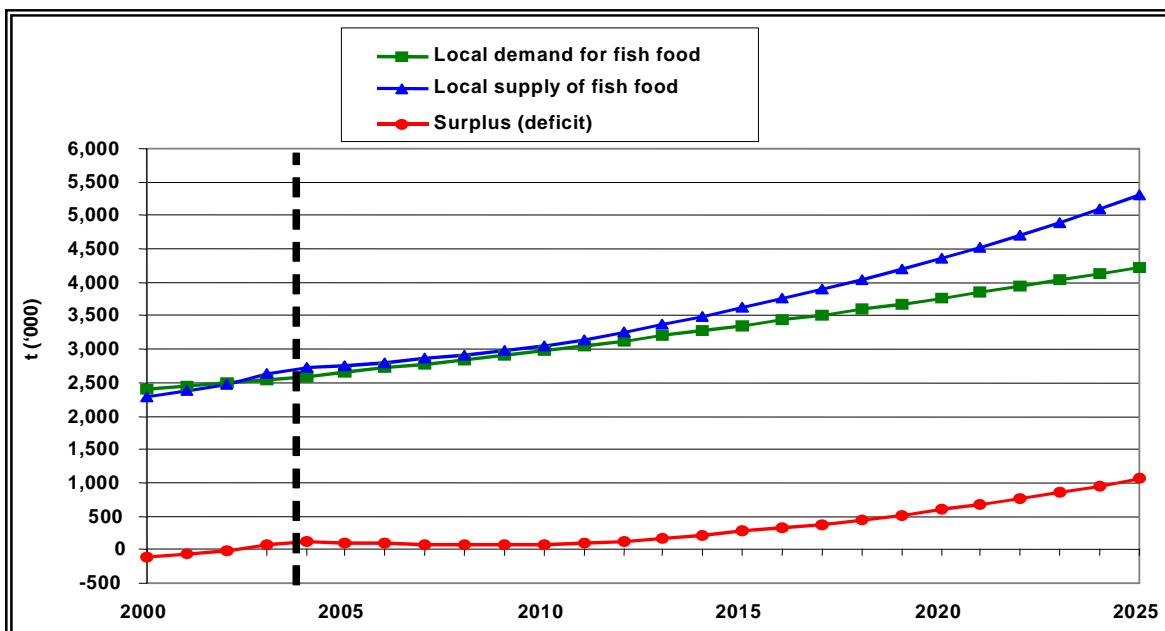


Figure 3.2.c. Food fish demand and supply projections with ecologically sound aquaculture expansion.

Recognizing the rising demand for fish in the Philippines, there is a need to support the initiatives to increase the available supply of fish and fish products for human consumption in a sustainable manner. In view of the critical current status of the fishery resources, three strategic thrusts are becoming apparent. First, the nationwide rationalization of fishing effort is inevitable. This will be accomplished through a reduction in fishing effort to sustainable levels in areas and from stocks currently heavily exploited or overfished. Another mode is to harvest sustainably the high-value species at the higher trophic level. Such activities represent the conservation side of fisheries management. On the development side, the feasibility of commercially exploiting the marine waters in EEZ (and beyond) will be explored during the First MTP.

The second thrust is to develop ecologically sound aquaculture, both for food fish and export market. Aquaculture's increasing contribution to overall food security is gaining greater recognition. Such may entail intensifying the production of traditional culture species, or introducing new ones. The third thrust is to make optimum use of harvests and reduce post-harvest losses. The current post-harvest losses of between 25% and 40% are not acceptable. The overall trend then to promote sustainability is to maintain and/or reduce the contribution of capture fisheries, accelerate the expansion of environment-friendly aquaculture, and further reduce post-harvest losses.

The fisheries sector's economic contributions that are described in Chapter 2 (*Overview of Philippine Fisheries*) are recapitulated here. Section 2.3.3

describes the sector's contribution to GDP and GVA, while Section 2.3.4 highlights its contribution to foreign exchange earnings. For employment, Section 2.3.5 describes that the fisheries sector provides direct and indirect employment to over 1.5 million people in 2004, representing about 5% of the national labor force.

3.3 Strategic Vision, Mission, Goal and Objectives

3.3.1 Development Vision and Mission

The vision for the Philippine fisheries sector describes the ideal setting or situation – towards the end of year 2025 – given the CNFIDP's 20-year time horizon (2006-2025). A vision represents the shared view, understanding or wish of all the relevant stakeholders. A provisional vision statement was formulated during a special multistakeholder visioning exercise held in April 2005. Subsequent consultations led to refinement of the fisheries sector's shared vision as follows:

"A sustainable and competitive fisheries industry that contributes to food security and provides optimum socio-economic benefits to Filipinos"

In view of the above vision, a corresponding mission statement was developed. A mission may be visualized as sort of a "bridge" to attaining the vision. It is a statement of how the vision will be achieved, and is often institutional/organizational in context. The agreed mission statement is given below:

"To build effective multi-sectoral collaboration and partnership arrangements that empower communities and other stakeholders for responsible stewardship of Philippine fisheries resources and ecosystems"

The CNFIDP's goal and objectives, as well as the corresponding subsector projects, are anchored on the above vision and mission statements. The plan's goal and objectives are likewise linked with the Philippine commitment to relevant international norms or instruments. For instance – from the ecological standpoint – the CNFIDP adheres to the CCRF's provision on fishery resource conservation. Another example is the CNFIDP's support to eradicate poverty, as a commitment of the country to the UN's MDG.

3.3.2 Goal and Objectives

Structurally, the CNFIDP has one goal and nine objectives (Figure 3.3.2.a). The goal and objectives represent the strategic directions to be pursued for the sector. Broadly, the goal over the long-term is sustainable development of Philippine fisheries. Such goal is expressed more fully as:

"To optimize and sustain the socio-economic benefits from fishers without jeopardizing the fishery resources and the associated habitats in the most administratively efficient and cost-effective manner"

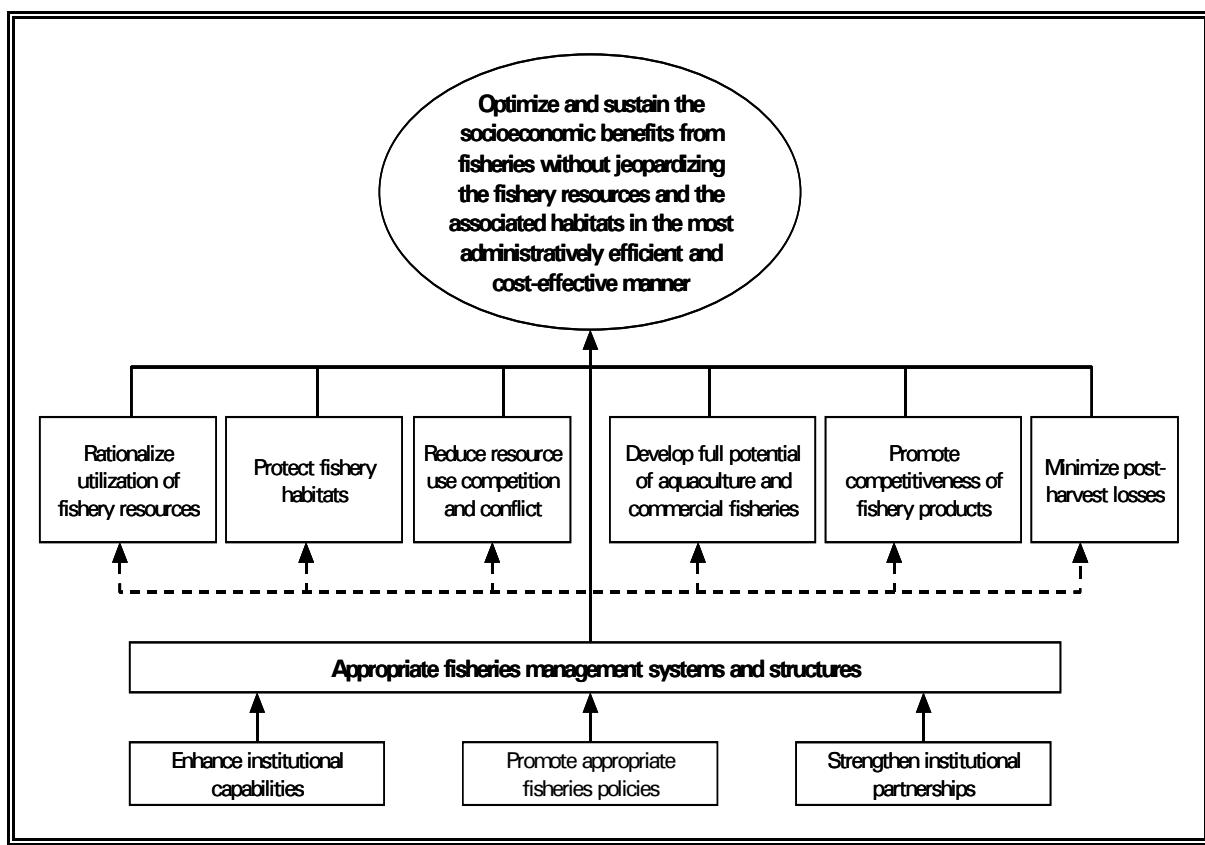


Figure 3.3.2.a. Goal and associated objectives of CNFIDP.

The nine objectives associated with the fisheries sector's goal correspond to the nine key problems/issues depicted in the integrated problem tree (Figure 2.7.a) presented in Chapter 2. In effect, these objectives are positive restatements of the nine key problems/issues identified for the sector. These generic objectives are translated in more specific terms in the individual projects given in Chapter 4. Attainment of these objectives will lead to attainment of the overall goal of sustainable development of Philippine fisheries. These objectives are consistent with the sectoral development

philosophy in Section 3.1. Moreover, these objectives are “robust” to the sectoral development factors/trends and the corresponding scenarios given in Section 3.2. It implies that these objectives must be pursued to optimize and sustain the benefits derived from the fisheries sector – regardless of the local, national and worldwide scenarios concerning politics and society, economy, science and technology, and environment. For example, fishing effort has to be rationalized for both municipal and commercial fisheries subsectors, whatever is the fish demand and supply scenario that ultimately prevails in the markets. Similarly, degraded critical fishery habitats need to be rehabilitated regardless of which alternative scenarios materialize within the four clusters.

Each of the nine objectives is briefly described in the following paragraphs.

The objective to **rationalize utilization of fishery resources** is largely focused on resource sustainability. This emphasis entails the harvesting of fishery resources within the biological limits and/or ecologically sustainable levels. Such is aligned with the principles of carrying capacity and ecosystem-based management. The rationalization is mainly intended for capture fisheries. The current harvesting level is already beyond the estimated potential yield of 1.9 million t. It also partly addresses the harvesting of seeds in the wild for aquaculture. A core thrust of this objective is to limit entry through appropriate licensing schemes and more effective enforcement mechanisms.

The objective to **protect fishery habitats** is ecological and/or environmental in focus. This conservation orientation requires the protection of the critical habitats, both inland and marine, as the health of the fishery resources is dependent upon them. Coral reefs, seagrass beds, mangroves and inland habitats must be rehabilitated and/or restored on the basis of their importance to the fisheries sector. Fishing methods or practices must not inflict negative impacts on the environment. These include the adoption of environment-friendly capture methods and aquaculture techniques. Hence, pollution must be minimized as it affects negatively the fisheries production. The management strategy for setting up fisheries sanctuaries and MPAs deserves increased attention.

The objective to **reduce resource use competition and conflict** is linked with issues of effective zoning and livelihoods. Fishers often compete among themselves for access to the resources, such as the conflict between municipal and commercial groups. Fishers compete for limited livelihoods/employment, which are exacerbated by increasing population pressure. They may also compete with other users of fishery habitats/resources; for instance, municipal fishers versus ecotourism operators. Hence, some development issues are outside the fisheries sector.

As the economy develops, more multiple-use conflicts or competition often happens.

The objective to **develop full potential of aquaculture and commercial fisheries** is largely development in context. Potential economic/financial benefits must be attained to the fullest. More than a quarter of a million hectares could potentially be used for aquaculture expansion. The CNFIDP recognizes that aquaculture will fulfill an increasingly greater role. Problems like poor quality of seed stocks, high production costs and conflicts of aquaculture with other resource uses need to be addressed. Another development area pertains to the expansion of capture fisheries in underutilized fishing grounds, particularly possible fisheries development in EEZ waters. Potential sites for commercial fisheries expansion are the offshore areas of Palawan, central Pacific seaboard and Sulu area.

The objective to **promote competitiveness of fishery products** acknowledges the fact that many of our fishery products are not globally competitive. Many goods do not pass the health and safety standards of developed nations, as evidenced by rejected shipments abroad. Problems like poor product quality and high production costs must be addressed. These include weak marketing strategies. Corollary with this, the development of appropriate technologies to make fishery products more internationally competitive is a pre-requisite.

The objective to **minimize post-harvest losses** aims to address the high fisheries post-harvest value and physical losses in the Philippines. At present, the percentage of loss from the point of harvest is quite high, averaging about 25%. Issues to be addressed range from limited infrastructure facilities up to lack of technological know-how. Attempts should be made to establish model post-harvest villages. This objective also deals with concerns pertaining to product safety and quality standards.

The first six strategic objectives are either resource, technological and/or economic in focus. The last three objectives are largely institutional/organizational in context. The objective to **enhance institutional capabilities** of organizations involved in fisheries management is of paramount importance. These include various entities, such as LGUs, NGAs, NGOs, local communities and even the private sector. Many agencies – from local to national – are not fully equipped to handle the full range of fisheries management functions. Among others, such organizations are hampered by limited funding, inadequate human resources and low priority given to fisheries. The management agencies can only effectively discharge their functions when the necessary staff and other logistical support are put in place.

The objective to **promote appropriate fisheries policies** focuses on the legal and policy regime. There is a need to address the overlaps in policies, rules and

regulations. Moreover, inconsistent implementation of national policies and laws must be also duly considered. There have been limited scientific inputs for crafting policy or enacting fishery laws. This objective likewise recognizes the significance of traditional and/or customary laws. Hence, there must be harmonization of policies at all levels of governance. This includes aligning local and national laws with relevant international agreements or instruments.

The objective to **strengthen institutional partnerships** aims to strengthen various types of partnerships. It may involve partnership between government and industry, as well as between local fishing communities and civil society groups. A Fisheries Industry Consultative Forum shall be established as part of this initiative. There has been limited coordination among concerned agencies/stakeholders. It is acknowledged that the government on its own cannot effectively manage the fisheries sector and must spur genuine participation of stakeholders. Thus, the commitment and active participation of all industry players is necessary. Overall, the nine objectives have to be pursued vigorously – regardless of the development factors and future scenarios – for the Philippines to have a truly competitive and sustainable industry.

In order to ensure that the proposed programs and projects are gender-responsive, a key strategy is to develop a comprehensive program that will address the existing gender unequal access, participation and benefit of women fishers by developing a comprehensive gender mainstreaming program. Its formulation must also include consultations, establishment of gender-inclusive database in fisheries, specific projects and activities to improve women's benefit to fisheries industry development, and capacity-building of stakeholders (men and women) and institutional strengthening of structures involved in fisheries industry development.

3.4 Program Components and Indicative Phasing

Hierarchically, CNFIDP is structured at four generic levels: (1) overall goal and strategic objectives; (2) MTPs; (3) program components; and (4) projects (Figure 3.4.a). Over the 20-year horizon, the CNFIDP shall have 4 MTPs whereby the relevant program components and projects shall be developed and consequently implemented in succession. Each MTP shall have its distinctive theme. The First MTP (2006-2010) is focused on "**Strengthening the foundation for sustainable growth**". This is the most crucial, since it will lay out the foundation for sustainable development of Philippine fisheries. The Second MTP (2011-2015) is anticipated to improve the sector's overall performance by building on the gains of the previous plan. The Third MTP (2016-2020) is expected to increase the global competitiveness of Philippine fishery products. Finally, the Fourth MTP (2021-2025) is envisioned to maintain the benefits of a sustainable industry.

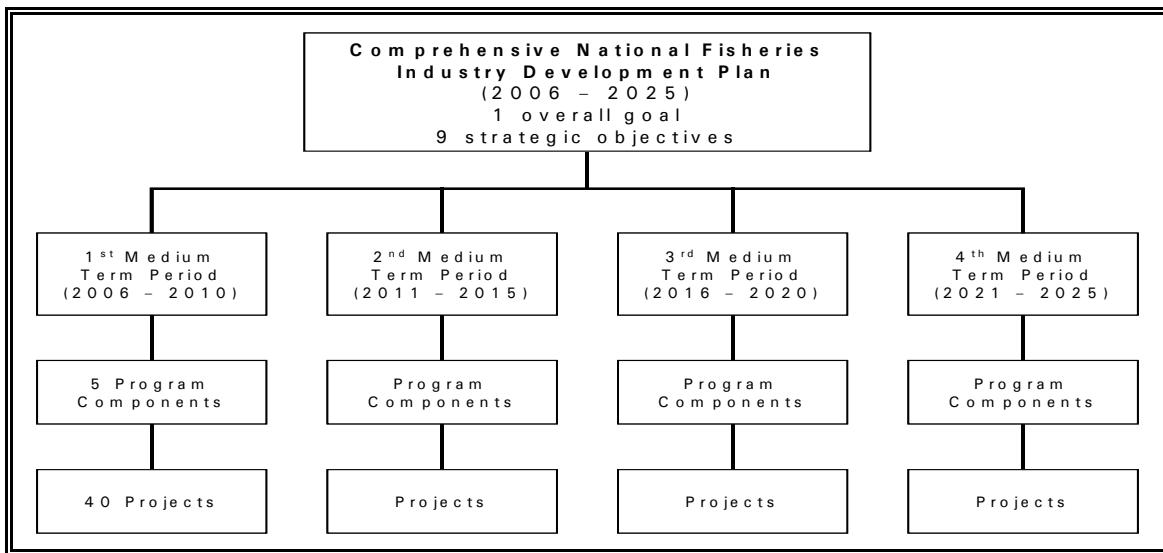


Figure 3.4.a. Structure of CNFIDP in relation to its implementation periods, program components and projects.

For the First MTP (2006–2010), there will be five major program components, namely: (1) Municipal Fisheries, (2) Commercial Fisheries, (3) Aquaculture, (4) Post Harvest, and (5) Institutional Development and Policy Support. Each program component consists of specific or distinct projects.

The eight projects under the **Municipal Fisheries** program component consist of various development and regulatory measures. The First MTP recognizes that capture fisheries shall remain, providing the traditional benefits, such as employment and nutrition. Fishing activities will continue for the municipal fisheries but there will be a corresponding rationalization in effort as well. For those who will opt out of the sector, corresponding alternative livelihood options shall be provided. Such options would include resource-based (fisheries and nonfisheries) livelihoods and those that do not depend on natural resources. The most significant fishery habitats – both inland and marine – shall be rehabilitated or restored.

The ten projects under the **Commercial Fisheries** program component address a range of issues, from effort reduction up to subsector expansion in underutilized areas. Fishing activities will also continue for the commercial fisheries subsector but with corresponding rationalization in effort. This means, for one instance, that the profitability of exploiting offshore fishery resources within EEZ waters and beyond shall be thoroughly studied within the First MTP period. Some offshore areas in Palawan, Sulu area and central Pacific were identified as potential expansion sites for capture fisheries. If the result is positive, then the necessary “re-tooling” of commercial fleets shall be undertaken. If the result is negative, reliance for national food fish requirements shall be placed on the aquaculture subsector entirely.

The eight projects under the **Aquaculture** program component put emphasis on the expanded role to be played by the aquaculture industry to address food fish security and other socioeconomic concerns. The use of environment-friendly aquaculture technologies shall be pursued. There will be an increase in contribution of aquaculture both for national food requirements and/or exports. A unified aquaculture plan shall be developed and adopted. It shall entail intensifying the production of traditional culture species (such as seaweeds, milkfish, tilapia and shrimp) and other promising species (such as carp). There will be pilot testing of new culture species, such as Pacific white shrimp (*Litopenaeus vannamei*). More sites will be targeted – particularly the underutilized and/or abandoned ponds – for aquaculture expansion. A reasonable percentage of potential expansion areas of some 285,000 ha shall be utilized. Notwithstanding, appropriate biodiversity and environmental safeguards shall be instituted.

In the case of the **Post Harvest** program component, the seven projects identified relate largely to maintaining the highest quality and/or value of the fishery products. The thematic areas covered by the projects include product safety, traceability, reduction of post-harvest losses, expansion of domestic and export markets, development of new products, and establishment of model post-harvest villages. Sectoral improvements may come from reduction in post-harvest losses. It is expected to reduce losses by around 20% by the end of 2010. This shall involve establishing the necessary infrastructure facilities, such as ice and cold storage plants. Part of the initiative is the development of a comprehensive program on product safety and quality systems and a systemic approach to marketing. Model villages for post harvest will be established in strategic areas.

For the **Institutional Development and Policy Support** program component, the eight projects are designed to improve the current fisheries management systems and structures at all levels: from local to national. Institutional development is quite crucial to effectively implement the various elements of CNFIDP. As the lead national fisheries agency, a capacity-building program for BFAR shall be developed/instituted. Appropriate partnerships, networks and alliances will be established. The partnership among government, NGO, private sector and civil society groups will be strengthened. Emphasis shall be given also in improving education, research and extension activities. There will be development of appropriate sector policies. These cover review/evaluation of key national legislations (e.g., RA 8550, AFMA) as well as provisions of relevant international agreements (e.g., CBD, CCRF).

The Gender Mainstreaming program component recognizes the significance of employing a gender responsive approach in fisheries development to make program interventions more effective, by allowing it to identify the particular and differential needs of fisherfolk communities and address them

accordingly. In that way, it also facilitates a process for program interventions to be more efficient and equitable as it promotes the involvement of women in decision-making processes and program implementations. The objective of gender mainstreaming in the context of fisheries industry development is to provide women and men equal opportunities to benefit from the development initiatives. The projects under this program are designed to institutionalize the mainstreaming of gender issues and concerns in fisheries development, particularly the recognition and valuation of the role and contribution of women in fisheries. Operating on a rights-based gender-responsive framework will enhance the capacity of coastal women to pursue claim-making in relevant fisheries concerns such as participation in governance, resource management, economic empowerment, organizational development and access to resources and basic social services. Appropriate and effective mechanisms and policies will be instituted to promote women empowerment. These will cover generation of gender-disaggregate data, conduct of various capability-building, consultations and education activities for the stakeholders, sustainable livelihood development, as well as the development of comprehensive gender-responsive program through a participatory-reasearch approach.

The Philippine fisheries sector faces serious challenges from environmental/ecological, social and economic issues. A key reason why management objectives set in earlier national fisheries plans were not fully achieved was due to the inadequate or inappropriate indicators and/or targets that defined such management objectives. Thus, implementation of CNFIDP shall be evaluated periodically based on the achievement of performance targets. The targets for the First and Fourth MTPs are presented in Table 3.4.a. These nine targets were initially identified as basis for the Philippine fisheries sector to track performance. The targets are viewed as "ends" as opposed to "means" indicators. These targets are essential for measuring later the impacts and outcomes of CNFIDP, and may serve as information for policymakers who wish to support project interventions under the five program components. It is stressed that these targets are preliminary, and shall be finalized/refined during the operational programming stage of CNFIDP.

Table 3.4.a. Objectives of CNFIDP and indicative performance targets for the First and Fourth MTPs.

Objectives	First MTP (2006-2010) targets	Fourth MTP (2021-2025) targets
1. Rationalize utilization of fishery resources	1. Optimized fishing within sustainable levels in major fishing grounds 2. Enhanced coastal fishery resources abundance and exploitation rates 3. Reduced catch of juvenile	1. Optimized fishing within sustainable levels in all fishing grounds 2. Improved coastal fishery resources abundance and exploitation rates 3. Minimized catch of juvenile fish

	<p>fishes</p> <p>4. Reduced by-catch of threatened, endangered and “unique” species</p>	<p>4. Eliminated by-catch of threatened, endangered and “unique” species</p>
2. Protect fishery habitats	<p>1. Decreased use of destructive methods and gears</p> <p>2. Reduced environmental stress and risks from fishing and aquaculture</p> <p>3. Increase in area of effectively managed coastal habitats</p>	<p>1. Minimized use of destructive methods and gears</p> <p>2. Minimized environmental stress and risks from fishing and aquaculture</p> <p>3. Annual increase in area of effectively managed coastal habitats</p>
3. Reduce resource use competition and conflict	<p>1. Reduced fisheries/resource use conflicts</p> <p>2. Enhanced MCS and/or enforcement capabilities</p> <p>3. Livelihood opportunities developed</p> <p>4. Improved delineation of, and compliance to, property or access rights and spatial/temporal management schemes</p>	<p>1. Minimized fisheries/resource use conflicts</p> <p>2. Improved MCS and/or enforcement capabilities</p> <p>3. Increased availability of livelihood opportunities</p> <p>4. Full delineation of, and compliance to, property or access rights and spatial/temporal management schemes</p>
4. Develop full potential of aquaculture and commercial fisheries	<p>1. Improved utilization of selected offshore fishery resources</p> <p>2. Pilot municipalities with mariculture livelihood parks (MLPs)</p> <p>3. Increased commercial fisheries and aquaculture export volume and value</p>	<p>1. Improved utilization of all offshore fishery resources</p> <p>2. Increased number of municipalities with MLPs</p> <p>3. Annual increase in commercial fisheries and aquaculture export volume and value compared with previous MTPs</p>
5. Promote competitiveness of fishery products	<p>1. Improved product quality and safety standards for priority commodities</p> <p>2. Enhanced per capita incomes in fishing and aquaculture</p> <p>3. Expansion of environment-friendly seafood and other “niche” markets</p>	<p>1. Improved product quality and safety standards for all commodities</p> <p>2. Annual increase in per capita incomes in fishing and aquaculture</p> <p>3. Environment-friendly seafood and other “niche” markets secured</p>
6. Minimize post-harvest losses	<p>1. Reduced post-harvest losses by at least 20%</p> <p>2. Improved fisheries post-harvest facilities in priority areas</p> <p>3. Increased value added in selected fisheries products</p>	<p>1. Reduced post-harvest losses by at least 15%</p> <p>2. Improved fisheries post-harvest facilities in all areas</p> <p>3. Increase value added in all fisheries products</p>
7. Enhance institutional capabilities	<p>1. Enhanced human, technical and financial capabilities of LGUs and NGAs relevant to fisheries assessment and management</p> <p>2. Improved LGU and NGA</p>	<p>1. Improved human, technical and financial capabilities of LGUs and NGAs relevant to fisheries assessment and management</p> <p>2. LGU and NGA enforcement capability fully developed</p>

	<p>enforcement capability</p> <p>3. Increased participation and inclusion of vulnerable groups in spatial and resource use</p>	<p>3. Participation and inclusion of all vulnerable groups in spatial and resource use</p>
8. Promote appropriate fisheries policies	<p>1. Improved policies consistent with international instruments and best practices</p> <p>2. Balance among efficiency, equity and environment in fisheries policies</p> <p>3. Enhanced scientific basis of policies, laws and regulations</p>	<p>1. All policies consistent with international instruments and best practices</p> <p>2. Improved balance among efficiency, equity and environment in fisheries policies</p> <p>3. Improved scientific basis of policies, laws and regulations</p>
9. Strengthen institutional partnerships	<p>1. Enhanced participation of stakeholders in implementing fisheries and habitat management</p> <p>2. Improved RD&E support</p> <p>3. Improved public-private sector partnerships</p>	<p>1. Improved participation of stakeholders in implementing fisheries and habitat management</p> <p>2. Sustained RD&E support</p> <p>3. Public-private sector partnerships institutionalized</p>
10. Enhance Gender-Responsiveness in Fisheries Development	<p>1. Gender-disaggregated statistical information generation and gender-analyzed</p> <p>2. Comprehensive gender-responsive fisheries program developed</p> <p>3. Developed policies and mechanisms promoting gender equality and women empowerment in fisheries</p> <p>4. Enhanced participation of women in decision-making processes and fisheries development program implementation</p>	<p>1. Gender-responsive framework and mechanism for information generation institutionalized</p> <p>2. Continuing program development that is gender-integrated and gender-responsive</p> <p>3. Institutionalized fisheries policies and mechanism consistent with gender equality and women empowerment</p> <p>4. Institutionalized participation of women in decision-making processes and fisheries development program implementation</p>

Note: Adjectives are used to show qualitative progression from the First to the Fourth MTPs. The adjective “minimized” has greater magnitude as compared with “decreased” or “reduced”; similarly, “improved” connotes more positive features as compared with “enhanced”. These targets are further elaborated in the section on monitoring and evaluation in Chapter 5.

The targets detail the results or benefits expected in achieving the overall goal and objectives of the Philippine fisheries sector. Such goal and objectives provide the sector’s strategic directions. Each target corresponds to an objective and can be used for evaluating progress made over the 20-year period, up to 2025 when objectives are expected to be fully met. Thus, the targets identified for the First MTP tell us the necessary and sufficient extent of achievements during the first 5 years of plan implementation.

The targets presented consider biological measures, as well as examine the behavior of the resource users and their economic settings, among others.

The targets under the first three objectives (objectives 1-3) relate to “stress reduction” and are specific on-the-ground measures to be achieved by the collaborating program/project implementors. The targets under the second set of objectives (objectives 4-6) relate to economic sustainability and poverty alleviation, especially among municipal fishers and coastal community members. The targets under the last three objectives (objectives 7-9) relate to governance, stakeholder participation and empowerment. It is assumed that economic and sociopolitical objectives will complement conservation objectives. Further, all relevant stakeholders in the Philippine fisheries sector should participate actively to attain the overall goal and objectives of the CNFIDP. Overall, the table depicts anticipated improvements in Philippine fisheries from one MTP to the other.

In summary, the Fourth and last MTP (2021-2025) is envisioned to maintain the benefits of a sustainable fisheries industry. The objectives set for the sector shall be achieved, through implementation of the appropriate programs and projects. For capture fisheries, the production shall be reduced to the biologically sustainable levels. The traditional benefits for nutrition and employment shall be continuously provided. Various forms of destructive and/or illegal fishing practices shall have been eliminated. At this time, the aquaculture subsector will have its greatest contribution to production. Aquaculture expansion will be at its peak, given the most stringent environmental safeguards. The appropriate portion of the potential area for expansion (of about 285,000 ha) shall be fully utilized.

Post-harvest losses at this time will be considerably reduced to minimal levels. Given technological innovations, Philippine products should be globally competitive as with its SEA neighbors. Institutionally, BFAR as the lead agency shall be fully capacitated commensurate with its responsibilities. The desired partnership arrangements shall be fully operational. Participation of all stakeholders and institutions shall likewise be maximized. Overall, at the end of the 20-year time horizon, it is anticipated that the strategic directions (overall goal and objectives) shall have been fully achieved.

CHAPTER 4

MEDIUM-TERM PRIORITY PROGRAMS AND PROJECTS

This chapter describes the 41 priority projects to be implemented over the first medium-term period (MTP) (2006-2010) of CNFIDP. These projects represent initial interventions that are needed to address the key management problems/issues described in Chapter 2. Successful implementation of these projects will ultimately lead to attainment of the CNFIDP's overall goal and associated objectives stated in Chapter 3. Section 4.1 summarizes the projects in relation to the specific problems/issues they address. These 41 projects are grouped into 5 program components: Municipal Fisheries (8 projects); Commercial Fisheries (10 projects); Aquaculture (8 projects); Post Harvest (7 projects); and Institutional Development and Policy Support (8 projects). Sections 4.2-4.6 sequentially present the individual projects by program components. Each project is described in a 7-point format, viz: project title; site/coverage; rationale/background; goal and objectives; key activities; schedule of activities; and indicative budget. The format is intended to facilitate subsequent development of the project concepts into full project proposals during the CNFIDP's operational programming phase.

4.1 Overview of Program Components and Projects

This section provides an overview of the 41 priority medium-term projects to be implemented within the period 2006-2010. By design, CNFIDP consists of five program components, namely: Municipal Fisheries, Commercial Fisheries, Aquaculture, Post Harvest and Institutional Development and Policy Support. The overview of the 41 projects is given in this section in three ways: (1) as a summary table in relation to the generic issues/problems they address; (2) as brief description of individual projects by program component; and (3) as a diagram with reference to the CNFIDP's goal and associated objectives. The 41 projects constitute the "action elements" of the plan in response to the key fisheries issues/problems identified in Chapter 2, namely: (1) depleted fishery resources, (2) degraded fishery habitats, (3) intensified resource use competition and conflict, (4) unrealized full potential of aquaculture and commercial fisheries, (5) uncompetitive products, (6) post-harvest losses, (7) limited institutional capabilities, (8) inadequate/inconsistent fisheries policies, (9) weak institutional partnerships; and (10) lack of recognition to the roles and contribution of women fishers in fisheries development.

The distribution of the 41 projects in relation to the key issues/problems they directly address is given in Table 4.1.a. All the key issues in Philippine fisheries are duly addressed by the set of proposed projects. There is at least one project that addresses every issue. In the ensuing paragraphs, the projects within each program component are briefly described individually.

Table 4.1.a. The 41 medium-term projects in relation to the key issues/problems of the Philippine fisheries sector.

Key issue	Program components				
	Municipal Fisheries	Commercial Fisheries	Aquaculture	Post Harvest	Institutional Development and Policy Support
1. Depleted fishery resources	Rationalization of Municipal Fishing Effort [MF-8]	Rationalization of Fishing Effort in Overfished Commercial Fishing Areas [CF-1] Implementation of the National Tuna Management Plan [CF-9]	Promotion of Investments in the Hatchery Industry [AQ-3]	---	---
2. Degraded fishery habitats	Rehabilitation and Regeneration of Coastal and Inland Ecosystems [MF-4] Enhancement of Locally	Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gears and Practices [CF-3]	Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points (HACCP)	---	---

Key issue	Program components				
	Municipal Fisheries	Commercial Fisheries	Aquaculture	Post Harvest	Institutional Development and Policy Support
	Managed Marine Areas [MF-3]		[AQ-5]		
3. Intensified resource use competition and conflict	Validation of Priority Use Rights through Municipal Registration and Licensing [MF-2] Sustainable Fisheries Livelihoods Support [MF-5]	Development and Implementation of a Monitoring, Control and Surveillance (MCS) System for Commercial Fisheries [CF-2]	---	---	---
4. Unrealized full potential of aquaculture and commercial fisheries	---	Exploratory Fishing in the Exclusive Economic Zone (EEZ) and Beyond, and in Underexploited Commercial Fishing Grounds [CF-4] Studies on the Biology and Culture of the Pacific Bluefin Tuna (<i>Thunnus orientalis</i>) [CF-5]	Increasing Export Competitiveness through Special Economic Zones (SEZ) [AQ-7]	---	---
5. Uncompetitive products	---	Rationalization of Fishing Vessel Designs and Fish Handling Systems [CF-8]	Development of Domestic Supply Chain and Expansion of Export Markets [AQ-4]	Strengthening of the Fish Inspection System in the Philippines [PH-1]	
	---	---	Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains [AQ-6]	Development of National Quality Standards (NQS) for Fish and Fishery Products [PH-2] Marketing and Promotion of Philippine Fish and Other Aquatic Products [PH-3] Development of New Value Added Fishery Products [PH-4] Characterization of Marine Natural Products [PH-5]	---

Key issue	Program components				
	Municipal Fisheries	Commercial Fisheries	Aquaculture	Post Harvest	Institutional Development and Policy Support
6. Post-harvest losses	Infrastructure and Post-harvest Facilities Development for Municipal Fisheries [MF-6]	Establishment of Cold Storage with Blast Freezer Facilities [CF-6]	---	Reduction of Fisheries Post-Harvest Losses via "Cold Chain System" [PH-6] Model Villages for Philippine Fisheries Post Harvest [PH-7]	---
7. Limited institutional capabilities	Comprehensive Education Program for Fisheries and Aquatic Resource Management Council (FARMC) and Fisherfolk Organizations [MF-1] Enhancement of Fishery Law Enforcement [MF-7]	Information, Education and Communication (IEC) for Commercial Fishers/Fishing Vessel Operators [CF-7]	Promotion of Aquaculture as Livelihood for Fishers and Smallholders [AQ-8]	---	Strengthening BFAR's Institutional Capacity [ID-1] Enhancing Fisheries Education and Training for a Sustainable Industry [ID-7] Strengthening Business Sector Capability [ID-5]
8. Inadequate/inconsistent fisheries policies	---	Legitimization and Implementation of the National Plan of Action (NPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing [CF-10]	Enhancement of Research, Development and Extension (RD&E) Programs and Prioritization based on Immediate Needs of Industry [AQ-2]	---	Improving the Policy and Regulatory Framework for Fisheries [ID-6]
9. Weak institutional partnership	---	---	Development of a Focused, United and Strategic Vision and Road Map for the Industry [AQ-1]	---	Building Fisheries Management Capacity through Effective Multisectoral Partnerships [ID-2] Networks of Local Fisherfolk and Aquaculture Communities [ID-3] Alliances for the

Key issue	Program components				
	Municipal Fisheries	Commercial Fisheries	Aquaculture	Post Harvest	Institutional Development and Policy Support
					Integrated Co-management of Fisheries Ecosystems [ID-4]
10. Lack of recognition of the roles and contribution of women fishers in fisheries development					Enhancing Gender-Responsiveness of Philippine Fisheries Industry Development Programs (ID-8)
Total projects	8	10	8	7	8

Note: The nine key issues in the first column are taken from Figure 2.7.a (key problems/issues confronting the fisheries sector) in Chapter 2. The alphanumeric label given in brackets after the project title denotes the specific project code within a program component (as given in Sections 4.2-4.6) and does not denote order of priority of importance.

4.1.1 Municipal Fisheries Component

The Municipal Fisheries projects directly address five issues. The problem of *depleted fishery resources* is addressed by the project on “Rationalization of Municipal Fishing Effort”, which espouses harvesting of wild species within the productive capacity of the resources. The project will be undertaken initially in 24 critical fishing grounds. For the issue on *degraded fishery habitats*, there are two proposed project interventions. The first is a project on “Rehabilitation and Regeneration of Coastal and Inland Ecosystems”. Twenty-four fishing areas are targeted to rehabilitate selected coral reefs, mangroves, seagrass beds and selected inland habitats. The second project is the “Enhancement of Locally Managed Marine Areas” with the objective of improving fish sanctuaries and marine refugia at 24 demonstration sites. The project would include a review of success stories and best practices in locally managed marine areas; identification of model areas for enhancement initiatives; the conduct of relevant capacity-building exercises and skills sharing; and dissemination of relevant IEC materials.

Relative to the issue of *intensified resource use competition*, two projects are proposed. The first is “Validation of Priority Use Rights through Municipal Registration and Licensing”, as among the main sources of conflict in fisheries is the unclear property/access rights. This project aims to work towards a broad recognition of the preferential rights of municipal fishers over coastal and marine resources, including the institutionalization of a suitable municipal registration and licensing system. The second project pertains to “Sustainable Fisheries Livelihoods Support” which seeks to increase the income of small fisherfolk families and organizations through resource and nonresource-based

livelihood schemes. A key component will be hands-on training combined with techno-demo and livelihood projects focusing on production, processing, marketing and enterprise development to be undertaken in 24 priority fishing grounds/areas.

The project on “Infrastructure and Post-harvest Facilities Development for Municipal Fisheries” shall address the issue on *post-harvest losses*. The project’s goal is to establish adequate infrastructure facilities to minimize losses of municipal fishery catches and products, including the setting up of village-level cold storage facilities and small-scale fish landing centers. Moreover, there will be provision of hands-on training in post-harvest technology and quality control.

The issue on *limited institutional capabilities* of LGUs and local communities will be addressed by two projects. The first project on “Comprehensive Education Program for Fisheries and Aquatic Resource Management Council (FARMC) and Fisherfolk Organizations” aims to develop a comprehensive education and training program for FARMC and small-scale fishers associations. Among the areas to be covered are the management of cooperatives, enterprise development and sustainable livelihoods. The second project is on “Enhancement of Fishery Law Enforcement”. It aims to integrate more fully the efforts of key stakeholders to significantly reduce illegal and destructive fishing practices. Among the key activities to be undertaken are capacity-building for deputized fish wardens, establishment of better coordination mechanisms among law enforcement units and enhancing progressive upscaling of Bantay Dagat efforts up to the fishing ground level.

4.1.2 Commercial Fisheries Component

The 10 projects under the Commercial Fisheries Component relate principally to 8 thematic issues. To deal with the issue of *depleted fishery resources*, 2 projects are proposed. The first is “Rationalization of Fishing Effort in Overfished Commercial Fishing Areas” to be undertaken in five priority fishing grounds/areas. This project shall demonstrate or model rational exploitation of fishery resources through the following component activities: development of a fishing ground management database to determine economically and biologically sustainable catch levels; regulation of fishing effort through a limited access regime; stock assessment with participation of the private sector; and adoption of selective gears to ensure sustainability of fish stocks. The second project is “Implementation of the National Tuna Management Plan” to ensure a steady supply of tuna, both for export and domestic consumption. Appropriate regulatory measures will be put in place to optimize the management of Philippine tuna fisheries. Particular emphasis shall be given to three major species: skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*) and bigeye tuna (*T. obesus*).

Relative to the issue of *degraded fishery habitats*, a project on “Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-

effective Fishing Gears and Practices" shall focus on the commercial sector. Through this project, it is hoped that adoption of selective fishing gear and harvesting practices by commercial fishers would be enhanced and contribute to protection of fishing grounds and resources. It shall likewise help in the preservation of associated marine biodiversity.

One project is directly relevant to the issue of *intensified resource use competition and conflict*. The project on "Development and Implementation of a Monitoring, Control and Surveillance (MCS) System for Commercial Fisheries" addresses this issue and aims to sustain the food supply and employment benefits derived from offshore or deep-sea resources. Establishing an effective MCS system would lessen the negative impacts of fishing operations, minimize poaching by foreign fishing vessels and promote judicious management of fish shelters or aggregating devices (*payaws*).

Two projects are intended to initially address the *unrealized full potential of commercial fisheries*. The first project is on "Exploratory Fishing in the Exclusive Economic Zone (EEZ) and Beyond, and in Underexploited Commercial Fishing Grounds". It aims to determine the full biological and economic potential of fishery resources in the EEZ and nontraditional commercial fishing grounds. If the results of exploratory fishing and studies prove to be financially viable, a scheme will be developed for exploiting underutilized fishery resources. The second project specifically deals with "Studies on the Biology and Culture of the Pacific Bluefin Tuna (*Thunnus orientalis*)". Once additional knowledge of the biology and cage culture of the species has been generated, pilot testing of cage production shall be undertaken in strategic areas, such as the northern and eastern Luzon waters (Cagayan, Isabela and Aurora Provinces), Davao Gulf and Palawan.

The problem on *uncompetitive products* may be partially mitigated by the project on "Rationalization of Fishing Vessel Designs and Fish Handling Systems". The high cost of production is partly attributed to the second-hand Japanese commercial fishing vessels (CFVs) that are generally overpowered for use in Philippine waters. The goal of this project, therefore, is to rationalize and improve the design of CFVs, and consequently improve their fuel efficiency.

The issue of *post-harvest losses* shall be addressed through the "Establishment of Cold Storage with Blast Freezer Facilities". The infrastructure will be initially built in Zamboanga City and Dipolog City to cater to the catch of sardine fleets operating in these areas. Such facilities shall improve the quality of canned and bottled sardines, as well as other commercially important species in other strategic areas of the country; minimize or eliminate wastage resulting from excess fish catches during peak fishing seasons; and assure continuous supply of fresh and frozen marine products.

The concern for *limited institutional capabilities* shall be initially addressed by the project on "Information, Education and Communication (IEC) for Commercial Fishers/Fishing Vessel Operators" that will focus on the

advantages of managed and/or limited access fisheries. Key activities to be undertaken are development and implementation of an IEC program, as well as management programs for specific fishing grounds and setting up of offshore MPAs. The last project under the Commercial Fisheries Component relates to *inadequate/inconsistent fisheries policies*. The “Legitimization and Implementation of the National Plan of Action (NPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing” is an international commitment of the Philippine government. Key activities to be undertaken include a review of the Fisheries Code and relevant laws, conduct of interagency dialogue and joint undertakings, sharing of information and conduct of trainings and IEC campaigns.

4.1.3 Aquaculture Component

The eight projects within the Aquaculture Component relate to seven key issues/concerns. There is one project that is directly relevant to the problem on *depleted fishery resources*. The project on “Promotion of Investments in the Hatchery Industry” will address aquaculture issues such as limited species variety, high fry cost and erratic supply due to a weak hatchery industry. Broodstock centers and natural food centers supporting small-scale hatcheries shall be established. Hence, excessive harvesting of wild “seeds” will be mitigated through these hatcheries. Within its five-year implementation period, the following shall have been achieved: improved technologies for existing and new aquaculture species; private sector investments in hatcheries and broodstock farms; recommendations for policy/regulations; and partnerships with foreign investors/companies.

The issue on *degraded fishery habitats* will be addressed by the project on “Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points (HACCP)”. Among others, this project shall establish mangrove buffer zones in fishpond developments and reforest illegally occupied areas. It shall likewise establish a certification scheme for farms to ensure that the marketed commodities are produced safely through environment-friendly farming methods.

One project shall address the issue of *unrealized full potential of aquaculture*. The project on “Increasing Export Competitiveness through Special Economic Zones (SEZ)” is specifically aimed at developing export-oriented aquaculture ventures. Through this initiative, the following results are anticipated: formation of a functional national authority or government-private sector consortium, establishment of regional economic zones and enhanced investments particularly those coming from foreign firms. The CNFIDP envisions that aquaculture will have an expanded role in meeting future fish demand, given the limited scope in increasing catches from wild stocks to feed the growing Philippine population.

Concerning the issue on *uncompetitive products*, two projects are proposed. One project pertains to the “Development of Domestic Supply Chain and

Expansion of Export Markets" to resolve the erratic and occasionally very low prices of aquaculture products in the local market. It shall focus on improving the distribution and marketing efficiency, as well as expanding the domestic supply chain through the marketing of processed and niche products, to take full advantage of the export market. Emphasis shall be placed on quality, food safety and traceability. The other project titled "Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains" aims to improve growth and yield of cultured stock and boost tolerance to diseases. Diversification into other cultivable native species of high market potential – particularly in mariculture – will not only increase the yields but shall likewise prevent the introduction of new aquatic diseases and pests. In the process, this project shall help preserve the natural biodiversity.

The *limited institutional capabilities* of local communities will be addressed by the project on "Promotion of Aquaculture as Livelihood for Fishers and Smallholders", which shall help uplift the socioeconomic status of fishers and reduce their dependence on capture fisheries. It emphasizes empowering smallholders and fishers to carve a sustainable livelihood in mariculture, particularly in adapting low-input aquaculture technologies. The project on "Enhancement of Research, Development and Extension Programs and Prioritization based on Immediate Needs of Industry" is the aquaculture industry's response to partly address the *inadequate/inconsistent fisheries policies*. Despite massive RD&E efforts, strategic gaps still exist in using the scientific findings for commercial ventures or undertakings. This initiative is expected to establish a functional research consortium, engage more extensively the private sector in RD&E, and provide economic incentives to scientists.

The project titled "Development of a Focused, United and Strategic Vision and Road Map for the Industry" aims to create a stronger and more focused aquaculture industry. Hence, it addresses the issue of *weak institutional partnerships*. This project likewise aims to attain the highest degree of public-private partnerships. The project's key outputs include implementation of relevant capacity-building programs, proposed aquaculture federation, road maps per commodity, and amended policies and regulations.

4.1.4 Post Harvest Component

The projects for the Post Harvest Component are focused on two clusters of fisheries issues: (1) uncompetitive products and (2) post-harvest losses. Five projects are proposed to address the issue of *uncompetitive products*. The first is a project on "Strengthening of the Fish Inspection System in the Philippines" through the application of suitable product safety and quality systems, such as HACCP and Good Manufacturing Practices. It is intended to improve the quality and safety of fish and other aquatic products, thereby enhancing their competitiveness both in the local and the export markets. This project shall result, among others, in rationalization of the fish inspection section of BFAR, increased number of competent fish inspectors, improved

product certification scheme and market-oriented fish inspection system. The second project pertains to the “Development of National Quality Standards for Fish and Fishery Products”, which are basic prerequisites in protecting the health and well-being of the consumers both within the country and abroad. Key project outputs include a database of all information related to quality criteria, standards and specifications. There will be also policy briefs to be developed from national and regional consultations to set the necessary policy agenda and direction. Brochures on national quality standards for dissemination as IEC materials will be also produced. Third, the project on “Marketing and Promotion of Philippine Fish and Other Aquatic Products” will develop market and market systems for effective linkage between production and consumption of fish and other aquatic products. It shall encourage better recognition of fish and fishery products in the export market, increase trading of fish and fishery products using an effective networking scheme, and identify products that may create a market niche. This project is also intended to establish an institutionalized ecolabeling system in the Philippines. Fourth, a project on “Development of New Value Added Fishery Products” is proposed given the emergence of new fisheries products activities worldwide in the last several years. Candidate species for these new product development activities include some aquaculture commodities (such as milkfish and tilapia) and seaweeds, particularly those belonging to these genera: *Codium*, *Caulerpa* and *Gracilaria*. Such development of globally competitive value-added fishery products may be facilitated by the establishment of one national and at least three regional “one-stop shop” facilities. The fifth project pertains to the “Characterization of Marine Natural Products”, given that several species of Philippine marine organisms have potential as raw materials for the extraction of natural products. Among others, this project shall determine the micro and macronutrients in several species of Philippine marine organisms in order to showcase their importance as table foods. The key output will be a database of different marine organisms in the Philippines that can be sources of marine bioactive compounds.

Two projects pertain to *post-harvest losses*. The first project will look into the “Reduction of Fisheries Post-harvest Losses via ‘Cold Chain System’” since not all fish harvested for human consumption actually reaches the consumers. In the Philippines, approximately 25% of the total fish production is lost along the distribution chain. This project aims to reduce post-harvest losses within the first MTP by 20%. The mechanisms to achieve this target would include the standardization of fish processing methodologies. The other project relates to the establishment of “Model Villages for Philippine Fisheries Post Harvest”, which will be initially undertaken in an identified pilot site. This project centers on the provision of alternative employment and income-generating activities to fishing communities through development and dissemination of appropriate and sustainable fisheries post-harvest technology at the village level. The expected output is the establishment of one model village for fisheries post-harvest; if proven successful, it shall be replicated in other fishing communities in the country.

4.1.5 Institutional Development and Policy Support Component

The seven projects under this component are largely directed at three governance issues. Three projects are proposed to address the *limited institutional capabilities* of NGAs, LGUs, private sector and other organizations involved in the fisheries sector. The first project is on “Strengthening BFAR’s Institutional Capacity” given that the agency’s mandates have expanded but the size of its bureaucracy has largely remained the same over the last decade. This project is therefore aimed to identify, define and implement the set of activities that will strengthen BFAR and match its institutional capacity with the challenges of leading the sustainable management of Philippine fisheries. Among the key outputs are the formulation of BFAR’s competency model/framework of excellence, capacity- building action plan, enhanced organizational chart, and systems and infrastructure development plans. The second project is geared towards “Enhancing Fisheries Education and Training for a Sustainable Industry” as the current fisheries education in the country needs a critical boost and serious support to enable it to effectively perform the task of providing qualified human resources. Hence, the project’s goal is to enhance the system of fisheries education by modernizing educational and training facilities, upgrading the capability of faculty and trainors, providing more scholarships, and expanding training partnerships. It will come up with assessment reports on the industry’s human resource needs in relation to the capabilities of the academic institutions, as well as investment plans for modernizing the fisheries’ educational system. The third project shall focus on “Strengthening Business Sector Capability” and is deemed necessary given that the development of the country’s fisheries cannot be effectively pushed through without involving the private sector. The project’s goal is to provide business firms involved in the fisheries industry with a framework to work collectively – among themselves and with government and other institutions involved in fisheries – in building the capability to meet the many challenges facing the industry. The first year will be spent on establishing the appropriate partnerships within the fisheries business sector and developing an action plan for subindustry capacity upgrading. The second year onwards shall be devoted to action plan implementation.

One project is aimed at addressing *inadequate/inconsistent fisheries policies*. The project for “Improving the Policy and Regulatory Framework for Fisheries” is in recognition of the significant governance reforms needed for fisheries as indicated in the 2004-2010 Medium-term Philippine Development Plan (MTPDP). As such, this project is geared towards creating a conducive policy and regulatory environment that supports the effective and efficient management of the fisheries sector. Some of the key project outputs are sectoral policy agenda, discussion papers, initial/revised drafts of new or revised rules/regulations, and various forms of IEC materials (e.g., educational papers, primers and brochures).

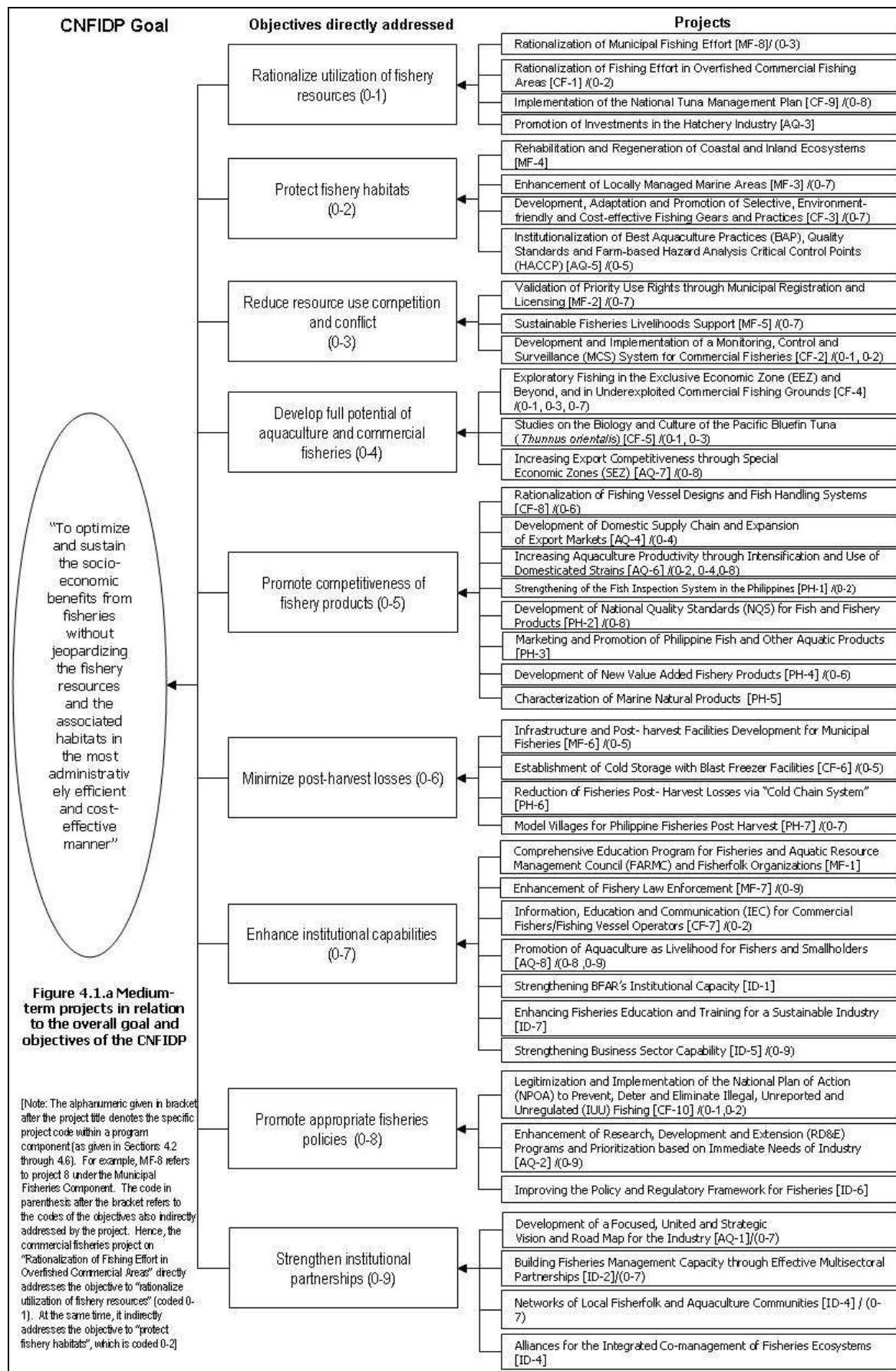
Three projects are designed to respond to the problem of *weak institutional partnerships*. The first project shall constitute “Building Fisheries Management Capacity through Effective Multisectoral Partnerships” that are deemed critical for the sector to move forward. Key activities to be undertaken include assessments of the readiness of potential partner institutions to enter into formal partnership arrangements, building organizational skills and developing common/shared plans among all institutions involved. Suitable partnership arrangements will be established in these 11 critical areas: (1) information systems, (2) policy, (3) building local community capability, (4) RD&E, (5) fisheries resources management, (6) product and market development, (7) building business sector capacity, (8) IEC campaign, (9) law enforcement, (10) financing and investments, and (11) education. The second project shall form the

“Networks of Local Fisherfolk and Aquaculture Communities” considering that networks can be an effective mechanism for empowerment and building the capacity of local communities. The project’s goal is to build networks of local communities to serve as channels for information sharing and as vehicles for the delivery of financial and other support for capacity- building of these site-based stakeholders. The first year shall focus on network establishment; network activities shall initially concentrate on information exchange and advocacy. The third project shall establish “Alliances for the Integrated Co-management of Fisheries Ecosystems”. It recognizes that the national and local governments alone cannot effectively handle all the fisheries management functions. This project, therefore, aims to build truly effective and formal alliances among local communities, LGUs, BFAR and other government agencies for the integrated co-management of specific ecosystems. Major activities include prioritizing the ecosystems to be managed through the alliances; enlisting the involvement of institutions/organizations in their respective ecosystem alliances; and institutionalizing the alliances.

4.1.6 The Projects and the CNFIDP Goal and Objectives

Figure 4.1.a illustrates the linkage of the 41 medium-term projects in relation to the overall goal and objectives of CNFIDP. The nine objectives are translation into positive statements of the nine key issues given in Table 4.1.a. In effect, the objectives are affirmative re-statements of the problems/issues, which are the negative conditions that affect the fisheries sector. Such objectives are also reflected in Figure 3.3.2.a (Integrated objective tree of Philippine fisheries) of Chapter 3. Successful implementation of the individual projects will lead to the attainment of these objectives. In turn, attaining them will contribute to the achievement of the goal of CNFIDP “to optimize and sustain the socioeconomic benefits of fisheries without jeopardizing the fishery resources and the associated habitats in the most administratively efficient and cost-effective manner”.

Overall, each project directly addresses one objective. The figure depicts, however, that a project may deal with more than one objective. For example, the municipal fisheries subsector’s project on “Enhancement of Locally Managed Marine Areas” directly addresses the objective to “protect fishery habitats”. In addition, however, it also addresses the objective to “enhance institutional capabilities”, as the project has some training and capability-building activities. Similarly, the aquaculture subsector’s project on “Increasing Export Competitiveness through Special Economic Zones (SEZ)” shall directly address the objective to “maximize full potential of aquaculture”. At the same time, it also supports the objective to “promote appropriate fisheries policies”, since appropriate legal instruments will be developed as part of this project.



4.1.7 Project Format/Outline

Every project is presented in a project brief and/or concept proposal format. As a stand-alone document, a project brief consists of seven elements as follows: (1) project title, (2) site/coverage, (3) rationale/background, (4) goal and objectives, (5) key activities, (6) schedule of activities and (7) indicative budget. Prelude to the first element is a code that links it to the projects earlier listed in Table 4.1.a and Figure 4.1.a.

The first element, "project title", is the distinctive name given to the project that describes broadly the scope of work to be undertaken. The second item, "site/coverage", pertains to the geographical location, ranging from a specific bay or a fishing ground up to the whole archipelagic waters. The third element, "rationale/background" provides an overview that describes the specific problems, needs or opportunities to be addressed by the project. Fourth, the "goal and objectives" describe what the project intends to achieve/bring about. The goal states the broad desired improvement over the long term. The objective describes the results to be achieved or changes that will occur in specific terms. Fifth, the "key activities" provide an enumeration of the actions and/or tasks to be carried out, their description (including methods) and key outputs. The sixth item is the "schedule of activities". It specifies the temporal sequence of activities with a maximum of five years (First MTP) given 2006 as the base year. The seventh item is the "indicative budget", which provides an estimate of the total project cost in terms of million pesos.

The rationale behind the seven-point format is to make the preparation of detailed project proposals in the subsequent operational programming stage more manageable. The project brief already provides most of the substantive elements required to develop full project proposals. The goal, objectives, outputs and activities contained in each project can readily be used to develop the logical framework matrix as basis for developing full project proposals. Once the entire CNFIDP has been approved, operational planning shall commence. Hence, the project briefs will be transformed into implementable and appropriately costed activities either by region or by specific geographical location.

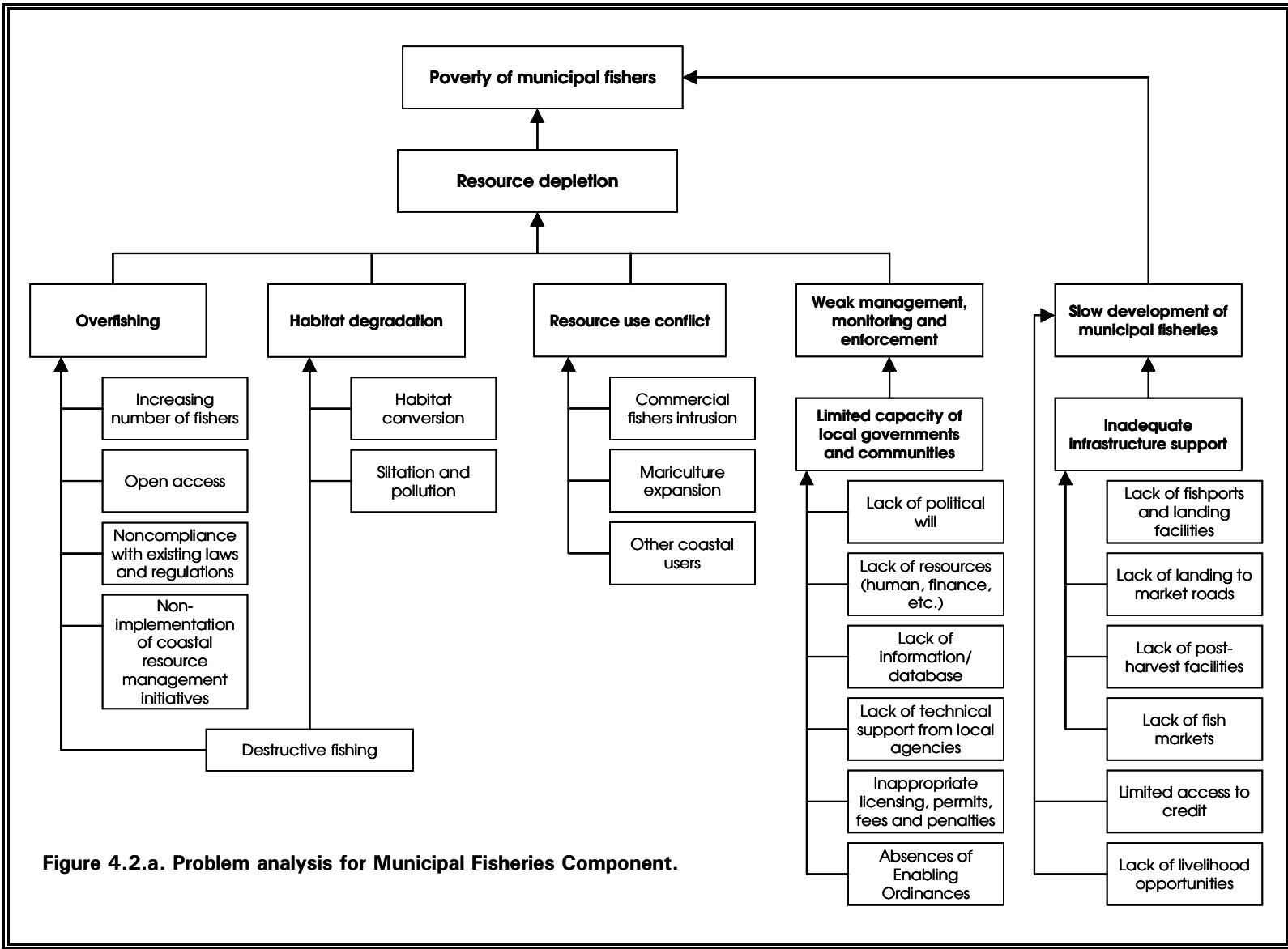
All of these 41 projects are presented individually from Section 4.2 through Section 4.6. The sequence of presentation of the component projects are as follows: municipal fisheries, commercial fisheries, aquaculture, post harvest, and institutional development and policy support. Prior to the full description of the individual projects in a seven-point format, there is a general introduction. It provides a summary description of the fisheries problems or issues that are specific to the program component. This introduction likewise shows the diagrammatic representation of the agreed problem tree/diagnosis, which was a result of various consultations of the CNFIDP Technical Working Groups with concerned stakeholders. These projects are by no means exhaustive, and must be viewed more as the catalytic actions to initially address the pressing problems confronting the Philippine fisheries.

4.2 Municipal Fisheries Component

The key issue in the municipal fisheries subsector is pervasive poverty with more than a million people who are directly dependent on municipal fisheries considered as poor. Poverty is largely brought about by the continuing depletion of fishery resources (Figure 4.2.a). In turn, four major factors contribute to resource depletion. The first one is overfishing due to the increasing number of entrants and open access nature of the resource. Second, there is degradation of fishery habitats brought about by several causes, such as the conversion of mangroves, seagrass beds and coral reefs into other economic uses. Destructive fishing practices contribute to both overfishing and habitat degradation. The third factor, resource use conflicts, likewise contributes to resource depletion. Conflicts happen between and/or among fisher groups, as well as between fisher groups and other users of the fishery resources, such as tourism operators.

The fourth major factor is weak management, and monitoring and enforcement capacities. Limited management capacity of LGUs and local communities largely contributes to this concern. In turn, a host of classical problems besetting these stakeholders – such as lack of political will, lack of human and financial resources and absence of enabling legislations – exacerbate the plights of LGUs. Institutionally, the slow development of municipal fisheries is a factor that contributes directly to the core problem of poverty. Both the limited access to credit and lack of livelihood opportunities lead to the slow development of municipal fisheries. The inadequate infrastructure support likewise contributes to this problem. Post-harvest facilities and reliable road networks are often lacking.

The eight projects described below address the identified key problems. Project 1 (Comprehensive Education Program for Fisheries and Aquatic Resource Management Council [FARMC] and Fisherfolk Organizations) shall enhance the capabilities of LGUs and the local communities in various facets of fisheries management. Project 2 (Validation of Priority Use Rights through Municipal Registration and Licensing) is proposed to minimize resource use conflicts. Project 3 (Enhancement of Locally Managed Marine Areas) and Project 4 (Rehabilitation and Regeneration of Coastal and Inland Ecosystems) both relate to the issue of habitat degradation. Project 5 (Sustainable Fisheries Livelihoods Support) shall help resolve the livelihood-related concerns. Project 6 (Infrastructure and Post-harvest Facilities Development for Municipal Fisheries) shall address the need for inadequate infrastructure support, particularly cold storage facilities and fish landing centers. Project 7 (Enhancement of Fishery Law Enforcement) shall mitigate the concern for weak law enforcement. Project 8 (Rationalization of Municipal Fishing Effort) addresses the overfishing concern. Collectively, these eight project interventions are anticipated to alleviate poverty among municipal fishers.

Figure 4.2.a. Problem analysis for Municipal Fisheries Component.**Figure 4.2.a. Problem analysis for Municipal Fisheries Component.**

PROJECT 1 (CODE: MF-1)

1. Project title : **Comprehensive Education Program for Fisheries and Aquatic Resource Management Council (FARMC) and Fisherfolk Organizations**

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

FARMCs are composed largely of fisherfolk representatives from the municipal fisheries subsector. However, many of these representatives still lack the necessary knowledge and skills that will help them maximize their participation in fisheries management. The Fisheries Code of 1998 stipulates the creation of FARMCs from barangay up to national levels. The LGUs and NGAs consult and coordinate with FARMCs as they carry out their regulatory, management and development functions over fishery resources.

This project seeks to improve the quality of their participation in various sectoral endeavors. They may include participation in the establishment of cooperatives and enterprise development. Such assertion is based on the premise that the dynamism of the FARMC system is the cornerstone of a more meaningful public participation of fisherfolks in municipal fisheries management.

4. Goal and objectives

The project's goal is to develop a comprehensive education and training program for small-scale fisher representatives. The specific objective is to develop the capacity of FARMC and fisherfolk organizations on sustainable fisheries management, establishment of cooperatives, enterprise development and sustainable livelihoods.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Undertake research on capacities and best practices of FARMCs	A survey will be conducted to assess the effectiveness of current FARMC capacities and best practices. The FARMC's role in the formulation of municipal fisheries development plans and in the enforcement of fishery laws will be assessed.	- Documentation of FARMC's capacities and best practices
2. Conduct a training needs analysis (TNA) for FARMCs	There will be a nationwide survey to evaluate the training needs of FARMCs in order to improve their capabilities.	- Prioritized training needs
3. Prepare appropriate training modules	Appropriate training modules will be developed and/or existing ones will be upgraded. Areas may include but not be	- Training modules

Key activities	Description/methodology	Key outputs
	limited to tropical fisheries management, cooperatives development and sustainable livelihoods. Such training modules shall vary depending on the needs of participants coming from FARMCs and municipal fishers.	
4. Conduct national FARMC trainors training	Three national trainings shall be conducted. There will be one training each in Luzon, Visayas and Mindanao.	- Trained trainors - Database of training participants
5. Conduct provincial and municipal-level FARMC trainings	Training will be undertaken in the provinces and municipalities of 24 priority bays/gulfs identified by FARMCs.	- Trained trainors - Database of training participants
6. Conduct hands-on training of municipal fishers	The hands-on training of the municipal fishers will also be undertaken in the 24 priority bays/gulfs. Among the anticipated training areas are sustainable livelihoods, establishment of cooperatives and enterprise development.	- Trained municipal fishers representing at least 24 organizations of fishers - Database of training participants

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Undertake research on capacities and best practices of FARMCs																				
2. Conduct a TNA for FARMCs																				
3. Prepare appropriate training modules																				
4. Conduct national FARMC trainors training																				
5. Conduct provincial and municipal-level FARMC trainings																				
6. Conduct hands-on training of municipal fishers																				

7. Indicative budget : PhP 210.0 million

PROJECT 2 (CODE: MF-2)

1. Project title : **Validation of Priority Use Rights through Municipal Registration and Licensing**

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

This project seeks to address the crucial issue on open access to resources in municipal fisheries. There is a necessity to significantly reduce fishing effort, especially in overfished and/or degraded fishing grounds. It is recognized that there is a need to balance social goals on one hand, and environmental goals, on the other hand. The project shall favor politically disadvantaged and economically marginalized municipal fishers. This bias shall be manifested in various measures, such as the initiation of comprehensive consultative processes and mechanisms. There may be a staggered or graduated implementation of licensing programs in areas where a significant portion of municipal fisherfolk population will be affected.

4. Goal and objectives

The project's goal is to work towards the broad recognition of the preferential rights of municipal fishers over coastal and marine resources within their ranks and among other economic sectors of the society. The objectives are:

1. to develop the capability of LGUs and FARMCs for effective and efficient implementation of the municipal registration and licensing system;
2. to organize the LGU-FARMC Fisheries Management Office;
3. to organize and operate a computerized municipal fisheries licensing system at LGU level; and
4. to issue appropriate licenses and permits to all municipal fishers.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct nationwide registration campaign	The nationwide campaign to be conducted shall highlight the significance of a municipal registration and licensing system. This task includes a documentation of the current state of municipal fisheries. Such documentation shall cover the socioeconomic, resource status and other technical conditions of municipal fisheries.	- IEC campaign - State of the art of municipal fisheries
2. Develop models for community property rights	There will be a development of models for community property rights systems that identify various possible institutional	- Models for community property rights

Key activities	Description/methodology	Key outputs
systems focusing on community-based licensing system	modalities and/or mechanisms. Its focus shall be on community-based licensing systems. A computer-based system shall be developed. This activity will be linked with existing initiatives in the development of licensing system for municipal fisheries. Based on this model, appropriate licenses will be issued later.	systems - Community-based licensing system, including associated database
3. Conduct hands-on training of LGU and FARMC on basic licensing system	Hands-on training will be conducted for identified LGU and FARMC personnel. Prior to that, appropriate training modules shall be prepared regarding the elements of the licensing system.	- Trained LGU and FARMC personnel - Training module - Participants database
4. Undertake hands-on training on computer-based operation of the licensing system	Selected LGU and FARMC personnel shall be trained on the use of computer-based municipal licensing system. Emphasis shall be given on the use of hardwares and softwares.	- Trained personnel
5. Conduct orientation/seminar on the procedures of registration	This will be a general orientation/seminar about the importance and procedures of registration and licensing system for selected FARMC members and municipal fishers. A registration manual shall be developed for this purpose. This project will be linked with the ongoing initiative of the BFAR and the FISH Project Office concerning municipal registration and licensing system.	- Trained personnel - Registration manual

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct nationwide registration campaign																				
2. Develop models for community property rights systems focusing on community-based licensing system																				
3. Conduct hands-on training of LGUs and FARMCs on basic licensing system																				
4. Undertake hands-on training on computer-																				

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
based operation of the licensing system																				
5. Conduct orientation/seminar on the procedures of registration																				

7. Indicative budget : PhP 300.0 million

PROJECT 3 (CODE: MF-3)

1. Project title : Enhancement of Locally Managed Marine Areas

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

There is a growing body of evidence coming from both fisheries scientists and fishers that locally managed marine areas, such as fish sanctuaries or marine refugia, are useful tools in fisheries management. They have been proven effective in enhancing fisheries productivity, improving the status of fish stocks and protecting critical fish habitats. Such positive impacts have been experienced in coralline, mangrove or seagrass ecosystems. Even with their increasing adoption as a management tool though, there is still a need to enhance these locally managed marine areas to demonstrate their long-term viability, and thereby encourage their further adoption by other fishing communities.

4. Goal and objectives

The broad aim of this project is to understand better the roles of locally managed marine areas in fisheries conservation. The specific objective is to enhance locally managed marine areas at specific demonstration sites.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Review of success stories and best practices of locally managed marine areas	There will be an inventory of locally managed marine areas that are primarily used as tools in fisheries management. This shall be followed by a review of the outcomes and/or performances of such locally managed marine areas. The effectiveness of such areas shall be assessed from resource, environmental, social and economic perspectives.	- Inventory list of locally managed marine areas used in fisheries management - State of the art of locally managed marine areas highlighting success stories and best practices
2. Identify model areas for enhancement initiatives	Based on the inventory list of locally managed marine areas used in fisheries management, model areas for enhancement initiatives will be identified. Several ecological, social and economic criteria may be used to assess and/or prioritize the selection of locally managed marine areas.	- Selected model or demonstration areas
3. Conduct participatory	Establishing and maintaining locally managed areas require some forms of	- Trained stakeholders

Key activities	Description/methodology	Key outputs
workshops with fishers for capacity-building and skills-sharing	specialized knowledge and technical skills. Hence, those to be involved in their planning and management need to undergo some training or skills enhancement. These may take several modes, such as field exercises in site assessments through participatory appraisals. These may likewise involve cross visits of the municipal fishers in areas with successful locally managed marine areas.	
4. Design and disseminate relevant IEC materials	Relevant IEC materials shall be developed concerning successful locally managed marine areas. These may be produced largely in popular formats, such as billboards, comics, pamphlets and posters.	- IEC materials including billboards, comics, pamphlets and posters
5. Develop support program for establishment of new locally managed marine areas	The crucial elements required to develop a support program for the establishment of new locally managed marine areas will be identified. Such program may involve training needs, stakeholder consultations, community organizing and participatory assessments of potential sites.	- Plan for a support program of new locally managed marine areas

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Review of success stories and best practices of locally managed marine areas																				
2. Identify model areas for enhancement initiatives																				
3. Conduct participatory workshops with fishers for capacity-building and skills-sharing																				
4. Design and disseminate relevant IEC materials																				

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
5. Develop support program for establishment of new locally managed marine areas																				

7. Indicative budget : PhP 120.0 million

PROJECT 4 (CODE: MF-4)

1. Project title : **Rehabilitation and Regeneration of Coastal and Inland Ecosystems**

2. Site/coverage : 24 bays/gulfs/inland ecosystems to be identified by FARMC

3. Rationale/background

Many fishing grounds and coastal ecosystems are in varying states of degradation. The degraded condition of many fishery habitats constrains the provision of sustained socioeconomic benefits derived from municipal fisheries. Degradation of fisheries habitats contributes to the vicious cycle of poverty and resource degradation. As a result, some municipal fishers are even compelled to resort to destructive fishing methods in an attempt to increase their catch and income. Thus, restoration of degraded fishery habitats is needed for the rehabilitation of fish stocks for sustained harvest over the long term.

4. Goal and objectives

The goal is to facilitate the rehabilitation of degraded fishery habitats. The specific objective is to rehabilitate selected degraded coral reefs, mangroves, seagrass and inland areas that are critical areas for the fisheries.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Identify high priority areas for rehabilitation	This shall involve establishing relevant criteria for the identification and prioritization of the critical fishery habitats and/or ecosystems. Baseline information shall be either generated or updated. To facilitate the process, computer-based maps shall be generated.	- List and maps of 24 bays/gulfs/inland ecosystems to be rehabilitated
2. Conduct consultations with key stakeholders in target sites	Stakeholder consultations will identify the various concerns regarding the rehabilitation efforts. Such may involve the conduct of visioning/scoping exercises with onsite stakeholders including local governments, line agencies, fisherfolk organizations and other economic interest groups.	- Documentation of goals and preferences of the stakeholders concerning rehabilitation efforts
3. Design site-specific rehabilitation plans	Specialists in rehabilitation and/or restoration efforts shall be involved in developing the appropriate plans. Their inputs as experts shall be integrated with the inputs of the community members in developing the rehabilitation plans. Such plans shall vary depending on the targeted	- Rehabilitation plans for coral reefs, mangroves, seagrass beds and inland fishery habitats

Key activities	Description/methodology	Key outputs
	fishery habitats. Techniques for the restoration of inland and coastal marine habitats will also vary.	
4. Undertake actual rehabilitation of critical fishery habitats and ecosystems	This pertains to the onsite rehabilitation efforts. Such initiatives may include but not be limited to mangrove reforestation, restoration of seagrass beds, coral transplantation and rehabilitation of degraded inland marshes and swamps.	- Selected fisheries habitats rehabilitated
5. Undertake monitoring and evaluation (M&E) to track implementation of rehabilitation plans	Periodic M&E shall be undertaken to track the implementation of rehabilitation plans. Successes or failures in implementation shall be monitored given appropriate indicators, such as the area of mangrove planted with seedlings and the survival rate of the corals transplanted. There will be participatory monitoring with the concerned stakeholders in coming up with relevant M&E reports.	- M&E reports

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Identify high priority areas for rehabilitation																				
2. Conduct consultations with key stakeholders in target sites																				
3. Design site-specific rehabilitation plans																				
4. Undertake actual rehabilitation of critical fishery habitats and ecosystems																				
5. Undertake M&E to track implementation of rehabilitation plans																				

7. Indicative budget : PhP 180.0 million

PROJECT 5 (CODE: MF-5)

1. Project title : Sustainable Fisheries Livelihoods Support

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

The livelihoods of fisherfolks and local community members often come from two major sources. The first livelihood source is the direct harvesting of wild fishery resources. As such, the fishers' livelihoods continue to be dependent on the status of fisheries and other coastal resources. Hence, resource management efforts for the municipal fisheries must necessarily include a livelihood development component. The provision of alternative or supplemental livelihoods is crucial particularly if the implementation of some regulatory measures will result in the reduction of fishing effort. A case in point is the closure of certain portions of the traditional fishing grounds to rehabilitate the fish stocks. The other source of livelihoods is from undertakings which are nonfisheries-based. These livelihoods could be based on other natural resources or other service industries.

Notwithstanding, sustainable livelihood development may also be necessary even if the fisheries are effectively managed. This is particularly true if the population growth is expanding at such a high rate. Demand for food fish of the increasing population cannot be effectively met by natural production. The Philippine coasts are among the most heavily populated areas in Asia. Thus, sustainable livelihood development should consist of an appropriate mix of resource-based and nonresource-based initiatives.

4. Goal and objectives

The project's goal is to increase the income of small fisherfolk families and organizations through engagement in resource and nonresource-based livelihood initiatives. The objectives are:

1. to identify potential livelihood development projects, such as seaweeds culture, marine fish cage, establishment of shallow water fish shelter or *payaw* for hook-and-line fishing, and ecotourism, by area/region;
2. to establish fisherfolk livelihood centers; and
3. to build partnerships between government and private sector and access long-term commitment on livelihood and funding support.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct research on livelihood options for municipal fishers	The research on potential livelihood projects will be conducted through some forms of participatory appraisals and/or technical feasibility studies. Such investigation will cover a range of suitable livelihood projects, both within and outside the fisheries sector.	- Set of priority livelihood options
2. Provide relevant livelihood trainings	Trainings are needed to upgrade the livelihood-related skills of the municipal fishers. Among others, the trainings may cover production, processing, entrepreneurship, commodity marketing and trading. Such trainings or skills enhancement may take various modalities, and may include formal lectures, field exercises and site visits.	- Trained participants
3. Develop and implement a marketing program for value-added fishery products	The marketing program will be designed for value-added fishery products and services for both local and export markets. This will be relevant for livelihoods involving the processing and trading of fishery products. Among others, value adding may require creation of new products, modification of existing products and reformulation in terms of products processing and packaging. This activity shall be linked with the Post Harvest Component's Project 4 (Development of New Value Added Products).	- Marketing program including marketing plans, feasibility studies and technical reports - Marketing program implemented
4. Improve fishery products and services through research and development (R&D)	This shall involve intensifying the R&D activities of the mandated agencies involved in the fisheries sector. This can be enhanced by the establishment of partnerships with the private sector and government agencies involved in R&D works.	- R&D publications - Partnership agreements among R&D institutions
5. Enhance capital mobilization through credit programs and accessing of soft loans	Municipal fishers need capital to engage in livelihood pursuits outside of the capture fisheries. Among others, this will involve a series of negotiations and submission of proposals with lending agencies and/or financing institutions.	- Loan agreements - Grant packages - Credit proposals
6. Develop and install a community-friendly market	This will start with a market research. Relevant data/information shall be generated from both government	- Database of community-based products

Key activities	Description/methodology	Key outputs
information system	agencies and private sources. A community-friendly market information system shall be developed and made operational.	- Operational market information systems

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct research on livelihood options for municipal fishers																				
2. Provide relevant livelihood trainings																				
3. Design and implement a marketing program for value-added fishery products																				
4. Improve fishery products and services through R&D																				
5. Enhance capital mobilization through credit programs and accessing of soft loans																				
6. Develop and install a community-friendly market information system																				

7. Indicative budget : PhP 550.0 million

PROJECT 6 (CODE: MF-6)

1. Project title : Infrastructure and Post-harvest Facilities Development for Municipal Fisheries

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

The lack of post-harvest facilities contributes to post-harvest losses incurred by municipal fishers. It is estimated that these losses – from the point of harvest up to the consumers' table – amount to at least 10% of the actual fish catch. The lack of post-harvest and marketing facilities also explains why municipal fishers cannot bring their products to the market centers. Provision of appropriate processing facilities and technology is therefore important to prevent post-harvest losses. Such infrastructure facilities are essential to develop products with added value in the market. In addition to technical and financial feasibility, final site selection should take into account relevant socioeconomic factors, such as the presence of strong fisherfolk cooperatives and lending agencies.

4. Goal and objectives

The goal is to establish appropriate infrastructure facilities to minimize post-harvest losses and to facilitate the marketing of fishery products of municipal fisherfolks. The project objectives are:

1. to establish village-level cold storage facilities;
2. to establish small-scale fish landing centers; and
3. to set up the appropriate organization to operate/maintain the infrastructure facilities.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Select appropriate sites for the establishment of infrastructure and post-harvest facilities	Several criteria will be used in the selection of appropriate sites for the establishment of infrastructure and post-harvest facilities. Among these criteria are the numbers of municipal fishers operating in the area, the significance of capture fisheries to the local economy and the presence of an organization capable of maintaining the physical infrastructures. Such facilities would include, but not be limited to village-level cold storage facilities and small-scale landing centers.	- Sites selected
2. Conduct feasibility studies	These studies shall evaluate the feasibility of constructing the infrastructure and post-harvest facilities from the technical,	- Feasibility studies - Technical

Key activities	Description/methodology	Key outputs
	economic and social standpoints. To be part of the process is a series of consultations with the concerned stakeholders.	reports
3. Construct and maintain infrastructure and post-harvest facilities	This starts with the actual site construction of the desired facilities. The maintenance of the established infrastructure and post-harvest facilities shall be undertaken by an appropriate organization. This project will be linked with Project 6 (Reduction of Fisheries Post-harvest Losses via "Cold Chain System") of Post Harvest Component.	- Facilities established and maintained

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Select appropriate sites for the establishment of infrastructure and post-harvest facilities																				
2. Conduct feasibility studies																				
3. Construct and maintain infrastructure and post-harvest facilities																				

7. Indicative budget : PhP 80.0 million

PROJECT 7 (CODE: MF-7)

1. Project title : Enhancement of Fishery Law Enforcement

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

This project seeks to reduce the incidence of illegal and destructive fishing practices. Such will be undertaken largely by enhancing institutional partnerships. A more dynamic cooperative arrangement shall be fostered among organizational entities involved in fisheries law enforcement. These would include but not be limited to DA-BFAR, the PNP Maritime Command, LGUs, NGOs and deputized fish wardens. Attainment of this goal will also contribute to resolving the issue of open access in nearshore and inland fisheries. Hence, more effective law enforcement will help reduce unregulated and illegal fishing effort, thereby reducing also the stress on fishery resources and ecosystems.

4. Goal and objectives

The project's goal is to enhance the integration of efforts of key law enforcement to significantly reduce illegal and destructive fishing practices. The objectives are:

1. to organize community-based and Fishery Law Enforcement Task Force (FLET);
2. to improve the scheme for deputization of fish wardens; and
3. to provide support for Bantay Dagat/FLET.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct capacity training program for deputized fish wardens	This is in addition to the regular law enforcement training being provided by BFAR, LGUs and other relevant organizations. Such training program shall include several facets of law enforcement, such as fishery laws and regulations, procedures for arrest of illegal fishers and protocols for court litigation.	<ul style="list-style-type: none"> - Approved/ accredited training program - Trained deputized fish wardens

Key activities	Description/methodology	Key outputs
2. Establish a better coordination mechanism among fisheries law enforcement units	<p>This is to address the relatively weak coordination mechanisms currently instituted among fisheries law enforcement units including Bantay Dagat, LGUs, PNP-Maritime Command and Philippine Coast Guard. To set up a more suitable coordination mechanism, there will be continuing training and dialogues among the stakeholders involved in law enforcement. Possible modalities for improved partnership arrangements are memorandum of agreement/understanding or letter of agreements.</p>	<ul style="list-style-type: none"> - Partnership arrangements with better coordination mechanism - Memorandum of agreement/understanding
3. Enhance progressive upscaling of Bantay Dagat efforts to the fishing ground level	<p>To attain the objective of upscaling of Bantay Dagat efforts to the fishing ground level, more advanced training on law enforcement shall be undertaken. Particular emphasis shall be given on MCS. Traditionally, Bantay Dagat focuses its efforts in nearshore areas. Part of strengthening is the provision of logistical support, such as communications equipment, fuel, patrol boats and additional personnel.</p>	<ul style="list-style-type: none"> - Trained Bantay Dagat personnel - Logistics and other technical support provided

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct capacity training program for deputized fish wardens																				
2. Establish a better coordination mechanism among fisheries law enforcement units																				
3. Enhance progressive upscaling of Bantay Dagat efforts to the fishing ground level																				

7. Indicative budget : PhP 190.0 million

PROJECT 8 (CODE: MF-8)

1. Project title : Rationalization of Municipal Fishing Effort

2. Site/coverage : 24 bays/gulfs to be identified by FARMC

3. Rationale/background

The municipal or small-scale fisheries in the Philippines are characterized by the prevalence of inefficient fishing gears (passive and nonmotorized), inefficient fisheries information system and poor marketing system dominated by middlepersons. Moreover, there is low level of financial support from the government and formal financing institutions. To bring the benefits of the fishing industry within the reach of the greatest number of people, the management of municipal fisheries has to be improved, particularly the rationalization of fishing effort. Government statistics on municipal and commercial fish production from 1982 to 1997 show that only five species of small pelagics (roundscad, fimbriated and Indian sardines, frigate tuna and Indian mackerel) out of nine species were caught primarily by the commercial fisheries subsector. The rest of the catch for small pelagics is still landed by the municipal fisheries subsector. This subsector, therefore, still plays a significant role in the country's food security. Unfortunately, the Philippine nearshore fisheries are largely overfished. Hence, there is a pressing need to rationalize the fishing effort for this subsector.

4. Goal and objectives

The goal is to promote the sustainable utilization of municipal fishery resources. Specifically, it aims to rationalize the fishing effort to ensure that it is within the productive capacity of the fishery resources.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Review fisheries management approaches	The first activity is the review of fisheries management approaches that may be used to regulate fishing effort in municipal fisheries. Such study may include an appraisal of applicable indirect regulation (or input controls), such as boat and gear restrictions, and direct regulation (or output controls), such as fixing a level for total allowable catch.	- Fisheries management approaches to rationalize fishing effort

Key activities	Description/methodology	Key outputs
2. Conduct an inventory of municipal fishing subsector	This will involve a comprehensive survey or inventory of the existing conditions in the municipal fisheries subsector. Such survey will be initially undertaken in the priority 24 bays/gulfs.	- Database of important parameters, such as fishing effort, type of vessels, number of people engaged in municipal fishing, etc.
3. Conduct stock assessment and biological studies	The stock assessment and biological studies shall give emphasis to key target species and/or major fishing gears operating in the selected fishing grounds. Among others, catch rates, fishing effort and other relevant information on municipal fishing boats operating in the project areas will be monitored. The database output would provide better estimate of stock levels and may indicate strategies in managing the fish stocks.	- Stock assessment reports - Biological studies - Database for municipal capture fisheries
4. Conduct research for shift in fishing gear use	This research activity shall assess the feasibility for a shift in fishing gear use to catch small pelagics. For example, fishers may change their gear from simple hook and line to gill net. Currently, most municipal fishing gears are catching nearshore and reef fish. By changing their gears, municipal fishers may increase their catch.	- Research report
5. Regulate fishing effort	The fifth activity is the actual implementation of agreed management measures. Fishing effort in municipal fisheries will be regulated, particularly in overfished or degraded fishing grounds. Such regulations may take various forms, such as strict requirement of a fishing license and banning of certain types of fishing gear. Regulations may also take certain forms of temporal and spatial restrictions.	- Appropriate management measures instituted

Key activities	Description/methodology	Key outputs
6. Develop a system to determine sustainable municipal catch levels	This involves a synthesis or integration of information from various sources and across disciplines as well. Among others, studies in selected fishing grounds will map out fishing areas by gear. With this computerized database, a management system will be developed to determine an optimum level of effort that can be sustained biologically by the resource in a particular fishing ground.	<ul style="list-style-type: none"> - Database system for monitoring fishing effort - Reports on sustainable municipal catch levels
7. Undertake a support IEC program	IEC campaigns concerning the need to regulate municipal fishing effort at the sustainable levels will be conducted. Suitable IEC materials shall be developed and disseminated, including popular education materials.	<ul style="list-style-type: none"> - Enhanced level of awareness of municipal fishers

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Review fisheries management approaches																				
2. Conduct an inventory of municipal fishing subsector																				
3. Conduct stock assessment and biological studies																				
4. Conduct research for shift in fishing gear use																				
5. Regulate fishing effort																				
6. Develop a system to determine sustainable municipal catch levels																				
7. Undertake a support IEC program																				

7. Indicative budget : PhP 770.0 million

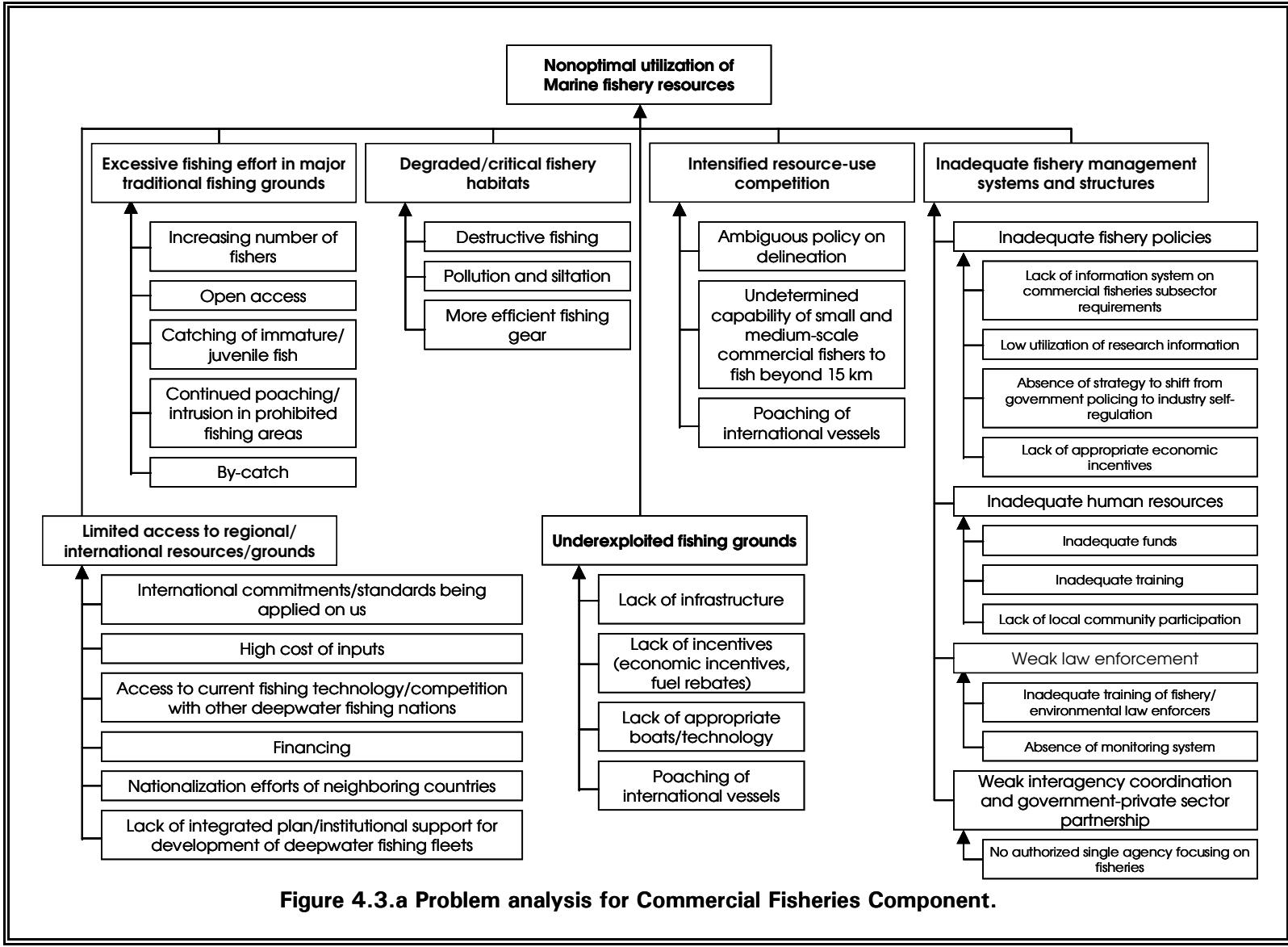
4.3 Commercial Fisheries Component

The core problem in the commercial fisheries subsector is the nonoptimal utilization of marine fishery resources beyond the 15-km limit (Figure 4.3.a). Six intricately related issues are associated with this core problem. First, there is limited access to regional/international fishery resources/grounds. In the past, the offshore areas of our neighboring nations were easily accessed; however, more restrictions are now being applied on the Philippines' fishing fleets. Among the other contributing factors are high cost of inputs (particularly fuel), limited access to modern fishing technology and lack of institutional support for development of deepwater fishing fleets. Second, the current level of effort is already excessive in major traditional fishing grounds. Internal factors that contribute to this include the increasing number of fishers, as well as the catching of small and juvenile fish. An external factor that exacerbates the situation is the intrusion of foreign fishing vessels. Third, critical fishery habitats are continuously being degraded. This is brought about by the use of highly efficient and/or destructive fishing techniques. There are also offsite factors that contribute to the degradation of critical fishery habitats, such as pollutants coming from inland sources. Fourth, while the overall level of effort is quite high, there are still a few underexploited fishing grounds. Examples are some hard-bottom portions of Palawan and Sulu Sea. This underexploitation is brought about by, among others, the lack of economic incentives, lack of appropriate vessels and lack of fishing technology. Fifth, there is an intensifying resource use competition. There is ambiguous policy on delineation of fishing areas; for example, some LGUs allow CFVs to fish within 10.1-15 km limit of their municipal waters. Since some small and medium-scale commercial fishers have limited capacity to fish beyond 15 km, they practically compete with the municipal fishers for the same fishery resources. The situation is exacerbated by the poaching of international vessels within the Philippines' internal waters. Sixth, from the institutional context, the inadequate fishery management systems and structures contribute to the nonoptimal marine fishery resources. Four problems in turn contribute to this key issue of inadequate fishery management systems and structures: inadequate fishery policies, inadequate human resources, weak law enforcement, and weak interagency coordination and government-private sector partnership.

The 10 priority projects described below address – singly or in tandem – the strategic issues given in Figure 4.3.a. Project 1 (Rationalization of Fishing Effort in Overfished Commercial Fishing Areas) addresses the issue of excessive fishing effort in major traditional fishing grounds. Project 2 (Development and Implementation of a Monitoring, Control and Surveillance [MCS] System for Commercial Fisheries) deals with the continued poaching/intrusion in prohibited fishing areas and the absence of monitoring system. Project 3 (Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gears and Practices) relates to the issue of degraded/critical fishery habitats. Project 4 (Exploratory Fishing

in the Exclusive Economic Zone [EEZ] and Beyond, and in Underexploited Commercial Fishing Grounds) addresses the concern for limited access to regional/international resources/grounds, as well as the issue of underexploited fishing grounds. Project 5 (Studies on the Biology and Culture of the Pacific Bluefin Tuna, *Thunnus orientalis*) addresses the issue of underexploited fishing grounds.

Project 6 (Establishment of Cold Storage with Blast Freezer Facilities) shall address the concern for lack of infrastructure facilities. Project 7 (Information, Education and Communication for Commercial Fishers/Fishing Vessel Operators) shall help resolve the issue of lack of information system on commercial fisheries subsector requirements. Project 8 (Rationalization of Fishing Vessel Designs and Fish Handling Systems) deals with the problem of lack of appropriate boats/technology. Project 9 (Implementation of the National Tuna Management Plan) relates both to the issue of excessive fishing effort and resource use competition. Project 10 (Legitimization and Implementation of the National Plan of Action [NPOA] to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated [IUU] Fishing) is an initiative to address weak law enforcement.

Figure 4.3.a. Problem analysis for Commercial Fisheries Component.**Figure 4.3.a Problem analysis for Commercial Fisheries Component.**

PROJECT 1 (CODE: CF-1)

1. Project title : Rationalization of Fishing Effort in Overfished Commercial Fishing Areas

2. Site/coverage

This project will initially be implemented in five major commercial fishing grounds situated in Northern Palawan Shelf (Calamianes Island Groups), Northern Jolo Shelf (Zamboanga-Sibuguey to Turtle Islands), Visayan Sea, Samar Sea and Tayabas Bay. Afterwards, other commercial fishing grounds will be covered. Focus shall be made on key species in each fishing ground, in particular, roundscad (*galunggong*) for Northern Palawan Shelf; sardine (*tamban*) for Northern Jolo Shelf; and sardinella (*tabagak*) for Visayan Sea. Other major species will be identified for stock assessment.

3. Rationale/background

The country's commercial marine fishery resources are biologically overfished, often severely, in traditional fishing areas (Armada 2004; Barut *et al.* 2004; Luna *et al.* 2004). Based on stock assessment studies by Silvestre and Pauly (1985) and Dalzell *et al.* (1987), the Philippine pelagic and demersal stocks have been overfished as early as 1984. Depletion of demersal stocks was observed in almost all trawlable areas of the country, starting with the important fishing grounds like Manila Bay, Lingayen Gulf and San Miguel Bay (BINU 2005). Barut *et al.* 2003 and Armada (2004) showed the overall trend of demersal stock decline in the Philippines, with the decline in stock density particularly pronounced in the 10-20 m and 20-50 m depth strata.

The decline in demersal stock, specifically the trawlable biomass, is supported by results of length-based assessment methods to estimate exploitation rates of common demersal species. Excessive fishing pressure has not only resulted in reduction of trawlable biomass; it has also altered the marine ecosystem such that catch composition has changed over the years (Armada 2004). Species composition changes that are reflective of growth, recruitment and ecosystem overfishing have occurred in many areas (Silvestre *et al.* 1986; Pauly *et al.* 1989; Cinco *et al.* 1995).

Barut *et al.* (2004) reiterated that an excessive fishing effort level is evident from the various countrywide and site-specific fisheries assessments conducted. Hence, there is a need to improve fisheries management in general, and to rationalize effort reduction in particular. Thus, this project is being proposed to ensure that the fishing effort is commensurate with the productive capacity of the commercial fishery resources or their utilization is within the biologically sustainable limits.

4. Goal and objectives

The goal of this project is to rationalize fishing effort in the commercial fisheries. The objectives are:

1. to develop a database/information management system for commercial fishing grounds to guide in determining economically and biologically sustainable catch levels;
2. to regulate fishing effort by presenting to fishing operators the advantages of a limited access regime over an open access regime;
3. to ensure the rational exploitation and sustainability of commercial fishery resources in the five priority fishing grounds;
4. to undertake stock assessment with participation of the private sector; and
5. to educate the private sector on the need to study the stocks and gear selectivity to ensure the survival of both the fishery stocks and the industry.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Review fisheries management approaches	A review of relevant fisheries management approaches and/or regulations relevant to commercial fisheries will be made. This study may include an appraisal of applicable indirect regulation (or input controls), such as boat and gear restrictions, and direct regulation (or output controls), such as fixing a level for total allowable catch. Demand-side controls that are largely associated with technology, market and consumer behavior shall likewise be explored. Among the concepts to be covered include quotas, MSY and total allowable catch.	- Comprehensive review of applicable commercial fishing regulations
2. Conduct an inventory of CFVs and commercial fishing gear	An inventory of CFVs in the five project sites and the different types of existing commercial fishing gear, including the number and deployment of FADs or <i>payaws</i> will be conducted. Key parameters to be collected would include number, type, tonnage of CFVs and accessory boats (such as skiffs, scout boats and light boat carriers); fishing fleet operations (such as fishing days, lighting time, settings and seasonality); and number of people engaged in commercial fishing.	- Inventory of CFVs and types of existing commercial fishing gear - Computerized database of relevant baseline data on commercial fisheries
3. Conduct stock assessment and biological	Stock assessment and biological studies on key target species of the fishing gears being operated in the selected fishing grounds/project areas will be undertaken. Catch rates, fishing effort and other relevant information on	- Commercial fisheries database that would indicate stock levels in

Key activities	Description/methodology	Key outputs
studies	commercial fishing fleets operating in the project areas will be monitored. The ensuing database may provide an indication of the stock levels that can be used in managing the stocks.	the fishing grounds
4. Conduct gear selectivity studies	Studies on gear selectivity will be undertaken to include major target species per fishing gear. By changing gear designs, gear selectivity will be re-oriented to select optimal sizes to be caught and allow juveniles to reach maturity. Hence, the fish stocks can be effectively conserved. Appropriate gear designs may likewise help maintain the integrity of the marine environment.	- Fish stocks conserved - Integrity of the marine environment maintained
5. Develop a management system to determine sustainable commercial catch levels	The results of the studies in each of the fishing grounds will be used to produce resource use maps that indicate the level of fishing effort in a particular location. Such computer-based or geographic information system (GIS) maps could easily be correlated with other relevant geographically referenced information. With these data, the management system to be developed may determine an optimum level of effort that will be sustained by the resources being harvested in a particular fishing ground.	- Management system to determine sustainable commercial catch levels
6. Regulate fishing effort	Commercial fishing effort will be regulated through various measures. One is through stricter implementation of a system of acquisition of fishing license. Another measure is through banning the use of certain types of commercial fishing gear.	- Rational use of commercial fishery resources
7. Conduct capability training and IEC campaign	Among others, the IEC campaign will be conducted to educate the private sector on the need to study the commercial stocks being exploited, to promote gear selectivity and to encourage fishing in EEZ and nontraditional fishing grounds. Capability training shall focus on regulatory measures – as mandated by RA 8550 – to reduce the negative impacts of fishing in the marine ecosystems. Appropriate training courses shall be developed for this purpose.	- Training courses - Enhanced awareness of stakeholders

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Review fisheries management approaches																				
2. Conduct an inventory of CFVs and commercial																				

7. Indicative budget : PhP 70.0 million

PROJECT 2 (CODE: CF-2)

1. Project title : **Development and Implementation of a Monitoring, Control and Surveillance (MCS) System for Commercial Fisheries**

2. Site/coverage : Strategic commercial fishing areas, including EEZ waters

3. Rationale/background

The development and implementation of an MCS system is vital for the survival of the commercial fisheries subsector. An MCS system may ensure that the offshore or deep-sea resources are properly conserved. Section 14 of RA 8550 stipulates that an MCS system shall be established to ensure that the fisheries and aquatic resources in the Philippine waters are “judiciously and wisely utilized and managed on a sustainable basis and conserved for the benefit and enjoyment exclusively of Filipino citizens.”

Commercial fisheries data, particularly on offshore fishing activities (e.g., species composition, fishing effort, discards, etc.), are still very limited. Fish aggregating devices (FADs) or *payaws* have proliferated. Such gears have reportedly caused resource-use conflicts, particularly concerning the rational allocation and harvest of *payaw*-related resources. Thus, there is a need for the establishment of management zone for fish shelters to avoid conflicts among resource users, as well as to protect the fishery resources. Moreover, the protection of Philippine fishery resources is rather lax that poaching by international fishing vessels has become a common occurrence. All these necessitate an MCS system specific to the country’s commercial fisheries.

The communication systems of most MCS systems are already available commercially. We can either go to vendors utilizing off-the-shelf systems based on Global Maritime Disaster Surveillance System - Emergency Positioning Indicating Beacons which are used by various fisheries, or we may opt to develop our own systems using global positioning system/global pocket radio system platforms. The challenge now is for BFAR to implement MCS in specific grounds. Another option is to use vessel traffic control radars with digital transponders. This system is also in use commercially, and the associated costs may be shared with the Philippine Coast Guard.

4. Goal and objectives

The goal of this project is to establish an MCS system specific to the commercial fisheries subsector. The objectives are:

1. to operationalize an MCS system for commercial fisheries;
2. to enhance the capability of implementors of MCS for the protection and conservation of Philippine marine resources;

3. to minimize poaching by foreign fishing vessels;
4. to establish effective conservation and management of fish shelter (*payaw*) in selected areas; and
5. to contribute to rational exploitation and sustainability of commercial fisheries resources.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct field visits and sectoral workshops	Field visits and stakeholder workshops will be conducted. These would result in the identification of potential MCS pilot sites, as well as in the development of the design of an MCS system specific for the commercial fisheries subsector.	<ul style="list-style-type: none"> - MCS pilot sites identified - Design of MCS system for commercial fisheries developed
2. Monitor state of commercial fishing grounds	Regular monitoring will be conducted to determine the state of selected commercial fishing grounds. This regular monitoring will be conducted through the use of computer-based technologies, such as remote sensing and aerial photography.	<ul style="list-style-type: none"> - GIS/remote sensing images of commercial fishing grounds
3. Develop effective licensing and monitoring mechanisms	A database system to monitor and control the activities of commercial fishing vessels and support fishing vessels will be worked out in detail. Such database system for CFV licensing and monitoring will be closely linked with licensing-related activities of Project 1 (Rationalization of Fishing Effort in Overfished Commercial Fishing Areas).	<ul style="list-style-type: none"> - Database system for CFV licensing and monitoring
4. Organize MCS for <i>payaw</i> management	An MCS specific for <i>payaw</i> management will be organized. Highly valuable fishes, such as various species of tuna, are caught using <i>payaw</i> . This activity involves conducting an inventory of gear owners and fishing operations in <i>payaws</i> . As needed, they shall be organized into a sort of "federation" to improve the management of <i>payaw</i> .	<ul style="list-style-type: none"> - MCS for <i>payaw</i> management organized
5. Delineate management zone for <i>payaw</i> operation	Delineation of management zone for fish shelter operation will be done in selected areas. Potential and existing <i>payaw</i> areas shall be prioritized for delineation, based on agreed criteria.	<ul style="list-style-type: none"> - Fish shelter management zone
6. Patrol commercial fishing areas	Regular patrol of project areas will be conducted to monitor the number of fishers, determine catch rates and other relevant information, check poaching of international vessels, and ensure the compliance of users with fishery regulations. Aside from obtaining	<ul style="list-style-type: none"> - Commercial fishing operations monitored - Poaching abated

Key activities	Description/methodology	Key outputs
	monitoring data for commercial fishing operations, poaching of foreign vessels will hopefully be abated by patrolling activities.	
7. Conduct relevant training and IEC courses	Relevant training courses and IEC campaigns will be conducted to enhance community participation in MCS for the protection and conservation of the country's marine resources.	<ul style="list-style-type: none"> - Training courses - Enhanced awareness among commercial fishery stakeholders

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct field visits and sectoral workshops																				
2. Monitor state of commercial fishing grounds																				
3. Develop effective licensing and monitoring mechanisms																				
4. Organize MCS for <i>payaw</i> management																				
5. Delineate management zone for <i>payaw</i> operation																				
6. Patrol commercial fishing areas																				
7. Conduct relevant training and IEC courses																				

7. Indicative budget : PhP 100.0 million

PROJECT 3 (CODE: CF-3)

1. Project title : Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gears and Practices

2. Site/coverage

Major commercial fishing areas of the Philippines such as, but not limited to, Visayan Sea, Ragay Gulf, Tayabas Bay, Sibuyan Sea, Samar Sea, Sulu Sea, Moro Gulf, Davao Gulf and Celebes Sea.

Major types of commercial fishing gear such as, but not limited to, purse seine (for tuna and small pelagics), ring net, bag net, gill net, Danish seine, beach seine and trawl.

3. Rationale/background

Great quantities of unwanted by-catch are being discarded at sea. Such by-catch results from some fishing operations which have a direct negative impact on the fishery resources, the environment and the availability of fish for consumption (FAO 1998). By-catch of nontarget species that were simply killed and discarded has contributed immensely to biodiversity loss and possibly to ecosystem changes (Ingles and Trono 2004). Affected animals include endangered species – e.g., sea turtles in shrimp trawl catches; marine mammals, such as the Irrawaddy dolphins in gillnet catches in Palawan’s Malampaya Sound (BINU 2005); finfish catches in shrimp trawls – and under-utilized species, such as jellyfish.

The volume of discards would be greatly reduced through the use of selective gear and environmentally friendly fishing practices. These fishing gears/methods would capture only those sizes and species targeted, ideally releasing all nontargeted species unharmed. In some parts of the world, efficient selective fishing gear and harvesting practices have been introduced successfully (FAO 1998). Locally, selective, environment-friendly and cost-effective fishing gear and harvesting practices could also be developed and promoted. Later on, these environment-friendly fishing gear and harvesting practices could be judiciously adopted by commercial fishers. These may lessen the direct negative impacts on commercial fishery resources and habitats. Likewise, environment-friendly fishing techniques will also minimize biodiversity loss.

4. Goal and objectives

The goal of this project is to promote environment-friendly fishing practices for the commercial fisheries subsector. The objectives are:

1. to develop selective, environment-friendly and cost-effective fishing

gear and harvesting practices;

2. to enhance adoption of selective fishing gear and harvesting practices by commercial fishers;
3. to contribute to the protection of commercial fishing grounds and fish species, and associated biodiversity; and
4. to help ensure the sustainable production of the commercial fish species.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct research technology verification and adaptation on fishing techniques	Research on technology verification and adaptation of fishing techniques and/or practices that have been proven effective in other countries will be conducted. As needed, modifications on the gear, equipment and practices would be instituted to reduce the incidental catch of nontarget and endangered species.	- Fishing gear/techniques proven effective in other countries verified for local adaptation
2. Conduct field experiments	Gear selectivity studies and field experiments will be conducted to develop selective, environment-friendly and cost-effective commercial fishing gear and methods that would efficiently size-select organisms and reduce the catch of juvenile fish and nontarget species. Among the activities to be carried out are covered-bunt and paired experiments. Studies on the types of commercial fishing gears being used in the project sites and their catches will also be done. Key parameters would include length and weight measurements of major target species ascertaining age distribution of catches.	- Selective, environment-friendly and cost-effective types of commercial fishing gears and techniques developed
3. Conduct capability training and IEC campaign	An IEC campaign shall be conducted to promote the adoption of environment-friendly fishing gear and harvesting practices among commercial fishers. For the adopted or newly developed gears, there will be training on gear selectivity while on board CFVs.	- Training courses - Extension services - Enhanced adoption of environment-friendly fishing gear and harvesting practices

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct research technology verification and adaptation on fishing techniques																				

7. Indicative budget : PhP 47.0 million

PROJECT 4 (CODE: CF-4)

1. Project title : **Exploratory Fishing in the Exclusive Economic Zone (EEZ) and Beyond, and in Underexploited Commercial Fishing Grounds**

2. Site/coverage : EEZ waters and beyond, and nontraditional fishing grounds.

3. Rationale/background

While overfishing in the commercial fisheries subsector has been documented in many publications, underexploitation of a few Philippine fishery resources has also been reported. This occurs in specific areas within the waters of EEZ and beyond. In many cases, foreign nationals, instead of Filipinos, are the ones exploiting the country's offshore fishery resources. Up until now, the country has not yet fully determined the existing or possible commercially valuable fishery resources in these areas.

Bernacsek (1996) indicated that some opportunities exist for increased harvesting of offshore fishery resources beyond the continental shelf in EEZ. These resources include tuna, other large pelagic and deepwater continental slope species. He estimated a potential annual yield of between 200,000 and 300,000 t from EEZ. Exploitation of underutilized fishery resources would thus contribute to the fishery sector's goal of food security and greater income, among others. The commercial fishing industry is given economic incentives by the government in the form of direct and indirect subsidies, tax breaks, and a rebate on fuel oil tax through the Department of Finance. These incentives are instituted to improve the capacity of commercial fishing operators to travel farther offshore, and likewise explore underdeveloped fisheries especially within the Philippine EEZ.

4. Goal and objectives

The goal of this project is to assess the economic potential of EEZ waters and beyond. The objectives are:

1. to determine the full biological and economic potential of existing fishery resources in EEZ and nontraditional commercial fishing grounds; and
2. to develop a scheme for exploiting underutilized fishery resources in commercial fishing grounds.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct exploratory fishing in EEZ waters and strategic nontraditional	Exploratory fishing in EEZ waters and strategic nontraditional fishing grounds will be intensified. Target areas may include, but not be limited to, the offshore hard bottoms around Palawan, southern Sulu Sea area and central part	- Economic viability of exploiting underutilized offshore commercial fishery resources

fishing grounds	of the Philippines' Pacific coast.	fully assessed
2. Monitor fishing activities in EEZ and underexploited fishing grounds	Fishing activities in EEZ and underexploited fishing grounds will be monitored to generate relevant baseline information.	- Baseline data on commercial fishing in EEZ and underexploited fishing grounds
3. Conduct biological studies on species of fish and other aquatic resources existing in the EEZ waters and beyond	Biological studies will be conducted to determine the species of fish and other aquatic resources existing in the EEZ waters and beyond. Key parameters that will be studied include reproductive biology, growth, migration, distribution, seasonality and abundance.	- Species composition - Relevant biological and ecological data on offshore fishery resources
4. Conduct training on safety of life at sea (SOLAS), navigation and relevant technology	Several training will be conducted to ensure safety of crews while conducting exploratory fishing activities. These include training on SOLAS, navigation and relevant technology. There will also be orientation seminars on HACCP.	- Trained commercial fishing crews - Enhanced awareness of stakeholders
5. Conduct IEC campaign	IEC campaign shall be conducted, if fishing would be financially viable, to encourage fishing in EEZ waters and beyond.	Rational exploitation of underutilized resources in EEZ waters and beyond

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct exploratory fishing in EEZ waters and strategic nontraditional fishing grounds																				
2. Monitor fishing activities in EEZ and underexploited fishing grounds																				
3. Conduct biological studies on species of fish and other aquatic resources existing in EEZ waters and beyond																				
4. Conduct training on SOLAS, navigation and relevant technology																				
5. Conduct IEC campaign																				

7. Indicative budget : PhP 85.0 million

PROJECT 5 (CODE: CF-5)

1. Project title : **Studies on the Biology and Culture of the Pacific Bluefin Tuna (*Thunnus orientalis*)**

2. Site/coverage : Northern and eastern Luzon waters (Cagayan, Isabela and Aurora Provinces), Davao Gulf and Palawan

3. Rationale/background

A recent survey conducted in northeast Luzon showed circumstantial evidence of the presence of juvenile Pacific bluefin tuna (1-6 kg in size) in the marine waters of Cagayan Province. The same species is also regularly captured by handline vessels and is being unloaded in Dingalan (Aurora Province). Lewis (2005), in his brief report on Pacific bluefin survey of northern Philippines, noted that "there is a reasonable expectation, based on anecdotal reports of landings of juvenile Pacific bluefin tuna (*Thunnus orientalis*) in northern and eastern Luzon (Ganaden *et al.*, pers. comm.), the proximity of this area to seasonal captures of spawning adult bluefin by Taiwanese longliners and the occurrence of larval bluefin tuna in adjacent waters, that quantities of juvenile Pacific bluefin tuna may regularly occur within northern Philippine waters." The spawning of Pacific bluefin occurs between Japan and the Philippines from April to June. This happens off southern Honshu in July and in the Sea of Japan in August.

The larvae, postlarvae and juveniles produced near the Philippines and south of Japan are usually transported northward by the Kuroshio Current toward Japan. Given variations in the prevailing currents, such may also be transported into the Philippine waters. Fish, in their first year of life (about 15-60 cm in length) are caught in the vicinity of Japan during the summer, fall and winter. Moreover, they appear also to occur to an unknown extent in northern Luzon. Such occurrences, if available in commercial quantity, could potentially support commercial cage culture of the species. This cage culture system has been successfully developed for the same or related bluefin species in countries like Australia, Mexico, Croatia, Spain and Morocco.

4. Goal and objectives

The goal of this project is to find other offshore species that could be utilized to contribute to the sustainability of the commercial fisheries subsector. The objectives are:

1. to establish additional knowledge on the biology and cage culture of the Pacific bluefin tuna; and
2. to pilot test the cage production of bluefin tuna for domestic market and possibly for export market as well.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct land-based and sea-going surveys	Land-based and sea-going surveys will be conducted to determine bluefin tuna occurrences in the Philippines. Target areas would include but not be limited to northern and eastern Luzon waters (Cagayan, Isabela and Aurora Provinces), Davao Gulf and Palawan. Possible location of growout cages will likewise be identified.	- Data on bluefin tuna occurrences - Pilot sites for growout cages identified
2. Conduct biological studies	Studies on the biology of the Pacific bluefin tuna will be conducted to determine more detailed information on the species. Key parameters would include taxonomic characteristics, size composition (by gear), spawning, seasonality and association with other tuna species.	- Baseline data on the biology and ecology of the Pacific bluefin tuna
3. Prepare growout cages, and stock cages with juvenile bluefin tuna	Growout cages will be set up in strategic culture sites. These will be ideally established in marine areas without typhoons or very strong currents. Juveniles of Pacific bluefin tuna will be stocked and reared in these cages.	- Growout cages established - Pilot cage culture of the Pacific bluefin tuna initiated
4. Monitor culture and management activities	Culture and management activities shall be monitored regularly. Several indicators will be developed and used for this purpose.	- Monitoring reports

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct land-based and sea-going surveys																				
2. Conduct biological studies																				
3. Prepare growout cages, and stock cages with juvenile bluefin tuna																				
4. Monitor culture and management activities																				

7. Indicative budget : PhP 40.0 million

PROJECT 6 (CODE: CF-6)

1. Project title : Establishment of Cold Storage with Blast Freezer Facilities

2. Site/coverage : Zamboanga City (west coast) and Dipolog City, and other strategic areas in the country.

3. Rationale/background

The establishment of cold storage facilities will address the perennial problem of unstable supply and corresponding fluctuation in prices of sardine (*tamban*) catches of the sardine fleets. Most of these fleets operate in the surrounding fishing grounds of Zamboanga City and Dipolog City. The sardine industry is seen to be more profitable and would thereby expand, if only there are cold storage facilities in these areas. There is an existing cold storage at the government-operated fishing port complex; however, it is located on the east coast of Zamboanga City. Geographically, this is quite far from the fleet's fishing grounds. The canneries are located on the west coast. Delivering the excess catch to the east coast cold storage entails additional operational expenses for the fishing fleet owners.

Fishing for sardines is seasonal, with a pronounced lean season coinciding with rough weather conditions from November to February. During peak seasons, the fleet production is more than what the sardine canneries in Zamboanga City can process and the bottled sardine processors in Dipolog City can handle. Hence, this results in excess catch and subsequent lowering of prices to unfavorable levels. There are instances when excess catches are discarded or left to rot, simply because there is no other market to sell the fish.

This project will greatly improve the quality of sardines being processed by the canneries and bottling processors, since the excess catch would immediately be delivered to the cold storage facilities. This will also stabilize the supply and prices of sardines to the benefit of the fishing, canning and bottling operators. Moreover, the project will facilitate storage of surplus catch of other fish species during peak seasons in other strategic areas of the country. Hence, aside from Zamboanga City and Dipolog City (both in Mindanao), four more strategic sites – two in the Visayas (e.g., Tacloban City) and two in Luzon (e.g., Dagupan City) – will be included as possible project sites. These would depend on the feasibility of constructing cold storage facilities in these areas.

4. Goal and objectives

The goal of this project is to stabilize the supply and prices of sardines and other commercially important fish species. The objectives are:

1. to have a ready destination for the excess catch of the sardine fleet operating off Zamboanga City and the sardine fishers in Dipolog City, including the excess catch of sardines and other commercially important species in other strategic areas of the country;
2. to improve the quality of canned and bottled sardines;
3. to minimize or eliminate wastage resulting from excess fish catches during peak fishing

seasons; and

4. to assure continuous supply of fresh and frozen marine products.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct a feasibility study for the project	A feasibility study will be conducted to determine the profitability and desirability of the project. Priority sites are Zamboanga City (west coast) and Dipolog City. Other strategic project areas are Tacloban City in the Visayas and Dagupan City in Luzon.	- Feasibility study for a cold storage with blast freezer - Facility sites identified
2. Identify appropriate project financing	Possible sources of funding will be identified. Appropriate financing schemes will be arranged with the prospective funding institutions.	- Potential project funding sources identified - Appropriate financing schemes/arrangements worked out
3. Construct the facility	Plans for the cold storage with blast freezer facilities will be prepared. Appropriate local construction permits will be secured. The facilities will be constructed on the sites identified in the feasibility study.	- New cold storage with blast freezer facilities constructed
4. Operate the cold storage facility	Working arrangements among entities for possible joint operation and maintenance of the facilities will be established. The Zamboanga and Dipolog facilities, as well as those to be constructed in other strategic areas of the country, will be in full operation under the management and administration of separate project managers. This project will be linked with Project 6 (Reduction of Fisheries Post-harvest Losses via "Cold Chain System") under the Post Harvest Component.	- New cold storage facilities fully operated and managed

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct a feasibility study for the project																				
2. Identify appropriate project financing																				
3. Construct the facility																				
4. Operate the cold storage facility																				

7. Indicative budget : PhP 810.0 million

PROJECT 7 (CODE: CF-7)

1. Project title : **Information, Education and Communication (IEC) for Commercial Fishers/Fishing Vessel Operators**

2. Site/coverage : Key fishing ports that are bases of commercial fishing vessels (Navotas, Zamboanga, Cadiz, Naga)

3. Rationale/background

A crucial problem in commercial fisheries management may be the open access mind-frame of commercial fishers/fishing operators. They may not fully realize that a completely unregulated open access fisheries results in economic losses and biologic wastage. Persuading fishers/fishing vessel operators that well-managed fisheries are their insurance to profitability and sustainability of the commercial fisheries industry will be the thrust of this project.

4. Goal and objectives

The goal of this project is to convince commercial fishers that both profitability and survival of their subsector lies in managed fisheries. The project objectives are:

1. to impart to commercial fishing operators the wisdom of managed fisheries;
2. to formulate an IEC program for commercial fishers/fishing vessel operators; and
3. to formulate and implement area management programs for specific fishing grounds with the participation of fishing operators.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Formulate the IEC program	<p>An IEC program will be designed to entice commercial fishers/fishing operators to shift from an open access mind-frame to a managed fishery. Key strategies will involve showing to them the benefits over the long term of managed commercial fisheries from the perspectives of socioeconomics (profits, employment) and biology (sustainability of fish stocks). The IEC program will use various media, including audio, print and video. The program components will include, among</p> <p>Others, orientation seminars on fisheries management, code of conduct for responsible fisheries, and related topics, such as SOLAS</p>	- IEC program developed

Key activities	Description/methodology	Key outputs
	and HACCP.	
2. Introduce the IEC program	The IEC program shall initially be introduced to commercial fishing aggregations in the provinces. Particularly, attention will be given to fishing aggregations in Zamboanga, General Santos and Davao. Fishing centers, such as Cadiz and Navotas, shall be addressed once a ground swell has been established in key areas.	- IEC program introduced
3. Formulate and implement area management programs	Area management programs for specific fishing grounds shall be formulated. These will be implemented with the participation of the fishing operators on a gear-specific program basis.	- Area management programs formulated and implemented
4. Establish MPAs	As part of IEC, MPAs may be established in strategic fishing grounds, provided commercial fishing operators are empowered to be part of the fishing ground management team. These MPAs will be linked with Project 2 (Enhancement of Locally Managed Marine Areas) under the Municipal Fisheries Component. In this way, a network of MPAs covering municipal and commercial fishing grounds will be formed.	- MPAs established

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Formulate the IEC program																				
2. Introduce the IEC program																				
3. Formulate and implement area management programs																				
4. Establish MPAs																				

7. Indicative budget : PhP 40.0 million

PROJECT 8 (CODE: CF-8)

1. Project title : Rationalization of Fishing Vessel Designs and Fish Handling Systems

2. Site/coverage : National

3. Rationale/background

The commercial fisheries subsector is plagued by inefficiencies in vessel design. Majority of CFVs are second-hand Japanese vessels, which were not designed for use in Philippine waters. As a result, most of the load capacities are underutilized and very likely overpowered. Fishing vessel designs have to be rationalized so that there is a single hull design to be adopted by various fishing operators, allowing also economies of scale in vessel building.

Moreover, fuel cost comprises a significant portion of the total cost of fishing operations. The price of fossil fuel has been increasing. Hence, there is a need for studies on fuel efficiency of fishing vessels, as well as on alternative sources of fuel for CFVs. Another major area for consideration is fish handling. The *banyera* (large basin) system has to be rationalized also to improve both load factors and reduce spoilage attributable to the use of *banyera*.

4. Goal and objectives

The goal of this project is to rationalize fishing vessel designs and fish handling systems. The objectives are:

1. to improve the design of CFVs;
2. to improve the fuel efficiency of fishing vessels and/or look for alternative sources of fuel; and
3. to improve the efficiency of fish handling systems.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Conduct studies on fish handling systems	Studies on fish handling systems will be conducted to improve load factors and to reduce spoilage. This will be linked with Project 2 (Development of National Quality Standards for Fish and Fishery Products) of the Post Harvest Component.	- Improved fish handling system
2. Conduct studies on hull designs	Studies on hull designs of commercial fishing vessels will be undertaken. These will include vessel hull modeling and tank studies.	- Vessel hull modeling system
3. Conduct prototyping and industrial	Prototyping and industrial trials will be done. The participation of commercial fishing operators will be elicited in this endeavor.	- Vessel prototypes

Key activities	Description/methodology	Key outputs
trials		
4. Conduct studies on fuel efficiency of fishing vessels and alternative sources of fuel	Studies on fuel efficiency of fishing vessels will be conducted. The key activity will also include studies on alternative sources of fuel – such as biofuel and coco oil – for commercial fishing operations.	- Fuel-efficient vessels - Alternative sources of fuel
5. Conduct IEC campaign	An IEC campaign will be conducted to encourage the various fishing operators to adopt the improved vessel design and fish handling systems.	- Extension services conducted - Enhanced awareness of stakeholders

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Conduct studies on fish handling systems																				
2. Conduct studies on hull designs																				
3. Conduct prototyping and industrial trials																				
4. Conduct studies on fuel efficiency of fishing vessels and alternative sources of fuel																				
5. Conduct IEC campaign																				

7. Indicative budget : PhP 50.0 million

PROJECT 9 (CODE: CF-9)

1. Project title : Implementation of the National Tuna Management Plan

2. Site/coverage : National

3. Rationale/background

The Philippine waters are among the most productive in the Western and Central Pacific Ocean (WCPO). Monsoonal current reversals, coastal upwelling and terrestrial inputs all contribute to this high marine productivity. Moreover, the successful development of purse seine fishing – in conjunction with the use of anchored FAD or fish shelter, locally called *payaw* – has greatly contributed to the Philippine waters having been a major tuna producer in the WCPO since the early 1970s. In recent years, over 200,000 t of tuna have been attributed to the domestic fisheries of the Philippines. Such volume comprises more than 10% of the WCPO tuna catch and over 20% of the yellowfin tuna catch in the region.

The National Tuna Management Plan is a framework of government regulatory measures that will provide proper management of the tuna fishery for three major species occurring in Philippine waters, namely: skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*) and bigeye tuna (*T. obesus*). It will also provide protective measures for bluefin tuna (*Thunnus thynnus orientalis*) and albacore tuna (*T. alalunga*) which are not common species in the Philippine waters.

The management measures have been drafted in consonance with the provisions of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean and the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks. The Philippines is a signatory to these international agreements. Moreover, the management plan has also considered the obligations of the Philippines under its membership in the Indian Ocean Tuna Commission and the International Commission for the Conservation of Atlantic Tunas. Considering the vital importance of the Philippine tuna fishery and the country's commitment to international agreements and other instruments, there is thus an urgent need to implement the National Tuna Management Plan.

4. Goal and objectives

The goal of this project is to ensure a sustainable supply of healthy tuna resources within Philippine waters and in the adjoining seas. The objectives are:

1. to maintain tuna catches at a sustainable level by adopting management measures including the setting of total allowable catch (TAC) within Philippine waters for each of the three major tuna species based on best available information;
2. to match fishing effort to TAC by limiting fishing capacity;
3. to assure equitable use of the tuna resources by apportioning allowable catch to specific user groups;
4. to ensure meaningful scientific information by acquiring timely and

accurate data on parameters such as catch, fishing effort and biology; and

5. to eliminate illegal, unreported and unregulated fishing on tuna stocks through a rational MCS system.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Update and review the plan	The plan shall be updated, as required, in the light of changing circumstances or new developments in the industry. Given the annual variation in tuna resources resulting from natural causes and fishing mortality, it is important that the management measures contained in the plan remain pertinent and meaningful. Thus, DA, through BFAR, shall conduct an annual review and, if necessary, amend or revise the management measures. Particular attention shall be given to TAC for the tuna species using the best available scientific evidence.	- National Tuna Management Plan reviewed and updated
2. Promulgate implementing rules and regulations	Implementing rules and regulations pertaining to the management plan will be promulgated or put into operation.	- Relevant Fisheries Administrative Orders formulated and promulgated
3. Revise the Fisheries Code	The BFAR, as the administrator of the National Tuna Management Plan, shall seek revisions of the Fisheries Code. The code was enacted into a national law way back in 1988 and some revisions may be necessary to support tuna management measures.	- Revised Fisheries Code (particularly the provisions related to tuna management)
4. Monitor and control commercial tuna fishing activities	The primary tool for monitoring licensed commercial tuna fishing activities will be the daily record of fish catch and landings. Each CFV for tuna must fill out a monthly fishing and catch log (to be provided by and submitted to BFAR). The information from the catch logs will be used by BFAR to determine TACs and allocations. In addition, port sampling will be undertaken by BFAR to crosscheck the record of fish catch and landings, and to gather biological information on landed tuna. The major controls on the tuna fishery will be exerted through limiting the number of fishing licenses and fleet hold capacity.	- Data on tuna catch and landings (for determining TACs and allocations) - Policy issuances on tuna fishery
5. Conduct surveillance of domestic and	The primary tools for surveillance will be an automatic locator system (ALS) for all licensed CFVs over 18 m in length, and a satellite-	- ALS and SRS information monitored

Key activities	Description/methodology	Key outputs
foreign CFVs	<p>based radar system (SRS) to depict all vessels fishing in the Philippine EEZ. The ALS will apply to both domestic fishing vessels and foreign vessels that transship tuna in Philippine ports. Surveillance of domestic fishing vessels will be conducted to ensure that CFVs are fishing outside of municipal waters, and that CFVs fishing outside of the Philippine waters are licensed to do so. Foreign vessels transshipping in Philippine ports will be required to have an ALS to ensure that they are not fishing in Philippine waters. The SRS will be used in conjunction with ALS to identify CFVs fishing without license and ALS. BFAR will establish a Fisheries Surveillance Control Center which will monitor ALS and SRS information. The Control Center will identify possible violators, and communicate with and direct to BFAR's Fishery Patrol vessels and units of cooperating military and/or enforcement agencies in inspecting CFVs and apprehending violators.</p>	<ul style="list-style-type: none"> - Fishing policies and regulations enforced
6. Carry out enforcement of fishery laws and regulations	<p>BFAR will coordinate the enforcement of pertinent laws and regulations, as well as the prosecution of offenders. The enforcement of fisheries laws and regulations shall be carried out by law enforcement officers of DA-BFAR, Philippine Navy, Philippine Coast Guard and PNP-Maritime Group. Prosecution of offenders will be the responsibility of the Department of Justice.</p>	<ul style="list-style-type: none"> - Enforcement of pertinent laws and regulations coordinated and carried out
7. Conduct relevant research	<p>Research requirements will be determined, and such research programs shall be undertaken as are necessary to provide a sound scientific basis for TACs and catch allocations. The National Stock Assessment Project will be continued to generate accurate tuna catch, effort and biological data. Information on tuna landings, species and size composition will be collected at General Santos and other major tuna landing localities. Stock assessments used in the National Tuna Management Plan have been drawn from regional sources, or extrapolated from existing information on Philippine tuna catches, sea area and estimated productivity. Detailed statistics on tuna CFVs, their numbers, sizes and gear specifications will be gathered from CFV licenses and actual investigation and monitoring. MSY and TAC for the tuna species within the territorial waters and EEZ will be</p>	<ul style="list-style-type: none"> - Tuna database (that would indicate stock levels and determine strategies in managing tuna stocks), including comprehensive statistics on tuna fishing vessels - Estimates of MSY and TAC for tuna species - Fishery management, measured

Key activities	Description/methodology	Key outputs
	<p>determined using the best available scientific evidence.</p> <p>Several alternative assessment approaches have been adopted in developing an initial or provisional MSY and TAC for Philippine waters, two of these are based on generalizations from existing regional MULTIFLAN-CL stock assessment model, outputs from the Philippine Tuna Research Program tagging study carried out in 1992 and a simple comparative area productivity approach. A review of TAC and MSY approaches as tools for tuna fishery management shall be made. The review shall include related fisheries regulations such as, but not limited to, regulations on fish shelter or <i>payaw</i>, fishing boundaries, minimum fish size, fishing gear limitations and fishing vessel monitoring.</p>	pertaining to MSY and TAC reviewed
8. Conduct relevant trainings and IEC campaign	Relevant trainings to improve management of tuna fisheries will be undertaken. An IEC campaign will be conducted to enhance policy compliance.	<ul style="list-style-type: none"> - Training courses - Enhanced awareness of stakeholders

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Update and review the plan																				
2. Promulgate implementing rules and regulations																				
3. Revise the Fisheries Code																				
4. Monitor and control commercial tuna fishing activities																				
5. Conduct surveillance of domestic and foreign CFVs																				
6. Carry out enforcement of fishery laws and regulations																				
7. Conduct relevant research																				
8. Conduct relevant trainings and IEC campaign																				

7. Indicative budget : PhP 250.0 million

PROJECT 10 (CODE: CF-10)

1. Project title : Legitimization and Implementation of the National Plan of Action (NPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing

2. Site/coverage : National

3. Rationale/background

The NPOA to prevent, deter and eliminate IUU fishing (NPOA-IUU) was developed in response to the challenges posed by the International Plan of Action to prevent, deter and eliminate IUU fishing (IPOA-IUU). The IPOA-IUU was developed within the framework of FAO's Code of Conduct for Responsible Fisheries (CCRF). It was adopted by the Committee on Fisheries of FAO in 2001.

IUU fishing in the Philippines is known to be widespread, though not quantified in terms of yield. The most common forms of IUU fishing in the country are poaching, cyanide fishing, blast fishing and the use of fine-meshed nets. Losses from poaching alone have been estimated to reach PhP 37 million annually (Aguilos 1998). This is not to mention the resulting environmental degradation and ecological imbalance brought about by IUU fishing activities.

IUU fishing is counter to the sustainability focus of the Fisheries Code. While the Fisheries Code seeks to achieve food security, IUU fishing diminishes fish stocks and destroys fish sanctuaries and marine habitats. Moreover, while the Fisheries Code seeks for rational and sustainable development, conservation and management of the country's fishery and aquatic resources, IUU fishing leads to overexploitation and depletion of resources. Hence, there is an urgent need to legitimize and implement NPOA-IUU. The NPOA-IUU points out areas that can be improved in the systems and mechanisms in the Philippine fisheries sector to reinforce the effectiveness of the Fisheries Code.

4. Goal and objectives

The goal of this project is to prevent, deter and eliminate IUU fishing. The objectives are:

1. to reinforce the effectivity of the Fisheries Code in addressing relevant sustainability issues;
2. to implement the voluntary prescriptions in FAO's CCRF and its associated International Plans of Actions; and
3. to ensure that no fishers support or engage in IUU fishing.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Legitimize NPOA-IUU and formulate NPOA-Capacity	<p>The Philippines is duty-bound to implement the prescriptions in CCRF. It has drafted a NPOA-IUU which shall be legitimized via an appropriate policy instrument by government. With the alarming trend in capture fisheries where annual catches have declined despite the continuously increasing intensity of fishing, a national plan of action to manage fishing capacity (NPOA-Capacity) will also be developed/formulated. This is a priority in the policy agenda as a follow-through to the one-year moratorium imposed in 2004 in the issuance of authorization to fish for new entrants in commercial fisheries.</p>	<ul style="list-style-type: none"> - NPOA-IUU - NPOA-Capacity
2. Review the Fisheries Code and relevant laws	<p>The Fisheries Code, which provides the main legal arsenal for fisheries management and prevention of IUU fishing, will be reviewed to ensure that fisheries policies and guidelines remain responsive to changing situations. The bareboat charter policies (in PD 866/1711) will also be reviewed to ascertain whether chartered foreign fishing vessels have previous history of IUU fishing and have in fact been engaged in IUU fishing in Philippine waters and in the high seas. BFAR and MARINA will maintain a list of chartered foreign fishing vessels under Philippine flag to monitor their fishing operations. Regulations will be put in place that will provide for the revocation of charter/lease contracts and de-registration of chartered vessels which are found to be engaged in IUU fishing.</p>	<ul style="list-style-type: none"> - Fisheries Code and relevant laws reviewed (in particular provisions related to prevention of IUU fishing)
3. Enforce terms and conditions in CFV license	<p>The terms and conditions stipulated in CFV license issued (e.g., submission of logbook sheets where information on fishing operations and fish catch is required to be entered, possession of valid Certificate of Clearance before departure to fishing ground) will be strictly enforced to ensure that fishers/fishing vessel operators do not engage in IUU fishing. Records of corporations and entities which fishing vessels have been issued CFV licenses will be scrutinized in order to determine the nationality of owners. If found to be foreigners, BFAR will ensure they will remain as such and will not actively engage in fishing in Philippine waters.</p> <p>For effective control over fishing vessels carrying Philippine flag, the fishing vessel</p>	<ul style="list-style-type: none"> - Licensing system enforced - Fishing vessel registration system regularly reviewed and enforced

Key activities	Description/methodology	Key outputs
	registration system will be regularly reviewed to make necessary adjustments that will address the problem of IUU fishing. Marking of fishing vessels, zoning of fishing grounds and limiting the number of licenses to be issued based on sustainable levels of fishing effort, will be pursued.	
4. Engage in interagency dialogue and joint undertakings	Interagency dialogue and joint undertakings will continue among agencies that forged a Memorandum of Agreement in 2004 to manage fishing capacity; eliminate, prevent and deter IUU fishing; and track changes in vessel ownership and/or annotate pending criminal and administrative cases involving CFVs in the fishing vessel record to ensure that access to the country's marine wealth is enjoyed only by Filipino citizens who fully and consistently comply with fishery and other related laws, rules and regulations. These agencies included BFAR, MARINA, PCG and the National Telecommunications Commission.	- Interagency interactions and collaborative activities
5. Institutionalize joint commitments	The MOA among BFAR, MARINA, PCG and the National Telecommunications Commission will expire in five years (2009). Hence, efforts will be made, as part of NPOA-IUU, to institutionalize the joint commitments at the policy level. This may either take the form of an Executive Order from the President of the Philippines, or appropriate legal instruments of the concerned agencies.	- Policy instrument institutionalized
6. Coordinate, consult and share information	An important element in successful implementation will be close and effective coordination and consultation, as well as the sharing of information to reduce incidence of IUU fishing. The Philippines is duty-bound to pass on any information received on vessels operating without proper documentation to neighboring States and relevant regional fisheries management organizations. It will encourage collaboration of appropriate national fisheries institutions with FAO and other relevant organizations in the establishment of a network of databases (e.g., genetic and other	- Network to support the implementation of NPOA-IUU
	markers for use in identifying fish species from samples of processed products, including the ability to identify the stock origin of source materials where feasible) to enhance efforts in research areas which will facilitate the elimination of IUU fishing. The full participation	

Key activities	Description/methodology	Key outputs
	of stakeholders in combating IUU fishing, including the industry, fishing communities and NGOs, shall also be encouraged. A Philippine MCS network will be organized that will annually identify targets and synchronize policies and enforcement efforts, share resources and information, and establish an integrated MCS plan to prevent and eliminate IUU fishing.	
7. Undertake trainings and IEC campaigns	Related trainings will be undertaken to upgrade the capabilities of the concerned agencies in the implementation of NPOA-IUU. One crucial training will be on boarding and inspection for individuals and organizations involved in port control. IEC campaigns will be undertaken to ensure that the public is aware of the detrimental effects of IUU fishing and that it supports the consistent and effective implementation of trade-related measures. To curb IUU fishing, BFAR will actively engage the Leagues of Municipalities and of Cities in dialogues. IEC campaigns will be undertaken, including the drafting of a model ordinance to facilitate legislation of requisite ordinances by the local legislative bodies. The Philippines will publicize apprehensions and actions on cases of IUU fishing within its area of jurisdiction, using the trimedia approach (broadcast, print and electronic media). The various government agencies and NGOs engaged in fisheries management and enforcement have their respective websites and publications, in addition to occasional fora through which matters relevant to IUU fishing are discussed and presented. With the support of FAO and relevant international financial institutions and mechanisms, collaboration with other developing countries in the areas of training, information exchange and capacity-building, will be pursued.	<ul style="list-style-type: none"> - Capability upgraded - Enhanced awareness - Draft of a model ordinance - Publications - Technical and scientific fora

6. Schedule of activities

Key activities	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Formulate NPOA-Capacity																				
2. Review the Fisheries Code and relevant laws																				

3. Enforce terms and conditions in CFV license																			
4. Engage in interagency dialogue and joint undertakings																			
5. Institutionalize joint commitments																			
6. Coordinate, consult and share information																			
7. Undertake trainings and IEC campaigns																			

7. Indicative budget : PhP 50.0 million

4.4 Aquaculture Component

The aquaculture subsector has not yet realized its full potential in terms of contribution to national growth and development. This is brought about by four key, intricately linked issues which continue to plague the industry (Figure 4.4.a). First, its low contribution to the Philippine economy is related to a number of causes. Without an agreed strategic direction, the aquaculture subsector's contribution to the economy can be quite limited as there is lack of continuity of government programs and inadequate RD&E programs. The price of aquaculture products in local markets remains low. The industry is beset with unfavorable external market forces (price fluctuations). Critical concerns include the seasonal oversupply of fish, undeveloped domestic market which is limited to fresh fish, and untapped export markets. Second, poverty has remained a pervasive issue. There is a lack of opportunities for coastal fisherfolks, owing largely to their limited financial capability and limited livelihood-related skills. Although the existing aquaculture industry is thriving, it is characterized by underproductivity. Constraining factors include the limited use of genetically superior strain and prevalence of pests and diseases on cultured species. The mariculture activities remain undeveloped due to inadequate investments/incentives and to limited development funds of LGUs.

Third, environmental degradation is a critical concern. Unsustainable aquaculture practices have put undue stress to the natural environment. The encroachment of fishponds into mangrove buffer zones, for instance, has resulted in the loss of nursery grounds for fisheries and has also altered coastlines. In addition, quality standards and farm-based HACCP have not been at par with international/regional standards. Fourth, with regard to natural resource base, there is the issue of resource depletion. The reliance on wild seed stock, limited species varieties and high cost of fry has resulted in depletion of wild/natural stock over time. This depletion problem, in turn, is associated with the lack of hatchery technology, as well as limited funds/investment for hatchery and broodstock development. Previous efforts of subsector participants and government agencies to strengthen the aquaculture industry in the Philippines have fallen short of attaining tangible and lasting benefits to the quality of life of the people and to the environment.

The eight aquaculture subsector projects being proposed offer a more integrated approach to address the issues mentioned above. Project 1 (Development of a Focused, United and Strategic Vision and Road Map for the Industry) addresses the first issue of the industry's lack of strategic direction and aims to create a more focused aquaculture industry. Project 2 (Enhancement of Research, Development and Extension [RD&E] Programs and Prioritization based on Immediate Needs of Industry) will respond to the issue of inadequate programs on RD&E and aims to promote investment in research from other sectors. Project 3 (Promotion of Investments in the Hatchery Industry) will deal with the issue of limited species variety and reliance on

wild seed stock by strengthening the hatchery industry. Project 4 (Development of Domestic Supply Chain and Expansion of Export Markets) is a response to the concern on low prices of aquaculture products by improving the distribution and marketing of fish products. Project 5 (Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points [HACCP]) will address the unsustainable aquaculture practices and aims to reduce environmental degradation and improve quality of aquaculture products. Project 6 (Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains) is an attempt to provide a solution to the problem of underproductivity through improved growth of cultured stock and tolerance to diseases. Project 7 (Increasing Export Competitiveness through Special Economic Zones [SEZ]) addresses the undeveloped mariculture practices by establishing special economic zones in the mariculture of species of high market potential. Project 8 (Promotion of Aquaculture as Livelihood for Fishers and Smallholders) is a response to the issue on lack of opportunities for fisherfolks and aims to uplift the socioeconomic status of fishers by reducing their dependence on fish capture through promotion and adoption of low-input aquaculture/mariculture activities.

Implementation of these projects through genuine partnerships among the sector stakeholders will catapult the aquaculture industry into realizing its full potential. As such, the following crucial goals will hopefully be achieved: (1) poverty alleviation through promotion and support of small-scale aquaculture of priority species such as oyster, mussel, seaweed, ornamental fish and high-value marine species; (2) reduced resource depletion and environment degradation through zonation and establishment of mariculture parks, institutionalization of BAP and rationalization of the use of inland waters for aquaculture; and (3) increased economic contribution to the national economy through export market expansion, commercialization of research results, use of superior aquaculture strains and species, and private sector investment in aquaculture.

Figure 4.4.a. Problem analysis for Aquaculture Component.

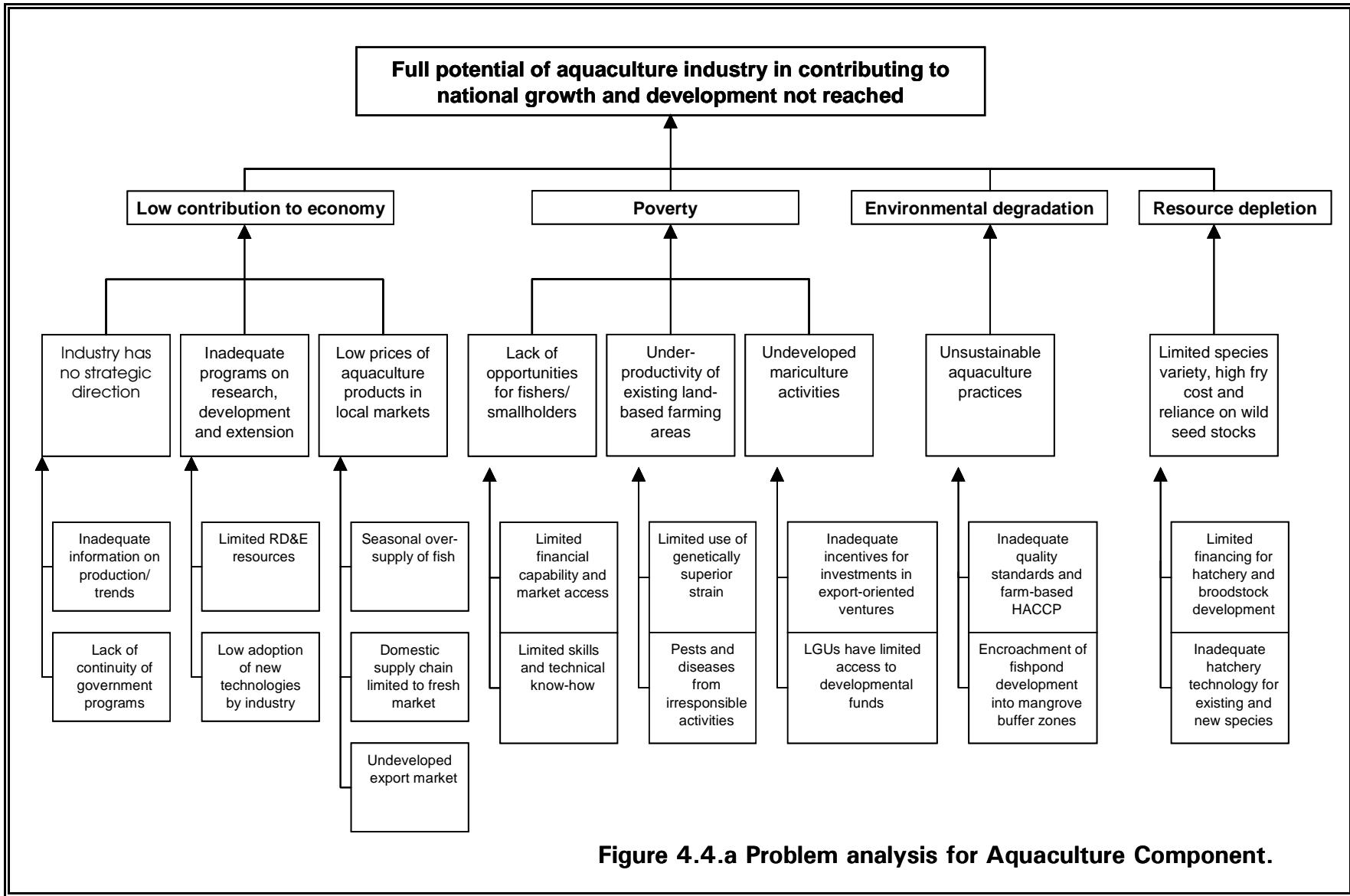


Figure 4.4.a Problem analysis for Aquaculture Component.

PROJECT 1 (CODE: AQ-1)

1. Project title : Development of a Focused, United and Strategic Vision and Road Map for the Industry

2. Site/coverage : National

3. Rationale/background

The Philippine's aquaculture industry is fragmented, characterized by stakeholder groups that are not well organized and with no strategic direction. Industry associations, in general, lack the capability to objectively analyze their needs and priorities, and clearly articulate their vision, mission and strategies. Further, there is no common platform to promote the common interest of the various sectors involved. Other issues that need to be addressed include: (1) lack of understanding of the dynamics of the aquaculture subsector; and (2) lack of continuity of programs due to changes in administration. Thus, there is a need to promote aquaculture and to develop markets through effective industry programs, policies and regulations.

Goal and objectives

The goal of this project is to create a stronger and more focused aquaculture industry towards the realization of a common national agenda. The project's objectives are:

1. to strengthen the industry support organizations towards the realization of focused and strategic programs with the government;
2. to adopt a common national agenda and rationalize government policy support; and
3. to promote industry development through private sector initiatives, with strong support from the government.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Undertake capacity-building programs	<p>Industry support organizations will be provided with the proper tools in assessing industry needs and market realities including: needs analysis, trainings/workshops, monitoring for gaps, assessment of strength and effectiveness of networks and partnerships, continuous upgrading of capabilities, regular conduct of scoping</p> <p>Exercises with stakeholders, realignment of directions/priorities and improvement of road maps.</p>	<p>- Relevant capacity programs identified and implemented</p>

Key activities	Description/methodology	Expected outputs
	The Development Academy of the Philippines (DAP) and the UP Aquaculture Society, Inc. (UP AQUASOC) will identify key industry support organizations based on their projects. Moreover, DAP will provide the necessary capacity-building programs while AQUASOC will assist DAP in customization and implementation of training modules. DA-BFAR, DTI, DOST, SEAFDEC and DENR shall collaborate with the industry on extension support: DTI on marketing, DOST and SEAFDEC on technology, and DENR on sustainability issues.	
2. Support the establishment of "umbrella" organizations	Industry support organizations will be strengthened through the conduct of sectoral meetings, review of possible federation composition and making of adjustments as needed. The federation shall be established to represent the interests of the industry and provide appropriate government recognition and support. It shall work with ad hoc committees from DA-BFAR, DTI, DOST, SEAFDEC and DENR to come up with specific recommendations and actions.	- Functional aquaculture federation
3. Solicit support to existing road maps	Concerned government agencies including DA-BFAR, DTI, DOST, SEAFDEC and DENR shall review existing commodity road maps and provide support for the commercialization of prioritized commodities.	- Aquaculture commodities commercialized
4. Review existing programs, policies and regulations	Continuous monitoring and periodic evaluation of plans, policies and regulations as to how effectively they address industry needs will be conducted.	- Recommendations on updating policies and regulations

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Undertake capacity-building programs																				

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2. Support the establishment of "umbrella" organizations																				
3. Solicit support to existing road maps																				
4. Review existing programs, policies and regulations																				

7. Indicative budget : PhP 42.5 million

PROJECT 2 (CODE: AQ-2)

1. Project title : Enhancement of Research, Development and Extension (RD&E) Programs and Prioritization based on Immediate Needs of Industry

2. Site/coverage : National

3. Rationale/background

Over the decades, the Philippines has developed a critical mass in fisheries RD&E. To date, however, there are still gaps in integrating the scientific and commercial values of some research findings. Most of the efforts had the objective of developing technologies and were directed towards food production, generation of employment, provision of social services and earning foreign exchange. The Medium-term Philippine Development Plan (2004-2010) clearly states that systemic failures arise from lack of coherence among the networks of institutions, resources, interactions and relationships, political mechanisms and instruments, as well as scientific and technological activities that define, promote, articulate and encourage technological innovation and diffusion process. Included here are the generation, importation, adaptation and dissemination of technologies.

Research orientation in certain cases has been quite strong that some institutions have become isolated centers of excellence. As such, these institutions focused their major undertakings only to research, and to a limited extent up to generation of technologies. In a number of cases, RD&E has failed to address critical issues related to technology generation. Lack of funding and appreciation of its full potential – particularly commercial application to benefit relevant stakeholders – may have contributed to this state of the industry.

Certainly, RD&E in aquaculture are essential to cope with the increasing challenges in fish farming. Investing on RD&E is therefore a matter of necessity for the industry to achieve global competitiveness. There is the need for the private sector to enhance its RD&E capabilities and to reduce its reliance on the government. In Thailand, the sheer size of Charoen Pokphand's business operations has made it the industry's *de facto* private sector leader in the provision of RD&E services. With no such equivalent entity in the Philippines, it is recommended that the industry should form a research consortium supported by the government, that will: (1) coordinate private sector efforts on R&D; (2) collaborate with national and international research institutions on the conduct of priority R&D needs; (3) assist government research institutions in rationalizing its RD&E activities for the industry; (4) be the industry's lead entity in the development of BAP; and (5) raise funds from private sector, international community and national government to support the research needs of the industry as a whole.

There is a need to encourage private sector and other stakeholders to fund certain research areas related and essential to farming of relevant species. The significant areas of investments would be in aquaculture biotechnology, breeding programs and development of feeds consisting of cheaper (indigenous) raw materials. Nontraditional sources of funds (such as public investment) in biotechnology research should be tapped for the subsector. Given the

reality of diminishing catch from the seas, research has focused on developing technologies that will increase farm production and on identifying cultivable and high-yield species. Species with high-export value, such as shrimps, command the most attention in research and extension efforts. Meanwhile, issues like property rights, environmental degradation and the role of women and children have contributed to the refocusing of aquaculture research. Government and other institutions working towards aquaculture development should put forward their long-term R&D thrusts and directions to ensure the continuity of relevant research undertakings.

4. Goal and objectives

The goal of this project is to focus the government RD&E programs on improving productivity and competitiveness and promoting investment on research from the private sector. The project's objectives are:

1. to identify the immediate needs of the industry and correspondingly direct RD&E activities in line with such needs; and
2. to tap the private sector and other nontraditional sources of funds for RD&E endeavors.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Establish a private sector and government research consortium	<p>An aquaculture research consortium will be organized to attend to priority RD&E needs of the aquaculture sector. Part of its mandate is to present relevant strategies based on the government's science and technology programs with the private sector.</p> <p>Workshops/consultations participated in by key government research institutions and industry support groups will be conducted to: (1) evaluate/validate the effectiveness of RD&E programs in relation to the industry's needs; (2) assess impacts and extent of adoption of new technologies; and (3) monitor activities in terms of increase in the number of technologies packaged (commercialized). Technologies will be validated through the conduct of trials with fish farmers.</p>	<ul style="list-style-type: none"> - Functional research consortium established - RD&E programs - Research technologies adopted by the industry

Key activities	Description/methodology	Expected outputs
2. Provide appropriate government funding support to the research consortium	Budgets will be provided and reviewed regularly for their sufficiency in relation to the programmed research activities. Investment climate, including mobilization of funds from the private sector, will be monitored and assessed.	- Sustained financing of prioritized research
3. Develop and implement fiscal incentives for private sector investments on R&D	DA-BFAR, BOI and DTI will work towards the provision of fiscal incentives for private sector investments on R&D.	- Incentives provided - Private sector engaged in R&D
4. Establish an incentive system for government scientists	Among others, DA-BFAR, SEAFDEC AQD and PCAMRD will help establish an incentive system for government scientists doing research, particularly on successful commercialization of their outputs.	- Incentive system established

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Establish a private sector and government research consortium																				
2. Provide appropriate government funding support to the research consortium																				
3. Develop and implement fiscal incentives for private sector investments on R&D																				
4. Establish an incentive system for government scientists																				

7. Indicative budget : PhP 254.0 million

PROJECT 3 (CODE: AQ-3)

1. Project title : Promotion of Investments in the Hatchery Industry

2. Site/coverage : National

3. Rationale/background

Hatchery production is one of the most viable farming technologies for major and promising cultivable species. This is because to date, the stocking requirements of brackishwater ponds, fish pens and sea cages still cannot be met because of insufficient fry supply coming from the wild and existing hatcheries. Such supply deficit has been recorded as well for shrimps, crustaceans and mollusks. For example, the country's milkfish industry alone has been saddled over the years by an acute fry shortage problem. Earlier records of 1.2 billion fry annually collected from the wild have dropped to a low of 600 million. In 1994, about 20 million fry were reportedly imported from Taiwan. At present, an estimated 360 million fry are being imported during peak season.

Strengthening of the local hatchery industry can address the problem of seasonality and inconsistency of seed supply. Standardized and reliable techniques have yet to be developed to achieve a year-round seed supply. In addition to milkfish, there is an equal need to pursue intensive production of hatchery-bred major cultivable species for the country to attain self-sufficiency in seed stock supply. This is needed to reduce (if not totally stop) the importation of fry. Efforts should also be geared towards volume production of quality fry at strategic areas in the country.

Captive broodstock materials will have to be established as well. In anticipation of the availability of low-cost, high-quality and consistent supply of seed produced from captive broodstock, the social implications on the wild seed industry should be considered. Marginal fishers who depend on the collection of wild seeds as their main source of livelihood will be most affected. Alternative livelihood opportunities, therefore, should be given priority attention. Measures should be provided to mitigate the loss of livelihoods of marginal fishers who derive their main income from collection of wild seeds.

To increase the supply of good quality seeds, R&D on captive broodstock of economically important cultivable species should be intensified. Species of high economic potential should be identified and funds should be allocated for the conduct of further research on and refinement of culture technologies. The government should develop policy and regulatory frameworks that recognize basic differences in reproductive protocol for producing seed for aquaculture and for stock enhancement in the wild.

4. Goal and objectives

The goal of this project is to strengthen the hatchery industry to address critical farming issues, such as limited species variety, high fry cost and erratic supply. The project's objectives are:

1. to achieve reliable supply and sources of seed stocks by encouraging/promoting more investments in hatchery ventures;
2. to increase the variety of cultivable species;
3. to improve/refine hatchery techniques resulting to higher yields, improved growth and disease-tolerant stocks (and strains);
4. to promote species diversification, particularly marine ornamental hatchery; and
5. to reduce pressures on wild stocks (for seeds and adult-sized stocks) through farming.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Improve hatchery and growout technologies	A refinement of hatchery and growout techniques will include upgrading of existing know-how through training and other means covering both existing and new species. These may include biotechnology, instrumentation, improved life support systems and automation. Resources from donor/international agencies promoting similar initiatives will be mobilized.	<ul style="list-style-type: none"> - Standardized and/or refined farming protocols - New techniques resulting from research areas relevant to farming procedures - Progressive farming technologies
2. Provide investment incentives and attractive loan packages	Mechanisms will be developed with the financing/banking sector to support private sector investment in aquaculture. Investment areas may include hatcheries, broodstock farms, biotechnological works and domestication programs for food fish and high-value species with export potentials. Mechanisms for tax exemptions will be explored. Concerned government agencies, such as BOI/DTI, will explore the establishment of international markets for farmed products with high export potential.	<ul style="list-style-type: none"> - Available credit/loan packages for various scales of enterprises - Access to foreign markets of farmed commodities
3. Rationalize legislations on importation of founder stocks	BFAR shall assess regulations on the importation and adoption of new policies without compromising the protection and utilization of local stocks.	<ul style="list-style-type: none"> - Rationalized policies and guidelines on importation
4. Encourage investment of	This will involve the preparation of appropriate fiscal incentives for the	<ul style="list-style-type: none"> - Reliable supply of quality seeds

Key activities	Description/methodology	Expected outputs
foreign genetic companies	pioneering venture including an assessment of level of contribution/benefits to industry over periods of time. It may entail partnership with local companies to promote greater investments in growout and processing industries.	
5. Collaborate with relevant organizations to support small-scale hatcheries	BFAR will identify NGOs, LGUs and state universities and colleges as broodstock centers and natural food centers to support the development of small-scale hatcheries.	- Support provided for small-scale hatcheries

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Improve hatchery and growout technologies																				
2. Provide investment incentives and attractive loan packages																				
3. Rationalize legislations on importation of founder stocks																				
4. Encourage investment of foreign genetic companies																				
5. Collaborate with relevant organizations to support small-scale hatcheries																				

7. Indicative budget : PhP 126.0 million

PROJECT 4 (CODE: AQ-4)

1. Project title : Development of Domestic Supply Chain and Expansion of Export Markets

2. Site/coverage : National

3. Rationale/background

A major obstacle to the growth of Philippine aquaculture in recent years is the fluctuation of fish prices in the local market. Such market condition is mainly attributed to the: (1) seasonal oversupply of fish due to seasonal harvest from wild fisheries; (2) poorly developed domestic supply chain; and (3) undeveloped export market. As a consequence, there have been fewer investments in aquaculture and many farmers have cut down on their inputs to reduce production cost at the expense of higher yield. Additionally, there has been the biased development of aquaculture towards large and integrated ventures that effectively discourage the participation of small players. To sustain the growth of aquaculture as a business enterprise and as a source of livelihood, there is a need to expand both domestic and export markets. This may be achieved through the development of better quality products and a more efficient supply chain.

4. Goal and objectives

The goal of this project is to address issues related to fluctuation of prices of aquaculture products in the local market by developing the domestic supply chain and expanding the export market. The project's objectives are:

1. to improve the quality of aquaculture products;
2. to improve the distribution and marketing efficiency of the domestic supply chain;
3. to expand the domestic supply chain through marketing of processed and niche products; and
4. to develop and expand the export market with emphasis on quality, food safety and traceability.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Identify appropriate market centers	Surveys and site visits will be conducted to monitor the improvement in production volume of identified species in terms of meeting market demand. This will help improve marketing channels and cost-efficiency in transporting specific products.	- Increase in distribution channels from growers to consumers
2. Promote investments in cold storage and processing facilities in	Infrastructure support including centralized processing facility will be developed to increase efficiency and quality assurance standards.	- Established cold storage and processing plants in

Key activities	Description/methodology	Expected outputs
strategic locations		key farming centers
3. Undertake marketing campaign to develop domestic market for frozen and processed products	Domestic demand and preferences will be assessed to provide a basis for the development of effective campaigns and promotions for frozen and processed products. Concerns to allow storage during peak production months will be considered.	- Sufficient volume/inventory of processed products
4. Undertake marketing campaign to develop export market for frozen and processed products	Export demand and preferences will be assessed to provide a basis for the development of effective campaign and promotions for frozen and processed products.	- Products exported to new markets
5. Promote farming of export-oriented species/products	Production volumes of identified species and acceptability of developed products will be monitored. Emphasis shall be given to species where the country can develop marketing advantage. The investment climate will be assessed and nontraditional sources of funds will be tapped.	- Wide array of products available for the export market - Adoption of progressive farming technologies

Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Identify appropriate market centers																				
2. Promote investments in cold storage and processing facilities in strategic locations																				
3. Undertake marketing campaign to develop domestic market for frozen and processed products																				
4. Undertake marketing campaign to develop export market for frozen and processed products																				
5. Promote farming of export-oriented species/products																				

7. Indicative budget : PhP 40.0 million

PROJECT 5 (CODE: AQ-5)

1. Project title : Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points (HACCP)

2. Site/coverage : National

3. Rationale/background

The rapid growth of aquaculture over the past two decades was achieved through the: (1) expansion in area and (2) intensification of aquaculture systems. The expansion of aquaculture areas included the conversion of large tracts of mangrove forests and swamps, and even coconut plantations, into fish and shrimp farms. These resulted in some negative social and ecological impacts. The loss of forestry and fishery products, including wild seeds, has implications on coastal dwellers that derive their income from these resources. Ecological impacts include alterations to patterns of silt retention, land formation, soil erosion and loss of protection from storm surges. After damage has been done, it is now generally agreed that mangrove areas are poor sites for aquaculture because of the problems associated with acid sulfate in the soil.

Intensification involves high stocking of the cultured species per unit of production area. This requires feed inputs since the natural food organisms within the culture system cannot support the food requirements of the cultured fish. Feeding increases nutrient loads from fecal and nonfecal excretions, as well as from unconsumed feeds. Chemicals such as therapeutants, pesticides, herbicides and inorganic nutrients are also commonly used to enhance productivity. When released directly into the natural bodies of water, these wastes and chemicals have polluting effects when their concentrations exceed the assimilative capacity of the water bodies. It has also been a common practice for aquaculture farms to develop in clusters. Hence, the infrastructures are concentrated within a small geographic area, such as enclosed coastal waters with poor water exchange. This often leads to "self-pollution" whereby one farm's effluent becomes another farm's or even the same farm's intake. These problems may be attributed to lack of properly planned and regulated aquaculture development that should adequately consider both economic and environmental considerations.

Since aquaculture development makes use of many resources – such as mangroves and water – that are either common or state property, mechanisms should be put in place to ensure that other resource users are duly consulted. There are now available technologies and practices that would make aquaculture operations environment-friendly. The most effective approach is to prevent or reduce the discharge of pollutants. These technologies include integrated re-circulating systems and treatment of

wastes before discharge. Development of environment-friendly feeds with optimum nutritional characteristics and improvements in feed management can also minimize adverse environmental impacts. The best approach to a successful aquaculture venture is to set up culture at the highest stocking density possible without degrading the environment. The Philippine Fisheries Code of 1998 and the Agriculture and Fisheries Modernization Act of 1997 have various provisions for aquaculture that pertain to environmental sustainability. The trend toward environment-friendly aquaculture is also evident in the activities of aquaculture agencies and institutions in recent years.

Some serious environmental problems in the subsector still remain. Limited budgets and the overriding desire to produce more impede the development of a totally environmentally responsible aquaculture. The profit motive and voluntary nature of the code of practice for aquaculture, as well as weak monitoring and enforcement capabilities of both national and local governments, hinder the adoption of environment-friendly practices. As such, research on environment-friendly technologies should be intensified to include the formulation of superior diets and innovations in culture practices that minimize polluted effluents. These innovations should be promoted among the private sector through effective training, extension and demonstration in pilot sites. The adoption by the private sector of the codes of conduct for responsible aquaculture could be hastened by developing economic incentives. Further, the system for penalizing environmental offenders in aquaculture should be reviewed and necessary revisions and/or improvements should be instituted to make it an effective deterrent. More importantly, there should be a national zoning and resource-use plan based on environmental carrying capacities of the zones. The government should also provide incentives to encourage farmers to locate their farms within these designated zones.

Recently, the changing choices and preferences of consumers of traded aquaculture products have influenced the major importing countries to impose standards and regulations to ensure food quality and safety. Some of these regulations have also paved the way for farmers to indirectly reduce the negative environmental impacts of production activities. With standards pertinent to aquaculture (e.g., labeling, traceability, antibiotic residues) now in place, various market strategies are continually being developed for adoption by the concerned stakeholders. These include: (1) product certification, (2) ecolabeling, (3) ethical or “fair trade” and (4) organic produce. All these are aimed at improving the public image of producers and thereby gaining the confidence of consumers.

The Philippines should take up the challenge and support the implementation of good practices and compliance to safety and quality standards. Relevant statistics will have to be gathered and consolidated to serve as baseline reference concerning the status and level of compliance of existing farming and ancillary industry activities. Protocols will have to be established based on prevailing international codes of conduct/practice. Concerted efforts of the government,

industry, academe, scientific communities and NGOs will have to be harnessed from the initial planning stages up to implementation of the desired programs and projects.

4. Goal and objectives

The goal of this project is to reduce environmental degradation from aquaculture and to improve the quality of aquaculture products with emphasis on quality, food safety and traceability. The project's objectives are:

1. to develop industry-led, commodity-oriented guidelines for BAP and a certification system for compliance;
2. to achieve greater marketability of farmed products that are certified safe;
3. to enforce mangrove buffer zones in fishpond development and reforest illegally occupied areas;
4. to establish BAP and certify farms for compliance; and
5. to develop and work for certification of farm areas that produce safe farmed commodities through environmentally and socially sustainable methods.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Develop industry-led, commodity-oriented guidelines for BAP and a certification system	Guidelines for BAP and a certification system for compliance will be developed. Existing programs from other countries shall be reviewed and modified, as needed. Regular assessments of the effectiveness of established protocols will be conducted.	- Rationalized set of protocols on BAP for specific marketable commodities - Set of compliance guidelines for industries seeking certification of commodities produced
2. Review of BAP	Consultations and reviews will be undertaken with BFAR and relevant experts from the private sector, academe and other institutions on appropriate technology and standards for the Philippine setting.	- Industry BAP adopted
3. Strengthen capability of LGUs in implementation of BAP	Appropriate fishery ordinances shall be developed as part of this initiative. The capability of LGUs will be upgraded through trainings conducted by BFAR and other relevant agencies. New information will be disseminated regularly to the trained human resource. Regulatory and management measures will be updated regularly based on new findings and recommendations. The degree of compliance will be monitored through regular visits.	- BAP compliance within LGU jurisdiction
4. Improve coordination of BFAR with DENR	Coordinative efforts shall focus on aquaculture zoning. This shall give attention	- Zoned areas where aquaculture development

Key activities	Description/methodology	Expected outputs
	to enforcement of regulations for buffer zones where the assistance of LGUs will also be tapped. The extent of implementation of agreed management schemes will be reviewed. Consultations and meetings to assess improvements and benefits from agreed strategies will be conducted.	may be pursued
5. Utilize GIS as a tool	Zoning of existing farm sites and other identified areas where aquaculture development will be pursued will use computer-based GIS to effectively and efficiently re-establish buffer zones and natural waterways. Stakeholder consultation will be undertaken to ensure that adequate space for buffer zones is considered.	- Identified resource areas (growing and harvest) suitable for aquaculture with buffer zones in place - Proper access and utilization of waterways along and within farming areas
6. Standardize grading system	The grading system specifically relates to quality and size. The level of compliance of farms with set standards will be monitored regularly. Standards will be reviewed with respect to applicability in the aquaculture areas.	- Standardized grading system
7. Provide farm-based HACCP training and certification	The Fisheries and Aquaculture Board (FAB), with the support of UPV and BFAR, will work on the development of quality standards and farm-based HACCP. The UP AQUASOC with the support of BFAR and Association of Philippine Prawn Feed Millers, Inc. will provide training to fish farmers through regional training workshops.	- Trained certifiers on HACCP
8. Establish a private sector-led institution that will provide a quality certification system 9.	This will be pushed through in collaboration with an internationally recognized aquaculture certification body. The FAB may initiate the organization of the seafood consortium, which will involve key private sector companies, industry support organizations and government agencies.	- Quality certification system established
10. Train and certify appropriate personnel on use of aquaculture drugs and medications	The Bureau of Food and Drugs will provide training to appropriate personnel (such as veterinarians) while BFAR will certify/accredit them. Evaluations will be conducted on the effectiveness of certified veterinarians.	- Effective use of aquaculture drugs and medications
10. Undertake a public awareness campaign	Food safety programs will be developed and implemented to manage the culture, harvest and transport of farmed products. The IEC shall cover various facets of the subsectors, such as safety programs, transport of farmed products, product labeling and quality standards.	- IEC campaigns conducted

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Develop an industry-led commodity-oriented guidelines for BAP and a certification system																				
2. Review of BAP																				
3. Strengthen the capability of LGUs in the implementation of BAP																				
4. Improve coordination of BFAR with DENR																				
5. Utilize GIS as a tool																				
6. Standardize grading system																				
7. Provide farm-based HACCP training and certification																				
8. Establish a private sector-led institution that will provide a quality certification system																				
9. Train and certify appropriate personnel on the use of aqua-culture drugs and medications																				
10.Undertake a public awareness campaign																				

7. Indicative budget : PhP 73.0 million

PROJECT 6 (CODE: AQ-6)

1. Project title : Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains

2. Site/coverage : National

3. Rationale/background

Advances in technology have resulted in the development of better strains of farmed aquatic plants and animals, which are of better quality, fast-growing, high-yielding and sturdier. Aquaculture stocks are increasingly used to enhance production in natural waters, as the degradation of habitats and excessive extraction of fishery stocks in the wild continue. There are concerns, however, which must be addressed when releasing domesticated stocks to natural waters. These relate to genetic and ecological impacts of hatchery-bred stocks on wild stock populations.

Beyond the negative impacts of introduction of exotic species, the seeds to be used for aquaculture purposes require certain desirable characteristics, such as high survival rate and optimal performance under culture conditions. These characteristics are products of breeding protocols appropriate for domestication, and not for release in the wild. The genetic requirements of stock for release differ from those for domestication. The fitness to survive in the wild is the more important characteristic of seeds for release. Uncontrolled releases of hatchery stocks into the wild may result in introgressive hybridization in wild stocks, and eventually into outbreeding depression among genetically diverse wild stock populations.

There are evidences regarding threats and/or negative impacts of exotic species on natural genetic resources. However, considering the need to enhance declining stocks, there are approaches that can be taken to minimize potential negative ecological impacts of the introduction of new species. An example is the release of species native to the water body from where their broodstock originated. A policy and regulatory framework should be developed to ensure more responsible stock enhancement programs. The government needs to prioritize its RD&E programs and rationalize its policies and regulations, particularly on the farming of domesticated and exotic species for the export market.

4. Goal and objectives

The goal of this project is to achieve improved growth and yield of cultured stock with improved characteristics, such as high tolerance to diseases. The project's objectives are:

1. to diversify into other cultivable species of high market potential, particularly in mariculture;

2. to rationalize legislations on importation of commercially important species/strains, most especially for shrimps, and encourage local investments on domestication; and
3. to prevent the introduction of new aquatic diseases and pests and preserve natural biodiversity.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Review and update import legislations	This review will be based on established import legislation programs within the Philippines and other countries. This involves strengthening competency and capability of government agencies on import risk analysis, quarantine and transboundary surveillance. Capability of trained staff will be assessed regularly to evaluate their performance.	- Harmonized procedures and processes - Effective legislations and policies
2. Review of business plans	Plans prepared by importers to justify the economic value of new introductions, especially for species with risk potentials, will be assessed. Reviewers will be updated on regional and global farming and market trends. Networks will be strengthened to allow for effective experts exchange, as part of the review process.	- Approved business plans - Improved growth and yield of cultured stock and improved tolerance to diseases
3. Develop appropriate ordinance	An ordinance appropriate for the aquaculture subsector shall be developed. This legal document will help prevent irresponsible introduction and illegal farming of unwanted species in their localities. Periodic evaluations and reviews will be conducted.	- Ordinance adopted
4. Promote greater public awareness	Public awareness campaigns on the risks of irresponsible movement of aquatic animals and plants will be undertaken. Surveys will be conducted and feedback mechanisms established to assess the level of awareness.	- IEC campaigns undertaken

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

CHAPTER 4
MEDIUM TERM PRIORITY PROGRAMS AND PROJECTS

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Review and update import legislations																				
2. Review of business plans																				
3. Develop appropriate ordinance																				
4. Promote greater public awareness																				

7. Indicative budget : PhP 26.0 million

PROJECT 7 (CODE: AQ-7)

1. Project title : Increasing Export Competitiveness through Special Economic Zones (SEZ)

2. Site/coverage : National

3. Rationale/background

Municipal fisheries in the Philippines have reached the point of diminishing returns. More fishers are chasing after lesser volume of fish stocks. There is a need to reduce fishing pressure to allow the fishery resources to recover. This can be done by encouraging fisherfolks to shift to other means of livelihood. Aquaculture, specifically sea-based aquaculture, beckons as one promising alternative. The culture of fish or other organisms in the sea will provide fisherfolks a source of livelihood involving the production of the same commodity within the same environment that they are already familiar with. Hence, sea-based aquaculture can be considered as a logical livelihood option.

The profitability of sea cages, particularly those set in deeper waters, has already been adequately demonstrated by a few pioneering individuals. Properly regulated as is done in other countries, and with judicious choice of species, it can be made sustainable. Candidate species for such a venture are milkfish, siganid, rabbitfish and saline-tolerant tilapia. Carnivore species, such as seabass (*Lates calcarifer*) or grouper (*Epinephelus* spp.), are also potential culture species. In areas where there is a possibility of producing tilapia biomass by cheaply using fertilizers only, or where there is seasonal excess of sea-catch, these species may be included. Milkfish is now the species being cultured in the pioneering sea cages.

The areas where sea-based aquaculture can be pushed through may be referred to as mariculture park. In the Philippines, mariculture parks already have a legal framework. The Fisheries Code of 1998 requires that aquaculture areas be designated by LGUs in the case of municipal waters or by DA for waters located outside municipal waters. Further, the appropriate government unit is also required to regulate the stocking density and feeding based on the carrying capacity of an area. The development of a mariculture park is the best way for LGUs or national government to implement the said provisions of the law.

Special economic zones must be established to accelerate the development of the above mariculture parks. Without support infrastructure, mariculture development will be difficult to monitor and regulate, and cages will be installed anywhere based purely on market considerations. In a mariculture park, the government can regulate the number and sizes of cages. The distance between cages will be predetermined by the location of the mooring buoys. Regulating the number of cages is one way of regulating stocking and feeding. Floating wave breakers can be installed to soften the impact of wave

action and reduce the risk of damage. Technical training on net-cage maintenance, stocking, feeding, size monitoring and harvesting should also be provided. Support services in the form of credit, extension service, cold storage and market linkage will be essential (Yap 2002).

4. Goal and objectives

The goal of this project is to establish SEZ for the development of export-oriented aquaculture ventures. The project's objectives are:

1. to adopt aquaculture as a viable means of reducing fish capture activities and as a management tool for coastal resource management;
2. to empower LGUs to rationalize its policies on commercial aquaculture investments, with particular consideration on their socioeconomic benefits to host fishing communities; and
3. to diversify into other cultivable species of high market potential, particularly in mariculture.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Establish a national authority or government-private sector consortium	This consortium will ensure that the programmed development of SEZ is consistent with the national agenda. Linkages developed with smallholders will be assessed. Improvements in operations, job generation and development of ancillary industries will be monitored.	- Expansion of export-oriented mariculture ventures - Growth of rural economies and creation of jobs and livelihoods
2. Promote the development of SEZ	The SEZ will be established at the regional and other appropriate levels based on several criteria. These may include production volume, suitability of aquatic resources and sites, access to market, viability of technology and efficiency of facilities.	- Economic growth - Creation of ancillary industries
3. Establish a legal framework with LGU that will allow investments	Investment may be poured in by local and/or foreign aquaculture companies. Benefits of such partnerships or alliances will be assessed through regular meetings and consultations among stakeholder groups.	- Increased number of industry players - Improved investment opportunities
4. Tap the support of financial institutions	Linkages with financial institutions will be strengthened to ensure a wider range of possible creditors. Support may take the form of soft	- Loans, grants, technical support and marketing contracts

Key activity	Description/methodology	Key outputs
	loans, grants, technical assistance or marketing contracts.	

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Establish a national authority or government-private sector consortium																				
2. Promote the development of SEZ																				
3. Establish a legal framework with LGU that will allow investments																				
4. Tap the support of financial institutions																				

7. Indicative budget : PhP 63.0 million

PROJECT 8 (CODE: AQ-8)

1. Project title : Promotion of Aquaculture as Livelihood for Fishers and Smallholders

2. Site/coverage : National

3. Rationale/background

Many fishing villages are now finding fishing as an increasingly difficult source of food and livelihood. Yet for many, this endeavor remains their only economic activity. This has driven many fishers to adopt destructive fishing practices, which have further aggravated the decline in municipal fisheries production. In recent years, the rising cost of seafood and technological advances in aquaculture has made fishfarming an economically sound alternative to fish capture. With the country's vast coastline and strategic geographical location to engage in the exportation of fishery products to Japan, China, Singapore, Hong Kong, Korea and Taiwan, the prospects for growth and expansion of marine fishfarming are enormous.

While fishfarming provides great promise as a source of alternative livelihood for fisherfolks, its prohibitive capital and operational requirements make it a difficult business venture for small farmers. Moreover, small operations lack the economies of scale to be efficient and competitive. Hence, the growth and expansion of fishfarming in the Philippines has inevitably favored the larger, commercial-scale operators. However, many commercial fishfarming ventures now occupy municipal fishing grounds. Sadly, these bring little socioeconomic gains to host communities due to lack of employment skills, and failure of LGUs to undertake proper valuation of the water resources for the benefit of displaced fishing communities.

4. Goal and objectives

The goal of this project is to uplift the socioeconomic status of fishers and reduce their dependence on fish capture, thereby allowing better management of the coastal fishery resources. The project's objectives are:

1. to empower smallholders and fishers to carve a sustainable livelihood in mariculture and to be competitive with commercial farmers; and
2. to develop "fair trade" marketing channels for fishfarmers.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Package low-input aquaculture technologies	Low-input aquaculture technology suited for small-scale operations will be recommended for adoption. Financing support from key government institutions and the private sector will be solicited.	- Increased production levels, revenue and employment

Key activity	Description/methodology	Key outputs
2. Establish a legal framework for investment	Consultations will be undertaken to develop a legal framework and to encourage investment in SEZ. Given this legal framework, LGUs, NGOs, private institutions and cooperatives shall work collaboratively to invest on the development and operation of livelihood activities within SEZ, specifically for smallholders and fishers.	- Legal framework - Improved investment environment for commercial mariculture
3. Organize a national NGO for management	This national NGO will undertake the development and management of livelihood-type farming operations for fishers and smallholders under the concept of a Mariculture Livelihood Park (MLP). The concept of MLP will be promoted in the development of an MLP-NGO, which will be supported by key government institutions and private sector.	- Functional MLP-NGO - Increased production volume from a number of growers
4. Establish model MLPs	Model MLPs will demonstrate their overall operations, including infrastructure, technology and institutionalized marketing. The MLP-NGO, with the support of the host LGU, will operate a model MLP for demonstration use, as well as for training.	- Model MLPs
5. Undertake resource valuation	This resource valuation will serve as basis for LGUs to rationalize the socioeconomic benefits of commercial aquaculture development to affected fishing communities. Benefits will be assessed through regular meetings/consultations among stakeholders. Lease fees and "economic incentives" to affected fishers will be recommended.	- Indicative values of resources as basis for equitable resource use or allocation
6. Support fishing communities with necessary programs	Such training programs will provide fishing communities with necessary skills for employment.	- Training program - Enhanced skills for employment

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Package low-input																				

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
aquaculture technologies																				
2. Establish a legal framework for investment																				
3. Organize a national NGO for management																				
4. Establish model MLPs																				
5. Undertake resource valuation																				
6. Support fishing communities with necessary programs																				

7. Indicative budget : PhP 77.0 million

4.5 Post Harvest Component

At present, the Philippine fisheries' post harvest subsector faces two intricately related core problems (Figure 4.5.a). These are the: (1) lack of competitiveness of Philippine fish and fishery products, and (2) post-harvest losses. In turn, there are five main factors that cause such lack of competitiveness. These include limited product development activities, high production cost, poor product quality, "unsafe" products and weak marketing strategies. High production cost is directly affected by inconsistent supply of raw materials, which in turn is affected by unsustainable harvesting techniques in commercial fisheries and municipal fisheries subsectors. Poor product quality and weak marketing strategies are issues that are largely "internal" to the post harvest subsector. Poor product storage facilities and poor labeling contribute to poor product quality. The relatively weak marketing strategies are brought by, among others, poor network and transport and distribution system. Constraints coming from commercial fisheries, municipal fisheries, aquaculture and post harvest subsectors all contribute to the issue of "unsafe" fishery products.

Lack of competitiveness is a reflection of the inability of Philippine fish and fishery products to compete both in the local and export markets. In the local market, most fish and fishery products cannot compete with other animal food products, such as pork, beef and poultry-based commodities. In the international market, our products experience rigid competition from importing countries. The lack of competitiveness results in low local sales volume that may ultimately lead to poverty. It also results in reduced export volume and sales that could eventually lead to loss of investment among the industry players in the commercial fisheries, aquaculture and post harvest subsectors.

There are losses along the distribution chain which can be broadly classified into three types: actual physical losses, nutritional losses or value losses. Hence, not all fish that are caught or harvested for human consumption actually reach consumers. Physical or material losses involve fish that are either lost due to spoilage (i.e., when it becomes inedible) or discarded in fishing vessels and fish-landing facilities. Nutritional losses refer to the decrease in the amount of nutrients a human body derives from eating fish that has lost its nutritional value due to inappropriate processing and preservation conditions. Spoilage of wet fish, infestation of dried and smoked fish, weight loss, and inferior finished products are all accompanied by losses in value. These post-harvest losses occur in four subsectors – municipal, commercial, aquaculture and post harvest – of the fisheries industry. Post-harvest losses lead to unnecessary increase in production volume, reduced income of fisherfolk and low local sales volume, all of which ultimately lead to poverty.

Seven priority projects are proposed to address the above intricately linked issues. Five projects collectively address the issue of lack of competitiveness.

Project 1 (Strengthening of the Fish Inspection System in the Philippines) addresses the issue of unsafe products. Project 2 (Development of National Quality Standards [NQS] for Fish and Fishery Products) relates to poor product quality, while the concern for weak marketing strategies is covered by Project 3 (Marketing and Promotion of Philippine Fish and Other Aquatic Products). Project 4 (Development of New Value Added Fishery Products) and Project 5 (Characterization of Marine Natural Products) deal with limited product development activities. Two projects directly address the issue of post-harvest losses. These are Project 6 (Reduction of Fisheries Post-harvest Losses via “Cold Chain System”) and Project 7 (Model Villages for Philippine Fisheries Post Harvest).

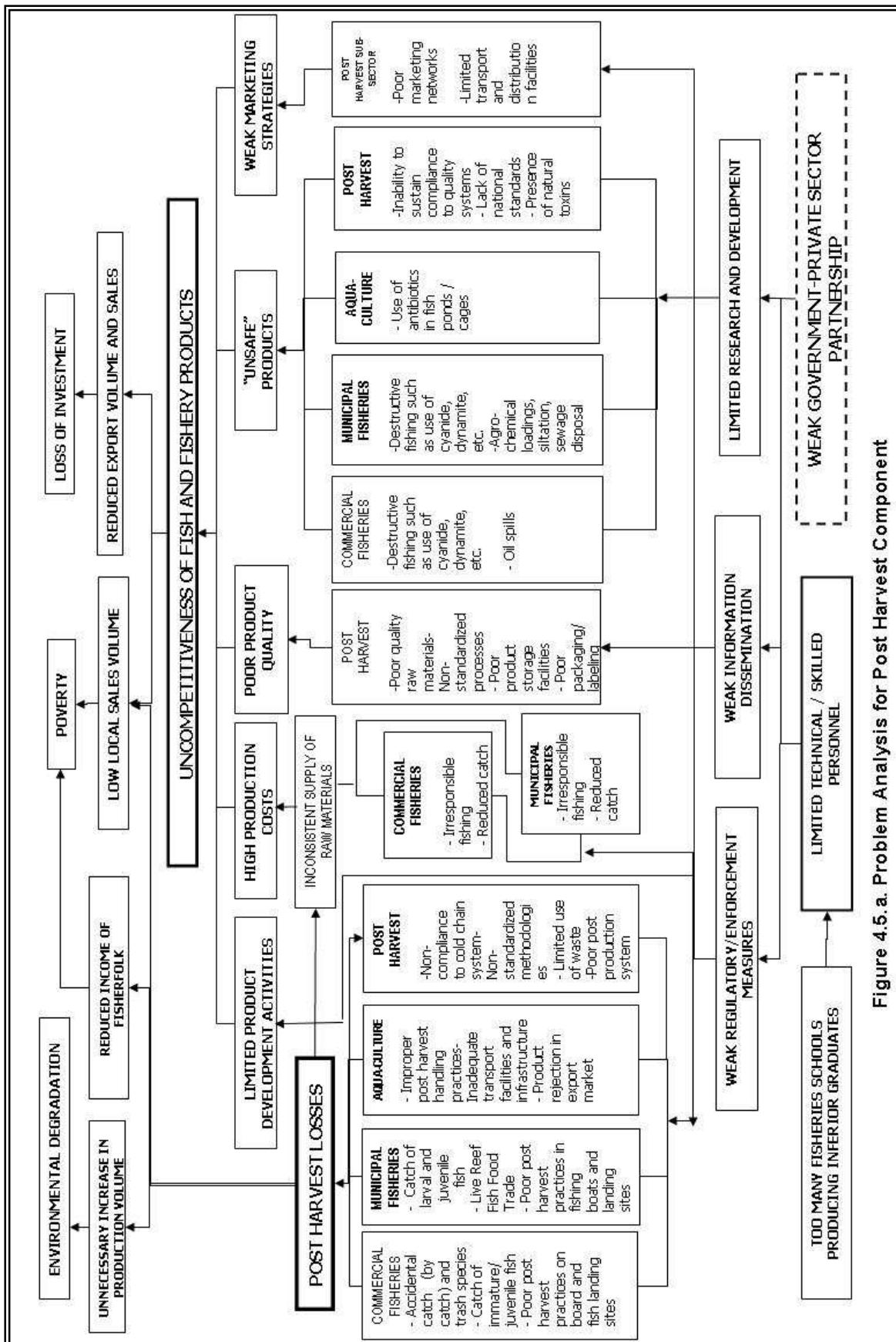


Figure 4.5.a. Problem analysis for Post Harvest component.

PROJECT 1 (CODE: PH-1)

1. Project title : Strengthening of the Fish Inspection System in the Philippines

2. Site/coverage : National

3. Rationale/background

Consumers have the right to demand for high-quality and safe fish and other aquatic products. Hence, it is the responsibility of all the players in the fisheries' post harvest subsector to adopt appropriate measures and to adhere to rules and regulations that ensure those rights. One effective way of doing this is to guarantee the safety of products and the manufacturing of quality and consistent products that conform to standards and specifications of the market. This can be done through the application of different product safety and quality systems in the entire food industry. These include, among others, HACCP, Sanitation Standards Operating Procedures (SSOP), Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP) and Good Laboratory Practices (GLP).

Some fish processors have been continuously improving their fishery products to meet the demands and specifications of the export market. Nevertheless, some of them are still not able to sustain compliance to existing quality systems as imposed by the major importing countries. Proofs to this are the rejection/detention cases that are experienced by some Philippine fishery products in the export market. The inability of the fish processors to sustain compliance to quality systems does not only affect the quality of the product; it also affects the safety of these products. If these concerns are not properly addressed, there will always be Philippine fishery products that are not competitive in the market. In worst cases, these may cause illness, injury or even death to consumers.

There have been efforts in the past to strengthen the fish inspection system in the Philippines. However, it is still imperative, at this point, that the fish inspection system in the country be further strengthened. This time, this project will be anchored to an efficient institutional framework for it to differ from the previous initiatives.

4. Goal and objectives

The goal of the project is to improve the quality and safety of fish and other aquatic products in the Philippines in order to enhance their competitiveness both in the local and export markets. The project objectives are:

1. to improve the fish inspection system in the Philippines; and
2. to establish an incentive scheme that will encourage local processors to produce high-quality and safe products.

5. Key activities

Key activities	Description/methodology	Expected outputs
1. Improve the fish inspection system in the Philippines		
- Rationalization of the Fish Inspection and Quarantine Section (FIQS) of BFAR	Activities will include a review of the existing setup of FIQS, including its organizational structure. Appropriate innovations will be introduced to improve the current setup. For example, a multistakeholder group of qualified inspectors can be formed. As needed, inspectors outside BFAR can be also tapped.	- Reorganized FIQS
- Comprehensive and regular training of fish inspectors	Training of fish inspectors (from BFAR, PFDA, LGUs and other qualified individuals from other agencies/institutions and the private sector) will be conducted in an attempt to increase their competency.	- Increased number of competent fish inspectors
- Review of existing product certification scheme and development of product certification scheme	Product certification scheme shall cover Halal, Kosher and other food systems. There will be development also of a market-oriented fish inspection system, as well as identification of hazards/risks associated with different Philippine fish and fishery products.	- Improved product certification scheme - A market-oriented fish inspection system - A list of hazards/risks associated with Philippine fish and fishery products
- Onsite training programs and technical services to the industry	Onsite training programs will be conducted and technical services will be also rendered. The training programs will be handled by a group of well-trained trainers (from BFAR, PFDA, LGUs and other qualified individuals from other agencies/institutions and the private sector). Training programs will include the: (1) comprehensive and site-specific training on fish handling (at source, in coastal communities, fish landing facilities and in fish processing plants); and (2) training on process control protocols and quality systems	- Regular training and technical assistance for increased competency

Key activities	Description/methodology	Expected outputs
	(e.g., GMP, GHP, GLP, HACCP, SSOP, etc.). Technical services, such as through IEC materials and onsite visits, on how to prepare Philippine fish and other aquatic products for the local and export markets will be rendered. There will be other services, such as on how to obtain license to operate (LTO) from BFAD, knowing the requirements of the US Food and Drug Administration, European Union, Japan and other countries, as well as in getting information for new products emerging in the market, consumer trends and preferences.	
- RD&E activities on biocontaminants	The RD&E activities on biocontaminants will include both naturally occurring and those acquired from the environment.	- List of biocontaminants and rapid detection methods and control measures
- Establishment of a national testing center and satellite testing centers	These centers will house up-to-date high-precision equipment and other facilities that will help ensure the compliance of Philippine fish and fishery products to the quality and safety requirements of importing countries. These centers will be provided with the necessary institutional support facilities and will be serviced by competent individuals. Private sector initiatives in establishing testing centers will also be highly encouraged.	- 1 National Testing Center - At least 3 Regional Testing Centers
2. Establish an incentive scheme		
- Development of valid and reasonable accreditation criteria	This will be developed in consultation with experts. Accreditation criteria currently being used in other countries may be adopted or modified to suit the Philippine conditions.	- Acceptable accreditation criteria
- Institution of the industry's "seal of excellence" and provision of incentives	The industry's "seal of excellence" will be awarded based on compliance with the agreed requirements. Provision of incentives (e.g., tax incentives, promotion of products in international expositions, exhibits and	- All FPEs with LTOs awarded with "seal of excellence"

Key activities	Description/methodology												Expected outputs							
	fairs, etc.) will likewise be given to quality and safety-compliant establishments.																			

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Improve the fish inspection system in the Philippines																				
- Rationalization of FIQS of BFAR																				
- Comprehensive and regular training of fish inspectors																				
- Review of existing product certification scheme, development of market-oriented fish inspection system																				
- Onsite training programs and technical services to the industry																				
- RD&E activities on biocontaminants																				
- Establishment of a national testing center and satellite testing centers																				
2. Establish an incentive scheme																				
- Development of valid and reasonable accreditation criteria																				
- Institution of the industry's "seal of excellence" and provision of incentives																				

7. Indicative budget : PhP 375.0 million

PROJECT 2 (CODE: PH-2)

1. Project title : Development of National Quality Standards (NQS) for Fish and Fishery Products

2. Site/coverage : National

3. Rationale/background

National safety and quality standards are basic prerequisites in protecting the health and well-being of the consumers, both here in the country and abroad. Such standards are also needed in safeguarding the interest of the subsector. Without these standards, there will be no effective means of ensuring safety of products and the manufacturing of quality and consistent products that conform to specifications of the market.

At present, the Philippine fish and fishery products find it difficult to compete both in local and export markets. This is most likely due to the fact that the country does not have a set of minimum quality and safety requirements. These national standards will provide local processors with clear guidelines concerning the level of quality and safety that they should target for their products. Although there are quality and safety standards, as indicated in the different FAO – such as FAO 195, FAO 210 and FAO 211 – they are generally based on the standards prescribed by FAO/World Health Organization (WHO)-Codex Alimentarius Commission. The lack of science-based national quality and safety standards for Philippine fish and fishery products makes it imperative for our products to conform to international standards that are based on analyses of products from developed countries.

4. Goal and objectives

The goal of the project is to improve the quality and safety of fish and other aquatic products in the Philippines. The project objectives are:

1. to develop the national quality standards for fish and other aquatic products; and
2. to come up with policy guidelines for the exportation and importation of different fish and other aquatic products.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Develop NQS for fish and other aquatic products		
- Comprehensive review of existing guidelines, international quality	The review will also dwell on past and existing RD&E activities about the development of quality standards and process standardization.	- Database of all information related to quality criteria, standards and

Activity	Description/methodology	Expected outputs
criteria/ requirements and processing methodologies		specifications
- RD&E activities on development of quality criteria and product standardization	The development of quality criteria and product standardization will be for fish and fishery products with no existing information.	- Quality criteria and product standards
- Production of brochures on NQS	The brochures on NQS will cover different commodities for dissemination as IEC materials.	- Brochures on NQS disseminated
- Regional and national consultations on NQS	These consultations will be undertaken at strategic locations throughout the country.	- One national and at least three regional consultations on NQS
2. Develop policy guidelines for the importation and exportation of fish and other aquatic products	Policy briefs/guidelines on importation and exportation of fish and fishery products (in close coordination with DOH-BFAD) will be developed. Such documents will set direction to Philippine fishery imports and exports.	- Policy briefs

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Develop NQS for fish and other aquatic products																				
- Comprehensive review of existing guidelines, international quality criteria/requirements and processing methodologies																				
- RD&E activities on development of quality criteria and product standardization																				
- Production of brochures on NQS																				
- Regional and national consultations on NQS																				
2. Develop policy guidelines for the importation and exportation of fish and other aquatic products																				

7. Indicative budget : PhP 200.0 million

PROJECT 3 (CODE: PH-3)

1. Project title : **Marketing and Promotion of Philippine Fish and Other Aquatic Products**

2. Site/coverage : National

3. Rationale/background

Fresh fish in the Philippines are typically marketed in retail quantities. This is directly done in traditional landing sites by municipal fishers and in local wet markets by some middlepersons. Some of the catches of commercial fishers are traditionally traded in landing sites in wholesale qualities. In most cases, though, the catch is transported to major fish ports for auctioning. Most of the aquaculture produce is either auctioned onsite, or is transported to major fish ports for auctioning. Those who engage in onsite bidding are middlepersons and fish exporters. Bidding in fish ports typically involves middlepersons, fish vendors from local wet markets and small fish processors.

Majority of the traditional fishery products (e.g., smoked, dried, salted, fermented and marinated) are traded in most of the wet markets all over the country. Some products, such as canned/bottled fish and fishery products, frozen fish and a limited number of value-added products are now in the shelves of large supermarket chains in the country. With regard to export products (both fresh fish and fishery products), Japan and the USA are the traditional export markets. Notwithstanding, Philippine fish and fishery products are now available in most Asian and in some European countries.

Although it cannot be denied that some of the Philippine fish and fishery products can compete with those in international and domestic markets, weak marketing strategies for some of these products still limit their market acceptability. For example, in the domestic market, the trading centers are not enough to provide competent marketing systems for the trading of fish and fishery products. This problem is exacerbated by the poor condition of the transport and infrastructure facilities in the country. In addition, promotion of Philippine fish and fishery products both in the domestic and international market is also limited. It is also necessary at this point to tap other markets and create a niche for some of the Philippine fish and fishery products.

Clearly, the adoption of the “from the farm to the table” approach in fisheries post harvest does not only require responsible handling and processing of fish and fishery products. It also demands marketing systems that effectively link the production and consumption of fish and fishery products. At the same time, these systems will have to ensure that the consumers are provided with quality and safe products on their dinner tables. In addition, there is a need to strengthen existing marketing network that can help in the immediate and proper distribution of fish and fishery products in the country.

Hence, it is important to have a project that is specifically designed to develop the market and marketing systems for the Philippine fish and fishery products. This initiative is an attempt to increase the sales of these products and to enhance their competitiveness both in the international and domestic markets, while providing the consumers with quality and safe products.

4. Goal and objectives

The project's goal is to develop market and market systems for effective linkage between production and consumption of fish and other aquatic products in the Philippines and abroad. The project objectives are:

1. to increase market opportunities for Philippine fish and fishery products;
2. to establish a systematic approach to marketing and promotion of Philippine fish and fishery products;
3. to ensure that marketing of products complies with all fisheries conservation and food quality and safety laws and regulations; and
4. to develop a system that will improve traceability of fish and other aquatic products that are traded both in international and domestic markets.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Systematize approach to marketing and promotion of Philippine fish and fishery products		
- Production and dissemination of IEC materials	The contents of these IEC materials will be drawn from available scientific and technical information for the different products. This is an attempt to promote the health benefits of consuming fish and other aquatic products.	- Increased market awareness to different fish and fishery products from the Philippines
- Information dissemination for appropriate packaging materials and methods	There will be an organized information dissemination system that will encourage the use of appropriate packaging materials and packaging methods for different fish and other aquatic products. This will be	- Increased awareness to existing technologies, laws and regulations
	accompanied by strict implementation of packaging regulations in the country and observance of truth in labeling the products.	

Activity	Description/methodology	Expected outputs
- Establishment of an ecolabeling system	Ecolabeling systems will be established in order to assure consumers that Philippine fish and other aquatic products are produced in an environment-friendly manner.	- Institutionalized ecolabeling system in the Philippines
- Improvement of traceability system	Innovations will be introduced to improve the current traceability system.	- A traceability system for Philippine seafood industry
- Intensive promotion of fish and fishery products in domestic market	This intensive market promotion may take the form of festive caravans in specific market sites, such as malls and local supermarkets.	- Increased exposure of local consumers to fish and fishery products
- Intensive promotion of fish and fishery products in international market	Priorities will be given to products of companies that are consistently compliant with product safety and quality systems. These will be awarded the “seal of excellence”, based on the incentive scheme proposed under Project 1 (Strengthening of the Fish Inspection System in the Philippines). These products will be promoted by the government in different seafood expositions, trade fairs and exhibits outside the Philippines. The project will initially target two international food fairs per year. The number of food fairs to be participated in for the succeeding years may increase later.	- Increased recognition of Philippine fish and fishery products in the export market
2. Strengthen marketing networks		
- Strengthening of existing market networks and the establishment of strategically located trading centers	These trading centers will provide various services and functions. Among others, the centers will: (1) serve as model trading centers where honest trade practices will be observed, as well as efficient services to consumers will be provided; (2) trade quality and safe products only; (3) conduct effective market matching transactions; (4) serve as venue for municipal fishers to get better prices for their catch, and enable small processors to expose their products to a bigger market; and (5) be used as a buying station for seafood exporters.	- Increased trading of fish and fishery products using an effective networking scheme
- Establishment of	This is to come up with a list of	- Identified

Activity	Description/methodology	Expected outputs
the “one product, one region” scheme	different ethnic or local products that can be showcased in the trading centers. From this list, a product or several products that can create a niche both in international and domestic markets may emerge. Priority products will be supported with good marketing and promotion campaigns.	products that can create a market niche
- Networking of new trading centers	Institutionalizing the networks will provide a mechanism for exchange of products from different areas in the Philippines. Moreover, it will also provide Filipino consumers with varied forms of fishery products at more affordable cost.	- Effective exchange of fishery products among trading centers

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Systematize approach to marketing and promotion of Philippine fish and fishery products																				
- Production and dissemination of IEC materials																				
- Information dissemination for appropriate packaging materials and methods																				
- Establishment of an ecolabeling system																				
- Improvement of traceability system																				
- Intensive promotion of fish and fishery products in domestic market																				
- Intensive promotion of fish and fishery products in international market																				
2. Strengthen marketing networks																				

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
- Strengthening of existing market networks and establishment of strategically located trading centers																				
- Establishment of the "one product, one region" scheme																				
- Networking of new trading centers																				

7. Indicative budget : PhP 150.0 million

PROJECT 4 (CODE: PH-4)

1. Project title : Development of New Value Added Fishery Products

2. Site/coverage : National

3. Rationale/background

Worldwide, there has been an emergence of new products over the last several years. The food industry, in particular, continuously introduces a staggering number of new and varied food products to consumers each year. This clearly indicates that the demand for these new products is strong and growing, while conventional processed products have been creating an old-fashioned image among consumers. In the local front, for our local seafood processors to face today's competitive business environment, their efforts should now be geared towards the development and the introduction of new products that meet the demands of today's market. Candidate species to these new product development activities include some aquaculture commodities (e.g., milkfish, tilapia, shrimps, etc.) and various genera of seaweeds (e.g. *Codium* spp., *Caulerpa* spp., *Gracilaria* spp., etc.).

New fishery products must be considered as key ingredients to the Philippines' current and future plans. Essentially, these new fishery products will serve as the "lifeblood" of our local seafood processors. To be competitive in the domestic and international markets, priority must be given in terms of budget allocation to: (1) new fishery product development efforts through creation of new products and modification of existing products; (2) profit maximization through reformulation, as well as process and package changes; and, (3) utilization of solid and water waste from fish processing establishments.

4. Goal and objectives

The goal of this project is to develop globally competitive value-added fishery products. Specifically, the objectives are:

1. to develop new fishery products using aquaculture commodities and seaweeds using the systematic, consumer-oriented scheme in new fishery product development;
2. to reposition in the market existing products from fishing communities through redesigning of packaging and product reformulation;
3. to create "one-stop-shop" facilities for the development of new fishery products; and
4. to conduct R&D activities on proper utilization of water and solid wastes from fish processing establishments.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Undertake RD&E activities using aquaculture species and seaweeds	There will be development of new fishery products that are significantly different from those available in the market. These new product development activities must be consumer-oriented and market-driven. Such activities will be done through either product diversification or value addition.	- At least 10 new fishery products developed
2. Redesign packaging and product reformulation of a selected number of fishery products	Product repositioning in the market can be done through either redesign of packaging or product reformulation of existing products from different regions in the country.	- At least one redesigned or reformulated product per region
3. Create “one-stop-shop” facilities for new product development	The “one-stop-shop” facilities will be established in strategically located sites. These facilities will offer services on the development of new fishery products for the private sector. These services will cover all the steps in new fishery product development using any desired commodity. These include concept development, product formulation, business evaluation, package development, shelf-life testing and end-product testing. Such testing covers nutrition information, as well as chemical and microbiological components, among others. There will be development of a HACCP plan for the new fishery product. Services will also include onsite testing, together with the contracting party, of the new product’s acceptability (via test marketing), as well as pilot and commercial scale production of the new product.	- Establishment of one national and at least three regional “one-stop-shop” facilities
4. Conduct RD&E activities on proper utilization of wastes from FPE		

5. Utilization of wastes in the extraction of potentially bioactive substance	Experiments will be undertaken concerning possible utilization of wastes in the extraction of potentially bioactive substance.	- A database of potentially bioactive substances from waste sources
6. Exploration of use of solid wastes from FPE	Experiments will be conducted to come up with new products using solid wastes from FPE.	- Different products from wastes

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Undertake RD&E activities using aquaculture species and seaweeds																				
2. Redesign packaging and product reformulation of a selected number of fishery products																				
3. Create "one-stop-shop" facilities for new product development																				
4. Conduct RD&E activities on proper utilization of wastes from FPE																				
- Utilization of wastes in the extraction of potentially bioactive substance																				
- Exploration of use of solid wastes from FPE																				

7. Indicative budget : PhP 130.0 million

PROJECT 5 (CODE: PH-5)

1. Project title : Characterization of Marine Natural Products

2. Site/coverage : National

3. Rationale/background

The world's greatest concentration of marine species occurs within the so-called East Indies Triangle that is bordered by the Philippines, the Malay Peninsula and New Guinea. One can find in this small triangle more species in almost every family of tropical marine organisms than anywhere else in the world. In the Philippines, the vast marine resources have long been exploited. However, these marine resources have not been tapped properly as potential sources of natural products.

The real potential of marine organisms in the Philippines is not well established. Some of these organisms in the country have long been commercially exploited. Notwithstanding, the country's efforts to characterize some marine organisms with no perceived commercial values – in terms of their potential as a good natural source of micro and macronutrients and bioactive substances – have been very limited. Little is known about the promise of Philippine aquatic species as important natural sources of proteins, carbohydrates, different vitamins, minerals and free amino acids. These species could also be sources of some potential bioactive substances that may have a wide variety of industrial, food, pharmaceutical, nutraceutical and biotechnological applications. While the nutritive and industrial values of important marine organisms in other countries are well-documented, there is limited information about the characteristics of the Philippine marine organisms that make them important sources of natural products.

Hence, the proposed project is designed to characterize and screen several marine organisms from the Philippine waters, in terms of their potentials as: (1) good sources of micro and macronutrients, and (2) raw materials for the extraction of natural products. This project is significant because of four reasons. First, this will provide detailed important information about the potential of Philippine species as cheap natural sources of proteins, carbohydrates, different vitamins, minerals and free amino acids for the Filipinos. Second, screening of different marine species for potential natural and bioactive compounds is a good first step in an inventory of the existing natural resources in the Philippines that can be potential sources of bioactive compounds. Third, the characterization of Philippine marine organisms is an important step to come up with better taxonomic identification in the country. Fourth, this project is an important alternative step to attain an increase in fisheries production in the country without exerting any added fishing pressure to the resources in the wild.

4. Goal and objectives

The goal of the project is to describe several species of Philippine marine organisms in terms of their potential as raw materials for the extraction of natural products. Specifically, it aims:

1. to determine the micro and macronutrients in several species of Philippine marine organisms in order to showcase their importance as table foods;
2. to screen different species of marine organisms for potential natural, bioactive compounds, through a screening protocol that will involve stepwise extraction and characterization of extracts; and
3. to come up with a comprehensive list of different species of Philippine marine organisms which show potentials as food items and as raw material for the extraction of potential natural, bioactive compounds.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Catalogue different Philippine marine organisms	This list will include their sources, distribution and present market values. Also included in this initial phase is the standardization of laboratory protocols about the determination of micro and macronutrients in different marine organisms. Among the information to be generated include: proximate composition (protein, lipid, ash and carbohydrates, both nonfibrous and fibrous), free and bound amino acids, fatty acids, minerals and some vitamins.	- Database of different marine organisms in the Philippines including their source areas
2. Conduct preliminary/ routine screening of some marine bioactive products	Activities will include preliminary screening of some marine organisms for natural bioactive products. This is an attempt to come up with an initial list of candidate compounds from these species. This will then be followed by routine screening for bioactive compounds, using different species, in terms of the following: steroids, carboxylic and sulfated carbohydrate contents, bioactive fatty acids and alcoholic components of marine organisms.	- Database of marine bioactive compounds from Philippine waters

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Catalogue different Philippine marine organisms																				
2. Conduct preliminary/routine screening of some marine bioactive products																				

7. Indicative budget : PhP 90.0 million

PROJECT 6 (CODE: PH-6)

1. Project title : Reduction of Fisheries Post-harvest Losses via “Cold Chain System”

2. Site/coverage : National

3. Rationale/background

The need to improve the system of getting fish from the water to the consumer is very apparent since not all fish that is harvested for human consumption actually reaches the consumers. Approximately 25% of the total fish production in most developing countries, including the Philippines, is lost along the distribution chain. Such loss is attributed to one or all of the following reasons: (1) actual physical or material losses, such as discard of by-catch in fishing vessels and spoiled/inedible fish in landing facilities; (2) nutritional losses or decrease in the amount of nutrients a human body derives from eating fish that has lost its nutritional value; and (3) losses in value due to spoilage of wet fish, infestation of dried and smoked fish, weight loss and inferior finished products. In the Philippines (and elsewhere), these post-harvest losses occur in four subsectors of the fisheries industry, namely, municipal fisheries, commercial fisheries, aquaculture and post harvest.

Reduction of post-harvest losses via the “cold chain system” can benefit the fisheries industry in a number of ways. For example, reduction of losses can be accompanied by an increase in the amount of quality fish that can reach the consumers. Subsequently, there can be reduction of pressure on the wild fishery resources since there will not be any unnecessary increase in the volume to be harvested. There can also be a corresponding increase in income to the players of the fisheries industry, such as municipal and commercial fishers, aquaculturists, fish retailers and processors. Since less fish is wasted, there will be less spoiled fish and less fish processing wastes that are disposed into the environment. Consequently, the negative environmental impacts may be reduced significantly. Hence, in order to enjoy these benefits and to bridge the gap between demand and production, a project that will focus on the reduction of fisheries post-harvest losses in the Philippines becomes imperative.

4. Goal and objectives

The project’s goal is to enhance the performance efficiency in fisheries post-harvest handling and processing. The associated objectives are:

1. to reduce post-harvest losses in the four subsectors of the fisheries industry, namely: municipal fisheries, commercial fisheries, aquaculture and post harvest subsectors; and
2. to standardize fish processing methodologies in fishing communities and in fish processing establishments.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Reduce post-harvest losses in the four subsectors of the industry		
- Comprehensive assessment of practices and estimated volume of losses	Four key strategies are identified on how the players in the fisheries industry can comply with the so-called "cold chain system". One will be an assessment of the post-harvest practices in the commercial fisheries, municipal fisheries, aquaculture and post harvest subsectors.	- Reduction of post- harvest losses from the current 25% to at least 20%
- Institution of relevant policy and regulatory measures	Some relevant policy and regulatory measures will be instituted to control some fishing practices, particularly those that are not environment-friendly.	- Policy measures and/or briefs on different fishing practices
- Appraisal of the needs for ice plant, freezing and ice/cold storage facilities	An appraisal will be conducted about the needs of the subsectors with regard to ice making/plant, ice storage, freezing and cold storage facilities and the provision of appropriate institutional facilities and support system.	- Appraisal report about the needed facilities including the required institutional support
- IEC campaign on proper handling	An intensive information dissemination campaign will be conducted among fish handlers on how to apply the "cold chain" principle. This will practically cover the proper techniques on: (1) proper handling of fish immediately after catch (as in the case of commercial and municipal fishers) or harvest (as in the case of fish from aquaculture); (2) unloading in major fish ports and other landing sites; (3) trading wet fish especially in wet markets and in major fish port complexes and municipal fish ports; and (4) handling upon receipt of, and when processing, fish in processing plants.	- IEC materials developed - IEC campaigns conducted
- Assessment of post- production storage/ distribution	There will be an assessment of the post-production storage and distribution systems in the Philippines and institution of appropriate	- Assessment report

Activity	Description/methodology	Expected outputs
systems	measures for areas needing improvements.	
2. Standardize fish processing methodologies to reduce post-harvest losses and maintain high- quality products		
- Cataloging of all fishery products and processing methodologies	This will involve a survey of fishery products and their associated processing methodologies.	- Database of different fishery products and processing methodologies
- Institution of relevant policy and regulatory measures on product quality and plant sanitation	A research will be conducted to determine the appropriate policy and regulatory measures that can be applied on product quality and plant sanitation. The results will guide in setting the minimum operating quality standards for FPE.	- Policy measures and/or briefs on post-harvest losses

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Reduce post-harvest losses in the four subsectors of the industry																				
- Comprehensive assessment of practices and estimated volume of losses																				
- Institution of relevant policy and regulatory measures																				
- Appraisal of the needs for ice plant, freezing and ice/cold storage facilities																				
- IEC campaign on proper handling																				
- Assessment of post-production storage/ distribution systems																				

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2. Standardize fish processing methodologies to reduce post- harvest losses and maintain high-quality products																				
- Cataloging of all fishery products and processing methodologies																				
- Institution of relevant policy and regulatory measures on product quality and plant sanitation																				

7. Indicative budget : PhP 375.0 million

PROJECT 7 (CODE: PH-7)

1. Project title : Model Villages for Philippine Fisheries Post Harvest

2. Site/coverage : National, with pilot testing in one model village

3. Rationale/background

One of the main objectives of the Philippine fisheries' post harvest subsector is the provision of supplementary livelihood to fishing communities through the use of appropriate post-harvest technology. However, understanding the needs and plight of these communities is an important prerequisite in planning and implementing meaningful and sustainable interventions. Hence, this project is designed as an action research project that is envisioned to study the social and economic well-being of fishing communities, and to come up with an appropriate community-based fish post-harvest technology for these communities. This participatory appraisal technique will serve as a springboard for the development of a holistic framework for community-based fisheries resource management that would involve the area of fisheries post harvest.

In the short term, the project is an attempt to increase the income of municipal fishers through the development and transfer of appropriate community-based post-harvest technologies. It is also meant to enhance the social awareness of the members of the fishing communities on the importance of coastal resource management (CRM). In the long term, the project is aimed at improving the economic status of municipal fishers while reducing pressure on the wild fisheries and improving the management of their fishery resources.

4. Goal and objectives

The goal of the project is to develop model villages for fisheries post harvest through combined research and community-based fisheries management. Specifically, the project objectives are:

1. to provide alternative employment and income-generating activities to fishing communities through development and dissemination of appropriate and sustainable post-harvest technology at the village level;
2. to enhance social awareness of fishing communities about the importance of community-based CRM through consultations and other fora;
3. to develop strategies that will recognize the specific needs and contributions of rural women in fishing communities; and
4. to sensitize the different disciplines, donor agencies, and government and nongovernment institutions on the need to incorporate fish processing-based community projects to their CRM strategies.

5. Key activities

Activity	Description/methodology	Expected outputs
1. Develop appropriate fish post-harvest technology in the model village	<p>This serves as Phase 1. It will include studies and onsite activities that are related, but not limited, to the following: (1) initial identification of sites that can potentially serve as model villages; (2) cataloging of fisheries post harvest related problems in fishing communities through diagnostic consultation and the so-called participatory model of community development; (3) identification of a pilot site that will be developed as a model village; (4) determination of appropriate fisheries post-harvest methodologies for the identified fishing community; (5) determination of the role of rural women in the identified fishing community and development of strategies to recognize the specific needs and contributions of women in that community; (6) assessment of the level of potential support from LGUs and NGOs; (7) evaluation of the socioeconomic impacts of the creation of a fisheries post-harvest village in the identified fishing community; (8) determination of appropriate strategies for the creation of a model fisheries post-harvest village in the identified fishing community; (9) development and dissemination of appropriate fisheries post-harvest technology to the model village; (10) establishment of appropriate fisheries post-harvest facilities and equipment; (11) development of marketing strategies for fish products from the model village; (12) organization of a self-regulating center for long-run diffusion of fish post-harvest technology in the model village; and (13) development of a systematic M&E aimed at determining whether or not the objectives of the projects have been achieved from the perspectives of both the project implementors and the target fishing community.</p>	<ul style="list-style-type: none"> - One model village for fisheries post harvest
2. Replicate the model village in other fishing communities	<p>This serves as Phase 2 of the project. The viability of the “Model Village for Fisheries Post Harvest” from Phase 1 – in the context of other fishing villages with the same characteristics – will be evaluated. If found to be a positive “show-window”, it will be used as a model for replication to other</p>	<ul style="list-style-type: none"> - Replication of the model village in other sites in the country

Activity	Description/methodology	Expected outputs
	<p>fishing communities in the country. Other collaborating agencies will also be sought, at this point, to enable the development of an integrated system for a community-based fisheries management scheme. In addition, comprehensive information dissemination will be conducted in an attempt to sensitize the different disciplines, donor agencies and government and nongovernment institutions on the need for fisheries post harvest to become part of their CRM program initiatives.</p>	

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Develop appropriate fisheries post-harvest technology in the model village																				
2. Replicate the model village in other fishing communities																				

7. Indicative budget : PhP 50.0 million

4.6 Institutional Development and Policy Support Component

The Philippines has still “inadequate fisheries management systems and structures” that hinders the effective management of its fisheries sector. It is acknowledged, though, that significant efforts and resources have been put into improving the system over the years. Such inadequacies in fisheries management systems and structures exist due to three intricately related issues: (1) limited institutional capabilities; (2) weak institutional partnerships; and (3) inadequate/inconsistent fisheries policies (Figure 4.6.a). In turn, there is a host of factors that are associated with these issues. Limited coordination among agencies and inadequate R&D are among the causes of limited institutional capabilities. In the case of inadequate/inconsistent fisheries policies, among the contributing factors are overlap in policies, rules and regulations, as well as limited scientific basis. Weak institutional partnerships is caused by inadequate information and limited public awareness.

The issue of limited human and financial resources is a cross-cutting contributory factor among these three issues. Financial resources are insufficient to carry out the needed capacity improvements and programs for BFAR and other government agencies. The bureau personnel perform multiple tasks in an effort to achieve the agency mission and deliver expected services. Although the Fisheries Code has contributed significantly to building a more solid policy framework for fisheries, much work in policy reforms still needs to be done. Among the key policy issues with inconsistencies and gaps include the following: expansion of municipal waters, functional delineation between LGUs and DENR on the regulation of foreshore/shorelands, and lack of clear national framework for RD&E in fisheries. Government agencies, civil society groups and the private sector need to work more closely. Among the crucial areas of collaboration are R&D, law enforcement, extension services, information systems and market development.

The eight subsector projects are therefore geared towards achieving fully operational fisheries management systems and structures. Project 1 (Strengthening the Bureau of Fisheries and Aquatic Resources' [BFAR's] Institutional Capacity) is meant to enhance the capability of BFAR as the premier fisheries management agency. Project 2 (Building Fisheries Management Capacity through Effective Multisectoral Partnerships), Project 3 (Networks of Local Fisherfolk and Aquaculture Communities) and Project 4 (Alliances for the Integrated Co-management of Fisheries Ecosystems) shall address the issue of weak institutional partnerships. Project 5 (Strengthening Business Sector Capability) is aimed at building the capacity of the business sector, recognizing that its contribution to the development of the industry is paramount. Project 6 (Improving the Policy and Regulatory Framework for Fisheries) addresses the issue of inadequate/inconsistent fisheries policies. Project 7 (Enhancing Fisheries Education and Training for a Sustainable Industry) addresses the issue of limited institutional capabilities, particularly the provision of trained and competent human resource. Project 8 (Enhancing Gender Responsiveness in Philippine Fisheries Industry Development Program) seeks to ensure the integration of a gender perspective within the CNFIDP.

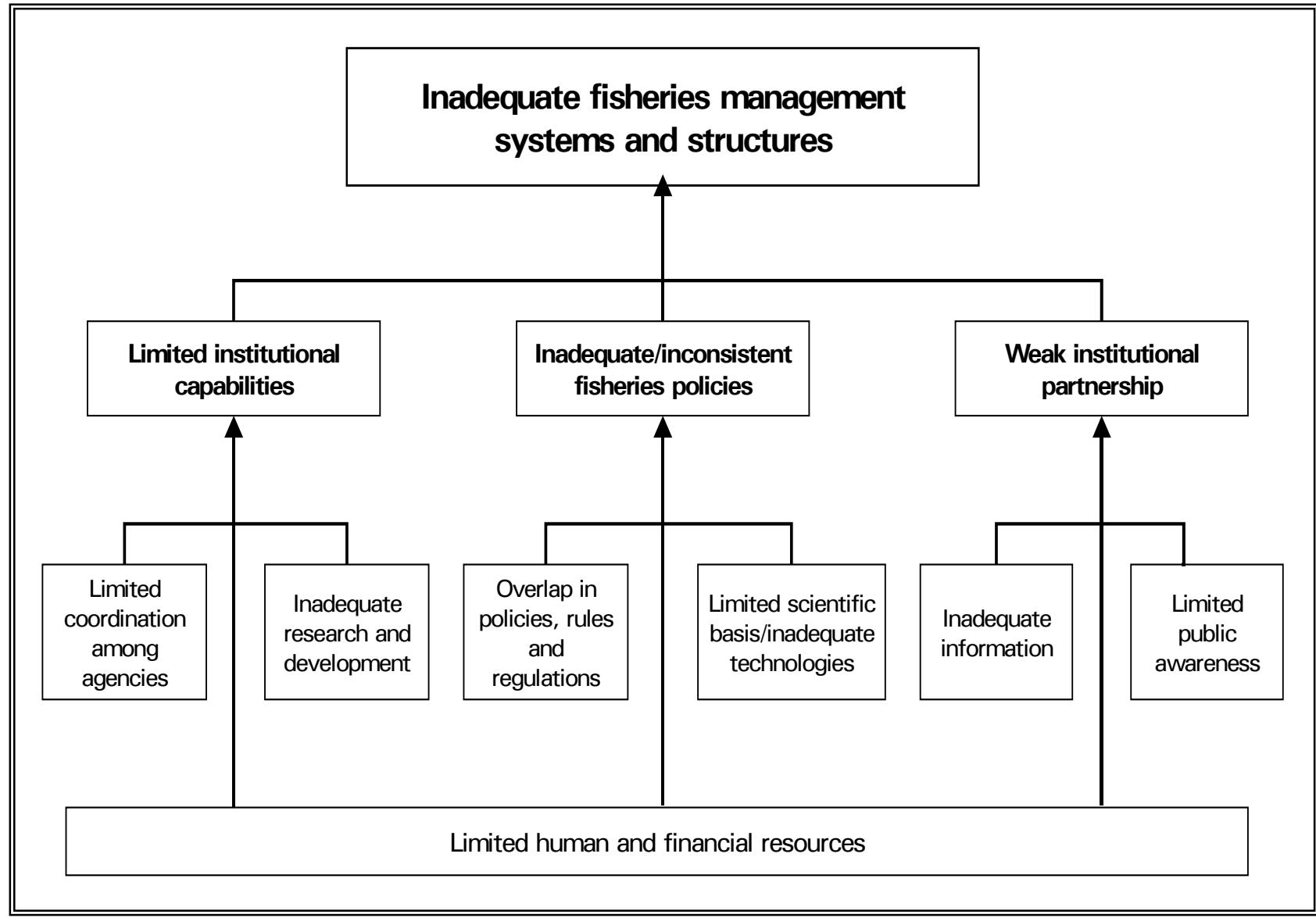


Figure 4.6.a. Problem analysis for Institutional and Policy Support Component.

PROJECT 1 (CODE: ID-1)

1. Project title : Strengthening the Bureau of Fisheries and Aquatic Resources' (BFAR's) Institutional Capacity

2. Site/coverage : National, entire bureau

3. Rationale/background

The BFAR, as the line bureau in charge of the fisheries sector, has quite a number of responsibilities as listed in the Fisheries Code of 1998. Among others, BFAR is responsible for policy and enforcement, industry support and development, regulation of commercial fisheries, research and monitoring. In order to carry out these responsibilities, the bureau maintains 10 divisions, 13 regional offices and 8 technology centers. As part of its work, the bureau coordinates with various international organizations, NGAs, LGUs, civil society groups, fishers' organizations and the private sector.

The bureau has a complex organizational structure. It has broad responsibilities and has to deal with the increasing change in its broader institutional environments. Hence, it has to ensure that it has the capacity to carry out its mission and mandates into the future. Among the problems that BFAR has to deal with are inconsistent policies, overlapping responsibilities, lack of financial resources, inadequate human resources, inadequate technology and the low priority given to fisheries issues.

To improve the agency's ability to carry out its mission effectively, BFAR will have to undergo a systematic capacity-building process. Capacity-building will include examining the functions of the agency; "re-engineering" the agency; designing, establishing and implementing the systems to improve the efficiency of the agency; as well as training and human resource development.

4. Goal and objectives

The goal of this project is to identify, define and implement the set of activities that will support the strengthening of BFAR and match its institutional capacity with the challenges of leading the sustainable management of Philippine fisheries. The project's objectives are:

1. to define the direction and focus of the BFAR capacity-building process towards attainment of the bureau's competency model;
2. to identify and define the reforms, programs, partnerships, systems and resources required by the bureau;
3. to formulate a capacity-building plan for the bureau and its employees, and to integrate this plan with other plans in which the bureau is involved; and

4. to put in place the mechanisms necessary to implement the plan, as well as to monitor and evaluate its implementation on a continuing basis.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Establish internal project management unit	The terms of reference (TOR) of the project management unit will be prepared. This also involves an allocation of staff and other resources to this unit.	<ul style="list-style-type: none"> - Project management unit's TOR - Staff TOR
2. Assess systems level and organizational level capacity	There will be an organizational analysis. Such assessment will be supplemented with focused group discussions involving BFAR employees and stakeholders.	<ul style="list-style-type: none"> - Report on the current state of the fisheries management system and the bureau
3. Develop the BFAR competency model	A series of workshops will be conducted involving the staff and management team of BFAR. Part of these is self-assessment and team building activities. There will be also modeling exercises.	<ul style="list-style-type: none"> - List of operational processes and behavioral indicators - Competency model/ BFAR framework of excellence - Re-articulated vision and mission statements
4. Develop BFAR capacity-building action plan	Internal planning workshops will be undertaken. These will provide the fora for identification of gaps between current and desired situations, articulation of strategies to attain desired situation, and allocation of resources (staff and financial) to implement the strategies. From these, several plans will be produced.	<ul style="list-style-type: none"> - BFAR Capacity Building Action Plan - Revised organizational chart, including human resources plan - Systems and infrastructure development plans - Communication plan
5. Implement capacity-building action plan	The capacity-building plan shall be implemented as agreed. Appropriate resources required for implementation shall be allocated.	<ul style="list-style-type: none"> - Plan implementation started

Key activity	Description/methodology	Key outputs
6. Monitor and evaluate progress	A system for progress monitoring shall be developed. BFAR staff, external reviewers and relevant stakeholders shall be involved in M&E.	<ul style="list-style-type: none"> - Periodic progress and performance reports - Reports of external reviewers - Results of stakeholders' feedbacks
7. Review and renew BFAR capacity-building action plan.	Planning workshops, as necessary, will be undertaken to review and/or update the plan.	- Updated action plan

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Establish internal project management unit																				
2. Assess systems level and organizational level capacity																				
3. Develop the BFAR competency model																				
4. Develop BFAR capacity-building action plan																				
5. Implement capacity-building action plan																				
6. Monitor and evaluate progress.																				
7. Review and renew BFAR capacity-building action plan.																				

7. Indicative budget : PhP 100.0 million

PROJECT 2 (CODE: ID-2)

1. Project title : **Building Fisheries Management Capacity through Effective Strategic Multisectoral Cooperation Arrangements**

2. Site/coverage : National, with participation of all institutions involved in fisheries management

3. Rationale/background

There is a wide range of institutions involved in the fisheries sector. These institutions include not only a variety of government institutions, but also local communities, civil society organizations and business groups. Many institutions claim that the lack of financial resources prevents them from effectively performing their respective roles in fisheries management. Some institutions, including government agencies, have overlapping functions and responsibilities. These overlapping functions have resulted not only in the inefficient use of whatever scarce resources are available, but also in poor institutional accountability due to functional redundancies.

In recent years, there has been an increasing emphasis on partnerships not only within development sectors but also across sectors. The three key benefits from functional partnerships are: greater efficiency, improved effectiveness and increased equity. These benefits are translated into various positive outcomes for each participant in the partnership. Examples of benefits include: (1) government agencies may experience less bureaucracy and lower administrative costs; (2) private companies may experience increased shareholder and societal values, enhanced corporate reputations and greater competitiveness; and (3) civil society organizations may experience greater access to resources, as well as enhanced human development and empowerment. The preparatory consultative works in developing this industry plan have consistently identified poor partnering skills as a major shortcoming of the Philippine fisheries sector. Hence, management capabilities must be enhanced to make strategic cooperative arrangements more effective.

4. Goal and objectives

The goal of this project is to establish effective partnerships that are deemed critical for the sustainable management of Philippine fisheries. The project's objectives are:

1. to conduct assessments of the readiness of potential partner institutions to enter into strategic cooperative arrangements;
2. to build organizational skills needed in effective partnering among all institutions involved;

3. to establish suitable cooperation arrangements in at least the following areas: (1) information systems, (2) policy, (3) building local community capability, (4) RD&E, (5) fisheries resources management, (6) product and market development, (7) building business sector capacity, (8) information and education campaign, (9) law enforcement, (10) financing and investments, and (11) education; and
4. to build a common/shared plan for each of the identified strategic area of cooperation with clear roles, responsibilities and accountability for all institutions involved.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Identify and secure involvement of institutions/ organizations in priority areas of cooperation;	<p>This involves a series of consultations and meetings with the potential cooperating institution. Introductory seminars concerning the partnerships will be provided.</p> <p>Planning workshops will be conducted that would include visioning exercises, identification of resources needed and team-building. Among the components to be developed are the organizational structures, action plans and proposals. Various trainings, such as those that relate to partnership, leadership, program planning and project management will be undertaken.</p>	<ul style="list-style-type: none"> - Sponsors/convenors for each partnership identified - Core groups formed - Operational structure - Formal agreements, such as MOUs, MOAs and contracts - Resource commitments - Strategic action plans (including programs and projects) - Grant and funding proposals - Project management manuals on systems and procedures
2. Implement the plans and maintain the strategic cooperative arrangements.	<p>The strategic action plans shall be implemented as adopted. Communication systems, such as web pages, will be developed. There will be regular meetings along the course of implementation. Likewise, there will be an M&E to track the progress of plans implementation.</p>	<ul style="list-style-type: none"> - Project progress reports - M&E reports
3. Sustain and strengthen the strategic cooperative arrangements	<p>Strategic actions plans will be assessed by internal and external reviewers. Government will also review the plans based on national development plans. Based on the results, the plans shall be revised. Workshops will be conducted to document the lessons learned and best practices in developing and strengthening the cooperation.</p>	<ul style="list-style-type: none"> - Report on best practices - Revised plans (e.g., rolling three-year plans)

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Identify and secure involvement of institutions/ organizations in priority areas of cooperation;																				
2. Build the organization and management required for each strategic cooperation																				
3. Implement the plans and maintain the strategic cooperative arrangements.																				
4. Sustain and strengthen the strategic cooperative arrangements																				

7. Indicative budget : PhP 50.0 million

PROJECT 3 (CODE: ID-3)

1. Project title : Networks of Local Fisherfolk and Aquaculture Communities

2. Site/coverage : National

3. Rationale/background

There is an increasing recognition around the world that new approaches for the sustainable management of fishery resources are necessary. Traditional management approaches that rely only on government agencies (national agencies and LGUs) have not been entirely successful. Co-management – or the arrangement whereby management responsibilities over fishery resources are shared between the government and the local fishing communities – has been recognized as a promising option for reform of fisheries governance institutions.

Involving local communities in the co-management of fisheries resources will not be successful, however, without ensuring that the communities themselves have the capacity to participate meaningfully in the co-management efforts. Networks can be an effective mechanism for empowerment and building the capacity of local communities. This may be achieved through the sharing of information and the delivery of support programs. Networks can also serve as channels for the distribution of capacity-building support to local communities. Eventually, such networks will be able to provide other opportunities and services for local communities to meaningfully participate in the co-management of fishery resources.

4. Goal and objectives

The project's goal is to build networks of local communities to serve as channels for the sharing of information and for the delivery of financial and other support services for capacity-building. The project's objectives are:

1. to establish or encourage the establishment of community-based networks for fisherfolk and aquaculture farmers;
2. to provide the coordination infrastructure for these networks;
3. to focus the network activities initially on information exchange and advocacy and to deliver later other forms of support; and
4. to encourage linkages between these networks and other institutions involved in fisheries management.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Establish the network coordinating units	As part of establishing the network coordinating units, network coordinators and staff will be recruited or appointed. These personnel will be duly trained. Planning workshops will be conducted to produce relevant strategic and action plans.	- Network coordinating units established - Strategic plan - Action plans
2. Build the networks	Needs assessments will be done to determine the specific requirements of the networks. Related activities to be undertaken include conducting training courses/seminars on community organization and empowerment, recruitment of network members, and visits to regions for presentations and meetings with community organizations. A program for capacity-building and accessing grant support will be developed.	- Networks of local fisherfolk and aquaculture communities established - Community-based organizations trained - Directory of community groups and leaders - Capacity-building program developed (including design of targeted grant support programs) - Linkages with NGOs, civil society organizations (CSOs) and other stakeholder groups established
3. Conduct network activities	This will initially focus on collecting of information, news and case studies to share. Other support services may be provided later.	- Network newsletter - Network website
4. Implement community grants program	Grant applications will be solicited from the concerned communities or networks. Relevant proposals will be awarded grants.	- Programs implemented

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Establish the network coordinating units																				
2. Build the networks																				
3. Conduct network activities																				
4. Implement community grants program																				

7. Indicative budget : PhP 100.0 million

PROJECT 4 (CODE: ID-4)

1. Project title : Alliances for the Integrated Co-management of Fisheries Ecosystems

2. Site/coverage : National

3. Rationale/background

The traditional approach to managing the fishery resources is to regulate access to the resource. These management responsibilities are often assumed by the national and/or the local government agencies. Unfortunately, there are few examples of truly successful fisheries management efforts around the world. Government institutions tasked with regulating access to fisheries are unable to effectively address resource management issues that increasingly include the use of these resources for economic activities other than fishing. In the past years, the participation of local communities in the management of resources or “co-management” has shown promise but success has so far been limited. The participation of local communities in the implementation process will allow such co-management efforts to be more successful. Their participation is also crucial in establishing the management objectives, as well as in identifying the knowledge base to be considered in decision-making. Such local community participation is called “integrated co-management.”

Another reason cited for the limited success of fisheries management efforts by local governments in the Philippines is using “municipal waters” as the basic unit for resource management. This is impractical due to the fact that most fishery resources are actually shared by two or more municipalities. Since such resources cannot be managed independently of the actions or efforts by other management institutions, sharing the resource through an “ecosystem approach” is often necessary. The ecosystem approach goes beyond ecological boundaries. It stresses collaborative arrangements and partnerships across management institutions. The integrated co-management of fisheries ecosystems through effective alliances, therefore, requires multistakeholder participation. These may include but not be limited to the following institutions: LGUs (villages, municipalities and provinces) with jurisdiction over the ecosystem or which residents are users of the ecosystem; local communities dependent on the ecosystem; CSOs; BFAR; private sector; and other government agencies.

4. Goal and objectives

The goal of the project is to build truly effective and formal alliances among concerned stakeholders for the integrated co-management of specific ecosystems. The objectives of the project are:

1. to conduct assessments of the readiness of potential partners in particular ecosystems to enter into formal partnership arrangements;

2. to build organizational skills in effective partnering among all institutions involved;
3. to identify opportunities to build technical capabilities of the institutions; and
4. to build a common/shared plan and M&E systems for the integrated co-management of particular ecosystems with clear roles and responsibilities for all institutions involved.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Identify and prioritize ecosystems to be managed through the alliances	Criteria for the selection of fishery ecosystems will be developed. The actual selection of the priority ecosystems shall be undertaken in consultation with experts, technical working groups and other concerned stakeholders.	<ul style="list-style-type: none"> - Prioritized list of ecosystems
2. Identify and enlist the involvement of institutions/ organizations in the alliance	There will be consultations and meetings with potential partners in the alliance for each ecosystem. The rationale behind establishing alliances shall be introduced through appropriate seminars.	<ul style="list-style-type: none"> - Sponsors/ convenors for each alliance identified - Core groups formed
3. Build an alliance for each ecosystem	Planning and partnering workshops that include visioning exercises, identification of resources needed and team-building will be undertaken. Training courses pertaining to areas like leadership and program/project management will be also conducted.	<ul style="list-style-type: none"> - Organizational setup for each alliance - Formal agreements (e.g., MOAs, MOUs, contracts, etc.) - Resource commitments - Alliance action plans (including programs and projects) - Project management manuals on systems and procedures
4. Implement the alliance plans and maintain the alliances	The agreed alliance plans shall be implemented. Among others, web pages will be developed as avenues for communications. There will be regular alliance meetings along the course of plan implementation. Likewise, there will be M&E to track the progress of implementation of specific programs/ projects/alliances.	<ul style="list-style-type: none"> - M&E reports - Alliance project reports
5. Institutionalize and	Alliance plans will be assessed	<ul style="list-style-type: none"> - Report on best

Key activities	Description/methodology	Key outputs
sustain the alliances	by internal and external reviewers. Based on the results, the plans shall be revised. Workshops will be conducted to document the lessons learned and best practices in institutionalizing the alliances.	practices - Revised plans (e.g., rolling three-year plans)

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Identify and prioritize ecosystems to be managed through the alliances																				
2. Identify and enlist the involvement of institutions/ organizations in the alliance																				
3. Build an alliance for each ecosystem																				
4. Implement the alliance plans and maintain the alliances																				
5. Institutionalize and sustain the alliances																				

7. Indicative budget : PhP 150.0 million

PROJECT 5 (CODE: ID-5)

1. Project title : Strengthening Business Sector Capability

2. Site/coverage : National

3. Rationale/background

Many studies have shown that the Philippine fisheries sector does not have the adequate systems and structures to sustainably manage its resources. While attention has been focused on the role of government agencies in fisheries management, there is increasing recognition that the development of the country's fisheries cannot be undertaken efficiently and effectively without involving the private sector. Unfortunately, adequate partnership mechanisms between the government and the private sector have neither been fully established nor have they been effectively nurtured. At the same time, the business sector itself has not established a strong track record in effective partnering among its individual and organizational members.

A key element to the long-term survival and growth of the business sector in fisheries will be the sector's recognition that the business landscape is changing. The business environment is expected to change rapidly in the coming years due to globalization, changing preferences of consumers, increasing importance of corporate environmental responsibility and development of new technologies. The sector then, at the level of individual firms, subsector groups and the entire sector, will need to institute changes at a faster pace. It will be important for our industries to begin to change their way of thinking and their manner of doing things. Among others, firms will have to change their management practices, the workforce will need to acquire new skills, and new technologies will have to be developed and/or adopted.

There will be a greater need to emphasize collaboration, partnerships and alliances to expand markets rather than competition within existing limited markets. There will be a greater need to utilize resources more effectively. It will be necessary to invest in better technologies, better training of the workforce and improvements in product quality. For these reasons, capacity-upgrading will have to be undertaken by the business sector with the government support, whenever possible. The various industry associations can lead such capacity-upgrading after they have had the opportunity to undertake the capacity-building processes on themselves.

4. Goal and objectives

The project's goal is to provide business institutions of the fisheries industry with a framework to work collectively – among themselves and with government and other institutions involved in fisheries – in building the

management capability to meet the many challenges facing the industry. The project's objectives are:

1. to build effective partnerships among the many industry associations within the fisheries sector;
2. to strengthen the capacities of these associations to better represent and serve their member-firms;
3. to build effective partnerships between these associations and government institutions, particularly in the area of market development and financial support for the industry;
4. to build a shared vision of a highly productive, sustainably managed and globally competitive Philippine fisheries industry and subindustries; and
5. to determine the capability/capacity gaps of the industry and develop plans to address these gaps on a continuing basis.

5. Key activities

Key activities	Description/methodology	Key outputs
1. Build a partnership of associations within the fisheries business sector	A series of strategic planning workshops among business industry associations will be undertaken. Such industry players shall agree on the strategic needs of the industry, including their respective roles and responsibilities.	<ul style="list-style-type: none"> - Formal agreements - Organizational structure - Medium and Long term action plans - Plans for implementation, communication and M&E
2. Assess sub-industry capacity-upgrading requirements	<p>Several activities will be undertaken to assess the subindustry's capacity-upgrading requirements. These may include formal surveys, focus group discussions, workforce training needs assessment and technology gap identification. Such capacity-building needs may be linked with Project 2 (Building Fisheries Management Capacity through Effective Multisectoral Partnerships).</p> <p>For example, education and training needs will be linked with education partnership, while technology needs may be submitted to RD&E partnership.</p>	<ul style="list-style-type: none"> - Assessment of sub-industry capacity-upgrading requirements
3. Develop action plan for sub-industry capacity-upgrading	Planning workshops and stakeholder consultations will be undertaken to develop the relevant plans. Financial support (at least for the first three years) will be sourced out for certain strategic activities to be undertaken by the private sector to upgrade industry capabilities.	<ul style="list-style-type: none"> - 3-year action plans for each sub-industry

Key activities	Description/methodology	Key outputs
4. Implement the action plans at industry and subindustry levels	The action plans shall be implemented as agreed upon at the appropriate industry and subindustry levels. Communication systems, such as webpages, will be developed. There will be regular industry and subindustry meetings along the course of action plans' implementation. Likewise, there will be an M&E to track the progress of plan implementation.	- Industry/subindustry progress reports - M&E reports - Annual progress review
5. Implement targeted grant support programs	Grant applications will be solicited from the concerned industry and subindustry organizations. Government together with donor agencies will assist industry groups' access grant and donor funding to support their strategic programs.	- Grant and donor support programs implemented
6. Review and renew industry and subindustry plans	Industry and subindustry plans will be reviewed by internal and external reviewers. Government will assess progress of industry and subindustry plans in accordance with national development plans. Based on the results, the plans shall be revised to conform with the new circumstances.	- Revised plans

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Build a partnership of associations within the fisheries business sector.																				
2. Assess subindustry capacity-upgrading requirements																				
3. Develop action plan for subindustry capacity-upgrading																				
4. Implement the action plans – industry and subindustry levels																				
5. Implement targeted grant support programs																				
6. Review and renew industry and subindustry plans																				

7. Indicative budget : PhP 100.0 million

PROJECT 6 (CODE: ID-6)

1. Project title : Improving the Policy and Regulatory Framework for Fisheries

2. Site/coverage : National

3. Rationale/background

The Medium-term Philippine Development Plan (MTPDP) covering the period 2004-2010 recognizes the critical need for governance reforms. Key reforms include the: (1) clarification of roles and responsibilities of LGUs, DENR and DA in delivering agriculture and fisheries services; (2) addressing institutional overlaps among DENR, DA and other government agencies; and (3) harmonizing the disparate component agencies and networks of the RD&E system (DA, DENR and DOST) with the goal of eventual consolidation and unification.

Although not specifically discussed in MTPDP, many stakeholders of the fisheries sector continue to believe that there is an increasing urgency in the need to create a Department of Fisheries. As such, it will be a separate and distinct agency from the Department of Agriculture. It is also believed that such a department could also handle more effectively international policy issues in fisheries, including access to fishing grounds outside our EEZ waters and trade-related issues. Policy frameworks also have to be reviewed in order to establish enabling environments for: (1) greater public and private sector collaboration and partnerships, (2) industry self-regulation and (3) more timely technology transfer.

4. Goal and objectives

The goal of this project is to move swiftly towards establishing a policy and regulatory environment that supports the effective and efficient management of the fisheries sector. The project objectives are as follows:

1. to conduct a careful assessment of the existing policies and regulations that have an impact on the system-level capacity of the fisheries sector, including the identification of gaps, inconsistencies and overlaps;
2. to undertake the research initiatives needed to make recommendations for necessary policy reforms;
3. to conduct information and education campaigns on critical policy issues; and
4. to undertake advocacy works to push for necessary policy reforms.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Solicit multistakeholder participation	A series of consultations, such as focus group discussions, will be undertaken to discuss the required policy agenda for the fisheries sector. There will be also initial review of ongoing policy initiatives.	- Policy agenda for fisheries
2. Undertake policy research/studies	Once the relevant policy problems have been identified and agreed upon, policy research/studies will be undertaken. These may take the form of commissioned studies with either individual experts or academic and research organizations.	- Policy briefs/ discussion papers - Initial drafts of new or revised rules/ regulations
3. Consult with multisectoral stakeholders	Policy workshops will be conducted to review the results of the outputs of the commissioned policy research/studies.	- Revised drafts of new or revised rules/ regulations
4. Conduct advocacy/public awareness activities	The technical outputs will be transformed into educational and information materials. These may take various print, video and audio formats.	- Educational papers - Primers/brochures - Media materials

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Solicit multistakeholder participation																				
2. Undertake policy research/studies																				
3. Consult with multisectoral stakeholders																				
4. Conduct advocacy/public awareness activities																				

7. Indicative budget : PhP 26.0 million

PROJECT 7 (CODE: ID-7)

1. Project title : Enhancing Fisheries Education and Training for a Sustainable Industry

2. Site/coverage : National

3. Rationale/background

This 20-year CNFIDP needs adequately trained human resources to effectively implement the different projects contained therein. Without support to human resource development, there is no assurance that an adequate number of qualified, competent and well-trained Filipinos will be available to implement, manage and ensure the success of CNFIDP. There is currently a limited number of technical personnel – particularly scientists and researchers – who are capable to continuously gather, analyze and document the data and information needed for rational fisheries management and development. Well-trained extension personnel are critically needed to train fishers on appropriate and sustainable fishing operations. Meanwhile, fishery entrepreneurship training is required by aquaculturists and fish processors.

At its present state, fisheries education in the country needs a critical boost and serious support to enable it to effectively perform the task of providing qualified human resources. The most compelling evidence of this condition is the Fisheries Technologists Board Examination that was institutionalized in 2003 as mandated by the Fisheries Code of 1998. Only the graduates of the College of Fisheries and Ocean Sciences of the University of the Philippines in the Visayas have performed satisfactorily with board passers occupying the top slots regularly and with passing percentage of about 85%. The nearest school is the Central Luzon State University with passing percentages ranging from mid-30% to 50%. Most schools have very low passing rates, and some have even obtained zero passing percentages. In the 2003 board exam, 13 out of the 23 schools which graduates took the exam had no board passer at all. This statistics necessitates the serious imperative to upgrade, enhance and improve our fishery schools and training centers.

There is also a declining enrolment in fisheries schools with many high school graduates opting for popular courses, such as nursing and computer science. A lack of scholarships for graduate degrees has limited the number of graduate students, leading to a serious lack of qualified academicians and researchers within the next few years. Given the limited pool of trained personnel, opportunities in the industry such as value-added products, new species for culture and even new fishing technologies, will be very difficult to take advantage of. For these reasons, fisheries education enhancement or upgrading will have to be undertaken by the fisheries educational institutions with the support, whenever possible, of the government.

4. Goal and objectives

The overall goal of the project is to enhance the fisheries education system of the country by providing the necessary logistical and human resource support. The project's specific objectives are:

1. to determine the human resource requirements of the fisheries industry and to assess the capability of schools and training centers to provide such human resource;
2. to match the industry human resource needs with education facilities and to establish modern instructional facilities at fisheries schools and training centers; and
3. to provide advanced training for fisheries technology practitioners.

5. Key activities

Key activity	Description/methodology	Key outputs
1. Assess the human resource requirements of the fisheries industry	A study will be conducted to rapidly assess the sector's human resource needs. Quantitative projections will be made concerning the requirements of both private and public sector components of the industry.	- Report on industry's human resource needs
2. Assess capabilities of fisheries education institutions	This may take various forms of research, such as social surveys and organizational analysis. Experts in the field shall be commissioned to undertake the required studies.	- Report on capabilities of Philippine educational institutions
3. Develop a plan for upgrading of educational and training facilities for fisheries human resource requirements	A plan will be developed to determine the requirements for modernizing the facilities and upgrading the capabilities of educators. Experts in the field shall be commissioned to undertake the study.	- Investment plan for upgrading educational facilities - Plans for building capability of fisheries educators and trainors
4. Upgrade educational facilities	This will be the actual establishment of the educational facilities. Included here is the installation of the needed equipment and fixtures.	- Improved educational and training facilities
5. Upgrade the capabilities of educators and trainors	Scholarships for advanced studies and training courses will be provided. Qualified educators and trainors will be sent to institutions of higher learning, both in the Philippines and abroad, to upgrade their skills.	- Enhanced capabilities of faculty and trainors

6. Schedule of activities

Activity	2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Assess the human resource requirement of the fisheries industry																				
2. Assess capabilities of fisheries education institutions																				
3. Develop a plan for the upgrading of educational and training facilities for fisheries human resource requirements																				
4. Upgrade educational facilities																				
5. Upgrade capabilities of educators and trainors																				

7. Indicative budget : PhP 150.0 million

PROJECT 8 (CODE: ID-8)

1. Project Title : Enhancing Gender Responsiveness in Philippine Fisheries Industry Development Program

2. Site/Coverage : National

3. Rationale/Background

In fisheries, women remain at the margins even among the marginalized municipal fisheries sub-sector. Even as women perform multiple roles to sustain their fishing livelihoods, their role in the industry have not been given due attention as welfare and are continuously neglected and contribution in labor are not valued. Government programs and policies remain, if at all pursued in local governance, as the underdeveloped fishing industry is continually challenged to be gender responsive.

Women from fishing households perform predominant roles in the pre- and post harvest activities, yet valuation of their labor are not given its due attention. As capture activities are predominantly male, pre- and post-harvest are the domains of women. Particularly, women are involved in hauling nets and installing stationary ones, when allowed to join capture fishing, regarded as support for men together with their children, assisting the males with their fish catch. Even as they are allowed to have permits for seaweeds farming, only their husbands apply for permits, as manifestation of cultural barriers that is deeply entrenched in coastal communities⁷. The fishing industry is partial to economically important production activities, production for market value, where women's capture activities, i.e. capture of *bangus* fry and shell gleaning usually for household consumption, do not figure in the mathematics of market valuation, which in effect undervalue women's labor and contribution.

As diverse as the women's role in fishing activities and their multiple task in ensuring the survival of their fishing households, almost always, their participation are not counted in the final production outputs, because women's roles are considered secondary, adjunct or extension of housework in fish production process. However, in commercial fishing, women and children give their share in production, i.e. offshore fishing activities using *sapyaw* and beach seining. Their roles comprise more or less 60% of the labor, but continue to be unrecognized as their plights are perennially placed in the margins of fishing concerns.

Despite their subordinate status, women continue to be at the forefront of resource management, but they continually face problems of lack of representation, unrecognized participation in co-management bodies, lack of

⁷ Case Study on seaweeds farming in Calatagan, (Food Insecurity And Gender Inequality: The Case Of Market Access For Philippine Seaweeds, Tanchuling, H. and Durano, M., 2005).

access to economic resources and technology, resource management efforts translated to economic gains remain elusive.

One of the major impediments to mainstreaming gender—which is the accepted strategy in enabling fairer participation and benefit among men and women in economic, political and social development, is the lack of information on the differential condition by sex in the sector. At the minimum, sex disaggregation if not gender data, is needed to achieve gender mainstreaming in policies and programs of the government, but so far, local government units do not have such data on the fishing industry, more so in municipal fishery sub-sector. This reflects how women's role in fisheries production are treated insignificantly as labor remain only recognized in the reproductive realm which continue to be undefined and undervalued.

Thus, the challenge remain, engendering the fishing industry will start from an articulated women fisheries agenda, towards developing gender responsive policies and programs for women in fisheries that the women fisherfolk themselves define. It is equally important that planning processes involve women—with the recognition of their important roles in the sector—and other stakeholders in the development of a gender-responsive sector plan.

Promoting greater women's participation and benefit in fisheries within the CNFIDP is deemed urgent, as it is essential. Considered as an evolving strategy, the challenge is to forward an integration of the gender perspective where the inclusion of women's participation for development in the fisheries sector will be prioritized.

4. Goals and Objectives

The project aims to promote gender equality and women empowerment in fisheries by enhancing the gender responsiveness of fisheries industry development processes. It seeks to ensure the integration of a gender perspective within the CNFIDP.

The specific objectives in enhancing gender responsiveness in Philippine fisheries development include:

1. To develop gender responsive programs and projects in the fisheries sector
2. To ensure effective participation of women fishers in all sectoral decision-making processes
3. To enhance the capabilities of women fishers on sustainable resource management, organizational development and enterprise development
4. To review best practices of and/or identification of women-managed areas (WMA) for replication
5. To institutionalize mechanism/s for gender mainstreaming in fisheries sectoral planning and policy development that is inclusive of women in fisheries stakeholders at the national and local levels
6. To strengthen the institutional capacities of BFAR to mainstream gender in fisheries programs and policies

5. Key activities

Key Activities	Description/Rationale	Expected Output
Conduct of gender-disaggregated inventory/database	A gender-responsive framework for information generation in fisheries industry will be developed. There will be an identification of gender data needed, survey and consolidation of data. The activity will include nationwide registration of women fishers. The designing of the database will be conducted as a tool for gender-disaggregated data generation. The integration of gender-related information management in other programs under CNFIDP implementation should be ensured.	Gender-disaggregated database
Conduct of national and regional consultations on the development of a comprehensive program for women fishers	The action will involve the conduct of consultations and workshops at the regional and national level with people's organizations/federations, NGO's, women's groups, fisheries experts and related government agencies within the fisheries sector to determine women's development agenda and identify programs that will address the needs of women fishers as equally important actors in the fisheries industry.	Comprehensive program and plan for women fishers; Grant and Funding proposals
Conduct of research on best practices of WMA	This will employ a participatory action research approach through conducting FGDs and case studies on selected areas that will determine and review best practices of women-managed fisheries/coastal areas. This will be determinant with the replication to other potential areas.	Research paper on best practices of WMA;
Establishment of new sites for the replication of WMA	There will be a conduct of resource mapping and identification of coastal and aquatic resources that are being utilized and managed by women fishers as basis for the identification of suitable sites for the establishment of women-managed areas; setting up of mechanisms to institutionalize women-managed areas;	New sites for WMA (at least ten sites)

Key Activities	Description/Rationale	Expected Output
	and development and implementation of coastal resource management plans/programs. Policies supportive of this initiative should be in place.	
Development of sustainable livelihood projects and marketing assistance specific for women fishers	A series of consultations will be conducted to ensure that livelihood programs are not only sustainable but also suited for women. The idea is to support and build on existing livelihood activities of women while expanding their economic opportunities at the same time.	Feasibility studies; Livelihood projects for women implemented; Budget allocation/grants; Product development for women's products; product catalogues; Market linkages
Conduct of TNA and gender-responsive trainings and education for women, FARMCs, fisherfolk organizations/ cooperatives, other stakeholders	Various trainings and educational activities will be undertaken such as leadership training, consciousness-raising, business/enterprise development training, training on organizational development and management, training on sustainable resource management, networking and partnership building, among many others. Prior to this is the development of training modules through the conduct of training needs analysis.	Capability-building programs implemented; IEC materials; More women leaders; Training modules
Development of gender mainstreaming curriculum as part of fisheries education	There will be consultations and write-shops with concerned stakeholders for the development of a curriculum for mainstreaming gender in fisheries education. Promotion and piloting of such curriculum will be undertaken through partnership with academic institutions and local government units.	Integrated gender in fisheries course curriculum
Capacity-building of BFAR personnel involved on gender	The activities will include the conduct of gender audit, GSTs, gender-integrated PIME, and the institutionalization gender	Gender Audit; TNA; Functional

Key Activities	Description/Rationale	Expected Output
mainstreaming including the strengthening of BFAR GAD Focal System	mainstreaming mechanisms. Partnerships between BFAR GAD Focal System with partners/stakeholders particularly, women fishers, NGOs, and other relevant government agencies such as NCRFW, and NAPC will be an important component of this program.	gender focal system; Gender mainstreaming tool kit; Regular and updated GAD Plans and Budget; GAD Plans and Reports
Formulation of policies promoting gender equality and women empowerment in fisheries	The formulation of policies will involve series of consultations on the review of existing policies, identification/validation of policy gaps and issues on gender and policy recommendations to enhance policies consistent with gender development and women empowerment. Drafting and issuance of said policies shall be undertaken.	Executive policies on gender issued; Legislative proposals drafted;

Total Indicative Budget: P165 Million

CHAPTER 5

MEDIUM-TERM IMPLEMENTATION SCHEME

This chapter provides key elements of the implementation scheme for the first medium-term period (2006-2010) components of CNFIDP. These elements are described in general terms, and expressed in a form intended to be expanded and detailed by BFAR during the operational programming stage that immediately follows formal CNFIDP adoption. *Section 5.1 (Institutional Arrangements)* describes general elements of the proposed organizational structure for plan implementation, as well as mechanisms to enhance the participation (and clarify the roles and responsibilities) of relevant fisheries agencies and stakeholders. As the main national line agency responsible for fisheries, BFAR shall take the lead role and responsibility for CNFIDP implementation. The BFAR shall engage industry groups and various multi-agency and multistakeholder fora to facilitate and enhance sectoral consultations, collaboration and participation which are essential to successful plan implementation. Contingent on operational realities and evident needs during plan implementation, BFAR shall consider establishment of partnerships in a number of thematic areas. These partnership arrangements shall serve as vehicles to: (1) effect participation and consolidation of resources and strengths across relevant fisheries agencies/stakeholders, and (2) support implementation of projects under CNFIDP.

Section 5.2 (Implementation Schedule and Indicative Costs) provides the phasing and costing of the 41 projects comprising the 5 medium-term program components of CNFIDP. Most of the projects (36 out of 41) involve tasks and activities to be implemented over the entire 5-year medium-term period (2006-2010). The indicative cost for implementing the 41 projects total about PhP 6.7 billion for the entire 5-year period (2006-2010) or roughly PhP 1.33 billion annually. Distribution of this total cost across the 5 medium-term program components of CNFIDP is as follows: (1) Municipal Fisheries – 35%; (2) Commercial Fisheries – 23%; (3) Aquaculture – 10%; (4) Post Harvest – 20%; and (5) Institutional Development and Policy Support – 12%. *Section 5.3 (Monitoring and Evaluation Scheme)* describes key M&E elements of CNFIDP. Inputs for development of performance indicators at the plan level are provided, and general elements of the M&E implementing mechanism (covering M&E responsibilities, procedures and schedules) are briefly described. The M&E scheme should be able to track progress in achieving the overall goal and objectives of the plan, provide accurate and timely feedback to implementing groups and partners, and clearly define responsibility and accountability for implementation performance and achievement of plan objectives.

5.1 Institutional Arrangements

This section describes general elements of the proposed institutional arrangements for CNFIDP implementation, particularly its medium-term program components subject to existing laws and other relevant rules and regulations that may need to be promulgated. Moreover, the section outlines mechanisms to enhance participation (and clarify roles and responsibilities) of relevant fisheries agencies and stakeholders in plan implementation. The prescribed institutional arrangements are described in general terms, and are intended to be expanded and detailed by BFAR during the operational programming stage that immediately follows formal CNFIDP adoption. Concededly, the institutional arrangements provide a general scheme and are preliminary in nature, and thus should be periodically reviewed and enhanced during the course of CNFIDP implementation.

The proposed institutional arrangements for implementation of CNFIDP are illustrated schematically in Figure 5.1. The BFAR will be primarily responsible for implementation of CNFIDP. Under the Fisheries Code of 1998 (Section 65), BFAR, as the line agency responsible for fisheries, is mandated to prepare and implement CNFIDP. Implementation of the plan will involve the relevant offices of BFAR, including its various divisions, sections, regional offices and centers. Operationally, the projects to be implemented are categorized into five program components, namely: Municipal Fisheries, Commercial Fisheries, Aquaculture, Post Harvest, and Institutional Development and Policy Support. As such, the bureau shall take the lead in operational uptake, programming and implementation of the various projects under each of the five program components. Necessarily, the role of the bureau in CNFIDP implementation will be crucial and multifaceted, including: preparation of detailed organization and management structure and processes for plan implementation; M&E; elaboration of financing plan for CNFIDP implementation; elaboration of partnerships to involve relevant agencies, partners and stakeholders in plan implementation; and provision of key technical and administrative support.

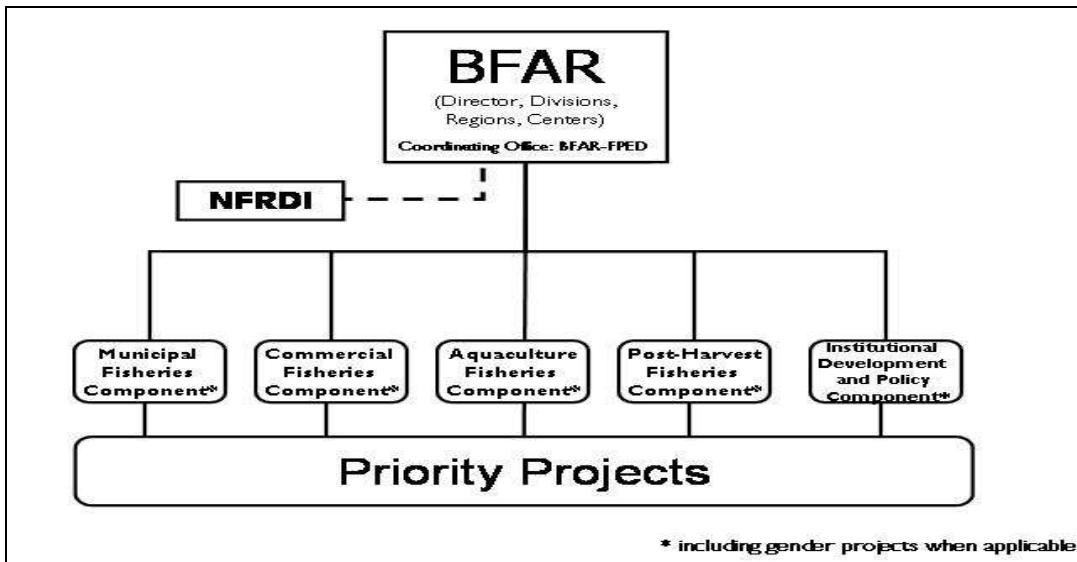


Figure 5.1. Proposed institutional arrangements for CNFIDP implementation.

Consultative Mechanism. Recognizing the wide array of institutions and stakeholders that needs to be involved in plan implementation, BFAR shall mobilize or engage existing industry groups and consultative fora as the means or venue to facilitate and enhance sectoral consultation, partnership, participation and collaboration which are essential for the successful and effective programming and implementation of CNFIDP. In this manner, the BFAR will facilitate a regular consultative dialogue with representatives from across the fisheries sector or industry, including those coming from private firms (of various scales), government (both NGAs and LGUs) and civil society groups, public and private donors and lending institutions. The composition and operational modality for this consultative mechanism shall be determined and elaborated by BFAR during the operational programming stage after the formal CNFIDP adoption.

Areas of Cooperation. The successful implementation of various projects under the CNFIDP would require the participation of many relevant fisheries agencies and stakeholders. The sector involves a large number of entities in the government, private sector and civil society. Aside from BFAR, these entities include other NGAs, LGUs, research and educational institutions, private firms, businesspersons, farmers, community/fisherfolk organizations, NGOs, financial institutions (government and private), regional bodies and international organizations. The BFAR will need to harness the participation and support of these entities in effective partnership arrangements to fully achieve the goal and objectives of CNFIDP. Hence, contingent on operational realities and evident needs during plan implementation, BFAR shall consider establishment of partnerships in a number of thematic areas, including but not limited to: information systems and knowledge management; policy development; building local community capacity; research, development and

extension; fisheries resource management; product and market development, building business sector capacity; information, education and communication; law enforcement; financing and investments; gender and development; and infrastructure development. These collaborative undertakings shall serve as vehicles to: (1) effect participation and consolidation of resources and strengths across relevant fisheries agencies/stakeholders, and (2) support the implementation of individual projects under CNFIDP. The specific modalities for each of the partnerships shall be defined and operationalized by BFAR with relevant partners/ collaborators contingent on evident needs and realities during CNFIDP implementation.

It should be noted that partnership is hinged on the premise of synergy: institutions acting in concert with one another will be more effective, rather than when acting individually. Fisheries-related agencies and organizations (whether from government, private or civil society) have some forms of limitations – be it mandate, funding, personnel, technical capability, equipment or infrastructure assets. Given the multifaceted problems confronting the fisheries sector, relevant agencies and organizations should integrate efforts, strengths and resources to address these problems. By pooling resources together in partnerships, efficiency will be enhanced. Partnership schemes can likewise promote transparency, facilitate exchange of information and enhance delivery of services, among others.

Coordinating Office. The BFAR-FPED will function as the coordinating office of the CNFIDP. The CO will be tasked with (1) facilitating thematic cooperation; (2) monitoring CNFIDP implementation and provide periodic consolidated CNFIDP performance report to the Director; (3) facilitating “problem-solving” to ensure smooth implementation of the projects; (4) preparing CNFIDP updates for dissemination to stakeholders and industry groups; (5) facilitating regular coordination meetings and consultations with stakeholders and industry groups; (6) organizing periodic CNFIDP management meeting with Lead Implementing Units; (7) coordinating with donor and other funding agencies; and (8) maintaining project files.

The institutional arrangements for CNFIDP implementation that are proposed and outlined above were guided by the constraints and lessons learned in implementation of past national fisheries plans. Such constraints and lessons include, among others, the following: (1) agencies and stakeholders had no strong sense of ownership of the plans; (2) institutional roles and responsibilities were not clearly defined and assigned; (3) programs and/or projects outlined in the plans did not sufficiently empower the agencies involved to carry out their responsibilities; (4) accountabilities for the expected outputs and outcomes of the plans were not clearly defined and assigned; (5) performance and progress of the sector against the plans were not systematically measured, monitored and evaluated on a regular basis; (6) progress of the sector against plan targets was

not communicated effectively to stakeholders; and (7) lack of financing plan and detailed operational programming of the national plans.

The BFAR is aware of these constraints and lessons, and shall ensure that these are again considered during the operational programming stage that immediately follows formal CNFIDP adoption. Moreover, in implementing CNFIDP, the bureau shall endeavor to:

1. promote CNFIDP not as BFAR's plan but as the plan of the entire fisheries sector/industry;
2. rally all institutions involved in Philippine fisheries to put their stakes in implementing CNFIDP activities;
3. establish a clear accountability structure for the activities and outcomes of CNFIDP;
4. establish, implement and maintain a system for monitoring and evaluating the progress being made by the sector/industry against the plan targets; and
5. keep all stakeholders in the sector/industry well-informed on CNFIDP progress and performance.

5.2 Implementation Schedule and Indicative Costs

The CNFIDP medium-term project portfolio consists of 41 projects distributed across 5 program components. The program components and the number of projects under them are as follows: (1) Municipal Fisheries – 8 projects; (2) Commercial Fisheries – 10 projects; (3) Aquaculture – 8 projects; (4) Post Harvest – 7 projects; and (5) Institutional Development and Policy Support – 8 projects. The indicative implementation schedule of the 41 projects identified for the first 5-year medium-term period of CNFIDP is summarized in Table 5.2.a. Most of the projects (36 out of 41) involve tasks and activities to be implemented over the entire 5-year period (2006-2010). Moreover, implementation of many of these projects would likely continue in subsequent medium-term periods in order to fully achieve their objectives and intended impacts.

Table 5.2.a. Schedule of implementation of various medium-term (2006-2010) projects under CNFIDP.

Component	Project	Year				
		1 (2006)	2 (2007)	3 (2008)	4 (2009)	5 (2010)
Municipal Fisheries	Project 1 – Comprehensive Education Program for Fisheries and Aquatic Resource Management Council (FARMC) and Fisherfolk Organizations					

Component	Project	Year				
		1 (2006)	2 (2007)	3 (2008)	4 (2009)	5 (2010)
	Project 2 – Validation of Priority Use Rights through Municipal Registration and Licensing					
	Project 3 – Enhancement of Locally Managed Marine Areas					
	Project 4 – Rehabilitation and Regeneration of Coastal and Inland Ecosystems					
	Project 5 – Sustainable Fisheries Livelihoods Support					
	Project 6 – Infrastructure and Post Harvest Facilities Development for Municipal Fisheries					
	Project 7 – Enhancement of Fishery Law Enforcement					
	Project 8 – Rationalization of Municipal Fishing Effort					
Commercial Fisheries	Project 1 – Rationalization of Fishing Effort in Overfished Commercial Fishing Areas					
	Project 2 – Development and Implementation of a Monitoring, Control and Surveillance (MCS) System for Commercial Fisheries					
	Project 3 – Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gears and Practices					
	Project 4 – Exploratory Fishing in the Exclusive Economic Zone (EEZ) and Beyond, and in Underexploited Commercial Fishing Grounds					
	Project 5 – Studies on the Biology and Culture of the Pacific Bluefin Tuna (<i>Thunnus orientalis</i>)					
	Project 6 – Establishment of Cold Storage with Blast Freezer Facilities					
	Project 7 – Information, Education and Communication (IEC) for Commercial Fishers/Fishing Vessel Operators					
	Project 8 – Rationalization of Fishing Vessel Designs and Fish Handling Systems					
	Project 9 - Implementation of the National Tuna Management Plan					
	Project 10 – Legitimization and Implementation of the National Plan of Action (NPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing					

Component	Project	Year				
		1 (2006)	2 (2007)	3 (2008)	4 (2009)	5 (2010)
Aquaculture	Project 1 – Development of a Focused, United and Strategic Vision and Road Map for the Industry					
	Project 2 – Enhancement of Research, Development and Extension (RD&E) Programs and Prioritization based on Immediate Needs of Industry					
	Project 3 – Promotion of Investments in the Hatchery Industry					
	Project 4 – Development of Domestic Supply Chain and Expansion of Export Markets					
	Project 5 – Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points (HACCP)					
	Project 6 – Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains					
	Project 7 – Increasing Export Competitiveness through Special Economic Zones (SEZ)					
	Project 8 – Promotion of Aquaculture as Livelihood for Fishers and Smallholders					
Post Harvest	Project 1 – Strengthening of the Fish Inspection System in the Philippines					
	Project 2 – Development of National Quality Standards (NQS) for Fish and Fishery Products					
	Project 3 – Marketing and Promotion of Philippine Fish and Other Aquatic Products					
	Project 4 – Development of New Value Added Fishery Products					
	Project 5 – Characterization of Marine Natural Products					
	Project 6 – Reduction of Fisheries Post Harvest Losses Via “Cold Chain System”					
	Project 7 – Model Villages for Philippine Fisheries Post Harvest					
Institutional Development and Policy Support	Project 1 – Strengthening the Bureau of Fisheries and Aquatic Resources’ (BFAR’s) Institutional Capacity					
	Project 2 – Building Fisheries Management Capacity through Effective Strategic Multisectoral Cooperation Arrangements					

Component	Project	Year				
		1 (2006)	2 (2007)	3 (2008)	4 (2009)	5 (2010)
	Project 3 – Networks of Local Fisherfolk and Aquaculture Communities					
	Project 4 – Alliances for the Integrated Co-management of Fisheries Ecosystems					
	Project 5 – Strengthening Business Sector Capability					
	Project 6 – Improving the Policy and Regulatory Framework for Fisheries					
	Project 7 – Enhancing Fisheries Education and Training for a Sustainable Industry					
	Project 8 - Enhancing Gender Responsiveness in Philippine Fisheries Industry Development Program					

A summary of the indicative costs for implementation of the medium-term program components of CNFIDP is given in Table 5.2.b. Total indicative cost or investment required is about PhP 6.7 billion for the entire 5-year (2006-2010) period, or about PhP 1.33 billion annually. The distribution of this total cost by program component is as follows: (1) Municipal Fisheries – 35%; (2) Commercial Fisheries – 23%; (3) Aquaculture – 10%; (4) Post Harvest – 20%; and (5) Institutional Development and Policy Support – 12%. Summaries of the indicative cost per project under each of the 5 program components are given in Tables 5.2.c - 5.2.g.

Table 5.2.b. Summary of indicative costs for implementation of various medium-term components of CNFIDP.

Component	Indicative cost (2006-2010)	Annualized cost	
		(PhP million)	
1 Municipal Fisheries	2,400.0	480.0	
2 Commercial Fisheries	1,542.0	308.4	
3 Aquaculture	701.5	140.3	
4 Post Harvest	1,370.0	274.0	
5 Institutional Development and Policy Support	841.0	168.2	
Total	6,854.5	1,370.9	

Table 5.2.c. Summary of indicative costs for medium-term (2006-2010) projects under the Municipal Fisheries Component of CNFIDP.

Municipal Fisheries Component projects		Indicative cost (2006-2010) (PhP million)
1	Comprehensive Education Program for Fisheries and Aquatic Resource Management Council (FARMC) and Fisherfolk Organizations	210.0
2	Validation of Priority Use Rights through Municipal Registration and Licensing	300.0
3	Enhancement of Locally Managed Marine Areas	120.0
4	Rehabilitation and Regeneration of Coastal and Inland Ecosystems	180.0
5	Sustainable Fisheries Livelihoods Support	550.0
6	Infrastructure and Post-harvest Facilities Development for Municipal Fisheries	80.0
7	Enhancement of Fishery Law Enforcement	190.0
8	Rationalization of Municipal Fishing Effort	770.0
Total indicative cost		2,400.0
Annualized indicative cost		480.0

Table 5.2.d. Summary of indicative costs for medium-term (2006-2010) projects under the Commercial Fisheries Component of CNFIDP.

Commercial Fisheries Component projects		Indicative cost (2006-2010) (PhP million)
1	Rationalization of Fishing Effort in Overfished Commercial Fishing Areas	70.0
2	Development and Implementation of a Monitoring, Control and Surveillance (MCS) System for Commercial Fisheries	100.0
3	Development, Adaptation and Promotion of Selective, Environment-friendly and Cost-effective Fishing Gears and Practices	47.0
4	Exploratory Fishing in the Exclusive Economic Zone (EEZ) and Beyond, and in Underexploited Commercial Fishing Grounds	85.0
5	Studies on the Biology and Culture of the Pacific Bluefin Tuna (<i>Thunnus orientalis</i>)	40.0
6	Establishment of Cold Storage with Blast Freezer Facilities	810.0
7	Information, Education and Communication (IEC) for Commercial Fishers/Fishing Vessel Operators	40.0
8	Rationalization of Fishing Vessel Designs and Fish Handling Systems	50.0
9	Implementation of the National Tuna Management Plan	250.0
10	Legitimization and Implementation of the National Plan of Action (NPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing	50.0
Total indicative cost		1,542.0
Annualized indicative cost		308.4

Table 5.2.e. Summary of indicative costs for medium-term (2006-2010) projects under the Aquaculture Component of CNFIDP.

Aquaculture Component projects		Indicative cost (2006-2010) (PhP million)
1	Development of a Focused, United and Strategic Vision and Road Map for the Industry	42.5
2	Enhancement of the Research, Development and Extension (RD&E) Programs and Prioritization based on Immediate Needs of Industry	254.0
3	Promotion of Investments in the Hatchery Industry	126.0
4	Development of Domestic Supply Chain and Expansion of Export Markets	40.0
5	Institutionalization of Best Aquaculture Practices (BAP), Quality Standards and Farm-based Hazard Analysis Critical Control Points (HACCP)	73.0
6	Increasing Aquaculture Productivity through Intensification and Use of Domesticated Strains	26.0
7	Increasing Export Competitiveness through Special Economic Zones (SEZ)	63.0
8	Promotion of Aquaculture as Livelihood for Fishers and Smallholders	77.0
Total indicative cost		701.5
Annualized indicative cost		140.3

Table 5.2.f. Summary of indicative costs for medium-term (2006-2010) projects under the Post Harvest Component of CNFIDP.

Post Harvest Component projects		Indicative cost (2006-2010) (PhP million)
1	Strengthening of the Fish Inspection System in the Philippines	375.0
2	Development of National Quality Standards (NQS) for Fish and Fishery Products	200.0
3	Marketing and Promotion of Philippine Fish and Other Aquatic Products	150.0
4	Development of New Value Added Fishery Products	130.0
5	Characterization of Marine Natural Products	90.0
6	Reduction of Fisheries Post-harvest Losses via "Cold Chain System"	375.0
7	Model Villages for Philippine Fisheries Post Harvest	50.0
Total indicative cost		1,370.0
Annualized indicative cost		274.0

Table 5.2.g. Summary of indicative costs for medium-term (2006-2010) projects under the Institutional Development and Policy Support Component of CNFIDP.

Institutional Development and Policy Support Component projects		Indicative cost (2006-2010)
		(PhP million)
1	Strengthening the Bureau of Fisheries and Aquatic Resources' (BFAR's) Institutional Capacity	100.0
2	Building Fisheries Management Capacity through Effective Multisectoral Partnerships	50.0
3	Networks of Local Fisherfolk and Aquaculture Communities	100.0
4	Alliances for the Integrated Co-management of Fisheries Ecosystems	150.0
5	Strengthening Business Sector Capability	100.0
6	Improving the Policy and Regulatory Framework for Fisheries	26.0
7	Enhancing Fisheries Education and Training for a Sustainable Industry	150.0
8	Enhancing Gender Responsiveness in Philippine Fisheries Industry Development Program	165.0
Total indicative cost		841.0
Annualized indicative cost		168.2

It should be noted that the implementation schedule and costs provided are indicative estimates, and thus, preliminary in nature. These are intended as initial inputs to the operational programming/planning phase which should commence immediately after formal CNFIDP adoption. Operational programming should allow implementing agencies/groups to detail for each project, among others, specific tasks and activities, their spatial and temporal implementation schedule, and budgetary requirements and sourcing/financing. The latter, in particular, requires immediate attention given the fiscal situation of government and the multiplicity of other equally pressing development needs of the country.

Potentially, there are a number of feasible public and private funding sources for implementation of CNFIDP projects. The national government can include portions of the funding requirements for the plan as part of the annual General Appropriations Act. Moreover, some funding requirements can possibly be sourced from the budget of DA, BFAR and/or other relevant fisheries agencies/organizations. The LGUs can also be tapped to provide funding counterpart for projects that will be implemented within their respective jurisdictions. Appropriate cost-sharing arrangements can also be explored with the private sector, particularly stakeholders who will benefit directly from project interventions under CNFIDP. Relevant local and

international NGOs, foundations, funding institutions and donors can also be tapped for projects which are consistent with their respective advocacies and/or development portfolios. Capturing portions of the rent resulting from sectoral improvements generated by the various projects shall form part of the long-term strategy for a sustainable financing mechanism for CNFIDP. During the operational programming phase, BFAR (as the main national fisheries agency) shall host a series of “donors” meetings and dialogues among implementing agencies/groups, as well as potential public and private sector funding partners to elaborate a detailed financing plan for CNFIDP. This process shall include meetings with international funding institutions, such as the Asian Development Bank and the World Bank.

5.3 Monitoring and Evaluation Scheme

An effective M&E scheme is indispensable to the successful implementation of any plan or program. Effective M&E schemes, among others, allow clear definition of implementation responsibility and accountability for attainment of plan targets at various levels of the institutional hierarchy. Concededly, limitations in this area have been the pitfall of many previous fisheries plans and programs in the country. Improvements, therefore, in the capability of the bureaucracy to design and implement (in an adaptive mode) an effective M&E scheme would be crucial to the attainment of the overall goal and objectives of CNFIDP. The detailed M&E scheme for CNFIDP should logically be designed and finalized during the operational programming stage that immediately follows formal plan adoption (see Figure 1.2.a). However, given the critical importance of the M&E scheme to plan success, elements representing preliminary inputs to such scheme are provided below. These elements should be considered and detailed by BFAR (as main implementing agency for the plan) together with other implementing agencies/groups during the operational programming stage for CNFIDP.

The M&E scheme should at least include the following general elements: (1) performance indicators and (2) implementing mechanism. The performance indicators normally consist of a logical hierarchy of desired outcomes or targets at plan, program, project, task and activity levels. The indicators should be objectively verifiable, and schedules for their attainment should be clear and specific at each level. Associated risks and assumptions – as well as means for evaluating attainment of targets at various levels – should also be provided. Overall, the indicators should enable the M&E scheme to track progress through time in achieving the goal and objectives of the plan. Table 5.3.a provides preliminary inputs for the development of performance indicators at the plan level. The table gives the overall goal of the plan, and provides generic indicators across the 9 main plan objectives versus main outcome/target categories, viz. (1) socioeconomic and equity targets, (2)

institutional/political targets, and (3) resource/environment targets. These initial performance indicator inputs should be refined during the operational programming phase and used in completing the detailed M&E scheme (covering the plan, program component, project, task and activity levels). Necessarily, this refinement process should allow for enhancement of the CNFIDP program/project portfolio and implementation schedule (based on clearer understanding of relative contribution to plan goal/objectives and implementation realities, particularly financing, which becomes more evident at the operational programming stage).

The M&E implementing mechanism should clearly define performance review/evaluation responsibilities, procedures and schedules, as well as appropriate feedback to implementing agencies/groups for timely revision or enhancement of various plan elements. The BFAR, as the main national line agency responsible for fisheries, shall take charge of the design and implementation of the detailed M&E scheme (including implementing mechanism) for the plan. The bureau shall consider establishment of Evaluation Groups to monitor and evaluate performance at the plan, program and project levels. The Evaluation Groups shall have regular support (pertaining to substantive, procedural and administrative matters) from the BFAR. Depending on M&E requirements and availability of experts, BFAR may invite selected stakeholders and implementing agencies/groups to join the Evaluation Groups. This is to facilitate the review and feedback process, and encourage objectivity of performance assessments. Regular review and enhancement at the project and subproject (i.e., task and activity) levels shall be undertaken at least annually. Regular review and enhancement of programs and the overall plan shall be undertaken at least during the middle and the end of each 5-year medium-term period. Review of plan elements outside these regular periods shall be encouraged contingent on urgent opportunities/realities or dramatic changes in conditions affecting plan implementation.

Table 5.3.a. Performance targets for monitoring the progress of CNFIDP implementation.

Goal: to optimize and sustain the socioeconomic benefits from fisheries without jeopardizing the fishery resources and associated habitats in the most administratively efficient and cost-effective manner.					
Objectives	Socioeconomic and equity targets	Institutional/political targets	Environmental/resource targets	Monitoring mechanism	Assumptions
1. Rationalize utilization of fishery resources	<ul style="list-style-type: none"> • Increased earnings of commercial and municipal fishers • Increased occupational and geographic mobility of fishers 	<ul style="list-style-type: none"> • Improved fisheries management system (access, structure and procedures) • Increased use of fisheries zonation and temporal 	<ul style="list-style-type: none"> • <i>Improved coastal fishery resources abundance and exploitation rates</i> • <i>Minimized catch of</i> 	<ul style="list-style-type: none"> • Catch and effort statistics (BFAR, BAS, etc.) • Fisheries and institutional 	<ul style="list-style-type: none"> • Adequate support from national/partner institutions • Availability of fisheries

Objectives	Socioeconomic and equity targets	Institutional/political targets	Environmental/resource targets	Monitoring mechanism	Assumptions
	<ul style="list-style-type: none"> Increased generation of reasonable resource rents Reduction in dependence on coastal fishing grounds Decreased fertility in fisheries households 	<ul style="list-style-type: none"> management schemes Increased adoption of property/access rights 	<ul style="list-style-type: none"> <i>juvenile fish</i> <i>Optimized fishing within sustainable levels</i> Minimized use of destructive methods and gears Improved catch per unit effort Increased rationalization of fishing capacity <i>Reduced by-catch of threatened, endangered and "unique" species</i> 	assessment reports	<ul style="list-style-type: none"> data and related documentation Cooperation of fisherfolks
2. Protect fishery habitats	<ul style="list-style-type: none"> Reduction in negative impacts and income losses due to habitat damage Reduction of public and private sector abatement and rehabilitation expenditures 	<ul style="list-style-type: none"> Improved plans for managing red tides, oil spills and catastrophic events Improved awareness/perceptions of stakeholders on linkage between fishery resources abundance/yield and coastal habitats 	<ul style="list-style-type: none"> <i>Increase in area of effectively managed coastal habitats</i> Improved coral reef, seagrass and mangrove habitat characteristics and status <i>Minimized use of destructive methods and gears</i> 	<ul style="list-style-type: none"> MPA monitoring reports Coastal habitat assessment reports Water quality monitoring reports 	<ul style="list-style-type: none"> Adequate support from national/partner institutions
3. Reduce resource use competition and conflict	<ul style="list-style-type: none"> Reduction of gear and income losses due to fisheries conflicts <i>Increased availability of livelihood opportunities</i> Reduction in social conflicts and instability in fishing and aquaculture 	<ul style="list-style-type: none"> Improved representation of stakeholders in fisheries management <i>Improved delineation of, and compliance to property or access rights and spatial/temporal management schemes</i> <i>Improved MCS and/or enforcement capabilities</i> 	<ul style="list-style-type: none"> <i>Reduced fisheries/resource use conflicts</i> 	<ul style="list-style-type: none"> Monitoring reports 	

Objectives	Socioeconomic and equity targets	Institutional/political targets	Environmental/resource targets	Monitoring mechanism	Assumptions
		<ul style="list-style-type: none"> Reduction of foreign and domestic poaching 			
4. Develop the full potential of aquaculture and commercial fisheries	<ul style="list-style-type: none"> <i>Increased number of municipalities with mariculture livelihood parks (MLPs)</i> Increased contribution of commercial fisheries and aquaculture in terms of GDP and GVA Increased per capita incomes <i>Increased commercial fisheries and aquaculture export volume and value</i> 	<ul style="list-style-type: none"> Institutionalization of best aquaculture practices 	<ul style="list-style-type: none"> Efficient utilization of coastal and marine aquaculture potential Increased use of environment-friendly and selective fishing methods and gears Improved assessment and use of fisheries potential of EEZ and offshore waters <i>Improved utilization of selected offshore fishery resources</i> Increased yields of high-value fish (in terms of production volume/ha) Increased aquaculture emphasis on species low in the food chain 	<ul style="list-style-type: none"> Monitoring reports Trade and industry reports BFAR/DA reports 	<ul style="list-style-type: none"> Recommended best aquaculture practices are used Adequate inputs and extension coverage are available Prices of aquaculture products are stable and do not fall Credit/micro-financing is available No natural disasters
5. Promote competitiveness of fishery products	<ul style="list-style-type: none"> <i>Enhanced per capita incomes in fishing and aquaculture</i> Decreased input and production costs Reduced transaction costs for fishing and aquaculture Reduced human health risks due to consumption of 	<ul style="list-style-type: none"> Improved marketing strategies Improved access to international markets <i>Improved product quality and safety standards</i> 	<ul style="list-style-type: none"> <i>Expansion of environment-friendly seafood and other "niche" markets</i> Increased product diversity and quality 	<ul style="list-style-type: none"> Trade and industry reports BFAR/DA reports 	<ul style="list-style-type: none"> Local and export demand continues to expand Minimal trade barriers

Objectives	Socioeconomic and equity targets	Institutional/political targets	Environmental/resource targets	Monitoring mechanism	Assumptions
	unsafe fisheries products				
6. Minimize post-harvest losses	<ul style="list-style-type: none"> <i>Increased value added in selected fisheries products</i> Increased production volume and value that reach suitable markets 	<ul style="list-style-type: none"> <i>Improved fisheries post-harvest facilities</i> Improved physical infrastructure support Improved access to modern technology 	<ul style="list-style-type: none"> <i>Reduced post-harvest losses by at least 20%</i> Reduced fishing pressure due to reduction in post-harvest losses 	<ul style="list-style-type: none"> Quality inspection reports Catch and effort statistics (BFAR, BAS, etc.) Fisheries reports 	<ul style="list-style-type: none"> Post harvest-related infrastructures are well managed and maintained
7. Enhance institutional capabilities	<ul style="list-style-type: none"> <i>Increased participation and inclusion of vulnerable groups in spatial and resource use</i> Improved representation of local stakeholders in fisheries management Improved awareness of local communities about fisheries issues 	<ul style="list-style-type: none"> <i>Improved human, technical and financial capabilities of LGUs and NGAs relevant to fisheries assessment and management</i> Improved compliance with, and consistent implementation of, laws and policies Improved institutional arrangements for fisheries and habitat management Implementation of relevant international fisheries instruments and obligations (FAO and ASEAN-SEAFDEC CCRF) <i>Improved LGU and NGA enforcement capability</i> 	<ul style="list-style-type: none"> Improved human, technical and financial capability of LGUs for local coastal habitat and fisheries management <i>Increased human, technical and financial capability of NGAs to support coastal habitat and fisheries management</i> 	<ul style="list-style-type: none"> Monitoring reports Fisheries and institutional assessment reports 	<ul style="list-style-type: none"> Communities are adequately involved in planning and management of fisheries resources NGOs are effective Counterpart funds are available
8. Promote appropriate fisheries policies	<ul style="list-style-type: none"> <i>Improved balance among efficiency, equity and environment in fisheries policies</i> Improved policies to enhance fish trade and 	<ul style="list-style-type: none"> Improved and consistent policy and regulatory framework <i>Improved policies consistent with international instruments and</i> 	<ul style="list-style-type: none"> Improved policies, laws and regulations related to the management of fisheries, coastal habitats and 	<ul style="list-style-type: none"> BFAR/DA reports 	<ul style="list-style-type: none"> Consensus among stakeholders is achieved in the development of

Objectives	Socioeconomic and equity targets	Institutional/political targets	Environmental/resource targets	Monitoring mechanism	Assumptions
	competitiveness	<p><i>best practices</i></p> <ul style="list-style-type: none"> • <i>Improved scientific basis of policies, laws and regulations</i> 	<p>biodiversity</p> <ul style="list-style-type: none"> • Improved adoption of precautionary principle, ecosystem approach • Improved information systems for fisheries management and policy development • Improved compliance with and consistent implementation of laws and policies 		fisheries policies
9. Strengthen institutional partnerships	<ul style="list-style-type: none"> • <i>Increased participation of stakeholders in implementing fisheries and habitat management</i> • <i>Improved public-private sector partnerships</i> 	<ul style="list-style-type: none"> • Improved partnership skills and capabilities of fisherfolks, LGUs and NGAs • <i>Improved RD&E support</i> • Improved collaborative management and research activities 	<ul style="list-style-type: none"> • Increased role of partnerships in implementing fisheries and habitat management • Improved effectiveness of management resulting from enhanced stakeholders' inputs 	<ul style="list-style-type: none"> • BFAR/DA reports 	<ul style="list-style-type: none"> • LGUs work well effectively together with NGOs, private sector, etc.

Note: Targets in italics are used as illustrative examples for indicative performance targets for the First and Fourth Medium-term Periods in Table 3.4.a of Chapter 3.

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Appendix 1. List of meetings and consultations conducted for the formulation of the Comprehensive National Fisheries Industry Development Plan (CNFIDP).

Date	Venue	Nature of meeting/consultation
2004		
21-23 September	Subic, Zambales	First Consultative Meeting for the Preparation of the CNFIDP
14 December	FISH Project Office, Pasig City	Core Technical Working Group (TWG) Consultative Meeting
2005		
5 January	FISH Project Office, Pasig City	Commercial and Municipal Fisheries TWG Meeting
13 January	FISH Project Office, Pasig City	Aquaculture and Post Harvest TWG Meeting
25 January	FISH Project Office, Pasig City	Institutional TWG Meeting
1 March	BFAR Central Office, Quezon City	The CNFIDP: Elements, Formulation Process and Current Status (update for BFAR Management and Regional Directors)
15 March	Davao City	Regional Consultation on Commercial Fisheries and Post Harvest Fisheries
17 March	General Santos City	Regional Consultation on Commercial Fisheries and Post Harvest Fisheries
5 April	BFAR Central Office, Quezon City	Consultation on Commercial Fisheries and Post Harvest Fisheries
12 April	Zamboanga City	Regional Consultation on Commercial Fisheries and Post Harvest Fisheries
14 April	BFAR Central Office, Quezon City	Visioning Workshop for CNFIDP
21-22 April	FISH Project Office, Pasig City	CNFIDP Scenario Planning Workshop/ Sectoral Development Framework
26 April	Butuan City	Regional Consultation on CNFIDP
28 April	Cagayan de Oro City	Regional Consultation on CNFIDP
2 May	Tacloban City	Regional Consultation on CNFIDP
7 July	FRMP Office, Quezon City	Presentation of Commercial Fisheries Sub-sector Situation/Issues
8 July	FRMP Office, Quezon City	Presentation of Municipal Fisheries Sub-sector Situation/Issues
14 July	FRMP Office, Quezon City	Presentation of Aquaculture and Post Harvest Subsector Situation/Issues
27 July	FISH Project Office, Pasig City	Presentation of Fisheries Institutional/Social Situation/Issues
28 July	FISH Project Office, Pasig City	Post Harvest Private Stakeholders Consultation
16-17 August	FISH Project Office, Pasig City	Workshop to Review the First Draft of the CNFIDP

Date	Venue	Nature of meeting/consultation
6 September	FISH Project Office, Pasig City	Workshop to Review/Enhance Chapters 3 and 5 of the CNFIDP (First Draft)
11-12 October	DAP, Pasig City	CNFIDP Program Enhancement Workshop (Part I: Aquaculture and Institutional)
19-20 October	DAP, Pasig City	CNFIDP Program Enhancement Workshop (Part II: Post Harvest and Institutional)
27 October	Auditorium, BSWM, Quezon City	Review/Enhancement of Aquaculture Component of the CNFIDP (First Draft) at the National Aquaculture Congress
7-8 November	ISO, Ateneo de Manila, Quezon City	Municipal Fisheries Stakeholders Consultation
10-11 November	DAP, Pasig City	CNFIDP Program Enhancement Workshop (Part III: Municipal and Commercial)
8-9 December	Days Hotel, Tagaytay City	BFAR/FISH Workshop for Final Review of the CNFIDP (Revised Draft)
2007		
15 June	ADAS	Coordination Meeting
1 July	BFAR Central Office	BFAR Executive Briefing
6 July	BFAR Central Office	Briefing for Divisions Chiefs, Center Chiefs and RFTC Directors
9 July	BFAR Central Office	Meeting with PKKK/ NFR
18 July	DA-NAFC	Presentation to NAFC-CAF
1 August	BFAR Central Office	Meeting with PKKK/ NFR
30 August	Century Imperial Suites, Quezon City	Briefing for RFOs (Mancom)
2008		
3 January	BFAR	Executive Briefing on BFAR Uptake
6 January	Clark, Pampanga	Presentation during BFAR Planning and Budgeting Workshop 2008
27 February	BFAR-ADAS	CNFIDP Focal Person Review
4 March	BFAR Central Office	Briefing for BFAR GAD System
24 June	BFAR Central Office	BFAR issues FOO 213 on the Adoption and Implementation of the CNFIDP
2 December	BFAR Central Office	BFAR creates Ad Hoc Committee to develop strategy to implement CNFIDP.
15 December	BFAR ARMM, Cotabato City	Briefing of BFAR ARMM in preparation for the drafting of the ARMM Fisheries Industry Plan

Appendix 2. List of organizations and agencies involved in the planning process for formulation of CNFIDP.

- 1 AA Export and Import Corp.
- 2 Alliance of Philippine Fishing Federation, Inc.
- 3 Aquaculture Development and Management
- 4 Bangus Association of the Philippines Inc.
- 5 Bureau of Fisheries and Aquatic Resources (BFAR) - Central Office (Quezon City)
- 6 BFAR - Region 1 (La Union)
- 7 BFAR - Region 2 (Tuguegarao City)
- 8 BFAR - Region 3 (Pampanga)
- 9 BFAR - Region 4-A (Quezon City)
- 10 BFAR - Region 4-B (Quezon City)
- 11 BFAR - Region 5 (Camarines Sur)
- 12 BFAR - Region 6 (Iloilo City)
- 13 BFAR - Region 7 (Cebu City)
- 14 BFAR - Region 8 (Tacloban City)
- 15 BFAR - Region 9 (Zamboanga City)
- 16 BFAR - Region 10 (Cagayan de Oro City)
- 17 BFAR - Region 11 (Davao City)
- 18 BFAR - Region 12 (General Santos City)
- 19 BFAR - Region 13 (CARAGA Region)
- 20 BFAR - Cordillera Autonomous Region
- 21 BFAR - Autonomous Region for Muslim Mindanao
- 22 BFAR - Regional Fisheries Training Centers
- 23 Budyong Women in Fisheries Network
- 24 Chamber of Fisheries and Aquatic Resources
- 25 Chamber of Aquaculture and Ancillary Industries
- 26 Central Luzon State University
- 27 Cruz Aquaculture Corp.
- 28 Congress of the Philippines
- 29 Department of Agriculture
- 30 Department of Environment and Natural Resources - Coastal and Marine Management Office
- 31 Department of Trade and Industry - Board of Investment
- 32 East Asia Fish Co.
- 33 Frabelle Fishing Corp.
- 34 Fisheries and Aquaculture Board
- 35 Foundation for Alternative Management of the Environment
- 36 Fisheries Improved for Sustainable Harvest
- 37 Fisheries Resource Management Project
- 38 German Technical Cooperation
- 39 Kaisahan ng mga Samahan Alay sa Kalikasan
- 40 Kalipunan ng Maliliit na Mangingisda sa Manila Bay

- 41 Kapisanan ng Magsasaka, Mangingisda at Manggagawa ng Pilipinas
- 42 Kilusang Mangingisda
- 43 National Fisheries Aquatic Resource Management Council
- 44 National Fisheries Reform - Institute of Social Order
- 45 NGOs for Fisheries Reform - Secretariat
- 46 National Fisheries Research and Development Institute
- 47 National Food Research Institute
- 48 Mindanao Economic Development Council
- 49 Maximo T. Kalaw Institute for Sustainable Development
- 50 Orient Integrated Development Consultants, Inc.
- 51 Office of the President
- 52 Office of the Presidential Adviser for Jobs Generation
- 53 Pederasyon ng mga Mamamayan na Nagkaisa sa Akian
- 54 Palawan State University
- 55 Pambansang Alyansa ng mga Mangingisda at Pamunuan ng Organisasyon
- 56 Progresibong Alyansa ng mga Mangingisda sa Pilipinas
- 57 Philippine Council for Aquatic and Marine Research and Development
- 58 Philippine Fisheries Development Authority
- 59 Philippine Shrimp Industry, Inc.
- 60 Philippine Tilapia, Inc.
- 61 Pinalakas na Ugnayan ng Mangingisda sa Luzon, Mindanao at Visayas
- 62 Resources, Environment and Economic Center for Studies
- 63 Sentro ng Alternatibong Lingap Panlegal
- 64 Samahan ng Maliliit na Mangingisda sa Montupar
- 65 Samaral People's Organizations Federation
- 66 Sea Champ International Export Inc.
- 67 Seaweed Industry Association of the Philippines
- 68 Social Development and Alternative Livelihood
- 69 Southeast Asian Fisheries Development Center
- 70 Tambuyog Development Center
- 71 University of the Philippines - Diliman
- 72 University of the Philippines in the Visayas
- 73 United States Agency for International Development
- 74 World Wildlife Fund for Nature - Philippines

Appendix 3. List of individual experts/stakeholders involved in the planning process for formulation of CNFIDP.

- 1 Abdua, Aldulgafor
- 2 Abella, Flor
- 3 Ablola, Jay Martin
- 4 Abracosa, Ramon
- 5 Adora, Gil
- 6 Agoncillo, Oliver
- 7 Aguilar, Glenn
- 8 Alano, Mariquit
- 9 Albaladejo, Marissa
- 10 Alboreda, Poy
- 11 Alesna, Edwyn
- 12 Alforque, Virgilio
- 13 Alura, Henry
- 14 Alves, Benedicto
- 15 Amatorio Jr., Rogelio
- 16 Anonuevo, Lito
- 17 Arbiol, Joseph
- 18 Arcamo, Sandra
- 19 Arevalo, Nemencio
- 20 Armada, Nygiel
- 21 Arroyo, Gloria Macapagal
- 22 Arugay, Gilbert
- 23 Ayson, Jovita
- 24 Babaran, Ricardo
- 25 Bagayao, Leopoldo
- 26 Baltazar, Consuelo
- 27 Bantaya, Mercedita
- 28 Barangan, Florendo
- 29 Barcia, Ma. Luisa
- 30 Barut, Noel
- 31 Baterina, Salacnib
- 32 Batungbacal, Ephraim
- 33 Benavidez, Joelle
- 34 Berida, Roberto
- 35 Bernal, Reynaldo
- 36 Bisuna, Pol
- 37 Bisuna, Ria
- 38 Bonifacio, Manuel
- 39 Borja, Norma
- 40 Borja, Pete
- 41 Borromeo, Edwin
- 42 Buan, Beth

43 Bueno, Severina
44 Cabana, Reggie
45 Cadapan, Peter Erick
46 Cafugauan, Howard
47 Cagauan, Arsenia
48 Calpe, Adelaida
49 Calvan, Dennis
50 Campeon, George
51 Camu, Muriel
52 Capacio, Ida
53 Capellan, Teresa
54 Capricho, Charlie
55 Cardano, Lorna
56 Carreon, Marciano III
57 Casil, Nerio
58 Castillo, Marinela
59 Chaneco, Fatima
60 Chua, Reynaldo
61 Cordova, Lorenzo Jr.
62 Corrales, Corazon
63 Cruz, Philip
64 Dang-awan, Rebecca
65 Davila, Nelson
66 Dela Cruz, Nely
67 Dela Pena, Dionisio
68 Dela Vega, Jaime
69 Delfin, Josefina
70 Demo-os, Juliet
71 De Venecia, Jose
72 Dickson, Alma
73 Dickson, Jonathan
74 Dimerin, Visa
75 Domenden, Nestor
76 Dumaot, Manioba
77 Echavez, Annabelle
78 Edra, Rolando
79 Emaguin, Amado
80 Ernacio, David
81 Escobar, Severino
82 Evangelista, Cristeta
83 Federizo, Bonifacio
84 Fermo, Jerry
85 Fernandez, Irene
86 Fernandez, Ma. Elena
87 Fileonor, Eleserio

88	Flores, Cristobal
89	Flores, Efren Jr.
90	Fortes, Romeo
91	Francisco, Benjamin
92	Gagalac, Manny
93	Galan, Reynaldo
94	Galera, Cesar
95	Galicia, Abundio
96	Ganaden, Reuben
97	Gaon, Edna
98	Garces, Len
99	Garcia, Emman
100	Gatuslao, Roberto
101	Generisa, Josefina
102	Gimelo, Alvin
103	Gojar, Filipina
104	Gomm, Anjo
105	Gonzales, Felix
106	Gonzales, Iza
107	Gonzales, Maryann
108	Grutas, Marjorie
109	Guerrero, Rafael III
110	Guidote, Marlito
111	Hilario, Vinancio
112	Hilomen, Vinancio
113	Imson, Joey
114	Inguillo, Azucena
115	Isidro, Alfredo
116	Jacinto, Ted
117	Jardin, Ruben
118	Jimenez, Buenvenido
119	Kintanar, Simeon
120	Libunao, Ronaldo
121	Lim, Felizardo
122	Llana, Ethel
123	Lopez, Nelson
124	Luga, Cynthia
125	Luna, Cesar
126	Macabalang, Sani
127	Macaraig, Ramon
128	Macas, Rosa
129	Maderazo, Mario
130	Maldan, Trusiya
131	Malvas, Sammy
132	Manalang, Esmeraldo

133 Maramba, Prescila
134 Matin, Bal
135 Mendoza, Leonarda
136 Mercado, Yayan
137 Mercene, Mildred
138 Miciano, Michelle
139 Minase, Vince
140 Molina, Emma
141 Moneda, Ana
142 Mones, Lizel
143 Monzales, Oscar
144 Morales, Guillermo
145 Morales, Milagros
146 Munoz, Jessica
147 Musali, Janice
148 Mutya, Maria Teresa
149 Natividad, Augusto
150 Nieves, Gaston Jr.
151 Noscal, Alvaro
152 Olama, Alauya
153 Olivera, Rafael
154 Ong, Drusila
155 Ongtangco, Remedios
156 Orrica, Renalee
157 Paclibare, Jose
158 Padilla, Jose
159 Pador, Erwin
160 Padron, Hermones
161 Pangan, Cyrus
162 Panganiban, Domingo
163 Pantanosas, Arlene
164 Pastor, Davelyn
165 Paterno, Vicente Manny
166 Pendaliday, Usop
167 Pido, Michael
168 Pimentel, Lorna
169 Platon, Rolando
170 Pol, Romulo
171 Ramiscal, Rafael
172 Ramos, Maribeth
173 Ranada, Marvin
174 Regaspi, Prescilla
175 Regpala, Regino
176 Resma, Samuel
177 Rodriguez, Basilio Jr.

178	Rosales, Rina
179	Rosario, Westly
180	Roxas, Sixto K.
181	Samson, Norida
182	Santos, Frank
183	Santos, Johanna
184	Santos, Kristine
185	Sarmiento, Malcolm
186	Sebastian, Cornelio
187	Siaron, Greg
188	Silvestre, Geronimo
189	Smith, Rebecca
190	Soliven, Bernadette
191	Suderio, Eduardo
192	Tabios, Benjamin Jr.
193	Tachuling, Pepe
194	Talib, Haji
195	Tan, Giselle
196	Tanchuling, Ted
197	Tanco, Chinling
198	Taripe, Chloe
199	Tayamen, Melchor
200	Tech, Elsie
201	Tiburcio, Fernando
202	Timog, Tessie
203	Tocino, Carmencita
204	Togonon, Ana Korina
205	Tolosa, Marilyn
206	Tomas, Ernesto
207	Torres, Francisco Jr.
208	Tumabiente, Lea
209	Umali, Bas
210	Umengan, Dinna
211	Ungkakay, Farisal
212	Vargas, Albert
213	Vargas, Evelyn
214	Vega, Mandy
215	Velasco, Amoreena
216	Velayo, Isidro
217	Ventura, Andrew
218	Verallo, Roy
219	Victoria, Vince
220	Villafuerte, Luis
221	Villanueva, James
222	Vitug, Annaliza

- 223 White, Alan
- 224 Yap, Emilia
- 225 Yap, Wilfredo
- 226 Zaragosa, Ester
- 227 Zialcita, Eduardo