



Technical Assistance Report

Project Number: 39031
December 2005

Technical Assistance Republic of the Philippines: Strategy for Sustainable Aquaculture Development for Poverty Reduction Project

CURRENCY EQUIVALENTS

(as of 15 October 2005)

Currency Unit	–	peso (₱)
₱1.00	=	\$0.01792
\$1.00	=	₱55.81

ABBREVIATIONS

ADB	–	Asian Development Bank
BFAR	–	Bureau of Fisheries and Aquatic Resources
DA	–	Department of Agriculture
FLA	–	fish lease agreement
MTPDP	–	Medium-Term Philippine Development Plan
NGO	–	nongovernment organization
PMU	–	project management unit
TA	–	technical assistance

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	General intervention
Sector	–	Marine and fisheries resources
Subsector	–	Aquaculture
Themes	–	Sustainable economic growth, inclusive social development, and environmental sustainability

NOTES

- (i) In this report, "\$" refers to US dollars.
- (ii) The fiscal year (FY) for the government ends on 31 December.

Vice President	J. Eichenberger, Operations Group 2
Director General	S. Akhtar, Southeast Asia Department
Officer-in-Charge	M.J. Rahman, Agriculture, Environment and Natural Resources Division, Southeast Asia Department
Team leader	M.N. Islam, Environment Specialist, Southeast Asia Department

I. INTRODUCTION

1. The Government of the Philippines has requested the Asian Development Bank (ADB) to provide advisory technical assistance (TA) for formulating a strategy for sustainable aquaculture development for poverty reduction.¹ The Fact-Finding Mission to prepare the TA was intermittently fielded on 22 August–14 September 2005. The Mission reached understanding with the Government on the design of the TA including the impact and outcome, methodology and key activities, cost estimates and financing, and implementation arrangements. The TA design and monitoring framework is in Appendix 1. The TA is included in ADB's *Country Strategy and Program (2005–2007): Philippines*.

II. ISSUES

2. The Philippines ranks among the top 15 fish-producing countries in the world. In 2004, total fisheries production in the Philippines was 3.9 million metric tons of fish, crustaceans, mollusks, and seaweeds. The Philippines is the second biggest producer of seaweeds, contributing 0.7 million tons or 6.6% of the world production of 10.5 million tons. In 2002, the fisheries industry contributed 2.2% of the gross domestic product in current prices.

3. The fisheries industry employs around 1 million people or 5% of the country's labor force. Around 26% of these people are engaged in aquaculture,² 68% in municipal and small-scale fisheries, and 6% in commercial fisheries. Of the total fisheries production in 2003, aquaculture contributed the highest share of 40.2% followed by commercial and municipal fisheries at 30.7% and 29.1%, respectively. Total fishery production increased at an average annual rate of 2.5% between 1990 and 2002. Most of the increase was due to large increases in aquaculture production (more than 6% annual production increase over this period). There have been modest increases in commercial capture fisheries (2.5% per year increase over the period). Overall fishery sector growth in 2003 was 7.4% compared with 6.5% in 2002, showing substantially higher growth rates than the Medium-Term Philippine Development Plan (MTPDP, 2001–2004) targets of 4.8% and 3.2%, respectively.

4. Aquaculture has a long history in the Philippines, starting with the traditional, low-density culture of milkfish in ponds and evolving into more sophisticated technology-based systems for the culture of various species of fish, shrimps, mollusks, and seaweeds. In terms of commodities, seaweeds contributed 68% to aquaculture production in 2003 (by raw weight), followed by milkfish (17%), tilapia (9%), and tiger shrimp (2.4%). Aquaculture involves fish pens, cages, and ponds in fresh and marine waters and the mariculture of oysters, mussels, and seaweeds. At present aquaculture fish production comes primarily from brackish water fishponds estimated at 239,323 hectares (ha) and freshwater fishponds (14,531 ha).

5. The aquaculture subsector has been identified in the Government's current MTPDP (2004–2010) as a sector whose increased growth will create jobs and ensure food security in support of the country's drive toward economic development. Such growth may be attained by increasing production intensity, diversifying existing commodities and fishery farms, or expanding fisheries production in inland waters. With the current focus on conservation and sustainable management of marine resources, it is possible that the contribution of the

¹ The TA first appeared in *ADB Business Opportunities* (internet edition) on 24 October 2005.

² Aquaculture is the culture of various species of fish, shrimps, mollusks, oysters, mussels, and seaweeds in both fresh and marine waters.

municipal and commercial sectors to total fish production will decline in the coming years, leaving aquaculture as the subsector to absorb the country's ever growing demand for fish and making it potentially a significant contributor to the country's food security and poverty reduction agenda.

6. In recent years, small-scale aquaculture has been introduced in many parts of the country and has made important contributions to income generation and employment of the rural poor. The family income and expenditure survey of the National Statistics Office in 2000 found the highest incidence of poverty (62%) among the agriculture, fishing, and forestry sectors. The income-generating potential created by the growing domestic demand and expanding international market for fish promises opportunities for reducing rural poverty. Since aquaculture requires only modest investments in physical and human capital, it has greater potential to raise the income of the poor compared with other agricultural activities. Aquaculture opens up new avenues for employment in the rural areas by increasing the opportunity for self-employment or working as hired labor in aquaculture farms. In line with the present development strategy of the Government, which focuses on the country's rural poor, aquaculture can be seen as a potential engine for rural economic growth and poverty reduction.

7. Small-scale aquaculture is already enhancing incomes and generating livelihood for coastal and inland fisherfolk communities. However, the full development of aquaculture has been constrained by a variety of technical, institutional, and financial problems. More specifically, aquaculture is faced with the following key constraints: (i) limited access of fish farmers to high-yielding environment-friendly aquaculture technologies; (ii) inadequate research and protocol development for breeding high value species; (iii) inadequate processing facilities for producing value-added products for the export market; (iv) lack of private sector participation in various stages of aquaculture production, trade, and marketing; (v) inadequate regulatory framework including land and water use; (vi) slow market development including infrastructure and market information support, trade and commercialization; and (vii) non-implementation of international accreditation systems (e.g., European Union and Hazard Analysis Critical Control Point).

8. ADB has been a major provider of technical and financial assistance to the Philippines fisheries sector. Other important sources of external assistance are the World Bank and the Japan Bank for International Cooperation. ADB has provided nine loans for \$169.5 million for six projects. ADB has also provided 10 project preparatory and advisory technical assistance for \$3.8 million to the sector. Out of the four projects approved and implemented during 1971–1989, two were for capture fisheries and fisheries infrastructure development, and two were for aquaculture development. The first aquaculture project³ was rated as unsuccessful and the second⁴ was rated as generally successful. Since 1989, ADB support to the sector, through the Fisheries Sector Program⁵ and Fisheries Resource Management Project⁶, emphasized on rationalization of sector policies and sustainable management and conservation of fisheries and marine resources. The Fisheries Sector Program was assessed as partly successful and the nearly completed Fisheries Resource Management Project is expected to be successful in

³ ADB. 1978. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of the Philippines for the Laguna de Bay Fish Pen Development Project*. Manila

⁴ ADB. 1983. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of the Philippines for the Aquaculture Development Project*. Manila.

⁵ ADB. 1989. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of the Philippines for the Fisheries Sector Program*. Manila.

⁶ ADB. 1997. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Republic of the Philippines for the Fisheries Resource Management Project*. Manila.

meeting its objectives. The lessons learned from the past program and projects highlight the importance of private sector participation in aquaculture, access to credit facilities, and consideration of natural disasters and environmental concerns in aquaculture system design.

9. The current Government policy on fisheries resource management and conservation has necessitated generation of alternative livelihoods for fisherfolk who are being withdrawn from capture fisheries. Aquaculture has been identified as an alternative livelihood with vast potentials for improving the welfare of fisherfolk. However, a coherent, integrated national strategic framework for the subsector is needed to address the sectoral constraints. The TA will develop an integrated, strategic road map for the aquaculture subsector, within which the Government, ADB, and the other stakeholders will be able to consider future support. The TA will prepare a subsector strategy study, taking a holistic view of opportunities and constraints, lessons learned from past programs, and balancing the need for increased production with environmental protection over the long term. The TA is in line with the general Government and ADB goals of poverty reduction and sustainable development while protecting the environment.

10. The TA will contribute results and recommendations to ADB's marine and fisheries resources management strategy and future project interventions in the Philippines. The TA will also help achieve Millennium Development Goal 1 (eradication of extreme poverty and hunger) and Millennium Development Goal 7 (ensure environmental sustainability).

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

11. The TA will help formulate and disseminate a medium- to long-term aquaculture subsector strategy and integrated action plan with a forward investment program that will reduce poverty and enhance the sustainability of the subsector. The outcomes will include rationalization of subsector policies, institutional arrangements, and planned interventions for expansion of aquaculture production and productivity that will particularly benefit the poor.

B. Methodology and Key Activities

12. The range of subsector opportunities to be tapped and constraints to be overcome require both sectorwide and subsector-specific approaches, coupled with subsector- and area-specific strategies and interventions to be implemented over the medium to long term. Policies and strategies will be based on an in-depth study and evaluation of present conditions and projected changes in the regional, national, and international settings. TA will involve surveys to gather pertinent information in support of strategy formulation, and workshops for consultation with stakeholders. The TA will cover these main areas: (i) a subsector overview; (ii) subsector policies and institutions; (iii) aquaculture subsector production, utilization, and management; (iv) aquaculture support infrastructure facilities and services, including research, training and extension, credit, trade and marketing; (v) environment, workers and consumers health and safety, and fish health management; and (vi) social development and economics. For key activities, the TA will (i) analyze existing policies and institutional arrangements and identify required changes for subsector development; (ii) review technical issues relevant to aquaculture development and management, and formulate a strategy and innovative measures to effectively address the issues; (iii) review existing and potential environmental problems in the subsector and recommend technical, legal, and institutional measures to mitigate such problems; (iv) assess the adequacy and effectiveness of the aquaculture support services and credit facilities

and recommend improvement of those services and facilities with private sector participation and investments; and (v) formulate a medium- to long-term aquaculture development strategy and integrated action plan with a forward investment program that would foster private sector participation and benefit the poor and the environment. In formulating the strategy, the TA will take into account the findings of relevant government and ADB studies including ADB's special evaluation study of rural aquaculture development for poverty reduction,⁷ and project completion reports and project performance audit reports on fisheries and aquaculture sector projects in the Philippines and other countries in the region.

C. Cost and Financing

13. The total cost of the TA is estimated to be \$860,000 equivalent comprising \$335,000 in foreign exchange and \$525,000 equivalent in local currency. The Government has requested ADB to finance \$600,000 equivalent, covering the entire foreign exchange cost and \$265,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. The Government will finance the balance of the local currency cost equivalent of \$260,000, by providing local travel expense, and office accommodation and counterpart staff. Details are in Appendix 2.

D. Implementation Arrangements

14. The Department of Agriculture (DA) will be the Executive Agency and will be responsible for overall TA administration and implementation. DA will implement the TA through its Bureau of Fisheries and Aquatic Resources (BFAR). BFAR will form a project management unit (PMU) headed by the BFAR director as overall project manager. The manager will be assisted by two assistant project managers for administrative and technical areas and will have adequate counterpart staff that will include the Technical Management Group, for day-to-day coordination and implementation of the TA. The PMU responsibilities will include providing feedback to the consultants and reporting to ADB. Interagency coordination will be ensured by an interagency steering committee, which will be chaired by the BFAR director and will meet regularly to review TA progress, identify issues, take remedial actions, and provide appropriate feedback to both the consultants and ADB. The representation of the committee may comprise of national Government agencies (National Economic and Development Authority, DA, Department of Finance, Department of Environment and Natural Resources, Department of Budget and Management), the private sector, academic and research institutions, non-government organizations (NGOs), and community-based organizations.

15. The TA will be implemented over approximately 8 months from March 2006 to November 2006. A participatory process approach will be followed, involving extensive consultation with a wide range of stakeholders at the national, regional, and local levels, particularly the local governments, private sector, NGOs, and members of the fishing community, and other official development partners, to ensure that their views and inputs are considered in formulating the aquaculture subsector strategy. Consultation will be achieved through a series of national and regional workshops at inception, midterm, and final stage of the TA. International institutions and official development partners active in the sector will be invited to participate in formulating the strategy.

⁷ ADB. 2004. *Special Evaluation Study on Small-Scale Freshwater Rural Aquaculture Development for Poverty Reduction*. Manila.

16. A multidisciplinary team of international (approximately 13 person-months) and domestic consultants (approximately 34 person-months) will be engaged by ADB to assist DA in the aquaculture development strategy study. The international consultants will have expertise in aquaculture and fisheries policies and institutions, aquaculture (marine, brackish water, and freshwater), and environment and fish health management. The domestic consultants will have expertise in fisheries policy and institution, aquaculture product processing, aquaculture trade and marketing, marine and brackish water aquaculture, freshwater aquaculture, environment/fish health management, community development, credit, economics and finance, and legal issues. The outline terms of reference are attached in Appendix 3. The team of consultants will be selected and engaged by ADB through a firm in accordance with ADB's *Guidelines on the Use of Consultants*. Considering the nature of the technical assistance, the shortlisted firms will be required to submit full technical proposals incorporating approaches and methodologies they consider best for conducting the TA and achieving its objectives. Quality of the proposals will be of prime consideration and, as such, the quality-based selection procedure be used in selecting the consulting firm. Services and equipment will be procured in accordance with ADB's *Guidelines for Procurement*. ADB will be responsible for procurement with DA's assistance. DA will provide office space for the consultants.

17. The TA milestones include (i) preparation of a detailed work program, (ii) sector review and field surveys, (iii) data analysis, (iv) stakeholder consultations, and (v) formulation of the sector strategy. The consultants will prepare the following reports: (i) inception report within 3 weeks of commencing services; (ii) interim report at the end of the third month, giving a detailed assessment of subsector needs and broad development strategies; (iii) draft final report at the end of the seventh month; and (iv) final report within 3 weeks from receipt of comments on the draft final report.

IV. THE PRESIDENT'S DECISION

18. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$600,000 on a grant basis to the Government of the Philippines for the Strategy for Sustainable Aquaculture Development for Poverty Reduction Project, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>Impact Sustainable development and management of Philippines aquaculture subsector.</p>	<p>Government interventions and investments consistent with the directions laid out in the Strategy Study for Sustainable Aquaculture Development for Poverty Reduction, produced under the TA</p> <p>Increased aquaculture subsector production and productivity</p> <p>Increased participation of fisherfolk in aquaculture subsector</p>	<p>Examination of annual planning documents of BFAR, DOF, and NEDA</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • The conclusions of the strategy study are consistent with government goals, objectives, and targets. • Subsequent administrations continue to support emphasis on the aquaculture subsector. <p>Risk</p> <ul style="list-style-type: none"> • Key government decision makers do not provide required support to the recommendations of the strategic plan and investment program laid out in the study.
<p>Outcome Formulation of interventions and investments in the sustainable development and management of Philippines aquaculture subsector for poverty reduction, food production, economic development, and environmental protection</p>	<p>A comprehensive and systematic sustainable aquaculture strategy and investment program formulated and agreed to by the Government, consistent with the findings of the report (May 2007)</p>	<p>A comprehensive and systematic sustainable aquaculture strategy study and investment program report</p>	<p>Assumptions</p> <ul style="list-style-type: none"> • The results of the strategy study and the investment program are accepted within the government and ADB. • Controversial issues are resolved through public consultations.
<p>Outputs 1. Aquaculture subsector strategy paper produced</p> <p>2. Public hearings and consultations on the</p>	<p>Subsector strategy clearly laid out with a review of subsector status, institutions, development opportunities, and constraints. Strategy also identifies and provides aquaculture investment areas in medium to long term (November 2006)</p> <p>National, regional and local workshop feedback</p>	<p>Final TA report acceptable to ADB and government</p> <p>Proceedings of workshops and</p>	<p>Assumption</p> <ul style="list-style-type: none"> • Counterpart staff provide adequate support and supervision. <p>Risk</p> <ul style="list-style-type: none"> • Revisions for adequate quality

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>strategy paper</p> <p>3. TA reports and documents</p>	<p>and conclusions are reflected in the final strategy paper (By October 2006)</p> <p>Briefings for BFAR, DA, NEDA , DOF, and other concerned agencies (By October 2006)</p> <p>Briefings for legislators (By October 2006)</p> <p>Timely submission of reports and documents</p>	<p>consultations</p> <p>Administrative records</p>	
<p>Activities with Milestones</p> <p>1.1 Review the present status, issues, and development potential of Philippines aquaculture subsector (March–June 2006)</p> <p>1.2 Review subsector policies, institutions, and other factors and their relevance to subsector development (March–June 2006)</p> <p>1.3 Articulate a vision, objectives, and targets for Philippines aquaculture development through government and stakeholder consultation (March–June 2006)</p> <p>1.4 On a pilot scale, assess fishponds under the fish lease agreements in selected BFAR regions (March–June 2006)</p> <p>1.5 Identify gaps between current situation and the articulated vision, objectives, and targets for aquaculture subsector development in the Philippines (July 2006)</p> <p>1.6 Formulate a policy framework and a medium- to long-term strategy for sustainable development and management of the subsector, including identification of investment constraints and opportunities in the subsector (August–October 2006)</p> <p>1.7 Develop integrated action plan to implement the strategy by identifying and prioritizing a medium- to long-term investment program that will integrate national economic and social objectives as well as technical, institutional, economic, and financial considerations and the environmental issues (August–October 2006)</p> <p>1.8 Make an analysis to show that the investment program will meet the articulated vision, objectives, and targets (August–October 2006)</p> <p>1.9 Formulate programs and projects to be included in the pipeline for government and ADB assistance with the required analysis to show that it will meet the articulated vision, objectives, and targets (August–October 2006)</p> <p>2.1 Organize and conduct a series of public consultations to obtain stakeholder inputs on the sector strategy and investment program (spread throughout March–October 2006)</p> <p>3.1. Prepare TA reports: (i) an inception report; (ii) a midterm report; (iii) a draft final report; (iv) a final report incorporating the comments of the Government and ADB; (v) documentation of various workshops, consultations, surveys, and data collected as part of the TA.</p>			<p>Inputs</p> <p>Consulting services (fielding of international and domestic consultants)</p> <p>Counterpart involvement (active involvement of BFAR, DA, and TA steering committee)</p> <p>Beneficiary participation (stakeholder participation at national, regional, and local levels)</p> <p>TA financing by ADB and government: \$860,000 equivalent in foreign and local currencies. Counterpart funds available as part of local currency cost.</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
(inception report: due 3 weeks from TA inception; midterm report: due at the end of month 3; draft final report: due at end of month 7; final report: due 3 weeks after receipt of comments on draft final report)			

ADB = Asian Development Bank, BFAR = Bureau of Fisheries and Aquatic Resources, DA = Department of Agriculture, DOF = Department of Finance, NEDA = National Economic and Development Authority, TA = technical assistance.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing (ADB)^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	260.0	0.0	260.0
ii. Domestic Consultants	0.0	150.0	150.0
b. International and Local Travel	30.0	12.0	42.0
c. Reports and Communications	0.0	5.0	5.0
2. Equipment ^b	8.0	0.0	8.0
3. Training, Seminars, and Workshops ^c	0.0	30.0	30.0
4. Surveys ^d	0.0	38.0	38.0
5. Miscellaneous Administration and Support Costs	0.0	5.0	5.0
6. Contingencies	37.0	25.0	62.0
Subtotal (A)	335.0	265.0	600.0
B. Government Financing			
1. Office Accommodation and Transport ^e	0.0	130.0	130.0
2. Remuneration and Per Diem of Counterpart Staff ^e	0.0	78.0	78.0
3. Others ^e	0.0	52.0	52.0
Subtotal (B)	0.0	260.0	260.0
Total	335.0	525.0	860.0

^a Financed by the ADB's technical assistance funding program.

^b Includes one set of computer, printer, photocopier, and associated software.

^c As needed for formulating the strategy study.

^d As needed for formulating the strategy study and will include pilot-scale assessment of fishponds under the fish lease agreements in selected Bureau of Fisheries and Aquatic Resources (BFAR) regions.

^e BFAR/Department of Agriculture assurance of a formal budgetary breakdown for the cost estimates from the regular operational funds of BFAR as the Government contribution for this technical assistance is attached to the memorandum of understanding.

Source: ADB estimates.

OUTLINE TERMS OF REFERENCE

A. Scope of Work

1. **Aquaculture and Fisheries Policy and Institution Specialist and Team Leader** (international, 6 person-months)

1. The specialist will (i) work closely with the team to review the Government's policy, plans, and legal framework on fisheries and aquaculture development and management, review the policy on institutional credit for smallholder aquaculture development, identify specific targeted policies for the poor and strategies for aquaculture development to reduce poverty, use said policies to guide the preparation of a subsector strategy and action program, and recommend, if necessary, required changes; (ii) evaluate institutional capacities and linkages of agencies with mandates for aquaculture development—national and local agencies, regional fisheries offices, rural communities, private institutions and/or sector, women's organizations, nongovernment organizations (NGOs), and, most importantly, local government units in the light of the decentralization strategies of the government; (iii) together with the team specialists, evaluate past efforts in institutional capacity building and use the data as basis for enhancing existing capacity-building programs to improve national coordination systems, enforcement programs, extension services, research networks, and information systems for aquaculture development and management; focus on improving the capacity of institutions to develop and implement strategies targeting poor people and upgrading the quality of aquaculture products based on national and internationally recognized accreditation schemes; (iv) identify any data gaps; and (v) draw up a work plan to enable the government to comply with relevant international protocols such as sustainable aquaculture guidelines and environmental standards, and determine appropriate administrative and implementation arrangements in support of such instruments.

2. As team leader, the specialist will (i) prepare the detailed work program and implementation schedule for the technical assistance (TA), and coordinate the work of the team of consultants; (ii) guide the team in conducting participatory rapid appraisals and stakeholder workshops, ensuring the full participation of the private sector, NGOs, women's organizations, and communities; (iii) prepare various reports, including a comprehensive assessment of the status, problems, and opportunities in aquaculture development in the country, and consolidate the various investment components; and (iv) work with the team to prepare the strategy study report and action plan for implementing the strategy, which will include a prioritized and sequential investment program in the medium to long term. The team leader will ensure that a holistic approach is used in developing the strategy study; comparative advantages are tapped; and national, social, economic, and environmental objectives are followed. Also, all types of inland and coastal aquaculture systems and species should be considered.

2. **Aquaculture Specialist (Marine, Brackish Water, and Freshwater)** (international, 4 person-months)

3. The specialist will (i) review and verify all aquaculture development and management issues; (ii) analyze the status and problems of the cage and pen culture in inland and coastal open water areas for all types of species and seaweed culture in the marine areas; (iii) assess current technologies for inputs, seed production, and hatchery management, and, in coordination with the international institutional specialist, design a system for implementing a national aquaculture system of inputs, production, and outputs; in coordination with the economist, evaluate the economic viability and social impact of existing and proposed

aquaculture operations, with emphasis on poor communities; (iv) prepare site selection criteria and technical guidelines, considering such factors as availability of culture technologies and fish and aquatic species, environmental and resource conditions, local initiatives, socioeconomic conditions of the community, institutional preparedness, availability of postproduction and marketing infrastructure, and compatibility with local government development plans; (v) identify any data gaps (which will include guiding pilot scale assessment of fishponds under the fish lease agreements [FLAs] in selected Bureau of Fisheries and Aquatic Resources [BFAR] regions); (vi) give recommendations to promote and implement a pragmatic program that meets national, sector, and subsector objectives and targets; and (vii) develop a framework for potential project interventions and design aquaculture development and management components, including a methodology for preparing project proposals.

3. Environment and Fish Health Management Specialist (international, 3 person-months)

4. The specialist will (i) conduct a comprehensive review and assessment of environment-related problems in the aquaculture subsector—in particular, operation and maintenance, oil spill, pollution and erosion, sand mining, resource degradation, fish disease and health management, fish kills, monitoring protocols, environmental accreditation requirements—and identify specific issues that need to be addressed; (ii) evaluate possible adverse impacts of a variety of aquaculture projects; and (iii) develop a strategy and innovative measures to effectively address these environmental problems and recommend environment-friendly policies, guidelines, and interventions that are cost-effective and economically viable; (iv) identify any data gaps; and (v) work with other specialists on the team to recommend changes in policy, procedures, institutions, and implementation mechanisms to effectively implement the proposed environment and fish health management strategies, policies, guidelines, protocols, and accreditation requirements.

4. Policy and Institution Specialist (domestic, 4 person-months)

5. The specialist will (i) assist the international policy and institutional specialist in reviewing the policy and institutional framework for aquaculture development by compiling and analyzing relevant policies and studies; conducting dialogues, interviews, and focus group discussions with national and local government officials and staff on relevant policies and institutional reforms to support smallholders aquaculture development; (ii) assess the current capacity of BFAR relative to its mandates, and recommend an appropriate capacity-building program; (iii) identify any data gaps; and (iv) assist the international policy and institutional specialist in designing and conducting participatory workshops, identify aquaculture development policies and strategies for poverty reduction, and prepare recommendations to enhance the national aquaculture development framework.

5. Aquaculture Product Processing Specialist (domestic, 4 person-months)

6. The specialist will (i) examine existing processing operations, technology, and quality control measures and regulations and identify processing and market issues; (ii) assess existing support infrastructure facilities and services, including ice plants, cold storage facilities, canning and other processing facilities, and their capacity and utilization as well as need for future expansion; (iii) identify market opportunities, both local and international, and assess the quality and specific species of marine and aquatic products in demand in regional and international markets; identify key postharvest issues including technology, facilities, and infrastructure that act as constraints to the diversification of markets or product development for new species; and

recommend appropriate measures to address identified constraints; (iv) prepare a strategy with innovative measures to develop aquaculture product processing and marketing systems, and identify investment opportunities and their funding requirements; (v) identify any data gaps; (vi) assess international accreditation programs for product processing and develop strategies to comply with those requirements; and (vii) make recommendations to promote and implement a pragmatic program that meets national, sector, and subsector objectives and targets.

6. Aquaculture Trade and Marketing Specialist (domestic, 4 person-months)

7. The specialist will (i) conduct market surveys and identify both local and international market opportunities for fish and other aquatic species; (ii) identify products and value-added processing that can involve poor communities, especially women; (iii) review and summarize key international and national regulations governing the marketing and trade of fish and fish products; (iv) identify key postharvest issues constraining the diversification of markets or product development for fish and other aquatic species covered by selected project interventions; (v) analyze supply and demand to assess transaction costs; (vi) prepare a program to help BFAR and provincial fisheries service offices establish a sustainable market information system that can efficiently distribute market information to fish producers, particularly small-scale producers; (vii) develop strategies for complying with international accreditation programs that will enhance the international marketability of aquaculture products; (viii) assess the role of the government and the private sector in trade and marketing in the subsector and recommend strategies for improving private sector participation; (ix) identify any data gaps; and (x) develop a strategy and investment program to enhance trade and marketability of aquaculture products in line with subsector growth objectives and targets.

7. Aquaculture Specialist (Marine and Brackish Water) (domestic, 4 person-months)

8. The specialist will (i) review the status of marine and brackish water aquaculture in the Philippines, highlighting sector development, research activities, and bilateral interventions; (ii) identify key strategies and technologies for subsector development interventions, including geographic scope and impact; (iii) provide sufficient data for evaluating the economic viability and social impact of each strategy and develop a framework for project interventions; (iv) assess the capacity and standards of public and private seed production facilities, and identify project interventions that will improve the production and distribution efficiency of seeds for marine and brackish water aquaculture; (v) recommend priority fish species and farming systems to promote and support smallholder aquaculture development; (vi) assist in determining which interventions will have maximum impact on poverty reduction; (vii) identify any data gaps (which will include pilot scale assessment of fishponds under FLAs in selected BFAR regions); and (viii) make recommendations to promote and implement a pragmatic program that meets national, sector, and subsector objectives and targets.

8. Aquaculture Specialist (Freshwater) (domestic, 4 person-months)

9. The specialist will (i) review the status of freshwater aquaculture in the Philippines, highlighting sector development, research activities, and bilateral interventions; (ii) identify key strategies and technologies for development interventions, including geographic scope and impact; (iii) provide sufficient data for evaluating the economic viability and social impact of each strategy and develop a framework for project interventions; (iv) assess the capacity and standards of public and private seed production facilities, and identify project interventions that will improve the production and distribution efficiency of seeds for freshwater aquaculture; (v)

recommend priority fish species and farming systems to promote under the proposed project to support smallholder aquaculture development; (vi) assist in determining which interventions will have maximum impact on poverty reduction; (vii) identify any data gaps (which will include pilot-scale assessment of fishponds under the FLAs in selected BFAR regions); and (viii) make recommendations to promote and implement a pragmatic program that meets national, sector, and subsector objectives and targets.

9. Environment and Fish Health Management Specialist (domestic, 4 person-months)

10. The specialist will (i) conduct a comprehensive review and assessment of environment and fish health-related problems in the inland and marine aquaculture sector; (ii) evaluate possible adverse impacts of proposed investment projects, particularly those requiring physical development, and prepare guidelines to mitigate potential adverse impacts; (iii) identify any data gaps; and (iv) develop strategy and innovative measures to effectively address these environmental problems and recommend cost-effective and environment-friendly interventions. The specialist will review available data and technical information—environmental risks and hazards—on existing aquaculture systems, assess technical capacity and infrastructure viability and develop cost-effective and technically and economically viable environmental and fish health management strategy, action program, and guidelines.

10. Community Development Specialist (domestic, 4 person-months)

11. The specialist will (i) use rapid appraisal methodologies and available socioeconomic data to prepare a socioeconomic and gender-specific profile of the targeted population; (ii) prepare a poverty analysis and design poverty intervention approaches consistent with the objectives of the Asian Development Bank (ADB) poverty reduction strategies and the ADB-Philippines Poverty Partnership Agreement; (iii) examine income and consumption patterns and/or accessible human development indicators of the target communities; (iv) assess the likelihood of social conflicts—impacts on indigenous communities and involuntary resettlement issues—arising from potential interventions; suggest mechanisms to ameliorate the conflicts and prepare the requisite indigenous people's development plan and resettlement plan; (v) identify any data gaps; and (vi) recommend a poverty intervention approach including appropriate implementation arrangements. Data and analysis presented should allow determination of the distribution of benefits among the target population and targeted poor, consistent with the guidelines in ADB's *Handbook for Integrating Poverty Impact Assessment in the Economic Analysis of the Projects* (2001) and *Handbook on Poverty and Social Analysis* (2001).

11. Credit, Economics and Finance Specialist (domestic, 4 person-months)

12. The specialist will (i) review existing channels of credit to aquaculture and identify any subsector or geographic constraints or gaps in credit availability to various groups in the subsector; (ii) assess the credit requirement of the subsector and the willingness to borrow and repayment capacity of various groups in the subsector; (iii) identify any data gaps; (iv) assess the role of the government and the private sector and make recommendations to enhance private sector participation; (v) make a fiduciary assessment that includes the financial management capacity of key sector institutions, auditing and accounting arrangements, procurement practices, budget preparation and management, and debt service capacity; and (vi) propose appropriate strategies and interventions to improve the creditworthiness of both inland and coastal aquaculture communities and increase access to credit for different groups.

12. Fisheries Legal Specialist (domestic, 2 person-months)

13. The specialist will review and assess (i) major legislation covering the marine and fisheries sector, as well as coastal resource laws, international treaties, national Marine Affairs Law, planning and zoning laws as they apply to fisheries resource use and the aquaculture subsector, and the amended Fisheries Law as it applies to aquaculture; (ii) relevant laws to determine the implication of decentralizing resource management and finance of regions; and (iii) legal impediments to enforcement of laws. The specialist will also (i) identify weaknesses in existing major pieces of legislation and propose appropriate amendments to such laws; identify weaknesses in enforcing laws and regulations, and prepare recommendations to address such weaknesses as they relate to sustainable aquaculture development; and (ii) recommend policy, strategy, legal, and law enforcement measures to support sustainable subsector development.

B. Reports and Meetings

14. The consultant team will report their findings and recommendations according to the following schedule: (i) an inception report, within 3 weeks of mobilization; (ii) a midterm report, at the end of the third month of the TA; (iii) a draft final report, at the end of the seventh month of the TA; and (iv) a final report incorporating the comments and suggestions of the Government and ADB on the draft final report, 3 weeks after receipt of said comments.

15. Tripartite review meetings will be held after submission of the inception, midterm, and draft final reports. In addition, the consultants will receive periodic feedback and guidance from the BFAR project management unit, TA steering committee, and ADB. The team will organize workshops with stakeholders to ensure a participatory approach to formulation of the sector strategy.