



PROJECT DOCUMENT

PROPOSED ACTIVITIES FOR THE YEAR 2020

Project ID: 0320200101

Program Category:	ASEAN-SEAFDEC ASSP and FCG Mechanism		
Project Title:	Sustainable Aquaculture through Cost-Effective Culture Systems and Prompt and Effective Aquatic Animal Health Management		
Program Strategy No:	II	Total Period	2020 - 2024
Lead Department:	Aquaculture Department (AQD)	Lead Country:	None
Donor/Sponsor:	Japanese Trust Fund (JTF)	Total Project Budget:	USD 650,000
Project Partner(s):	None	Budget for 2020:	USD 130,000
Lead Technical Officer:	Koh-ichiro Mori, Deputy Chief / AQD	Project Participating Country(ies)	All Members Countries

PART I: PROJECT DESCRIPTION

1. Executive Summary:

This Project is being proposed to:

1) Community-Based Hatchery, Nursery, Grow-out of Giant Freshwater Prawn (GFWP) in Laguna Lake and Tributaries

This activity aims to develop a community-based strategy for mass production of high-value indigenous species such as the giant freshwater prawn post-larvae (PL) for grow-out and explore a strategy for managing enhanced inland fisheries.

2) Promoting Alternative Feeds for Sustainable Production of Freshwater Aquaculture Species

This activity aims to further develop alternative feeds using locally readily available feed ingredients for culturing freshwater species in a small-scale in Southeast Asia.

3) Ecosystem Approach to Responsible/Sustainable Shrimp Farming

This activity aims to identify an aquaculture management plan that can improve shrimp production, and include the development of a recirculating system using earthen ponds. Organisms that can be used in the constructed/ artificial wetlands will be identified.

4) Development of Aquaculture Techniques on New Aquatic Species for Promotion and Creation of Local Aquaculture Industry

This activity aims to develop techniques for promoting and creating local aquaculture industry, i.e. for flathead lobster, breeding, seed production and nursery rearing; for kawakawa and shortfin scad, breeding, seed production and grow-out; for seahorse, technique for distinguishing wild and cultured.

5) Development Diagnosing Procedures Against Emerging Shrimp and Fish Diseases

This activity aims to diagnose unknown mortalities comprehensively, develop diagnosing procedures against emerging shrimp and fish diseases, and develop disinfection procedure for polychaetes.

6) Survey of the Epidemiology, Distribution, Occurrence and Prevalence of EHP

This activity aims to survey for the epidemiological information and elucidate various aspects of *Enterocytozoon hepatopenaei* (EHP) infection.

7) In Vitro and in Hatchery Investigation of Organisms, Chemicals and Methods to Prevent or

Mitigate the Effect of Important Shrimp Diseases

This activity aims to investigate other organisms, chemicals and methods against important shrimp pathogens in the hatchery, in order to come up with recommendations and guidelines to protect or mitigate of the diseases.

8) Application of Integrated Approaches in the Management of Viral Infections and Other Emerging Diseases in Brackish Water Ponds

This activity aims to apply integrated approaches combining elements of vaccination, host inhibition of pathogen multiplication, and other methods that are crucial for optimizing disease control and management procedures against shrimp and fish diseases occurring in brackishwater grow-out ponds.

9) Capacity Enhancement on Sustainable Aquaculture and Aquatic Animal Health Management

This activity aims to conduct training courses on sustainable aquaculture, fish nutrition and feed development, and fish health management, to enable farmers in the region to acquire technology and skills on sustainable aquaculture.

2. Background and Justification:

Global fish production was about 171 million tons in 2016, with aquaculture representing 47 % of the total (FAO 2018). With the capture fishery production relatively static since the late 1980s, aquaculture has been responsible for the continuing impressive growth in the supply of fish for human consumption. Asia has accounted for about 89% of world aquaculture production for over two decades. In 2016, five SEAFDEC Member Countries, which are Indonesia, Viet Nam, Myanmar, Thailand and Philippines, were included in the major aquaculture producers whose production exceeds 500,000 tons.

On the other hand, the growth in aquaculture also brought negative impacts into our region such as; degradation of the culture sites, destruction of sensitive ecosystems, decrease in bio-diversity, spread of diseases, social conflicts, etc. All of them hinders the sustainability of aquatic food production. Majority of the repercussions which affect not only the stability of culture production but also stock levels of wild aquatic species and precluding efforts towards food security and poverty alleviation.

Aquaculture Department (AQD) of the SEAFDEC has acquired useful information and developed skills especially in the fields of feed development, culture technology, community-based management for production, fish health management, development of vaccine treatment, protective measures against existing and emerging diseases, and in the conduct of the training courses for aquaculture under the JTF 6 regional program titled “Promotion of sustainable aquaculture and resource enhancement in Southeast Asia”, 2015 - 2019. Those activities should be further strengthened so that the sustainable utilization and management of aquatic resources will be accomplished in responsible manner in the Southeast Asian region. Sustainable aquaculture through cost-effective culture systems and prompt and effective aquatic animal health management would be the wholesome practices towards these goals.

3. Gender Sensitivity of the Project

The study leaders in this project consisted of five males and 6 females. The study leaders were chosen based on their specialty, were not in an arbitrary manner depending on their gender.

4. Project Goal, Outcome, Outputs, Activities, Indicators and Verification:

4.1 Logical Framework

GOAL (Overall Objectives, Impact)	Indicators	Means of Verification
Attaining Sustainable Aquaculture through Cost-Effective Culture Systems and Prompt and Effective Aquatic Animal Health Management	<ul style="list-style-type: none"> - Developed and updated technologies for sustainable aquaculture - Update developed techniques and information on training course - Spread knowledge and skills with training course and journal 	<ul style="list-style-type: none"> - Number of developed strategies and technologies for sustainable aquaculture - Number of Update developed techniques and information on training course - Number of Spread knowledge and skills with training course and journal
OUTCOME	Indicators	Means of Verification
Dissemination of Aquaculture Strategies and Technologies, and Improvement of Aquaculture Production in Southeast Asia	<ul style="list-style-type: none"> - Technology and knowledge on sustainable aquaculture as references for policy planning and aquaculture management - Improved and newly developed production of aquaculture species with the developed strategies and technologies 	<ul style="list-style-type: none"> - Number of view and download of technological manuals and information for sustainable aquaculture on SEAFDEC/AQD homepage - Efficiency of aquaculture production using the developed strategies and technologies
OUTPUT 1	Indicators	Means of Verification
Development of Strategies and Technologies for Aquaculture Production in Southeast Asia	Strategies and techniques in farm to improve aquaculture production.	<ul style="list-style-type: none"> - Government formulated and implemented enabling policies in support of sustainable aquaculture based on guidelines and technologies - Practical realization of developed methods, strategies and guideline
ACTIVITY 1	Indicators: key inputs (Number to be conducted, Where, Time)	Means of Verification
Activity 1.1: Community-Based Hatchery, Nursery, Grow-out of Giant Freshwater Prawn (GFWP) in Laguna Lake and Tributaries	<ul style="list-style-type: none"> - Completed a socioeconomic baseline survey validated by local stakeholders - Constructed and operationalized a community-based GFWP hatchery and nursery, and established collaboration with grow-out farmers - Generated income from sale of GFWP juveniles from nurseries and market-sized GFWP from grow-out cages - Capacitated fisherfolks in 	<ul style="list-style-type: none"> - Conduct scheduled monitoring of project performance according to proposed activities - Periodic meeting of stakeholders (i.e. fisherfolk organization, local government officers, Laguna Lake Development Authority, DA-BFAR, SEAFDEC/AQD-BFS, and other stakeholders) - Monitor cost, harvest and

	<p>aquaculture livelihoods.</p> <p>One (1) community-based hatchery constructed and operational with 50,000 PL initial production capacity per month in Brgy Pipindan, Binangonan, Rizal in 2021, after baseline survey and training in 2020. Minimum of three (3) grow-out farmers in Laguna Lake tributaries trained and operational per year from 2022-2024</p>	<p>income in community-based hatchery and nursery operations</p> <ul style="list-style-type: none"> - Monitor profitability of grow-out operators. - Monitor availability of GFWP in local and Metro Manila markets
<p>Activity 1.2: Promoting Alternative Feeds for Sustainable Production of Freshwater Aquaculture Species</p>	<ul style="list-style-type: none"> - Production of alternative feeds using agricultural wastes and by-products identified in GOJ-TF6 and evaluation for on-farm trials - Continued development of alternative feeds using other local, readily available ingredients for laboratory and on-farm trials - Adoption of the alternative feeds by small-scale fish farmers - Reduced production costs of small-scale fish farmers using alternative feeds and feeding strategies developed and identified in the study 	<ul style="list-style-type: none"> - Other alternative feed ingredients identified and processed for use in the continued development of alternative feeds - Production parameters (e.g. growth, survival, FCR, yield) monitored - Cost and benefits evaluated
<p>Activity 1.3: Ecosystem Approach to a Responsible/Sustainable Shrimp Farming</p>	<p>Aquaculture management plan for small scale shrimp holders/farmers developed</p>	<p>Increased shrimp production of adaptors</p>
<p>Activity 1.4: Development of Aquaculture Techniques on New Aquatic Species for Promotion and Creation of Local Aquaculture Industry</p>	<p>To develop hatchery and grow-out techniques on the breeding, seed production and nursery rearing of kawakawa (<i>Euthynnus affinis</i>), shortfin scad (round scad, <i>Decapterus macrosoma</i>), flathead lobster (<i>Thenus orientalis</i>) and seahorse (<i>Hippocampus comes</i>)</p>	<p>Established seed production and grow-out techniques for adoption of local aquaculture industry</p>
OUTPUT 2	Indicators	Means of Verification

Development of Procedures in Disease Control and Management against Shrimp and Fish Diseases in Southeast Asia	Procedures in disease control and management against shrimp and fish diseases to improve aquaculture production	<ul style="list-style-type: none"> - Government formulated and implemented enabling policies in support of disease control and management based on developed procedures - Practical realization of developed procedures
ACTIVITY 2	Indicators: key inputs (Number to be conducted, Where, Time)	Means of Verification
Activity 2.1: Development Diagnosing Procedures Against Emerging Shrimp and Fish Diseases	<ul style="list-style-type: none"> - Comprehensive diagnosis on unknown mortalities of crustacean and fish - Development and optimization of conventional PCR protocol and real time PCR for emerging fish and shrimp diseases - Conduct of susceptibility test on polychaetes against WSSV (Artificial Infection, Histopathology, in situ) 	<ul style="list-style-type: none"> - Diagnosed unknown mortalities of crustacean and fish - Optimized diagnostic protocols for emerging fish and shrimp diseases. - Dissemination of the standardized diagnostic protocol through hands-on training; provision positive control - Preparation of disease cards
Activity 2. 2: Survey of the Epidemiology, Distribution, Occurrence and Prevalence of EHP.	<ul style="list-style-type: none"> - Surveillance Survival rate, growth rate of shrimp - Procedures of isolation of viability of spores - Mode of transmission Cohabitation, horizontal and vertical transmission 	<ul style="list-style-type: none"> - Active surveillance reports/database - Guidelines to protect shrimp from EHP
Activity 2.3: In Vitro and in Hatchery Investigation of Organisms, Chemicals and Methods to Prevent or Mitigate the Effect of Important Shrimp Diseases	Recommendations and guidelines on organisms, chemicals and methods that can be used to protect shrimp from and/ or mitigate the effect of WSSV, EMS and other important shrimp diseases	List of organisms, chemicals and methods that will lead to less incidence of shrimp disease outbreak in hatchery tank trials
Activity 2.4: Application of Integrated Approaches in the Management of Viral Infections and Other Emerging Diseases in Brackish Water Ponds	2 tank trials and 3 pond trials to be conducted in SEAFDEC/AQD Tigbauan Main Station and Dumangas Brackishwater Station, January 2020- December 2024	<ul style="list-style-type: none"> - Completed preliminary tank trials - Completed successful ponds trials demonstrating the efficacy of the integrated approaches - Recommended procedures for the management of viral and emerging diseases in

		pond culture
OUTPUT 3	Indicators	Means of Verification
Capacity Enhancement on Sustainable Aquaculture and Aquatic Animal health Management in Southeast Asia	Dissemination of aquaculture strategies and technologies	Carry out training courses on aquaculture
ACTIVITY 3	Indicators: key inputs (Number to be conducted, Where, Time)	Means of Verification
Activity 3.1: Training Course on Sustainable Aquaculture	- Promotion of marine aquaculture technologies in the region - Promotion of freshwater aquaculture technologies in rural communities in the region	- Conduct of training course on marine aquaculture in the region - Conduct of training course on community-based freshwater aquaculture in rural communities to introduce alternative livelihood to small-holder fish farmers
Activity 3.2: Training Course on Fish Nutrition and Feed Development	Skills enhancement and dissemination of improved feed development and management practices to ASEAN Member States	Successfully implemented training course to develop skills, disseminate knowledge and new information in feed formulation and feeding management to SEA participants
Activity 3.3: Training Course on Fish Health Management in Aquaculture	Increased capacity to manage aquatic animal diseases among stakeholders in ASEAN Member States	Successfully implemented training courses to disseminate knowledge, skills, and new approaches in fish health management to SEA participants
OUTPUT 4	Indicators	Means of Verification
Progress management of project	Proper practice of the project	Carry out annual progress meeting and international workshop
ACTIVITY 4	Indicators: key inputs (Number to be conducted, Where, Time)	Means of Verification

Activity 4.1: Annual Progress Meeting	Hold annual meeting organized by SEAFDEC/AQD to review the project achievement.	- Carry out annual progress meeting - Review and evaluate the project achievements
Activity 4.2: International Workshop	Hold the workshop organized by SEAFDEC/AQD to review the project achievement and exchange brand-new information on aquaculture.	- Carry out international workshop - Updated on the issues related to sustainable aquaculture
Activity 4.3: Coordination by the Project Leader	Coordinate and encourage the research, training and dissemination, and also facilitate information exchange	- Contribute to achieve the project's objectives - Control the budget - Review the overall project achievements on the provided meetings.

4.2 Project Implementation Plan for 2020 - 2024

Activities	2020				2021				2022				2023				2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Output 1:																				
Activity 1.1																				
Activity 1.2																				
Activity 1.3																				
Activity 1.4																				
Output 2:																				
Activity 2.1																				
Activity 2.2																				
Activity 2.3																				
Activity 2.4																				
Output 3:																				
Activity 3.1																				
Activity 3.2																				
Activity 3.3																				
Output 4:																				
Activity 4.1																				
Activity 4.2																				
Activity 4.3																				

4.3 Proposed Budget for 2020 - 2024

(Unit: USD)

Output	Activities	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)	Year 4 (2023)	Year5 (2024)
Output 1	Activity 1.1	10,000	10,000	10,000	10,000	9,000

	Activity 1.2	10,000	10,000	10,000	10,000	9,000
	Activity 1.3	10,000	10,000	10,000	10,000	9,000
	Activity 1.4	10,000	10,000	10,000	10,000	9,000
Output 2	Activity 2.1	10,000	10,000	10,000	10,000	9,000
	Activity 2.2	10,000	10,000	10,000	10,000	9,000
	Activity 2.3	10,000	10,000	10,000	10,000	9,000
	Activity 2.4	10,000	10,000	10,000	10,000	9,000
Output 3	Activity 3.1	14,000	14,000	14,000	14,000	12,000
	Activity 3.2	8,000	8,000	8,000	8,000	7,500
	Activity 3.3	8,000	8,000	8,000	8,000	7,500
Output 4	Activity 4.1	6,000	6,000	6,000	6,000	0
	Activity 4.2	0	0	0	0	17,000
	Activity 4.3	14,000	14,000	14,000	14,000	14,000
Sub-Total		130,000	130,000	130,000	130,000	130,000

PART II: PROJECT ACHIEVEMENTS IN 2019

Note: No information in 2019 are available since the new JTF 6-II activities will commence in 2020.

PART III: PROPOSED ACTIVITIES FOR THE YEAR 2020

1. Project Summary in 2020:

In 2020, the following activities will be implemented.

1) In 2020, social preparation methods, including baseline social survey and formulation of local regulations, will be applied to enable the implementation of community-based strategies for mass production of giant freshwater prawn (GFWP) juveniles in hatcheries and nurseries. These seeds will contribute to an increase in supply of seeds required by grow-out farms in Laguna Lake and tributaries. Overall, the activity aims to contribute to food and livelihood security through aquaculture.

2) Alternative feed(s) identified in the JTF 6 will be used in cage trials using advanced-stage tilapia juveniles as well as the seasonal effect on the growth performance and feed efficiency of Nile tilapia using two feeding strategies (daily and skip feeding) will be studied.

3) Organisms that can be used in the constructed/artificial wetlands will be identified. Different organisms will be investigated as to their efficiency to purify pond effluents and ability to grow in a brackish water pond environment. Considering that in the past studies under the JTF project, mangroves have been proven to purify shrimp pond effluents and the use of tilapia greenwater improves shrimp growth and survival. In the project, other organisms that can improve water quality or purify pond effluents will be investigated.

4) Survey and procurement of breeders of new aquatic species kawakawa (*Euthynnus affinis*), shortfin scad (round scad, *Decapterus macrosoma*), Flathead lobster (*Thenus orientalis*) and seahorse

(*Hippocampus comes*) for developing breeding and seed production techniques will be carried out.

5) Comprehensive diagnosis on unknown mortalities and development of detection methods for the emerging diseases will be conducted. Polychaetes are known to be a major food of several penaeid species. However, there are reports that polychaetes can be also a carrier of WSSV. Hence, the susceptibility test will be conducted in order to elucidate the possibility of polychaetes as a carrier of WSSV and also disinfection protocol will be verified.

6) *Enterocytozoon hepatopenaei* (EHP) is the microsporidian parasite that causes *Hepatopancreatic microsporidiosis* (HPM) in shrimp. Given its current status as an emerging disease and potential spread, active surveillance, distribution, occurrence and prevalence of EHP will be studied in the Philippines.

7) The study will investigate chemicals and methods that can be used to prevent the horizontal and vertical transmission of WSSV and other important shrimp diseases. The efficiency of egg disinfection in fertilized eggs will be investigated. Among the disinfectants to be investigated are electrolysis, iodine, formalin and chlorine; to be used singly or in combination. Preliminary experiments on the artificial insemination or fertilization of *P. monodon* will also be done.

8) Simulation tank trials utilizing previously developed protocols that will lead to an optimized disease control and management strategy against shrimp and other emerging diseases in brackishwater ponds will be conducted.

9) Training on sustainable aquaculture, particularly on rural aquaculture program, will be conducted with participants from SEAFDEC member countries as well as training on feed development and fish health management.

2. Outcome, Outputs and Activities and Proposed Budget:

(Unit: USD)

Proposed Activities	Descriptions	Proposed Budget
Outcome	Dissemination of aquaculture strategies and technologies, and improvement of aquaculture production in Southeast Asia	
Output 1:	Development of strategies and technologies for aquaculture production in Southeast Asia	
Activity 1.1	<p>“Community-Based Hatchery, Nursery, Grow-out of Giant Freshwater Prawn (GFWP) in Laguna Lake and Tributaries”</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Personnel services, technical assistant 20%</i> = US\$ 2,800 • <i>Hired labor, field assistants</i> = 1,500 • <i>Research animals, materials, supplies</i> = 900 • <i>Travel DSA, accommodation, vehicle use/hire</i> = 2,000 • <i>Meetings, workshops</i> = 800 • <i>Capital outlay small hatchery</i> = 2,000 	10,000

Activity 1.2	<p>Promoting Alternative Feeds for Sustainable Production of Freshwater Aquaculture Species</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Personnel services, TA and Research Aide 25%</i> = US\$ 2,700 • <i>Office, laboratory supplies, feed ingredients</i> = 2,000 • <i>Laboratory analysis</i> = 3,000 • <i>Travel, meetings and workshops</i> = 1,000 • <i>Laboratory/ research equipment</i> = 1,300 	10,000
Activity 1.3	<p>Investigate organisms that can be used in the constructed/artificial wetlands; assessed based on efficiency in removing nutrients from pond effluent and ability to grow/ survive in pond condition</p> <p><i>Estimated expenditure:</i></p> <ul style="list-style-type: none"> • <i>Collection of organisms for investigation</i> <ul style="list-style-type: none"> <i>Organisms</i> = US\$ 200 <i>Travel Cost</i> = 1,800 • <i>Laboratory analysis</i> = 3,000 • <i>Technical Assistant</i> = 3,500 • <i>Sundries, office/lab supplies</i> = 200 • <i>Pond rehabilitation</i> = 1,300 	10,000
Activity 1.4	<p>Survey, procurement and development of breeding and seed production techniques for new aquatic species for local aquaculture industry</p> <p>Candidate species for seed production studies are kawakawa (<i>Euthynnus affinis</i>), shortfin scad (round scad, <i>Decapterus macrosoma</i>), flathead lobster (<i>Thenus orientalis</i>) and seahorse (<i>Hippocampus comes</i>)</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Traveling cost</i> = US\$ 4,000 • <i>Hatchery operation cost</i> = 3,000 • <i>Labor cost in hatchery</i> = 2,500 • <i>Others (communication etc)</i> = 200 	10,000
Output 2:	Development of procedures in disease control and management against shrimp and fish diseases in Southeast Asia	
Activity 2.1	<p>Development of diagnostic procedures against emerging fish and shrimp diseases.</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Personnel services, technical assistant</i> = US\$ 6,500 • <i>Travel cost</i> = 200 • <i>Communication</i> = 100 (telephone, fax, postage, freight) • <i>Supplies and materials</i> = US\$ 1,200 (consumables, goods, and miscellaneous) • <i>Research expenses</i> = US\$ 2,000 (analysis of samples, broodstock, PLs, chemicals, personnel expenditures and miscellaneous) 	10,000

Activity 2.2	<p><i>Enterocytozoon hepatopenaei</i> (EHP) is a recently emerging shrimp pathogen that causes severe growth retardation in shrimps resulting in a disease condition known as <i>Hepatopancreatic microsporidiosis</i> (HPM). Disease surveillance work on shrimp will be carried out for the occurrence of EHP in Philippines. Shrimp samples will be assessed for the presence of EHP using light and scanning electron microscopy, histology, PCR, in situ hybridization and other molecular diagnostic tools.</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Travel cost</i> = US\$ 1,300 • <i>Daily subsistence allowance</i> = 700 • <i>Accommodation</i> = 1,000 • <i>Communication</i> = 100 • <i>(telephone, fax, postage, freight)</i> • <i>Supplies and materials</i> = 100 • <i>(consumables, goods, and miscellaneous)</i> • <i>Research expenses</i> = 6,800 <p><i>(analysis of samples, broodstock, PLs, chemicals, personnel expenditures and miscellaneous)</i></p>	10,000
Activity 2.3	<p>In Vitro and in Hatchery Investigation of Organisms, Chemicals and Methods to Prevent or Mitigate the Effect of Important Shrimp Diseases</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Electrolytic machine</i> = US\$ 1,200 • <i>Chemicals</i> = 1,200 • <i>Laboratory Analysis</i> = 2,400 • <i>Laboratory supplies</i> = 1,500 • <i>Sundries, office supplies</i> = 200 • <i>Technical Assistant</i> = 3,500 	10,000
Activity 2.4	<p>Application of integrated approaches in the management of viral infections and other emerging diseases in brackish water ponds</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Personnel services, technical assistant 50%</i> = US\$ 2,940 • <i>Research animals, feeds, materials, supplies</i> = 2,600 • <i>Laboratory Analysis</i> = 1,700 • <i>Repair and maintenance of tank facilities</i> = 1,600 • <i>Travel DSA, accommodation, vehicle use/hire</i> = 960 • <i>Sundries, office supplies</i> = 200 	10,000
Output 3:	Capacity enhancement on Sustainable Aquaculture and Aquatic Animal health management in Southeast Asia	
Activity 3.1	<p>Marine and Freshwater aquaculture program</p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Travel, DSA, Accommodation, Training fee</i> = US\$ 5,000 • <i>Honoraria</i> = 2,000 • <i>Supplies and materials</i> = 4,000 • <i>Training equipment</i> = 2,300 • <i>Communication</i> = 100 • <i>Food</i> = 600 	14,000
Activity 3.2	<p><i>Training Course on Fish Nutrition & Feed Management</i></p> <p><i>Estimated expenditures:</i></p> <ul style="list-style-type: none"> • <i>Travel, DSA, Accommodation, Training fee</i> = US\$ 2,500 	8,000

	<ul style="list-style-type: none"> • <i>Honoraria</i> = 1,000 • <i>Supplies and materials</i> = 2,000 • <i>Training equipment</i> = 1,800 • <i>Communication</i> = 100 • <i>Food</i> = 600 	
Activity 3.3	<i>Training Course on Fish Health Management</i> <i>Estimated expenditures:</i> <ul style="list-style-type: none"> • <i>Travel, DSA, Accommodation, Training fee</i> = US\$ 2,500 • <i>Honoraria</i> = 1,000 • <i>Supplies and materials</i> = 2,000 • <i>Training equipment</i> = 1,800 • <i>Communication</i> = 10 • <i>Food</i> = 600 	8,000
Output 4:	Progress management of project	
Activity 4.1	Hold annual meeting at SEAFDEC/AQD <i>Estimated expenditures:</i> <ul style="list-style-type: none"> • <i>Travel, DSA, Accommodation, Training fee</i> = US\$ 4,500 • <i>Communication</i> = 100 • <i>Food</i> = 900 • <i>Supplies and materials</i> = 500 	6,000
Activity 4.2	<i>Not applicable</i>	0
Activity 4.3	Coordinate and encourage the research, training and dissemination, and also facilitate information exchange <i>Estimated expenditures:</i> <ul style="list-style-type: none"> • <i>Personnel services of financial assistant</i> = US\$ 6,000 • <i>Travel cost</i> = 4,000 • <i>Communication</i> = 500 • <i>Equipment</i> = 1,000 • <i>Food</i> = 1,000 • <i>Office Supplies</i> = 1,500 	14,000

3. Implementation Plan of Activities in 2020:

Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Output 1:												
Activity 1.1												
Activity 1.2												
Activity 1.3												
Activity 1.4												
Output 2:												
Activity 2.1												
Activity 2.2												
Activity 2.3												
Activity 2.4												
Output 3:												
Activity 3.1												
Activity 3.2												

Activity 3.3													
Output 4:													
Activity 4.1													
Activity 4.2													
Activity 4.3													

4. Expected Activity Results in 2020:

Planned activity	Expected Activity Results
Activity 1 Development of Strategies and Technologies for Aquaculture Production in Southeast Asia	
Activity 1.1: Community-Based Hatchery, Nursery, Grow-out of Giant Freshwater Prawn (GFWP) in Laguna Lake and Tributaries	<ul style="list-style-type: none"> Completed a socioeconomic baseline survey validated by local stakeholders Established collaboration with fish farmers, local government and related agencies to implement the study Initiated the construction and conducted GFWP trial hatchery and nursery runs
Activity 1.2: Promoting Alternative Feeds for Sustainable Production of Freshwater Aquaculture Species	Alternative feed(s) for advanced stage tilapia fingerlings identified; information on the seasonal growth performance and feed efficiency of Nile tilapia using two feeding strategies known
Activity 1.3: Ecosystem Approach to a Responsible/Sustainable Shrimp Farming	<ul style="list-style-type: none"> Identified list of organisms that can purify pond effluent and therefore be used in a constructed wetland Identified list of organisms that can grow under brackish water pond condition and therefore be used in a constructed wetland
Activity 1.4: Development of Aquaculture Techniques on New Aquatic Species for Promotion and Creation of Local Aquaculture Industry	<ul style="list-style-type: none"> Identified source of breeders of new aquatic species for promotion and creation of local aquaculture industry Reproductive biology established and initial trials on the breeding and seed production conducted
Activity 2 Development of Procedures in Disease Control and Management Against Shrimp and Fish Diseases in Southeast Asia	
Activity 2.1: Development Diagnosing Procedures against Emerging Shrimp and Fish Diseases	<ul style="list-style-type: none"> Diagnosed unknown mortalities Development diagnostic procedures against emerging shrimp and fish diseases

Planned activity	Expected Activity Results
Activity 2.2: Surveillance and Epidemiology of EHP in Philippines	<ul style="list-style-type: none"> • A list of the penaeid species infected with EHP in Philippines will be generated • A list of prevalence and intensity rate of EHP in penaeid shrimps collected in Philippines be identified
Activity 2.3: In Vitro and in Hatchery Investigation of Organisms, Chemicals and Methods to Prevent or Mitigate the Effect of Important Shrimp Diseases	<ul style="list-style-type: none"> • List of chemicals, organisms, and methods that can be used to disinfect fertilized eggs to prevent the vertical transmission of WSSV • Assessed feasibility of artificial insemination/fertilization in <i>P. monodon</i>
Activity 2.4: Application of Integrated Approaches in the Management of Viral Infections and Other Emerging Diseases in Brackish Water Ponds	<ul style="list-style-type: none"> • Completed preliminary tank trials • Assessment of the practicability of the approaches under farm conditions
Activity 3 Capacity Enhancement on Sustainable Aquaculture and Aquatic Animal Health Management	
Activity 3.1: Training Course on Sustainable Aquaculture	<ul style="list-style-type: none"> • Training course to develop skills and disseminate updated information on hatchery of marine finfishes • Training course on community-based freshwater aquaculture successfully conducted with participants equipped with technical knowledge and skills on breeding, propagation and culture of freshwater aquaculture species
Activity 3.2: Training Course on Fish Nutrition and Feed Development	Training Course to develop skills, disseminate knowledge and new information in feed formulation and feeding management to SEA participants successfully conducted
Activity 3.3: Training Course on Fish Health Management in Aquaculture	Completed training course to disseminate knowledge, skills, and new approaches in fish health management to SEA participants
Activity 4 Progress Management of Project	
Activity 4.1: Annual Progress Meeting	<ul style="list-style-type: none"> • Carry out annual progress meeting • Review and evaluate the project achievements

Planned activity	Expected Activity Results
Activity 4.2: International Workshop	Not applicable
Activity 4.2: Coordination by the Project Leader	<ul style="list-style-type: none"> • Contribute to achieve the project's objectives • Control the budget • Review the overall project achievements on the provided meetings.
